

Draft Comprehensive Conservation Plan and Environmental Assessment

Lake Andes National Wildlife Refuge Complex

South Dakota

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Summary



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Pintails wade in waters of the Lake Andes National Wildlife Refuge.

This section summarizes the draft comprehensive conservation plan and environmental assessment for the U.S. Fish and Wildlife Service's Lake Andes National Wildlife Refuge Complex (Complex). The National Wildlife Refuge System Improvement Act of 1997 requires that a comprehensive conservation plan be developed for each unit of the National Wildlife Refuge System by 2012. The final plan for the Complex is scheduled for completion in 2012 and will guide management of the Complex over the next 15 years.

The Complex

Located in southeastern South Dakota, the Lake Andes National Wildlife Refuge Complex consists of three units: the Lake Andes National Wildlife Refuge, Karl E. Mundt National Wildlife Refuge, and the Lake Andes Wetland Management District. The Complex lies within the Plains and Prairie Pothole Region of South Dakota (figure 1), an ecological treasure of biological importance for wildlife, particularly waterfowl and other migratory birds—although the Plains and Prairie Pothole Region occupies only 10 percent of North America's waterfowl breeding range, it produces approximately 50 percent of the continent's waterfowl population.

The Complex manages lands located within Aurora, Bon Homme, Brule, Charles Mix, Clay, Davison, Douglas, Hanson, Hutchinson, Lincoln, Turner, Union, and Yankton Counties in southeastern South Dakota. These lands include a variety of grassland and wetland habitats which are managed with grazing, haying, rest, burning, restoration, tree plantings, invasive plant control, and very limited application of water level manipulation.

Each waterfowl production area managed by the wetland management district typically contains wetlands that are managed for waterfowl and shorebirds. Extensive wetland drainage and alteration throughout the Plains and Prairie Pothole Region has reduced the number of wetlands available to migratory birds to the point that most of the wetlands in the Complex are surrounded by cropland. Upland areas are managed for a high diversity of native vegetation to sustain grassland birds.

The National Wildlife Refuge System

All the units of the Lake Andes National Wildlife Refuge Complex are part of the National Wildlife Refuge

System. This system began when, in 1903, President Theodore Roosevelt designated the 5.5-acre Pelican Island in Florida as the Nation's first wildlife refuge for the protection of native nesting birds. This was the first time the Federal Government set aside land for wildlife. This small but significant designation was the beginning of the National Wildlife Refuge System.

One hundred years later, the National Wildlife Refuge System has become the largest collection of lands in the world specifically managed for wildlife, encompassing more than 150 million acres within 553 refuges and more than 3,000 waterfowl production areas providing breeding and nesting habitat for migratory birds. Today, there is at least one refuge in every State as well as in Puerto Rico and the U.S. Virgin Islands.

The Improvement Act of 1997 established a clear mission for the System.

The mission of the 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.

Planning Issues of the Complex

In May 2007, a notice of intent was published in the Federal Register announcing the Service's intent to prepare a comprehensive conservation plan and environmental assessment for the Complex and to obtain suggestions and information on planning issues to be considered. Throughout the planning process, the planning team distributed information to stakeholders including the State of South Dakota, tribal governments, partners, and neighboring landowners and communities to involve them in this planning process.

Following the analysis of comments from Service staff and the public and a review of applicable laws, the planning team identified several key planning issues. These issues were considered in the development of alternatives (chapter 3) and are summarized below.

LAKE ANDES WATER QUALITY AND FISHERY

Numerous comments were received during scoping asking the planning team to consider restoration of Lake Andes in the comprehensive conservation plan. Over the past 100 years Lake Andes has supported a



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Interpretive signs educate visitors about the Complex.

boom-and-bust fishery that has been successful during wet periods (when fish are abundant) and unsuccessful during dry periods (which fish die out). Over the years several events and processes have affected the fishery as well as the lake's water quality on which numerous plants, fish, and migratory birds depend.

INVASIVE PLANT CONTROL

Invasive plants are degrading the quality of Complex habitats and spreading to neighboring private lands. Comments received during scoping indicated that the Complex's neighbors desire more effective control of invasive and noxious weeds on Complex properties.

MONITORING AND RESEARCH

Only isolated and uncoordinated research and opportunistic monitoring has occurred in the lands administered by the Complex. Additional surveys and research are needed to provide the science-based information necessary to improve management of the Complex.

PRAIRIE RESTORATION

During scoping, many people expressed a desire for more prairie restoration on the Complex. Much of the native prairie that existed in the area before settlement has been lost through cultivation or degraded by invasive plants. Once broken, native prairie is essentially lost; however, restoration of native grasses and forbs can provide habitat that is very valuable to waterfowl and other migratory birds.

PUBLIC ACCESS AND OPPORTUNITIES FOR WILDLIFE-DEPENDENT RECREATION

Much of Lake Andes National Wildlife Refuge and all of Karl E. Mundt National Wildlife Refuge are currently closed to public use. During scoping, a number of people commented that they would like the planning team to explore the possibility of expanding public access opportunities on both of these refuges.

FUNDING, INFRASTRUCTURE, AND PARTNERSHIPS

Funding limits the staffing, the infrastructure, and to a large degree the capability of the Complex staff to conserve wildlife and to provide wildlife-dependent

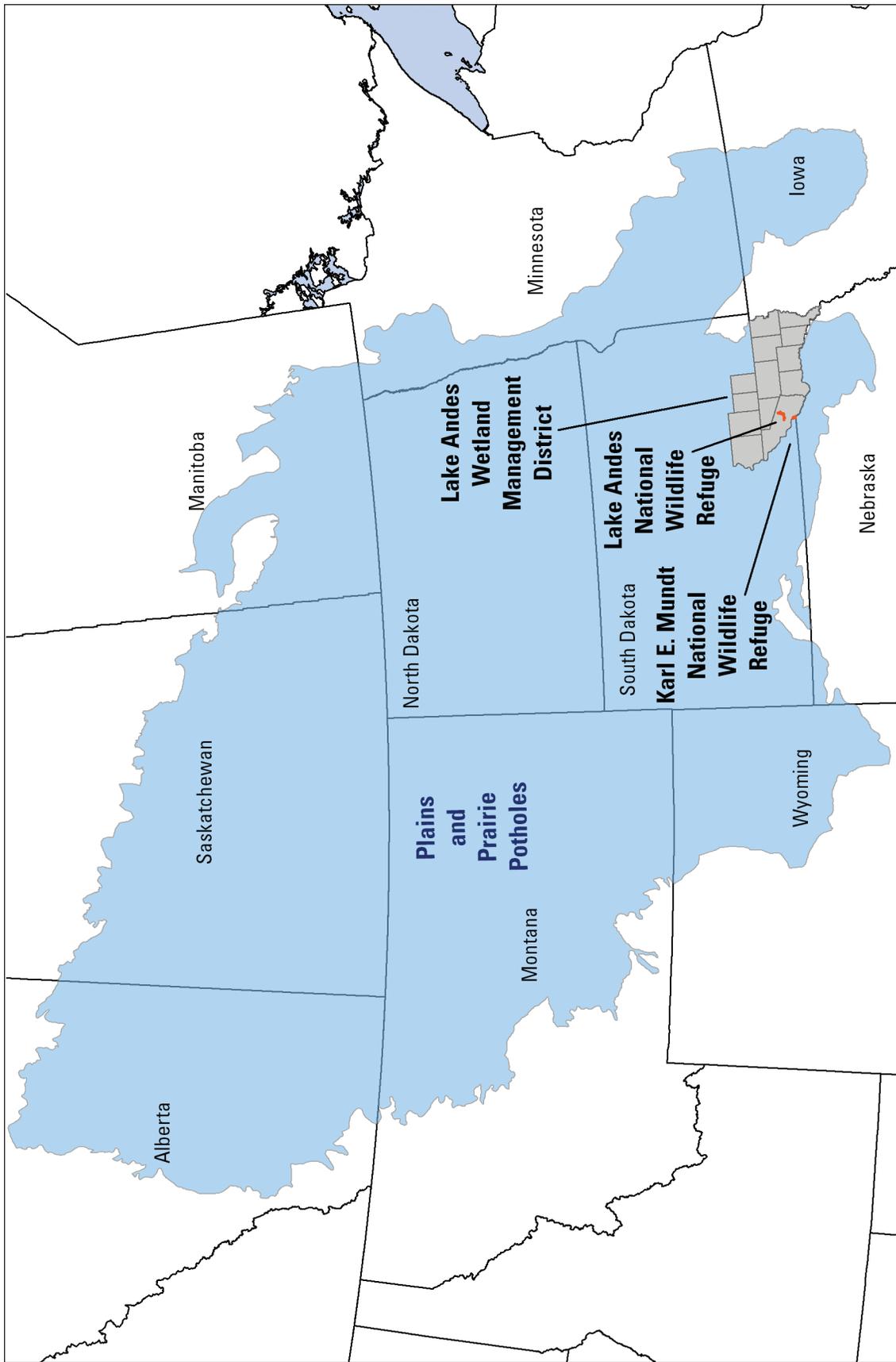


Figure 1. Map of the Plains and Prairie Pothole Region and the Lake Andes National Wildlife Refuge Complex, South Dakota.

recreation. Partnerships are an important way to help expand the staff's capabilities to conserve wildlife and provide more and better recreation opportunities, especially when funding is so limited.

Vision Statements for the Complex

Early in the planning process the planning team developed and refined a vision statement for each unit of the Complex. These future-oriented statements will guide the management of the Complex over the life of this comprehensive conservation plan.

VISION STATEMENT FOR LAKE ANDES NATIONAL WILDLIFE REFUGE

Migratory birds thrive on wetlands and grasslands composed of native plants. Visitors enjoy walking the foot trails, watching and photographing wildlife, and learning about Plains and Prairie Pothole Region habitat. Teachers bring their students to the refuge's outdoor classroom.

VISION STATEMENT FOR KARL E. MUNDT NATIONAL WILDLIFE REFUGE

Soaring bald eagles hunt, roost, and rear their young in this cottonwood forest where Lewis and Clark ventured up the Missouri River. Booming prairie chickens share the Missouri River bluffs with wild turkey, sharp-tailed grouse, quail, and songbirds. Careful observers, floating downstream along the refuge's portion of the Missouri National Recreational River, may notice hunting bobcats, hovering raptors, or flying bats above placidly feeding deer. Wildlife-dependent recreational opportunities on this refuge foster a greater understanding of the refuge's resources and the mission of the National Wildlife Refuge System.

VISION STATEMENT FOR LAKE ANDES WETLAND MANAGEMENT DISTRICT

The waterfowl production areas and conservation easements of the Lake Andes Wetland Management District provide a network of wetland and grassland habitats that preserve the integrity of vital nesting and breeding grounds of North America's migratory waterfowl. This mosaic of diverse and vigorous plant communities, interspersed with wetland complexes, supports a variety of marsh birds, shorebirds, songbirds, and colonial birds, as well as prairie grouse, upland plovers, sand pipers, and other resident wildlife species typical of the Plains and Prairie Pothole Region. District staff, landowners, cooperators, neighbors, and other partners work together to promote habitat conservation programs throughout the district and to control invasive plant species on public lands. Both consumptive and non-consumptive compatible wildlife-dependent recreational uses are allowed on these public lands.

Goals for the Complex

The following goals reflect the visions for the units of the Complex—providing for healthy ecosystems and compatible opportunities for the public to appreciate and enjoy the natural environment.

WETLANDS GOAL

Acquire, restore, manage, and protect wetlands for the conservation of migratory birds and other water-dependent species endemic to the Plains and Prairie Pothole Region.

RIPARIAN GOAL

Acquire, restore, manage, and protect riparian habitats endemic to the lower Missouri River for the conservation of bald eagles, other species of concern, and migratory birds.



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Birdwatchers gather on the Complex.

UPLANDS GOAL

Acquire, restore, manage, and maintain a diverse mix of native grassland habitats to support migratory birds and resident wildlife found in the northern mixed-grass prairie ecosystem.

VISITOR SERVICES GOAL

Provide opportunities for high quality and compatible hunting, fishing, environmental education, environmental interpretation, wildlife photography, and wildlife observation for persons of all abilities and cultural backgrounds by fostering an understanding and appreciation of the Lake Andes National Wildlife Refuge Complex and the missions of the Service and Refuge System.

OPERATIONS GOAL

Provide funding, staffing, infrastructure, protection of cultural resources, partnerships, and a safe working environment to achieve the purposes and objectives of the Lake Andes National Wildlife Refuge Complex.

Management Alternatives

The Service has prepared this draft comprehensive conservation plan and environmental assessment in cooperation with the South Dakota Game, Fish and Parks Department and the Yankton Sioux Tribe and with significant involvement from the public. After reviewing a wide range of public comments and management needs, the Service developed and analyzed the following alternatives for management of the Complex. Alternative B is the proposed action of the Service and is presented in chapter 6 as the draft comprehensive conservation plan.

ALTERNATIVE A—CURRENT MANAGEMENT (NO ACTION)

Under alternative A, current management activities conducted by the Service throughout the Complex would not change. The Service would not develop any new management, restoration, or education programs for the Complex. Staff would not modify or expand current habitat and wildlife management practices conducted for the benefit of migratory birds and other wildlife. Staff would perform monitoring and research activities at current levels. Funding and staff levels would not change. Programs would continue in the same direction with the same intensity.

ALTERNATIVE B—MODIFIED MANAGEMENT

This alternative focuses on addressing many of the external and internal comments received during scoping. Under this alternative, there would be increased efforts to restore fish and wildlife habitat on Lake Andes; more effective control of invasive plants; more focused monitoring, studies, and research activities; more restoration of native plants in grasslands; expanded opportunities for hunting, fishing, environmental education, interpretation, and wildlife observation and photography; and increased funding for the additional staff, infrastructure, and partnerships necessary to allow the Complex to fulfill the purposes for which the units of the Complex were established by Congress.

ALTERNATIVE C—INTENSIVE MANAGEMENT

Like alternative B, this alternative addresses comments received during scoping. However it goes one step further and focuses on a more intensive approach to wildlife and public use management. It would require additional staff beyond levels required for implementation of alternative B.

Abbreviations

BCR	bird conservation region
CMCLRO	Charles Mix County Lake Restoration Organization
CFRs	Code of Federal Regulations
CCP	comprehensive conservation plan
CWCS	comprehensive wildlife conservation strategy
cfs	cubic feet per second
DNC	dense nesting cover
DBH	diameter at breast height
DDT	dichlorodiphenyltrichloroethane
DVE	duck virus enteritis
EDRR	Early Detection Rapid Response
EA	environmental assessment
EHD	epizootic hemorrhagic disease
FmHA	Farmers Home Administration
FTE	full-time equivalent
gpm	gallons per minute
GIS	geographic information system
GPS	global positioning system
HAPET	Habitat and Population Evaluation Team
HPAI	highly pathogenic avian influenza
Karl E. Mundt Refuge	Karl E. Mundt National Wildlife Refuge
Lake Andes Refuge	Lake Andes National Wildlife Refuge
Complex	Lake Andes National Wildlife Refuge Complex
Lake Andes District	Lake Andes Wetland Management District
mg/L	milligrams per liter
NEPA	National Environmental Policy Act of 1969
Refuge System	National Wildlife Refuge System
Improvement Act	National Wildlife Refuge System Improvement Act of 1997
NPAM	Native Prairie Adaptive Management
NABCI	North American Bird Conservation Initiative
NAWCA	North American Wetlands Conservation Act
PPJV	Prairie Pothole Joint Venture
P.L.	Public Law
RLGIS	Refuge Lands Geographic Information System database
RONs	Refuge Operation Needs System
Administration Act	Refuge System Administration Act of 1966
SDGFP	South Dakota Game, Fish and Parks
SWG	State Wildlife Grant
Service	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
U.S.C.	United States Code

USDA APHIS	U.S. Department of Agriculture Animal and Plant Health Inspection Service
VOR	visual obstruction reading
WNV	West Nile virus

Definitions of these and other terms are in the glossary, located after chapter 6.

CHAPTER 1—Introduction



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A birdwatcher emerges from the Lake Andes National Wildlife Refuge Complex headquarters.

The U.S. Fish and Wildlife Service (Service) has developed this draft comprehensive conservation plan (CCP) and environmental assessment (EA) to provide a foundation for the management and use of the Lake Andes National Wildlife Refuge Complex (Complex) located in southeastern South Dakota (figure 2). When finalized, the CCP portion of this document will serve as a working guide for management programs and actions at the Complex over the next 15 years.

This draft CCP and EA was developed in compliance with the National Wildlife Refuge System Improvement Act of 1997 (Improvement Act) and Part 602 of “The Fish and Wildlife Service Manual.” The actions described within this draft CCP and EA meet the requirements of the National Environmental Policy Act of 1969 (NEPA). Compliance with NEPA is being achieved through public involvement and the analyses presented in this document.

The final CCP will specify the necessary actions to achieve the vision, purposes, and goals of the Complex, as described in chapter 2, “The Refuge Complex.” Wildlife is the first priority in the management of the Complex, and public use (wildlife-dependent recreation) is allowed and encouraged as long as it is compatible with the Complex’s purposes.

This draft CCP and EA have been prepared by a planning team composed of representatives from various Service programs, including national wildlife refuges; South Dakota Game, Fish and Parks (SDGFP); and the Yankton Sioux Tribe. In addition, the planning team used public input. Public involvement and the planning process are described in section 1.5, “The Planning Process.”

After reviewing management needs and a wide range of public comments, the planning team developed alternatives for management of the Complex; these are presented in chapter 3, “Alternatives.” Resources of the Complex are described in chapter 4, “Affected Environment,” and predicted effects of the alternatives are described in chapter 5, “Environmental Consequences.” The planning team recommended one alternative to be the Service’s proposed action. This action addresses all substantive issues while fulfilling the vision, purposes, and goals of the Complex, and it is the Service’s recommended course of action for management of the Complex. The details of the proposed action compose the draft CCP, which is chapter 6.

1.1 Purpose and Need for the Plan

The purpose of this draft CCP and EA is to identify the role that the Complex will play in support of the mission of the National Wildlife Refuge System (Refuge System) and to provide long-term guidance for management of refuge programs and activities. The CCP is needed to:

- communicate with the public and other partners in efforts to carry out the mission of the Refuge System;
- provide a clear statement of direction for management of the refuge;

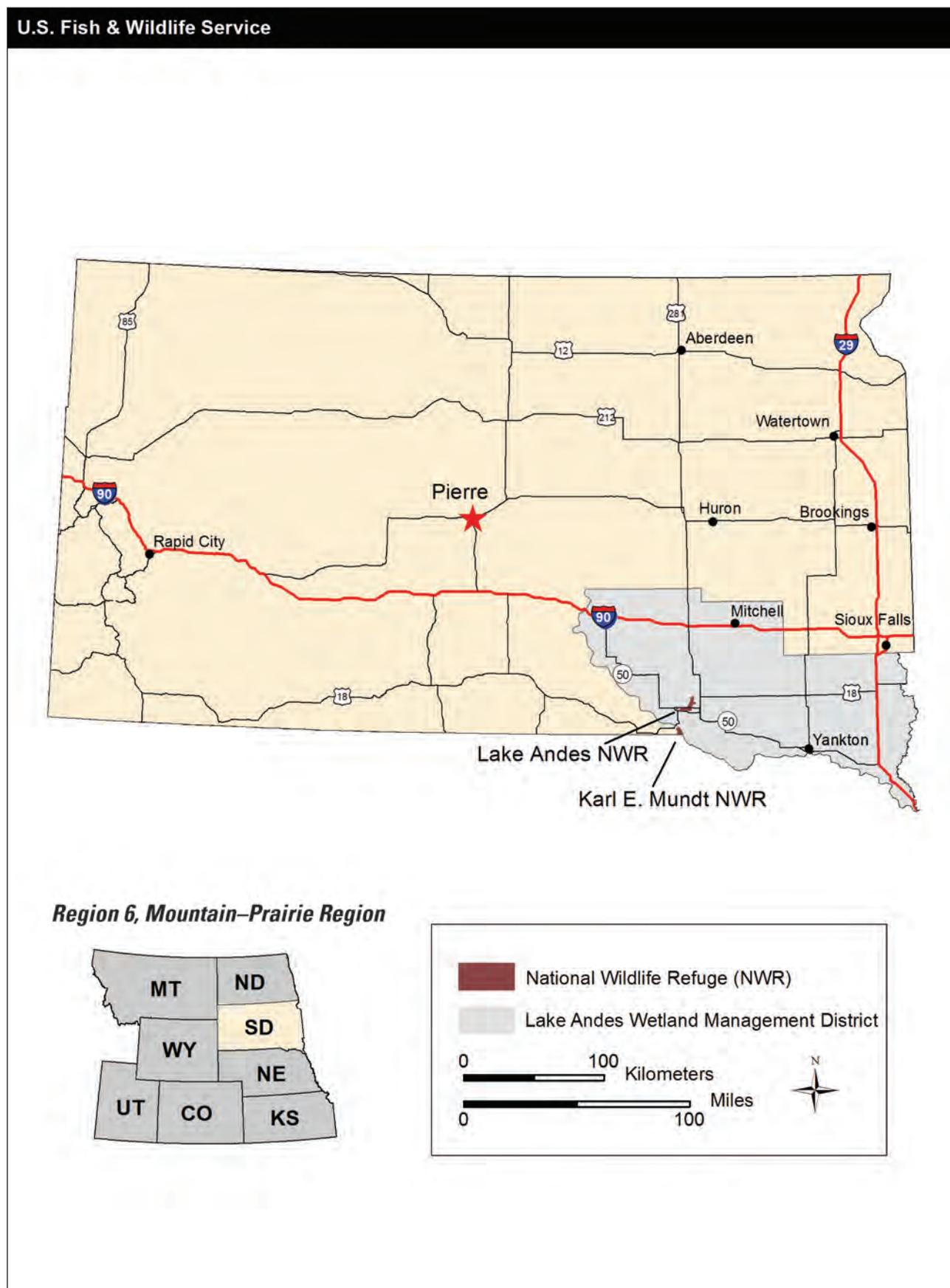


Figure 2. Location map of the Lake Andes National Wildlife Refuge, Karl E. Mundt National Wildlife Refuge, and Lake Andes Wetland Management District, South Dakota.

- provide neighbors, visitors, and government officials with an understanding of the Service's management actions on and around the refuge;
- ensure that the Service's management actions are consistent with the mandates of the Improvement Act;
- ensure that management of the refuge is consistent with Federal, State, and county plans;
- provide a basis for development of budget requests for the refuge's operation, maintenance, and capital improvement needs.

Sustaining the nation's fish and wildlife resources is a task that can be accomplished only through the combined efforts of governments, businesses, and private citizens.

1.2 North American Model of Wildlife Conservation

Wildlife conservation in North America evolved to take on a form unique in the world; in recent years, it has come to be known as the North American Model of Wildlife Conservation (Geist et al. 2001). The wildlife conservation movement arose out of the conflict between market hunters and sport hunters in the mid- to late-nineteenth century. Market hunting increased in response to the growth in urban population fueled by the Industrial Revolution. Between 1820 and 1860, the percentage of Americans living in cities increased from 5 percent to 20 percent; this fourfold increase is the greatest proportional increase in urban population that ever occurred in the United States (Reiss 1995). The demand for meat and hides—along with feathers for the millinery trade—led to exploitation of game animals by market hunters. Along with the increase in the urban population came a new breed of hunter—one who hunted for the chase and the challenge it provided. These sport hunters valued game animals more when they were alive; market hunters, however, placed value on dead animals they could bring to market. The growing legion of sport hunters started a national movement that resulted in Federal and State governments taking responsibility for regulating the take of wildlife.

The keystone concept of the North American Model of Wildlife Conservation, and the bedrock that allowed government to exercise control, is the public trust doctrine (Geist and Organ 2004). With origins in Greek and Roman law, the Magna Carta, and the 1842 *Martin v. Waddell* U.S. Supreme Court decision, the public trust doctrine as it applies to wildlife conservation is the principle that wildlife belongs to no one; it is held in trust for all by government.

The seven pillars of the North American Model of Wildlife Conservation follow:

- wildlife as a public trust resource
- elimination of markets for game
- allocation of wildlife by law
- wildlife only killed for a legitimate purpose
- wildlife considered an international resource
- science as the proper tool to discharge wildlife policy
- democracy of hunting

For more than 100 years, these pillars have stood the test of time despite significant changes in approaches to wildlife conservation. The original conservation movement championed by Theodore Roosevelt, George Bird Grinnell, and others emphasized stemming wildlife population declines through implementing programs that restricted take and protected lands. During the 1920s, conservationists realized that greater efforts were needed, and a committee including Aldo Leopold, A. Willis Robertson, and other leading conservationists of the time authored the 1930 American Game Policy. This policy called for a restoration program for habitats and populations based on scientific research and supported with stable, equitable funding. Within a decade, many needs of this program were fulfilled through landmark legislation, including the Duck Stamp Act, to fund land acquisition for national wildlife refuges. In addition, the Pittman–Robertson Wildlife Restoration Act shifted excise taxes imposed on firearms and ammunition to fund wildlife restoration through cooperation between the Service and State fish and wildlife agencies. To use this money, States were required to pass laws that prevented diversion of hunting license revenues to any purpose other than administration of the State fish and wildlife agency.

In recent decades, wildlife management has placed greater emphasis on overall wildlife diversity. All wildlife species have benefited from the North American Model of Wildlife Conservation pillars, not just game animals. The Refuge System has evolved along with the North American Model of Wildlife Conservation—it today provides refuge for virtually all species found in the United States and recreation for all Americans.

It is a realization of the North American Model of Wildlife Conservation to provide for science-based management of international wildlife resources held in trust for all. The importance of this system to American society can best be appreciated if we were to contemplate its loss. Wildlife connects us to the heritage of this country and our ancestors who built our society. It connects us as well to the natural world of which we are a part, but from which we have become so disconnected. To lose this connection is to lose the basis of our humanity.

1.3 The U.S. Fish and Wildlife Service and the Refuge System

The Service is the principal Federal agency responsible for fish, wildlife, and plant conservation. The Refuge System is one of the Service's major programs.

U.S. FISH AND WILDLIFE SERVICE



In the late 19th and early 20th centuries, America's fish and wildlife resources were declining at an alarming rate, largely due to unrestricted market hunting. Concerned citizens, scientists, and hunting and angling groups joined together and generated the political

The mission of the U.S. Fish and Wildlife Service, working with others, is to conserve, protect, and enhance fish and wildlife and their habitats for the continuing benefit of the American people.

will for the first significant conservation measures taken by the Federal Government. These actions included the establishment of the Bureau of Fisheries in the 1870s and, in 1900, passage of the first Federal wildlife law—the Lacey Act—which prohibited interstate transportation of wildlife taken in violation of State laws. Beginning in 1903, President Theodore Roosevelt established more than 50 wildlife refuges across the Nation.

Over the next three decades, the United States ratified the Migratory Bird Treaty with Great Britain, and Congress passed laws to protect migratory birds, establish new refuges, and create a funding source for refuge land acquisition. In 1940, the U.S. Fish and Wildlife Service was created within the Department of the Interior, and existing Federal wildlife functions including law enforcement, fish management, animal damage control, and wildlife refuge management were combined into a single organization for the first time.

Today, the Service enforces Federal wildlife laws, manages migratory bird populations, restores nationally significant fisheries, conserves and restores vital

wildlife habitat, protects and recovers endangered species, and helps other governments with conservation efforts. In addition, the Service administers a Federal aid program that distributes hundreds of millions of dollars to States for fish and wildlife restoration, boating access, hunter education, and related programs across the United States.

SERVICE ACTIVITIES IN SOUTH DAKOTA

Service activities in South Dakota contribute to the State's economy, ecosystems, and education programs. The following list describes the Service's presence and activities statewide in South Dakota each year:

- employs 173 people in South Dakota
- coordinates 191 volunteers donating more than 8,000 hours in the following areas:
 - more than 4,000 hours for wildlife and habitat
 - nearly 1,500 hours for maintenance work
 - 1,350 hours for wildlife-dependent recreation
 - 1,165 hours in miscellaneous other activities related to Service work
- manages two national fish hatcheries encompassing 591.79 acres
- manages one fish and wildlife management assistance office
- manages seven national wildlife refuges encompassing 103,884.85 acres
- manages six wetland management districts across 50 South Dakota counties; these districts comprise the following:
 - 160,432.41 fee acres (waterfowl production areas)
 - 591,308.44 wetland easement acres
 - 705,532.59 grassland easement acres
 - 712.23 flowage and miscellaneous easement acres
 - 40,875.90 Farmers Home Administration easements
- hosts more than 202,000 annual visitors to Service-managed lands:
 - more than 93,000 hunting visits and an unknown number of trapping visits
 - nearly 45,000 fishing visits
 - more than 57,500 wildlife observation visits
 - environmental education programs for nearly 7,000 students
- provides \$4,668,784 to SDGFP for sport fish restoration and \$8,793,314 for wildlife restoration and hunter education
- employs eight Partners for Fish and Wildlife program managers who have helped private landowners restore wetland and upland habitats as shown below:
 - 195 wetlands restored (654 acres)
 - 136 wetlands established (589 acres)

- 53 upland sites (grazing systems) enhanced (26,300 acres)
- 31 grassland restorations (1,798 acres)
- makes payments to counties through the Refuge Revenue Sharing Act (Public Law [P.L.] 95–469, amended 1978); payments for fee title lands are based on the greatest of three-quarters of 1 percent of the fair market value (appraisals are completed every 5 years), 25 percent of net receipts, or \$0.75 per acre

NATIONAL WILDLIFE REFUGE SYSTEM

In 1903, President Theodore Roosevelt designated the 5.5-acre Pelican Island in Florida as the Nation's first wildlife refuge for the protection of native nesting birds. This was the first time the Federal Government set aside land for wildlife. This small but significant designation was the beginning of the National Wildlife Refuge System.

One hundred years later, the Refuge System has become the largest collection of lands in the world specifically managed for wildlife, encompassing more than 150 million acres within 553 refuges and more than 3,000 waterfowl production areas providing breeding and nesting habitat for migratory birds. Today, there is at least one refuge in every State as well as in Puerto Rico and the U.S. Virgin Islands.

The Improvement Act of 1997 established a clear mission for the Refuge System.

The mission of the 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 Improvement Act states that each national wildlife refuge (that is, each unit of the Refuge System, which also includes wetland management districts) shall be managed to:

- fulfill the mission of the Refuge System;
- fulfill the individual purposes of each refuge and district;
- consider the needs of fish and wildlife first;
- fulfill the requirement of developing a CCP for each unit of the Refuge System, and fully involve the public in the preparation of these plans;
- maintain the biological integrity, diversity, and environmental health of the Refuge System;

- recognize that wildlife-dependent recreation activities including hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation, are legitimate and priority public uses;
- retain the authority of refuge managers to determine compatible public uses.

In addition to the mission for the Refuge System, the wildlife and habitat vision for each unit of the Refuge System stresses the following principles:

- Wildlife comes first.
- Ecosystems, biodiversity, and wilderness are vital concepts in refuge and district management.
- Habitats must be healthy.
- Growth of refuges and districts must be strategic.
- The Refuge System serves as a model for habitat management with broad participation from others.

Following passage of the Improvement Act, the Service immediately began to carry out the direction of the new legislation, including preparation of CCPs for all national wildlife refuges and wetland management districts. Each refuge and district is required to complete its CCP within the 15-year schedule (by 2012). As directed by the Improvement Act, the Service involves the public in preparing all CCPs.

PEOPLE AND THE REFUGE SYSTEM

The Nation's fish and wildlife heritage contributes to the quality of American lives and is an integral part of the country's greatness. Wildlife and wild places have always given people special opportunities to have fun, relax, and appreciate the natural world.

Whether through bird watching, fishing, hunting, photography, or other wildlife pursuits, wildlife recreation contributes billions of dollars to local economies. In particular, money generated from the taxing of sporting arms and ammunition and of fishing equipment that is authorized by the Pittman–Robertson and Dingell–Johnson Acts, respectively, has generated tens of billions of dollars. Distributed by the Service, this money has been used by States to increase wildlife and fish populations, expand habitat, and train hunters across the Nation. Approximately 35 million people visited the Refuge System in 2006, mostly to observe fish and wildlife in their natural habitats (Carver and Caudill 2007). Visitors are most often accommodated through nature trails, auto tours, interpretive programs, and hunting and fishing opportunities. Local communities that surround the refuges and wetland management districts derive significant economic benefits. Economists report that Refuge System visitors contribute more than \$1.7 billion annually to local economies (Carver and Caudhill 2007).

1.4 National and Regional Mandates

National wildlife refuges and wetland management districts are managed to achieve the mission and goals of the Refuge System, along with the designated purpose of the refuge or district (as described in establishing legislation, Executive orders, or other establishing documents). Key concepts and guidance of the Refuge System are in the Refuge System Administration Act of 1966 (Administration Act), Title 50 of the Code of Federal Regulations (CFR), “The Fish and Wildlife Service Manual,” and the Improvement Act.

The Improvement Act amends the Administration Act by providing a unifying mission for the System, a new process for determining compatible public uses on refuges and districts, and a requirement that each unit of the Refuge System be managed under a CCP. The Improvement Act states that wildlife conservation is the priority of Refuge System lands and that the Secretary of the Interior will ensure that the biological integrity, diversity, and environmental health of refuge lands are maintained. Each refuge or district must be managed to fulfill the Refuge System’s mission and the specific purposes for which it was established. The Improvement Act requires the Service to monitor the status and trends of fish, wildlife, and plants in each unit of the Refuge System.

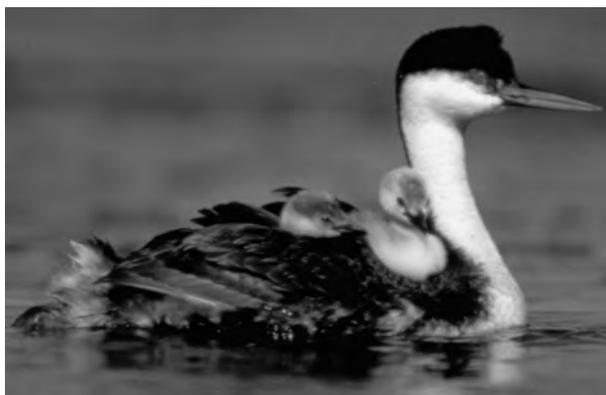
Detailed descriptions of these and other laws and Executive orders that may affect the CCP or the Service’s implementation of the CCP are in appendix A. Service policies on planning and day-to-day management of a refuge are in the “Refuge System Manual” and “The Fish and Wildlife Service Manual.” Region 6 Service guidance on complying with the Migratory Bird Treaty Act (appendix B) will be followed.

1.5 Refuge Contributions to National and Regional Plans

The Lake Andes National Wildlife Refuge Complex contributes to the conservation efforts described below.

FULFILLING THE PROMISE

A 1999 report, “Fulfilling the Promise, The National Wildlife Refuge System” (USFWS 1999), is the culmination of a yearlong process by teams of Service employees to evaluate the Refuge System nationwide. This report was the focus of the first national Refuge System conference (in 1998), which was attended by refuge managers, other Service employees, and representatives from leading conservation organizations.



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The report contains 42 recommendations packaged with three vision statements dealing with wildlife and habitat, people, and leadership. This CCP deals with all three of these major topics, and the planning team looked to the recommendations in the report for guidance during CCP planning.

BIRD CONSERVATION

During the past few decades, there has been growing interest in conserving birds and their habitats. This trend has led to the development of partnership-based bird conservation initiatives that have produced international, national, and regional conservation plans. “All-bird” conservation planning in North America is being achieved through the North American Bird Conservation Initiative (NABCI). Formed in 1999, the NABCI committee is a coalition of government agencies, private organizations, and bird initiatives in the United States working to advance integrated bird conservation based on sound science and cost-effective management to benefit all birds in all habitats. Conservation of all birds is being accomplished under four planning initiatives: the “U.S. Shorebird Conservation Plan,” the “North American Landbird Conservation Plan” (Partners in Flight), the “North American Waterbird Conservation Plan,” and the “North American Waterfowl Management Plan.”

U.S. Shorebird Conservation Plan

Partners from State and Federal agencies and non-governmental organizations from across the country pooled their resources and expertise to develop a conservation strategy for migratory shorebirds and the habitats upon which they depend. The resulting plan, the “U.S. Shorebird Conservation Plan,” provides a scientific framework to determine species, sites, and habitats that most urgently need conservation action. The main goals of the plan, completed in 2000, are to ensure that adequate quantities and qualities of shorebird habitat are maintained at local levels and to maintain or restore shorebird populations at the continental and hemispheric levels. Separate technical reports were developed that focused on a



Figure 3. Map of the bird conservation regions of North America.

conservation assessment, comprehensive monitoring strategy, research needs, and education and outreach. These national assessments were used to step down goals and objectives into 11 regional conservation plans. Although some outreach, education, research, monitoring, and habitat conservation programs are being implemented, accomplishment of conservation objectives for all shorebird species will require a coordinated effort among traditional and new partners.

North American Landbird Conservation Plan (Partners in Flight)

The “North American Landbird Conservation Plan,” developed through the Partners in Flight program, began in 1990 with the recognition of declining population levels of many migratory bird species. The challenge, according to the program, is managing human population growth while maintaining functional natural ecosystems. To meet this challenge, Partners in Flight worked to identify priority landbird species and habitat types. Partners in Flight activity has resulted in 52 bird conservation plans covering the continental United States.

The primary goal of Partners in Flight is to provide for the long-term health of landbird life on this continent. The first priority is to prevent the rarest

species from going extinct. The second priority is to prevent uncommon species from descending into threatened status. The third priority is to “keep common birds common.”

For planning purposes, Partners in Flight splits North America into seven groups of birds by ecological area—avifaunal biomes—and 37 bird conservation regions (BCRs) (figure 3). The Lake Andes National Wildlife Refuge Complex is within the prairie avifaunal biome in BCR 11, the Prairie Pothole Region.

BCR 11 is the most important waterfowl production area in the North America, despite extensive wetland drainage and tillage of native grasslands. The density of breeding dabbling ducks commonly exceeds 100 pairs per square mile in some areas during years with favorable wetland conditions. The area constitutes the core of the breeding range of most dabbling duck and several diving duck species. BCR 11 provides critical breeding and migration habitat for more than 200 other bird species, including such species of concern as Franklin’s gull and yellow rail, as well as piping plover, federally listed as threatened. In addition, Baird’s sparrow, Sprague’s pipit, chestnut-collared longspur, Wilson’s phalarope, marbled godwit, and American avocet are among the many priority nonwaterfowl species that breed in BCR 11. According to NABCI,

wetland areas also provide key spring migration sites for Hudsonian godwit, American golden-plover, white-rumped sandpiper, and buff-breasted sandpiper.

Partners in Flight conservation priorities in the prairie avifaunal biome focus on protection of remaining prairies; management of existing grasslands using fire and grazing; and control of invasive plants, including woody plant encroachment.

North American Waterbird Conservation Plan

The “North American Waterbird Conservation Plan” provides a contiguous framework for conserving and managing colonial-nesting waterbirds including 209 species of seabirds, coastal waterbirds (gulls, terns, and pelicans), wading birds (herons and ibises), and marshbirds (certain grebes and bitterns). The overall goal of this conservation plan is to make sure that the following are sustained or restored throughout the waterbirds’ ranges in North America: (1) the distribution, diversity, and abundance of waterbird populations; (2) waterbird habitats (breeding, migratory, and nonbreeding); and (3) important sites for waterbirds. The geographic scope of the plan covers 28 countries from Canada to Panama as well as islands and near-shore areas of the Atlantic and Pacific Oceans, the Gulf of Mexico, and the Caribbean Sea. This waterbird partnership consists of Federal, State, and Provincial wildlife agencies; individuals; and nonprofit conservation organizations.

Waterbird planning regions were identified to allow for planning at a practical, landscape-level scale. Planning region boundaries are based on a combination of political considerations and ecological factors. Sixteen planning regions were identified within North and South Americas. Lake Andes National Wildlife Refuge Complex is located within the Northern Prairie and Parkland Conservation Region. The Northern Prairie and Parkland Region is an area composed primarily of mixed-grass prairie. The region offers waterbirds a tremendous variety and often a high density of small wetlands or “potholes,” which range from wet meadows to saline lakes, marshes, and fens. Widely regarded as the most important waterfowl production area in North America, the region boasts 24 colonial and 15 noncolonial species of waterbirds including the endangered least tern. Several species reach their highest densities or have breeding ranges contained largely within the region, notably the American white pelican, eared grebe, California gull, black tern, Forster’s tern, and Franklin’s gull.

North American Waterfowl Management Plan

The “North American Waterfowl Management Plan” (NAWMP) was originally written in 1986. The plan envisioned a 15-year effort to achieve landscape conditions that could sustain waterfowl populations. Specific NAWMP objectives are to increase and restore duck populations to the average levels of the

1970s—62 million breeding ducks and a fall flight of 100 million birds.

By 1985, waterfowl populations had plummeted to record lows. Habitat on which waterfowl depend was disappearing at a rate of 60 acres per hour. Recognizing the importance of waterfowl and wetlands to North Americans and the need for international cooperation to help in the recovery of a shared resource, the governments of the United States and Canada developed a strategy to restore waterfowl populations through habitat protection, restoration, and enhancement. Mexico became a signatory to the plan in 1994.

The plan is innovative because of its international scope and its implementation at the regional level. Its success depends on the strength of partnerships called joint ventures, which involve Federal, State, Provincial, tribal, and local governments; businesses; conservation organizations; and individual citizens.

Joint ventures are regional, self-directed partnerships that carry out science-based conservation through a wide array of community participation. Joint ventures develop implementation plans focusing on areas of concern identified in the plan. The Lake Andes National Wildlife Refuge Complex lies within the Prairie Pothole Joint Venture.

RECOVERY PLANS FOR FEDERALLY LISTED THREATENED OR ENDANGERED SPECIES

Where federally listed threatened or endangered species occur on the Complex, management goals and strategies in their respective recovery plans will be followed. The list of threatened or endangered species that occur on the Complex will change as species are listed or delisted, or as listed species are discovered on Complex lands.

At the time of plan approval, the Complex is following the draft recovery plan for:

- Piping plover (threatened) in the northern Great Plains (USFWS 1994a);
- Whooping crane (endangered) (USFWS 1994b);
- Interior least tern (endangered) (USFWS 1990);
- Western prairie fringed orchid (threatened) (USFWS 1996).

STATE COMPREHENSIVE CONSERVATION WILDLIFE STRATEGY

Over the past several decades, documented declines of wildlife populations have occurred nationwide. Congress created the State Wildlife Grant (SWG) program in 2001. This program provides States with Federal dollars to support conservation aimed at preventing wildlife from becoming endangered and in need of protection under the Endangered Species Act. The SWG program represents an ambitious endeavor to take an active hand in keeping species from becoming threatened or endangered in the future. According to



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the SWG program, each State and territory as well as the District of Columbia must complete a comprehensive wildlife conservation strategy (CWCS) by October 1, 2005, to receive future funding.

The strategies promulgated under the SWG program will help define an integrated approach to the stewardship of all wildlife species, with additional emphasis on species of concern and habitats at risk. The goal is to shift focus from single-species management and highly specialized individual efforts to a geographically based, landscape-oriented fish and wildlife conservation effort. The Service approves CWCSs and administers SWG program funding.

The CWCS for the State of South Dakota was reviewed and information was used during development of this draft CCP. Implementation of CCP habitat goals and objectives will support the goals and objectives of the CWCS.

The CWCS for South Dakota is guided by SDGFP's mission: "to perpetuate, conserve, manage, protect, and enhance South Dakota's wildlife resources, parks, and outdoor recreational opportunities." This statement sets the framework for the State's actions.

SDGFP has opted to apply a coarse filter/fine filter strategy to its public land management needs. The CWCS emphasizes ecosystem diversity as the primary means to address habitat needs for biodiversity, with a secondary focus on nonhabitat concerns regarding species of greatest conservation need. Program staff establishes a schedule for the development of recovery objectives for State-listed species. A threats assessment, identification of recovery goals, and species recovery actions provide a coordinated approach and give guidance for cooperating agencies to assist in recovery of these species. Management actions directed toward species are designed using an adaptive management framework.

South Dakota's list of "Species of Greatest Conservation Need" includes 28 birds, 10 mammals, 7 freshwater mussels, 4 gastropods, 9 insects, 20 fishes, and 12

reptiles and amphibians. There are three primary criteria for inclusion in the list: State- and federally listed species for which the State has a mandate for recovery, species for which South Dakota represents a significant portion of the species' overall range, and species that are indicative of or depend upon a declining or unique habitat in South Dakota.

1.6 Strategic Habitat Conservation

A BROADER VISION

In the face of escalating challenges such as land use conversion, invasive species, water scarcity, and complex issues that have been amplified by accelerating climate change, the Service has evolved from its ecosystem approach to conservation toward developing a broader vision.

A cooperative effort by the Service and the U.S. Geological Survey (USGS) culminated in a report by the National Ecological Assessment Team (USGS 2006). The report outlines a unifying adaptive resource management approach for conservation at a landscape scale—the entire range of a priority species or suite of species. This is strategic habitat conservation—a way of thinking and doing business by incorporating biological goals for priority species populations, making strategic decisions about the work needed, and constantly reassessing.

Since 2006, the Service has taken significant steps to turn this vision into reality and has defined a framework of 22 geographic areas. Experts from the Service and USGS developed this framework through an aggregation of bird conservation regions (figure 3). The Complex lies in the Plains and Prairie Potholes Region (figure 1). Key species and species groups targeted in this geographic area are paddlefish, pallid sturgeon, waterfowl, shorebirds, grassland birds, and black-footed ferret.

The Service is using this framework of geographic areas as the basis to locate the first generation of landscape conservation cooperatives. These cooperatives are conservation–science partnerships between the Service and other Federal agencies, States, tribes, nongovernmental organizations, universities, and other entities. Designed as fundamental units for planning and science, the cooperatives have the capacity to help the Service carry out the elements of strategic habitat conservation—biological planning, conservation design and delivery, and monitoring and research. Coordinated planning and scientific information will strengthen the Service's strategic response to accelerating climate change, land use conversion, invasive species, water scarcity, and a host of other challenges.

CLIMATE CHANGE

The Service believes that any rapid acceleration in climate change could affect the Nation’s fish, wildlife, and plant resources in profound ways. While many species would continue to thrive, some may decline and in some instances go extinct. Others would survive in the wild only through direct and continuous intervention by managers. In 2010, the Service drafted a strategic plan to address climate change for the next 50 years entitled “Rising to the Challenge—Strategic Plan for Responding to Accelerating Climate Change” (USFWS 2010). The strategic plan employs three key strategies: adaptation, mitigation, and engagement. In addition, the plan acknowledges that no single organization or agency can address climate change without allying itself with others across the Nation and around the world (USFWS 2010). This draft plan is an integral part of the Department of the Interior’s strategy for addressing climate change as expressed in Secretarial Order 3289 (September 14, 2009).

The Service will use the following guiding principles from the draft strategic plan (USFWS 2010) in responding to climate change:

- priorities setting—continually evaluate priorities and approaches, make difficult choices, take calculated risks, and adapt to climate change
- partnership—commit to a new spirit of coordination, collaboration, and interdependence with others

- best science—reflect scientific excellence, professionalism, and integrity in all the Service’s work
- landscape conservation—emphasize the conservation of habitats within sustainable landscapes, applying the Service’s strategic habitat conservation framework
- technical capacity—assemble and use state-of-the-art technical capacity to meet the climate change challenge
- global approach—be a leader in national and international efforts to meet the climate change challenge

1.7 Planning Process

The Service prepared this draft CCP and EA in compliance with the Improvement Act, Part 602 of “The Fish and Wildlife Service Manual,” NEPA, and the Council on Environmental Quality regulations that implement NEPA. Additional requirements and guidance are contained in the Refuge System’s planning policy, issued in 2000. This policy established requirements and guidance for refuge and district plans—including CCPs and stepdown management plans—to make sure that planning efforts follow the Improvement Act. The planning policy identified several steps of the CCP and environmental analysis process (figure 4).



Figure 4. Steps in the planning process.

The planning team consists of Service personnel from national wildlife refuges, SDGFP, and the Yankton Sioux Tribe (see appendix C). During pre-planning, the team developed a mailing list, identified planning issues, drafted a list of special qualities that characterized the Complex, and drafted vision statements and goals that will guide the management of the Complex over the next 15 years. The planning team identified current status of each Complex program and compiled and analyzed relevant data. Table 1 summarizes the planning process to date for this draft CCP and EA.

PUBLIC INVOLVEMENT

Scoping is the process of obtaining information from the public for input into the planning process. Public involvement, which is required by NEPA, helps ensure that substantive public comments (those that are within the authority and management capabilities of the Service) are addressed in the final CCP.

During preplanning, a mailing list was prepared that included private citizens; local, regional, and State government representatives and legislators; other Federal agencies; and interested organizations (see appendix D). On November 27, 2006, a planning update was sent to recipients on the mailing list; this update included information on the history of the Complex, an overview of the CCP process, and a comment form and postage-paid envelope to give the public an opportunity to provide written comments. The planning update also included an invitation to attend public scoping meetings.

The three public scoping meetings, which were also announced by local media, were held in November 2006. At each meeting, a presentation was given about the Complex, the CCP and EA, and the NEPA process. Attendees were encouraged to ask questions and offer comments during the meeting, and each attendee was given a comment form to submit additional thoughts or questions in writing. The 23 attendees included local citizens and members of the White Lake Sportsmen's Club and Pheasants Forever.

A notice of intent to prepare the draft CCP and EA was published in the Federal Register on May 2007.

Comments were received throughout the public scoping process. Input obtained from meetings and correspondence, including emails, was considered in development of this draft CCP and EA.

STATE COORDINATION

The SDGFP is responsible for managing natural resource lands owned by the State, in addition to enforcement responsibilities for the State's migratory birds and endangered species.

On August 25, 2006, an invitation letter to participate in the CCP process was sent by the Service's Region 6 Director to the SDGFP director, and two representatives from SDGFP were assigned to the planning

team. Local SDGFP wildlife managers and the staff of the Complex maintain excellent and ongoing working relations that predate the start of the CCP process.

TRIBAL COORDINATION

On August 25, 2006, the Service's Region 6 Director sent letters to six Native American tribal governments with aboriginal interests in the planning area: Omaha Tribal Council, Ponca Tribe of Nebraska, Santee Sioux, Winnebago Tribal Council, Yankton Sioux, and Otoe-Missouria Tribe. Each letter included information about the CCP and invited tribal recipients to serve on the planning team. In turn the Service received one inquiry and, after receiving clarification on the CCP process, the Yankton Sioux tribal government designated a tribal member as the representative for its nation in the planning process. This member participated in the initial planning meetings and site visits but later left the tribal government and stopped participating in the planning process. The Yankton Sioux tribal government was unable to find a replacement.

RESULTS OF SCOPING

Table 1 summarizes all scoping activities. Public input collected from scoping meetings and correspondence, including comment forms and emails, was used in the development of a final list of Complex issues to be addressed in this draft CCP and EA.

The Service determined which alternatives could best address these issues. The planning process ensures that issues with the greatest effect on the Complex are resolved or given priority over the life of the final CCP. Identified issues, along with a discussion of effects on resources, are summarized in chapter 2.

In addition, the Service considered suggested changes to current Complex management presented by the public and other groups.

DECISION TO BE MADE

The Service's Director of Region 6 will make the final decision on the selection of a preferred alternative for the CCP. The Regional Director's decision will be based on the legal responsibility of the Service and will consider the mission of the Service and the System, other legal and policy mandates, the purposes of the Refuge Complex, the visions and goals identified in this draft CCP, and public input received. Other considerations will be land uses in the surrounding area and other parts of the ecosystem, the environmental effects of the alternatives, and budget projections.

The Service's final decision will be documented in a finding of no significant impact that is published together with the final CCP and distributed to the public. The Service will begin to carry out the final CCP immediately upon publication of the notice of availability of the final CCP in the Federal Register.

Table 1. Planning process summary for the Lake Andes National Wildlife Refuge Complex, South Dakota.

<i>Date</i>	<i>Event</i>	<i>Outcome</i>
September 2006	Initial meeting with the proposed planning team	Developed the CCP overview; finalized the planning team; developed an initial list of Complex issues and qualities; initiated the development of the CCP mailing list
October 23–25, 2006	Kickoff meeting	Updated the Complex issues and qualities list; identified biological and mapping needs; planned public scoping process
November 27, 2006	Mailing of the first planning update	Mailed a planning update (a short document describing the CCP process), comment form, and a postage-paid envelope to each recipient on the mailing list
November 2006	Public scoping planning	Finalized the scoping meeting schedules and formats
November 28, 2006	Public meeting—Plankinton, South Dakota	Offered the public an opportunity to learn about the CCP and to provide comments
November 29, 2006	Public meeting—Parker, South Dakota	Offered the public an opportunity to learn about the CCP and to provide comments
November 30, 2006	Public Meeting—Lake Andes, South Dakota	Offered the public an opportunity to learn about the CCP and to provide comments
February 21–22, 2007	Purpose, vision, and goals workshop	Identified the purposes and developed the draft visions and goals for the Complex
May 16–17, 2007	Alternatives workshop	Drafted a comprehensive range of alternatives for management of the Complex
October 2008	Environmental consequences and election of the proposed action workshop	Assessed the environmental consequences of implementing each alternative and selected the proposed action (preferred alternative)
September 2011	Objectives and strategies workshop	Drafted the objectives, strategies, and rationales for the proposed action
December 2011	Draft CCP and EA preparation	Prepared sections of the preliminary draft CCP and EA
April 2012	Review of the draft CCP and EA	Reviewed the first draft of the CCP and EA and provided comments
April–May 2012	Internal Service review of the draft CCP and EA	Staff from the Service's regional office and others reviewed the draft CCP and EA and provided comments
May–October 2012	Preparation of public draft CCP and EA	Reviewed internal comments and updated the draft CCP and EA
October 2012	Preparation and distribution of second planning update	Prepared and mailed second of two planning updates for the CCP and EA
October–November 2012	Public review of draft CCP and EA	Released public draft of CCP and EA
November 2012	Planning team review of public comments	Will compile and consider public comments and recommend changes to the CCP
November 2012	Briefing of the Service's Regional Director	Service's Regional Director and deputy regional director will review and address a summary of public comments
November 2012	Briefing of the Service's National Director	Will make necessary changes to the final CCP; the Service's National Director will be briefed on public comments and the Service's responses
December 2012	CCP approval	Service's Regional Director will determine whether to approve final CCP
December 2012–January 2013	CCP and summary trifold printing and distribution	Will finalize, print, and distribute final CCP and planning summary trifold

CHAPTER 2—The Refuge Complex



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Wood ducks are commonly seen on Complex lands.

2.1 Establishment, Acquisition, Management History, and Use

The Lake Andes National Wildlife Refuge Complex consists of three units: Lake Andes National Wildlife Refuge (which serves as the Complex headquarters) (Lake Andes Refuge), the Karl E. Mundt National Wildlife Refuge (Karl E. Mundt Refuge), and the Lake Andes Wetland Management District (Lake Andes District).

The Complex shares a common staff that currently consists of the wildlife refuge manager, wildlife refuge specialist, wildlife biologist, administrative officer, and two maintenance workers. The Complex also supports a wildlife biologist from the Service's Partners for Fish and Wildlife program.

LAKE ANDES NATIONAL WILDLIFE REFUGE

Authorized by Executive order in 1936, the Lake Andes National Wildlife Refuge (figures 5 and 6) was formally established in 1939 when the State of South Dakota granted an easement allowing the Service to operate a refuge for migratory birds and other wildlife.

This 5,639-acre refuge includes Lake Andes, a 4,700-acre lake created by the last ice age. The lake's shallow

waters are very attractive to migrating and nesting waterfowl, shorebirds, and other waterbirds. Water levels in the lake vary from 0 to 12 feet depending entirely on climatic conditions and precipitation, and the lake supports a boom-and-bust fishery that depends on water quality and water quantity. Grasslands surrounding the lake provide optimal habitat for nesting waterfowl and grassland songbirds, and in this area nesting densities are very high (greater than 300 nests per square mile).

Lake Andes Refuge is divided into four units. The lake itself comprises three of these units—the North Unit, Central Unit, and South Unit—and the fourth, the Owens Bay Unit, lies at the southeastern bank of Lake Andes.

Water level manipulation, grazing, prescribed burning, invasive plant control, and prairie restoration are used on the refuge to provide optimal habitat for migratory birds. Approximately 2,000 people—mostly birdwatchers—visit this refuge each year. A foot trail provides public access to a series of small wetlands that attract migrating waterfowl and shorebirds in great numbers.

KARL E. MUNDT NATIONAL WILDLIFE REFUGE

Named for a former South Dakota senator, the Karl E. Mundt National Wildlife Refuge (Karl E. Mundt Refuge) is located below the Fort Randall Dam and encompasses a portion of the Missouri National Recreational

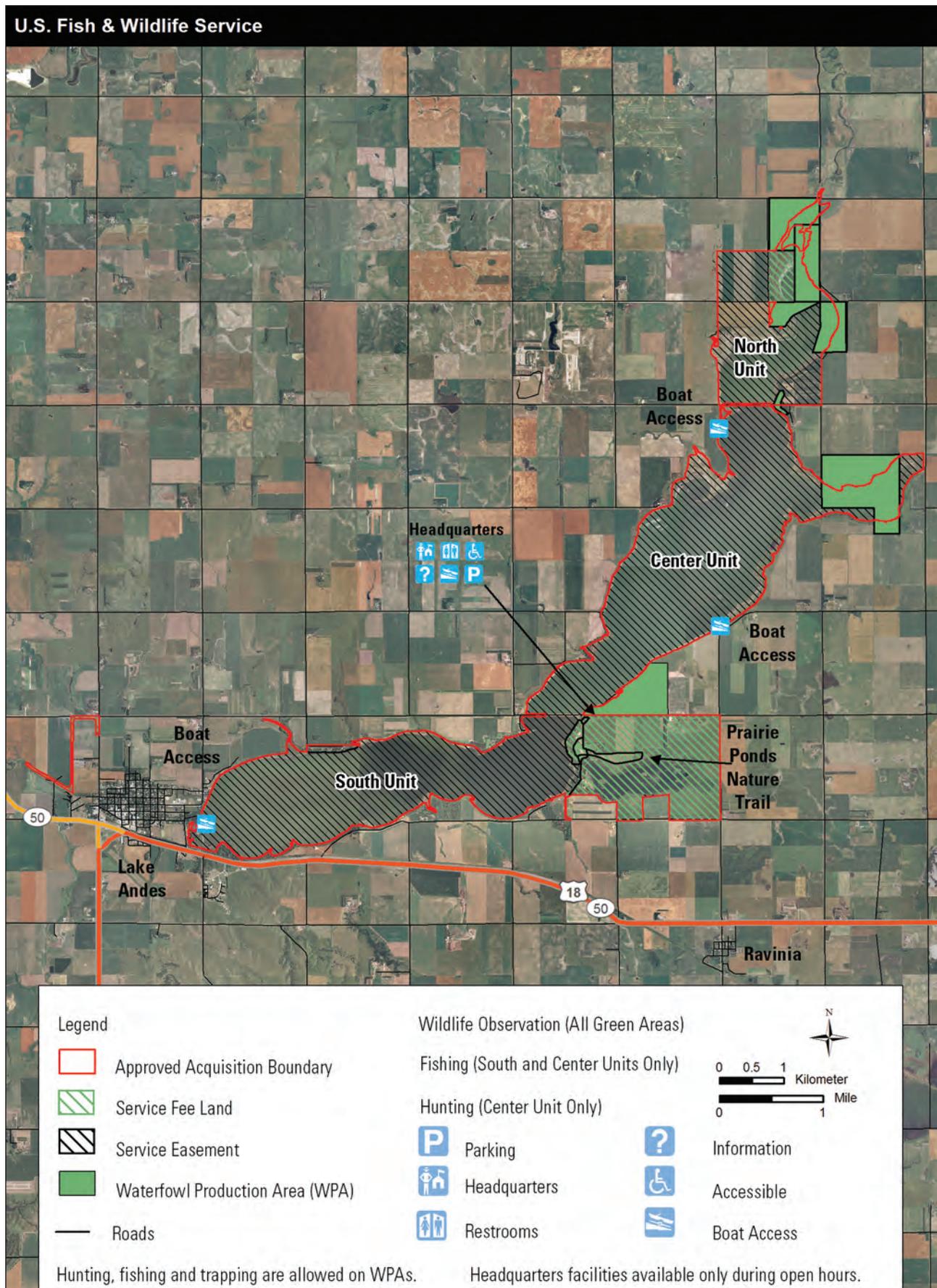


Figure 5. Map of the Lake Andes National Wildlife Refuge, South Dakota.



© John Jave

Pheasant

River (figures 7 and 8). This refuge was established in 1974 when the National Wildlife Federation and the Southland Corporation donated 700 acres of land and 300 acres of easement to the Service for the primary purpose of bald eagle conservation. At that time, loss of habitat, the widespread use of dichlorodiphenyltrichloroethane (DDT), and poaching had thinned the bald eagle population in the lower 48 states to 1 percent of its former size. The Karl E. Mundt Refuge was the first national wildlife refuge established for the conservation of bald eagles, and since establishment the refuge has also provided important habitat for neotropical migratory birds that require riparian forests to migrate and nest.

Haying, grazing, prescribed burning, invasive plant control, and prairie restoration are used to maintain riparian and upland habitats. The refuge is closed to public use to reduce disturbance to bald eagles; however, guided tours are provided annually for approximately 50 visitors.

LAKE ANDES WETLAND MANAGEMENT DISTRICT

The 104,242-acre Lake Andes Wetland Management District was established in 1958 and protects 18,782 acres of habitat in waterfowl production areas (figures 9–14). These waterfowl production areas are public lands open to hunting, fishing, wildlife observation, and other forms of wildlife-dependent recreation. The district protects an additional 80,000 acres of habitat through easements that prevent loss of wetlands and grasslands on private land. Acquisition of additional easements is ongoing.

Grazing, haying, prescribed burning, invasive plant control, and prairie restoration are used to provide optimal waterfowl and other migratory bird habitat. Approximately 15,000 people visit the district each

year to hunt, observe wildlife, or fish on waterfowl production areas. Most of these visitors are hunters pursuing ring-necked pheasants.

2.2 Special Values of the Complex

Early in the planning process, the planning team and public identified the outstanding qualities of Lake Andes National Wildlife Refuge Complex. These qualities are the characteristics and features of the Complex that make it special, valuable for wildlife, and worthy of inclusion in the Refuge System. Such qualities can be unique biological values as well as simple values like providing a quiet place to enjoy nature or view wildlife. It was important to identify these special values to recognize the Complex's worth and to ensure that its special values are preserved, protected, and enhanced through the planning process. The following summarizes the qualities that make the Complex unique and valued:

- The Complex protects and manages nationally significant nesting and migration habitat for waterfowl and other migratory birds.
- The Complex conserves and restores wetlands and grasslands for the benefit of wildlife and people.
- The Complex provides the public with opportunities for wildlife-dependent recreation and a place to reconnect with nature.
- The Complex contributes to local economies, the preservation of open space, and the quality of life of area residents and visitors.

2.3 Purposes

Every unit in the Refuge System has a purpose for which it was established. This purpose is the foundation upon which to build all programs, from biology and public use programs to maintenance and facilities programs. No action taken by the Service or public may conflict with this purpose. The purposes are found in the legislative acts or administrative orders that authorize either the transfer or acquisition of land for the units. Over time an individual unit may contain lands that have been acquired under a variety of transfer and acquisition authorities, giving the unit more than one purpose.

The goals, objectives, and strategies identified in this draft CCP and EA are intended to support the purposes for which the Lake Andes Refuge, Karl E. Mundt Refuge, and Lake Andes District were established.

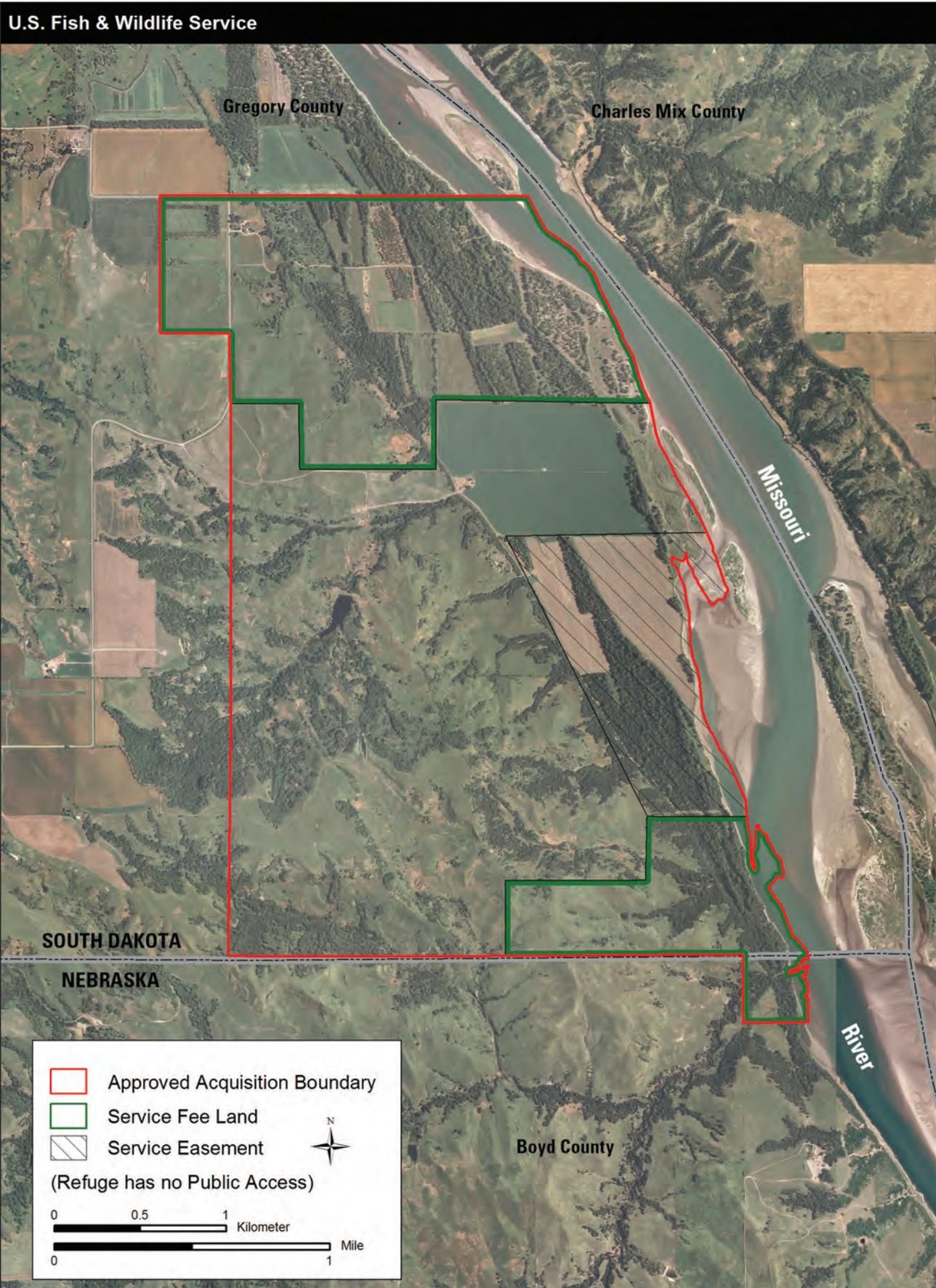


Figure 7. Map of the Karl E. Mundt National Wildlife Refuge, South Dakota.

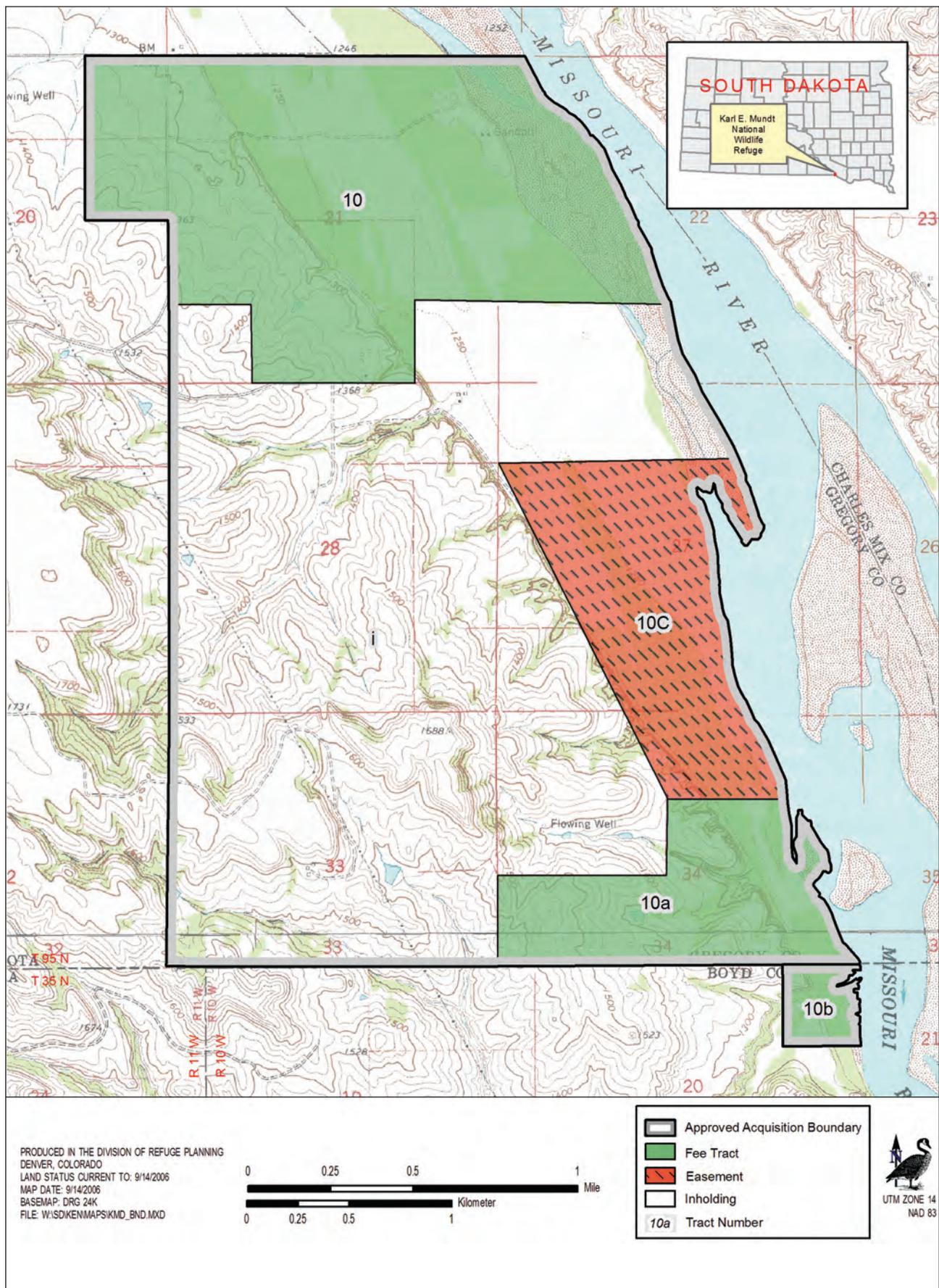


Figure 8. Land status map of the Karl E. Mundt National Wildlife Refuge, South Dakota.



Figure 9. Lake Andes Wetland Management District waterfowl production areas in Davison and Hanson Counties, South Dakota.

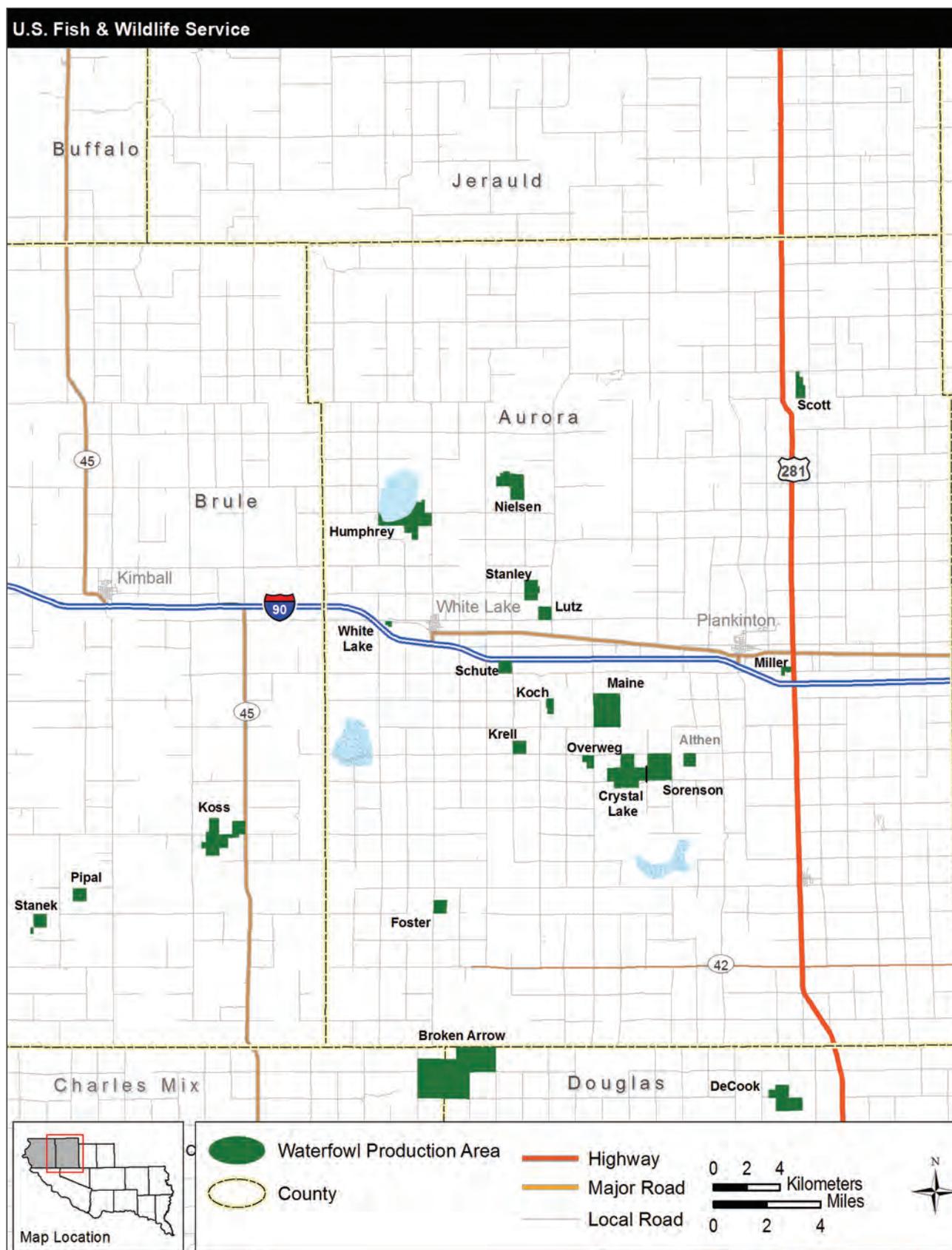


Figure 10. Lake Andes Wetland Management District waterfowl production areas in Brule and Aurora Counties, South Dakota.

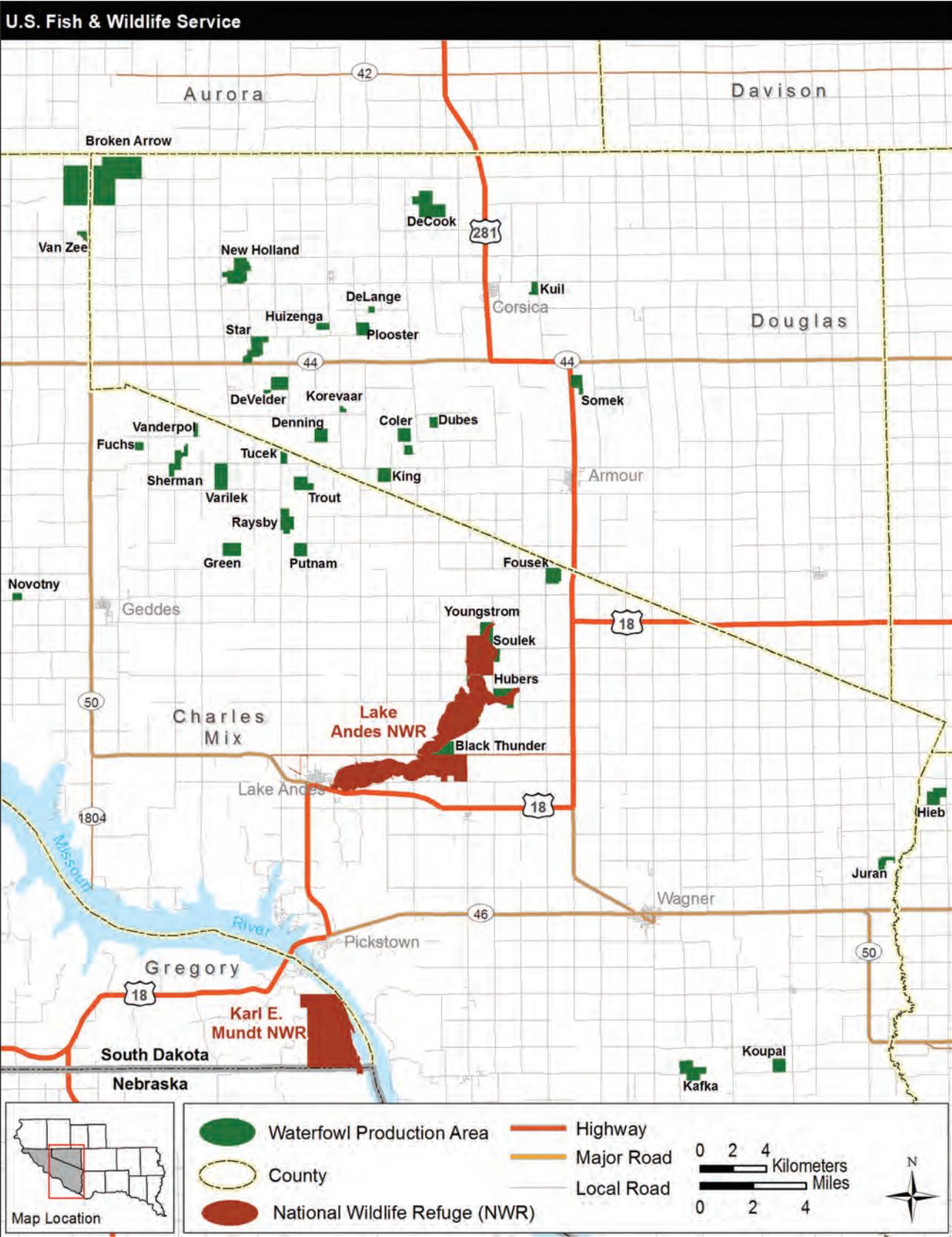


Figure 11. Lake Andes Wetland Management District waterfowl production areas in Charles Mix and Douglas Counties, South Dakota.

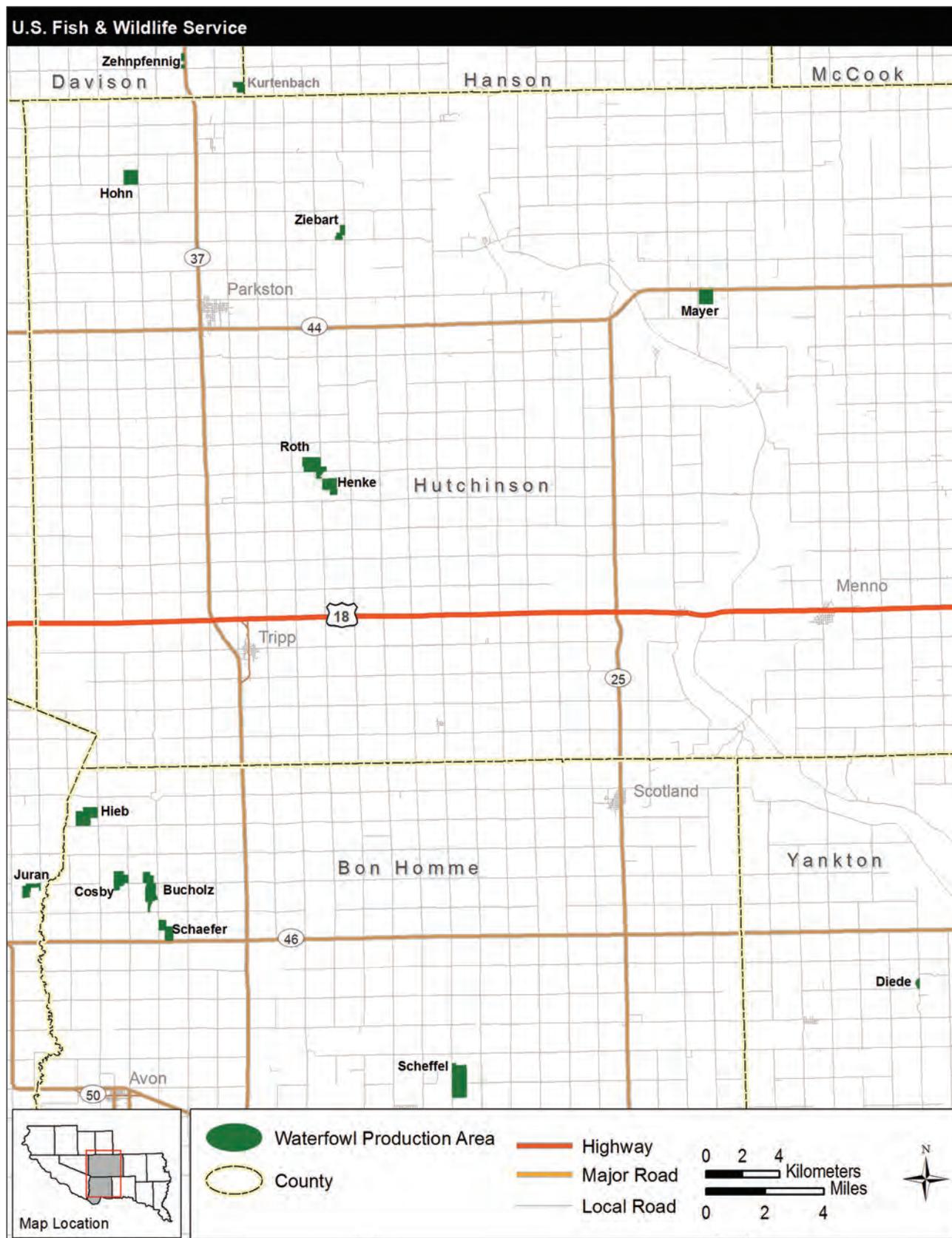


Figure 12. Lake Andes Wetland Management District waterfowl production areas in Bon Homme and Hutchinson Counties, South Dakota.

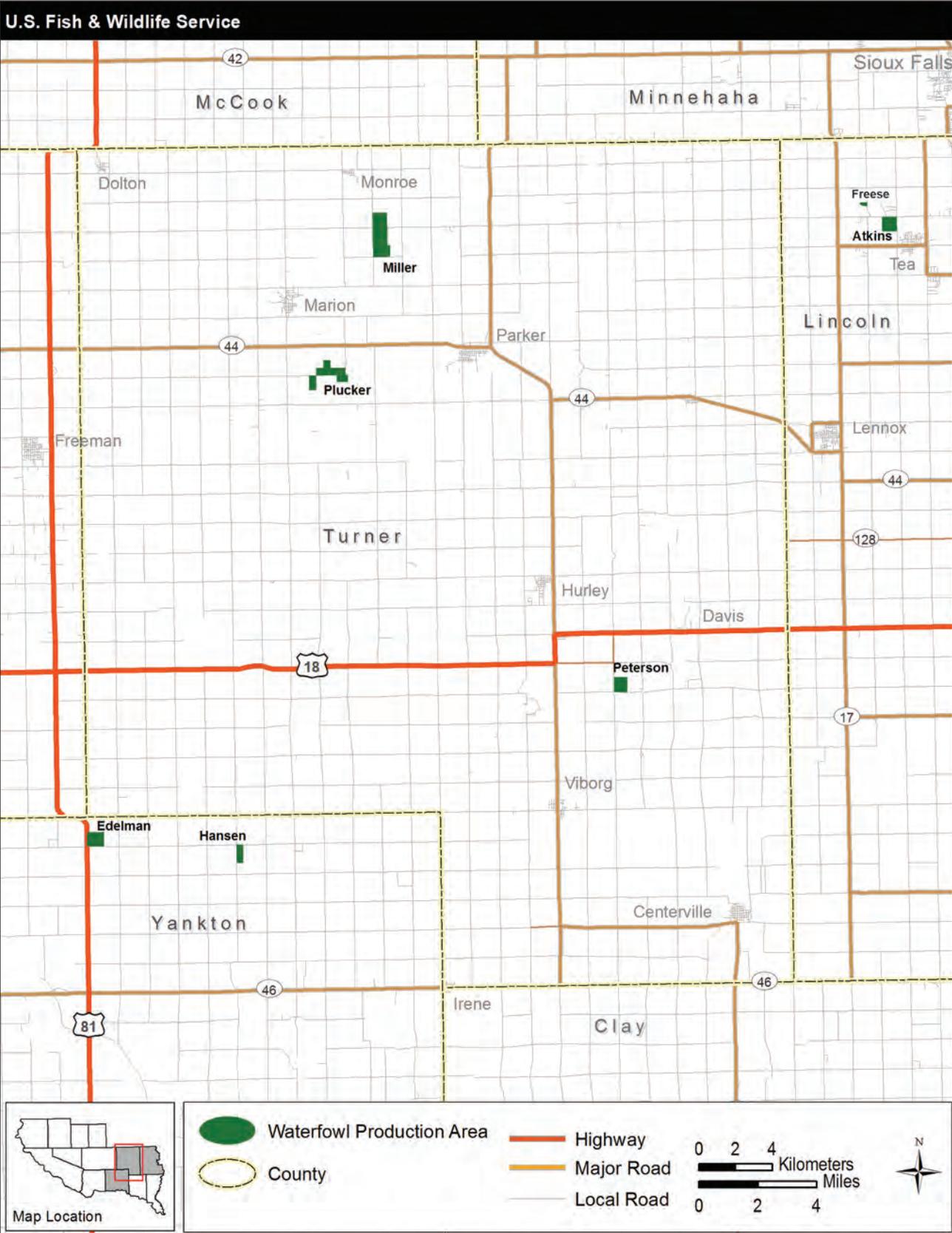


Figure 13. Lake Andes Wetland Management District waterfowl production areas in Turner, Yankton, and Lincoln Counties, South Dakota.

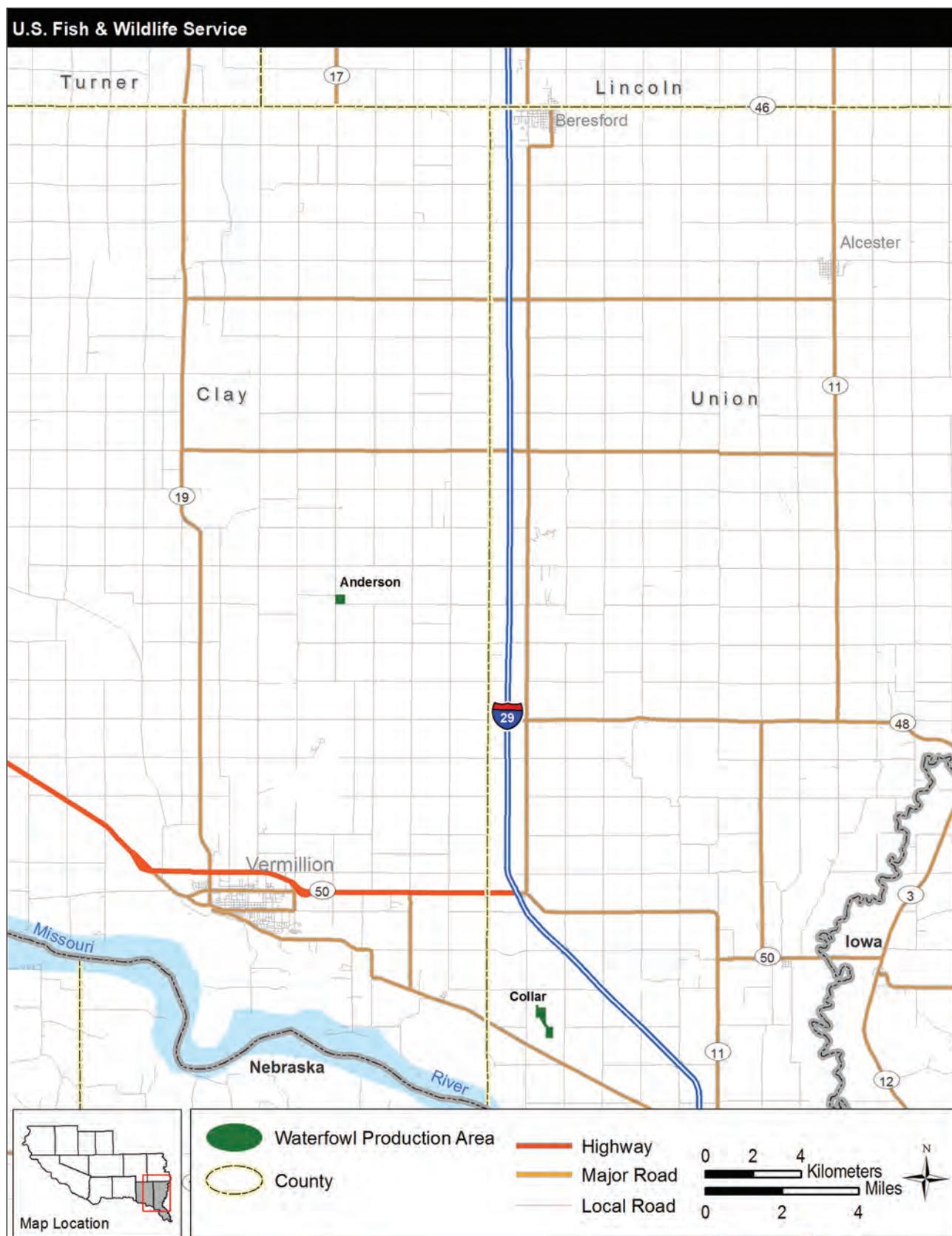


Figure 14. Lake Andes Wetland Management District waterfowl production areas in Clay and Union Counties, South Dakota.

LAKE ANDES NATIONAL WILDLIFE REFUGE

Lake Andes National Wildlife Refuge was authorized on February 14, 1936, by President Franklin D. Roosevelt through Executive Order No. 7292, under the authority of the Migratory Bird Conservation Act (16 United States Code [U.S.C.] 715d):

“as a refuge and breeding ground for migratory birds and other wildlife.”

“for use as an inviolate sanctuary, or for any other management purpose, for migratory birds.”

KARL E. MUNDT NATIONAL WILDLIFE REFUGE

Karl E. Mundt National Wildlife Refuge was authorized on April 17, 1975, under the authority of the Endangered Species Act of 1973 (16 U.S.C. 1531–1543):

“to conserve fish, wildlife, or plants which are listed as endangered or threatened species.”

LAKE ANDES WETLAND MANAGEMENT DISTRICT

Lake Andes Wetland Management District was authorized on August 1, 1958, under the authority of P.L. 85–585, which amended the Migratory Bird Hunting and Conservation Stamp Act of 1934 (16 U.S.C. 718c). Official purposes are from a number of sources:

Regional Guidance, 2004: “to ensure the long-term viability of the breeding waterfowl population and production, through the acquisition and management of Waterfowl Production Areas, while considering the needs of other migratory birds, threatened and endangered species, and other wildlife.”

Migratory Bird Hunting Stamp Act (16 U.S.C. 718c): “as [waterfowl production areas] subject to all provisions of the Migratory Bird Conservation Act ... except the inviolate sanctuary provisions.”

Migratory Bird Conservation Act (16 U.S.C. 715d): “or for any other management purpose, for migratory birds.”

Consolidated Farm and Rural Development Act (7 U.S.C. 1924): “for conservation purposes.”

2.4 Visions

At the beginning of the planning process, the Service developed a vision for each unit in the Complex. These vision statements describe the focus of management, including what will be different in the future, and form the essence of what the Service is trying to accomplish at the Complex by the end of the 15-year life of the CCP. These vision statements appear below.

VISION STATEMENT FOR THE LAKE ANDES NATIONAL WILDLIFE REFUGE

Migratory birds thrive on wetlands and grasslands composed of native plants. Visitors enjoy walking the foot trails, watching and photographing wildlife, and learning about Plains and Prairie Pothole Region habitat. Teachers bring their students to the refuge’s outdoor classroom.

VISION STATEMENT FOR THE KARL E. MUNDT NATIONAL WILDLIFE REFUGE

Soaring bald eagles hunt, roost, and rear their young in this cottonwood forest where Lewis and Clark ventured up the Missouri River. Booming prairie chickens share the Missouri River bluffs with wild turkey, sharp-tailed grouse, quail, and songbirds. Careful observers, floating downstream along the refuge’s portion of the Missouri National Recreational River, may notice hunting bobcats, hovering raptors, or flying bats above placidly feeding deer. Wildlife-dependent recreational opportunities on this refuge foster a greater understanding of the refuge’s resources and the mission of the National Wildlife Refuge System.



Karl E. Mundt National Wildlife Refuge

VISION STATEMENT FOR THE LAKE ANDES WETLAND MANAGEMENT DISTRICT

The waterfowl production areas and conservation easements of the Lake Andes Wetland Management District provide a network of wetland and grassland habitats that preserve the integrity of vital nesting and breeding grounds of North America's migratory waterfowl. This mosaic of diverse and vigorous plant communities, interspersed with wetland complexes, supports a variety of marsh birds, shorebirds, songbirds, and colonial birds, as well as prairie grouse, upland plovers, sand pipers, and other resident wildlife species typical of the Plains and Prairie Pothole Region. District staff, landowners, cooperators, neighbors, and other partners work together to promote habitat conservation programs throughout the district and to control invasive plant species on public lands. Both consumptive and non-consumptive compatible wildlife-dependent recreational uses are allowed on these public lands.

2.5 Goals

The Service developed five management goals for the Lake Andes National Wildlife Refuge Complex. These goals will direct efforts toward achieving the vision and purpose(s) of each unit in the Complex. These goals are based on the Improvement Act, the purpose(s) of each unit in the Complex, and information developed during planning.

WETLANDS GOAL

Acquire, restore, manage, and protect wetlands for the conservation of migratory birds and other water-dependent species endemic to the Plains and Prairie Pothole Region.

RIPARIAN GOAL

Acquire, restore, manage, and protect riparian habitats endemic to the lower Missouri River for the

conservation of bald eagles, other species of concern, and migratory birds.

UPLANDS GOAL

Acquire, restore, manage, and maintain a diverse mix of native grassland habitats to support migratory birds and resident wildlife found in the northern mixed-grass prairie ecosystem.

VISITOR SERVICES GOAL

Provide opportunities for high quality and compatible hunting, fishing, environmental education, environmental interpretation, wildlife photography, and wildlife observation for persons of all abilities and cultural backgrounds by fostering an understanding and appreciation of the Lake Andes National Wildlife Refuge Complex and the missions of the Service and Refuge System.

OPERATIONS GOAL

Provide funding, staffing, infrastructure, protection of cultural resources, partnerships, and a safe working environment to achieve the purposes and objectives of the Lake Andes National Wildlife Refuge Complex.

2.6 Planning Issues

Several key issues were identified following the analysis of comments collected from Service staff and the public and a review of the requirements of the Improvement Act and NEPA. These key issues were considered in the development of alternatives (chapter 3) and are summarized below.

LAKE ANDES WATER QUALITY AND FISHERY

Over the past 100 years Lake Andes has supported a boom-and-bust fishery that has been successful during wet periods (when fish are abundant) and unsuccessful during dry periods (which fish die out). Over the years several events and processes have affected the fishery as well as the water quality on which numerous plants, fish, and migratory birds depend. Responding to complaints of flooding, the U.S. Congress in 1921 ordered an artificial outlet constructed on the lake to reduce the maximum depth from 25 feet to 12 feet. Limiting the maximum depth results in a shallower lake that will be low or dry more frequently than before. Additionally, ongoing agricultural activities in the watershed have deposited phosphorus, nitrogen, and sediment in the lake. These deposits reduce levels of dissolved oxygen in the water, affecting fish, vegetation, and the fishery. As a result, rough fish—which can survive in oxygen-poor water—have become more prevalent and difficult to control in the lake and watershed.



USFWS

Over the past 100 years Lake Andes has supported a boom-and-bust fishery that has been successful during wet periods (when fish are abundant) and unsuccessful during dry periods (when fish die out).

During scoping, numerous comments were received asking that the restoration of Lake Andes be included in the CCP.

INVASIVE PLANT CONTROL

Invasive plants are degrading the quality of Complex habitats. Canada thistle, leafy spurge, musk thistle, wormwood sage, Russian olive, smooth brome, and Kentucky bluegrass are the primary species of concern. Of these, Canada thistle occupies the greatest number of acres on the Complex and creates the biggest problem when its seeds become airborne in July. There is more thistle than can be treated in one growing season with the resources available to the Complex. Noxious weed infestations are particularly troublesome for neighboring landowners who are required by State and local laws to control those species of plants on their lands. Some of these landowners see Complex lands as the source of invasive plants colonizing their lands. Comments received during scoping indicated that the Complex's neighbors desire more effective control of noxious weeds on Complex properties.

MONITORING AND RESEARCH

Additional surveys and research are needed to provide the science-based information necessary to improve management on the Complex.

PRAIRIE RESTORATION

Much of the native prairie that existed in this area before settlement has been lost through cultivation or degraded by invasive plants such as smooth brome or Kentucky bluegrass. Once broken, native prairie is essentially lost; however, restoration of native grasses and forbs can provide habitat that is very valuable to waterfowl and other migratory birds. During scoping for the CCP, a number of people expressed a desire for more prairie restoration on the Complex.

PUBLIC ACCESS AND OPPORTUNITIES FOR WILDLIFE-DEPENDENT RECREATION

Much of Lake Andes Refuge and all of Karl E. Mundt Refuge are closed to public use. During scoping, a number of people commented that they would like the planning team to explore the possibility of expanding public access opportunities on both of these refuges.

FUNDING, INFRASTRUCTURE, AND PARTNERSHIPS

Funding limits the staffing, the infrastructure, and to a large degree the capability of the Complex staff to conserve wildlife and to provide wildlife-dependent recreation. Partnerships are an important way to help expand the staff's capabilities to conserve wildlife and provide more and better recreation opportunities, especially when funding is so limited.

CHAPTER 3—Alternatives



USFWS

The Karl E. Mundt National Wildlife Refuge encompasses a portion of the Missouri National Recreational River.

Alternatives are different approaches to management of the Complex. Alternatives are designed to resolve Complex issues; achieve the purposes, visions, and goals associated with the Complex; help fulfill the mission of the Refuge System; and comply with current laws, regulations, and policies. This chapter describes three management alternatives considered for the Lake Andes National Wildlife Refuge Complex:

- alternative A, current management (no action)
- alternative B, modified management (proposed action)
- alternative C, intensive management

NEPA requires an equal and full analysis of all alternatives considered for implementation.

3.1 Substantive Issues and Alternatives Development

Based on public input from scoping meetings and written comments, as well as guidelines from NEPA, the Improvement Act, and Service Planning Policy, the planning team selected the substantive issues that will be addressed at the Complex:

- restoration of Lake Andes water quality and fishery
- invasive plant control
- monitoring and research

- prairie restoration
- public access and opportunities for wildlife-dependent recreation
- funding, infrastructure, and partnerships

These issues are summarized above in section 2.6, “Planning Issues.” The planning team discussed alternatives for management that will address these substantive issues and meet the goals of the Refuge System. Each alternative described in the following sections addresses each substantive issue somewhat differently.

3.2 Elements Common to All Alternatives

A number of elements are common to all three alternatives:

- addressing water quality and quantity concerns
- potentially using of an array of practices to manage habitats (for example, mechanical, chemical, or biological control methods)
- emphasizing acquiring, monitoring, and enforcing easements
- protecting all known and newly discovered cultural resources
- restoring prairies to native grasses to improve nesting habitat for waterfowl and other migratory birds

3.3 Description of Alternatives

The theme and general management direction for each alternative is described below.

ALTERNATIVE A—CURRENT MANAGEMENT (NO ACTION)

Under alternative A, current management activities conducted by the Service throughout the Complex would not change. The Service would not develop any new management, restoration, or education programs for the Complex. Staff would not modify or expand current habitat and wildlife management practices conducted for the benefit of migratory birds and other wildlife. Staff would perform monitoring and research activities at current levels. Funding and staff levels would not change. Programs would continue in the same direction with the same intensity.

Wetlands Goal

Water Quality. Water quality in Lake Andes is poor. Excessive nutrients from the surrounding watershed and a persistent population of rough fish limit not only the presence of oxygen in the water, but also the presence of aquatic vegetation. Poor water quality significantly degrades the quality of fish and wildlife habitat in the lake. Actions to restore the lake and the surrounding watershed would help the lake achieve its full potential as fish and wildlife habitat.

At present Complex staff is participating in meetings with the Charles Mix County Lake Restoration Organization (CMCLRO) and supporting and guiding its efforts to improve water quality and quantity in Lake Andes. CMCLRO seeks to improve water quality through the following actions:

1. Sediment removal. CMCLRO seeks to remove sediments from Lake Andes that are laden with high levels of nitrogen and phosphorus—nutrients that lead to frequent algae blooms that cloud the water and block sunlight penetration to a degree that many species of aquatic plants cannot grow. When the algae decompose, the oxygen content of the lake water is reduced to a level at which sport fish species and other aquatic animals and plants cannot survive.
2. Supporting soil conservation practices. CMCLRO is supporting ongoing government efforts to clean up the Lake Andes watershed through cost-shared, voluntary soil conservation practices (for example, planting buffer strips to reduce agricultural runoff, fencing livestock out of seasonal drainages, and cost-sharing agricultural waste containment systems).

3. Controlling the rough fish population. CMCLRO intends to remove carp and bullhead species of rough fish that persist in oxygen-poor waters. The feeding behaviors of these fish agitate the water to the degree that sunlight penetration is blocked, thereby reducing aquatic vegetation.

Under alternative A, Complex staff would continue to work with CMCLRO to improve water quality in Lake Andes.

Water Quantity. Water levels in Lake Andes are highly variable. The lake has no water source other than run-off from snow and rain. The basin goes dry on average every 10–20 years. Although periodic drying has both positive and negative effects on fish and wildlife, a reliable source of clean water would present opportunities to manage water levels to provide nationally significant fish and wildlife habitat.

CMCLRO seeks to improve water quantity by developing a reliable source of clean water for Lake Andes. Complex staff is participating in meetings with CMCLRO, supporting and guiding their efforts; this coordination would continue under alternative A. At this time the most likely water source would be Lake Francis Case, which is approximately 8 miles from Lake Andes.

Disease Control. Historically, avian cholera, botulism, and duck virus enteritis (DVE) outbreaks have occurred infrequently on the Complex. The last documented outbreaks occurred in 1984, 1980, and 1973.

Under this alternative, limited monitoring, containment, and clean-up of diseased birds would continue in accordance with the existing “Lake Andes National Wildlife Refuge Complex Wildlife Disease Contingency Plan” (WDCP). Wetlands (especially the Owens Bay Unit of the Lake Andes Refuge) would be monitored during peak migration periods in spring and fall.

Because of the risk to humans from highly pathogenic avian influenza (HPAI), increased emphasis would be placed on bird species known or suspected to be highly susceptible (for example, lesser scaup).

Riparian Goal

Cottonwood Restoration on Karl E. Mundt Refuge. Dams on the Missouri River have significantly reduced the reproduction and survival of cottonwoods on which bald eagles and many species of neotropical migratory birds depend. Cottonwood planting is necessary in order for these species to have suitable habitat on Karl E. Mundt Refuge in the future. Cottonwood restoration on this refuge is currently conducted, and would continue to be conducted, in a sporadic, opportunistic fashion, only as funding and staffing allows. Periodically, cottonwood seedlings would be planted and then fenced for approximately 5 years to protect them from deer and rabbits. There is and would be no formal plan.

Uplands Goal

Avian Nest Predator Control. Red foxes, striped skunks, and raccoons routinely prey on the nests of ground-nesting birds. In areas of limited nesting habitat, predators can suppress a bird population. Funding and staffing shortages preclude predator management on the Complex. Recreational trapping and hunting of mammalian predators would continue to be allowed on waterfowl production areas; however, these activities do not and would not occur to the degree that predator populations are controlled.

Habitat Restoration. Complex uplands are managed for tall, dense cover because it is attractive to nesting ducks. In addition to benefiting waterfowl, such vegetation is also favored by many other grassland birds. Under this alternative, the Complex would continue to restore and enhance the tall- and mixed-grass plant communities to create a mosaic that reflects the habitat requirements for waterfowl and other grassland-nesting birds. Restoration efforts must be compatible with invasive plant control efforts; this generally limits the opportunity to plant forbs. Lands with a cropping history that are infested with invasive plants would be farmed by cooperators for several growing seasons to prepare them for subsequent grassland restoration. Lands without a cropping history (that is, native prairie) would be managed with haying, grazing, and burning to keep them vigorous and productive.

Issues and Areas of Concern Relating to All Habitats

Invasive Plant Control. Canada thistle, musk thistle, leafy spurge, wormwood sage, eastern red cedar, Siberian elm, and Russian olive are the primary invaders of Complex lands. Smooth brome, Kentucky bluegrass, and crested wheatgrass also invade a large percentage of the Complex; however, attempts to control these grasses are secondary. Most control efforts are directed at Canada thistle using grazing, haying, mowing, and biological methods. This species is a pervasive pest partly because control measures are limited and generally require repeated applications. Canada thistle colonizes the wetland margins and then spreads into the uplands. Areas identified for treatment are generally grazed, mowed, or burned prior to chemical application.

Under alternative A, Complex management will continue to control invasive plants on wetlands, uplands, and riparian lands using chemical, mechanical, and biological control methods. Due to funding and staffing shortages, most infestations are currently treated only once every 3 years, which can be problematic because uplands often become re-infested within 3–5 years.

Noxious weed infestations are particularly troublesome for neighboring landowners who are required

by State and local laws to control those species of plants on their lands. Some of these landowners see Complex lands as the source of invasive plants colonizing their lands.

As is currently the practice, prescribed fire would be used primarily as a habitat management treatment to keep grasslands vigorous. Most burning to control of invasive plants would occur when the target plant species reaches the stage when it is most vulnerable; for smooth brome, this would be the “four or five leaf stage.” Most burning would occur during the months of April and May, with the objective of decreasing invasive cool-season grasses (smooth brome and Kentucky bluegrass) in favor of warm-season native grasses.

Habitat Protection. The Service will continue to pursue opportunities to protect wetland and grassland habitats on a willing-seller basis. The mechanisms to conserve valuable wetland habitat will include (but not be limited to) purchasing easements and fee title of lands (land which would then be government-owned). Approximately 3,000 acres of wetland and grassland habitat are protected annually through easement acquisition. Lands that are for sale and next to Complex lands will be inspected for possible purchase. Complex staff would also continue to monitor and enforce wetland and grassland easement provisions and Farmers Home Administration (FmHA) conservation easement provisions in accordance with current policies.

The two units of the Karl E. Mundt Refuge are separated by a tract of private land. Complex staff would continue to pursue a conservation easement on the private tract, as development of this tract would compromise the habitat integrity of the refuge.

A significant issue on the Karl E. Mundt Refuge, which lies approximately 4 miles downstream of the Fort Randall Dam, is riverbank erosion. During periods of high water releases from the dam, erosion is substantial where the bank has not been riprapped (approximately 20 percent of the riverbank is unprotected). Mature cottonwood trees that are used by bald eagles fall into the river when the soil holding them up erodes. The National Park Service, which maintains the Missouri National Recreational River, is opposed to the addition of riprap because of aesthetics, downstream erosion impacts, and the effect it has on attempts to convince riparian landowners to forego riprap. Riverbank protection would remain unchanged under this alternative.

Another issue on the Karl E. Mundt Refuge is that beavers sometimes kill cottonwood trees that are used by bald eagles for roosting and nesting. When chewing activities are particularly acute, a local trapper is permitted to trap beaver near the problem area(s). Where chewing has not progressed to the point where cottonwoods have been completely girdled, individual trees would be wrapped with wire to protect them from beaver.

Visitor Services Goal

Hunting. Hunting would continue on all waterfowl production areas throughout the Complex and on the Center Unit of the Lake Andes Refuge.

Fishing. Fishing would be allowed on all waterfowl production areas throughout the Complex and in the Center and South Units of Lake Andes Refuge (note, however, that most wetlands on the Complex are too shallow to sustain a sport fishery). Stocking of fish would continue to be limited to Schaeffer and Scheffel Waterfowl Production Areas and the Center and South Units of the Lake Andes Refuge.

Complex staff would continue to participate in meetings with CMCLRO and support and guide its efforts to improve water quality and quantity in Lake Andes. Complex staff would also support the group's efforts to restore a sport fishery in the South Unit of Lake Andes and to develop a fishing pond on the edge of the town of Lake Andes.

Environmental Education and Interpretation. Complex staff would continue to provide environmental education and interpretation as requested. Activities would include hosting school groups; conducting refuge tours; providing hunter safety courses; and holding outdoor festivals, fairs, and expos.

Wildlife Observation and Photography. Opportunities for wildlife observation and photography would continue to be provided in a passive manner. Foot trails on Atkins Waterfowl Production Area and the Owens Bay Unit of Lake Andes Refuge would remain open and be maintained.

The Karl E. Mundt Refuge would remain closed to public entry.

All waterfowl production areas on the Complex would remain open to recreational trapping in addition to hunting, fishing, wildlife observation, photography, environmental education, and interpretation.

Operations Goal

Staffing and Funding. Staffing and funding would be limited to the current levels (appendix E), which are inadequate to properly manage the resources and facilities of the Complex.

Infrastructure, Equipment, and Operations and Maintenance. Infrastructure, equipment, and operations and maintenance would be limited to the current levels (appendix E). No additional buildings, heavy equipment, and vehicles would be added, only replaced as needed.

Monitoring and Research. Limited monitoring of habitat conditions and wildlife populations would continue in the wetlands (the 4-square-mile waterfowl survey, breeding shorebird survey, and waterfowl population survey), riparian areas (wintering and nesting bald eagle surveys), and uplands (the breeding mourning

dove survey, Christmas bird count, and breeding shorebird survey). Requests for research within the Complex would be permitted if deemed compatible with the purposes of the units of the Complex.

Cultural Resources. Cultural resources would continue to be protected in accordance with Federal and State laws and regulations, specifically Section 106 of the National Historic Preservation Act of 1966, whenever ground-disturbing activities are planned.

Partnerships. Inadequate funding and staffing would prevent the Complex from pursuing partnerships beyond those made with approximately 80 cooperators for grazing, haying, and farming.

Partnerships addressing wildlife conservation on private lands would continue to be supported through the collaboration between the biologist on station and Partners for Fish and Wildlife. Most of these projects would continue to focus on wetland restoration, grassland restoration, and implementation of grazing systems that are beneficial to ground-nesting birds and other wildlife.

ALTERNATIVE B—MODIFIED MANAGEMENT

This alternative focuses on addressing many of the external and internal comments received during scoping (section 3.1, "Substantive Issues and Alternatives Development"). Under this alternative there would be increased efforts to restore fish and wildlife habitat on Lake Andes; more effective control of invasive plants; more focused monitoring, studies, and research activities; more restoration of native plants in grasslands; expanded opportunities for hunting, fishing, environmental education, interpretation, and wildlife observation and photography; and increased funding for the additional staff, infrastructure, and partnerships necessary to allow the Complex to fulfill the purposes for which the units of the Complex were established by Congress.

Wetlands Goal

Water Quality. Water quality in Lake Andes is poor. Excessive nutrients from the surrounding watershed and a persistent population of rough fish limit not only the presence of oxygen in the water, but also the presence of aquatic vegetation. Poor water quality significantly degrades the quality of fish and wildlife habitat in the lake. Actions to restore the lake and the surrounding watershed would help the lake achieve its full potential as fish and wildlife habitat.

The Complex staff would continue to participate in meetings with CMCLRO and support and guide its efforts to improve water quality and quantity in Lake Andes. CMCLRO seeks to improve water quality through the following actions:

1. Sediment removal. CMCLRO seeks to remove sediments from Lake Andes that are laden with

high levels of nitrogen and phosphorus—nutrients that lead to frequent algae blooms that cloud the water and block sunlight penetration to a degree that many species of aquatic plants cannot grow. When the algae decompose, the oxygen content of the lake water is reduced to a level at which sport fish species and other aquatic animals and plants cannot survive.

2. Supporting soil conservation practices. CMCLRO is supporting ongoing government efforts to clean up the Lake Andes watershed through cost-shared, voluntary soil conservation practices (for example, planting buffer strips to reduce agricultural runoff, fencing livestock out of seasonal drainages, cost-sharing agricultural waste containment systems).
3. Controlling the rough fish population. CMCLRO intends to remove carp and bullhead species of rough fish that persist in oxygen-poor waters. The feeding behaviors of these fish agitate the water to the degree that sunlight penetration is blocked, thereby reducing aquatic vegetation.

Under this alternative, the use of additional fish screens to reduce the immigration of rough fish into Lake Andes would be investigated and implemented if practical. If implemented, fish screens would be placed on all tributaries leading into the lake and under both dikes.

Water Quantity. Water levels in Lake Andes are highly variable. The lake has no water source other than runoff from snow and rain. The basin goes dry on average every 10–20 years. Although periodic drying has both positive and negative effects on fish and wildlife, a reliable source of clean water would present opportunities to manage water levels to provide nationally significant fish and wildlife habitat.

CMCLRO seeks to improve water quantity by developing a reliable source of clean water for Lake Andes. Complex staff is participating in meetings with CMCLRO and supporting and guiding its efforts; this coordination would continue under alternative B. At this time the most likely water source would be Lake Francis Case, which is approximately 8 miles from Lake Andes.

Under this alternative, a water system that would pump water from the Center Unit into the South Unit of Lake Andes would be investigated and implemented if practical. Such a water system would provide greater water depths in the South Unit for sport fishing while providing shallower depths for waterfowl habitat in the Center Unit.

Disease Control. Historically, avian cholera, botulism, and DVE outbreaks have occurred infrequently on the Complex. The last documented outbreaks occurred in 1984, 1980, and 1973.

Under this alternative, limited monitoring, containment, and clean-up of diseased birds would continue



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Although managing habitat for bald eagles on Karl E. Mundt Refuge would occur under all three alternatives, alternatives B and C call for expanded efforts.

in accordance with the existing WDCP. Wetlands (especially the Owens Bay Unit of Lake Andes Refuge) would be monitored during peak migration periods in spring and fall. Under this alternative, additional surveys would be conducted on other Service lands that have high concentrations of bird species known or suspected to be susceptible to HPAI (for example, lesser scaup).

Riparian Goal

Cottonwood Restoration on Karl E. Mundt Refuge. Dams on the Missouri River have significantly reduced reproduction and survival of cottonwoods on which bald eagles and many species of migratory birds depend. Cottonwood planting is necessary in order for these species to have suitable habitat on the Karl E. Mundt Refuge in the future. Restoration of cottonwood-dominated riparian habitats on this refuge is currently conducted in a sporadic, opportunistic fashion, as funding and staffing allows. There is no formal plan directing these restoration efforts. Under this alternative, however, Complex staff would develop and implement a stepdown riparian woodland habitat management plan on Karl E. Mundt Refuge. Cottonwoods and other woodland plants would be established in the riverbottom and, in some cases, in upland areas. When young, these plants would be fenced to protect them from herbivory. Herbaceous plants would be controlled around these seedlings for the first 3–5 growing seasons to aid establishment, reduce competition, and boost growth.

Uplands Goal

Avian Nest Predator Control. Red foxes, striped skunks, and raccoons routinely prey on the nests of ground-nesting birds. In areas of limited nesting habitat, predators can suppress a bird population. Funding and staffing shortages preclude predator management on the Complex. Recreational trapping and hunting of



Prescribed fire would be used as a management tool under all three alternatives.

mammalian predators is allowed on waterfowl production areas; however, it does not occur to the degree that predator populations are controlled.

To enhance nesting success, waterfowl nest predators—namely skunk, fox, and raccoon—would be removed from selected areas during the nesting period by trapping. The removal of these waterfowl nest predators would not only increase nesting success for waterfowl but would also increase nesting success for other ground-nesting migratory birds. Complex staff would facilitate the implementation of partner operated predator control programs on large blocks of land to increase waterfowl production throughout the district where the block of land averages 40 duck pairs or more per square mile.

Habitat Restoration and Reconstruction. Complex uplands are managed for tall, dense cover because it is attractive to nesting ducks. In addition to benefiting waterfowl, such vegetation is also favored by many other grassland birds. Under this alternative, the Complex would continue to restore and enhance the tall- and mixed-grass plant communities to create a mosaic that reflects the habitat requirements for waterfowl and other grassland-nesting birds. Restoration efforts must be compatible with invasive plant control efforts; this generally limits the opportunity to plant forbs. Lands with a cropping history that are infested with invasive plants would continue to be farmed by cooperators for several growing seasons to prepare them for subsequent grassland restoration. Grazing, burning, and haying would be used to keep grasslands vigorous before and after restoration. Restored grasslands and lands without a cropping history (that is, native prairie) would continue to be managed with haying, grazing, or burning to keep them vigorous and productive. Sites that do not respond to the above management treatments would be inter-seeded with native grasses or forb mix.

Under this alternative, the focus would be on restoration of a high diversity of native grasses and forbs. Approximately 200 acres of upland would be restored annually.

This alternative would call for the purchase of equipment for collection of desirable plant seeds and construction of a building for cleaning, drying, and storing those seeds.

Issues and Areas of Concern Relating to All Habitats

Invasive Plant Control. Canada thistle, musk thistle, leafy spurge, wormwood sage, eastern red cedar, Siberian elm, and Russian olive are the primary invaders of Complex lands. Smooth brome, Kentucky bluegrass, and crested wheatgrass also invade a large percentage of the Complex lands; however, attempts to control these grasses are secondary. Most control efforts are directed at Canada thistle using grazing, haying, mowing, and biological methods. This species is a pervasive pest partly because control measures are limited and generally require repeated applications. Canada thistle colonizes the wetland margins and then spreads into the uplands.

Noxious weed infestations are particularly troublesome for neighboring landowners who are required by State and local laws to control those species of plants on their lands. Some of these landowners see Complex lands as the source of invasive plants colonizing their lands.

Currently areas identified for treatment are generally grazed, mowed, or burned prior to chemical application. Complex management would continue to control invasive plants on wetlands, uplands, and riparian lands using chemical, mechanical, and biological control methods. Due to funding and staffing shortages, most infestations are currently treated once every 3 years, which can be problematic because uplands often become re-infested within 3–5 years. Under alternative B, infestations on Lake Andes Refuge, Karl E. Mundt Refuge, and high priority waterfowl production areas would be treated annually. Remaining infestations would continue to be treated once every 3 years.

Formal monitoring and mapping of infestations of invasive plants on the Complex would be initiated under this alternative. This alternative calls for annual surveys to detect the presence of species of invasive plants that have not been widely established on the Complex, such as saltcedar. Infestations that are detected would be mapped, treated, and retreated annually with the goal of eradication. Additionally, there would be an increased emphasis on control of eastern red cedar, Russian olive, and other invasive tree species.

Prescribed fire would be used primarily as a habitat management treatment to keep grasslands vigorous. Prescribed fires could occur at any time of year depending on management objectives. However, most burning would generally occur in the months of April and May, with the objective of decreasing invasive

cool-season grasses (smooth brome and Kentucky bluegrass) in favor of warm-season native grasses.

Habitat Protection. The Service would continue to pursue opportunities to protect wetland habitats on a willing-seller basis. The mechanisms to conserve valuable wetland habitat would include (but not be limited to) purchasing easements and fee title of lands. Approximately 3,000 acres of wetland and grassland habitat is protected annually through easement acquisition. Lands that are for sale and next to Complex lands would be inspected for possible purchase. The Service would also analyze and pursue the acquisition of land with high wetland and wildlife values even if these lands are not next to Refuge System lands. Under this alternative, Complex staff would contact landowners within the area encompassed by the Lake Andes District whose lands fall within areas identified with a density of 60 duck pairs or more per square mile for possible easement acquisition.

Under this alternative, the Complex staff would analyze and pursue exchange of low priority Refuge System lands that possess marginal wildlife values, including fee title lands and FmHA conservation easements.

Complex staff would also continue to monitor and enforce wetland easement provisions and FmHA conservation easement provisions in accordance with current policies.

The two units of the Karl E. Mundt Refuge are separated by a tract of private land. This alternative would pursue acquisition (if the landowner is willing) of a conservation easement or fee title for the tract of land that lies between the two units of the refuge.

A significant issue on the Karl E. Mundt Refuge, which lies approximately 4 miles downstream from the Fort Randall Dam, is riverbank erosion. During periods of high water releases from the dam, erosion is substantial where the bank has not been riprapped (approximately 20 percent of the riverbank is unprotected). Mature cottonwood trees that are used by bald eagles fall into the river when the soil holding them up erodes. The Missouri National Recreational River (managed by the National Park Service), which runs through the Complex, is opposed to the addition of riprap because of aesthetics and downstream erosion impacts. Under this alternative, methods to prevent streambank erosion on this refuge would be investigated and implemented in cooperation with the Missouri National Recreational River and the U.S. Army Corps of Engineers. The emphasis would be on instream structures such as weirs (which do not create erosion problems downstream) rather than riprap.

Another issue on the Karl E. Mundt Refuge is that beavers sometimes kill cottonwood trees that are used by bald eagles for roosting and nesting on riparian habitats. When chewing activities are particularly acute

a local trapper is permitted to trap beaver near the problem area(s). Where chewing has not progressed to the point where cottonwoods have been completely girdled, individual trees would be wrapped to protect them from beavers. Under this alternative, staff would identify and protect mature cottonwood trees that have high potential for bald eagle nesting and roosting.

Visitor Services Goal

Hunting. Hunting would continue on all waterfowl production areas throughout the Complex and on the Center Unit of Lake Andes Refuge.

Boat access for waterfowl hunters to the Center Unit would be improved through the construction of a boat ramp that is functional at a wide range of water levels and highly resistant to ice damage.

Expansion of hunting accessibility and opportunity through the addition of limited hunts (for example, for hunters with disabilities or hunters with bows or muzzleloaders) would be investigated in cooperation with the State. Complex staff would review areas currently closed to hunting to determine their compatibility for hunting.

Fishing. Fishing would be allowed on all waterfowl production areas throughout the Complex and on the Center and South Units of Lake Andes Refuge (note, however, that most wetlands on the Complex are too shallow to sustain a sport fishery). Stocking of fish is currently limited to Schaeffer and Scheffel Waterfowl Production Areas and the Center and South Units of the Lake Andes Refuge.

Complex staff would continue to participate in meetings with CMCLRO and support and guide its efforts to improve water quality and quantity in Lake Andes. Complex staff would also support the group's efforts to restore a sport fishery in the South Unit of Lake Andes and to develop a fishing pond on the edge of the town of Lake Andes.

Boat access for anglers to the South Unit of Lake Andes would be improved through the construction of a boat ramp that is functional at a wide range of water levels and highly resistant to ice damage.

Environmental Education and Interpretation. Complex staff would continue to provide environmental education and interpretation as requested. Activities would include hosting school groups; conducting refuge tours; providing hunter safety courses; and holding outdoor festivals, fairs, and expos.

This alternative calls for an outdoor recreation planner to be added to the staff (appendix E). Opportunities for environmental education and interpretation would be expanded by drafting and executing an outreach plan for the surrounding area. Teacher workshops would be part of the plan, as would additional interpretive signs, exhibits, and brochures.

The existing headquarters building would be remodeled to provide a visitor center and environmental education classroom.

Wildlife Observation and Photography. Current opportunities for wildlife observation and photography would continue to be provided. Foot trails on Atkins Waterfowl Production Area and the Owens Bay Unit of Lake Andes Refuge would continue to be maintained. The accessibility of existing foot trails would be improved by paving or firming the surface.

All waterfowl production areas on the Complex would remain open to recreational trapping in addition to hunting, fishing, wildlife observation, photography, environmental education, and interpretation.

Limited portions of Karl E. Mundt Refuge and portions of Lake Andes Refuge that are currently closed to the public would be opened for wildlife observation and photography. Observation and photography blinds would be provided in appropriate locations on the Complex.

Operations Goal

Staffing and Funding. Staffing and funding would be significantly expanded to carry out this alternative and accomplish the vision statements and goals developed for this plan.

Infrastructure, Equipment, and Operations and Maintenance. The existing headquarters building would be remodeled and expanded to provide a visitor center and to accommodate additional employees.

The existing maintenance shop and storage buildings would be remodeled and expanded to correct deficiencies and to accommodate additional staff and equipment.

Additional equipment and vehicles would be added to the Complex fleet.

Monitoring and Research. Limited monitoring of habitat conditions and wildlife populations would continue in the wetlands (the 4-square-mile waterfowl survey, breeding shorebird survey, and waterfowl population survey), riparian areas (wintering and nesting bald eagle surveys), and uplands (breeding mourning dove survey, Christmas bird count, and breeding shorebird survey). Monitoring surveys and studies conducted by Complex staff would be expanded to better understand the effects of management treatments on habitats and wildlife populations and to better address refuge management issues. For example, staff might conduct a study to determine the most effective way to restore a high diversity of native grasses and forbs in areas that are infested with invasive plants. New surveys and studies would also be added and may include habitat and invasive plant mapping; migratory bird surveys; and studies of nests, prescribed fire effects, invasive plant control effects, upland restoration projects.



Research and monitoring efforts would be expanded under alternatives B and C.

University-led research to develop methods for riparian and prairie restoration and weed control on waterfowl production areas and refuges would be encouraged. Requests for research within the Complex would be permitted if deemed compatible with the purposes of the units of the Complex. Research needs for the Complex (for example, identifying more effective strategies to restore smooth brome-dominated grasslands or identifying more effective strategies to restore cottonwoods) would be identified, prioritized, and pursued within the research community. Compared to alternative A, this is a proactive approach to research on the Complex.

Cultural Resources. Cultural resources would continue to be protected in accordance with Federal and State laws and regulations, specifically Section 106 of the National Historic Preservation Act of 1966, whenever ground-disturbing activities are planned.

Partnerships. Besides the existing partnerships, Complex staff would actively seek partnerships with government agencies, organizations, sporting groups, and landowners to explore new avenues to fulfill the visions and goals of this plan.

Partnerships addressing wildlife conservation on private lands would continue to be supported through the collaboration between the biologist on station and Partners for Fish and Wildlife. Most of these projects would continue to focus on wetland restoration, grassland restoration, and implementation of grazing systems that are beneficial to ground-nesting birds and other wildlife.

The creation of a “friends” group (a group that would advocate for the Complex with political, financial, or volunteer support) would be pursued for greater support of Complex management.

ALTERNATIVE C—INTENSIVE MANAGEMENT

Like alternative B, this alternative addresses comments received during scoping. However it goes one step further and focuses on a more intensive approach to wildlife and public use management.

Wetlands Goal

Water Quality. Water quality in Lake Andes is poor. Excessive nutrients from the surrounding watershed and a persistent population of rough fish limit not only the presence of oxygen in the water, but also the presence of aquatic vegetation. Poor water quality significantly degrades the quality of fish and wildlife habitat in the lake. Actions to restore the lake and the surrounding watershed would help the lake achieve its full potential as fish and wildlife habitat.

The Complex staff would continue to participate in meetings with CMCLRO and support and guide its efforts to improve water quality and quantity in Lake Andes.

CMCLRO seeks to improve water quality through the following actions:

1. Sediment removal. CMCLRO seeks to remove sediments from Lake Andes that are laden with high levels of nitrogen and phosphorus—nutrients that lead to frequent algae blooms that cloud the water and block sunlight penetration to a degree that many species of aquatic plants cannot grow. When the algae decompose, the oxygen content of the lake water is reduced to a level at which sport fish species and other aquatic animals and plants cannot survive.
2. Supporting soil conservation practices. CMCLRO is supporting ongoing government efforts to clean up the Lake Andes watershed through cost-shared, voluntary soil conservation practices (for example, planting buffer strips to reduce agricultural runoff, fencing livestock out of seasonal drainages, cost-sharing agricultural waste containment systems).
3. Controlling the rough fish population. CMCLRO intends to remove carp and bullhead species of rough fish that persist in oxygen-poor waters. The feeding behaviors of these fish agitate the water to the degree that sunlight penetration is blocked, thereby reducing aquatic vegetation.

The use of additional fish screens to reduce the immigration of rough fish into Lake Andes would be investigated and implemented if practical. Fish screens would be placed on all tributaries leading into the lake and under both dikes.

Under this alternative, Complex staff would seek partnerships with landowners in the Lake Andes watershed to facilitate actions that would improve water quality in Lake Andes. Examples include using plant buffer strips or excluding livestock from drainages to reduce sediment and nutrient runoff into Lake Andes. These actions would be the same types of soil conservation actions that agencies like the Natural Resources Conservation Service are already facilitating; however, this alternative would enhance the existing effort and use the Partners for Fish and Wildlife Program.

Water Quantity. Water levels in Lake Andes are highly variable. The lake has no water source other than runoff from snow and rain. The basin goes dry on average every 10–20 years. Although periodic drying has both positive and negative effects on fish and wildlife, a reliable source of clean water would present opportunities to manage water levels to provide nationally significant fish and wildlife habitat.

CMCLRO seeks to improve water quantity by developing a reliable source of clean water for Lake Andes. Complex staff would continue to participate in meetings with CMCLRO, and support and guide its efforts. At this time the most likely source would be Lake Francis Case, which is approximately 8 miles from Lake Andes.

A water system that would pump water from the Center Unit into the South Unit of Lake Andes would be investigated and implemented if practical. Such a water system would provide greater water depths in the South Unit for sport fishing while providing shallower depths for waterfowl habitat in the Center Unit.

Disease Control. Historically, avian cholera, botulism, and DVE outbreaks have occurred infrequently on the Complex. The last documented outbreaks occurred in 1984, 1980, and 1973.

Monitoring, containment, and clean-up of diseased birds would continue in accordance with the existing WDCP. Wetlands (especially the Owens Bay Unit of the Lake Andes Refuge) would be monitored during peak migration periods in spring and fall.

Mortality surveys along pre-established routes would be conducted during migration and for wintering populations. Because of the risk to humans from HPAI, increased emphasis would be placed on bird species known or suspected to be highly susceptible (for example, lesser scaup).

Under this alternative, live birds (by trapping) and dead birds (by hunter check stations) would be actively sampled. Oropharyngeal and cloacal swabs would be used to determine presence or absence of disease.

Riparian Goal

Cottonwood Restoration on Karl E. Mundt Refuge. Dams on the Missouri River have significantly reduced reproduction and survival of cottonwoods on which bald eagles and many species of migratory birds depend. Cottonwood planting is necessary in order for these species to have suitable habitat on the Karl E. Mundt Refuge in the future. Restoration of cottonwood-dominated riparian habitats on this refuge is currently conducted in a sporadic, opportunistic fashion, as funding and staffing allows. There is no formal plan directing these restoration efforts.

Under this alternative, the Complex staff would develop and implement a stepdown riparian woodland habitat management plan for Karl E. Mundt Refuge.

Cottonwoods and other woodland plants would be established in the riverbottom and, in some cases, in upland areas. When young, these plants would be fenced to protect them from herbivory. Herbaceous plants would be controlled around these seedlings for the first three to five growing seasons to aid establishment, reduce competition, and boost growth.

Complex staff would work with the U.S. Army Corps of Engineers to provide river flows conducive to cottonwood restoration.

Uplands Goal

Avian Nest Predator Control. Red foxes, striped skunks, and raccoons routinely prey on the nests of ground-nesting birds. In areas of limited nesting habitat, predators can suppress a bird population. Funding and staffing shortages preclude predator management on the Complex. Recreational trapping and hunting of mammalian predators is allowed on waterfowl production areas; however, they do not occur to the degree that predator populations are controlled.

Under this alternative the staff would actively pursue partner-driven predator control throughout the Complex. To enhance nesting success, waterfowl nest predators—skunks, foxes, and raccoons—would be removed from selected areas during the nesting period by trapping. The removal of these waterfowl nest predators would not only increase nesting success for waterfowl but would also increase nesting success for other ground-nesting migratory birds. Complex staff would facilitate the implementation of predator control programs on large blocks of land that average 40 duck pairs or more per square mile to increase waterfowl production throughout the district.

Habitat Restoration. Complex uplands are managed for tall, dense cover because it is attractive to nesting ducks. In addition to benefiting waterfowl, such vegetation is also favored by many other grassland birds. Under this alternative, the Complex would continue to restore and enhance the tall- and mixed-grass plant communities to create a mosaic that reflects the habitat requirements for waterfowl and other grassland-nesting birds. Restoration efforts must be compatible with invasive plant control efforts; this generally limits the opportunity to plant forbs. Lands with a cropping history that are infested with invasive plants would continue to be farmed by cooperators for several growing seasons to prepare them for subsequent grassland restoration. Grazing, burning, and haying would be used to keep grasslands vigorous before and after restoration. Restored grasslands and lands without a cropping history (that is, native prairie) would continue to be managed with haying, grazing, or burning to keep them vigorous and productive.

Under this alternative, the focus would be on restoration of a high diversity of native grasses and

forbs. Approximately 300 acres of upland would be restored annually.

This alternative would call for the purchase of equipment for collection of desirable plant seeds and construction of a building for cleaning, drying, and storing those seeds.

Issues and Areas of Concern Relating to All Habitats

Invasive Plant Control. Canada thistle, musk thistle, leafy spurge, wormwood sage, eastern red cedar, Siberian elm, and Russian olive are the primary invaders of Complex lands. Smooth brome, Kentucky bluegrass and crested wheatgrass also invade a large percentage of the Complex lands; however, attempts to control these grasses are secondary. Most control efforts are directed at Canada thistle using grazing, haying, mowing, and biological methods. This species is a pervasive pest partly because control measures are limited and generally require repeated applications. Canada thistle colonizes the wetland margins and then spreads into the uplands.

Noxious weed infestations are particularly troublesome for neighboring landowners who are required by State and local laws to control those species of plants on their lands. Some of these landowners see Complex lands as the source of invasive plants colonizing their lands.

Areas identified for treatment are generally grazed, mowed, or burned prior to chemical application. Complex management will continue to control invasive plants on wetlands, uplands and riparian lands using chemical, mechanical, and biological control methods. Due to funding and staffing shortages, most infestations are currently treated once every 3 years, which can be problematic because uplands often become re-infested within 3–5 years. Under alternative C, infestations on Lake Andes Refuge, Karl E. Mundt Refuge, and high priority waterfowl production areas would be treated twice annually. Remaining infestations would continue to be treated once every 3 years.

Formal monitoring and mapping of invasive plant infestations on the Complex would be initiated under this alternative. This alternative calls for annual surveys to detect the presence of invasive plants that are not widely established on the Complex, such as saltcedar. All infestations found would be mapped, treated, and re-treated annually with the goal of eradication. Additionally, there would be an increased emphasis on control of eastern red cedar, Russian olive, and other invasive tree species.

Under alternative C, the Complex would pursue the formation of an invasive species “strike team” to more effectively control invasive plants on Service lands in South Dakota.

Prescribed fire would be used primarily as a habitat management treatment to keep grasslands vigorous.

Prescribed fires could occur at any time of year depending on management objectives. However, most burning would generally occur in the months of April and May, with the objective of decreasing invasive cool-season grasses (smooth brome and Kentucky bluegrass) in favor of warm-season native grasses.

Habitat Protection. The Service would continue to pursue opportunities to protect wetland habitats on a willing-seller basis. The mechanisms to conserve valuable upland habitat would include (but not be limited to) purchasing easements and fee title of lands. Approximately 3,000 acres of wetland and grassland habitat is protected through easement acquisition annually. Under this alternative, lands that are for sale and next to Complex lands would be inspected for possible purchase. Complex staff would also analyze and pursue the acquisition of land with high wildlife values even if these lands are not next to Refuge System lands. Complex staff would also pursue grassland easement acquisition from landowners within the area encompassed by the Lake Andes District whose lands fall within the areas identified with a density of 60 duck pairs or more per square mile.

Complex staff would analyze and pursue exchange of low priority Refuge System lands that possess marginal wildlife values, including fee title lands and FmHA conservation easements.

The Complex staff would also continue to monitor and enforce wetland easement provisions and FmHA conservation easement provisions in accordance with current policies.

The two units of the Karl E. Mundt Refuge are separated by a tract of private land. The habitat integrity of the refuge would suffer if this tract of private land were developed. Rather than pursuing a conservation easement, this alternative would pursue acquisition (if the landowner is willing) of fee title to the tract of land that lies between the two units of the Karl E. Mundt Refuge.

A significant issue on the Karl E. Mundt Refuge, which lies approximately 4 miles downstream of the Fort Randall Dam, is riverbank erosion. During periods of high water releases from the dam, erosion is substantial where the bank has not been riprapped (approximately 20 percent of the riverbank is unprotected). Mature cottonwood trees that are used by bald eagles fall into the river when the soil holding them up erodes. The National Park Service, which maintains the Missouri National Recreational River, is opposed to the addition of riprapp because of aesthetics, downstream erosion impacts, and the effect it has on attempts to convince riparian landowners to forego riprapp. Methods to prevent streambank erosion on this refuge would be investigated and implemented in cooperation with the National Park Service and the U.S. Army Corps of Engineers. The emphasis would be on

instream structures such as weirs (which do not create erosion problems downstream) rather than riprapp.

Another issue on the Karl E. Mundt Refuge is that beavers sometimes kill cottonwood trees that are used by bald eagles for roosting and nesting on riparian habitats. When chewing activities are particularly acute a local trapper is permitted to trap beaver near the problem area(s). Under this alternative, staff would identify mature cottonwood trees and protect them with a basal wrap that prevents herbivory.

Visitor Services Goal

Hunting. Hunting would continue on all waterfowl production areas throughout the Complex and on the Center Unit of the Lake Andes Refuge.

Boat access for waterfowl hunters to the Center Unit would be improved through the construction of a boat ramp that is functional at a wide range of water levels and highly resistant to ice damage.

Expansion of hunting accessibility and opportunity through the addition of limited hunts (for example, for hunters with disabilities or hunters with bows or muzzleloaders) would be investigated in cooperation with the State. Complex staff would review areas currently closed to hunting to determine their compatibility for hunting.

Fishing. Fishing would be allowed on all waterfowl production areas throughout the Complex and on the Center and South Units of Lake Andes Refuge (note, however, that most wetlands on the Complex are too shallow to sustain a sport fishery). Stocking of fish would be limited to Schaeffer and Scheffel Waterfowl Production Areas and the Center and South Units of Lake Andes Refuge.

Complex staff would continue to participate in meetings with CMCLRO and support and guide its efforts to improve water quality and quantity in Lake Andes. Complex staff would also support the group's efforts to restore a sport fishery in the South Unit of Lake Andes and to develop a fishing pond on the edge of the town of Lake Andes.



Additional interpretive signs at the Complex would be created under alternatives B and C.

Boat access for anglers to the South Unit of Lake Andes Refuge would be improved through the construction of a boat ramp that is functional at a wide range of water levels and highly resistant to ice damage.

Environmental Education and Interpretation. Complex staff would continue to provide environmental education and interpretation as requested. Activities would include hosting school groups; conducting refuge tours; providing hunter safety courses; and holding outdoor festivals, fairs, and expos.

Under this alternative, an outreach plan would be drafted and executed to expand opportunities for environmental education and interpretation. Teacher workshops would be part of the plan, as would creating additional interpretive signs, exhibits, and brochures.

A new visitor center would be constructed at the Complex headquarters. The visitor center would include a classroom, facilities to support teachers and students, and interpretive exhibits. An outdoor recreation planner would be added to the Complex staff to support this facility (appendix E).

Wildlife Observation and Photography. Current opportunities for wildlife observation and photography would continue to be provided. Foot trails on Atkins Waterfowl Production Area and the Owens Bay Unit of Lake Andes Refuge would continue to be maintained. The accessibility of existing foot trails would be improved by paving or firming the surface.

All waterfowl production areas on the Complex would remain open to recreational trapping in addition to hunting, fishing, wildlife observation, photography, environmental education, and interpretation.

Limited portions of Karl E. Mundt Refuge and portions of Lake Andes Refuge that are currently closed to the public would be opened for wildlife observation and photography. Observation and photography blinds would be provided in appropriate locations on the Complex.

To provide more opportunity for wildlife observation and photography, an observation tower would be constructed and a self-guiding auto tour route would be developed for the Lake Andes Refuge.

Operations Goal

Staffing and Funding. Staffing would be expanded beyond alternative A, and funding would be expanded beyond alternatives A and B to carry out this alternative and accomplish the visions developed for this plan.

Infrastructure, Equipment, and Operations and Maintenance. Instead of remodeling the existing headquarters building, a new visitor center would be constructed. A seed drying facility would be constructed.

Additional equipment and vehicles would be added to the Complex fleet. Furthermore, a greater level of operations and maintenance activities would be required.

Monitoring and Research. Current monitoring of wetland habitat conditions and wildlife populations would continue (the 4-square-mile waterfowl survey, breeding shorebird survey, and waterfowl population survey). Wetland surveys and studies would be expanded to better understand the effects of management treatments on habitats and wildlife populations. In addition to existing riparian and upland surveys, monitoring surveys and studies conducted by Complex staff would be expanded to better understand the effects of management treatments on habitats and wildlife populations. For example, staff might conduct a study to determine the most effective way to restore a high diversity of native grasses and forbs in areas that are infested with invasive plants.

Requests for research within the Complex would be permitted if deemed compatible with the purposes of the units of the Complex. Research needs for the Complex (for example, identifying more effective strategies to restore cottonwoods or identifying more effective strategies to restore smooth brome-dominated grasslands) would be identified, prioritized, and pursued within the research community. Under this alternative, Complex staff would pursue funding and research opportunities (for example, native prairie restoration projects) with universities on habitat management and new and effective surveying methodologies and actively seek funding to facilitate research on Service-owned lands relevant to management of the Complex. This is a more proactive approach to research on the Complex compared to alternative B.

Cultural Resources. Cultural resources would continue to be protected in accordance with Federal and State laws and regulations whenever ground-disturbing activities are planned. In addition, a comprehensive cultural resources survey of Service-owned wetlands throughout the Complex would be conducted. Any projects involving potential adverse effects on significant cultural resources would follow procedures as outlined in Section 106 of the National Historic Preservation Act.

Partnerships. Besides the existing partnerships, Complex staff would actively seek new partnerships with government agencies, organizations, sporting groups, and landowners to explore new avenues to fulfill the visions and goals of this plan.

Partnerships addressing wildlife conservation on private lands would continue to be supported through the collaboration between the biologist on station and Partners for Fish and Wildlife. Most of these projects would continue to focus on wetland restoration, grassland restoration, and implementation of grazing systems that are beneficial to ground-nesting birds and other wildlife.

CHAPTER 4—Affected Environment



USFWS

Grasslands characterize much of the Karl E. Mundt National Wildlife Refuge.

This chapter describes the Complex's environmental resources that may be affected by the implementation of the CCP. It describes the physical environment and biological resources of Complex lands as well as its fire and grazing history, cultural resources, visitor services, socioeconomic environment, and operations.

4.1 Physical Environment

Located in southeastern South Dakota, the Lake Andes National Wildlife Refuge Complex includes two refuges and 85 waterfowl production areas (within one wetland management district) scattered throughout 14 counties (Aurora, Bon Homme, Brule, Charles Mix, Clay, Davison, Douglas, Gregory, Hanson, Hutchinson, Lincoln, Turner, Union, and Yankton). Complex staff manage thousands of noncontiguous tracts of Federal and private land totaling 110,925 acres: 21,193 acres of refuges and waterfowl production areas and 89,732 acres of conservation easements (figures are current as of September 2010). The geology, topography, soils, and climate of Complex lands are discussed below. Unless otherwise noted, information in this section has come from Bryce et al. 1998.

GEOLOGY AND TOPOGRAPHY

The Lake Andes Refuge is situated in a partially buried bedrock valley (Kume 1977). All Complex lands

are part of the Northern and Northwestern Glaciated Plains, whose landscape was created by the most recent continental glaciation event, the Late Wisconsin, which occurred 25,000–20,000 years ago. Glaciation left the landscape rich in moraine and numerous wetlands. The Complex consists of grasslands; riparian forests; upland habitat; native prairie; and temporary, seasonal, and semi-permanent and permanent wetlands.

The majority of the Complex's waterfowl production areas and grassland and wetland easements fall within the Southern Missouri Coteau and Southern Missouri Coteau Slope ecoregions. The Southern Missouri Coteau ecoregion, the southern fringe of continental glaciation, exhibits gentle undulations in topography, smaller areas of wetland density, and more stream erosion. The Southern Missouri Coteau Slope ecoregion has a good amount of rock-free loess. The remaining waterfowl production areas and easements exist in the eastern portion of the Lake Andes District within the James River Lowland ecoregion. This ecoregion exhibits a flat to gently rolling topography, high density of wetlands, and warmer temperatures.

Karl E. Mundt Refuge in Gregory County is the only part of the Complex that lies west of the Missouri River. As such, the landscape of the refuge differs from that of the other Complex lands. This area falls in the Southern River Breaks ecoregion characterized by more temperate conditions with heavily wooded deciduous forests. The topography is characterized by dissected hills and canyons with slopes of high relief

bordering the Missouri River and its alluvial plains. Cretaceous Pierre Shale is the primary surface geology.

The Complex lies within the westernmost extent of continental glaciation (Pre-Late Wisconsin Glaciation and Late Wisconsin Glaciation). The melting ice from this glacial stagnation and retreat formed most of the prairie potholes found throughout the Complex. The geological materials underlying the Complex lands consist of Wisconsinan glacial till and loess over Cretaceous Pierre Shale (exposed bedrock is present throughout the city of Lake Andes and along the bluffs of the Missouri river) and sandstone of Niobrara Formation (primary bedrock of the Complex lands in the eastern portion of the Lake Andes District) (Johnson and Higgins 1997).

SOILS

Soils differ in the four ecoregions—the Southern Missouri Coteau, Southern Missouri Coteau Slope, James River Lowland, and the Southern River Breaks—in which Complex lands lie. The main soil series in the Southern Missouri Coteau ecoregion are Eakin, Highmore, Java, Beadle, Dudley, DeGrey, and Zahl. These soils are deep and moderately to well drained and formed in silty and/or clayey material over glacial till with permeability ranging from slow to moderate.

The main soil series in the Southern Missouri Coteau Slope ecoregion are Highmore, Mobridge, Houdek, and Ethan. Deep, well drained soils formed in loamy glacial till, silty glacial drift, or silty alluvium on uplands. Permeability ranges from moderate to moderately slow.

The James River Lowland ecoregion is made up of the Beadle, Dudley, Hand, Bonilla, Houdek, and Prosper soil series. These soils are generally deep, moderately to well-drained, loamy, or silty soils on uplands. These soils range in permeability from very slow to moderate.

The Southern River Breaks ecoregion mainly consists of the Tuthill, Sansarc, Okaton, and Manter soil series. With the exception of Manter (a deep soil), these soils are generally shallow, well drained and formed in clayey shale residuum on uplands. Permeability ranges from slow to moderately rapid.

CLIMATE

Relative to the rest of the Northern and Northwestern Glaciated Plains, the southern location of the Complex results in milder winters with longer, warmer summers. Temperatures range from -16 °F to 104 °F and average 51 °F. Annual rainfall varies from 17 inches to 24 inches while annual evaporation can amount to 36 inches, resulting in some years of marginal to poor wetland conditions. Precipitation on Karl E. Mundt Refuge averages 20–22 inches, and average snowfall is 60 inches.

4.2 Water Resources

SURFACE WATER

Lake Andes and the Missouri and James Rivers are the primary sources of water supply for the Complex. Two roadway dikes separate Lake Andes into the North Unit, Center Unit, and South Unit. Lake Andes has a drainage area of about 230 square miles. Andes Creek flows into the North Unit and is the largest contributor of inflow into the Lake Andes Basin. The remaining units receive inflow from several unnamed tributaries. Tributaries to Lake Andes are ephemeral (Sando and Neitzert 2003). The water level of Lake Andes is solely dependent on watershed runoff, thus fluctuations between flooding and a completely dry lake bed are common.

Agriculture is widespread throughout fourteen-county region of the Complex. Unfortunately, some agricultural activities—especially feedlot operation and crop production—cause nutrient enrichment, siltation, and algal growth that, together with other causes, have impaired the quality of water basins, streams, and Lake Andes over the years. Poor water quality significantly degrades the quality of fish and wildlife habitat in the lake. Complex staff is participating in meetings with CMCLRO and supporting and guiding its efforts to improve water quality and quantity in Lake Andes. CMCLRO seeks to improve water quality through the following actions:

1. Sediment removal. CMCLRO seeks to remove sediments from Lake Andes that are laden with high levels of nitrogen and phosphorus—nutrients that lead to frequent algae blooms that cloud the water and block sunlight penetration to a degree that many species of aquatic plants cannot grow. When the algae decompose, the oxygen content of the lake water is reduced to a level at which sport fish species and other aquatic animals and plants cannot survive.
2. Supporting soil conservation practices. CMCLRO is supporting ongoing government efforts to clean up the Lake Andes watershed through cost-shared, voluntary soil conservation practices (for example, planting buffer strips to reduce agricultural runoff, fencing livestock out of seasonal drainages, cost-sharing agricultural waste containment systems).
3. Controlling the rough fish population. CMCLRO intends to remove carp and bullhead species of rough fish that persist in oxygen-poor waters. The feeding behaviors of these fish agitate the water to the degree that sunlight penetration is blocked, thereby reducing aquatic vegetation.

GROUNDWATER

The Lake Andes Basin and Choteau Creek Basin reach across the following counties: Aurora, Charles Mix, Gregory, Davison, Douglas, Hutchinson, and Bon Homme (Sando and Neitzert 2003).

The Dakota Aquifer, one of the classic artesian aquifers, covers most of central North America and is part of the Great Plains Aquifer System (Bredehoeft et al. 1983). The Dakota Aquifer in southeastern South Dakota consists of Dakota Formation overlain by Cretaceous shales (Gosselin et al. 2003).

In 1985, an artesian well was placed 960 feet into the Dakota sandstones of the Dakota Aquifer. This free-flowing well drains groundwater into Owens Bay. When first installed, this well pumped 900 gallons per minute (gpm). Today, this rate has decreased by about 70 percent to 250 gpm.

WETLANDS

Wetlands are lands where saturation with water is the dominant factor determining the nature of soil development and the types of plant and animal communities living in the soil and on its surface (Cowardin et al. 1979). Wetlands are extremely productive and important as breeding and nesting habitat for migratory birds and as wintering habitat for many resident wildlife species.

Wetlands are classified using a number of attributes including vegetation, water regimes (the length of time water occupies a specific area), and water chemistry. Prairie potholes are described using the following non-tidal water regime modifiers (Cowardin et al. 1979):

- Temporarily flooded: surface water is present for brief periods during the growing season. The water table usually lies below the soil surface most of the season, so plants that grow in both uplands and wetlands are characteristic.
- Seasonally flooded: surface water is present for extended periods especially early in the growing season, but is absent by the end of the season in most years.
- Semi-permanently 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 surface.
- Permanently flooded: water covers the land throughout the year in nearly all years. Vegetation is composed of obligate hydrophytes, such as cattails.

Even though drainage and other wetland-decimating factors have taken their toll, wetlands are still a prominent feature of the landscape within the Complex. Wetlands on the Complex range from temporarily flooded to permanently flooded. Surface hydrology of these wetlands is influenced by a combination

of precipitation, surface runoff, surface water, and groundwater inputs.

WATER RIGHTS

The following is a summary of water rights associated with Complex lands:

- Lake Andes holds water rights filed April 22, 1940, for a total of 20,534 acre-feet, of which 13,721 acre-feet are for storage and 6,813 acre-feet are for seasonal use.
- Owens Bay Well holds water rights filed July 6, 1956, for 2.22 cubic feet per second (cfs) from the Dakota Sandstone artesian aquifer to be stored in Owens Bay.
- Varilek Waterfowl Production Area holds water rights filed December 27, 1988, for 139 acre-feet of storage.
- Sherman Waterfowl Production Area holds water rights filed December 27, 1988, for 271 acre-feet of storage.
- Broken Arrow Waterfowl Production Area holds water rights filed October 7, 1985, to impound 131.2 acre-feet of storage from Joubert Drain through the means of Dam #7.
- Roth Waterfowl Production Area holds water rights filed July 30, 1997, for 323 acre-feet of storage and 212 acre-feet of seasonal use.
- The Lake Andes District holds 904 wetland easement contracts protecting 37,985 acres of naturally occurring wetlands.

4.3 Vegetation Communities

Vegetation communities associated with the Complex's wetland, upland, and riparian areas are discussed below. Figures 15–18 show the various land cover types found on and around Complex lands.

WETLANDS AND ASSOCIATED VEGETATION COMMUNITIES

Wetlands throughout the Complex provide both resting cover and food resources for migratory birds. Substantial emergent and submergent aquatic vegetation occurs in freshwater wetlands. Sago pondweed, coontail, and duckweed occur in the deeper, more permanently flooded zones, while cattail, bulrush, bur-reed, and smartweed grow in shallow areas that may go dry due to a drawdown. Poor water quality is a limiting factor for aquatic vegetation in individual wetlands scattered throughout the Complex. The poor quality can lead to algae blooms, reducing sunlight penetration and thus restricting growing potential for aquatic plants.

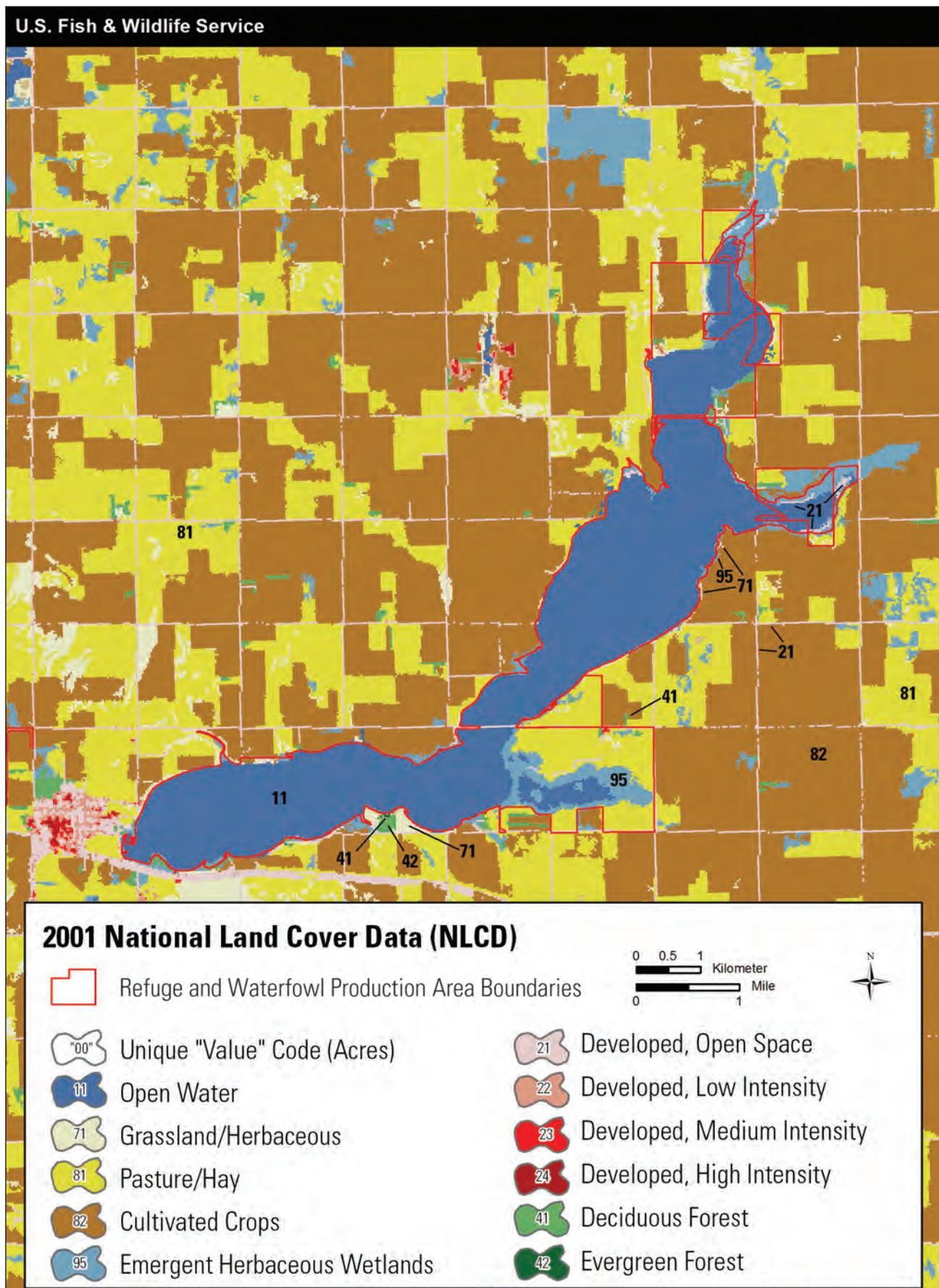


Figure 15. National Land Cover Data for the Lake Andes National Wildlife Refuge, South Dakota.

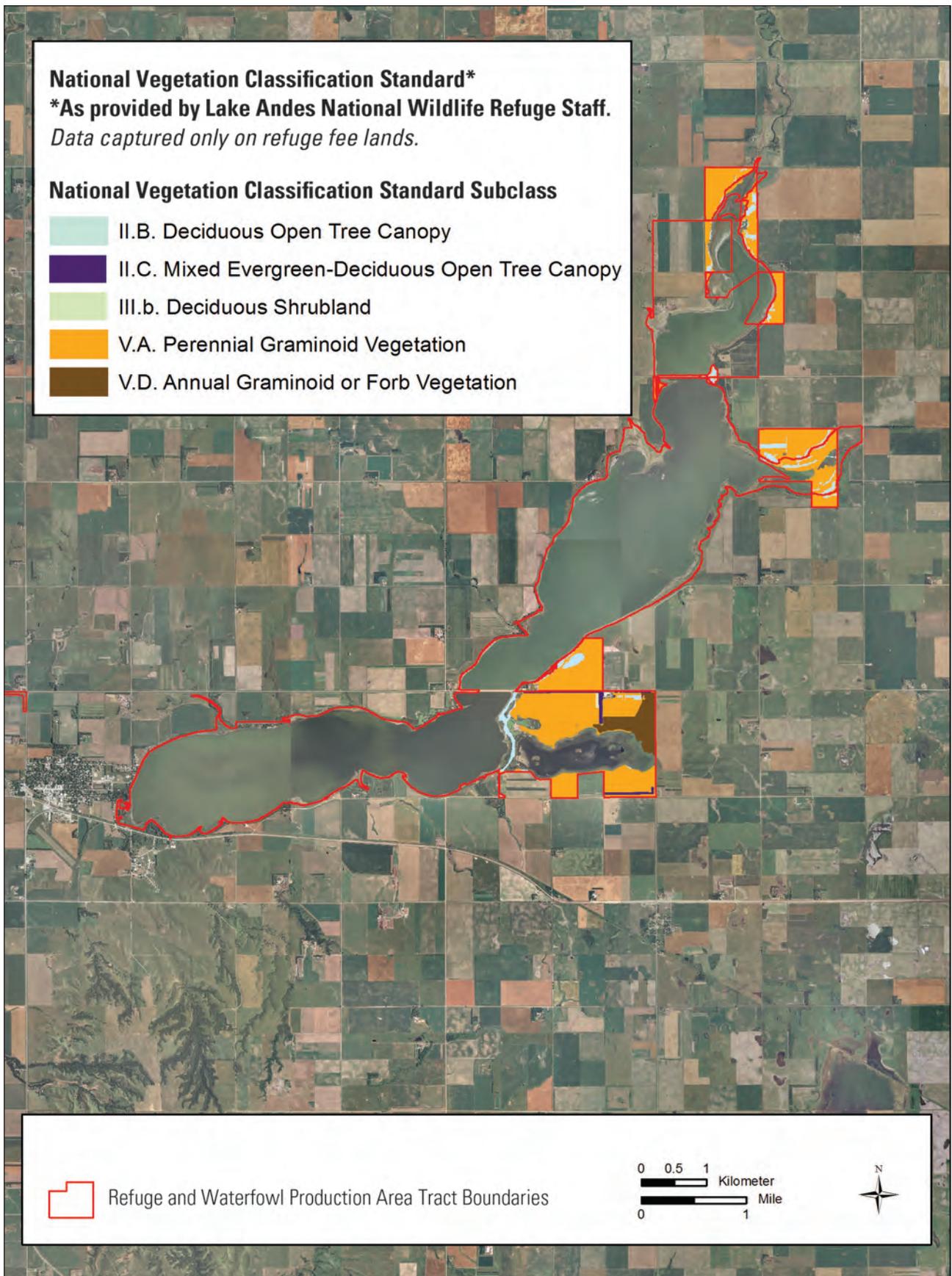


Figure 16. National Vegetation Classification Standard vegetation on the Lake Andes National Wildlife Refuge, South Dakota.

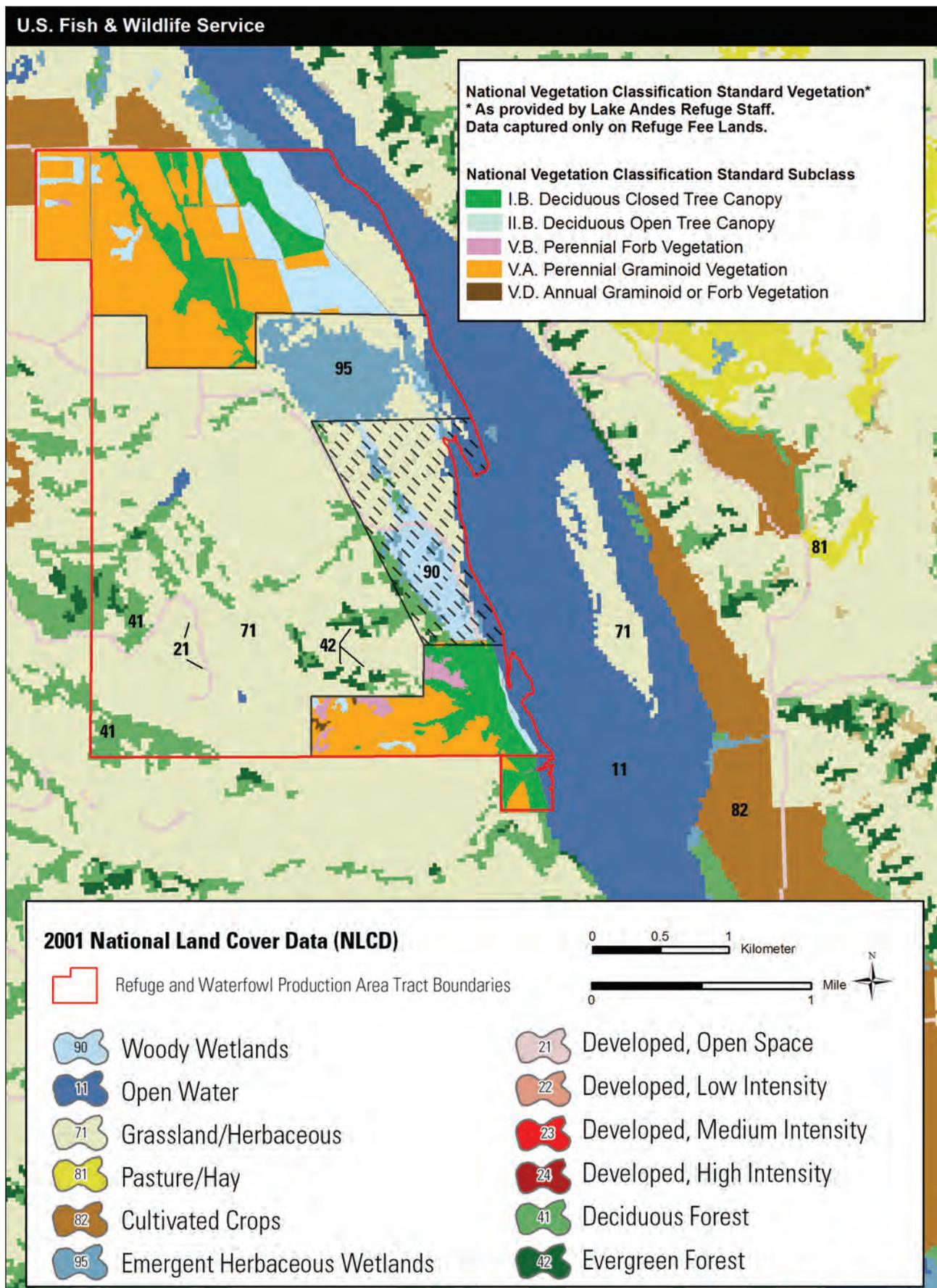


Figure 17. National Land Cover Data for the Karl E. Mundt National Wildlife Refuge, South Dakota.

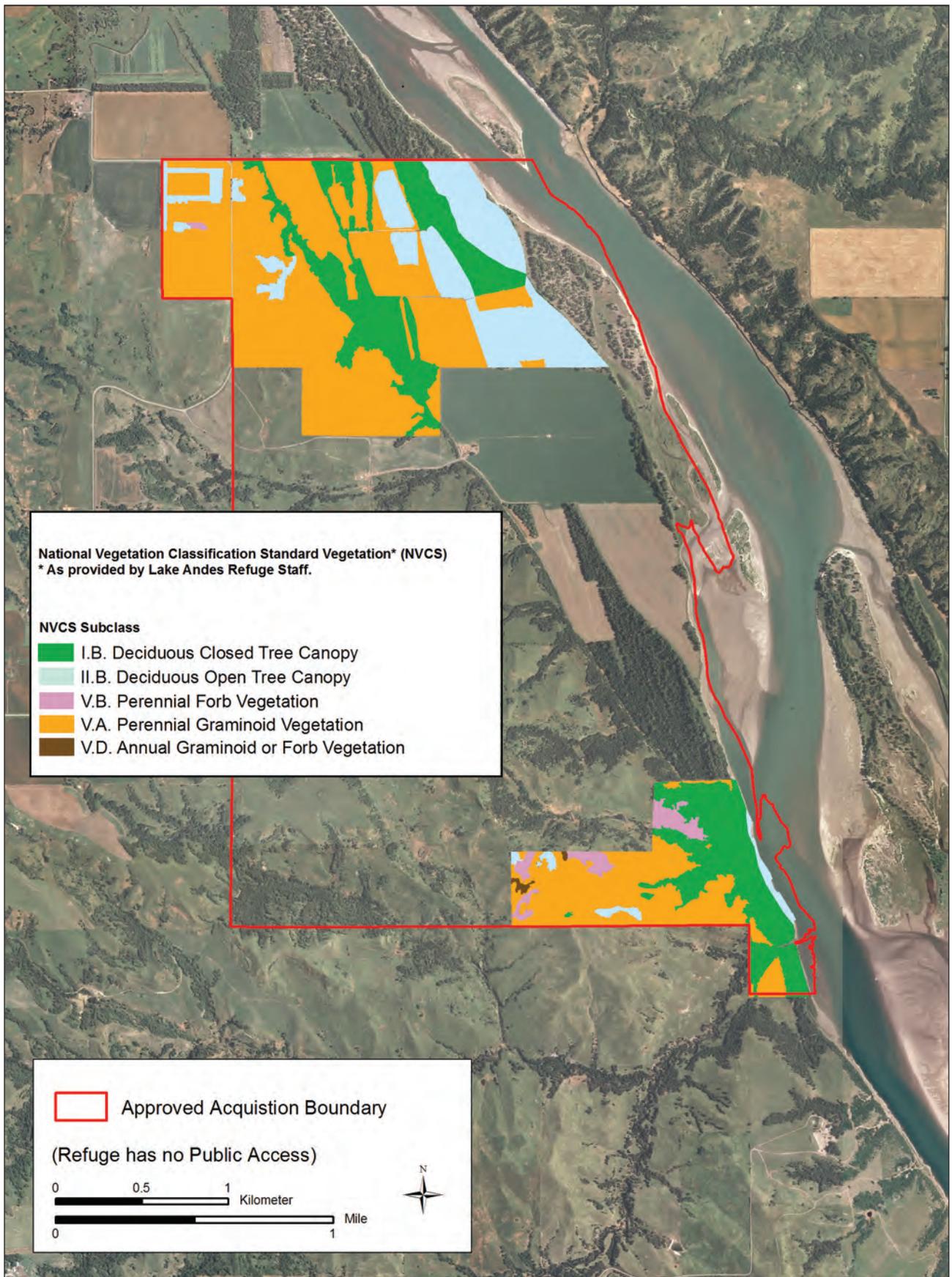


Figure 18. National Vegetation Classification Standard vegetation on the Karl E. Mundt National Wildlife Refuge, South Dakota.

Most palustrine basins exhibit concentric zones of vegetation that are dominated by different plant species (Kantrud et al. 1989). The terms commonly used in reference to these zones are, in decreasing order of water permanency, deep marsh, shallow marsh, and wet meadow (Kantrud et al. 1989). The water regime in a deep marsh zone is usually semi-permanent. Dominant plants include cattail, bulrush, submersed or floating plants, and submersed vascular plants, but this zone also may be devoid of vegetation if bottom sediments are unconsolidated. Shallow marsh zones are usually dominated by emergent grasses, sedges, and some forbs, but submersed or floating vascular plants also may occur. Wet meadow zones also are typically dominated by grasses, rushes, and sedges, whereas submersed or floating plants are absent.

Management of wetlands in the Complex where facilities have been developed (Owens Bay and Broken Arrow Waterfowl Production Area) simulates natural (that is, historic) wet-dry cycles by raising and lowering water levels to meet specific management objectives. This encourages emergent and submergent aquatic vegetation growth, increases invertebrate biomass, improves water clarity, breaks down and cycles accumulated nutrients in bottom sediments, and augments control of common carp. Extensive mudflats are created when wetlands are in the initial drawdown phase. Mudflats provide optimal feeding opportunities for migrating shorebirds, wading birds, and other waterbirds.

The wetland easement program has provided perpetual protection for 37,985 acres of wetlands on private lands in the wetland management district. A current total of 54 FmHA easements protect 3,834 acres of wetlands. This has secured a landscape-level habitat base for migratory birds. While normal farming practices may have essentially erased some of the smaller, temporary, and seasonal wetland basins, most of the habitat that has been protected remains intact.

UPLANDS AND ASSOCIATED VEGETATION COMMUNITIES

Upland vegetation is essential in providing nesting habitat for migratory and resident bird species. Upland habitats also provide necessary habitat requirements for resident wildlife throughout the year. The Lake Andes District holds 199 grassland easement contracts, providing perpetual protection for 38,103 acres of privately owned grasslands within the district. The program continues to expand the acreage protected annually.

The Complex currently uses a variety of management techniques to maintain and enhance upland habitat conditions on fee-title uplands including the use of prescribed fire, grazing, haying, native grass seeding, and invasive species management.

During the 1930s, large fields formerly planted to crops were planted with nonnative grasses including smooth brome, crested wheatgrass, and Kentucky bluegrass species to minimize soil erosion.

In the early 1970s, habitat management techniques were developed to provide dense nesting cover for waterfowl. Several areas on the refuge were planted to grass species such as tall and intermediate wheatgrass, sweet clover, and alfalfa. These fields initially provided good cover for nesting birds; however, over time they deteriorated and were prone to invasion by Canada thistle and other problem species (for example, smooth brome). The Complex has begun the process of restoring these grasslands to native grasses and forbs. The native grass restoration process generally involves cropping the field for 3 or more years to eliminate exotic cool-season grass seeds and rhizomes, control Canada thistle and other noxious weeds, and prepare a seedbed for planting native grass seed.

Uplands were historically composed of warm-season grasses characteristic of the short-grass prairie to the west and the cool- and warm-season grasses characteristic of the tallgrass prairie to the east (Samson et al. 1988); thus, the area represented a zone of ecotonal mixing that included a diversity of short grass, intermediate grass, and tallgrass species (Bragg and Steuter 1996). The most common mixed-grass prairie grass species within the Complex include western wheatgrass, slender wheatgrass, witchgrass, blue grama, sideoats grama, needle and thread, Indiangrass, switchgrass, big bluestem, little bluestem, and Canada wildrye. Smooth brome and Kentucky bluegrass are nonnative, invasive species that are dominant throughout many Complex lands. Chemical, mechanical, and biological control of these species is of high priority. Common upland forbs include American licorice, annual sunflower, Canada goldenrod, curlycup gumweed, heath daisy, hemp dogbane, leadplant, Maximilian sunflower, meadow anemone, Missouri goldenrod, showy milkweed, silverleaf scurfpea, smartweed, stiff goldenrod, stiff sunflower and woolly verbena. Prairie rose and prickly rose are the most prevalent shrubs found throughout Complex uplands.

South Dakota upland plant associations are shown in appendix F.

RIPIARIAN AREAS AND ASSOCIATED VEGETATION COMMUNITIES

The riparian areas of the Complex fall mostly within the Karl E. Mundt Refuge, located along the Missouri River. The broken topography of the river breaks provide valuable riparian habitat. Draws and northern aspects are heavily wooded with deciduous forests that provide essential roosting and nesting sites for bald eagles and many other migratory birds.

Cottonwood forests were historically a major component of the floodplains of the Missouri River. Floods

supported a healthy ecosystem by offering moisture to sustain trees and wetland plants, depositing sediment and nutrients to enhance soils and providing seedbeds for establishing new cottonwood stands. The use of flow-regulating facilities (for example, levees and dams) has led to major cottonwood declines with existing cottonwood stands aging and being replaced by later-successional species. Bald eagles are highly dependent on mature cottonwoods for roosting and nesting. A cottonwood restoration plan is essential for the restitution of riparian diversity and habitat for bald eagle and other migratory bird species.

Dominant trees of the riparian woodlands include prairie cottonwood, green ash, American elm, box elder, hackberry, peach-leaved willow, bur oak, white mulberry, common hackberry, and honey locust. Russian olive and eastern red cedar are invasive tree species that are beginning to dominate the landscape. The presence of these species can reduce the integrity of the riparian habitat. Emphasis is placed on the eradication of these species on Complex riparian lands.

Common shrubs include roughleaf dogwood, riverbank grape, woodbine, narrowleaf willow, and sandbar willow. Riverbottom grasses and forbs are primarily Canada wildrye, prairie sandreed, big bluestem, switchgrass, dogbane, milkweed, white snakeroot, Downy brome, sand dropseed, sedge, ragweed, sweetclover, and prairie cordgrass. Canada thistle has infested almost all riparian margins in eastern South Dakota, including those that lie within the Complex. Leafy spurge and musk thistle are also becoming widespread invaders in these areas. This is particularly troublesome because invasive plants in riparian areas provide a constant supply of seed to downstream areas through water movement. Chemical, mechanical, and biological control of Canada thistle and other herbaceous weed infestations are of high priority.

Dominant plants of the uplands of riparian areas include switchgrass, big bluestem, little bluestem, sideoats grama, western wheatgrass, green needlegrass, silver buffaloberry, and yucca. Invasive species such as Canada thistle, musk thistle, and leafy spurge are also invading these uplands and are being targeted with control methods.

4.4 Wildlife

MAMMALS

A total of 57 mammals have been recorded in South Dakota (appendix G); of these, 48 mammal species have been recorded on the Complex. Representative species include coyote, red fox, white-tailed jackrabbit, white-tailed deer, thirteen-lined ground squirrel,

badger, raccoon, mink, muskrat, striped skunk, deer mouse, masked shrew and meadow vole.

BIRDS

Numerous bird species occur in South Dakota (appendix G); more than 220 bird species have been documented throughout the Complex. There are 85 bird species known to breed within the Complex, 13 of which are waterfowl species. The six most abundant of the breeding duck species include mallard, blue-winged teal, northern pintail, gadwall, American widgeon, and northern shoveler. When habitat conditions are favorable, breeding duck densities exceed 60 pairs per square mile in several portions of the Complex. The Service began conducting annual breeding waterfowl population surveys throughout North Dakota, South Dakota, and northeastern Montana in 1987, focusing on 13 duck species that are the primary breeding species in the Plains and Prairie Pothole Region. Based on survey data, a strong positive relationship exists between wetland condition (that is, wet area or number of wet ponds) and both breeding pairs and duck recruitment.

Twenty-eight species of shorebirds have been documented throughout the Complex. Three shorebird species are regular breeders on Complex lands: killdeer, spotted sandpiper, and upland sandpiper. Regionally rare species such as marbled godwits are commonly observed on the Complex. A number of songbirds migrate through or nest on the Complex. Declining species, such as grasshopper sparrow, bobolink, western meadowlark, and dickcissel, are commonly observed on Complex grasslands.

The Karl E. Mundt Refuge was established after discovering nearly 300 endangered bald eagles—the largest population of wintering bald eagles at that time—spending the winter below the Fort Randall Dam. In 1992, the refuge became the site of the first successful nesting attempt in South Dakota in over a century. Since that time more than 30 eaglets have been recruited to the population from the refuge. Beginning with that first nest 10 years ago, the bald eagle nesting population in South Dakota has expanded to more than 20 active nests. The high recruitment rate and the close proximity of nests on the refuge are testimony to the quality of the habitat.

FISH

Most of the wetlands on the Complex are too shallow to support a fishery. However, there are wetlands in the Schaeffer Waterfowl Production Area and Scheffel Waterfowl Production Area in Bon Homme County that are typically deep enough to support a fishery. These wetlands are regularly stocked for fishing.

Historically, Lake Andes was one of the best bass fishing lakes in South Dakota. It was a well-stocked fishery supporting species such as northern pike,

largemouth bass, yellow perch, bluegill, black crappie, walleye, and channel catfish. Today, the lake suffers from low dissolved oxygen levels and high concentrations of algae. The poor water quality of Lake Andes has reduced the high species richness that once characterized the lake. Carp and black bullhead are the only species that can tolerate the poor quality of the lake. These species are further degrading the water quality through their aggressive feeding behavior that agitates the water to the degree that sunlight penetration is blocked, which impairs aquatic vegetation growth.

THREATENED AND ENDANGERED SPECIES

Endangered whooping cranes sometimes use Complex lands for feeding and resting during their spring and fall migrations. Additionally, there are two federally delisted species commonly observed on Service lands within the Complex. Recently delisted from the endangered species list, bald eagles and peregrine falcons frequently use the Complex lands. Bald eagles regularly use the mature cottonwood habitat of Karl E. Mundt Refuge for roosting and nesting. Peregrine falcons benefit from the abundance of prey such as small birds and ducks.

The American burying beetle, which was listed as an endangered species in 1989, has recently been discovered inhabiting Gregory County; however, none have been documented on the Karl E. Mundt Refuge, which lies within Gregory County, nor on any other unit of the Complex.

4.5 Cultural Resources

HISTORICAL RESOURCES

The Complex's early 20th century history is tied to the Works Progress Administration, which was the program responsible for building the two roadway dikes that split Lake Andes into three separate units. These dikes are considered historical resources.

Many of the old homesteads that existed on Lake Andes Refuge, Karl E. Mundt Refuge, and several waterfowl production areas have been removed. Prior to any groundbreaking activities, such as removing these homesteads, the Complex staff complies with Federal and State laws and regulations, specifically Section 106 of the National Historic Preservation Act of 1966. Under these provisions, local archeologists inspect and record the area of interest to determine if the groundbreaking disturbance would affect any historical properties.

4.6 Visitor Services

The Complex offers a variety of recreational opportunities to local residents and other visitors centered on the wildlife resources. Opportunities on the Complex include wildlife-dependent and wildlife compatible uses legislated by Congress and outlined in the Improvement Act. These uses include hunting, fishing, wildlife observation, wildlife photography, environmental education, and interpretation.

HUNTING

The Center Unit of Lake Andes and all waterfowl production areas are open to hunting for white-tailed deer, ring-necked pheasant, and other State game. The peak period for hunting is during ring-necked pheasant hunting season in the fall. An estimated 15,000 hunting visits occur on the Complex each year—about 81 percent of all visitations to the Complex. It is estimated that total expenditure by hunters at the Complex is about \$570,400 per year (BBC Research & Consulting 2008).

FISHING

Fishing is permitted year-round on the Center and South Units of Lake Andes and on the wetlands of Schaeffer and Scheffel Waterfowl Production Areas in Bon Homme County. The water level of the lake and wetlands are highly dependent upon surface runoff. Thus, cycles of wet and dry periods commonly affect fishing opportunities.

The wetlands at Schaeffer and Scheffel Waterfowl Production Areas are typically deep enough to support a fishery and are regularly stocked with yellow perch. The poor water quality of Lake Andes today (low dissolved oxygen levels and high algal growth) can only support carp and black bullhead during dry cycles.

An estimated 741 fishing visits occur each year on the Complex. The expenditure from these visits has been estimated to generate about \$12,800 per year (BBC Research & Consulting 2008).

ENVIRONMENTAL EDUCATION AND INTERPRETATION

Complex staff members provide educational talks and tours for schools and other groups upon request. Informational brochures and Complex maps are available at the Complex headquarters and at information kiosks located outside of the headquarters and at the beginning of the nature trail. Throughout the Atkins Wetland Interpretive Trail interpretive signs illustrate the importance of conserving wetlands and restoring native grasslands. An estimated 1,058 environmental education and interpretation participants visit the Complex each year.



USFWS
Lake Andes National Wildlife Refuge Headquarters

WILDLIFE OBSERVATION AND PHOTOGRAPHY

The Complex provides great opportunities for viewing and photographing wildlife, particularly views of migrations of waterfowl, shorebirds, and neotropical birds. Ducks and geese begin concentrating in large numbers in October, and numbers generally peak in December. The abundance and variety of wildlife species combined with relatively low visitation provides many opportunities to view wildlife close up.

Lake Andes Refuge offers a 1-mile foot trail that winds around the Prairie Ponds (four small ponds about 1–4 acres in size) and runs along Owens Bay. The trailhead is next to the Complex headquarters, and an observation platform provides an elevated view of the ponds, which are managed to provide attractive habitat for migratory birds during spring and fall migration. Waterfowl, shorebirds, grassland birds, and white-tailed deer are common along this route.

The 1-mile Atkins Wetland Interpretive Trail offers self-guided opportunities to observe 160 acres of wetlands and native prairies on the Atkins Waterfowl Production Area. Interpretive signs along the trail present information about the importance of conserving wetlands and restoring native grasslands as well as describing some of the birds visitors may encounter. The trail leads to an overlook where visitors can admire native prairies. Waterfowl, grassland birds, and white-tailed deer can easily be spotted on this trail.

There are an estimated 2,800 wildlife observation and photography visits to the Complex each year. Total expenditure by these non-consumptive recreational activities—including environmental education and interpretation—is estimated to be \$36,800 per year (BBC Research & Consulting 2008).

4.7 Fire and Grazing History

Prior to European settlement, wildfires along with grazing (primarily by bison, prairie dogs, and insects) and

drought were the primarily ecological disturbances that revitalized grasslands. Ignitions for these wildfires were caused by both lightning and Native Americans, with most wildfires likely occurring during the summer and fall. Depending on weather conditions, a wildfire could burn thousands of acres, creating a mosaic of burned, unburned, and grazed areas. Historical fire frequency was probably highly variable but has decreased since settlement (Umbanhowar 1996); however, little information is available on the pre-settlement occurrence of fire within the Complex area. For the mixed-grass prairie, fire return interval evidence seems to point to about every 5–10 years on the moist portions of mixed-grass prairie and around 25 years on dry portions (Frost 1998, Wright and Bailey 1982). In general, where precipitation is limited, such as in the western and central grasslands, a long-term decline in grass production occurs when burning is more frequent than every 5–10 years. This fire frequency may be best for natural fire management of grasslands, such as the short- or mixed-grass prairies, although fire exclusion may be best for other purposes (Bragg 1995). Tallgrass prairie tends to have a quicker fire return interval than mixed-grass prairie. Science seems to indicate roughly a 3- to 7-year fire return interval for most of the tallgrass prairie.

After settlement by Europeans, wildfires were suppressed. Today, most local fire departments and area farmers and ranchers still aggressively suppress wildfires. It has also been the policy on Service lands within the Complex to aggressively suppress wildfires.

The Complex uses prescribed fire to simulate the historical influence fire had on plant communities. Burning removes layers of residual cover; this action can reduce plant species diversity and increase a wildfire's resistance to control. Even though prescribed burning can occur at any time of year, most prescribed fires are currently applied in April and May, depending on the prescribed fire's objectives and the associated impact(s) on flora and fauna. The Complex's use of this tool is limited by many factors including plan development, staff availability, and weather. Because of these limiting factors, prescribed fire is rarely used on Complex lands. Since 2001, the Complex has treated about 3,800 acres with prescribed fire.

Although prescribed burns are infrequent on the Complex, air quality is still an issue when burns do occur. The National Ambient Air Quality Standards include maximum allowable pollution levels for particulate matter, ozone, sulfur dioxide, nitrogen dioxide, lead, and carbon dioxide. Particulate matter is a measure of tiny liquid or solid particles in the air that is respirable in the lungs. Carbon from automobiles and diesel engines, prescribed fire activities on Complex lands, and dust associated with wind-blown sand and dirt from roadways and fields contribute to particulate matter.

Similar to fire, grazing greatly influences the structure and composition of grassland communities. Most plant species have developed growing points located at or near the ground surface, which allows the plant to be clipped off without killing it.

Complex staff works with cooperators to mimic grazing disturbances such as grazing by bison. Grazing is generally conducted during the spring and early summer for about 6 weeks, and again in the fall in upland habitats, to stress exotic cool-season grasses and favor native warm-season grasses and forbs. In this instance, overgrazing is beneficial as it damages invasive grasses to the point where native seeds have a better chance to grow with less competition.

4.8 Socioeconomics

The 14-county area of the Lake Andes National Wildlife Refuge Complex is home to over 154,000 persons. Since 1990, the population has grown by 1.1 percent per year (BBC Research & Consulting 2008). This 14-county area employs over 70,000 workers mostly in trades, transportation, utilities, government, education and health services, and manufacturing (BBC Research & Consulting 2008).

The Complex employs six full-time equivalent (FTE) employees and one part-time employee, for a total of 6.7 FTEs (appendix E). The most current budget totaled \$687,400, of which about \$544,000 went toward salaries. A report titled “Banking on Nature” evaluated the impacts of refuges on local economies. Lake Andes National Wildlife Refuge Complex was estimated to generate about \$620,000 per year in total visitor expenditures (BBC Research & Consulting 2008).

CHAPTER 5—Environmental Consequences



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Thousands of migrating birds use Complex lands each year.

This chapter discusses environmental consequences that may result from implementing the actions of each of the three alternatives. Chapter 3, “Alternatives,” describes the actions that could result in the consequences described here, and chapter 4, “Affected Environment,” describes resource conditions and interactions.

This chapter describes (1) effects common to all of the alternatives, (2) the environmental consequences of each alternative, and (3) the cumulative impact of the alternatives.

5.1 Effects Common to All Alternatives

All alternatives would have the same impacts related to air quality, environmental justice, socioeconomic, and global warming, as described below.

AIR QUALITY

No adverse effects on air quality are expected. Short-term effects on air quality from prescribed burning on Complex lands would not vary significantly between the alternatives. The Great Plains Fire District staff would plan prescribed fire operations to reduce negative effects on neighbors. Rapid mop-up would mitigate the amount and duration of smoke near the ground. Use of ignition techniques that result in slow spread

would reduce the amount of particulates in the air. Prescriptions would be used that require wind directions and smoke dispersal that reduce smoke impacts on neighboring occupied dwellings and roadways. Rapid mop-up would mitigate the amount and duration of smoke near the ground.

ENVIRONMENTAL JUSTICE

None of the alternatives considered would pose adverse environmental effects on minority or low-income populations. Access to and use of Complex lands is free.

SOCIOECONOMICS

Economic impacts are typically measured in numbers of jobs lost or gained and the associated result on income. None of the alternatives would significantly impact the economics of the surrounding area.

GLOBAL WARMING

All of the alternatives would conserve vegetated habitat and retain a similar level of carbon sequestration. The use of prescribed fire, which releases carbon dioxide, would result in no net loss of carbon, due to the rapid recovery of burned vegetation. Overall, there would be little significant change in carbon sequestered between alternatives.

As it relates to global climate change, the documentation of long-term changes in vegetation, species, and hydrology is an important part of research and monitoring. Adjustments in management may be necessary over time to adapt to a changing climate.

5.2 Description of Consequences by Alternative

The following section provides a description of the effects expected for each alternative. Table 2 at the end of this chapter summarizes each alternative and its environmental consequences.

ALTERNATIVE A (NO ACTION)

Wetlands Goal

Water Quality and Quantity on Lake Andes Refuge.

Complex staff would continue to work with CMCLRO to enhance the efforts of government agencies to improve water quality in Lake Andes and its watershed. Complex staff would continue to seek clarification of the Service's authority over the lake portion of Lake Andes Refuge.

Removal of high-nitrogen, high-phosphorus sediment and improved soil conservation in surrounding watersheds would improve water quality. Potential actions may include planting buffer strips to reduce agricultural runoff, fencing livestock out of seasonal drainages, and cost-sharing agricultural waste containment systems. Sediment removals and increased soil conservation would reduce algae blooms and fish kills.

The presence of carp would continue to damage water quality in Lake Andes. The feeding behaviors of rough fish agitate the water to the degree of blocking sunlight penetration, which can reduce aquatic vegetation growth and ultimately limit invertebrate food sources for waterfowl and sport fish species.

Water quantity would remain inadequate for effective management of water levels optimum for fish and wildlife.

Disease Control. Through these actions, Complex staff would continue to monitor disease on Lake Andes Refuge (especially the Owens Bay Unit) weekly during peak spring and fall migration periods. Opportunistic monitoring would continue elsewhere on the Complex. Staff would continue to contain disease within Complex lands, remove dead birds, and submit samples of dead birds to the USGS National Wildlife Health Center in accordance with the current WDCP. As a result of the limited range of disease monitoring, outbreaks off Complex lands may continue to be undetected or may be reported after containment procedures are no longer possible, which could lead to the spread of disease to other birds and increased risk to humans.

Riparian Goal

Cottonwood Restoration on Karl E. Mundt Refuge. Dams on the Missouri River would continue to erode important riparian habitats and limit the regeneration of cottonwoods, leading to a decline in cottonwood habitat.

Replanting of cottonwood stands would continue to take place sporadically and only as funding and opportunities allowed. Under this alternative, cottonwood habitat would continue to reduce in size as erosion and lack of regeneration persisted. Cottonwoods are essential to bald eagles that nest and roost in these trees. The lack of cottonwood regeneration would directly impact bald eagles and other migratory bird species.

Uplands Goal

Avian Nest Predator Control. Avian nest predators—foxes, skunks, and raccoons—would remain uncontrolled by the Complex due to insufficient funding and staff. Recreational trapping and hunting of mammalian predators would continue to be allowed, although these activities would not occur to the degree at which predator populations would be controlled. As a result, nest predation would continue at the current level, which could be detrimental to waterfowl populations.

Restoration of Fee-Title Lands. Under alternative A, uplands would continue to be burned, sprayed, and grazed to improve nesting habitat. The lands would continue to be hayed to remove the buildup of vegetative litter and duff on government-owned lands (fee-title lands). Previously farmed lands that are dominated by non-native plants would continue to be restored to desirable plant species with the aid of herbicides. However, restoration must comply with invasive plant control efforts, and this limits opportunities to plant native forbs. Nonnative trees will continue to be removed through prescribed burns and mechanical means.

Under this alternative, uplands throughout the Complex would continue to be restored to their native grass condition, but due to the lack of restoration of native forbs and the slow pace of restoration, the value of these habitats to migratory birds and insects (for example, butterflies) would continue to be inadequate.

Issues and Areas of Concern Related to All Habitats

Invasive Species Control. Under alternative A, invasive plant control methods on wetlands, uplands, and riparian habitat would remain unchanged. Canada thistle, musk thistle, leafy spurge, wormwood sage, eastern red cedar, and Russian olive are primary invaders. Smooth brome, Kentucky bluegrass, and crested wheatgrass are invasive species controlled only secondary to the primary invaders. Mechanical control methods (haying, tree cutting), chemical control methods (herbicide applications), and biological control methods (for example, flea beetles for destruction of leafy spurge) would continue to be integrated and implemented according to specific site needs. Individual infestations would be treated an average of once every 3 years. Invasive plants would continue to exist on Service lands at the current infestation level. Some neighboring landowners see Complex lands as

the source of invasive plants on their lands, and they are mandated by law to control those species on their lands. Complaints and resentment from these landowners would continue at current levels.

Habitat Protection. Complex staff would continue to acquire high-quality wetland and grassland easements. Acquisition of government-owned land (fee-title land) with high wildlife values that is next to Refuge System lands would be inspected for possible purchase if budget allows. Lands currently under Service management would continue to be protected. However, currently lands with high wildlife values within the Complex that could be protected are being lost to agriculture, urbanization, and development caused in part by the Service's slow acquisition response; private landowners sometimes wait 2–5 years or more for an offer and need a quicker response from the Service. Due to existing Service responsibilities, management of Complex lands with minimal wildlife value will continue to require diversion of personnel, funds, equipment, and other resources that could be better allocated to manage Complex lands with high wildlife value.

Complex staff will continue to monitor and enforce easement provisions and FmHA conservation easement provisions in accordance with current policies. These lands will remain protected for the benefit of waterfowl and other grassland or migratory bird species.

Complex staff would continue to pursue a conservation easement on the nearly 2,000 acres of land that falls between the North Unit and South Unit of the Karl E. Mundt Refuge. The acquisition of this conservation easement would reduce the risk of this land being developed and prevent further fragmentation of riparian habitat. Bald eagles and other migratory birds that depend on this habitat would be protected from disturbance.

On riparian habitat, the trapping and removal of nuisance beavers would continue periodically to protect and safeguard cottonwood habitat as needed. The current, low level of beaver removal would lead to continued loss of mature cottonwoods and reduced nesting and roosting sites for bald eagles and other migratory birds.

Visitor Services Goal

Hunting. Under alternative A, hunting would continue on all waterfowl production areas and the Center Unit of Lake Andes Refuge. As has been the trend in pheasant hunting over the long term, hunting would likely increase in these areas, eventually decreasing the quality of hunting experience.

Fishing. Fishing would continue on all waterfowl production areas and the Center and South Units of Lake Andes Refuge. Support would continue for CMCLRO's efforts to restore a fishery on the South Unit of Lake Andes and to develop a fishing pond on the edge of



Lake Andes National Wildlife Refuge

USFWS

the town of Lake Andes. Despite continual water fluctuations in Lake Andes, water quality enhancements would improve the fishery. Under this alternative, boat ramps would not be fixed or improved, and the quality of boat access for fishing would continue to be poor.

Environmental Education and Interpretation. The current level of environmental education and interpretation provided to the public would remain unchanged. Limited environmental education and interpretation opportunities such as hosting occasional school group tours, providing hunter safety training, and participating in outdoor festivals and other offsite events would continue throughout the Complex. As a result, the Complex's potential to reconnect people with nature would be unrealized.

Wildlife Observation and Photography. Under this alternative, the Complex would continue to provide limited opportunities for wildlife observation and photography. Foot trails on Atkins Waterfowl Production Area and the Owens Bay Unit of Lake Andes Refuge would be maintained, and the public would be allowed access to the Prairie Ponds for wildlife observation and photography opportunities. Trails for people with disabilities would remain only marginally accessible, and public access to portions of the Complex with high potential for wildlife observation and photography, specifically Karl E. Mundt Refuge, would remain closed. Under this alternative, the Complex would not reach its full potential for wildlife observation and photography.

Operations Goal

Staffing and Funding. Budget cuts have led to a 22 percent reduction in permanent staff of the Complex over the last 10 years. Current funding and staffing levels are inadequate to properly manage the resources and facilities of the Complex, and current staff levels are not adequate to implement alternative A. The restoration of one deputy wildlife refuge manager (one FTE)

and the conversion of one career seasonal maintenance worker to full time (currently at 0.7 FTE) would be necessary to restore the staff to previous levels and implement alternative A (appendix E); however, under alternative A, staffing levels would not change.

The grassland habitats that dominate the Complex require frequent management disturbance (for example, burning, grazing, and haying) to remain productive for wildlife. Such management is lacking, and Complex habitats are suffering as a result. Wildlife populations that depend on these habitats are being affected. Lack of adequate staffing continues to allow the degradation of infrastructure including fences, signs, and buildings throughout the Complex. Inadequate staffing impedes full development of wildlife-dependent recreation throughout the Complex. Under current staffing levels, outreach is not possible.

Infrastructure, Equipment, and Operations and Maintenance.

The Complex would continue to operate at the current level of maintenance of equipment, vehicles, and real property. Some portions of infrastructure (for example, fences) would remain in poor condition. The maintenance shop would continue to operate with current deficiencies including its leaking roof. No additional heavy equipment would be acquired. The efficiency of the Complex maintenance programs would continue to be compromised by a deficient shop building.

Fences and other infrastructure would continue to deteriorate over time and would impact habitat and wildlife management efforts.

Monitoring and Research. No changes would be made to the current monitoring and research procedures. Staff would continue conducting limited monitoring of habitat conditions and wildlife populations on wetlands (the 4-square-mile waterfowl survey, breeding shorebird survey, and waterfowl population survey on wetlands), on riparian lands (the bald eagle nesting survey, migratory bird use of the riparian forest survey, and bald eagle winter roosting survey) and on uplands (the breeding waterfowl survey, dove counts, Christmas bird counts, Karl E. Mundt Refuge upland migratory bird survey, and breeding shorebird survey). The limited amount of monitoring and research would continue to hinder staff's basic knowledge of habitat characteristics, vegetative cover management, invasive species infestation, and wildlife populations present as well as their relationships with the habitats. This will continue to prevent the staff from developing effective management activities and using adaptive resource management to improve success.

Requests for habitat and wildlife research would continue to be supported if it complies with Complex purposes. This research would continue to be initiated although it typically does not address questions essential to the management of the Complex.

Cultural Resources. Impacts on cultural resources would be neutral, as the staff would continue to survey for and protect these resources, on an as-needed basis. Any projects involving potential adverse effects on significant cultural resources would follow the procedures outlined in Section 106 of the National Historic Preservation Act.

Partnerships. Complex staff would be unable to take full advantage of partnership opportunities, to the detriment of the habitats and wildlife present in the Complex, due to inadequate funding and staffing. Complex staff would continue supporting existing partnerships with private cooperators, agencies and organizations; specifically the Partners for Fish and Wildlife program which allows for wildlife conservation on private lands. Most of these projects would continue to focus on wetland and grassland restoration and implementation of grazing systems that are beneficial to ground-nesting birds and other wildlife. Public support for the Complex and its programs is limited.

ALTERNATIVE B (MODIFIED MANAGEMENT)

Wetlands Goal

Water Quality and Quantity on Lake Andes Refuge.

Under this alternative, Complex staff would work with CMCLRO as described in alternative A. Water quality management would focus on investigating the effectiveness of utilizing fish screens to reduce the number of rough fish in Lake Andes Refuge and improve water quality and aquatic plant growth. Improved water quality and increased aquatic plant growth may allow for the presence of sport fish and other waterfowl in Lake Andes.

Water quantity management would focus on investigating (and designing and building, if feasible) a water system that would pump water from the Center Unit into the South Unit of Lake Andes. This pumping system would provide a water depth in the South Unit adequate for sport fishing while providing shallower depths for waterfowl habitat in the Center Unit. Under this alternative, Complex staff could manage water levels to provide optimum conditions for fish and wildlife.

Disease Control. Under alternative B, management would be the same as alternative A, plus staff would initiate surveys of other Service lands that have high concentrations of birds susceptible to HPAI. As a result, under this alternative disease outbreaks would be more likely to be detected and contained than under alternative A, reducing the risk of the spread of disease to other birds and humans.

Riparian Goal

Cottonwood Restoration on Karl E. Mundt Refuge. Effects would be the same as under alternative A, plus Complex

staff would develop and implement a riparian woodland habitat management plan for Karl E. Mundt Refuge. The decline of cottonwood-dominated habitats would be slowed, thus extending the use of the Complex by bald eagles, migratory birds, and other wildlife of this habitat.

Uplands Goal

Avian Nest Predator Control. To improve nesting success of waterfowl and other ground-nesting birds, Complex staff would facilitate implementation of large block trapping of significant nest predators conducted by partner organizations. Overall nesting success of waterfowl and other ground-nesting birds throughout the Complex would increase, thus sustaining or increasing current bird populations. Nest predator control would focus on blocks of land that average 40 duck pairs or more per square mile.

Restoration. Uplands restoration would be similar to that described in alternative A, plus management would primarily focus on restoration with a high diversity of native grasses and forbs. However, on low priority waterfowl production areas where it is not feasible to plant natives, alfalfa may be interseeded on a small scale. Approximately 200 acres of upland would be restored annually. Lands with no record of farming will be managed by burning, grazing, or haying to encourage native grass and forb growth. Sites that do not respond to the above management treatments may be interseeded with native grasses or a mix of forbs.

Target grassland restoration and management would be implemented to provide habitat for grassland-nesting birds (a guild of species representing a broad spectrum native to the area), but efforts would concentrate on waterfowl and migratory species of highest management concern, and for those known to nest on the Complex. Success of grassland bird management in a given area requires managers to consider the habitat requirements of grassland birds and thus identify management actions to enhance habitat quality for the local grassland bird. By doing so, the Complex would be able to provide better habitats for waterfowl and other selected migratory birds with the necessary components throughout their life cycles.

Issues and Areas of Concern Relating to All Habitats

Invasive Plant Control. Actions would be the same as under alternative A, except infestations on refuges and high priority waterfowl production areas would be treated annually rather than only once every 3 years. This would decrease the density and reoccurrence of invasive plant infestations. Landowner complaints and resentment would decrease as a result of reduced invasive plant infestations. It is also expected that

public perception and attitudes towards the Complex and its staff would improve, with a likely increase in support for the purposes and goals of the Complex.

Staff would initiate formal monitoring and mapping of invasive plant infestations on the Complex.

Under this alternative, the staff would seek to form an invasive species “strike team” for South Dakota that would focus on the control and eradication of invasive species on uplands.

Surveys to detect the presence of invasive plant species that are not widely established on the Complex would be conducted annually. Any plants detected would be mapped and treated annually with the goal of eradication. The habitat quality of Service lands for ground-nesting birds, waterfowl, and other wildlife would improve as a result of the reduced infestations.

On riparian habitats, there would be an increased emphasis on the control of Russian olive, eastern red cedar, and other invasive tree species. All herbaceous weeds—leafy spurge, Canada thistle, musk thistle—would be treated once annually. Increased control of invasive tree species would allow natural regeneration of native plants that provide better habitat for native wildlife and reduce the spread of invasive plants downstream. Infestations of invasive plants would decrease to a maintenance level where they can be more efficiently controlled. Overall ecosystem health and wildlife habitat would improve.

Habitat Protection. Management would be the same as under alternative A, with the addition that staff would evaluate existing government-owned lands held in fee title for their value to trust species. Complex staff would pursue exchange of Service lands with marginal wildlife value and pursue acquisition of lands with high wildlife value (from willing sellers as opportunities allow), even if these lands do not adjoin existing Service lands. The ability to exchange lands of low wildlife value for lands with high wildlife value would free limited resources to focus on managing Service lands (and acquiring new lands) that are more valuable to trust species.

Currently the two units of the Karl E. Mundt Refuge are separated by a tract of private land. Rather than focusing only on acquiring one conservation easement, this alternative would also permit acquisition (if the landowner is willing) of fee title to the tract of land that lies between the two units of the Refuge.

Additional emphasis would be placed on investigating and implementing new methods to reduce streambank erosion on riparian habitat by using in-stream structures (for example, weirs) to pull river flow away from the streambank. Using weirs and other instream structures would negate the need to add additional riprap and would protect the scenic value of the Missouri River corridor next to Karl E. Mundt Refuge. Instream structures would reduce

erosion, helping reduce the loss of hardwoods along the Missouri River and increasing nesting and roosting sites for bald eagles and other migratory birds.

Mature cottonwood trees that appear to be at risk from beaver would be identified and protected with a basal wrap that prevents herbivory. Trapping beaver and protecting selected trees would decrease the rate of cottonwood loss and thus extend the use of this habitat by bald eagles, migratory birds, and other wildlife. It would also decrease the current need to control beaver.

Visitor Services Goal

Hunting. This alternative would be the same as alternative A except a park ranger would be added to the Complex staff and would investigate providing limited big game hunting opportunities (for example, archery or muzzleloader hunting only) on portions of Lake Andes Refuge and Karl E. Mundt Refuge where hunting is currently prohibited. This would improve the quality of the hunting experience and provide a measure of control for wildlife populations not currently manageable through hunting. However, opening Karl E. Mundt Refuge to hunting may result in fewer trophy animals being available for harvest on neighboring public and private lands.

Boat access to the Center Unit of Lake Andes Refuge would be improved by constructing a boat ramp that is ice resistant and functional over a wide range of water depths. This would allow for easier access to the lake for waterfowl hunting.

Fishing. Actions would be the same as alternative A, but boat access to the South Unit of Lake Andes Refuge would be improved by constructing an ice-resistant boat ramp that would be functional over a wide range of water depths. Access for fishing on the South Unit of Lake Andes would improve.

Environmental Education and Interpretation. Actions would be the same as under alternative A, except an outdoor recreation planner would be added to the Complex staff. Environmental education and interpretation opportunities would be expanded. The Complex's potential to reconnect people with nature would be more fully realized. Environmental education activities would be expanded and would include holding teacher workshops, hosting school groups, conducting refuge tours, providing hunter safety courses, and hosting outdoor festivals, fairs, and expos. Additional interpretive exhibits and brochures would be created. Interpretive and environmental education programs would increase understanding and support of Complex programs, as well as be an integral part of the Service's efforts to reconnect children with nature. Complex headquarters would be remodeled and expanded to provide a visitor center and environmental education classroom that would

attract greater numbers of visitors and provide the facilities needed for an effective environmental education program.

Wildlife Observation and Photography. Actions would be the same as under alternative A, except the Complex would provide access for wildlife observation and photography on portions of Karl E. Mundt Refuge and Lake Andes Refuge that are currently closed. Observation and photography blinds would be provided on selected areas of the Complex, and the accessibility of existing foot trails would be improved and provide better access for people with disabilities. As a result, the Complex's potential for wildlife observation and photography would be more fully realized, and visits to the Complex would increase.

Operations Goal

Staffing and Funding. Additional staff would be needed to implement this alternative (appendix E). The amount of conservation and restoration work included in this alternative would be commensurate with staffing levels. A greater range of priority areas would receive proper attention and management effort. Habitat and wildlife resources would receive a greater level of protection (that is, through acquisition, easements, and law enforcement). All wildlife-dependent recreational opportunities would be expanded and enhanced.

Infrastructure, Equipment, Supplies, and Operations and Maintenance. Under alternative B, the maintenance and condition of Complex infrastructure would improve. Operational and maintenance support for management of wetland, riparian, and upland habitats would increase. The headquarters building would be expanded and remodeled to provide more wildlife-dependent recreation opportunities and to support additional employees. The maintenance shop would be remodeled to correct existing deficiencies and accommodate additional staff and equipment, and additional heavy equipment would be acquired (for example, a soil packer). A seed harvest, processing, and drying facility would be constructed.

As a result of these upgrades, conditions of infrastructure throughout the Complex would improve. Upland restoration would be accelerated and would be more cost efficient through use of the Complex's own seed harvest and seed storage equipment. Habitat management activities would be accomplished in an expedited manner. Complex employees would work in a safe and healthy environment, and the efficiency of Complex operations would be enhanced.

Monitoring and Research. Monitoring and research under this alternative would be similar to that under alternative A. However, research efforts would be more proactive. Complex staff would determine and prioritize research needs for the Complex. Examples



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Wood Duck

of such needs could include habitat mapping, identifying more effective strategies to restore uplands or cottonwoods in riparian areas, and conducting studies to determine the effectiveness of management actions (like prescribed fire). Complex staff would then approach the research community with these needs. Information gathered by focused, specific research would allow the staff to make better habitat management decisions.

University-led research to develop methods for riparian and prairie restoration and weed control on waterfowl production areas and refuges would be encouraged. The implementation of alternative B would yield improved knowledge on current levels of weed infestation, management of invasive species, and which upland and riparian habitat restoration techniques would help to achieve the goals of the CCP.

Cultural Resources. Impacts on cultural resources would be neutral, as the staff would continue to survey for and protect these resources on an as-needed basis. Any projects involving potential adverse effects on significant cultural resources would follow procedures as outlined in Section 106 of the National Historic Preservation Act.

Partnerships. Actions would be the same as alternative A, except that Complex staff would pursue new partnerships with government agencies, sporting groups, landowners, and other groups to achieve the visions of this plan. This alternative also calls for the creation of a “friends” group to support Complex management. These new partnership opportunities would expand wildlife conservation and increase public support for the Complex and its programs.

ALTERNATIVE C (INTENSIVE MANAGEMENT)

Wetlands Goal

Water Quality and Quantity on Lake Andes Refuge. Management would be the same as under alternative

B, plus the Complex would enhance the efforts of the Natural Resources Conservation Service to improve water quality in the Lake Andes watershed through the Partners for Fish and Wildlife Program (for example, by planting buffer strips to reduce soil erosion). Enhanced soil conservation in the surrounding watershed would improve water quality—in part by reducing nutrients and organic and chemical inputs into the lake—and benefit wildlife, fisheries, vegetative communities, and invertebrates.

Disease Control. Disease control would follow the same method provided in alternative B with the addition of initiating active sampling of live (trapping) and dead birds (hunter check stations). Oropharyngeal and cloacal swabs would be used to test for the presence or absence of disease. Disease outbreaks would be more likely to be detected and contained than under alternative B.

Riparian Goal

Cottonwood Restoration on Karl E. Mundt Refuge. Under alternative C, the management actions and environmental consequences regarding cottonwood restoration would be the same as under alternative B.

Uplands Goal

Avian Nest Predator Control. Under alternative C, the management actions and environmental consequences regarding avian nest predator control would be the same as under alternative B.

Restoration. Under alternative C, the management actions and environmental consequences regarding uplands restoration would be the same as under alternative B.

Issues and Areas of Concern Related to All Habitats

Invasive Plant Control. Invasive plants would be controlled on wetlands, uplands, and riparian habitats as described in alternative B, except infestations on both refuges and high priority waterfowl production areas would be treated twice annually. The remainder of the Complex’s infestations would be treated on average once every 3 years. Invasive plant densities would decrease even more quickly than under alternative B. Over time, invasive plant infestations would be reduced to a maintenance level where less staff time and funding would be necessary to control invasive plants. It is also expected that public perception and attitudes towards the Complex and its staff would improve, with a likely increase in support for the purposes and goals of the Complex.

Under this alternative, the Complex would pursue the formation of an invasive species “strike team” for South Dakota to more effectively control invasive plants on Service lands in South Dakota.

On the Karl E. Mundt Refuge, all mature cottonwoods would be protected with a basal wrap that prevents herbivory. Wrapping most cottonwood trees would further decrease the rate of cottonwood loss, and thus extend the use of this habitat by bald eagles, migratory birds, and other wildlife.

Protection. Under alternative C, the management actions and environmental consequences regarding habitat protection would be the same as under alternative B.

Visitor Services Goal

Hunting. Under alternative C, the management actions and environmental consequences regarding hunting would be the same as under alternative B.

Fishing. Under alternative C, the management actions and environmental consequences regarding fishing would be the same as under alternative B.

Environmental Education and Interpretation. Actions and effects would be the same as under alternative B, except a new headquarters and visitor center would be constructed instead of remodeling the existing headquarters as in alternative B.

Wildlife Observation and Photography. The level of wildlife observation and photography opportunity on the Complex would be the same as alternative B with an additional focus on providing an observation tower and developing a self-guiding auto tour route on Lake Andes Refuge. The existence of the auto tour route and observation tower would provide people of all ages and abilities previously unavailable opportunities to observe and photograph wildlife, as well as a panoramic view of the landscape in a more natural setting.

Operations Goal

Staffing and Funding. Additional staff would be required to implement this alternative (appendix E). The amount of conservation and restoration work would be commensurate with staffing levels. A greater range of priority areas would receive proper attention and management effort. Habitat and wildlife resources would receive a greater level of protection (that is, through acquisition, easements, and law enforcement).

All wildlife-dependent recreational opportunities would be expanded and enhanced. All habitat areas (not just priority areas) would be improved. The staff would have better access to habitat and wildlife information and the opportunity to query and refine data output and thus finely adjust management efforts, research, and monitoring.

Infrastructure, Equipment, Supplies, and Operations and Maintenance. Actions would be the same as under alternative B, except the existing headquarters building would be replaced with a new headquarters and visitor center. Additional heavy equipment would be

acquired (for example, an excavator, combine, soil packer, bulldozer, transport truck, and trailer) and a seed drying facility would be constructed. As a result of this alternative, upland restoration would be accelerated and would be more cost efficient through use of the Complex's own seed harvest and seed storage equipment. Habitat management activities would be accomplished in an expedited manner.

Monitoring and Research. Under alternative C, monitoring and research would be conducted as described in alternative B. This alternative calls for the additional pursuit of funding and research opportunities (for example, native prairie restoration projects) with universities on habitat management and new, effective surveying methodologies. This could improve the monitoring and research methods of the Complex. This is an even more proactive approach than that of alternative B.

Cultural Resources. This action would be similar to that in alternative B, with the addition of a comprehensive cultural resources survey on all Complex lands. Having lands proactively cleared for cultural resources would increase the efficiency of land-disturbing management activities on the Complex. Law enforcement would be able to better protect cultural resources sites once they were identified.

Partnerships. Alternative C calls for the same management actions as alternative B and would result in the same environmental consequences.

5.3 Cumulative Impacts

Cumulative impacts are the potential effects that could result when the proposed action is added to the actions of the past, present, and future. These impacts could be the result of several independent impacts, which could become significant when added together over time.

Implementing alternative B, the proposed action, would reduce the risk of cumulative impacts because of the procedure in which habitat and wildlife management and other programs would be conducted.

NEPA requires mitigation measures when the environmental analysis process detects possible significant impacts on habitats, wildlife, or the human environment. All activities proposed under alternative B are not expected nor intended to produce significant levels of environmental impacts that would require mitigation measures. Nevertheless, the CCP will contain the following measures to preclude significant environmental impacts from occurring:

- Federally listed species will be protected from intentional or unintended impacts by having activities banned and/or restricted where these species occur.
 - Hunting safety regulations will be closely coordinated with, and enforced by, personnel from the Complex and SDGFP personnel.
 - All proposed activities will be regulated to reduce potential impacts on wildlife and plant species, especially during their sensitive reproductive cycles.
 - Monitoring protocols will be established to determine goal achievement levels and possible unforeseen impacts to resources for application of adaptive management to ensure wildlife and habitat resources, as well as the human environment, are preserved.
- The CCP can be revised and amended after 5 years of implementation, for application of adaptive management to correct unforeseen impacts that occur during the first years of the plan.

Table 2. Summary of CCP alternatives for the Lake Andes National Wildlife Refuge Complex, South Dakota.

<i>Alternative A— no action</i>	<i>Alternative B— modified management</i>	<i>Alternative C— intensive management</i>
GOAL for Wetlands. Acquire, restore, manage, and protect wetlands for the conservation of migratory birds and other water-dependent species endemic to the Plains and Prairie Pothole Region.		
Water Quality and Quantity on Lake Andes Refuge—Actions		
Continue working with the CMLRO to improve water quality and quantity in Lake Andes through partnerships and cost-sharing actions such as: sediment removal, improved soil conservation practices, control of rough fish population, and water augmentation.	<p><i>Same as alternative A, plus:</i></p> <p>Investigate the effectiveness of using fish screens to improve sports fishery in Lake Andes.</p> <p>Investigate and, if feasible, design and build a water system that would pump water from the Center Unit into the South Unit of Lake Andes to provide increased water depth in the South Unit for sport fishing, while providing shallower depths for waterfowl habitat on the Center Unit.</p>	<p><i>Same as alternative B, plus:</i></p> <p>Enhance the Natural Resources Conservation Service’s efforts to improve water quality in the Lake Andes watershed through the Partners for Fish and Wildlife Program (improve cost share for private landowners on projects that improve water quality in the Lake Andes watershed).</p>
Water Quality and Quantity on Lake Andes Refuge—Environmental Consequences		
<p>Water quality would improve through the removal of sediments laden with high levels of nitrogen and phosphorus and the effort to improve soil conservation in the surrounding watershed. Algae blooms and fish kills would be reduced.</p> <p>Rough fish would continue to damage water quality and limit aquatic plant growth through their feeding habits.</p> <p>Water quantity would remain inadequate for effective management of water levels for fish and wildlife.</p>	<p><i>Same as alternative A, plus:</i></p> <p>The incorporation of fish screens may help alleviate the predominance of rough fish on the lake and thus improve water quality and aquatic plant growth.</p> <p>A pumping system would allow refuge managers to provide water levels that are more optimal for fish, waterbirds, and other wildlife.</p>	<p><i>Same as alternative B, except:</i></p> <p>Enhancing soil conservation in the surrounding watershed would improve water quality (that is, fewer nutrients and less organic and chemical input into the lake) and benefit wildlife, fisheries, vegetative communities, and invertebrates.</p>
Invasive Plant Control—Actions		
<p>Continue to use mechanical, chemical, and biological control methods to control invasive plants.</p> <p>Individual infestations would be treated on average once every 3 years.</p>	<p><i>Same as alternative A, except:</i></p> <p>Infestations on Lake Andes Refuge, Karl E. Mundt Refuge, and high priority waterfowl production areas would be treated annually. Remaining infestations would be treated once every 3 years.</p> <p>Surveys to detect the presence of saltcedar would be conducted annually. Any saltcedar plants detected would be eradicated.</p>	<p><i>Same as alternative B, except:</i></p> <p>Infestations on Lake Andes Refuge, Karl E. Mundt Refuge, and high priority waterfowl production areas would be treated twice annually. Remaining infestations would be treated once every 3 years.</p> <p>In addition, the staff would pursue the formation of an invasive species strike team to more effectively control invasive plants on Service lands in South Dakota.</p>

Table 2. Summary of CCP alternatives for the Lake Andes National Wildlife Refuge Complex, South Dakota.

<i>Alternative A— no action</i>	<i>Alternative B— modified management</i>	<i>Alternative C— intensive management</i>
Invasive Plant Control—Environmental Consequences		
<p>Invasive plants would continue to exist on Service lands at current levels of infestation. Neighboring landowner complaints and resentment would continue at current levels.</p>	<p>The density of invasive plant infestations would decrease. Landowner complaints and resentment would decrease. The habitat quality of Service lands for ground-nesting birds would improve.</p>	<p>Invasive plant densities would decrease even more quickly than under alternative B. Over time invasive plant infestations would be reduced to a maintenance level where less staff time and funding would be necessary to control invasive plants. Social consequences would be similar to those under alternative B.</p>
Protection (easements; acquisition of wetlands; cultural resources)—Actions		
<p>Continue monitoring and enforcing provisions of conservation easements. Continue acquiring easements. Continue acquiring fee-title “round outs” of existing Service lands from willing sellers as opportunities allow. Continue protecting cultural resources according to regulations and guidelines.</p>	<p><i>Same as alternative A, plus:</i> Evaluate existing lands held in fee title for their value to trust species. Pursue divestiture of Service lands with marginal wildlife value. Pursue acquisition of lands with high wildlife value (from willing sellers as opportunities allow), even if such lands do not border existing Service lands.</p>	<p><i>Same as alternative B, plus:</i> Conduct a comprehensive cultural resources survey of all Service lands in the Complex.</p>
Protection (easements; acquisition of wetlands; cultural resources)—Environmental Consequences		
<p>Lands currently under Service management would continue to be protected; however, lands with high wildlife value that are not next to existing Service lands could be lost to development. Management of Service lands with marginal wildlife value would continue to be a diversion of limited resources that could be better allocated to manage lands with high wildlife value. Cultural resources would be adequately protected.</p>	<p><i>Same as alternative A, plus:</i> The ability to divest of lands with marginal wildlife value would free limited resources to focus management on Service lands that are more valuable to trust species. Complex staff would have greater flexibility to pursue protection of lands with high wildlife value within the wetland management district. Cultural resources would be adequately protected.</p>	<p><i>Same as alternative B, plus:</i> A Complex-wide cultural resources survey would allow for better protection of cultural resources. Having lands proactively cleared for cultural resources would increase the efficiency of land-disturbing management activities on the refuge complex. Law enforcement staff would be better able to protect cultural resources sites once such sites were identified.</p>
Disease Control—Actions		
<p>Continue weekly disease monitoring on Lake Andes Refuge during peak spring and fall migration periods and opportunistic monitoring elsewhere on the Complex. Continue containment, removal of dead birds, and submittal of samples to the USGS National Wildlife Health Center when disease outbreaks occur in accordance with the “Lake Andes National Wildlife Refuge Disease Contingency Plan.”</p>	<p><i>Same as alternative A, plus:</i> Survey other Service lands that have high concentrations of birds susceptible to HPAI.</p>	<p><i>Same as alternative B, plus:</i> Sample live birds (trapping) and dead birds (hunter check stations) using oropharyngeal and cloacal swabs to test for the presence or absence of disease.</p>
Disease Control—Environmental Consequences		
<p>Outbreaks outside Lake Andes Refuge may remain undetected, or may be reported after effective containment is no longer possible, leading to greater spread of disease and greater risk to humans, in the case of epizootic diseases.</p>	<p>Disease outbreaks would be more likely to be detected and contained than in alternative A.</p>	<p>Disease outbreaks would be more likely to be detected and contained than in alternative B.</p>

Table 2. Summary of CCP alternatives for the Lake Andes National Wildlife Refuge Complex, South Dakota.

<i>Alternative A— no action</i>	<i>Alternative B— modified management</i>	<i>Alternative C— intensive management</i>
Monitoring and Research—Actions		
<p>Continue conducting limited monitoring of habitat conditions and wildlife populations (for example, invertebrate survey, breeding waterfowl surveys, and breeding shorebird surveys).</p> <p>Continue supporting habitat and wildlife research as requested.</p>	<p><i>Same as alternative A, plus:</i></p> <p>Expand existing surveys and add surveys that address refuge management issues.</p> <p>Determine and prioritize research needs for the Complex. Approach the research community with these needs.</p>	<p><i>Same as alternative B, plus:</i></p> <p>Pursue funding to facilitate research on Complex lands.</p>
Monitoring and Research—Environmental Consequences		
<p>Limited analysis of habitat management treatments would continue to hinder the Complex staff's understanding and ability to use adaptive resource management to improve success and attain management goals.</p> <p>Research would continue to be initiated by outside researchers and typically would not address the key management questions of the Complex.</p>	<p>Additional surveys would provide additional data to inform staff decisions.</p> <p>Research would become pro-active and focus on the key management questions of the Complex. Information gathered by focused, specific research would allow the staff to make better habitat management decisions.</p>	<p><i>Same as alternative B, plus:</i></p> <p>Facilitate additional research on the Complex.</p>
<p>GOAL for Riparian Habitat. Acquire, restore, manage, and protect riparian habitats endemic to the lower Missouri River for the conservation of bald eagles, other species of concern, and migratory birds.</p>		
Cottonwood Restoration on Karl E. Mundt Refuge—Actions		
<p>Dams on the Missouri River would continue to limit cottonwood regeneration and lead to a decline in cottonwood habitat. Continue replanting cottonwood stands on Karl E. Mundt Refuge as funding and opportunities allow.</p>	<p><i>Same as alternative A, plus:</i></p> <p>Develop and implement a riparian restoration plan for Karl E. Mundt Refuge that includes establishment of native understory plant species along with plains cottonwood.</p>	<p><i>Same as alternative B.</i></p>
Cottonwood Restoration on Karl E. Mundt Refuge—Environmental Consequences		
<p>Cottonwood-dominated habitats would continue to decrease in size due to lack of natural cottonwood regeneration and loss of habitat to erosion. Loss of habitat would directly impact bald eagles (nesting and roosting) and other migratory bird species (migration and nesting) dependent on cottonwood riparian habitats.</p>	<p>The decline of cottonwood-dominated habitats would be slowed, thus extending the use of the refuge by bald eagles, migratory birds, and other wildlife of this habitat.</p>	<p><i>Same as alternative B.</i></p>
Invasive Species Control on Karl E. Mundt Refuge—Actions		
<p>Continue using mechanical, chemical, and biological control methods as needed to control invasive plants (weeds and trees).</p>	<p><i>Same as alternative A, plus:</i></p> <p>Increase emphasis on control of Russian olive, eastern red cedar, and other invasive tree species. All herbaceous weeds (leafy spurge, Canada thistle, musk thistle) would be treated annually.</p> <p>An annual survey to detect the presence of the invasive tree, saltcedar, would be initiated. Any plants found would be eradicated.</p>	<p><i>Same as alternative B, except:</i></p> <p>Herbaceous weeds would be treated twice annually.</p>

Table 2. Summary of CCP alternatives for the Lake Andes National Wildlife Refuge Complex, South Dakota.

<i>Alternative A— no action</i>	<i>Alternative B— modified management</i>	<i>Alternative C— intensive management</i>
Invasive Species Control on Karl E. Mundt Refuge—Environmental Consequences		
<p>Invasive plants (trees and weeds) would continue to exist on Service lands at current levels of infestation.</p> <p>Control of beaver at current levels would allow continued loss of mature cottonwoods on which bald eagles and other migratory birds depend.</p>	<p>Increased control of Russian olive, eastern red cedar, and other invasive tree species would allow natural regeneration of native plants that provide better habitat for native wildlife and reduce the spread of invasive plants downstream.</p> <p>Infestations of invasive plants would decrease to a maintenance level where they can be more efficiently controlled. Ecosystem health and wildlife habitat would be improved.</p> <p>An annual survey to detect saltcedar would provide an excellent opportunity to eradicate any plants discovered.</p> <p>Protecting selected trees would lead to a decrease in the rate of loss of cottonwoods and thus extension of the use of this habitat by bald eagles, migratory birds, and other wildlife. It would also decrease the current need to control beaver.</p>	<p><i>Regarding invasive trees, same as alternative B. Regarding other invasive species, same as alternative B, except:</i></p> <p>Biannual treatments of herbaceous weeds would result in further reduction of infestation levels compared to alternative B.</p> <p>Also, wrapping most cottonwood trees would further decrease the rate of loss of cottonwoods to herbivory, and thus extend the use of this habitat by bald eagles, migratory birds, and other wildlife.</p>
Habitat Protection on Karl E. Mundt Refuge—Actions		
<p>Continue to pursue a conservation easement on lands between the north and south units of the Karl E. Mundt Refuge.</p> <p>Continue protection of cultural resources according to current policies and regulations.</p> <p>Continue to allow periodic removal of beaver to safeguard cottonwood habitat as needed.</p>	<p><i>Same as alternative A, plus:</i></p> <p>Investigate and implement new methods to reduce streambank erosion by using in stream structures (for example, weirs) to pull river flow away from the streambank. Pursue acquisition of fee title of the conservation easement on a willing-seller basis.</p> <p>Mature cottonwood trees that appear to be at risk from beaver would be identified and protected with a basal wrap that prevents herbivory.</p>	<p><i>Same as alternative B, plus:</i></p> <p>Conduct a comprehensive cultural resources survey on the riparian habitats of Karl E. Mundt Refuge.</p> <p>All mature cottonwoods would be protected with a basal wrap that prevents herbivory.</p>
Habitat Protection on Karl E. Mundt Refuge—Environmental Consequences		
<p>The risk of development of lands next to the refuge and fragmentation of riparian habitats would be reduced. Bald eagles and other migratory birds dependent on riparian habitat would continue to be protected from disturbance.</p> <p>Cultural resources would continue to be protected under existing regulations from development and management activities.</p>	<p>Using weirs and other instream structures to protect streambanks from erosion would negate the need to add riprap, thus protecting the scenic value of the Missouri River corridor next to Karl E. Mundt Refuge.</p>	<p><i>For streambanks, same as alternative B. For all other considerations, same as alternative B, plus:</i></p> <p>A Complex-wide cultural resources survey would allow for better protection of cultural resources. Having lands proactively cleared for cultural resources would increase the efficiency of land-disturbing management activities on the Complex. Law enforcement would be better able to protect cultural resources sites once they were identified.</p>
Monitoring and Research—Actions		
<p>Continue conducting limited monitoring of habitat conditions and wildlife populations (for example, bald eagle nesting, migratory bird use of the riparian forest, and bald eagle winter roosting). Continue supporting habitat and wildlife research as requested.</p>	<p><i>Same as alternative A, plus:</i></p> <p>Expand existing surveys and add surveys that address refuge management issues.</p> <p>Determine and prioritize research needs for the Complex. Approach the research community with these needs.</p>	<p><i>Same as alternative B, plus:</i></p> <p>Pursue funding to facilitate research on Complex lands.</p>

Table 2. Summary of CCP alternatives for the Lake Andes National Wildlife Refuge Complex, South Dakota.

<i>Alternative A— no action</i>	<i>Alternative B— modified management</i>	<i>Alternative C— intensive management</i>
Monitoring and Research—Environmental Consequences		
<p>Limited analysis of habitat management treatments would continue to hinder the Refuge Complex staff’s understanding and ability to use adaptive resource management to improve success and attain management goals.</p> <p>Research would continue to be initiated by outside researchers and typically would not address the key management questions of the Complex.</p>	<p>Additional surveys would provide additional data to inform staff decisions. Research would become pro-active and focus on the key management questions of the Complex. Information gathered by focused, specific research would allow the staff to make better habitat management decisions.</p>	<p><i>Same as alternative B, plus:</i> Additional research would be facilitated on the Complex.</p>
<p>GOAL for Uplands. Acquire, restore, manage, and maintain a diverse mix of native grassland habitats to support migratory and resident wildlife found in the northern mixed-grass prairie ecosystem.</p>		
Avian Nest Predator Control—Actions		
<p>Continue without control of significant avian nest predators (for example, fox, skunk, and raccoon) due to lack of funding and staff.</p>	<p>Facilitate implementation of large block trapping of significant nest predators (such as that sponsored by Delta Waterfowl), to improve nesting success of waterfowl and other ground-nesting birds.</p>	<p><i>Same as alternative B.</i></p>
Avian Nest Predator Control—Environmental Consequences		
<p>Portions of the Complex may suffer from nest predation that is a detriment to waterfowl populations.</p>	<p>Overall nesting success of waterfowl and other ground-nesting birds throughout the Complex would increase, thus sustaining or increasing current bird populations.</p>	<p><i>Same as alternative B.</i></p>
Invasive Plant Species Control—Actions		
<p>Continue to use mechanical, chemical, and biological control methods to control invasive plants.</p> <p>Individual infestations would be treated on average once every 3 years.</p> <p>Approximately 3,000 infested acres would be treated annually.</p>	<p><i>Same as alternative A, plus:</i> A total of 33 percent of infestations would be treated annually instead of once every 3 years. The staff would seek to form an invasive species “strike team” for South Dakota.</p>	<p><i>Same as alternative B, plus:</i> A total of 33 percent of infestations would be treated annually with a follow-up inspection and spot treatment(s) as needed. The remainder of the Complex’s upland infestations would be treated on average once every 3 years.</p>
Invasive Plant Species Control—Environmental Consequences		
<p>Neutral impacts; invasive and nuisance species would continue to exist on Service lands at current levels of infestation; accordingly, many neighboring landowners would continue to resent the presence of invasive species on Service lands next to their own while other neighbors of the Complex would compliment staff efforts to control invasive/nuisance species.</p>	<p>Under this alternative it is expected that invasive species infestations would be reduced from current levels throughout the Complex. It is also expected that public perception and attitudes towards the Complex and its staff would improve, with a likely increase in support for the purposes and goals of the Complex.</p>	<p>Under this alternative it is expected that invasive species infestations would continue to decline and be reduced from levels achievable under alternatives A or B. It is also expected that public perception and attitudes toward the Complex and its staff would improve, with a likely increase in support for the purposes and goals of the Complex.</p>
Protection—Actions		
<p>Continue evaluating and acquiring high-quality grassland easements and fee title of “round outs” from willing sellers as opportunities arise and budgets allow. Continue monitoring and enforcing easement provisions on easement lands. Continue meeting existing cultural resources protection policies.</p>	<p><i>Same as alternative A, plus:</i> Analyze and pursue divestiture or exchanges of fee-title and easement lands with marginal wildlife value and pursue protection of other lands with high wildlife value, even if these lands are not “round outs” to existing properties. Identify ownerships and conduct a com.</p>	<p><i>Same as alternative B, plus:</i> Pursue a cultural resources survey of all fee-title lands in the Complex.</p>

Table 2. Summary of CCP alternatives for the Lake Andes National Wildlife Refuge Complex, South Dakota.

<i>Alternative A— no action</i>	<i>Alternative B— modified management</i>	<i>Alternative C— intensive management</i>
	<p>prehensive analysis of high-value wildlife habitat throughout the district and establish contact with those landowners to pursue options to protect those lands</p>	
Protection—Environmental Consequences		
<p>Lands currently under Service management would continue to be protected. However, lands with high wildlife values that are not protected would continue to be lost to agriculture, urbanization, and development caused in part by the Service’s slow acquisition response (private landowners sometimes wait 2–5 years or longer for an offer and need a quicker response from the Service). Because of existing Service responsibilities, management of Complex lands with minimal wildlife value would continue to be a diversion of necessary resources (for example, personnel, equipment) that could be better allocated to manage Complex lands with high wildlife value.</p> <p>Impacts on cultural resources would be neutral, as the staff would continue to survey for and protect cultural resources on an as-needed basis.</p>	<p><i>For cultural resources, same as alternative A.</i></p> <p>For other considerations, same as alternative A, except:</p> <p>The Complex’s ability to divest lands with minimal wildlife value would allow Complex resources to be reallocated to manage lands with high wildlife values.</p> <p>The Complex staff would have greater flexibility to pursue protection of all lands with high wildlife values that occur within the boundaries of the wetland management district.</p>	<p><i>Same as alternative B, plus:</i></p> <p>Identifying all existing cultural resources on the upland habitats of fee-title lands. This would allow for better preservation and protection of these cultural resources as well as expediting and increasing the efficiency of habitat management activities, thereby benefiting the wildlife and plants that depend on this habitat type.</p>
Restoration—Actions		
<p>Continue burning, spraying, and grazing to improve nesting habitat and haying to remove buildup of vegetative litter and duff on fee-title lands.</p> <p>Continue restoration activities on previously farmed areas dominated by nonnative plants. These areas would be cropped for several years in preparation for the reseeding of desirable plant species. To assist in the grass establishment efforts, herbicides such as glyphosate and imazapic would continue to be used. Continue to remove nonnative trees through mechanical means and prescribed burns.</p>	<p><i>Same as alternative A, plus:</i></p> <p>Management would primarily focus on restoration with a high diversity of native grass and forb mix. However, where it is not feasible to plant natives, dense nesting cover may be used on a small scale.</p> <p>Target grassland restoration and management to provide habitat for grassland nesting birds (a guild of species representing a broad spectrum native to the area) but efforts would concentrate on waterfowl and migratory species of highest management concern and on those known to nest on the Complex.</p> <p>Lands with no record of farming would be managed by burning, grazing, or haying to encourage native grass and forb growth. Sites that do not respond to the above management treatments would be interseeded with native grass or forb mixes.</p> <p>Purchase equipment for collection of native plant seeds, and construct facilities for cleaning, drying, and storing those seeds.</p>	<p><i>Same as alternative B.</i></p>

Table 2. Summary of CCP alternatives for the Lake Andes National Wildlife Refuge Complex, South Dakota.

<i>Alternative A— no action</i>	<i>Alternative B— modified management</i>	<i>Alternative C— intensive management</i>
Restoration—Environmental Consequences		
<p>Uplands throughout the Complex would continue to be restored to their native grass condition, but because of the lack of restoration of native forbs and the slow pace of restoration, the value of these habitats to migratory birds and insects (for example, butterflies) would continue to be inadequate.</p>	<p><i>Same as alternative A, except:</i> Prairie restoration would proceed at a higher rate, and a higher diversity of native plants would be used. In addition to waterfowl, other grassland-nesting bird species would benefit.</p>	<p><i>Same as alternative B.</i></p>
Monitoring and Research—Actions		
<p>Continue minimal monitoring of habitat conditions and wildlife populations. Continue to allow outside requests to perform habitat and wildlife research.</p>	<p><i>Same as alternative A, plus:</i> Reexamine existing surveys and add surveys as needed to address refuge management issues. Use adaptive management procedures to improve habitat management. Determine and prioritize research needs for the Complex. Approach the research community with these needs.</p>	<p><i>Same as alternative B, plus:</i> Pursue funding to facilitate research on Complex lands.</p>
Monitoring and Research—Environmental Consequences		
<p>Lack of basic knowledge of habitat characteristics, vegetative cover management, invasive species infestation, and wildlife populations present and their use and relationships with the habitats would continue to prevent the staff from being able to develop effective management activities and to use adaptive resource management to improve success. Research under this alternative is reactive, thus research would not address the key management questions on riparian habitats.</p>	<p>Implementation of this alternative would yield improved knowledge on current levels of weed infestation and on management of invasive species, as well as what upland habitat restoration techniques would help to achieve the goals of the CCP. Implementing this alternative would likely improve the Complex staff's understanding of the habitat requirements of grassland birds and assist in developing grassland bird management plans. Nest success information would indicate if predator control efforts are needed to meet production goals. This data and knowledge would allow the staff to better manage habitats and the wildlife that depend on uplands.</p>	<p><i>Same as alternative B, plus:</i> Some universities might perform research, inventory, or monitoring on the Complex's upland habitats.</p>
<p>GOAL for Visitor Services. Provide opportunities for high quality and compatible hunting, fishing, environmental education, environmental interpretation, wildlife photography, and wildlife observation for persons of all abilities and cultural backgrounds by fostering an understanding and appreciation of the Lake Andes National Wildlife Refuge Complex and the missions of the Service and Refuge System.</p>		
Hunting—Actions		
<p>Continue to allow hunting on waterfowl production areas and the Center Unit of Lake Andes refuge.</p>	<p><i>Same as alternative A, except:</i> Add a park ranger to the Complex staff who would investigate, and if feasible and compatible, provide limited, additional big game hunting opportunities (for example, archery or muzzleloader hunting only) on portions of Lake Andes Refuge and Karl E. Mundt Refuge where hunting is not currently allowed. Improve boat access to the Center Unit of Lake Andes Refuge by constructing a</p>	<p><i>Same as alternative B.</i></p>

Table 2. Summary of CCP alternatives for the Lake Andes National Wildlife Refuge Complex, South Dakota.

<i>Alternative A— no action</i>	<i>Alternative B— modified management</i>	<i>Alternative C— intensive management</i>
	<p>boat ramp that is ice-resistant and functional over a wide range of water depths.</p> <p>Improve access to hunting for people with disabilities by allowing vehicle access to select areas normally closed to vehicles on a case-by-case basis.</p>	
Hunting—Environmental Consequences		
<p>Hunting use would continue to increase where currently allowed. As use increases the quality of the hunting experience could decrease due to crowding.</p> <p>The staff would accommodate people with disabilities (for example, provide vehicle access to hunting areas normally closed to vehicles) on a case-by-case basis.</p>	<p><i>Same as alternative A, except:</i></p> <p>The Complex would provide expanded hunting opportunities, which would improve the quality of the hunting experience, and provide a measure of control for wildlife populations not currently manageable through hunting.</p> <p>Opening Karl E. Mundt Refuge to hunting may result in fewer trophy animals available for harvest on neighboring public and private land.</p> <p>Improving access would provide additional hunting opportunities.</p>	<p><i>Same as alternative B.</i></p>
Fishing—Actions		
<p>Continue to allow fishing on waterfowl production areas and the Center and South Units of Lake Andes Refuge.</p> <p>Continue to support the efforts of CMLRO to restore a fishery on the South Unit of Lake Andes, including a fishing pond on the edge of the town of Lake Andes.</p>	<p><i>Same as alternative A, plus:</i></p> <p>Improve boat access to the South Unit of Lake Andes Refuge by constructing a boat ramp that is ice-resistant and functional over a wide range of water depths.</p>	<p><i>Same as alternative B.</i></p>
Fishing—Environmental Consequences		
<p>Although the fisheries of Lake Andes would continue to fluctuate, improvements in water quality should improve the fishery. Boat access for fishing on the South Unit would continue to be poor.</p>	<p><i>Same as alternative A, except:</i></p> <p>Access for fishing on the South Unit of Lake Andes would improve.</p>	<p><i>Same as alternative B.</i></p>
Environmental Education and Interpretation—Actions		
<p>Continue to provide environmental education presentations as requested.</p> <p>Continue to provide a modest amount of interpretive media.</p>	<p><i>Same as alternative A, except:</i></p> <p>Add an outdoor recreation planner to the Complex staff to expand environmental education and interpretation opportunities. This new staff member would plan and initiate an environmental education program with teachers in the surrounding area. Potentially add new interpretive media in the headquarters area, and possibly the Karl Mundt Refuge area would also receive interpretive panels.</p> <p>Complex headquarters would be remodeled and expanded to provide a visitor center and environmental education classroom.</p>	<p><i>Same as alternative B, except:</i></p> <p>A new headquarters and visitor center would be constructed instead of remodeling the existing headquarters as in alternative B.</p>

Table 2. Summary of CCP alternatives for the Lake Andes National Wildlife Refuge Complex, South Dakota.

<i>Alternative A— no action</i>	<i>Alternative B— modified management</i>	<i>Alternative C— intensive management</i>
Environmental Education and Interpretation—Environmental Consequences		
<p>The Complex’s potential to reconnect people with nature would be unrealized.</p>	<p>Interpretative and environmental education programs would increase understanding and support of Complex programs, as well as be an integral part of the Service’s efforts to reconnect children with nature.</p> <p>A visitor center would attract greater numbers of visitors and provide the facilities needed for an effective environmental education program.</p> <p>The Complex’s potential to reconnect people with nature would be more fully realized.</p>	<p><i>Same as alternative B.</i></p>
Wildlife Observation and Photography—Actions		
<p>Continue to provide unlimited opportunities for wildlife observation and photography on all waterfowl production areas, and the Center and South Units of Lake Andes Refuge. Continue to maintain existing foot trails. Continue to allow public access to Owens Bay and the Prairie Ponds for wildlife observation and photography opportunities. The North Unit of Lake Andes Refuge and Karl E. Mundt Refuge would continue to be closed to general public</p>	<p><i>Same as alternative A, except:</i></p> <p>Provide increased, but limited access for wildlife observation and photography on portions of Karl E. Mundt Refuge and the North Unit of Lake Andes Refuge. Observation and photography blinds would be provided on selected areas of the Complex. Improve accessibility of existing foot trails.</p>	<p><i>Same as alternative B, plus:</i></p> <p>Develop a self-guiding auto tour route on Lake Andes Refuge. Construct an observation tower on Lake Andes Refuge.</p>
Wildlife Observation and Photography—Environmental Consequences		
<p>Opportunities for wildlife observation and photography would not reach their full potential. Trails for people with disabilities would remain marginally accessible. Public access to portions of the Complex with high potential for wildlife observation and photography would remain closed.</p>	<p>The Complex’s potential for wildlife observation and photography would be more fully realized.</p> <p>People with disabilities would have better access to existing foot trails on the Complex.</p>	<p><i>Same as alternative B, plus:</i></p> <p>The existence of the auto tour route would provide people of all physical abilities opportunities to observe and photograph wildlife.</p>
<p>GOAL for Operations. Provide funding, staffing, infrastructure, protection of cultural resources, partnerships, and a safe working environment to achieve the purposes and objectives of the Lake Andes National Wildlife Refuge Complex.</p>		
Staffing and Funding—Actions		
<p>Budget cuts have led to a 22-percent reduction in permanent staff over the last 10 years. The current staff of the Complex is not adequate to implement alternative A. The restoration of one deputy wildlife refuge manager and the conversion of one career seasonal maintenance worker to full time would be necessary to restore the staff to previous levels and to implement alternative A.</p> <p>Existing positions total 6.7 full-time-equivalents and are as follows: one wildlife refuge manager, one wildlife refuge specialist (wetland management district), one wildlife biologist, one wildlife biol</p>	<p><i>Same as alternative A, except:</i></p> <p>The following additions to the Complex staff would be added (bringing the Complex staff to 12.0 full-time-equivalents): one deputy wildlife refuge manager, one outdoor recreation planner, one park ranger, one biological technician, and one prescribed fire technician; additionally, one career seasonal maintenance worker position would be converted to a full-time position.</p>	<p><i>Same as alternative B, plus:</i></p> <p>The following additions to Complex staff would be added (bringing the Complex staff to 14.0 full-time equivalents): one biological technician, one prescribed fire technician, and one maintenance worker.</p>

Table 2. Summary of CCP alternatives for the Lake Andes National Wildlife Refuge Complex, South Dakota.

<i>Alternative A— no action</i>	<i>Alternative B— modified management</i>	<i>Alternative C— intensive management</i>
<p>ogist (Partners for Fish and Wildlife), one administrative officer, one full-time maintenance worker, and one career seasonal maintenance worker. However, a total of 8.0 full-time equivalents would be needed to implement this alternative.</p>		
Staffing and Funding—Environmental Consequences		
<p>Current funding and staffing is inadequate to properly manage the resources and facilities of the Complex. The grassland habitats that dominate the Complex would continue to require frequent management treatments (for example, burning, grazing, haying) to remain productive for wildlife. Such management would be lacking and habitats would suffer as a result. Wildlife populations that depend on these habitats would continue to be impacted. Lack of adequate staffing would continue to allow the degradation of infrastructure (for example, fences, signs, buildings) throughout the Complex. Inadequate staffing would continue to impede full development of wildlife-dependent recreation throughout the Complex.</p>	<p>Additional staffing would provide the resources to manage and restore more habitats annually. Wildlife populations that depend on these habitats would increase. Additional staffing would also provide the resources to adequately maintain facilities, equipment, and vehicles. Wildlife-dependent recreational opportunities would be expanded and enhanced.</p>	<p><i>Same as alternative B, plus:</i> Habitat restoration would be accelerated, and additional public use facilities would be constructed.</p>
Infrastructure: Equipment, Supplies, Operations and Maintenance—Actions		
<p>Continue current level of maintenance of equipment, vehicles, and real property. No additional heavy equipment would be acquired.</p>	<p>Increase operational and maintenance support for management of wetland, riparian and upland habitats. Expand and remodel the headquarters building to provide more wildlife-dependent recreation opportunities and to support additional employees. Remodel the maintenance shop to correct existing deficiencies and accommodate additional staff and equipment. Construct a seed drying facility. Acquire additional heavy equipment (for example, excavator, combine, soil packer, bulldozer, transport truck and trailer).</p>	<p><i>Same as alternative B, except:</i> Replace the existing headquarters building with a new headquarters and visitor center.</p>
Infrastructure: Equipment, Supplies, Operations and Maintenance—Environmental Consequences		
<p>Some portions of infrastructure (like fences) would remain in poor condition. No additional heavy equipment would be acquired. The efficiency of the Complex maintenance programs would continue to be compromised by a deficient shop building. Infrastructure would continue to deteriorate over time (e.g. fences) and would impact habitat and wildlife management efforts.</p>	<p>Conditions of infrastructure throughout the Complex would improve. Complex employees would work in a safer and healthier environment. Efficiency of Complex operations would be enhanced. Control of invasive plants would be accelerated.</p>	<p><i>Same as alternative B, except:</i> Control of invasive plants would be even more accelerated.</p>

Table 2. Summary of CCP alternatives for the Lake Andes National Wildlife Refuge Complex, South Dakota.

<i>Alternative A— no action</i>	<i>Alternative B— modified management</i>	<i>Alternative C— intensive management</i>
Partnerships—Actions		
<p>Continue to support existing partnerships with private cooperators, agencies, and organizations. Staff shortages relative to existing workload would continue to limit the pursuit of partnership opportunities that require a large amount of time.</p> <p>Continue to support wildlife conservation on private land through the Partners for Fish and Wildlife program.</p>	<p><i>Same as alternative A, except:</i></p> <p>Pursue new partnerships to achieve the vision of this CCP.</p> <p>Pursue the creation of a “friends” group to support Complex management.</p>	<p><i>Same as alternative B.</i></p>
Partnerships—Environmental Consequences		
<p>Complex staff would be unable to take full advantage of partnership opportunities, to the detriment of the habitats and wildlife present in the Complex. Public support for the Complex and its programs is limited.</p> <p>Wildlife conservation on private lands would continue through the Partners for Wildlife program.</p>	<p><i>Same as alternative A, except:</i></p> <p>Complex staff would take advantage of partnership opportunities to expand wildlife conservation and increase public support for the Complex and its programs.</p>	<p><i>Same as alternative B.</i></p>

CHAPTER 6—Implementation of the Proposed Action



USFWS

A snowy owl perches on a sign in the Lake Andes National Wildlife Refuge.

The planning team developed objectives in support of goals identified in chapter 2 to carry out the proposed action (alternative B) for management of the Lake Andes National Wildlife Refuge Complex. This chapter presents suggested strategies to achieve objectives; rationale supporting the goals, objectives, and strategies; and assumptions used in developing the CCP.

Biological goals and objectives emphasize management of plant communities as habitat for wildlife, especially migratory birds, and are organized by major habitat types that occur on the Complex. Goals and objectives are habitat-based (rather than wildlife-based) because wildlife often responds to factors beyond control of local refuge management. (For example, disease outbreaks or habitat conditions on important staging or wintering sites can affect populations of migratory birds.) Furthermore, management practices such as fire, grazing, haying, tree removal, and water level manipulation focus on plant communities rather than wildlife populations. Habitat-based objectives emphasize monitoring of important vegetation attributes such as community composition and vegetation structure over time. In most cases, wildlife population responses to habitat changes are not directly monitored. Rather, site-specific inventories, applied research, and literature reviews allow for reasonable predictions of wildlife responses to habitat management.

Important to note is that in South Dakota, the Service places highest priority on two groups of species—together known as trust species—and holds

special responsibility in managing and conserving these species. The first group contains those species that are State or federally listed as endangered or threatened. Some listed species pass through the Complex (for example, whooping crane) or occur in the general area (for example, least tern and piping plover); however, the Complex does not provide significant habitat (for example, breeding habitat) for any listed species.

The second group contains those species listed as migratory birds, a long list of birds that can be found in the Migratory Bird Treaty Act. For the most part, migratory birds include all bird species that occur in the U.S. with the exception of nonnative birds (for example, European starling, English sparrow, and Eurasian collared dove) and non-migratory birds (for example, sharp-tailed grouse and greater prairie chicken). According to Section 7 of Service Director's Order 172, "Responsibilities of Federal Agencies to Protect Migratory Birds" (USFWS 2004):

Many Service programs are actively involved in bird conservation activities. Our objective for migratory bird management and conservation is to minimize the potential adverse effects of migratory bird take, with the goal of striving to eliminate take, while implementing our mission. All Service programs strive to take an ecosystem approach to protection and restoration of species and their associated habitats. As migratory birds is one of our trust resources, all programs must emphasize

an interdisciplinary, collaborative approach to migratory bird conservation in cooperation with other Service programs, in addition to other governments, State and Federal agencies, and non-Federal partners. However, we recognize that direct or indirect actions taken by Service employees in the execution of their duties and activities as authorized by Congress may result in the take of migratory birds. In many instances, short-term negative impacts on migratory birds are balanced by long-term benefits. We will incorporate ecosystem integrity, reduction of invasive species, and long-term adaptive management in migratory bird management, using the best available scientific information.

Objectives in this chapter are written with trust species in mind.

6.1 Identification of the Proposed Action

The planning team has identified alternative B as the proposed action after determining that it accomplishes the following:

- best achieves the purposes, vision, and goals for the Complex
- helps fulfill the System mission
- maintains and, where appropriate, restores the ecological integrity of the Complex and the System
- addresses the significant issues and mandates
- is consistent with principles of sound fish and wildlife management

Under alternative B, management of the Complex would emphasize developing and implementing an improved, science-based priority system to restore prairie habitats for the benefit of waterfowl, State and federally listed species, migratory birds, and other native wildlife. Complex staff would focus on high-priority tracts and, when possible, on lower-priority tracts. The focus would be to restore ecological processes and native grassland species to the greatest extent possible within the parameters of available resources and existing constraints. Complex staff would seek to maintain and in some cases expand the existing levels and types of public use programs, ensuring that programs offered to the public are of consistently high quality.

6.2 Goals, Objectives, Strategies, and Rationale

The terms goal, objective, strategy, and rationale are defined below:

- A goal is a descriptive, broad statement of desired future conditions that conveys a purpose but does not define measurable units.
- An objective is a concise statement of what is to be achieved, how much is to be achieved, when and where it is to be achieved, and who is responsible for achieving it.
- A strategy is a way to achieve an objective.
- A rationale presents the background details used to formulate an objective. The rationale provides context to enhance comprehension and facilitate future evaluations.

The management direction presented in this chapter meets the purposes, visions, and goals of the Complex. Objectives and strategies to carry out the goals would support both resource needs and public use.

6.3 Prioritization for Waterfowl Production Areas

For its waterfowl production areas, habitat protection and restoration are the Lake Andes District's primary emphases. Strategic planning enables the Service to make decisions on what habitats need protection and what landscapes have the greatest value to the health of waterfowl populations.

Based in Bismarck, North Dakota, the Habitat and Population Evaluation Team (HAPET) conducts research and develops predictive models. Through HAPET's research and modeling of the Plains and Prairie Pothole Region of South Dakota, the Service can predict duck pair density. This modeling tool provides the Service with information needed to conserve and restore wetland and grassland landscapes that will benefit waterfowl and other bird species. The Service bases its protection priority for wetland and grassland habitat on this modeling effort. The Service's conservation goal is to protect habitat capable of supporting 25 or more breeding duck pairs per square mile. Figure 19 shows the predicted concentrations of duck pairs throughout the Complex.

A 2007 report by the U.S. Government Accountability Office analyzed the effectiveness of Service acquisitions under the waterfowl production area program. As a consequence of this analysis, the Service recently

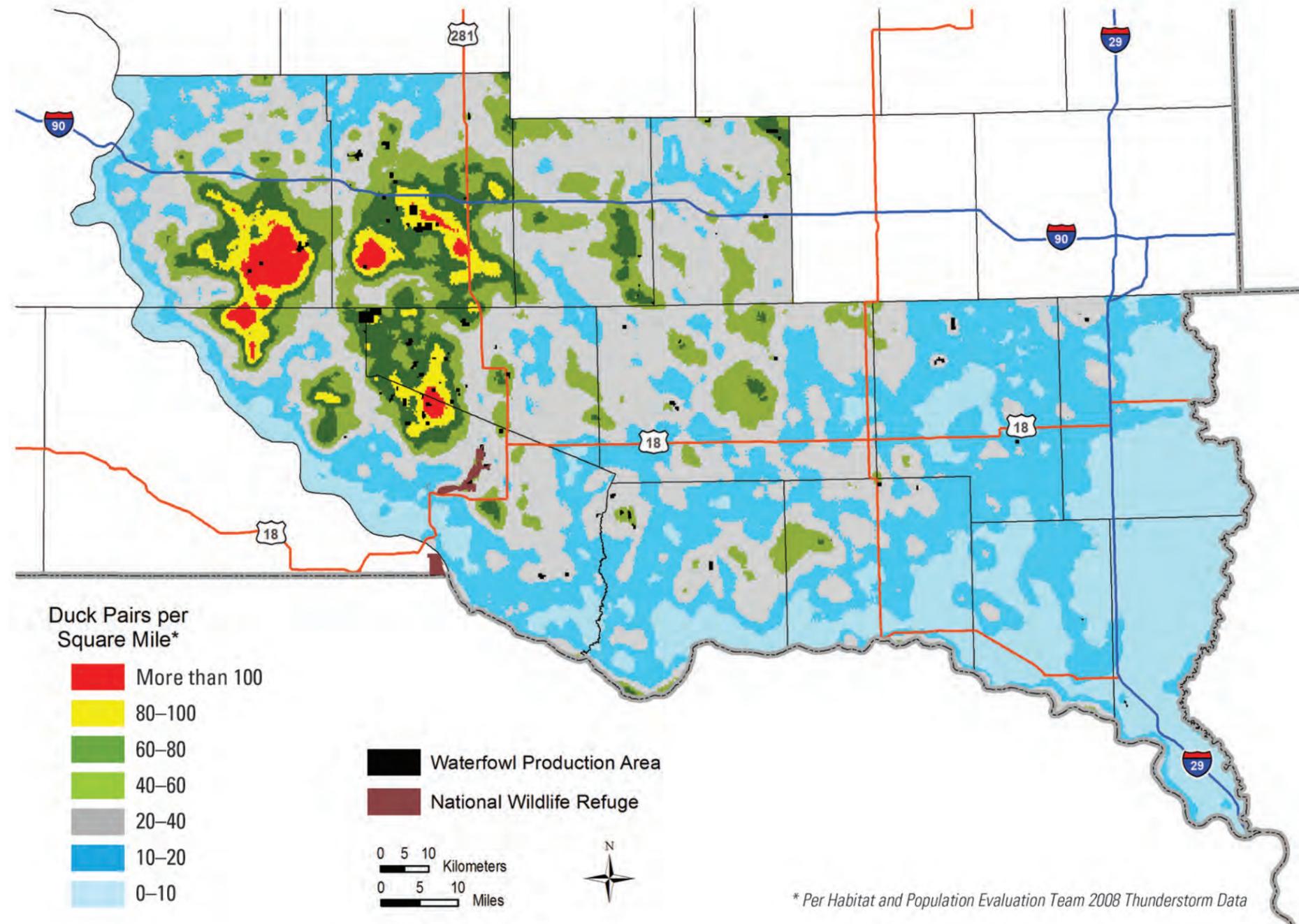


Figure 19. Predicted concentrations of duck pairs throughout the Lake Andes National Wildlife Refuge Complex, South Dakota.

completed a decision tree matrix (figure 20) that outlines how to set priorities for grassland and wetland acquisitions. Strategic planning increases the likelihood of making cost-effective decisions by avoiding misapplications of management treatments or investing in areas with limited potential to affect populations.

PRIORITIZATION OBJECTIVE

Implement the standardized, science-based prioritization decision tree developed for the CCP (figure 20) so that limited funding and management resources are objectively allocated to waterfowl production areas according to the potential for that unit to benefit waterfowl and grassland birds. Focus allocation of limited resources to high priority units as discussed in selected objectives below. Refine the prioritization system as additional biological information becomes available; reevaluate the prioritization system 5 years and 10 years after CCP approval.

Strategies

- Apply multiple selection criteria for prioritizing waterfowl production areas according to the decision tree (figure 20) and as summarized below.
 1. Primary Criterion—Duck Pairs per Square Mile or Native Sod Tract Size. Duck Pairs per Square Mile is divided into two levels of priority: more than or equal to 60 and fewer than 60. Native Sod Tract Size is divided into two levels of priority: larger than 70 acres and smaller than 70 acres.
 2. Secondary Criterion—Waterfowl Production Area Tract Size or Planted Native Grass Tract Size. Waterfowl Production Area Tract Size is divided into two levels of priority: larger than 160 acres and smaller than 160 acres. Planted Native Grass Tract Size is divided into two levels of priority: larger than 100 acres and smaller than 100 acres.
 3. Tertiary Criterion—Land Protection within 1 Mile of Waterfowl Production Area. Land Protection within 1 Mile is divided into two levels of priority: larger than 160 acres and smaller than 160 acres.

The result of objectively applying these three criteria using the decision tree (figure 20) is the assignment of a priority level for each waterfowl production area in the wetland management district (table 3). In all, there are eight priority levels. The highest priorities will receive the greatest focus when resources are limited. A range of priorities have been applied to selected objectives later in this chapter.

Rationale

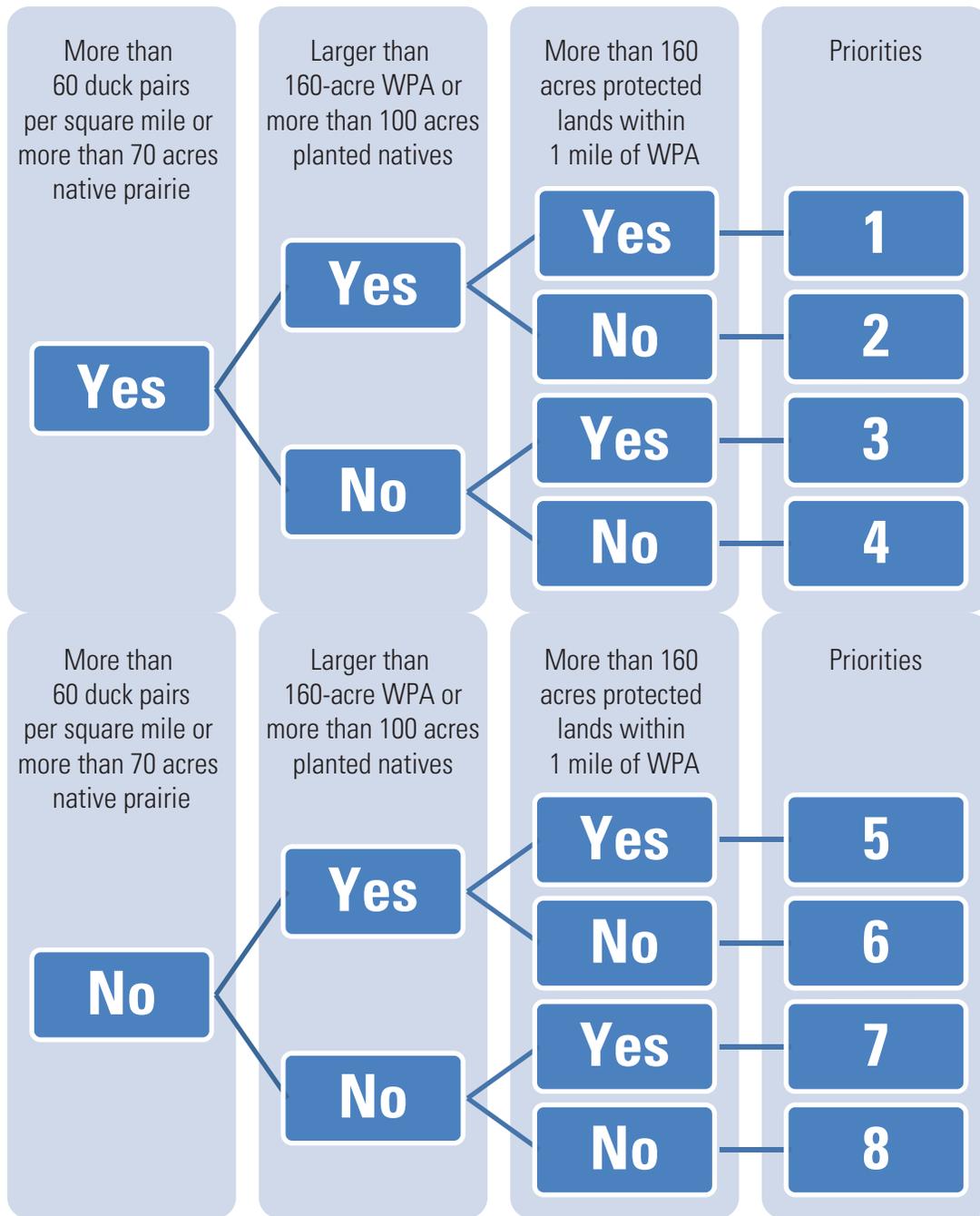
Most northern mixed-grass and tallgrass prairie has been destroyed. Key roles of the Refuge System include conservation of biological integrity, diversity, and ecological health (USFWS 2001). Accordingly,

the Complex should contribute to the conservation of native prairie communities.

However, Service-owned native prairie is badly deteriorated, mainly through extensive invasion by introduced, cool-season grasses. Recent inventory data suggest that relatively intact native herbaceous flora is uncommon on Service-owned land in the Dakotas, with few remaining large tracts dominated by native grasses and forbs (Grant et al. 2009). Current inventory data for the Complex (2009) indicate that native grasses and forbs are evident on 20 percent of the native prairie (figure 21). As of April 2012, there are 5,793 acres of native prairie on the Complex.

It is likely that some native prairie vegetation has already passed a degradation threshold—in other words, restoration of a diverse, native herbaceous flora in such areas is an unrealistic and impractical goal. Multiple experiments in the northern Great Plains have found that fire and other control methods such as herbicide applications depend heavily for their success on the presence of a minimum of 20 percent of native species in the matrix (Dill et al. 1986, Willson and Stubbendieck 2000). A grass matrix dominated by a few introduced species inhibits the germination, establishment, and persistence of most native species. However, restoration may be possible on some tracts, especially where native grasses, sedges, and forbs are more common and widespread. Such tracts need to be identified by objective criteria that focus on (1) the diversity and prevalence of existing native plants and (2) landscape area and connectivity.

Both criteria underlie the quality of nesting habitat for grassland birds, a species guild of significant conservation concern. Grassland birds have become the fastest and most consistently declining guild of birds in North America (figure 22) (Herkert 1995, Knopf 1994, Peterjohn and Sauer 1999, Samson and Knopf 1994, Vickery and Herkert 2001); 48 percent of grassland species are of conservation concern and 55 percent show significant declines (North American Bird Conservation Initiative 2009). As a result, a multitude of grassland-dependent birds are of conservation concern (table 4). Johnson (2006) found that at current rates of decline, within 40 years only 10–25 percent of the population of these grassland bird species will remain. Accordingly, because South Dakota constitutes the central portion of many grassland-obligate bird species' geographical ranges (Sauer et al. 2008), managing habitat for grassland birds is of critical importance. Complex staff has developed a list of focal species it is best positioned to help protect and maintain on the basis of the species' geographic ranges and specialized habitats; these species are identified in habitat management discussions throughout this chapter.



WPA = waterfowl production area

Figure 20. Decision tree for prioritizing management of waterfowl production areas.

Table 3. Priorities for management of waterfowl production areas according to the decision tree (figure 20).

<i>Waterfowl production area</i>	<i>County</i>	<i>Priority</i>	<i>Waterfowl production area</i>	<i>County</i>	<i>Priority</i>
Boggs	Hanson	1	VanZee	Charles Mix	3
Broken Arrow	Charles Mix	1	Vogel	Davison	3
Coler	Douglas	1	Zehnpfennig	Davison	3
Crystal Lake	Aurora	1	Diede	Yankton	4
DeVelder	Douglas	1	Huizenga	Douglas	4
Hieb	Bon Homme	1	Koch	Aurora	4
Humphrey	Aurora	1	Kurtenbach	Davison	4
King	Douglas	1	Mayer	Hutchinson	4
Krell	Aurora	1	Novotny	Charles Mix	4
Lutz	Aurora	1	Pipal	Brule	4
Maine	Aurora	1	Ziebart	Hutchinson	4
New Holland	Douglas	1	Atkins	Lincoln	5
Nielsen	Aurora	1	Bertels	Hanson	5
Plucker	Turner	1	Black Thunder	Charles Mix	5
Putnam	Charles Mix	1	Bucholz	Bon Homme	5
Raysby	Charles Mix	1	Edelman	Yankton	5
Sherman	Charles Mix	1	Huber	Charles Mix	5
Sorenson	Aurora	1	Roth	Hutchinson	5
Stanley	Aurora	1	Youngstrom	Charles Mix	5
Star	Douglas	1	Fousek	Charles Mix	6
Trout	Charles Mix	1	Hohn	Hutchinson	6
DeCook	Douglas	2	Kafka	Charles Mix	6
Green	Charles Mix	2	Miller	Turner	6
Koss	Brule	2	Scheffel	Bon Homme	6
Miller	Aurora	2	Scott	Aurora	6
Somek	Douglas	2	Welker	Hanson	6
Varilek	Charles Mix	2	Delger	Hanson	7
Althen	Aurora	3	Dubes	Douglas	7
Cosby	Bon Homme	3	Henke	Hutchinson	7
Delange	Douglas	3	North Unit	Charles Mix	7
Denning	Douglas	3	Schaefer	Bon Homme	7
Foster	Aurora	3	Soulek	Charles Mix	7
Fuchs	Charles Mix	3	Anderson	Clay	8
Korevaar	Douglas	3	Collar	Union	8
Lindeman	Davison	3	Freese	Lincoln	8
Overweg	Aurora	3	Hansen	Yankton	8
Plooster	Douglas	3	Juran	Charles Mix	8
Schneider	Hanson	3	Kayser	Hanson	8
Schute	Aurora	3	Koupal	Charles Mix	8
Stanek	Brule	3	Kuil	Douglas	8
Tucek	Charles Mix	3	Peterson	Turner	8
Vanderpol	Charles Mix	3	White Lake	Aurora	8

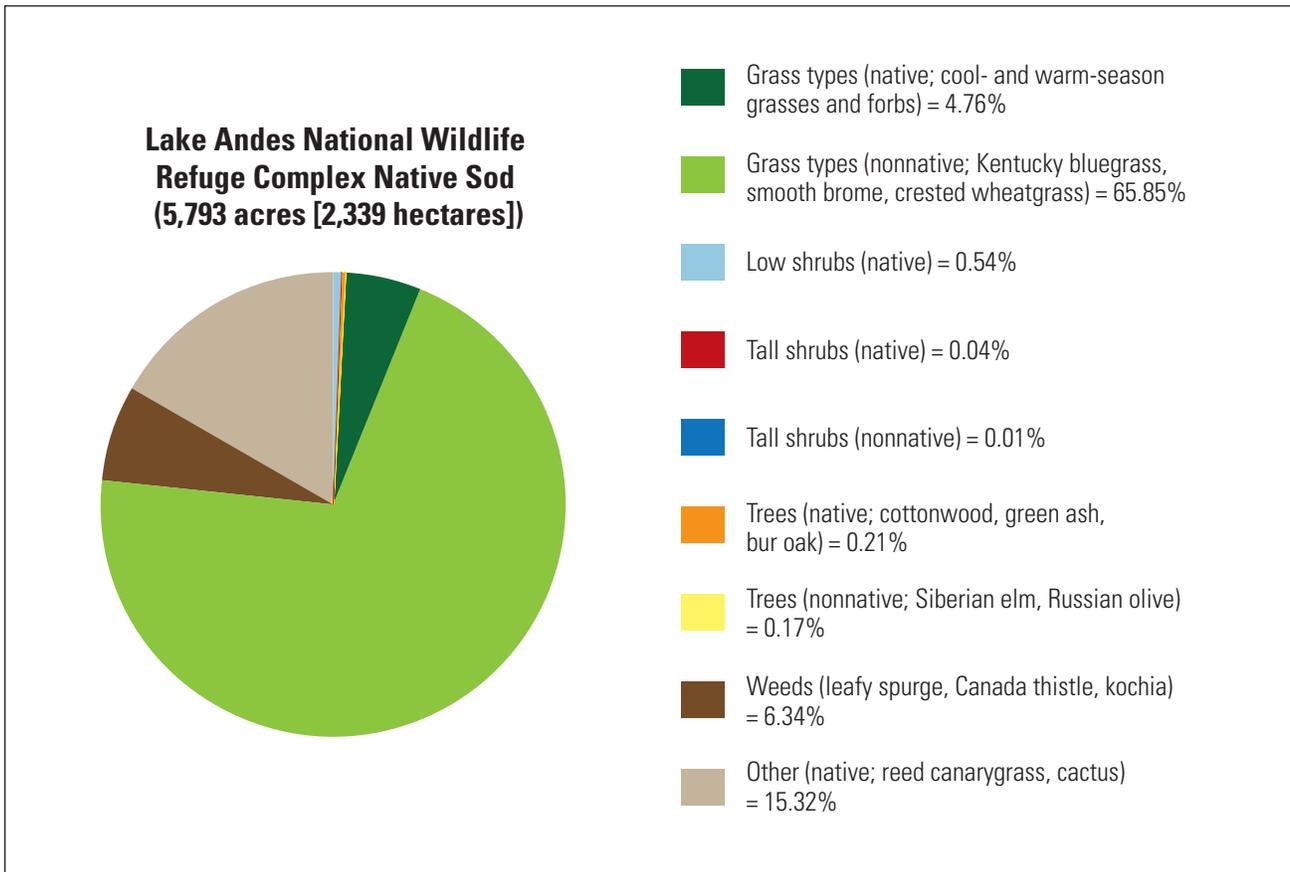


Figure 21. Dominant vegetation community types on native prairie on the Lake Andes National Wildlife Refuge Complex, South Dakota.

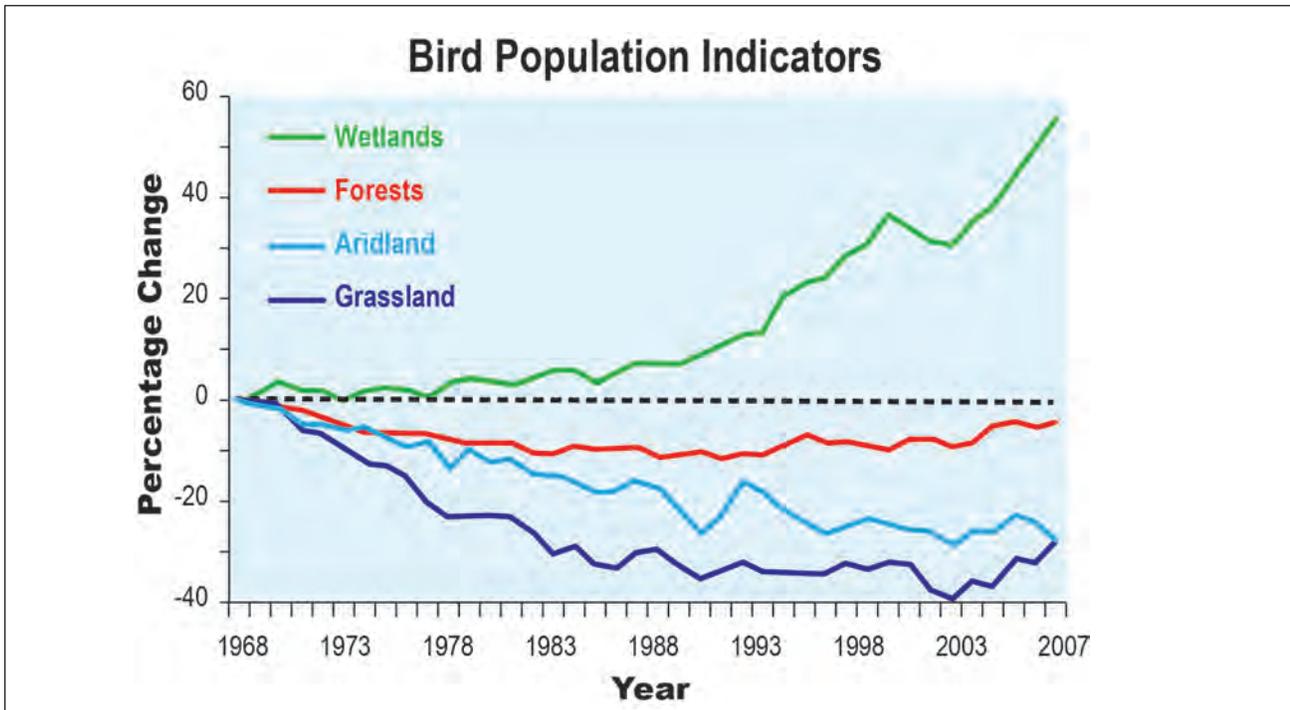


Figure 22. North American bird population indicators based on trends for obligate species in four major habitats (North American Bird Conservation Initiative 2009).

Table 4. Birds of conservation concern or priority species.

<i>Species</i>	<i>Prairie Pothole Region Birds of Conservation Concern (USFWS 2008)</i>	<i>Region 6 Birds of Conservation Concern (USFWS 2008)</i>	<i>South Dakota Priority Species (Bakker 2005)</i>	<i>Threatened or Endangered Species</i>
American bittern	X	X	X	
Bald eagle	X	X		
Bell's vireo		X		
Black tern	X		X	
Black-billed cuckoo	X	X	X	
Black-crowned night-heron			X	
Bobolink				
Burrowing owl		X	X	
Chestnut-collared longspur	X	X	X	
Dickcissel	X			
Ferruginous hawk		X	X	
Franklin's gull			X	
Golden eagle		X		
Grasshopper sparrow	X	X	X	
Greater prairie-chicken			X	
Horned grebe	X	X	X	
Lark bunting			X	
Least bittern	X	X		
Least tern				X
Loggerhead shrike		X		
Long-billed curlew	X	X		
Marbled godwit	X	X	X	
Northern harrier			X	
Piping plover				X
Red-headed woodpecker	X	X		
Savannah sparrow			X	
Sedge wren				
Sharp-tailed grouse			X	
Short-eared owl	X	X	X	
Swainson's hawk	X		X	
Upland sandpiper	X	X	X	
Virginia rail			X	
Western meadowlark			X	
Willet			X	
Willow flycatcher		X		
Wilson's phalarope			X	

A recent evaluation of habitat use and requirements for grassland bird species of greatest conservation need in central and western South Dakota provided the following recommendations to managers for preservation and restoration of grassland habitat to help maintain populations of grassland-obligate bird species.

To maintain current populations and species diversity, it is critical that managers preserve as much native grassland as possible. Due to the diverse habitat requirements of these species of concern, grasslands should be under varying management regimes including rest, grazing (in varying intensities), haying, and prescribed burning. Reduction and removal of exotic plant species should be a key element in establishing habitat for grassland-obligate species as many are negatively affected by increases in exotic plant coverage. Preserved patches should be large in size as some species are area-sensitive and prefer patches between 618 and 3,954 acres or larger. Grassland patches should also have little to no woody edge. Finally, these patches should be located in close proximity to one another, or in areas of little fragmentation, to help increase the amount of grassland habitat in the landscape, as many of these grassland bird species were positively associated with landscape variables, some up to 10,500 feet distant (Greer 2009).

A fundamental assumption is that, under current management—which lacks an objective, science-based system of identifying and prioritizing restoration of native prairie tracts—native herbaceous flora would continue to decline and disappear. Implementation of the prioritization objective and its supporting strategy would improve the chances that some native prairie would be restored.

6.4 Wetlands

Acquire, restore, manage, and protect wetlands for the conservation of migratory birds and other water-dependent species endemic to the Plains and Prairie Pothole Region.

WETLANDS OBJECTIVE 1: IMPROVE WATER QUALITY IN LAKE ANDES

Over the next 15 years, Complex staff will work with partners to improve the water quality of Lake Andes to sustain healthy fish and wildlife populations, in part by reducing phosphorus to less than 0.25 milligrams per liter [mg/L] and increasing dissolved oxygen to greater than 4 mg/L.

Strategies

- Support the efforts of CMCLRO to improve water quality in the Lake Andes watershed.



© John Jave

The black-crowned night heron is a South Dakota Priority Species.

- Support conservation programs that will reduce phosphorus, nitrogen, and sediment levels in the Lake Andes watershed.
- Provide information to landowners in the watershed that explains the importance of water quality to fish and wildlife.
- Monitor levels of phosphorus and dissolved oxygen in Lake Andes.
- Investigate ways to control populations of common carp in Lake Andes.

Rationale

Studies have revealed that Lake Andes suffers from excessive levels of nutrients, especially phosphorus and nitrogen (Larson 2009, South Dakota Department of Environment and Natural Resources 1992). These nutrients cause robust algae blooms that reduce sunlight penetration through the water column. When the algae die, a chemical process results that significantly reduces oxygen in the water. The nutrient overload and the subsequent lack of oxygen kills fish and native aquatic plants that are important to fish and wildlife. These same studies indicate that nutrients continue to be deposited into the lake from the surrounding watershed. Larson (2009) recommended cleaning up the watershed before undertaking the costly and time-consuming process of removing nutrient-laden sediment from the lake. Livestock waste and fertilizer are the most significant sources of excess nutrients in the watershed (South Dakota Department of Environment and Natural Resources 1992).

Larson (2009) established water quality goals for Lake Andes. The primary goal is to maintain a dissolved oxygen level of greater than 4 mg/L. The secondary goal is to maintain a total phosphorus level of less than 0.25 mg/L. Modeling efforts indicate that this goal can be reached by reducing total phosphorus loads from the watershed by approximately 36 percent.

The feeding behavior of common carp contributes to the reduction of sunlight penetration into the water column. This limits the diversity and distribution of beneficial aquatic plants. These fish also compete with sport fish (for example, yellow perch and northern pike) and migratory birds for food (Swanson and Nelson 1970). Carp have much lower requirements for dissolved oxygen than perch or pike, so they can more easily persist during periods of poor water quality. Controlling populations of carp in Lake Andes would improve water quality; however, it would be a considerable challenge. Tributaries to Lake Andes would have to be gated in such a way that carp would not recolonize the lake during runoff events. Reduction of carp populations within the lake might have to wait until drought dries the lake completely.

WETLANDS OBJECTIVE 2: IMPROVE WATER QUANTITY AND WATER LEVEL MANAGEMENT IN LAKE ANDES

Over the next 15 years, Complex staff will work with partners to improve the water quantity and water level management of Lake Andes to benefit fish and wildlife populations. Water quantity enhancements will target additions greater than 5000 acre-feet per year. Water levels in the Center Unit will average approximately 3 feet in depth. Improving water quantity and quality will depend on (1) developing a clean water source and (2) constructing a pump station, respectively. Each will require a significant amount of funding that will likely be difficult to obtain.

Strategies

- Support the efforts of CMCLRO to develop a reliable source of clean water for Lake Andes.
- Investigate and, if feasible, construct a pump system that would allow water levels to be increased in the South Unit for sport fishing while decreasing water levels in the Center Unit for waterfowl.

Rationale

Lake Andes has no perennial water supply. It is dependent on runoff in the watershed. Currently there is no way to significantly vary the water depth between the lake's South Unit and Center Unit. It would be beneficial to fish to create deeper water levels in the South Unit and beneficial to migratory birds to create shallower water levels in the Center Unit. When water levels are moderate, pumping water from the Center Unit to the South Unit would provide better habitat for fish and wildlife. Given the size of Lake Andes, it is not known if a pump station could move enough water from the Center Unit to the South Unit to create a significant difference in depth.

American bittern, blue-winged teal, and American avocet are wetland focal species for this plan. Collectively their preferred water depths range from 0 inches to 15

inches (Dechant et al. 2002, 2003; Sousa 1985). During most years much of Lake Andes is far deeper than this. If a pump station proves practical, then water depths in the Center Unit and North Unit can be managed for migratory birds.

WETLANDS OBJECTIVE 3: CONTROL INVASIVE PLANTS ON COMPLEX WETLANDS THROUGH EARLY DETECTION–RAPID RESPONSE

Over the life of this plan, Complex staff will identify and strive to eradicate all infestations of new and emerging invasive and noxious plant species (for example, non-native phragmites, purple loosestrife, and saltcedar) that are not well established on Complex wetlands.

Strategies

- Survey for presence of invasive plant species and use global positioning system (GPS) and geographic information system (GIS) technologies to map and monitor infestations of invasive plants.
- Upon discovery, attempt eradication of highly invasive plants that are not well established on the Complex (for example, saltcedar, purple loosestrife, and nonnative phragmites).
- Use all appropriate methods (for example, herbicides, mechanical removal, biological control, and fire) to eradicate invasive and noxious plants.

Rationale

Identifying infestations early and eradicating them while they are small is the most efficient way to control invasive and noxious plants.

Exotic species are a major threat to native ecosystems in the United States and considered second only to habitat destruction in significance. Control of invasive species is a management priority because they have a direct negative effect on the ability of refuges to fulfill their wildlife conservation mission, including migratory waterfowl and songbird production, species recovery, biological diversity, biological integrity, and ecosystem function.

Prevention is considered the highest priority under a successful integrated invasive plant management program. Public and private landowners work very hard to address the spread of invasive plants yet rarely have sufficient resources to manage all populations. When prevention fails, rapidly responding to new invaders is critical to limiting impacts and costs of new invasions. This process—termed early detection–rapid response (EDRR)—involves surveying land, identifying new invaders to an area, and pursuing treatment as quickly as possible.

The “USFWS Invasive Species Strategic Plan” (USFWS 2003) recommends focusing on early detection and completely eradicating smaller infestations rather than trying to control large, well established infestations. It has been shown to be far less costly to

control invasive plants through eradicating new invasions or small patches than by trying to control well established invasions (Chippendale 1991 in Hobbs and Humphries 1995, Frid et al. 2011, Leung et al. 2002, Keller et al. 2007). Small satellite populations of invasives often expand more rapidly and potentially cover more area than the front of a source population (Cousens and Mortimer 1995, Moody and Mack 1988). (A fitting analogy is fire: many spot fires may occupy or “fill” an area more quickly than the advancing front of the fire.) Additionally, since most invasive plants have a long lag period following introduction, they can usually be eradicated at this early stage if recognized. Rejmanek and Pitcairn (2004) note that early detection can make the difference between employing feasible offensive strategies and retreating to defensive strategies that usually require ongoing financial commitments.

For example, treating two new small patches of a species when discovered will most likely result in successful eradication, preventing them from spreading and adding to the existing management burden. On the other hand, treating a large existing patch with all available resources for years may only result in a slight decrease in patch size or density—moreover, during that time the two new invasions would continue to grow and spread, creating an even greater need for more resources.

Resources must be directed at detecting early invasions in cooperation with Complex partners and responding rapidly to new invasions. If resources are not directed to EDRR, then invasions are allowed to outpace management efforts, leading to greater areas of infestations that are costly and time-consuming to treat.

Although prevention and EDRR are important components of an integrated invasive species management strategy, certain large, well established infestations should also be targeted at least for containment. For these species, prioritization by species or area must occur first to determine which species have the greatest impact on trust resources and whether infestations are in areas of high conservation value. Containing those infestations will maximize the effectiveness of limited resources.

WETLANDS OBJECTIVE 4: PROTECT WETLANDS THROUGH EASEMENT ACQUISITION

Provided adequate funding is available, the Complex’s wetland district manager will lead annual efforts to secure perpetual conservation easements on more than 300 acres of unprotected, high priority wetland acres to benefit migratory birds, to provide water storage for flood protection, to improve water quality, and to recharge groundwater—all of which benefit indigenous plant and animal species and State- and federally listed species throughout the life of the CCP.

Strategies

- Focus the protection of wetlands (and associated grasslands) with conservation easements in areas of high waterfowl nesting densities. Use the current Upland Accessibility for Breeding Duck Pairs in the Lake Andes National Wildlife Refuge Complex map (figure 23) to geographically guide acquisition priorities.
- Use the Partners for Fish and Wildlife Program as a way to inform prospective sellers of the Service’s conservation easement program.
- Use the Service’s strong partnerships with Ducks Unlimited, North American Wetlands Conservation Act (NAWCA), and other conservation organizations to generate non-Duck Stamp funding to buy conservation easements.
- Examine data from HAPET, The Nature Conservancy, Ducks Unlimited, and others to identify geographic areas valuable to waterfowl and other migratory birds.

Rationale

Wetland drainage and filling continues to be a conservation issue in eastern South Dakota. Approximately 20,000 acres are drained or filled annually in the Plains and Prairie Pothole Region (Dahl 2000). Acquisition of an easement on private land rather than outright fee purchase results in more conservation “bang for the buck.” In short these easements protect wetlands from draining, filling, or non-permitted burning. The primary source of funds for easement purchases is the Migratory Bird Conservation Fund from the sale of Duck Stamps. All migratory bird hunters 16 years of age and over must annually purchase and carry a Federal Duck Stamp. Many collectors, art enthusiasts, and other conservationists (especially bird watchers) also buy duck stamps to support migratory bird conservation. Approximately 98 cents of every duck stamp dollar goes directly into the Migratory Bird Conservation Fund to purchase wetlands and wildlife habitat for inclusion into the National Wildlife Refuge System.

In most cases acquisition of wetland easements will be in concert with grassland easements on the same tract of land. Protecting the nesting habitat that surrounds wetlands is critically important.

HAPET has identified wetlands that are especially at risk of drainage. These are temporary and seasonal wetlands, 1 acre in size, that are completely or partially embedded in cropland. The pressure to drain and fill these wetlands to support tillage agriculture puts these basins at higher risk of conversion than those in grasslands. At the same time, these wetlands have important value for waterfowl. Based on predictive models developed by HAPET, the Service

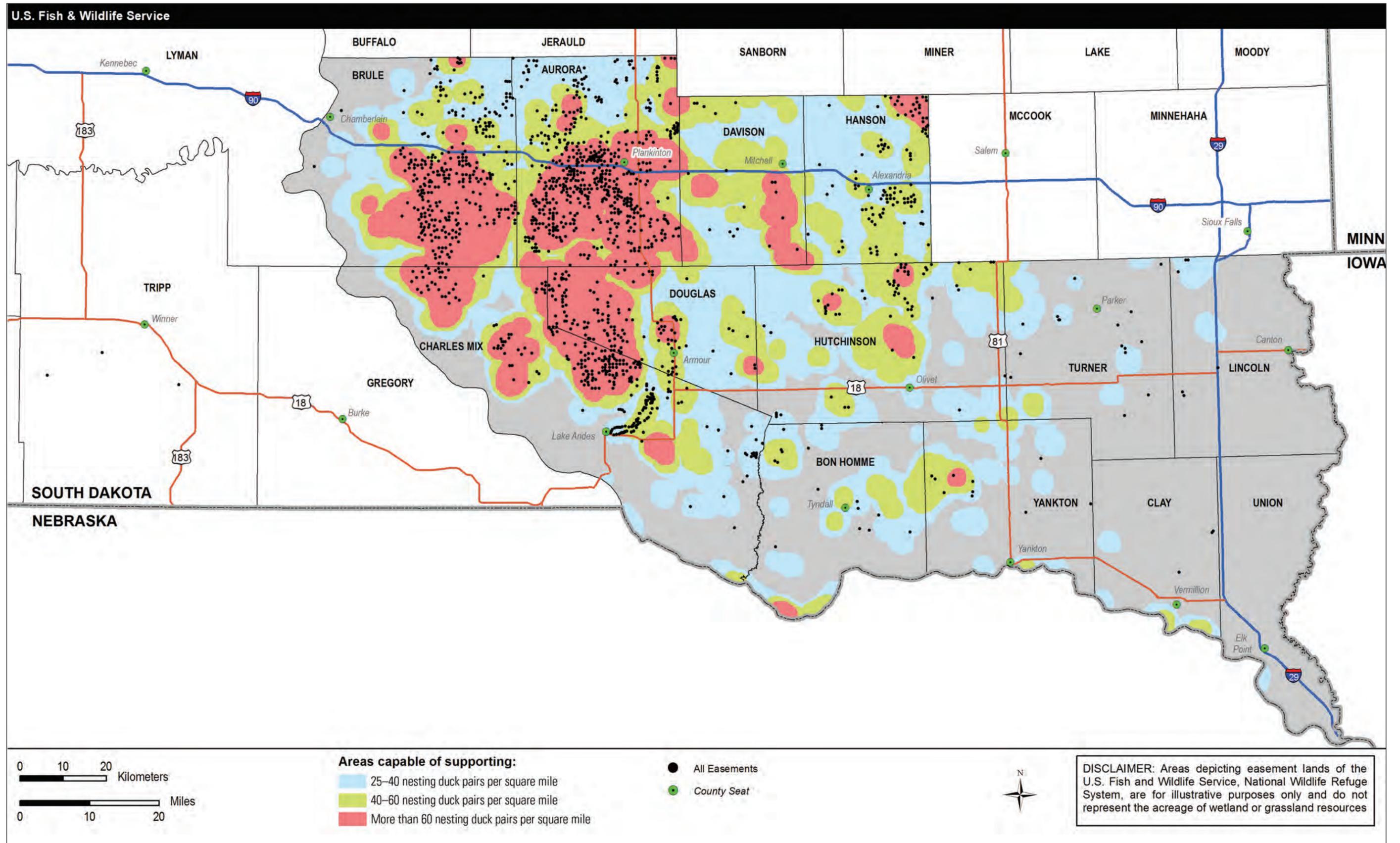


Figure 23. Upland accessibility for breeding duck pairs in the Lake Andes National Wildlife Refuge Complex, South Dakota.

has prioritized conservation easement acquisitions to focus on the following:

- wetlands that are not protected
- wetlands capable of supporting more than 25 breeding duck pairs per square mile
- wetlands embedded in cropland, where the risk of degradation is especially high
- wetland types at greatest risk of degradation: seasonal and temporary basins
- semi-permanent and permanent wetlands less than 1 acre in size

According to HAPET, waterfowl pairs in the Plains and Prairie Pothole Region are supported on 7.33 million wetland acres, of which 1.49 million acres are currently protected by wetland easements or waterfowl production areas. An estimated 1.15 million duck pairs reside in these wetlands, leaving the majority of pairs (3.10 million, or 73 percent) dependent on wetlands that are currently unprotected (except through the “Swampbuster” provision of the Farm Bill). Using the criteria above, HAPET identified 1.4 million acres of priority wetlands within the area encompassed by the Plains and Prairie Pothole Region that are in greatest need of protection; these wetlands would support 1.5 million duck pairs. This number has been adopted as a protection goal by both the Dakota Working Group (a team consisting of refuge managers and project leaders from refuges and districts in South Dakota and North Dakota) and the Prairie Pothole Joint Venture (PPJV) (Ringelman 2005).

Established in 1987 as one of the original six priority joint ventures under the North American Waterfowl Management Plan, the PPJV protects, restores, and enhances high priority wetland and grassland habitats to help sustain populations of waterfowl, shorebirds, waterbirds, and prairie landbirds.

The NAWMP, an international agreement developed in 1986, recognizes the recovery and perpetuation of waterfowl and other wetland wildlife that depend on the restoration of wetlands and associated ecosystems throughout North America. As a result, it established cooperative initiatives (joint ventures) to reverse declines in wetland habitats and associated wildlife.

The PPJV is a dynamic partnership that functions as a network and seeks partners at the local, regional, national, and international levels. The partnership involves Federal and State agencies, nongovernmental conservation groups, private landowners, scientists, universities, policy makers, resource managers, corporations interested in conservation, communicators, tribes, resource conservation districts, and land trusts, among others. The PPJV is constantly seeking additional talent and organizations or private individuals interested in prairie habitat conservation.

Protection of priority wetlands with conservation easements would not only benefit waterfowl, but would also have benefits for other migratory waterbirds. Niemuth et al. (2006) demonstrated the importance of temporary and seasonal wetlands embedded in agricultural landscapes to migrant shorebirds in the Plains and Prairie Pothole Region.

To calculate offers for a conservation easement, the Service uses the assessed value of the land and a multiplier derived from the relationship between the sale price and assessed values of similar properties in the area. This acquisition process works most efficiently, then, when the Service focuses its acquisition efforts in one area before moving onto other areas. Accordingly, targeting areas with high waterfowl nesting densities not only ensures that conservation easements have high value for wildlife, it also reduces administrative burden because the Service can focus its efforts in one area.

To inform prospective sellers of the Service’s conservation easement program, the Service will use the Partners for Fish and Wildlife Program. Often times, a biologist from this program is the first point of contact for landowners who would otherwise be unaware of the available conservation programs.

WETLANDS OBJECTIVE 5: RESTORE WETLANDS

Over the next 15 years, the Partners for Fish and Wildlife biologist and Complex staff will strive to restore 300 drained wetland basins on private lands (either Partners for Fish and Wildlife projects or easements) and Complex lands to provide more wetland habitat for blue-winged teal, American bittern, and American avocet (the three focal species for wetland habitats) and other migratory birds.

Strategies

- Use Complex staff and equipment or private contractors to restore drained wetlands.

Rationale

When eastern South Dakota was settled, many wetland basins were drained for agricultural purposes. Today many landowners are interested in the values that wetlands provide such as erosion control, flood prevention, water table recharge, and wildlife habitat. As a result many drained wetlands are being restored, primarily through Partners for Fish and Wildlife, which uses grant money to cost-share wildlife habitat improvements on private lands. Restoration typically involves placing an earthen plug in the ditch that drains a wetland. The site is surveyed and the ditch plug constructed to restore the natural hydrology of the wetland basin without exceeding its natural depth. Restored wetlands provide additional habitat for migratory birds and all of the other values mentioned above.

WETLANDS OBJECTIVE 6: MANAGE WETLAND WATER ON THE PRAIRIE PONDS

Over the next 15 years, Complex staff will manage the water levels of the Prairie Ponds to provide ideal habitat for a great diversity of migratory birds. In particular, from March through July levels will be managed for blue-winged teal and American bittern, which prefer water depths of 2–15 inches and hemimarsch conditions. From mid-July through early October, levels will be managed for American avocet, which prefers water depths of 0–4 inches and sparsely vegetated mudflats. Water levels will vary between years and within years depending on water depths in Owens Bay and Lake Andes.

Strategies

- Use the Owens Bay artesian well to provide water to the Prairie Ponds as needed.
- Because of continually declining flows, initiate plans to replace the Owens Bay artesian well during the next 15 years.
- Conduct periodic drawdowns using water control structures to provide ideal habitat for migratory birds.
- Use an adaptive management process to evaluate and improve management treatments.
- Control cattails as needed to provide hemimarsch habitat.
- Develop and implement monitoring protocols to gather baseline data on wetlands, such as information on plant communities, invertebrate populations, and water quality on wetland habitats throughout the Complex.
- Use the floristic quality assessment and vegetation transects to inventory wetland vegetation.
- Use invertebrate traps to inventory species and populations.
- Conduct a critical thinking process that lists, describes, and prioritizes biological information needs for wetlands on the Complex that would be best addressed through outside research to inform and improve refuge management. This information will be provided to potential research partners and the research community. Use resources such as the zone biologist, past research partners, and other research contacts to develop the biological information needs list.

Rationale

The Prairie Ponds are four small ponds approximately 1–4 acres in size within the Owens Bay Unit of Lake Andes Refuge. They are managed to provide attractive habitat for migratory birds during spring and fall migration. Water control structures provide some control of water levels in the ponds. The Owens Bay artesian

well is the only source of water for the Prairie Ponds. The well was drilled in 1985 and upon completion was flowing at 900 gpm. As is typical for artesian wells in this area, flows have gradually decreased as the well casing has collapsed. Currently the well flows at 250 gpm, a rate that is barely adequate to manage water in the ponds. The well is nearing the end of its useful life and needs to be replaced.

The chief value of the Prairie Ponds is wildlife-dependent recreation in the form of wildlife observation and photography and environmental education and interpretation. Management of water levels and the interspersed of emergent vegetation (like cattails) with open water are to provide ideal conditions during migration. Blue-winged teal, American bittern, and American avocet are focal species for wetlands on the Complex. These species were selected in part for their diverse habitat preferences. Blue-winged teal prefers water depths between 2 and 10 inches and a 50:50 mix of emergent vegetation and open water (that is, hemimarsch). American bittern prefers a water depth of 4 inches and dense emergent vegetation 3–5 feet in height; it also prefers a block of this habitat less than 7 acres in size. American avocet prefers shallow wetlands with a water depth less than 4 inches and sparse vegetation. Habitat needs cannot be provided for each of these three focal species on the same pond at the same time; however, these conditions can be provided as water supply and vegetation conditions change year to year.

Developing and implementing monitoring protocols, inventorying wetland vegetation, and identifying and prioritizing biological information needs for wetlands will enable Complex staff to use the best available science to inform management decisions. Knowledge gaps regarding natural resources the Complex has been entrusted with managing and protecting are many and varied.

WETLANDS OBJECTIVE 7: CONTROL AVIAN DISEASE IN WETLANDS

During spring and fall migration periods, the Complex biologist will continue to lead avian disease surveillance and response efforts to outbreaks (for example, avian botulism or avian cholera) as necessary to limit wildlife losses throughout the life of this plan.

Strategies

- Annually review and ensure that the Complex's WDCP is up to date.
- Follow the monitoring and response protocols outlined in the WDCP and the "Field Manual of Wildlife Diseases" (Friend and Franson 1999).
- Maintain a supply of personnel protective equipment for emergency cleanup operations.

- Cooperate with U.S. Department of Agriculture Animal and Plant Health Inspection Service (USDA APHIS) Wildlife Services and SDGFP for HPAI monitoring when necessary.
- Consult with the Service's Region 6 Wildlife Health Office for advice on wildlife health issues.

Rationale

Lake Andes Refuge suffered a DVE outbreak in 1973 that led to the death of 40,000 migratory birds. At the time, refuge management was attempting to provide wintering habitat for waterfowl and this led to unusually high concentrations of birds. Disease passed easily from bird to bird in the close quarters. After the die-off, measures were taken to discourage birds from attempting to winter on the refuge. Disease outbreaks since 1973 have been few and far between (table 5).

Routine surveillance has led to early detection and rapid response to outbreaks. Response includes collecting and sending a sample of dead birds to the USGS National Wildlife Health Center in Madison, Wisconsin, for diagnosis. Response also includes removal of dead birds from the environment. Such action has proven effective for controlling disease outbreaks on the Complex. Evelsizer (2002) has suggested that carcass

removal did not appear to be an effective technique for managing botulism outbreaks on large wetlands where less than 30 percent of the dead birds could be found and collected. This is something to keep in mind when conditions significantly restrict the ability to remove dead birds. Avian botulism and avian cholera are the two most prevalent documented diseases that have occurred on the Complex.

Bird disease response is a readily evolving process. Prior to 2006, districts dealt primarily with two diseases in the avian communities: West Nile virus (WNV) and avian botulism. WNV is a flavivirus with an enzootic cycle that involves primarily mosquitoes and birds. It was introduced into the Plains and Prairie Pothole Region in 2002. By 2003, WNV had been shown to affect 162 species of birds. The ecology of the northern prairie seems to offer favorable conditions for its continued enzootic transmission (Centers for Disease Control and Prevention 2003).

Avian botulism is a disease that affects the peripheral nerves and results in paralysis of voluntary muscles. It is contracted when a bird ingests toxin produced by the bacterium *Clostridium botulinum*. Outbreaks of avian botulism have occurred in the United States since at least the beginning of the twentieth century.

Table 5. History of documented wildlife disease outbreaks on the Lake Andes National Wildlife Refuge Complex, South Dakota.

<i>Date</i>	<i>Disease</i>	<i>Species affected</i>	<i>Number of dead animals</i>	<i>Location</i>
September 1947	Botulism	Ducks	300	Lake Andes area
January 1973	Duck virus enteritis (DVE)	Geese and ducks	40,000	Owens Bay and Missouri River below Fort Randall Dam
Spring 1980	Avian cholera and botulism	Mallard, redhead, lesser scaup, pintail, Canada goose, white-fronted goose	1,515	Lake Andes
October 1980	Botulism	Not reported	4	Lake Andes
March 1981	Botulism	Lesser scaup, shoveler, pintail, redhead, ring-necked	286	Lake Andes
August 1984	Botulism	Coot, blue-winged teal, green-winged teal, gadwall, mallard, pintail	3,350	Lake Andes Refuge South and Center Units
September 1985	Botulism	Shoveler, gadwall, mallard, wood duck, ruddy, unknown, widgeon, blue-winged teal, green-winged teal	614	Lake Andes Refuge Center Unit
August 1987	Botulism	Coot, shoveler, gadwall, mallard, pintail, widgeon, blue-winged teal, green-winged teal, yellowlegs, sandpiper species	750	Owens Bay
August 1987	Epizootic hemorrhagic disease (EHD)	White-tailed deer	13	Karl E. Mundt Refuge area
March 2003	Avian cholera	Mallard, Canada goose	5	Owens Bay, Prairie Ponds
August 2011	Botulism	Blue-winged teal, pintail, shoveler, great blue heron, coot	500	Sorenson Waterfowl Production Area, Koss Waterfowl Production Area

Botulism outbreaks are often characterized by lines of carcasses on wetland peripheries during the summer when ambient temperatures are high and water levels are receding. Filter-feeding and dabbling waterfowl and probing shorebirds appear to be among the species at greatest risk (Friend and Franson 1999). With safe handling practices, birds affected by botulism and WNV pose a relatively minor threat to the health of individuals directly handling the infected individuals (Domek 1998, Friend and Franson 1999).

The most common causative agent of botulism is a type-C toxin produced by the bacterium *Clostridium botulinum* (Friend and Franson 1999). The disease appears to be exacerbated through what is commonly referred to as “the carcass–maggot cycle,” which includes the following events:

1. *Clostridium botulinum* (from previously ingested spores) vegetates and produces toxin in response to biochemical changes associated with death and decomposition.
2. Maggots feed on carcasses and concentrate toxin.
3. Toxic maggots are ingested by birds.
4. Toxicity leads to death, producing additional carcasses and perpetuating the cycle.

Because of the toxin’s extremely high potency, these events lead to rapid acceleration in the rate of deaths due to botulism. Consumption of as few as one or two toxin-laden maggots may be adequate to kill an otherwise-healthy bird (Friend and Franson 1999).

The presumed significant role of the carcass–maggot cycle in the epizootiology of botulism has been the central factor in development of field procedures for reducing impacts of the disease on migratory bird populations. Botulism management typically involves late-summer surveillance of lakes that are prone to botulism, and intensive carcass retrieval with the goal of removing dead birds from the affected lake as quickly as possible. Carcass pickup has been widely accepted as the best approach to minimizing botulism-induced mortality of waterbirds and has been recommended by wildlife health professionals based on knowledge of botulism epidemiology (Friend and Franson 1999).

With each new disease presenting itself as a threat to Service staff and the general public (for example, the highly pathogenic H5N1 strain of HPAI), concurrent disease responses are developed to coincide with each threat. HPAI is a disease caused by a virus that infects both wild birds (such as shorebirds and waterfowl) and domestic poultry. Each year, there is a bird flu season just as there is an influenza season for humans and, like human influenza, some forms of avian influenza are worse than others (USGS 2006). Recently, the H5N1 strain of HPAI has been found in an increasing number of countries in Europe, Asia, and Africa. This strain is not present in the United States, but

is likely to spread to this country (Dr. Thomas Roffe, veterinarian, USFWS, Montana, personal communication). There are a number of ways that the H5N1 strain could potentially reach the United States: (1) wild bird migration, (2) illegal smuggling of birds or poultry products, and (3) travel by infected people or people traveling with virus-contaminated articles from areas where H5N1 already exists (USGS 2006).

Avian cholera is widely distributed and poses a constant threat to migratory bird populations, especially where dense concentrations of birds occur. Avian cholera epizootics (diseases affecting large numbers of animals) were found to be inversely related to densities of semi-permanent wetland basins. It is not known with certainty what environmental or physiological factors trigger an outbreak, but it appears to be associated with physiologically stressed birds that are concentrated on a limited number of wetlands (Smith and Higgins 1990).

6.5 Riparian

Acquire, restore, manage, and protect riparian habitats characteristic of the lower Missouri River for the conservation of bald eagles, other species of concern, and migratory birds.

RIPARIAN OBJECTIVE 1: MANAGE WOODLANDS FOR BALD EAGLES AND RED-HEADED WOODPECKERS ON KARL E. MUNDT REFUGE

Over the next 15 years, Complex staff will plant more than 5 acres of eastern cottonwoods (where 70 percent of the total tree population is above 30 feet height with a canopy cover of less than 40 percent) to provide habitat for resident, nesting, and winter roosting bald eagles and maintain snags to provide suitable habitat for redheaded woodpeckers, equaling four or five snags larger than 8 inches diameter at breast height (DBH) per acre.

Strategies

- Identify sites to plant cottonwoods that will benefit bald eagles and redheaded woodpeckers. Plant cottonwood seedlings at a density that will result in a canopy cover of less than 40 percent when the trees mature to a height of greater than 30 feet.
- Inventory the density of snags per acre greater than 8 inches DBH within the woodlands of the Karl E. Mundt Refuge. Protect these snags from fire or cutting. Monitor snag density every 5 years over the life of the plan. Collect baseline information on canopy cover and compare native forest to planted forest.



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Birds at the Lake Andes National Wildlife Refuge.

- Use the Floristic Quality Index and vegetation transects to inventory existing woodlands and monitor long-term vegetation changes.
- When planting, use native genotypes when possible.
- Protect planted seedlings from herbivory by enclosing them in deer- and rabbit-resistant fences.
- Draft a habitat management plan for Karl E. Mundt Refuge to guide habitat restoration and reconstruction efforts.
- Conduct a critical thinking process that lists, describes, and prioritizes biological information needs for the Karl E. Mundt Refuge that would be best addressed through outside research to inform and improve refuge management. This information will be provided to potential research partners and the research community.

Rationale

Two of the three focal species for riparian habitats, bald eagles and redheaded woodpeckers, rely on cottonwoods for suitable habitat on the Karl E. Mundt Refuge. The bald eagle was recently removed from the endangered and threatened species list. Redheaded woodpecker populations have suffered widespread rapid declines throughout their range for a number of years (4.6 percent per year since 1980) (Smith et al. 2000). Cottonwoods are largely dependent on highly varying river flows and deposition of sediment to replace old dying trees with young trees that can survive to attain mature height and diameter. Cottonwoods evolved alongside the dynamic forces of rivers. An adequate level of natural cottonwood regeneration no longer occurs due to dams erected on the Missouri River. The dams strain out the sediments that form sandbars where cottonwood seeds germinate after a flood, and they attenuate the high flows that establish cottonwood seedlings high above the elevation of lesser floods in subsequent years. Under today's conditions planting is necessary to reestablish cottonwoods in the riverbottom. Such mature trees are important to

bald eagles and redheaded woodpeckers for roosting and nesting sites (Smith et al. 2000). Mature trees also provide the shade necessary for the establishment of other understory trees and shrubs upon which Bell's vireo, the third riparian habitat focal species, and other species of migratory birds depend.

Planting cottonwoods and other riparian trees and shrubs is necessary to ensure availability of suitable habitat for these species in the future. In the past cottonwood restoration has been conducted in an opportunistic fashion as funding and staffing allowed. Complex staff will develop a habitat management plan for restoration of native trees, shrubs, grasses, and forbs on Karl E. Mundt Refuge to provide ideal habitat for nesting and migrating birds and high quality wildlife observation opportunities. Such a plan will provide specific guidance and facilitate additional partnerships and supplementary funding. Techniques will be used that protect young trees and shrubs from browsing and competition.

RIPARIAN OBJECTIVE 2: RESTORE WOODLAND UNDERSTORY ON KARL E. MUNDT REFUGE

Throughout the life of this plan, Complex staff will restore, protect, and enhance the native understory (especially 1–10 feet above ground) of the Karl E. Mundt Refuge cottonwood floodplain (for example, roughleaf dogwood, American plum, narrow-leaf willow, Missouri gooseberry, and black raspberry) by 10 percent to provide high quality nesting and migration habitat for Bell's vireo, yellow-billed cuckoo, spotted towhee, ovenbird, and other woodland migratory birds.

Strategies

- Restore native understory plants within established (higher than 30 feet and greater than 8 inches DBH) cottonwood plantings.
- Diversify the existing understory by adding native shrub species.
- Build species lists for restoration using current vegetation inventories conducted on the refuge by the University of South Dakota and the University of Nebraska–Lincoln.
- When planting, use native genotypes when possible.
- Draft a habitat management plan for Karl E. Mundt Refuge to guide habitat restoration and reconstruction efforts.
- Protect existing understory plants from fire and domestic grazing.
- Restore American plum thickets to both riverbottom and appropriate upland sites on the refuge.

Rationale

Many migratory birds rely on the forest understory for nesting, foraging, and migration. It is not enough to restore cottonwoods without restoring the plants that

are commonly found in their understory. Reestablishing shrubs that can thrive without overhead shade (such as American plum) will also provide important foraging and nesting sites. Many of these plants were cleared for farming (along with cottonwoods) years ago.

Bell's vireo prefers a shrubby understory for nesting, foraging, and migration.

RIPARIAN OBJECTIVE 3: CONTROL INVASIVE PLANTS ON KARL E. MUNDT REFUGE

Over the next 15 years the Complex staff will attempt to annually treat 100 percent of invasive forb infestations (for example, Canada thistle, musk thistle, leafy spurge, and common mullein) on Karl E. Mundt Refuge to improve habitat for migratory birds. One hundred percent of nonnative invasive trees and shrubs (for example, Russian olive, Siberian elm, white mulberry, and saltcedar) will be removed over the next 10 years. Eastern redcedar (an invasive native tree) will be controlled where it is invading grasslands on the refuge. Smooth brome and other invasive grasses will be controlled through grassland reconstruction on lands that were previously plowed and through restoration techniques on native sod over the life of the plan, as described in the grassland section of this chapter.

Strategies

- Use GPS and GIS to map and monitor infestations of invasive plants. Document areas treated in the Service's Refuge Lands Geographic Information System database (RLGIS).
- Continue using grazing, haying, burning, herbicides, insects, cutting, and seeding as part of an integrated pest management strategy to control invasive plants.
- Continue to work with cooperators to apply grazing, haying, and farming treatments
- Use vendors to apply herbicide aerially where necessary to reach areas inaccessible to ground-based equipment. (Such use will be rare on the refuge.)
- Conduct an annual riparian survey to detect and treat saltcedar and purple loosestrife.

Rationale

Invasive plants degrade the quality of habitats on refuge lands. Native migratory birds including Bell's vireo, red-headed woodpecker, and bald eagle thrive in high quality habitats of native vegetation. Infestations of invasive forbs, trees, and shrubs are currently limited. Invasive plants degrade the quality of surrounding habitat. Typically they compete with native plants for nutrients and water. Treating all of the known invasive forb infestations annually and all of the known tree and shrub infestations over the next 10 years will clear the way for the much more intensive effort required to change grasslands from smooth brome to

native grasses and forbs. Controlling invasive plants improves the quality of wildlife habitat on the refuge.

RIPARIAN OBJECTIVE 4: PROTECT WOODLANDS AND RIVER BANKS ON KARL E. MUNDT REFUGE

Throughout the life of this CCP, Complex staff will protect mature cottonwoods (including snags) from herbivory and riverine erosional effects to provide adequate habitat for resident, nesting, and winter roosting bald eagles, red-headed woodpeckers, and other woodland-dependent species.

Strategies

- Use trapping or shooting when necessary to control beaver damage. Enlist the services of experienced beaver trappers. Coordinate control efforts with SDGFP.
- Experiment with the use of different materials on or around the trunks of selected cottonwoods alongside the Missouri River, to protect them from beaver herbivory and to provide a nonlethal alternative.
- Use the resources of the Missouri National Recreation River to identify and study instream water-diversion structures that provide an alternative to riprap.
- Conduct annual riverbank surveys on the refuge in the fall to monitor and document erosion and beaver damage.

Rationale

Cottonwoods are not replacing themselves in the riverbottom like they were before Fort Randall Dam was completed on the Missouri River in 1956. The dam has largely eliminated the natural flooding and deposition processes with which cottonwoods evolved. The result is riparian woodland that is slowly diminishing. Beaver fell mature cottonwoods every year, which makes these trees unavailable for bald eagles, red-headed woodpeckers, and other migratory birds. In a natural system beaver herbivory would be compensated by numerous young cottonwoods replacing the older trees. Given the lack of regeneration, controlling beaver is sometimes necessary to protect the woodland.

A significant issue on the Karl E. Mundt Refuge, which lies approximately 4 miles downstream of the Fort Randall Dam, is riverbank erosion. Approximately 20 percent of the refuge's riverbank is protected by rock riprap. During high flow water releases from the dam, erosion is substantial where the bank is unprotected. Mature cottonwood trees, some of which are used by bald eagles, often fall into the river when the soil holding them erodes. Protecting these mature trees from loss is necessary to ensure there will be enough available as wildlife habitat in the future. Protection coupled with periodic replanting should ensure continuation of these important woodlands.

Rock riprap can be considered a blessing or a curse depending on one's perspective. When it is protecting



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Protecting and restoring woodlands on Karl E. Mundt Refuge would be a focus of management under the proposed alternative.

the riverbank, it is a blessing for the landowner. However, research has shown that often the river's energy is merely reflected downstream where it erodes another site. The Missouri National Recreational River includes the boundary of the Karl E. Mundt Refuge and the Missouri River corridor between Fort Randall Dam and Sioux City (100 river miles). This river is part of the National Wild and Scenic River System. Protecting aesthetics and scenic resources is a mandate of the National Wild and Scenic Rivers Act. Besides the impacts mentioned above, riprap is not typically considered aesthetically pleasing. Fortunately there are some alternatives to riprap for bank protection. A number of researchers have designed and experimented with natural instream water diversion structures that draw the flow of a river away from the river bank. These have taken many forms but typically they are made of large dead trees that are secured to the riverbottom. In appearance they look like a logjam. If funding and permits can be secured, one or more of these structures could be designed and installed in the Missouri River next to the refuge and monitored for effectiveness.

RIPARIAN OBJECTIVE 5: FORM PROTECTION PARTNERSHIPS FOR KARL E. MUNDT REFUGE

Over the next 15 years, the Karl E. Mundt Refuge manager will enhance the protection of the refuge from nearby development by seeking new and expanded partnerships with agencies and individuals (for example, the U.S. Army Corps of Engineers, SDGFP, Yankton Sioux Tribe, the Missouri National Recreational River, and neighboring landowners) to conserve lands within and surrounding the refuge.

Strategies

- Work with agencies, tribes, and individuals who manage lands next to the Complex to manage their lands for protection from harmful development.

- Continue to pursue acquisition of a conservation easement or fee title purchase on approximately 2,000 acres (within the approved refuge boundary) between the two units of the Karl E. Mundt Refuge, to protect the refuge from development that would negatively impact wildlife, wildlife habitat, and wildlife-dependent recreation.
- Pursue acquisition of conservation easements or fee title purchases next to the Karl E. Mundt Refuge (figure 8).
- Facilitate woodland restoration on lands next to the Karl E. Mundt Refuge to protect wildlife habitat for bald eagle, red-headed woodpecker, Bell's vireo, and other trust species.

Rationale

Many species of migratory birds and other wildlife prefer a block of appropriate habitat of a certain minimum size to meet their life needs. When that block of habitat is continuous and large, the local population will likely thrive. If that habitat is fragmented, the local population will likely suffer.

Currently the Karl E. Mundt Refuge is fragmented. Its two units—the North Unit (677 acres) and South Unit (282 acres)—are considered relatively small for many wildlife species, and these tracts are separated by a tract of private land approximately 2,000 acres in size.

Furthermore, within the last 10 years home construction has occurred next to the refuge, and such development could degrade the quality of the habitat on the refuge. Fortunately this development has occurred far from the riverbottom—the area of critical use for bald eagles, red-headed woodpeckers, and other migratory birds.

Protection of neighboring lands is critical to the protection of the relatively small refuge. Given this circumstance, Complex staff will continue to pursue conservation protection on neighboring lands through formal and informal partnerships, associated easements, or purchase in fee.

6.6 Uplands

Acquire, restore, manage, and maintain a diverse mix of native grassland habitats to support migratory birds and resident wildlife found in the northern mixed-grass prairie ecosystem.

UPLANDS OBJECTIVE 1: CONTROL INVASIVE PLANTS ON COMPLEX GRASSLANDS (EARLY DETECTION RAPID RESPONSE)

Over the life of this CCP the Complex staff will identify and strive to eradicate all infestations of noxious plant species (for example, yellow toadflax, Russian

mallow, common mullein, knapweed spp., houndstongue, and chicory) that are not well established on Complex grasslands.

Strategies

- Survey for presence of invasive plant species and use GPS and GIS to map and monitor infestations of invasive plants.
- Use EDRR principles.
- Seek funding for an invasive species strike team for South Dakota refuges and wetland management districts.

Rationale

Exotic species are a major threat to native ecosystems in the United States and considered second only to habitat destruction in significance. Control of invasive species is a management priority because these species have a direct negative effect on the ability of refuges to fulfill their wildlife conservation mission, including migratory waterfowl and songbird production, species recovery, biological diversity, biological integrity, and ecosystem function.

Public and private landowners work very hard to address noxious weed spread yet rarely have sufficient resources to manage all populations of all nonnative species on their land. Prevention is considered the highest priority under a successful integrated invasive plant management program. Prevention of new infestations must occur to prevent threats to habitat and additional management burden. However, when prevention fails, quickly finding and responding to new invaders is critical to limiting costs and impacts of invasions.

EDRR is a method of surveying areas, identifying new invaders, and pursuing treatment as quickly as possible. The “USFWS Invasive Species Strategic Plan” (USFWS 2003) recommends focusing on early detection and completely eradicating smaller infestations rather than trying to control large, well established infestations. It has been shown to be far less costly to control invasive plants through eradicating new invasions or small patches than by trying to control well established invasions (Chippendale 1991 in Hobbs and Humphries 1995, Leung et al. 2002, Keller et al. 2007, Frid et al. 2011). Small satellite populations of invasives often expand more rapidly and potentially cover more area than the front of a source population (Cousens and Mortimer 1995, Moody and Mack 1988). (A fitting analogy is fire: many spot fires may occupy or “fill” an area more quickly than the advancing front of the fire.) Additionally, since most invasive plants have a long lag period following introduction, they can usually be eradicated at this early stage if recognized. Rejmanek and Pitcairn (2004) note that early detection can make the difference between employing feasible offensive strategies and retreating



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Controlling the spread of invasive species on Complex lands will help prevent these species from spreading to neighboring private lands.

to defensive strategies that usually require ongoing financial commitments.

For example, treating two new small patches of a species when discovered will most likely result in successful eradication, preventing them from spreading and adding to the existing management burden. On the other hand, treating a large existing patch with all available resources for years may only result in a slight decrease in patch size or density—moreover, during that time the two new invasions would continue to grow and spread, creating an even greater need for more resources.

Resources must be directed at detecting early invasions in cooperation with Complex partners and responding rapidly to new invasions. If resources are not directed for EDRR, then invasions are given time and allowed to outpace management efforts, leading to greater areas of infestations that are costly and time-consuming to treat.

Although prevention and EDRR are important components of an integrated invasive species management strategy, certain large, well established infestations should also be targeted at least for containment. For these species, prioritization by species or area must occur first to determine which species have the greatest impact on trust resources and whether infestations are in areas of high conservation value. Containing those infestations will maximize the effectiveness of limited resources.

UPLANDS OBJECTIVE 2: CONTROL INVASIVE FORBS ON COMPLEX GRASSLANDS

Over the next 15 years, the Complex staff will annually treat invasive forb infestations (for example, leafy spurge, Canada and musk thistle, wormwood, and other State-defined noxious weeds) on the highest priority (Priorities 1 and 2) refuges and waterfowl production areas to improve habitat quality for mallard, upland

sandpiper, grasshopper sparrow, and other migratory birds. Priority 3 and 4 units will be treated every 2–3 years. Priority 5–8 units will be treated as necessary or as dictated by county weed boards.

Strategies

- Run the prioritization model every 5 years as data are added to the duck upland accessibility model.
- If funding and staffing allow, consider moving lower priority units (Priorities 3 and 4) to an annual treatment protocol.
- Use GPS and RLGIS to map and monitor infestations of invasive plants.
- Continue using grazing, haying, burning, herbicides, insects, mowing, and seeding as part of an integrated pest management strategy to control invasive plants.
- Continue to work with cooperators to apply grazing, haying, and farming treatments.
- Use aerial application vendors to reach areas inaccessible to ground-based equipment.
- Focus control efforts on non-EDRR areas with more than 5 percent invasive plant cover or infestations larger than 0.25 acre.
- When appropriate, use Burned Area Rehabilitation funds to control and prevent the spread of invasive plant species.

Rationale

Typically invasive plants treated once every 3 years die the first year but recover to their former strength by the third year, resulting in no change in the number of acres occupied by invasive plants. Plants treated and then monitored and retreated annually in subsequent years can eventually reach a “maintenance level” where the time and cost to monitor and treat infestations is significantly reduced. This level is reached when weeds are reduced to a density where they are efficiently treated from sprayers mounted on off-road vehicles instead of large boom sprayers. Prioritizing Complex grasslands (and associated wetlands) and treating the highest priorities annually should result in reaching a maintenance level for this select group in approximately 15 years. Assuming funding is not significantly reduced, additional lands would be added to the annual treatment group until all grasslands are treated annually. The long-term goal is to reach a maintenance level for all invasive plant infestations on the Complex.

UPLANDS OBJECTIVE 3: CONTROL INVASIVE WOODY SPECIES ON COMPLEX GRASSLANDS

Over the life of this plan, the Complex staff will annually remove invasive trees (for example, Russian olive, eastern red cedar, Siberian elm, and white mulberry) and shrubs on refuges and one of the highest

priority waterfowl production areas (Priorities 1 or 2) to improve nesting habitat for mallard, upland sandpiper, grasshopper sparrow, and other grassland migratory birds.

Strategies

- Use tree shears, chainsaws, and other heavy equipment to remove invasive trees and shrubs. Apply herbicide immediately to deciduous tree stumps to prevent resprouting.
- Burn eastern red cedars when they are young and when suitable fuels exist to carry fire. Use backing fires to increase heat duration and intensity for more effective control.
- Apply appropriate herbicide to saltcedar (foliar or basal bark application) without cutting and leave standing for two full growing seasons for optimal uptake and effective control.
- Make wood available to the public through a permit process to reduce disposal costs.
- Use fire crews to burn slash piles and reduce woody debris.
- Map invasive trees on the Complex using GPS and RLGIS.
- Remove trees invading grasslands as the first priority.
- Remove shelterbelts and planted trees as the second priority. Removal of shelterbelts on refuges and waterfowl production areas will be considered on a case-by-case basis using established regional guidelines.
- Invasive trees (for example, Russian olive, Siberian elm, and eastern red cedar) may be removed regardless of their location.
- When there is a choice between favoring tree-nesting and grassland-nesting migratory birds, in most cases manage for the grassland birds because of their declining populations and their dependency on the grassland habitat Complex lands provide.

Rationale

Historically, the northern Great Plains was a grassland-dominated ecosystem where fire and grazing restricted natural tree growth to riparian floodplains, wooded draws, islands in lakes, and small patches along leeward wetland edges (Higgins 1986). These patches and corridors of trees and shrubs were the only woodland features in the prairie landscape (Rumble et al. 1998).

The prevalence of fire in the presettlement prairie created an environment inhospitable to trees (Higgins 1986, Severson and Sieg 2006). The growing points of most grassland species are usually protected at the base of the plant. In contrast, woody vegetation possesses elevated growing points that are more vulnerable to injury or fatality from fire. Grassland plants

persist and expand with frequent and repetitive burns, whereas woody plants tend to decrease (Vogl 1974). The tallgrass and mixed-grass prairie types that cover South Dakota produce large quantities of fuel that dry quickly and burn easily (Steuter and McPherson 1995). Specifically, bluestem prairies recover quickly post-fire and can even provide enough fuel for multiple burns in a single growing season (Bragg 1982).

Climate also played a pivotal role in the development of grasslands—particularly the limiting effect of periodic drought on the growth and expansion of trees (Weaver and Albertson 1936). Herbivory and hoof action of grazing animals also constrained the establishment and expansion of woody vegetation. The effects of ungulates, fire, and drought combined to inhibit tree growth and expansion across the grasslands of South Dakota.

Presently, however, grassland fragmentation is escalating at an alarming rate. During 2008, in eastern South Dakota, the USDA and County Conservation Districts planted 255 miles of trees, covering 2,801 acres of land with 1,115,780 trees (G. Yapp, USDA, personal communication, 2009).

The response of grassland birds to unnatural tree conditions has received recent research emphasis. Grant et al. (2004a) determined that the probability of occurrence of breeding grassland birds decreased notably for 11 species as the percentage of woody vegetation increased. Further, negative effects on grassland bird communities increased as the height of woody plants increased (that is, brush giving way to tall shrubs giving way to trees). By most accounts, the grasslands became unsuitable for nine species of grassland birds as woodland cover exceeded 25 percent (Grant et al. 2004a). A recent study in North Dakota and South Dakota determined that bobolink, Savannah sparrow, and sedge wren specifically avoided tree plantings; however, these species would use the same areas after tree belts were removed (Naugle and Quamen 2007).

Nest predators and nest parasite species increase near woody habitat edges (Burger et al. 1994, Johnson and Temple 1990); in other words, planting woody vegetation in previously treeless grasslands exacerbates these problems. Tree plantings in grasslands create den and foraging sites for predators historically uncommon to grasslands (Kuehl and Clark 2002, Pedlar et al. 1997, Sargeant 1972, Sargeant et al. 1987). Gazda et al. (2002) indicated that duck nest success decreases near planted woodlands as a result of increased predation by mammal and bird species associated with trees and shrubs. Waterfowl and waterbirds have been shown to avoid wetlands where trees and shrubs occur along wetland margins, presumably to evade predation (Rumble and Flake 1983, Shutler et al. 2000). Johnson and Temple (1990) determined that nest predation rates were lower for five species of grassland

songbirds in areas where nests were more than 148 feet from woody vegetation.

Brown-headed cowbird is a nest parasite whose population has increased in recent decades to the detriment of other birds (Shaffer et al. 2003). Cowbirds lay eggs in the nest of other birds, and the host birds act as foster parents to the cowbird young, thus reducing survival of the host bird's young (Lorenzana and Sealy 1999). Studies in mixed-grass prairie and tall-grass prairie determined that grassland birds nesting close (less than 541 feet) to wooded edges incur higher rates of brood parasitism from cowbirds than nests farther away (Johnson and Temple 1990, Patten et al. 2006, Romig and Crawford 1995). Shaffer et al. (2003) documented that brown-headed cowbirds parasitize 24 of the 36 North American grassland bird species.

Service-owned lands in South Dakota are part of this historically grassland-dominated ecosystem, where fire, grazing, and drought restricted natural tree growth to limited areas (Higgins 1986). Now, planted or volunteer trees and shrubs occur in many waterfowl production areas. Although most woody plantings existed before Service ownership of these lands, the Service did establish tree planting after acquisition in attempts to improve wildlife habitat. Volunteer trees are prevalent primarily due to lack of fire. Planted trees and shrubs such as green ash, cottonwood, and buffaloberry are native to North America; however, many others, such as caragana, Russian olive, and Siberian elm, are nonnative species. The most troublesome species planted in South Dakota is eastern red cedar. The species' extreme adaptability has enhanced its spread into areas where it was formerly rare or absent. Additional increases in its spread are due to tree plantings and the selection of the most aggressive cultivars (Ortman et al. 1996). Most of these plantings are considered unnatural components of the historical habitat. Additionally, nonnative species such as Russian olive and Siberian elm are invasive and also readily spread from both Service-owned and non-Service-owned plantings into new areas.

Preventing the encroachment and planting of woody vegetation into grassland ecosystems contributes significantly to the recovery of grassland bird populations (Herkert 1994). Recent research indicates that the elimination and reduction of invasive and planted woody vegetation will benefit most grassland-dependent bird species (Bakker 2003, Grant et al. 2004a, Johnson and Temple 1990, Naugle and Quamen 2007, Patten et al. 2006, Shaffer et al. 2003, Sovada et al. 2005). Although many woodland bird species might nest in planted woodlands, few are of management concern (Kelsey et al. 2006), suggesting that the loss of planted woodlands will have negligible effects on woodland bird species whose populations are stable or expanding.

In view of the research that has highlighted the deleterious effects of woody vegetation on prairie ecosystems, systematic removal of invasive and planted woody vegetation from Service lands is critical to the improvement of habitat for grassland-dependent birds. Sites for tree removal on waterfowl production areas are prioritized on the basis of landscape characteristics; the majority of removal is targeted in areas with the largest blocks of grassland, with emphasis on native prairie tracts and areas to be restored to planted native vegetation. Reducing fragmentation in these core areas has the potential to provide the most benefits to grassland-dependent birds. In addition, the removal of woody species more than 3.28 feet tall should target the removal of the larger shrubs and trees that pose the greatest ecological threat to grassland ecosystems on Service lands, rather than on small native shrubs, such as prairie rose, leadplant, and western snowberry, which are important components of grassland ecosystems.

Prior to Euro-American settlement in South Dakota, woody vegetation primarily occurred in riparian or streamside areas in broken topography in the upper drainages of streams, as well as on escarpments and in sandhills. These areas often had increased soil and foliar moisture, standing water, and relatively steep topography that provided protection from fires (Severson and Sieg 2006).

Although numerous patches of native woodlands still exist in the northern Great Plains, today, large expanses of once nearly treeless prairie are now intermixed with cropland and scattered small (less than 5-acre) linear and block-shaped tree plantings (also commonly referred to as windbreaks, shelterbelts, and tree belts). Baer (1989) estimated that these plantings cover 3 percent of the landscape in the State. Tree plantings are designed to reduce soil erosion from croplands (Baer 1989) and to provide shelter for farm sites and livestock, and are viewed by many as striking landscape features that symbolize settlement of the western United States. However, they also further fragment remaining grasslands by creating abrupt boundaries that exacerbate edge effects (O'Leary and Nyberg 2000, Ribic and Sample 2001, Winter et al. 2000). Additionally, the suppression of ecological processes such as fire and grazing has allowed an increase in the encroachment of woody plants into grasslands (Bakker 2003). These factors have been linked to the deterioration of grassland bird populations, which are declining faster and more consistently than any other group of North American birds (Herkert 1995, Samson and Knopf 1994). Research indicates that native grassland birds need large, contiguous tracts of treeless grasslands to maintain populations (Bakker et al. 2002, Herkert 1994, Winter et al. 1999). The literature overwhelmingly indicates that invasive and planted trees in prairie landscapes often

adversely affect a variety of bird groups (Bakker 2003). Specifically, trees on the prairie are correlated with adverse consequences for ducks (Rumble and Flake 1983), wetland birds other than ducks (Naugle et al. 1999), prairie grouse (Hanowski et al. 2000, Niemuth 2000), grassland songbirds (Grant et al. 2004a, Winter et al. 2000), and ring-necked pheasants (Schmitz and Clark 1999, Snyder 1984).

Historically, the prairie was a treeless landscape. Trees and tall shrubs can diminish the survival of nests of grassland birds by harboring potential nest predators. They also provide perches from which brown-headed cowbirds can find other species' nests in which to lay eggs. Relatively small areas of tall woody vegetation can effectively fragment grassland habitats and cause many grassland bird species to avoid entire landscapes. Based on these findings, elimination of tall woody cover is a logical strategy for restoration of landscape structure and plant community composition, as well as a means to improve the attractiveness and security of the habitat for a variety of grassland-breeding bird species.

UPLANDS OBJECTIVE 4: MANAGE NATIVE PRAIRIE HABITAT

Over the next 15 years the Complex staff will annually treat at least 500 acres of native mixed-grass prairie habitat that has been invaded by tame grasses (for example, smooth brome, Kentucky bluegrass, and crested wheatgrass) using habitat management treatments such as grazing, haying, burning, and interseeding to facilitate competition from native grasses and forbs and to enhance nesting and migration habitat for upland sandpiper, mallard, and grasshopper sparrow (the three focal species for upland and grassland habitats) and other migratory birds. Increase native plant groupings by 10 percent over 15 years. Efforts will focus on Lake Andes Refuge, Karl E. Mundt Refuge, and Priority 1–4 waterfowl production areas.

Strategies

- Participate in the Service's Native Prairie Adaptive Management (NPAM) study. Annually monitor NPAM units to evaluate the effectiveness of upland habitat management treatments.
- Where necessary, interseed native grasses and forbs to restore native vegetation species to prairies. Use native genotypes where possible. (Note that Service policy regarding refuge management implicitly promotes seeding to reestablish native plants in native prairie where such plants have become rare or absent [National Wildlife Refuge System Biological Integrity, Diversity, and Environmental Health, 601 FW 3, 2001]).
- Use prescribed fire, in appropriate times and with appropriate patterns, to reinvigorate native prairie grassland habitat.

- Develop a grassland habitat management plan that will guide prairie reconstruction and restoration on the Complex (figure 21). This plan will provide additional criteria for selecting and prioritizing Complex lands for reconstruction and restoration.

Rationale

One of the most important management standards of the Improvement Act is a provision directing the Secretary of the Interior to “ensure that the biological integrity, diversity, and environmental health of the System are maintained for the benefit of present and future generations of Americans,” otherwise known as the ecological integrity provision. With the exception of the System mission, the ecological integrity provision is the most important and pervasive provision of the Improvement Act. Maintaining the biological integrity, diversity, and environmental health of protected lands is a fundamental concept widely recognized as basic to modern scientific resource management, and by virtue of the Improvement Act, the Service now has a fundamental legal duty to do so.

This objective focuses on restoration and maintenance of the floristic composition on tracts identified as high priorities. A fundamental assumption is that, with continued management focused on vertical structure over other prairie qualities and values, native herbaceous flora would continue to decline and disappear on native prairie tracts. This objective improves the chance that some native prairie would be restored by applying frequent and precisely timed disturbance.

Over the last several decades, rest or non-use (that is, lack of grazing, haying, and prescribed fire) was emphasized as a management approach to increase densities of duck nests in uplands on waterfowl production areas in North Dakota and South Dakota. In the short term (2–20 years), greater vertical structure may be maintained in northern grasslands that are rested. The structure of such idle vegetation is believed to be more important than plant species composition when the management goal is waterfowl production, in part because the density and survival of nests of prairie ducks are believed to be greatest on rested grasslands (Naugle et al. 2000, Schranck 1972).

However, a management approach for upland-nesting duck habitat that emphasizes rest has long-term implications that are often overlooked in short-term management studies, because continuous idling without periodic defoliation disturbance fails to promote long-term grassland health (Naugle et al. 2000). With extended rest, introduced grasses, especially smooth brome and Kentucky bluegrass, may more rapidly displace native vegetation (Murphy and Grant 2005). Monotypic stands of smooth brome and Kentucky bluegrass are less attractive to upland-nesting ducks than other types of grass-forb cover (Nenneman 2003).

Studies conducted on exotic plant species and habitat quality for grassland birds have shown that grassland bird species richness or abundance are lower in grasslands dominated by exotic species than in grasslands containing native species (Bakker and Higgins 2009, Greer 2009, Lloyd and Martin 2005, Pampush and Anthony 1993, Wilson and Belcher 1989). Recent South Dakota research reported that increasing coverage of grasslands by exotic plant species had a negative effect on the occurrence and densities of four of South Dakota’s species of greatest conservation need—chestnut-collared longspur, western meadowlark, grasshopper sparrow, and lark bunting (Greer 2009). Bakker and Higgins (2009) found that intermediate wheatgrass monotypes and cool-season mixes of exotic species in South Dakota contained 40–60 percent fewer grassland bird species than did native sod prairie. Ribic et al. (2009) found that grasshopper sparrows occurred in higher densities in native prairie remnants with greater native plant coverage than in the Natural Resources Conservation Service’s Conservation Reserve Program fields or hay fields containing greater amounts of exotic species. Increased vegetative heterogeneity in tracts of native sod prairie may support more arthropod prey for grassland birds (Hickman et al. 2006, McIntyre and Thompson 2003); arthropod prey diversity is positively associated with grassland bird richness (Hamer et al. 2006).

Losses of plant, bird, and arthropod species diversity are not the only consequences when introduced plants invade northern prairie. The long-term effect of introduced perennials does more than simply determine species composition; it also affects ecosystem processes (Wilson 2002). Ecosystem processes such as nutrient cycling and water-use patterns in prairies dominated by smooth brome and Kentucky bluegrass differ from those in native grasslands (Hunt et al. 1991, Trlica and Biondini 1990). Nutrient pools, energy flows, soil invertebrate and mycorrhizal relationships, and the water cycle can all be altered significantly (Christian and Wilson 1999, Seastedt 1995, Vinton and Goergen 2006, Wilson 2002).

In efforts to emulate these natural regimes that sustained wildlife populations prior to pioneer settlement, land managers must attempt to simulate the ecological processes that maintained the habitat prior to settlement. A strategy to improve competitive advantages of native herbaceous plants should match the types, timing, and frequencies of prescribed disturbances to those under which these plants evolved. Several sources indicate that native grasslands devoid of grazing and fire deteriorate quickly (Anderson et al. 1970, Kirsch and Kruse 1973, Kirsch et al. 1978, Schacht and Stubbendieck 1985). The grasslands function similarly to living organisms in that they respond to activities within the ecosystem. Specifically, the forbs and grasses covering the landscape have developed biological



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Prescribed fire is one tool wildlife managers use to emulate the defoliation process with which prairie plants evolved.

adaptations to thrive in the presence of herbivory and fire. Wildlife managers use various tools—including prescribed fire and prescribed grazing—to emulate the defoliation process with which prairie plants evolved. The frequency of certain activities depends on the particular habitat components. For instance, a pristine native prairie tract may require a burn every 3–5 years and intermittent, prescribed grazing of domestic cattle, whereas areas that are heavily invaded require more frequent management treatments. Prescribed burning, mowing, and herbicide application can reduce the abundance of smooth brome, but without sustained control efforts, the species is remarkably persistent (Willson and Stubbendieck 2000).

In determining restoration actions, vegetation composition is considered along a habitat continuum, where plant communities can be separated by degree of invasion by undesirable plants. A continuum for native prairie in eastern South Dakota (beginning with the least desirable vegetation) could be shown as: noxious weeds (for example, Canada thistle or leafy spurge) → nonnative, woody species (for example, Russian olive or Siberian elm) → invasive, volunteer woody species (for example, eastern red cedar) → smooth brome → Kentucky bluegrass → native low shrubs (for example, western snowberry) and native herbaceous vegetation. With management, less desirable plant species are replaced by more desirable plant groups. For example, it is acceptable in the short term to increase Kentucky bluegrass in areas where leafy spurge is reduced. Conversely, replacement of Kentucky bluegrass by smooth brome is undesirable.

Therefore, restoration management should focus more on strategies to reduce smooth brome. Smooth brome generally seems more difficult to control than other introduced cool-season grasses (Murphy and Grant 2005). Smooth brome, Kentucky bluegrass, and

crested wheatgrass are all “strong invaders” (Ortega and Pearson 2005), able to become community dominants and form nearly monospecific stands. However, smooth brome more significantly alters the quality and structure of native prairie than does Kentucky bluegrass (Blankespoor 1987); may have a competitive advantage over native grasses, particularly in high nitrogen soils (Vinton and Goergen 2006); and can modify soil microbiota to directly facilitate its own invasion and subsequently impede restoration of native communities (Jordan et al. 2008).

A strategy to decrease the competitive abilities of Kentucky bluegrass and smooth brome should focus on the combined use of prescribed fire and prescribed grazing. Kentucky bluegrass responds well to fire, decreasing in abundance as fire frequency increases until it is nearly absent in annually or biannually burned plots in both low-productivity (Knops 2006) and high-productivity prairies (Smith and Knapp 1999, Towne and Owensby 1984). Fire has the greatest negative effect on Kentucky bluegrass during stem elongation or in dry years (Murphy and Grant 2005). Conversely, Kentucky bluegrass tends to increase under prolonged rest or with grazing (Murphy and Grant 2005). Smooth brome also increases under rest but, in contrast to Kentucky bluegrass, appears sensitive to repeated grazing but unaffected or variably affected by prescribed fire (also reviewed in Murphy and Grant 2005). Periodic monitoring will ensure that the appropriate management treatment is applied for the invasive species and severity of the infestation on the given management unit.

Historically, the prairie was a treeless landscape. Trees and tall shrubs can diminish the survival of nests of grassland birds by harboring potential nest predators. They also provide perches from which brown-headed cowbirds can find other species’ nests in

which to lay eggs. Relatively small areas of tall woody vegetation can effectively fragment grassland habitats and cause many grassland bird species to avoid entire landscapes. Based on these findings, elimination of tall woody cover is a logical strategy for restoration of landscape structure and plant community composition, as well as a means to improve the attractiveness and security of the habitat for a variety of grassland-breeding bird species.

Although the focus of this objective is the restoration and maintenance of floristic composition in native prairie, wildlife would also benefit. The contemporary breeding bird community on waterfowl production areas in eastern South Dakota is characterized by species that tolerate introduced, cool-season grasses and relatively tall, dense, herbaceous cover. Habitat for a broader array of northern prairie birds (including several endemics and other species characteristic of the historical native prairie community) may be significantly increased by providing frequent disturbance and the resulting increases in early successional stages.

Nevertheless, there are often tradeoffs in wildlife response to consider when reintroducing major habitat disturbances such as fire and grazing; short-term losses should be weighed against net gains over longer periods. For example, management treatments might influence the survival of grassland bird nests—directly by burning nests or through livestock trampling, or indirectly through increased predation or brood parasitism rates—when nest site vegetation is modified by fire or grazing.

Despite declines in densities during the first growing season following a prescribed burn, Murphy et al. (2005) found that most species of grassland-breeding birds in northern mixed-grass prairie are adapted to recurring fire (every 4–6 years) by nesting in unburned patches and returning to pre-burn levels of abundance and nest density after the first growing season. Further, the authors found that fire had almost no discernible impact on nest survival for all species of grassland birds examined, with the exception of the Savannah sparrow in the first post-burn growing season.

Murphy et al. (2005) found similar results for waterfowl; duck nest densities were reduced during the first growing season following a fire, but recovered 2–3 years post-fire. Similarly, Kruse and Bowen (1996) found that grazing alone reduced nest densities during the grazing years, but the vegetation and ducks recovered quickly after grazing ended. However, studies of nesting success have reported neutral to positive responses of waterfowl to grazing and prescribed fire. Murphy et al. (2005) found greater nest survival for mallards and gadwalls during the first post-fire growing season than in subsequent years and no fire effects on nest survival in other duck species, regardless of how recently fire had occurred. Kruse and Bowen (1996) found that waterfowl nest success

was not influenced by burning and grazing treatments, while several studies have reported greater nesting success in grazed grasslands than in other habitats in the Plains and Prairie Pothole Region (Barker et al. 1990, Greenwood et al. 1995). Warren et al. (2008) found that nesting females were most successful at sites with above-average vegetation density that are in fields with increased grazing intensity (that is, nesting in clumps of vegetation in areas more generally characterized by low levels of residual cover). Grazed areas may attract fewer predators because of low densities of some types of prey, such as small mammals (Grant et al. 1982, Runge 2005), less cover for concealment, or both. Higher nesting success in grazed fields may occur because predators respond negatively to low prey density (Clark and Nudds 1991, Larivière and Messier 1998).

UPLANDS OBJECTIVE 5: RECONSTRUCT PRAIRIE ON PREVIOUSLY FARMED AREAS

Annually and for the next 15 years, the Complex staff will begin the process of prairie reconstruction on 200 acres of previously tilled lands, to recreate native grasslands (including native forbs) and provide high quality habitat for mallard, grasshopper sparrow, upland sandpiper, and other migratory birds. Focus efforts on Lake Andes Refuge, Karl E. Mundt Refuge, and waterfowl production areas that are within Priorities 1–4.

Strategies

- Create partnerships with cooperative farmers to farm areas identified for reconstruction for two or more growing seasons to eliminate invasive grasses and provide a clean seedbed for replanting.
- As needed, monitor Complex lands reconstructed to native prairie grasses and forbs to evaluate the effectiveness of upland habitat management and reconstruction efforts, especially in the early stages of reconstruction.
- Develop a grassland habitat management plan that will guide prairie reconstruction and restoration on the Complex. This plan will provide additional criteria for selecting and prioritizing Complex lands for reconstruction and restoration.
- Significantly reduce invasive plants prior to the reseeded phase of reconstruction.
- Using the best available science, determine which plant species were native to individual tracts of each Complex unit. Replant a diverse mix of grasses and forbs using genotypes that are from the local area where possible.

Rationale

Prairie reconstruction and prairie restoration are two different processes. Prairie reconstruction refers to reestablishing (replanting) native plants (grasses,

forbs, shrubs) on sites that were tilled. Typically sites are farmed for 2 or more years to eliminate invasive plants, and then reseeded with a mixture of native plant species. Prairie restoration involves applying management treatments to bring a native prairie remnant (never tilled) back to a point where native plants thrive. This objective concerns prairie reconstruction.

Native migratory birds fare best in native vegetation (Bakker and Higgins 2009). Complex grasslands have been invaded by nonnative grasses such as smooth brome, Kentucky bluegrass, and crested wheatgrass. An intensive reconstruction effort is necessary to eliminate competition from invasive grasses and reestablish native plant species.

The establishment of native-dominated perennial herbaceous cover, in concert with prescribed application of periodic fire and grazing, resists the encroachment and establishment of invasive species. Sources in the literature suggest that species-rich seed mixtures may reduce weed invasion on native seeded grasslands (Blumenthal et al. 2003, Carpinelli 2001, Pokorny 2002, Sheley and Half 2006, Tilman et al. 1996). In a study by Pokorny et al. (2005), the investigators determined that indigenous forbs resisted invasion by spotted knapweed better than grasses did. The overall theory in the literature indicates that seeding a species-rich seed mixture increases the inclusion of various functional groups among plant species. The more species included in a mixture, the higher the probability of providing competition to resist invasion by nonnative plants. Moreover, native vegetation is preferred over nonnative vegetation by a number of grassland birds (Bakker and Higgins 2009). Mark Sherfy of USGS found that ducks nesting in CRP fields in North Dakota and South Dakota showed no significant preference for tame grass-seeded fields—that is, dense nesting cover (DNC)—over native seeded fields. In addition, nest success was slightly higher in native seedings than in tame grass seedings. According to Klett et al. (1984), nest initiation rates for mallard, gadwall, and blue-winged teal in North Dakota and South Dakota were as high or higher in native-seeded fields than in seeded fields that lacked natives. Similarly, nest success was not significantly different in native-seeded than in tame grass-seeded study fields (Klett et al. 1984). Ultimately, reconstruction success (habitat improvement) is dependent on monitoring and management efforts. Monitoring determines the nature and the appropriate timing of the management action. Effective management (prescribed fire, grazing, mowing, or chemical treatment) of reconstruction sites is critical for establishment, productivity, and longevity of the grassland stands. The Complex's focus on using native plants to reconstruct waterfowl production areas is consistent with the Improvement Act, which includes an integrity policy that states that Refuge System units are to promote biological integrity, diversity,

and environmental health and attempt the restoration of historical conditions on Refuge System lands (Schroeder et al. 2004).

UPLANDS OBJECTIVE 6: IMPROVE TAME GRASSES

On lands not slated for grassland restoration or reconstruction (Priority 5–8 waterfowl production areas), Complex staff will apply management treatments (for example, grazing, fire, haying, and interseeding) to improve tame grass habitat for migratory birds throughout the life of this CCP. Interseeding of nonnative forbs such as alfalfa would not exceed an average of 50 acres per year on tracts that were previously cropped and are dominated by tame grass.

Strategies

- Use grazing, haying, fire, and interseeding of forbs to keep tame grass vigorous and beneficial for migratory birds.
- Avoid treatments and locations that are relatively time-consuming.
- When interseeding, use forb species that are inexpensive, non-invasive, and easily controlled (for example, alfalfa). Invasive nonnative plant species like sweet clover or red clover will not be interseeded.

Rationale

Tame grass is defined as nonnative grass species. In this area the typical tame grass species are smooth brome, Kentucky bluegrass, intermediate wheatgrass, and crested wheatgrass.

Grasslands with a forb component, including legumes like alfalfa, are attractive to invertebrates. Invertebrates are very important to breeding migratory birds and their young. The nutrition they provide is especially important to egg-laying females and young of the year.

Certain upland areas were seeded back to an herbaceous cover of introduced vegetation known as DNC. Traditionally, these seed mixtures comprised cool-season introduced grasses and legumes (intermediate wheatgrass, tall wheatgrass, alfalfa, and sweetclover) that establish well under a wide variety of soil, moisture, and climatic conditions that exist across the Plains and Prairie Pothole Region. Such a mixture provides nesting cover for generalist birds including upland-nesting ducks (Duebber et al. 1981), northern harrier, and sedge wren (Johnson et al. 2004). DNC provides attractive nesting cover for waterfowl for 6–8 years after seeding and up to 15 years with proper management (Duebber and Frank 1984, Higgins and Barker 1982, Lokemoen 1984).

Ideally, the majority of these tracts planted to DNC will be seeded back to a native mixture; however, certain situations may limit the opportunity to do so. If a DNC mixture is used, intermediate wheatgrass and tall

wheatgrass are viable grasses to select, and alfalfa is an appropriate legume. Under no circumstances should smooth brome, Kentucky bluegrass, crested wheatgrass, or sweetclover be used in DNC mixtures. DNC tracts must also be managed to maintain optimal vigor throughout the life cycle of the planting. Especially in cropland-dominated areas, invasive plant threats will persist and will require appropriate treatments to control. Management methods such as grazing and fire may be used to stimulate the height and density of DNC mixtures. Mechanical methods such as haying may also benefit plantings by removing the litter layer. Finally, the most productive stands of DNC are those that are reseeded approximately every 10–15 years, including appropriate crop rotation frequency as seedbed preparation (Duebbert et al. 1981). Before a tract is planted back to DNC, the Service's integrity policy and the sustainability of native grasslands should be considered.

Tame grass tracts that have not begun the seedbed preparation process will be maintained in an idle state that generally consists of a predominance of introduced cool-season grass species. Before seedbed preparation for seeding to native grass, these sites are of relatively low priority. Management efforts can be better directed toward higher priority upland areas such as native prairie, tracts already reseeded to native grass, and tracts being prepared for native reseeded. According to Mark Sherfy of USGS, there is evidence that, despite the presence of introduced cool-season perennial grass cover, DNC likely supports multiple plant species and generalist birds, including upland-nesting ducks.

UPLANDS OBJECTIVE 7: MANAGE GRASSLAND STRUCTURE

Over the life of this CCP, Complex staff will maintain a minimum of 40 percent of all grassland acres in a high visual obstruction reading (VOR) category (greater than 8 inches; Robel et al. 1970), a minimum of 25 percent in a medium VOR category (4–8 inches), and a minimum of 5 percent in a low VOR category (less than 4 inches) to provide a mosaic of habitat types for the broadest possible variety of grassland migratory birds.

Strategies

- Manage grasslands with prescribed fire, grazing, haying, rest, or a combination.
- Monitor VOR using a methodology modified from Robel et al. (1970) once every 5 years on a representative portion of Complex grasslands.
- Use the Floristic Quality Index to monitor vegetation quality and changes before and after grassland habitat treatments, restorations, and reconstructions. Use RLGIS to document habitat treatments and store vegetation data.

- Use resources such as the Refuge Inventory and Monitoring Office in Fort Collins, Colorado, to improve the effectiveness and efficiency of monitoring.
- Conduct a critical thinking process that lists, describes, and prioritizes biological information needs for grasslands on the Complex that would be best addressed through outside research to inform and improve refuge management. This information will be provided to potential research partners and the research community. Use resources such as the Service's zone biologist, past research partners, and other research contacts to develop the biological information needs list.

Rationale

Focal species were selected for Complex grasslands. These include the mallard, which prefers high grass height (VOR of greater than 8 inches); the grasshopper sparrow, which prefers medium grass height (VOR of 4–8 inches); and the upland sandpiper, which prefers low grass height (VOR of less than 4 inches). Providing habitat for each of these three species will benefit many other grassland migratory bird species (for example, dickcissel, northern harrier, gadwall, sedge wren, blue-winged teal, northern shoveler, bobolink, northern pintail, western meadowlark, marbled godwit, and willet). Quantitative measurements of VOR of upland nesting species are shown in figure 24.

Managing for 40 percent or more in the high VOR category (greater than 8 inches) will provide a grassland habitat that is underrepresented in the surrounding private landscape, and one that is ideal for many species of waterfowl and other migratory birds. Medium VOR (4–8 inches), and especially low VOR (less than 4 inches), are well represented in the surrounding private landscape.

Gathering information specific to Complex lands would enable Complex staff to use the best available science to guide management decisions.

UPLANDS OBJECTIVE 8: PROTECT GRASSLANDS THROUGH EASEMENTS

Provided adequate funding is available, the wetland district manager will lead annual efforts to secure perpetual conservation easements on 3,000 acres of unprotected, high priority grassland acres, to benefit migratory birds; sequester carbon; improve soil stabilization and water quality; and benefit indigenous plant and animal species, resident wildlife, and federally and State-listed species throughout the life of this plan.

Strategies

- Focus the protection of grassland (and associated wetlands) with conservation easements in areas of high waterfowl pair densities. Use the current Upland Accessibility for Breeding Duck Pairs in the Lake Andes National Wildlife Refuge map (figure 23) to guide acquisition priorities.

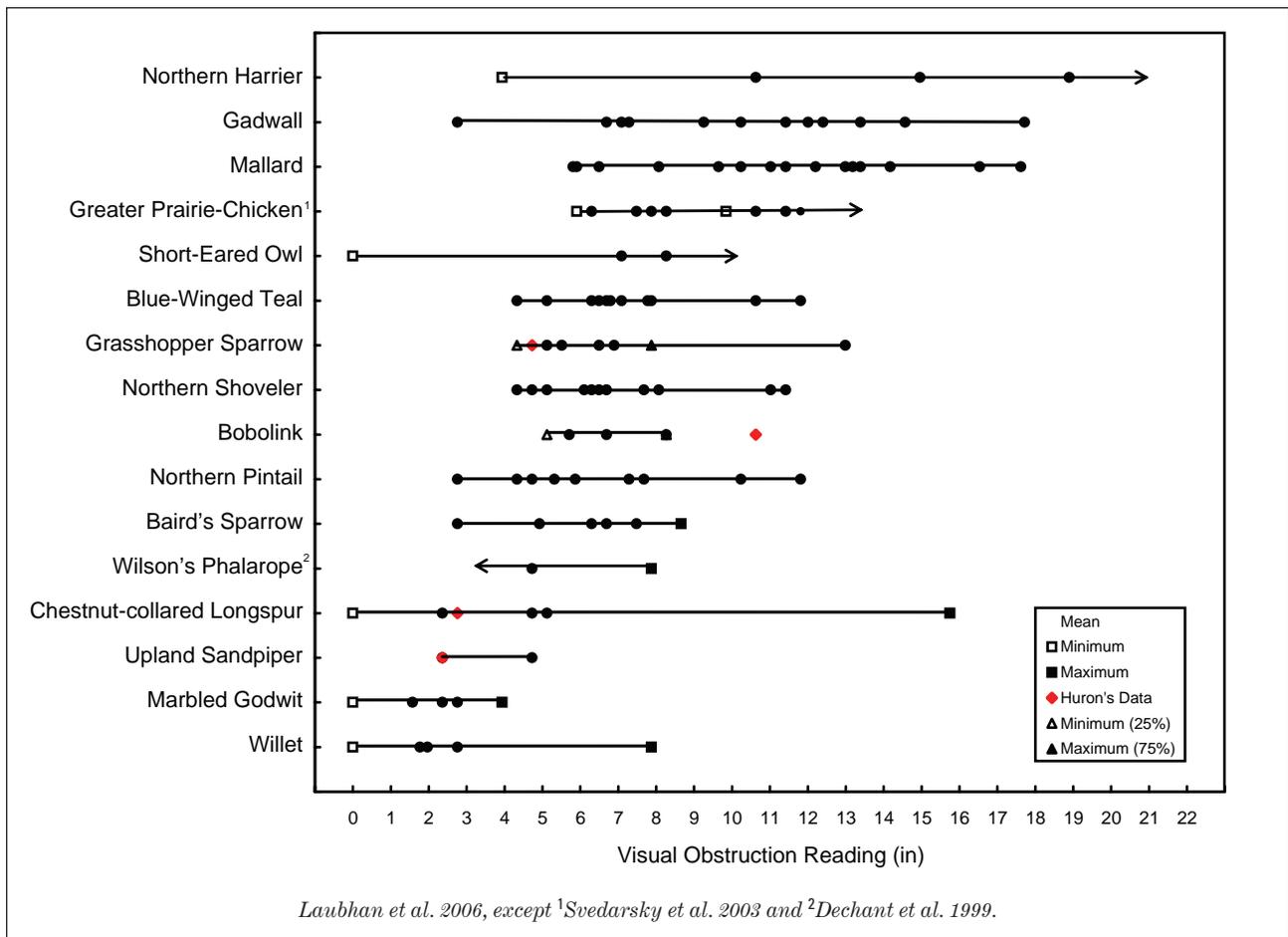


Figure 24. Quantitative measurements of visual obstruction readings of upland nesting species.

- Use the Partners for Fish and Wildlife Program as a way to inform prospective sellers of the Service's conservation easement program.
- Use the Service's strong partnership with Ducks Unlimited, NAWCA, and other conservation organizations to generate non-Duck Stamp funding to buy additional conservation easements.
- Maintain prioritized lists of willing sellers whose lands have been approved for easement acquisition.
- Work closely with the Huron Wetland Acquisition Office to process high priority easement evaluations and to communicate acquisition priorities for the Lake Andes District.
- Examine data from HAPET, The Nature Conservancy, Ducks Unlimited, and others to identify geographical areas valuable to trust species. Pursue acquisition of easements to promote wildlife conservation.

Rationale

The initial focus of the Service's Small Wetland Acquisition Program was the protection of wetlands through purchasing land in fee title and acquiring perpetual wetland easements. However, data also revealed the

importance of upland grasslands to successful nesting of waterfowl. With the continued conversion of grassland to cropland and consistent declines in the populations of grassland-dependent birds, the need to protect neighboring grassland habitats became evident. The Service received authorization and began to acquire grassland easements in South Dakota in 1989. Like a wetland easement, a grassland easement transfers limited perpetual rights to the Service for a one-time, lump-sum payment. The purpose of a grassland easement is to prevent the conversion of grassland to cropland, while minimally restricting existing agricultural practices. More specifically, the purposes of a grassland easement are:

- to improve the water quality of wetlands by reducing soil erosion and the use of chemicals and fertilizers on surrounding uplands;
- to improve upland nesting habitat for all ground-nesting birds, especially waterfowl, and enhance nesting success on private lands;
- to perpetuate grassland cover established by other Federal programs (for example, CRP);

- to provide an alternative to the purchase of uplands in fee title, thus maintaining lands in private ownership.

Grassland easements restrict the landowner from altering the grass by digging, plowing, disking, or otherwise destroying the vegetative cover. Haying, mowing, and seed harvest are restricted until after July 15 of each year. The landowner can graze without restriction (appendix H).

Considering the strong and ongoing partnership with Ducks Unlimited and the consistent success of using its non-Federal money to help acquire NAWCA grants, it is likely the Service's grassland easement program will enjoy stable, if not increasing, funding over the next 15 years. Under these circumstances and using an average acquisition target based on 2008 Division of Realty data, the Service would secure protected status for more than 500,000 grassland acres in South Dakota.

HAPET has developed a model that shows the distribution of priority grassland patches (at least 55 acres) in relation to breeding duck pairs (at least 25 per square mile) (figure 25) and predicts that for every 1 percent decline of priority grassland in the Plains and Prairie Pothole Region, there will be 25,000 fewer ducks in the fall. Protection of priority grassland patches not only benefits waterfowl, but also a wide variety of grassland-dependent migratory birds such as western meadowlark (Johnson and Igl 2001).

HAPET identified 11.56 million acres in the PPJV area of North Dakota, South Dakota, and eastern Montana that meet the above criteria. By subtracting grasslands already protected on waterfowl production areas or grassland easements, HAPET identified 10.4 million grassland acres in need of protection. The Dakota Working Group and the PPJV (Ringelman 2005) have adopted this figure as a protection goal. Securing protected status on 500,000 acres of priority grassland in the next 15 years would help the Service advance toward meeting this goal.

Additionally, the HAPET model has identified larger grassland areas with respect to area-dependent, grassland-nesting birds such as northern harrier, upland sandpiper, and grasshopper sparrow (Johnson and Igl 2001). These areas consist of contiguous grass cover encompassing at least 640 acres with at least 30 percent of the area comprising permanent or semi-permanent wetlands. Protection of these large, contiguous blocks of grass within a larger, grassland-dominated landscape should provide adequate protection for a wide range of grassland-dependent migratory bird species that are of management concern (Estey 2007).

To inform prospective sellers of the Service's conservation easement program, the Service will use the Partners for Fish and Wildlife Program. Often times, a biologist from this program is the first point of contact

for landowners who would otherwise be unaware of the available conservation programs.

UPLANDS OBJECTIVE 9: PROTECT GRASSLANDS THROUGH FEE ACQUISITION

Throughout the life of this CCP, the Complex's wetland district manager will strive to secure additional land in fee title as waterfowl production areas from willing sellers, at an average annual rate of 0.5 percent over the existing land base, within high priority sections of the Grassland Bird Conservation Area (figure 25) and areas shown in HAPET's Upland Accessibility for Breeding Duck Pairs in the Lake Andes National Wildlife Refuge Complex map (figure 23) for migratory bird conservation.

Strategies

- Purchase stand-alone or roundout properties with habitat values equal to or greater than existing high-priority waterfowl production areas.
- Stand-alone properties could be purchased ahead of a roundout property or any easement.
- Continue to use the Service's strong partnership with others to acquire waterfowl production areas through purchase and donation.
- Consider exchange proposals with other conservation organizations with the goal of improving management capability.

Rationale

Waterfowl production areas are public lands purchased by the Federal Government for increasing the production of migratory birds, especially waterfowl. The purchase of land—or ownership in fee title—entails the Federal Government holding ownership of land on behalf of the American public. Money to buy waterfowl production area lands typically comes from the public purchase of Federal Duck Stamps. This important program aims to ensure the long-term protection of waterfowl and other migratory bird breeding habitat—primarily in the Plains and Prairie Pothole Region of the northern Great Plains. Waterfowl production areas are open to the public for hunting, fishing, wildlife (bird) watching and photography, and trapping.

The majority of waterfowl production areas in the Lake Andes District were purchased in the 1960s. Historically, acquisition of waterfowl production areas focused on larger semi-permanent wetlands; often, very little associated upland was included in the tract. As grassland cover was converted to cropland, the Service recognized the importance of purchasing uplands next to wetlands for waterfowl production. When considering a waterfowl production area purchase from willing sellers, the Service ranks sites with native prairie, rare wildlife and plant species, a diversity of temporary and semi-permanent wetlands, and areas near or next to another waterfowl production

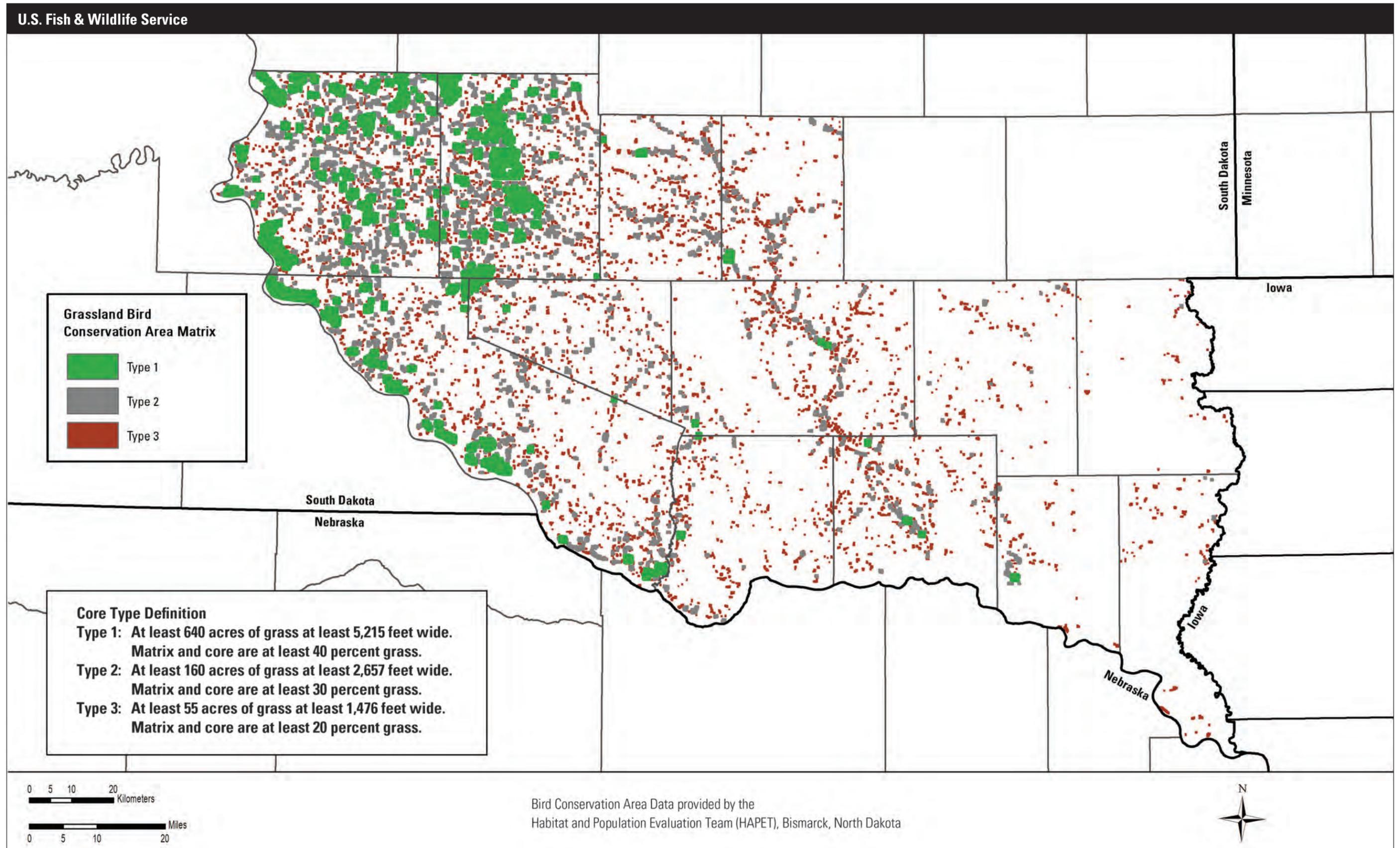


Figure 25. Grassland bird conservation area matrix.

area as high priorities for acquisition. Currently, the Service purchases on average one waterfowl production area in each district every 3 years.

UPLANDS OBJECTIVE 10: EVALUATE WILDLIFE VALUES OF COMPLEX LANDS

Throughout the life of this CCP, Complex staff will evaluate the biological integrity and value to wildlife populations of lands suspected of no longer meeting the Service's purposes, and will pursue legal means to exchange tracts of land to ensure limited Refuge System resources are focused on conserving the most valuable habitats for Service trust resources.

Strategies

- Examine interests currently held in fee title and identify those that are clearly of low value to trust species. Pursue exchange of these interests to ensure that limited Refuge System resources are focused on conserving the most valuable habitats.
- Use proceeds from exchanges to acquire high priority habitats. All purchases would be from willing sellers and subject to approval from the Service.
- Apply the waterfowl production area prioritization model to identify fee tracts that are of low priority for conservation. Consider starting a process to exchange these lands.

Rationale

Compared with today, years ago the Service was less selective when it came to acquiring and accepting lands for the Refuge System. Techniques and information have evolved and as a result there are many more tools available to determine the value to wildlife conservation of a tract or interest.

In the past land acquisition has proceeded through a reactive process. Landowners approached the Service when they were interested in selling their land. Years ago lands were acquired with very little information relevant to an individual tracts value for migratory birds. In hindsight this sometimes resulted in acquisition of lands that had marginal wildlife value. Resources to manage these lands are very limited and not expected to increase appreciably in the near future. A process that identifies valuable lands for future acquisition and current holdings for future divestiture will allow limited resources to be focused on the most valuable land for migratory bird conservation.

Consideration will be given for the exchange of the following waterfowl production areas: Freese, Diede, Collar, Anderson, Kayser, and White Lake.

UPLANDS OBJECTIVE 11: CONTROL NEST PREDATORS ON LAKE ANDES WETLAND MANAGEMENT DISTRICT

Throughout the life of this CCP, the Complex will support and facilitate opportunities for control of nest

predators (for example, raccoons, striped skunks, red fox, opossum, and other vermin) led and carried out by partner organizations, to facilitate higher nest success (greater than 35 percent Mayfield nest success) among mallards and other waterfowl across the wetland management district.

Strategies

- Investigate support from Delta Waterfowl and other potential partners.
- Facilitate control efforts where waterfowl nesting density is greater than 40 pairs per square mile.
- Allow control of nest predators by partner organizations during the nesting season.
- Facilitate nest monitoring by partner organizations, on a representative sample of the control area before, during, and after control.
- Remove predator habitat from waterfowl production areas that could harbor nest predators (for example, abandoned buildings, rock piles, and abandoned shelterbelts).

Rationale

Animals that prey on migratory bird nests are abundant on the Lake Andes District. Raccoon, striped skunk, opossum, and red fox have the most significant negative effect on migratory bird nesting success in this area. Food and cover in the agricultural landscape results in "bumper crops" of these three species nearly every year. Control of nest predators during the nesting season in habitats similar to that of the district has been shown to significantly increase nesting success of waterfowl. The Complex does not have the resources to control nest predators and monitor nesting success in a significant way across the vast landscape of the district. Such an effort would have to be performed by an outside organization that is committed to improving the nesting success of ground-nesting birds in the Plains and Prairie Pothole Region. This type of activity has occurred on other districts in the Plains and Prairie Pothole Region in the past 10 years.

According to Beauchamp et al. (1996), nest success of upland nesting ducks has declined from a mean of 30 percent in 1935 to a mean of 10 percent in the early 1990s. This decrease in nest success can likely be attributed to multiple factors, including a substantial long-term loss, fragmentation, and degradation of wetland and grassland habitat, as well as an unbalanced predator community. According to Sovada et al. (2004), habitat conversions have changed predator-prey relationships and increased populations of certain waterfowl predators. In addition to waterfowl, predation is an important cause of nest failure for passerines, shorebirds, ground-nesting raptors (for example, northern harrier and short-eared owl), and upland gamebirds (Martin 1988, 1995; Helmers and Gratto-Trevor 1996).

Several studies support the hypothesis that removal of predators like striped skunk, raccoon, and red fox increases waterfowl nest success (Garrettson and Rohwer 2001, Garrettson et al. 1996, Hoff 1999, Mense 1996), productivity (Sovada et al. 2001), and brood production (Balsler et al. 1968, Duebbert and Lokemoen 1980, Garrettson et al. 1996, Sargeant et al. 1995). Greenwood and Sovada (1996) suggested that lethal control of predators can potentially improve waterfowl production across large landscape areas. Predator removal can be a viable alternative where habitat management actions are not sufficient to support waterfowl nest success at or above maintenance levels (Sovada et al. 2004). Reynolds et al. (2001) suggested that on average (dependent on multiple variables) the landscape must be composed of 40 percent grass cover or more for mallards to achieve a nest success of 15–20 percent (population maintenance level). Sovada et al. (2001) stresses that predator management activities must provide for flexibility across the landscape because of the dynamic nature of factors (like climatic conditions) that influence waterfowl recruitment. Additionally, Sargeant et al. (1995) and Garrettson and Rohwer (2001) both concluded that predator control on large blocks is more effective than on smaller areas.

Past surveys of upland duck nest success on Complex lands indicate that in some years duck nests suffer predation at levels which suppress nest success to a point below a minimum maintenance threshold (15–20 percent). Additionally, several studies have shown that the nest success for ducks on refuges and waterfowl production areas throughout much of the Plains and Prairie Pothole Region is often less than the recommended minimum nest success values of 15–20 percent (Cowardin et al. 1985, Greenwood 1986, Greenwood et al. 1990, Klett et al. 1988). Furthermore, Klett et al.

(1988) suggested that while conservation programs may curb grassland and wetland losses, only a minimal increase in duck nest success will occur unless mammalian predation is reduced. According to Dixon and Hollevoet (2005) nest predator control will be most effective on areas with more than 60 duck pairs per square mile and from 20 to 40 percent grassland cover. Predator control would occur between March 15 and July 15.

6.7 Visitor Services

Provide opportunities for high quality and compatible hunting, fishing, environmental education, environmental interpretation, wildlife photography, and wildlife observation for persons of all abilities and cultural backgrounds by fostering an understanding and appreciation of the importance and purposes of the Lake Andes National Wildlife Refuge Complex and the missions of the Service and Refuge System.

VISITOR SERVICES OBJECTIVE 1: IMPROVE LAKE ACCESS ON LAKE ANDES NATIONAL WILDLIFE REFUGE

Within 5 years of plan approval, and with assistance of partners, Complex staff will design ice-resistant, functional boat ramps to provide access to the Center, South, and North Units of Lake Andes Refuge over a wide range of water depths to furnish adequate access for waterfowl hunting, fishing, management activities, and other compatible uses.

Strategies

- Pursue cooperative funding to cover the cost of engineering and construction.
- Use boat ramp designs that have performed well in northern climates with shallow water depths.
- Use partners such as CMCLRO and the SDGFP.
- Created parking areas as needed to accommodate increased lake usage.

Rationale

Two primitive boat ramps were constructed on the Center Unit of Lake Andes Refuge years ago. They were built using concrete planks. During winter, ice and wave action moved the planks and made the ramps inoperable.

To improve access to Lake Andes, boat ramps are needed that are not prone to ice damage and have sufficient length and slope to provide access at a wide range of water depths. Ramps would be developed on the North and South Units; these ramps would be used for fishing, hunting (Center Unit only), maintenance, and other compatible uses. The ramp on the North Unit would be restricted to Service use only.



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A bench for wildlife observation on the Complex.

VISITOR SERVICES OBJECTIVE 2: INVESTIGATE INCREASING HUNTING OPPORTUNITIES

Throughout the life of the CCP, the Complex staff will maintain or enhance hunting opportunities on refuges and waterfowl production areas and continue to provide information about public opportunities for hunting in accordance with State and Federal regulations.

Strategies

- Work with the State and other partners to ascertain if any new types of hunting opportunities (for example, archery hunting, muzzleloader hunting, or hunting opportunities for youth and hunters with disabilities) can be provided in a compatible way where they are currently prohibited, specifically Karl E. Mundt Refuge and Lake Andes Refuge's North, South, and Owen's Bay Units.
- Determine criteria that are currently used by SDGFP and the Service to classify people as hunters with disabilities.
- If new types of hunting are prudent and compatible, modify the Lake Andes National Wildlife Refuge Hunting Plan and make changes to refuge-specific regulations (50 CFR) to accommodate new hunting opportunities.
- Determine if a biological need exists to control populations of resident species within areas currently closed to hunting.
- Participate in updating Waterfowl Production Area Mapper, a Service Web site that provides electronic information on locations and features of waterfowl production areas.
- Explore options to develop or improve infrastructure to support hunting opportunities.
- Explore opportunities for development of universally accessible facilities and locations for hunters with disabilities. Work with partners to help fund such facility development.
- Keep data current to allow the State to incorporate district information into the SDGFP hunting guide. Meet with SDGFP personnel annually to discuss joint issues (for example, ensuring that printed hunting information is accurate).

Rationale

Hunting ring-necked pheasant, prairie grouse, waterfowl, other gamebirds, and deer on the Complex is very popular. The primary hunting seasons for all species occur from October through December. A light goose conservation order hunting season provides hunters an opportunity to harvest snow geese during the spring migration.

Waterfowl production areas are open to hunting as authorized by 50 CFR, part 32.1. This provision states that waterfowl production areas shall be open

to the hunting of migratory gamebirds, upland game, and big game subject to the provisions of State law and regulations.

Because the popularity of hunting on public lands is increasing, crowding is becoming an issue that affects the quality of the hunting experience. Crowds of hunters lead to unsafe hunting conditions and compromise harvest opportunities as game is dispersed.

Pressure for hunting is intensifying on Service lands. The number of nonresident hunters is increasing. In addition, the extent of private property off limits to hunting is increasing, while CRP grassland acres on private lands are decreasing.

To ensure a high-quality hunting experience, it is essential to maintain healthy populations of resident wildlife and migratory birds through habitat management. There is a growing demand for hunting opportunities for hunters with disabilities (for example, wheelchair-bound hunters). Youth hunting already occurs in accordance with State regulations.

The recreational benefits of areas closed to hunting will be considered when determining whether or how to open new areas to hunting. The capability of the Complex law enforcement staff to patrol additional areas open to hunting and to manage special hunts will also be considered.

VISITOR SERVICES OBJECTIVE 3: INVESTIGATE INCREASING FISHING OPPORTUNITIES

Within 5 years of CCP approval, Complex staff will work with the State and other partners to ascertain if additional compatible fishing opportunities can be provided on Lake Andes.

Strategies

- Draft a compatibility determination for fishing on the North Unit of Lake Andes.
- Work with and support the efforts of CMCLRO to restore a high quality fishery on the South Unit of Lake Andes.
- Continue to work with SDGFP and the Service's Fisheries Assistance Office to allow fish stocking on the South Unit of Lake Andes and on Scheffel and Schaefer Waterfowl Production Areas in Bon Homme County. Limit stocking to these waters due to the ephemeral nature of the Complex's wetlands and the competition for food between fish and waterfowl.
- If compatible, make changes to refuge-specific regulations (50 CFR) to open all of Lake Andes, including the North Unit, to fishing.

Rationale

During the 1920s, visitors came from miles around to fish in Lake Andes for black bass. The fishing was so good that numerous resorts were built on the shores of the lake, and tourism dominated the local economy.

The drought of the 1930s dealt a heavy blow to tourism. Since this time, fishing has continued to be good during wet cycles but poor during dry cycles.

Many changes have been made to Lake Andes and its surrounding landscape since the 1920s. When the refuge was expanded to include Lake Andes in 1939, local supporters envisioned a refuge that would provide quality fishing, waterfowl hunting, and waterfowl conservation. Recognizing the differing needs of fish and waterfowl (for example, water depth) led many refuge managers to focus management on waterfowl only. More recently, managers and partners have come to appreciate that water quality, not quantity, is the limiting factor for both fish and waterfowl. Excessive nutrients and turbid water caused by carp feeding have limited the growth of wetland vegetation that is critical to invertebrate populations—the food of fish and waterfowl. Many people remember how good the fishing can be during wet cycles and are interested in improving it. Complex staff recognize the cyclic nature of water depths in Lake Andes and want to provide habitat that is good for fish during wet cycles and good for waterfowl and other waterbirds during dry cycles.

VISITOR SERVICES OBJECTIVE 4: IMPROVE ENVIRONMENTAL EDUCATION AND INTERPRETATION BY HIRING AN OUTDOOR RECREATION PLANNER

If funding becomes available, within 10 years of CCP approval, retain an outdoor recreation planner to expand and manage onsite and offsite environmental education and interpretation programs that support youth and nature Service programs, increase students' exposure and knowledge of the Refuge System, and reconnect children and adults with nature.

Strategies

- If necessary, share the outdoor recreation planner with SDGFP, The Nature Conservancy, or other conservation groups.
- Forge partnerships and all necessary contacts with local school districts and other educational institutions to facilitate school-based outdoor lab activities.
- Promote self-guided tours, led by educators, targeting onsite environmental education for school-age children.
- Develop an educator's guide to self-guided refuge tours, which provides a menu of options and lessons for site-specific environmental education tours. The educator's guide will be tailored to the needs of various class levels with varied levels of complexity, depending on the age level/class of the students.
- Continue to actively participate in the Fort Randall Birding Festival by facilitating bird watching tours at Karl E. Mundt Refuge and at the Owen's Bay Unit of Lake Andes Refuge, as well as exploring

the possibility of opening other sites where festival participants can engage in wildlife observation and photography.

- Continue to actively participate in the Youth Outdoor Expo by providing staff to demonstrate outdoor activities such as shotgun skills, fishing, and turkey hunting.
- Create interpretive exhibits at Atkins Waterfowl Production Area and other sites within the Complex that emphasize ecological processes within natural plant and animal communities, refuge habitat management practices, and restoration of upland, wetland, and riparian habitats.
- Develop, print, and distribute Complex-specific brochures and Web-based materials (for example, species lists, visitor services facilities and regulations, and waterfowl production area regulations) to inform the public and increase awareness of the Complex and Refuge System's missions, as well as promote visitation to Complex lands.
- Promote greater understanding among diverse public groups of the Complex's refuges and waterfowl production areas, as well as the other units, and their values, uses, management, and vital roles in the Refuge System mission.
- Communicate key issues to offsite audiences through radio, television, newspapers, and the Internet.
- Maintain a current and dynamic Web page for the Complex.
- Remodel the Complex headquarters to provide a visitor center and classroom.

Rationale

The Service made connecting people with nature one of its highest priorities in 2007. Working to connect people to nature, the Service also strives to help the public understand that they have a role in natural resource conservation. The Service recognizes that its commitment to connecting people to nature is critical to the future of both the agency and to the conservation legacy of the Nation's fish and wildlife resources. The initial focus for the Service's work in this area is to connect children with nature. Environmental education is one of several ways the Service commits to public service and the future. The importance of environmental education in the Refuge System is further underscored by the fact that it is one of the six priority wildlife-dependent recreational activities supported by the Refuge System Improvement Act of 1997.

The Service's definition of environmental education for the Refuge System is as follows: a process designed to teach citizens and visitors the history and importance of conservation and the biological and scientific knowledge of our Nation's natural resources. Through this process, we can help develop a citizenry that has the awareness, knowledge, attitudes, skills,

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A footpath on the Complex.

motivation, and commitment to work cooperatively toward the conservation of our Nation's environmental resources. Environmental education within the Refuge System incorporates onsite, offsite, and distance learning materials, activities, programs, and products that address the audience's course of study, unit purpose(s), physical attributes, ecosystem dynamics, conservation strategies, and the Refuge System mission (USFWS policy 605 FW 6).

The staff of the Refuge Complex is currently involved in two America's Great Outdoors projects, Dakota Grasslands and Missouri River String of Pearls. One of the overriding goals of America's Great Outdoors is to reconnect people with nature, especially on working landscapes when humans live sustainably with nature.

Expansion of environmental education and interpretation would provide a benefit for visitors, foster understanding of and support for Complex management, and help reconnect people with nature.

VISITOR SERVICES OBJECTIVE 5: COMMERCIAL BAIT HARVESTING

Within 5 years of CCP approval, the wildlife refuge manager will determine the compatibility of commercial bait harvesting with trust wildlife species conservation, and act appropriately to safeguard trust resources.

Strategies

- Develop a compatibility determination for commercial bait harvesting.
- Prevent commercial bait harvesting (or stocking of bait fish) on Service-managed wetlands that do not currently support a fishery, due to competition for food between fathead minnows and waterfowl. Scheffel Waterfowl Production Area, Schaeffer Waterfowl Production Area, and Lake Andes are the only waters that currently support a fishery.
- If bait harvesting is deemed incompatible, identify and phase out existing operations.

Rationale

Commercial bait harvesting occurs on Lake Andes where the Service's jurisdiction had been in question

until recently. Lake Andes has long been a part of the Refuge System, primarily through an easement from the State of South Dakota. It was recently determined that the Administration Act applied to this easement. This Federal law provides authority and guidelines relevant to secondary uses such as commercial bait harvesting on refuges. On Lake Andes, secondary uses must be compatible with the purpose of the refuge, which is migratory bird conservation. In addition, commercial uses must be a benefit to the purpose of the refuge.

According to Bouffard and Hanson (1997) waterfowl marshes traditionally have been managed for both waterbirds and fish based on the assumption that fish, except carp, are compatible with waterfowl (Johnson 1964, Poff 1985). Their review of the scientific literature indicated that this assumption is often incorrect. Armstrong and Leafloor (1990) studied fish-waterfowl interactions in the Plains and Prairie Pothole Region and recommended keeping fish out of wetlands that are managed for waterfowl such as waterfowl production areas.

Semipermanent wetlands throughout the upper-midwestern United States are commonly used as commercial rearing ponds for bait fish, including fathead minnows (Carlson and Berry 1990; Dobie 1956, 1972; Peterson and Hennagir 1980; Van Eeckout 1976). Fathead minnows have potential to use a large proportion of a wetland invertebrate food resources because they (1) are present and feed year round, (2) forage in the entire water column, and (3) consume invertebrates throughout their life cycle (Held and Peterka 1974, Price et al. 1991).

Commercial bait harvesting typically involves the sustainable removal of fathead minnows from wetlands. Hanson and Riggs (1995) evaluated the effects of fathead minnows on wetland invertebrates. Indices of aquatic invertebrate abundance, biomass, and taxon richness were all lower in wetlands containing fathead minnows. At high densities fathead minnows reduced the suitability of wetlands as seasonal foraging areas for waterfowl. Competition for macroinvertebrates between fish and waterfowl influences habitat selection by female ducks and may be a major determinant of duckling feeding efficiency and growth rates on some waters in Canada and Scandinavia (DesGranges and Rodrigue 1986; Eadie and Keast 1982; Eriksson 1979, 1983; Perhsson 1984, 1991). Fish are often major determinants of aquatic invertebrate abundance and community structure.

VISITOR SERVICES OBJECTIVE 6: IMPROVE OPPORTUNITIES FOR WILDLIFE OBSERVATION AND PHOTOGRAPHY

Within 3 years of CCP approval, Complex staff will assess the compatibility of opening limited portions of areas currently closed to public entry on Karl E.

Mundt Refuge and Lake Andes Refuge for wildlife observation and photography.

Strategies

- Draft a simple plan that outlines access geographically and temporally to ensure compatibility.
- Complete a compatibility determination for this new use.
- Investigate the possibility of providing a self-guided nature trail on Karl E. Mundt Refuge.
- Use the strategies for accessibility found in Visitor Services Objective 7.

Rationale

Some areas that are currently closed to public entry offer excellent opportunities for wildlife observation and photography. The Karl E. Mundt Refuge has not been opened to public entry since its establishment in 1974. This was intended to minimize disturbance to bald eagles that wintered and nested on the refuge. Since that time, the bald eagle population has recovered and the species was removed from the list of threatened and endangered species.

Woodland habitat on the refuge provides migration and nesting habitat for a variety of migratory bird species that are not commonly seen outside of woodlands. Such areas are prized by birdwatchers. With bald eagle populations secure, now may be the time to allow limited public entry on the refuge. Entry could still be prohibited in sensitive areas and during sensitive seasons, such as near eagle nests when they are nesting. Access would be by foot. A trailhead parking lot and a foot trail would have to be developed to provide access to the North Unit of the refuge. The South Unit is surrounded by private land with the exception of its shared boundary with the Missouri River and due to difficult access will remain closed to public entry.

VISITOR SERVICES OBJECTIVE 7: IMPROVE ACCESSIBILITY FOR WILDLIFE OBSERVATION AND PHOTOGRAPHY

When supplemental funding becomes available, Complex staff will improve accessibility of selected portions of existing foot trails (the Prairie Ponds within the Owens Bay Unit of Lake Andes Refuge and Atkins Waterfowl Production Area) by paving the surface, to allow access for people with disabilities and improve their wildlife observation and photography opportunities. The Complex staff will also develop accessible observation and photography blinds and towers.

Strategies

- Seek funding through the Education and Visitor Services Branch of the Service's Region 6 Refuges Program.

- Provide wildlife observation and photography blinds in strategic sites on refuges and waterfowl production areas including some that are accessible to people of all abilities. Allow the compatible use of personal portable blinds.
- Construct, place, and manage blinds using guidelines provided in the "Welcoming Photographers to National Wildlife Refuges Handbook."
- Construct blinds that are semi-permanent so they can be moved with heavy equipment as habitat conditions change.
- Notify the public of blind locations and proper use upon construction and placement.
- Construct observation towers and platforms on strategic sites, some of which are accessible to people of all abilities.

Rationale

Most people have some form of disability during their life, whether it is permanent or temporary. Providing access for people with disabilities is not only the right thing to do, it is also the law. Generally speaking facilities and recreational activities need to be accessible for people of all abilities. If a foot trail is provided, then a portion of that foot trail or another one nearby must be accessible.

Blinds and observation towers and platforms in strategic locations facilitate up-close views of wildlife for photography or observation. When properly placed and used such facilities limit disturbance of wildlife.

6.8 Operations

Provide funding, staffing, infrastructure, protection of cultural resources, partnerships, and a safe working environment to achieve the purposes and objectives of the Lake Andes National Wildlife Refuge Complex.

OPERATIONS OBJECTIVE 1: EXPAND STAFFING AND INFRASTRUCTURE

Throughout the life of this plan and as additional funding allows, the project leader will prioritize and fill the positions identified in the Refuge Operation Needs System (RONS) in order to fulfill the visions, goals, and objectives of this plan (see appendix E for a complete staffing list). Infrastructure will be expanded as needed to accommodate additional staffing.

Strategies

- Review the priorities for positions listed in the RONS periodically and reprioritize as necessary.
- When funding allows, remodel and expand the headquarters building to provide a visitor center and to accommodate additional staff.



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Staffing and infrastructure would be expanded under the proposed alternative.

- When funding allows, remodel and expand the maintenance shop to correct deficiencies and accommodate additional staff and equipment.
- Acquire additional small and heavy equipment and replace existing worn-out equipment.

Rationale

An expansion of staff and infrastructure is necessary to achieve the visions, goals, and objectives of this plan. Additional conservation work is directly dependent on additional funding. Expansion of the maintenance shop would improve the condition of infrastructure throughout the Complex, and employees would work in a safer and healthier environment. Additional equipment would enhance the efficiency of Complex operations.

New or replacement equipment and facilities needed for the implementation of this CCP in the next 15 years includes two 150 horsepower (or larger) tractors, a skid-steer loader, a tracked excavator, an articulating loader, a small bulldozer, 4x4 vehicles (one every other year), two herbicide sprayers, a semi-tractor with lowboy trailer, a roller packer, a native grass drill, an amphibious Argo vehicle, ORVs (one every other year), a boat herbicide sprayer, a pull-behind scraper (also known as a soil scraper), an equipment storage shed, a fence post pounder, and two Trimble GPS units (and associated software and equipment).

OPERATIONS OBJECTIVE 2: BUILD A PRAIRIE RECONSTRUCTION FACILITY

Throughout the life of this CCP and as additional funding allows, a prairie reconstruction facility will be built to process, clean, dry, and store native grass and forb seeds and related equipment.

Strategies

- Seek partnerships, grants, and other opportunities for supplemental funding to accomplish this objective.

Rationale

Prairie reconstruction is a major part of this CCP. Space to process, clean, dry, and store native grass and forb seeds is not available. Additional facilities and equipment are needed to efficiently implement prairie reconstruction on the Complex. Using local genotypes requires harvesting, processing, and storing seed. Purchasing seed for reconstruction is very costly. Harvesting and replanting seed is more cost-effective.

Equipment needed and which would be stored here includes a seed stripper, combine, hammer mill, seed dryer, seed cleaner, seed separator, and other general use equipment.

OPERATIONS OBJECTIVE 3: REPLACE ARTESIAN WELL

As soon as additional funding allows, Complex staff will replace the existing artesian well on Owen's Bay to provide water for the Prairie Ponds and Owen's Bay and the wildlife and plant species dependent on it.

Strategies

- Seek partnerships, grants, and other opportunities for supplemental funding to accomplish this objective.

Rationale

The Prairie Ponds are a series of small ponds that were created for wildlife observation, environmental education, and interpretation near Complex headquarters. An artesian well provides the only water source for these ponds. Flow from the well has been steadily decreasing since it was drilled in 1985. Currently, flow from the well is barely adequate to provide the water needed to make habitat conditions attractive to migratory birds in the ponds. Replacement of the well is expensive (approximately \$150,000 to \$250,000) and will be dependent on supplemental funding.

OPERATIONS OBJECTIVE 4: PROTECT CULTURAL RESOURCES

For the duration of the CCP, significant cultural resources will be preserved and protected within Complex lands.

Strategies

- Adhere to all Federal laws associated with cultural resources.
- Consult a Service archeologist before any landscape management disturbance or activity occurs that might affect structures older than 50 years or disturb the soil surface. These activities must undergo a Section 106 review under the National Historic Preservation Act.
- Consult a Service archeologist on appropriate site mapping, data storage, site preservation, and protocols to follow regarding newly discovered sites.

- Consult a Service archeologist on cultural resource research and study requests.
- Avoid areas of known cultural resources (and potentially sensitive areas when practical) during management actions. While cultural resources information should not be readily available to the public, Complex staff and law enforcement officers should know the locations of sensitive resources so they can be managed and protected.
- Continue to coordinate National Historic Preservation Act Section 110 Cultural Resource Inventories on Complex lands.
- Avoid or conduct noninvasive (archival or oral history) investigations of cultural sites such as historic graves.
- Whenever possible, document interviews with local people and long-term Complex staff.
- Protect structures that are eligible for the National Register of Historic Places.
- Educate staff on cultural resource issues and the importance of National Historic Preservation Act compliance, because staff awareness is vital to preservation and protection of resources.
- Conduct post-burn cultural resources inventories on the Complex's fee-title lands.
- Consult with Service archeologists whenever old buildings are planned for removal, or ground-disturbing activities are planned. If after consultation and clearance cultural resources are found anyway, cease construction immediately and contact Service archeologists. Assist Service archeologists with documentation of cultural resources as needed.
- Consult tribal archeologists to identify and avoid sensitive cultural resource areas.

Rationale

Cultural resources include archaeological sites (pre-historic and historic and their associated documentation), buildings and structures, landscapes, objects, and historic documents. These assets form tangible links with the past. The Complex is responsible for protecting and managing these irreplaceable resources for future generations.

The Service established a cultural resources management program to manage the rich collection of cultural resources under its jurisdiction. Some of the primary goals related to refuge management include the (1) identifying, evaluating, and encouraging preservation of cultural resources and (2) consulting a broad array of interested parties.

OPERATIONS OBJECTIVE 5: EXPAND PARTNERSHIPS—SEEK ADDITIONAL PARTNERS

Throughout the life of this plan, Complex staff will seek to expand existing partnerships and develop

new ones in order to enhance wildlife conservation and wildlife-dependent recreation on the Complex.

Strategies

- Contact nongovernmental organizations and other potential partners that could facilitate the implementation of this CCP (for example, Pheasants Forever and Ducks Unlimited).

Rationale

Many of the objectives in this CCP require additional funding for implementation. Conservation partners can sometimes provide supplemental funding to accomplish a project that is of mutual interest to the partner and the Service.

OPERATIONS OBJECTIVE 6: EXPAND PARTNERSHIPS—DEVELOP A FRIENDS GROUP

Within 10 years of plan approval, the Complex's project leader will seek to establish a "friends" group to support and advocate for the Complex's programs and needs.

Strategies

- Contact conservation groups and conservation-minded individuals in or near the Complex's 14-county area and determine their interest, willingness, and capability to advocate for the Complex.

Rationale

Field stations often must compete for additional staffing and funding. At times friends groups can advocate for a field station when the station itself cannot. Such groups can be a significant benefit to a field station's wildlife conservation and wildlife-dependent recreation programs.

OPERATIONS OBJECTIVE 7: LAW ENFORCEMENT—EASEMENTS

Throughout the life of the CCP, protect all wetland and grassland areas under perpetual easement through active monitoring and law enforcement in accordance with the provisions of the conservation easement contracts.

Strategies

- Based on existing law enforcement needs for the Complex, add a full-time Federal wildlife officer (GL-1801) to the Complex staff. This will prevent protected wetlands and grasslands from being lost through violations as a result of insufficient law enforcement staff.
- Following the guidelines contained in the "Easement Manual" for enforcement procedures, conduct annual surveillance flights to detect potential conservation easement violations and promptly follow up with needed enforcement action.
- If personnel and funds are available, annually send letters to new landowners informing them of

existing conservation easements on their property, including associated easement provisions.

- Proactively map pre-1976 wetland easements and provide maps to landowners along with a copy of the easement contract containing provisions.
- Work with HAPET to provide each county USDA office within the wetland management district a map of Service interests showing waterfowl production areas and easements. USDA personnel use maps to identify Service easements prior to granting any wetland drainage or grassland alteration requests. Update maps as needed.
- If personnel and funds are available, conduct aerial flights to obtain digital photography of all wetland and grassland easements.
- Seek assistance from HAPET for spatial data requests on the locations of Service interests in the pre-planning of wind generator farms, fuel pipelines, overhead distribution power lines, or other large-scale commercial developments.

Rationale

When the Small Wetlands Acquisition Program was initiated more than 50 years ago, the Service believed that conservation easements would require little to no maintenance or enforcement efforts. However, it soon became evident that in order to protect the government's interest in these easements, a systematic approach was necessary for easement administration and enforcement. "Swampbuster" provisions of the Farm Bill (which prohibit conversion of wetlands for the production of commodity crops by Farm Bill participants) notwithstanding, pressures to drain and fill wetlands have continued to intensify. As farm implements such as drills, sprayers, and tractors become larger, landowners increasingly view small isolated wetlands as nuisance spots because they are tired of working around them. Other Farm Bill programs can also unintentionally increase pressure to violate wetland easement provisions. One such USDA program, Prevented Planting, provides compensation to a landowner for acres that cannot be seeded to a crop. To qualify for payment, the operator must only make an attempt to farm the acres (oftentimes, these are wetland acres). Simply plowing the ground once in the fall, when wetlands are naturally dry, can constitute an attempt. To facilitate plowing, landowners often burn off the wetland vegetation. It is common for these burns to occur on conservation easement-protected wetlands without the required permit from the administering district, which is a violation of the easement provisions.

In the absence of active and effective enforcement, the Service's conservation easement interests could be lost forever, in contrast to resources that the government owns outright. A 15-year hiatus in

enforcement action would likely result in irreparable harm to the Service's easement interests and permanent loss of habitat.

Because most grassland easements protect native prairie, the major enforcement concern is cultivation. While violations involving the conversion of native prairie to cropland are extremely rare, full restoration is arguably impossible (although restoration of grassland is possible to regain compliance with grassland easement provisions, which do not specify native prairie). Accordingly, enforcement is essential to the protection of these habitats. Haying, mowing, or harvesting seed before July 15, in violation of the conservation easement provision, could cause direct losses of grassland-nesting birds, including waterfowl. Haying is not common on native prairie, but it is more likely to occur on tamegrass grasslands. Enforcing early hay violations affords another opportunity to meet and visit with landowners and operators. These contacts may serve to remind landowners and operators of the conservation easement provisions and hopefully prevent more serious violations in the future. Like any law enforcement action, the ultimate goal is voluntary compliance.

OPERATIONS OBJECTIVE 8: LAW ENFORCEMENT—PUBLIC USES

Throughout the life of the CCP, the Complex will protect natural and cultural resources pursuant to all relevant laws, Executive orders, regulations, and policies. The Complex will provide law enforcement for all public uses on Service lands.

Strategies

- Provide adequate law enforcement coverage for all hunting, fishing, and trapping seasons to ensure compliance with laws and regulations while providing for public safety and welfare.
- Develop extensive methods for signage to facilitate information transfer, and to address communication needs through the use of kiosks, public use leaflets, and tear sheets explaining regulations and prohibited activities.
- Develop, coordinate, and maintain working relationships with State and local law enforcement authorities and fire departments to protect Complex properties and Federal trust species.
- Continue to coordinate with SDGFP conservation officers and Yankton Sioux tribal game wardens to conduct law enforcement patrols and ensure compliance with regulations.

Rationale

Law enforcement is necessary to ensure protection and compliance with laws and regulations. Sharing resources and information with other officers increases the effectiveness of the law enforcement program.

OPERATIONS OBJECTIVE 9: MANAGE WILDLAND FIRES

Throughout the life of the CCP, provide adequate collaboration and teamwork between the fire program and refuge program to ensure that the objectives of Department of Interior fire policies and other Federal policies are met and that prescribed burning remains a viable tool for habitat management.

Strategies

- Safely suppress all wildfires within the Complex.
- Maintain fire qualifications for all capable Complex staff.
- Utilize Burned Area Emergency Response and Burned Area Rehabilitation funding as needed.
- Update the fire district fire management plan as needed to accommodate this CCP.
- Make treatment of Complex lands near the wildland-urban interface high priorities for reduction of hazardous fuels.

Rationale

Having long recognized fire as a key process that shapes wildlife habitat structure and function, the Service has managed and used fire extensively for the past 70 years. Guiding principles of fire management in the Service include responsible stewardship,

hazardous fuel reduction, wildland–urban interface management, and habitat management strategies based on conserving ecological integrity, meeting the objectives of the “National Fire Plan,” and establishing effective partnerships.

The emphasis of the Service’s fire management program has shifted from one of suppression to the use of prescribed fire and wildfire as management tools to achieve national fire policy objectives, habitat objectives, and landscape-level change.

Fuel treatments need to be properly planned using an interagency and interdisciplinary approach when possible and practical, using an integrated approach across different programmatic areas.

The “2010 U.S. Fish and Wildlife Service Fire Management Handbook” established a statement of intent: “Fuels treatments should properly be planned on an interdisciplinary basis and be integrated as much as practicable with other resource management activities, and serve to implement the appropriate Comprehensive Conservation Plan. With the guidance from the Service Fire Management Handbook, fire management staff will strive to work closely with all other staff in the district to plan prescribed fire activities in a way that will reduce the risk of wildfires and also have positive results in the area of habitat management.”

Glossary

abiotic—Pertaining to nonliving things.

accessible—Pertaining to physical access to areas and activities for people of different abilities, especially those with physical impairments.

adaptive management—Rigorous application of management, research, and monitoring to gain information and experience necessary to assess and modify management activities; a process that uses feedback from research, monitoring, and evaluation of management actions to support or modify objectives and strategies at all planning levels; a process in which policy decisions are implemented within a framework of scientifically driven experiments to test predictions and assumptions inherent in a management plan. Analysis of results helps managers determine whether current management should continue as is or whether it should be modified to achieve desired conditions.

Administration Act—National Wildlife Refuge System Administration Act of 1966.

alternatives—Different sets of objectives and strategies or means of achieving refuge purposes and goals, helping fulfill the Refuge System mission and resolving issues.

amphibian—Class of cold-blooded vertebrates including frogs, toads or salamanders.

annual—A plant that flowers and dies within 1 year of germination.

baseline—Set of critical observations, data, or information used for comparison or a control.

biological control—Reduction in numbers or elimination of unwanted species by the introduction of natural predators, parasites, or diseases.

biological diversity, also biodiversity—Variety of life and its processes, including the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur (“U.S. Fish and Wildlife Service Manual” 052 FW 1.12B). The National Wildlife Refuge System’s focus is on endemic species, biotic communities, and ecological processes.

biological integrity—Composition, structure, and function at the genetic, organism, and community levels consistent with natural conditions and the biological processes that shape genomes, organisms, and communities.

biomass—Total amount of living material, plants and animals, above and below the ground in a particular habitat or area.

biota—Animals and plants of a given region.

biotic—Pertaining to life or living organisms.

breeding habitat—Habitat used by migratory birds or other animals during the breeding season.

buffer zone or buffer strip—Protective land borders around critical habitats or water bodies that reduce runoff and nonpoint source pollution loading; areas created or sustained to lessen the negative effects of land development on animals and plants and their habitats.

canopy—Layer of foliage, generally the uppermost layer, in a vegetative stand; midlevel or understory vegetation in multilayered stands. Canopy closure (also canopy cover) is an estimate of the amount of overhead vegetative cover.

CCP—See comprehensive conservation plan.

CFR—See Code of Federal Regulations.

cfs—Cubic feet per second.

climax—Community that has reached a steady state under a particular set of environmental conditions; a relatively stable plant community; the final stage in ecological succession.

Code of Federal Regulations (CFR)—Codification of the general and permanent rules published in the “Federal Register” by the executive departments and agencies of the Federal Government. Each volume of the CFR is updated once each calendar year.

community—Area or locality in which a group of people resides and shares the same government.

compatible use—Wildlife-dependent recreational use or any other use of a refuge that, in the sound professional judgment of the director of the U.S. Fish and Wildlife Service, will not materially interfere with or detract from the fulfillment of the mission of the Refuge System or the purposes of the refuge (“Draft U.S. Fish and Wildlife Service Manual” 603 FW 3.6). A compatibility determination supports the selection of compatible uses and identified stipulations or limits necessary to ensure compatibility.

complex—See refuge complex.

comprehensive conservation plan (CCP)—A document that describes the desired future conditions of the refuge and provides long-range guidance and management direction for the refuge manager to

accomplish the purposes of the refuge, contribute to the mission of the Refuge System, and to meet other relevant mandates (“Draft U.S. Fish and Wildlife Service Manual” 602 FW 1.5).

concern—See issue.

conservation—Management of natural resources to prevent loss or waste. Management actions may include preservation, restoration, and enhancement.

cool-season grass—Grass that begins growth earlier in the season and often become dormant in the summer; will germinate at lower temperatures (65–85°F). Examples are western wheatgrass, needle and thread, and green needlegrass.

cooperative agreement—Legal instrument used when the principal purpose of the transaction is the transfer of money, property, services or anything of value to a recipient in order to accomplish a public purpose authorized by Federal statute and substantial involvement between the Service and the recipient is anticipated.

coteau—A hilly upland including the divide between two valleys; a divide; the side of a valley.

cover, also cover type, canopy cover—Present vegetation of an area.

CRP—Conservation Reserve Program.

cultivar—A plant variety that has been produced in cultivation by selective breeding.

cultural resources—Remains of sites, structures, or objects used by people in the past.

cultural resource inventory—Professionally conducted study designed to locate and evaluate evidence of cultural resources present within a defined area. Inventories may involve various levels including background literature search (class I), sample inventory of project site distribution and density over a larger area (class II), or comprehensive field examination to identify all exposed physical manifestation of cultural resources (class III).

database—Collection of data arranged for ease and speed of analysis and retrieval, usually computerized.

deciduous—Pertaining to any plant organ or group of organs that is shed annually; perennial plants that are leafless for sometime during the year.

defoliation—Removing of vegetative parts; to strip vegetation of leaves; removal can be caused by weather, mechanical, animals, and fire.

demography—Quantitative analysis of population structure and trend.

dense nesting cover (DNC)—Composition of grasses and forbs that allows for a dense stand of vegetation that protects nesting birds from the view of predators, usually consisting of one to two species of wheatgrass, alfalfa, and sweetclover.

disturbance—Significant alteration of habitat structure or composition. May be natural (for example, fire) or human-caused events (for example, timber harvest).

DNC—See dense nesting cover.

drawdown—Manipulating water levels in an impoundment to allow for the natural drying-out cycle of a wetland.

EA—See environmental assessment.

easement—Agreement by which a landowner gives up or sells one of the rights on his/her property.

ecosystem—Dynamic and interrelating complex of plant and animal communities and their associated nonliving environment; a biological community, together with its environment, functioning as a unit. For administrative purposes, the Service has designated 53 ecosystems covering the United States and its possessions. These ecosystems generally correspond with watershed boundaries and their sizes and ecological complexity vary.

emergent—Plant rooted in shallow water and having most of the vegetative growth above water such as cattail and hardstem bulrush.

endangered species, Federal—Plant or animal species listed under the Endangered Species Act of 1973, as amended, that is in danger of extinction throughout all or a significant portion of its range.

endangered species, State—Plant or animal species in danger of becoming extinct or extirpated in a particular State within the near future if factors contributing to its decline continue. Populations of these species are at critically low levels or their habitats have been degraded or depleted to a significant degree.

endemic species—Plants or animals that occur naturally in a certain region and whose distribution is relatively limited to a particular locality.

environmental assessment (EA)—Concise public document, prepared in compliance with the National Environmental Policy Act, that briefly discusses the purpose and need for an action and alternatives to such action, and provides sufficient evidence and analysis of impacts to determine whether to prepare an environmental impact statement or finding of no significant impact (40 CFR 1508.9).

environmental education—Education aimed at producing a citizenry that is knowledgeable concerning the biophysical environment and its associated problems, aware of how to help solve these problems, and motivated to work toward their solution.

environmental health—Natural composition, structure, and functioning of the physical, chemical, and other abiotic elements, and the abiotic processes that shape the physical environment.

EPA—Environmental Protection Agency.

extinction—Complete disappearance of a species from the earth; no longer existing.

extirpation—Extinction of a population; complete eradication of a species within a specified area.

fauna—All the vertebrate and invertebrate animals of an area.

- Federal land**—Public land owned by the Federal Government, including lands such as national forests, national parks, and national wildlife refuges.
- federally listed species**—Species listed under the Federal Endangered Species Act of 1973, as amended, either as endangered, threatened, or species at risk (formerly candidate species).
- fee title**—Acquisition of most or all of the rights to a tract of land.
- fire management plan (FMP)**—A plan that identifies and integrates all wildland fire management and related activities within the context of approved land/resource management plans. It defines a program to manage wildland fires (wildfire and prescribed fire) (U.S. Department of Agriculture 2009).
- fire regime**—Description of the frequency, severity, and extent of fire that typically occurs in an area or vegetative type.
- flora**—All the plant species of an area.
- FMP**—See fire management plan.
- forb**—A broad-leaved, herbaceous plant; a seed-producing annual, biennial, or perennial plant that does not develop persistent woody tissue but dies down at the end of the growing season.
- forest**—Group of trees with their crown overlapping (generally forming 60–100% cover).
- fragmentation**—The alteration of a large block of habitat that creates isolated patches of the original habitat that are interspersed with a variety of other habitat types; the process of reducing the size and connectivity of habitat patches, making movement of individuals or genetic information between parcels difficult or impossible.
- FTE**—Full-time equivalent.
- geographic information system (GIS)**—Computer system capable of storing and manipulating spatial data; a set of computer hardware and software for analyzing and displaying spatially referenced features (points, lines and polygons) with nongeographic attributes such as species and age.
- GIS**—See geographic information system.
- goal**—Descriptive, open-ended, and often broad statement of desired future conditions that conveys a purpose but does not define measurable units (“Draft U.S. Fish and Wildlife Service Manual” 620 FW 1.5).
- “go-back” prairie**—Previously cultivated cropland that has been allowed to revert to herbaceous cover.
- GPS**—See global positioning system.
- guild**—A group of species that use a common resource base in a similar fashion within an ecological community. A guild can be generally defined (for example, grassland birds) or specifically defined (for example, seed-eating small mammals).
- habitat**—Suite of existing environmental conditions required by an organism for survival and reproduction; the place where an organism typically lives and grows.
- habitat conservation**—Protection of animal or plant habitat to ensure that the use of that habitat by the animal or plant is not altered or reduced.
- habitat disturbance**—Significant alteration of habitat structure or composition; may be natural (for example, wildland fire) or human-caused events (for example, timber harvest and disking).
- habitat type, also vegetation type, cover type**—Land classification system based on the concept of distinct plant associations.
- hemi-marsh**—The emergent phase of a seasonal or semipermanent wetland where the ratio of open water area to emergent vegetation cover is about 50:50, and vegetation and open water areas are highly interspersed.
- herbivore**—Animal feeding on plants.
- herbivory**—The eating of plants, especially ones that are still living.
- impoundment**—A body of water created by collection and confinement within a series of levees or dikes, creating separate management units although not always independent of one another.
- Improvement Act**—National Wildlife Refuge System Improvement Act of 1997.
- integrated pest management**—Methods of managing undesirable species such as invasive plants; education, prevention, physical or mechanical methods of control, biological control, responsible chemical use, and cultural methods.
- interseed**—Mechanical seeding of one or several plant species into existing stands of established vegetation.
- introduced species**—A nonnative plant or animal species that is intentionally or accidentally released into an ecosystem where it was not previously adapted.
- introduction**—Intentional or unintentional escape, release, dissemination, or placement of a species into an ecosystem as a result of human activity.
- invasive plant, also noxious weed**—Species that is nonnative to the ecosystem under consideration and whose introduction causes, or is likely to cause, economic or environmental harm or harm to human health.
- inviolate sanctuary**—Place of refuge or protection where animals and birds may not be hunted.
- issue**—Any unsettled matter that requires a management decision; for example, a Service initiative, opportunity, resource management problem, a threat to the resources of the unit, conflict in uses, public concern, or the presence of an undesirable resource condition (“Draft U.S. Fish and Wildlife Service Manual” 602 FW 1.5).
- lacustrine**—Relating to, formed in, living in, or growing in lakes.
- lek**—A physical area where males of a certain animal species gather to demonstrate their prowess and

compete for females before or during the mating season.

local agencies—Municipal governments, regional planning commissions, or conservation groups.

management alternatives—See alternatives.

management plan—Plan that guides future land management practices on a tract of land. See cooperative agreement.

mean sea level—The sea level halfway between average levels of high and low water.

mechanical control—Reduction in numbers or elimination of unwanted species through the use of mechanical equipment such as mowers and clippers.

mesic—Characterized by, relating to, or requiring a moderate amount of moisture; having a moderate rainfall.

microhabitat—Habitat features at a fine scale; often identifies a unique set of local habitat features.

migration—Regular extensive, seasonal movements of birds between their breeding regions and their wintering regions; to pass usually periodically from one region or climate to another for feeding or breeding.

migratory bird—Bird species that follow a seasonal movement from their breeding grounds to their wintering grounds. Waterfowl, shorebirds, raptors, and songbirds are all migratory birds.

migratory game bird—Bird species, regulated under the Migratory Bird Treaty Act and State laws (legally hunted, including ducks, geese, woodcock, and rails).

mission—Succinct statement of purpose or reason for being.

mitigation—Measure designed to counteract an environmental impact or to make an impact less severe.

mixed-grass prairie—Transition zone between the tall-grass prairie and the short-grass prairie dominated by grasses of medium height that are approximately 2–4 feet tall. Soils are not as rich as the tall-grass prairie and moisture levels are less.

monitoring—Process of collecting information to track changes of selected parameters over time.

monotypic—Having only one type or representative.

moraine—Mass of earth and rock debris carried by an advancing glacier and left at its front and side edges as it retreats.

national wildlife refuge (NWR)—Designated area of land, water, or an interest in land or water within the Refuge System, but does not include coordination areas; a complete listing of all units of the Refuge System is in the current “Annual Report of Lands Under Control of the U.S. Fish and Wildlife Service.”

National Wildlife Refuge System (Refuge System)—Various categories of areas administered by the Secretary of the Interior for the conservation of fish and wildlife including species threatened with extinction, all lands, waters, and interests therein

administered by the Secretary as wildlife refuges, areas for the protection and conservation of fish and wildlife that are threatened with extinction, wildlife ranges, game ranges, wildlife management areas, and waterfowl production areas.

National Wildlife Refuge System Improvement Act of 1997 (Improvement Act)—Sets the mission and the administrative policy for all refuges in the Refuge System; defines a unifying mission for the Refuge System; establishes the legitimacy and appropriateness of the six priority public uses (hunting, fishing, wildlife observation, wildlife photography, environmental education, and interpretation); establishes a formal process for determining appropriateness and compatibility; establish the responsibilities of the Secretary of the Interior for managing and protecting the Refuge System; requires a comprehensive conservation plan for each refuge by the year 2012. This Act amended portions of the Refuge Recreation Act and National Wildlife Refuge System Administration Act of 1966.

native species—Species that, other than as a result of an introduction, historically occurred or currently occurs in that ecosystem.

NAWMP—See North American Waterfowl Management Plan.

Neotropical migrant, also Neotropical migratory bird—Bird species that breeds north of the United States–Mexico border and winters primarily south of this border.

NEPA—National Environmental Policy Act.

nest success—Percentage of nests that successfully hatch one or more eggs of the total number of nests initiated in an area.

nongovernmental organization—Any group that does not include Federal, State, tribal, county, city, town, local, or other governmental entities.

North American Waterfowl Management Plan (NAWMP)—North American Waterfowl Management Plan, signed in 1986, recognizes that the recovery and perpetuation of waterfowl populations depends on restoring wetlands and associated ecosystems throughout the United States and Canada. It established cooperative international efforts and joint ventures composed of individuals; corporations; conservation organizations; and local, State, provincial, and Federal agencies drawn together by common conservation objectives. The Souris River basin refuges are included in the “Prairie Pothole Joint Venture.”

notice of intent—Notice that an environmental impact statement will be prepared and considered (40 CFR 1508.22); published in the “Federal Register.”

noxious weed, also invasive plant—Any living stage (including seeds and reproductive parts) of a parasitic or other plant of a kind that is of foreign origin (new to or not widely prevalent in the U.S.)

- and can directly or indirectly injure crops, other useful plants, livestock, poultry, other interests of agriculture, including irrigation, navigation, fish and wildlife resources, or public health. According to the Federal Noxious Weed Act (PL 93-639), a noxious weed (invasive plant) is one that causes disease or has adverse effects on humans or the human environment and, therefore, is detrimental to the agriculture and commerce of the United States and to public health.
- NRCS**—Natural Resources Conservation Service of the U.S. Department of Agriculture.
- NWR**—See national wildlife refuge.
- NWRS**—See National Wildlife Refuge System.
- objective**—Concise statement of what is to be achieved, when and where it is to be achieved, and who is responsible for the work. Objectives are derived from goals and provide the basis for determining management strategies. Objectives should be attainable, time-specific, and measurable.
- palustrine**—Refers to a nontidal wetland dominated by trees, shrubs, persistent emergents, and emergent mosses or lichens; or a wetland in tidal areas where salinity due to ocean-derived salts is below 0.5 parts per thousand.
- Partners in Flight**—Western Hemisphere program designed to conserve Neotropical migratory birds and officially endorsed by numerous Federal and State agencies and nongovernmental organizations; also known as the Neotropical Migratory Bird Conservation Program.
- partnership**—Contract or agreement entered into by two or more individuals, groups of individuals, organizations or agencies in which each agrees to furnish a part of the capital or some in-kind service, such as labor, for a mutually beneficial enterprise.
- patch**—Area distinct from that around it; an area distinguished from its surroundings by environmental conditions.
- perennial**—Lasting or active through the year or through many years; a plant species that has a life span of more than 2 years.
- phenology**—The relationship between plant or animal development and climatic conditions.
- planning team**—Team that prepares the comprehensive conservation plan. Planning teams are interdisciplinary in membership and function. A team generally consists of a planning team leader; refuge manager and staff biologist; staff specialists or other representatives of Service programs, ecosystems or regional offices; and State partnering wildlife agencies as appropriate.
- planning team leader**—Typically a professional planner or natural resource specialist knowledgeable of the requirements of National Environmental Policy Act and who has planning experience. The planning team leader manages the refuge planning process and ensures compliance with applicable regulatory and policy requirements.
- planning unit**—Single refuge, an ecologically or administratively related refuge complex, or distinct unit of a refuge. The planning unit also may include lands currently outside refuge boundaries.
- plant association**—Classification of plant communities based on the similarity in dominants of all layers of vascular species in a climax community.
- plant community**—Assemblage of plant species unique in its composition; occurs in particular locations under particular influences; a reflection or integration of the environmental influences on the site such as soil, temperature, elevation, solar radiation, slope, aspect, and rainfall; denotes a general kind of climax plant community (ponderosa pine or bunchgrass).
- PPJV**—“Prairie Pothole Joint Venture.”
- predation**—Mode of life in which food is primarily obtained by the killing or consuming of animals.
- prescribed fire**—A wildland fire originating from a planned ignition to meet specific objectives identified in a written, approved, prescribed fire plan for which NEPA requirements (where applicable) have been met prior to ignition (U.S. Department of Agriculture 2009).
- priority public use**—See wildlife-dependent recreational use.
- pristine**—Typical of original conditions.
- private land**—Land that is owned by a private individual, a group of individuals, or a nongovernmental organization.
- private landowner**—Any individual, group of individuals, or nongovernmental organization that owns land.
- private organization**—Any nongovernmental organization.
- proposed action**—Alternative proposed to best achieve the purpose, vision, and goals of a refuge (contributes to the Refuge System mission, addresses the significant issues, and is consistent with principles of sound fish and wildlife management). The draft comprehensive conservation plan.
- public**—Individuals, organizations, and groups; officials of Federal, State, and local government agencies; Indian tribes; and foreign nations. It may include anyone outside the core planning team. It includes those who may or may not have indicated an interest in Service issues and those who do or do not realize that Service decisions may affect them.
- public involvement**—Process that offers affected and interested individuals and organizations an opportunity to become informed about, and to express their opinions on, Service actions and policies. In the process, these views are studied thoroughly and thoughtful consideration of public views is given in shaping decisions for refuge management.
- public involvement plan**—Broad long-term guidance for involving the public in the comprehensive planning process.

public land—Land that is owned by the local, State, or Federal Government.

purpose of the refuge—Purpose specified in or derived from the law, proclamation, executive order, agreement, public land order, donation document, or administrative memorandum establishing authorization or expanding a refuge, refuge unit, or refuge subunit (“Draft U.S. Fish and Wildlife Service Manual” 602 FW 1.5).

refuge complex—A grouping of two or more Service units (for example, national wildlife refuge, wetland management district) that is administered by staff at one of the units.

refuge lands—Lands in which the Service holds full interest in fee title, or partial interest such as limited-interest refuges.

refuge purpose—See purpose of the refuge.

Refuge System—See National Wildlife Refuge System.

region 6—“Mountain-Prairie Region” of the U.S. Fish and Wildlife Service, which administers Service programs in Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Wyoming, and Utah.

rest—Free from biological, mechanical, or chemical manipulation, in reference to refuge lands.

restoration—Artificial manipulation of a habitat to restore it to something close to its natural state. Involves taking a degraded grassland and reestablishing habitat for native plants and animals. Restoration usually involves the planting of native grasses and forbs, and may include shrub removal and prescribed burning.

rhizomatous—A plant having rhizomes— A continuously growing, horizontal, underground stem that produces roots and sends shoots upward at intervals (for example, many iris species).

riparian area or riparian zone—Area or habitat that is transitional from terrestrial to aquatic ecosystems including streams, lakes, wet areas, and adjacent plant communities and their associated soils that have free water at or near the surface; an area whose components are directly or indirectly attributed to the influence of water; of or relating to a river; specifically applied to ecology, “riparian” describes the land immediately adjoining and directly influenced by streams. For example, riparian vegetation includes all plant life growing on the land adjoining a stream and directly influenced by the stream.

runoff—Water from rain, melted snow, or agricultural or landscape irrigation that flows over the land surface into a water body.

sandhills—Sand dunes created by wind and wave action following the melting of large glaciers about 8,000–10,000 years ago. Soils are sand and silt. Local relief exceeds 80 feet in some places.

scoping—Process of obtaining information from the public for input into the planning process.

sediment—Material deposited by water, wind, and glaciers.

Service—See U.S. Fish and Wildlife Service.

shelterbelt—Single to multiple rows of trees and shrubs planted around cropland or buildings to block or slow down the wind.

shorebird—Any of a suborder of birds such as a plover or a snipe that frequent the seashore or mud flat areas.

sound professional judgment—Finding, determination, or decision that is consistent with principles of sound fish and wildlife management and administration, available science and resources, and adherence to the requirements of the National Wildlife Refuge System Administration Act and other applicable laws.

spatial—Relating to, occupying, or having the character of space.

special status species—Plants or animals that have been identified through Federal law, State law, or agency policy as requiring special protection of monitoring. Examples include federally listed endangered, threatened, proposed, or candidate species; State-listed endangered, threatened, candidate, or monitor species; the Service’s species of management concern; and species identified by the Partners in Flight program as being of extreme or moderately high conservation concern.

special use permit—Permit for special authorization from the refuge manager required for any refuge service, facility, privilege, or product of the soil provided at refuge expense and not usually available to the general public through authorizations in Title 50 CFR or other public regulations (“National Wildlife Refuge System Manual” 5 RM 17.6).

species of concern—Those plant and animal species, while not falling under the definition of special status species, that are of management interest by virtue of being Federal trust species such as migratory birds, important game species, or significant keystone species; species that have documented or apparent populations declines, small or restricted populations, or dependence on restricted or vulnerable habitats. Species that: (1) are documented or have apparent population declines; (2) are small or restricted populations; or (3) depend on restricted or vulnerable habitats.

stand—Any homogenous area of vegetation with more or less uniform soils, landform, and vegetation. Typically used to refer to forested areas.

step-down management plan—Plan that provides the details necessary to carry out management strategies identified in the comprehensive conservation plan (“Draft U.S. Fish and Wildlife Service Manual” 602 FW 1.5).

strategy—Specific action, tool, or technique or combination of actions, tools, and techniques used to

meet unit objectives (“Draft U.S. Fish and Wildlife Service Manual” 602 FW 1.5).

submergent—Vascular or nonvascular hydrophyte, either rooted or nonrooted, that lies entirely beneath the water surface, except for flowering parts in some species.

succession—Orderly progression of an area through time from one vegetative community to another in the absence of disturbance. For example, an area may proceed from grass-forb through aspen forest to mixed-conifer forest.

surficial—Relating to or occurring on the surface.

temporarily flooded—Surface water is present for brief periods during the growing season.

trust resource—Resource that, through law or administrative act, is held in trust for the people by the government. A Federal trust resource is one for which trust responsibility is given in part to the Federal Government through Federal legislation or administrative act. Generally, Federal trust resources are those considered to be of national or international importance no matter where they occur, such as endangered species and species such as migratory birds and fish that regularly move across statelines. In addition to species, trust resources include cultural resources protected through Federal historic preservation laws, nationally important and threatened habitats, notably wetlands, navigable waters, and public lands such as State parks and national wildlife refuges.

trust species—See trust resource.

understory—Any vegetation whose canopy (foliage) is below, or closer to the ground than canopies of other plants.

upland—Dry ground; other than wetlands.

USDA—U.S. Department of Agriculture.

U.S. Fish and Wildlife Service (Service, USFWS)—Principal Federal agency responsible for conserving, protecting, and enhancing fish and wildlife and their habitats for the continuing benefit of the American people. The Service manages the 93-million-acre National Wildlife Refuge System composed of more than 530 national wildlife refuges and thousands of waterfowl production areas. It also operates 65 national fish hatcheries and 78 ecological service field stations, the agency enforces Federal wildlife laws, manages migratory bird populations, restores national significant fisheries, conserves and restores wildlife habitat such as wetlands, administers the Endangered Species Act, and helps foreign governments with their conservation efforts. It also oversees the Federal aid program that distributes millions of dollars in excise taxes on fishing and hunting equipment to State wildlife agencies.

U.S. Fish and Wildlife Service mission—The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect, and enhance fish,

wildlife, and plants and their habitats for the continuing benefit of the American people.

USFWS—See U.S. Fish and Wildlife Service.

U.S. Geological Survey (USGS)—Federal agency whose mission is to provide reliable scientific information to describe and understand the earth; minimize loss of life and property from natural disasters; manage water, biological, energy, and mineral resources; and enhance and protect our quality of life.

USGS—See U.S. Geological Survey.

vision statement—Concise statement of what the planning unit should be, or what the Service hopes to do, based primarily on the Refuge System mission, specific refuge purposes, and other mandates. In addition, the vision statement is tied to the maintenance and restoration of biological integrity, diversity, and environmental health of each refuge and the Refuge System.

visual obstruction—Pertaining to the density of a plant community; the height of vegetation that blocks the view of predators and conspecifics to a nest.

visual obstruction reading (VOR)—Measurement of the density of a plant community; the height of vegetation that blocks the view of predators to a nest.

VOR—See visual obstruction reading.

wading birds—Birds having long legs that enable them to wade in shallow water. Includes egrets, great blue herons, black-crowned night-herons, and bitterns.

warm-season grass—Grass that begins growth later in the season (early June); require warmer soil temperatures to germinate and actively grow when temperatures are warmer (85–95°F). Examples are Indiangrass, switchgrass, and big bluestem.

waterfowl—Category of birds that includes ducks, geese, and swans.

watershed—Geographic area within which water drains into a particular river, stream or body of water. A watershed includes both the land and the body of water into which the land drains.

wetland—Land transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water.

wetland easement—Perpetual agreement entered into by a landowner and the Service. The easement covers only the wetlands specified in the agreement. In return for a single lump-sum payment, the landowner agrees not to drain, burn, level, or fill wetlands covered by the easement.

wetland management district (WMD)—Land that the Refuge System acquires with Federal Duck Stamp funds for restoration and management primarily as prairie wetland habitat critical to waterfowl and other wetland birds.

wilderness—“A wilderness, in contrast with those areas where man and his own works dominate the

landscape, is hereby recognized as an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain” (Wilderness Act of 1964 Section 2c [P.L. 88-577]). This legal definition places wilderness in the “untrammelled” or “primeval” end of the environmental modification spectrum. Wilderness is roadless lands, legally classified as component areas of the National Wilderness Preservation System, and managed to protect its qualities of naturalness, solitude, and opportunity for primitive types of recreation. 5,000 contiguous roadless acres or is sufficient in size as to make practicable its preservation and use in an unimpaired condition (“Draft U.S. Fish and Wildlife Service Manual” 610 FW 1.5).

wildfire—Unplanned ignition of a wildland fire (such as a fire caused by lightning, volcanoes, unauthorized and accidental human-caused fires) and escaped prescribed fires (U.S. Department of Agriculture 2009).

wildland fire—A general term describing any non-structure fire that occurs in the wildland. There are two types of wildland fire – wildfire and prescribed fire (U.S. Department of Agriculture 2009).

wildlife-dependent recreational use—Use of a refuge involving hunting, fishing, wildlife observation and photography, or environmental education and interpretation. These are the six priority public uses of the Refuge System as established in the National Wildlife Refuge System Administration Act, as amended. Wildlife-dependent recreational uses, other than the six priority public uses, are those that depend on the presence of wildlife.

wildlife management—Practice of manipulating wildlife populations either directly through regulating the numbers, ages, and sex ratios harvested, or indirectly by providing favorable habitat conditions and alleviating limiting factors.

WMD—See wetland management district.

woodland—Open stands of trees with crowns not usually touching, generally forming 25–60 percent cover.

xerophytic—Pertaining to a plant that needs very little water (adapted to growing in dry habitat).

Appendix A

Key Legislation and Policies

This appendix briefly describes the guidance for the National Wildlife Refuge System and other policies and key legislation that guide the management of the Huron, Madison, and Sand Lake Wetland Management Districts.

A.1 National Wildlife Refuge System

The mission of the 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.

(National Wildlife Refuge System Improvement Act of 1997)

GOALS

- Fulfill our statutory duty to achieve refuge purpose(s) and further the Refuge System mission.
- Conserve, restore where appropriate, and enhance all species of fish, wildlife, and plants that are endangered or threatened with becoming endangered.
- Perpetuate migratory bird, interjurisdictional fish, and marine mammal populations.
- Conserve a diversity of fish, wildlife, and plants.
- Conserve and restore, where appropriate, representative ecosystems of the United States, including the ecological processes characteristic of those ecosystems.
- 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 and photography, and environmental education and interpretation.

GUIDING PRINCIPLES

There are four guiding principles for management and general public use of the Refuge System established by Executive Order 12996 (1996):

- **Public Use**—The Refuge System provides important opportunities for compatible wildlife-dependent recreational activities involving hunting, fishing, wildlife observation and photography, and environmental education and interpretation.
- **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.
- **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.

A.2 Legal and Policy Guidance

Management actions on national wildlife refuges and wetland management districts are circumscribed by many mandates including laws and executive orders, the latest of which is the Volunteer and Community Partnership Enhancement Act of 1998. Regulations that affect refuge management the most are listed below.

American Indian Religious Freedom Act (1978)—Directs agencies to consult with native traditional religious leaders to determine appropriate policy changes necessary to protect and preserve Native American religious cultural rights and practices.

Americans with Disabilities Act (1992)—Prohibits discrimination in public accommodations and services.

Antiquities Act (1906)—Authorizes the scientific investigation of antiquities on Federal land and provides penalties for unauthorized removal of objects taken or collected without a permit.

Archaeological and Historic Preservation Act (1974)—Directs the preservation of historic and archaeological data in Federal construction projects.

Archaeological Resources Protection Act (1979), as amended—Protects materials of archaeological interest from unauthorized removal or destruction and requires Federal managers to develop plans and schedules to locate archaeological resources.

Architectural Barriers Act (1968)—Requires federally owned, leased, or funded buildings and facilities to be accessible to persons with disabilities.

Clean Water Act (1977)—Requires consultation with the U.S. Army Corps of Engineers (404 permits) for major wetland modifications.

Endangered Species Act (1973)—Requires all Federal agencies to carry out programs for the conservation of endangered and threatened species.

Executive Order 11988 (1977)—Requires Federal agencies to provide leadership and take action to reduce the risk of flood loss, minimize the impact of floods on human safety, and preserve the natural and beneficial values served by the floodplains.

Executive Order 12996, Management and General Public Use of the National Wildlife Refuge System (1996)—Defines the mission, purpose, and priority public uses of the National Wildlife Refuge System. It also presents four principles to guide management of the Refuge System.

Executive Order 13007, Indian Sacred Sites (1996)—Directs Federal land management agencies to accommodate access to and ceremonial uses of Indian sacred sites by Indian religious practitioners, avoid adversely affecting the physical integrity of such sacred sites, and where appropriate, maintain the confidentiality of sacred sites.

Federal Noxious Weed Act (1990)—Requires the use of integrated management systems to control or contain undesirable plant species and an interdisciplinary approach with the cooperation of other Federal and State agencies.

Federal Records Act (1950)—Requires the preservation of evidence of the government's organization, functions, policies, decisions, operations, and activities, as well as basic historical and other information.

Fish and Wildlife Coordination Act (1958)—Allows the U.S. Fish and Wildlife Service to enter into agreements with private landowners for wildlife management purposes.

Migratory Bird Conservation Act (1929)—Establishes procedures for acquisition by purchase, rental, or gifts

of areas approved by the Migratory Bird Conservation Commission.

Migratory Bird Hunting and Conservation Stamp Act (1934)—Authorizes the opening of part of a refuge to waterfowl hunting.

Migratory Bird Treaty Act (1918)—Designates the protection of migratory birds as a Federal responsibility; and enables the setting of seasons and other regulations, including the closing of areas, Federal or non-Federal, to the hunting of migratory birds.

National Environmental Policy Act (1969)—Requires all agencies, including the Service, to examine the environmental impacts of their actions, incorporate environmental information, and use public participation in the planning and implementation of all actions. Federal agencies must integrate this Act with other planning requirements, and prepare appropriate documents to facilitate better environmental decision making. [From the Code of Federal Regulations (CFR), 40 CFR 1500]

National Historic Preservation Act (1966), as amended—Establishes as policy that the Federal Government is to provide leadership in the preservation of the Nation's prehistoric and historical resources.

National Wildlife Refuge System Administration Act (1966)—Defines the National Wildlife Refuge System and authorizes the Secretary of the Interior to permit any use of a refuge, provided such use is compatible with the major purposes for which the refuge was established.

National Wildlife Refuge System Improvement Act of 1997—Sets the mission and administrative policy for all refuges in the National Wildlife Refuge System; mandates comprehensive conservation planning for all units of the Refuge System.

Native American Graves Protection and Repatriation Act (1990)—Requires Federal agencies and museums to inventory, determine ownership of, and repatriate cultural items under their control or possession.

Refuge Recreation Act (1962)—Allows the use of refuges for recreation when such uses are compatible with the refuge's primary purposes and when sufficient funds are available to manage the uses.

Rehabilitation Act (1973)—Requires programmatic accessibility in addition to physical accessibility for all facilities and programs funded by the Federal Government to ensure that any person can participate in any program.

Rivers and Harbors Act (1899)—Section 10 of this Act requires the authorization of U.S. Army Corps of Engineers prior to any work in, on, over, or under navigable waters of the United States.

Volunteer and Community Partnership Enhancement

Act (1998)—Encourages the use of volunteers to assist in the management of refuges within the Refuge System; facilitates partnerships between the Refuge System and non-Federal entities to promote public awareness of the resources of the Refuge System and public participation in the conservation of the resources; and encourages donations and other contributions.

Appendix B

Compliance with Migratory Bird Treaty Act and Guidance



IN REPLY REFER TO:

United States Department of the Interior

FISH AND WILDLIFE SERVICE Mountain-Prairie Region



MAILING ADDRESS:
P.O. Box 25486, DFC
Denver, Colorado 80225-0486

STREET LOCATION:
134 Union Boulevard
Lakewood, Colorado 80228-1807

SEP 23 2010

Memorandum

To: All Region 6 National Wildlife Refuge System Employees

From: Assistant Regional Director, National Wildlife Refuge System, Region 6 

Subject: Compliance with Migratory Bird Treaty Act and Guidance

As many of you are aware, Refuges met with Office of Law Enforcement (OLE) and the Migratory Bird Office (MB) to develop draft guidance to field stations on compliance with Migratory Bird Treaty Act (MBTA). U. S. Fish and Wildlife Service policy 720 FW 2 describes the Agency's responsibility to protect migratory birds. We are required to evaluate projects and management practices to avoid or minimize take of migratory birds with emphasis on Birds of Management Concern, the most recent list is attached. The other two attachments described below are designed to provide Project Leaders and Partners Biologists with guidance on compliance with MBTA.

The attachment titled "Conducting National Wildlife Refuge Non-Habitat Management Activities in Region 6" is designed to provide guidance to Project Leaders on non-habitat management activities that may result in the take of migratory birds. This would include construction and rehabilitation projects, such as wetland creation/restoration, dikes/dams, water control structures, buildings, roads, wells, power lines, water lines, septic systems, and other non-habitat management activities. If your project involves anything that is on or will be placed on your Real Property Inventory, then it fits under this guidance. If you are conducting an activity of any sort besides habitat management and it could result in take of migratory birds, then this guidance should be followed. This is also the same guidance provided to corporations and the private industry by Ecological Services, MB, and OLE.

The attachment titled "Conducting National Wildlife Refuge Habitat Management Activities in Region 6" is designed to provide guidance to Project Leaders on habitat management activities that may result in the take of migratory birds. The two areas focused on were mechanical treatment (e.g., haying, mowing, tree/shrub removal, and non-chemical invasive species suppression) and prescribed fire. Guidance on these activities is outlined in this document. Other habitat management activities, such as grazing and chemical treatment of invasive species, are not defined and best management practices should be implemented.

If you have questions on the guidance provided, please contact your zone supervisor.

Attachments

Appendix C

Preparers and Contributors

This document is the result of the extensive, collaborative, and enthusiastic efforts by the members of the Lake Andes National Wildlife Refuge Complex planning team below. Many others contributed insight and support.

<i>Team member</i>	<i>Position</i>	<i>Work unit</i>
Core planning team		
Michael J. Bryant	Project leader	Lake Andes National Wildlife Refuge Complex, South Dakota
Jack Freidel	Regional habitat manager	South Dakota Game, Fish and Parks
Bernardo Garza	Planning team leader	USFWS Regional Office, Denver, Colorado
Mark Heisinger	Lake Andes Wetland Management District manager	Lake Andes National Wildlife Refuge Complex, South Dakota
John Keeler	Wildlife biologist and chemist	Yankton Sioux Tribe
Cami Dixon	Zone biologist for North and South Dakota	USFWS
Mark Ely	Chief, GIS Division	USFWS Regional Office, Denver, Colorado
Andy Lindbloom	Regional wildlife manager	South Dakota Game, Fish and Parks
Edward Rodriguez	Wildlife biologist	Lake Andes National Wildlife Refuge Complex, South Dakota
Steve Spawn	Private lands biologist	Lake Andes National Wildlife Refuge Complex, South Dakota
Barry Williams	Archaeologist	USFWS Office, Bismarck, North Dakota
Additional planning team members		
Mike Artmann	Wildlife biologist, Planning Division	USFWS Regional Office, Denver, Colorado
Jeff Dvorak	Seasonal maintenance and biological technician	Lake Andes National Wildlife Refuge Complex, South Dakota
John Eldridge	Permanent maintenance worker	Lake Andes National Wildlife Refuge Complex, South Dakota
Gene Slaba	Former permanent maintenance worker	Lake Andes National Wildlife Refuge Complex, South Dakota
Contributors		
Richard Coleman	Former assistant regional director, National Wildlife Refuge System	USFWS Regional Office, Denver, Colorado
Megan Estep	Chief, Water Rights Division	USFWS Regional Office, Denver, Colorado
Sheri Fetherman	Chief, Division of Education and Visitor Services	USFWS Regional Office, Denver, Colorado
Mark J. Hogan	Private lands coordinator for Wyoming	USFWS, Casper, Wyoming
Matt Hogan	Assistant regional director, National Wildlife Refuge System	USFWS Regional Office, Denver, Colorado
Wayne King	Region 6 Division of Refuges biologist	USFWS Regional Office, Denver, Colorado
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Carl Millegan	Deputy Refuge Supervisor (North Dakota and South Dakota)	USFWS Regional Office, Denver, Colorado

Manuel Oliveira	Deputy Assistant Regional Director, Refuge System	USFWS Regional Office, Denver, Colorado
Bernie Petersen	Refuge Supervisor (North Dakota and South Dakota)	USFWS Regional Office, Denver, Colorado
Tyson Powell	Solicitor	U.S. Solicitor's Office, Denver, Colorado
Steve Shuck	Realty operations manager	USFWS Regional Office, Denver, Colorado
Cindy Souders	Outdoor recreation planner	USFWS Regional Office, Denver, Colorado
Meg Van Ness	Regional archaeologist	USFWS Regional Office, Denver, Colorado

Appendix D

Public Involvement

Public scoping was initiated for the Lake Andes National Wildlife Refuge Complex (Complex) comprehensive conservation planning process in a notice of intent published in May 2007 in the Federal Register. The notice announced the U.S. Fish and Wildlife Service's intent to prepare a comprehensive conservation plan and environmental assessment for the entire Complex (which includes the Lake Andes National Wildlife Refuge, Karl E. Mundt National Wildlife Refuge, and the Lake Andes Wetland Management District) and to obtain suggestions and information on the scope of issues to be considered in the planning process.

Three public meetings were held in southeastern South Dakota:

- Tuesday, November 28, 2006, at the Golden Pheasant in Plankinton, 5–8 p.m.
- Wednesday, November 29, 2006, at the Turner County Courthouse in Parker, 5–8 p.m.
- Thursday, November 30, 2006 at the Community Center in Lake Andes, 5–8 p.m.

A short presentation on the Complex and the planning process was given at each meeting. Numerous written, verbal, and emailed comments were received during the open comment period (which closed on January 15, 2007). Comments received identified biological, social, and economic concerns regarding the different aspects of management of the units of the Complex.

The mailing list for the comprehensive conservation plan and environmental assessment includes, but is not limited to, the organizations and individuals listed below.

D.1 Federal Officials

U.S. Senator John Thune, Washington, DC
Senator Thune's Area Director, Pierre, South Dakota
U.S. Senator Tim Johnson, Washington DC
Senator Johnson's Area Director, Pierre, South Dakota
U.S. Representative Stephanie Herseth Sandlin,
Washington DC
Representative Herseth Sandlin's Area Director,
Pierre, South Dakota

D.2 Federal Agencies

Bureau of Reclamation, Pierre, South Dakota
USDA—FSA, Clear Lake, South Dakota
USDA—FSA, Faulkton, South Dakota
USDA—FSA, Brookings, South Dakota
USDA—FSA and NRCS, McIntosh, South Dakota
USDA—FSA and NRCS, Pierre, South Dakota
USDA—FSA and NRCS, Timber Lake, South Dakota
USDA—FSA and NRCS, Mound City, South Dakota
USDA—FSA and NRCS, Selby, South Dakota
USDA—FSA and NRCS, Gettysburg, South Dakota
USDA—FSA and NRCS, Onida, South Dakota
USDA—FSA and NRCS, Chamberlain, South Dakota
USDA—FSA and NRCS, Wessington Springs, South Dakota
USDA—FSA and NRCS, Highmore, South Dakota
USDA—FSA and NRCS, Ipswich, South Dakota
USDA—FSA and NRCS, Leola, South Dakota
USDA—FSA and NRCS, Aberdeen, South Dakota
USDA—FSA and NRCS, Redfield, South Dakota
USDA—FSA and NRCS, Huron, South Dakota
USDA—FSA and NRCS, Miller, South Dakota
USDA—FSA and NRCS, DeSmet, South Dakota
USDA—FSA and NRCS, Madison, South Dakota
USDA—FSA and NRCS, Howard, South Dakota
USDA—FSA and NRCS, Woonsocket, South Dakota
USDA—NRCS, Mitchell, South Dakota
USDA—APHIS, Pierre, South Dakota
National Park Service, Omaha, Nebraska
USFWS—Ecological Services, Pierre, South Dakota
USFWS—National Wildlife Refuge System, Albuquerque, New Mexico; Anchorage, Alaska; Arlington, Virginia; Atlanta, Georgia; Fort Snelling, Minnesota; Hadley, Massachusetts; Portland, Oregon; Rawlins, Wyoming; Sacramento, California; Shepherdstown, West Virginia; Washington, DC
USGS—Fort Collins Science Center, Ft. Collins, Colorado

D.3 Tribal Officials

Omaha Tribal Council, Macy, Nebraska
Otoe-Missouria Tribe, Red Rock, Oklahoma
Pawnee Tribe, Pawnee, Oklahoma
Ponca Tribe of Nebraska, Niobrara, Nebraska

Ponca Tribe of Oklahoma, Ponca City, Oklahoma
Santee Sioux Tribal Council, Niobrara, Nebraska
Winnebago Tribal Council, Winnebago, Nebraska
Yankton Sioux Tribe, Marty, South Dakota

D.4 State Officials

Governor M. Michael Rounds, Pierre, South Dakota

D.5 State Agencies

South Dakota Game, Fish and Parks Department,
Pierre, South Dakota
SDSU Extension Service, Brookings, South Dakota

D.6 Local Government

County commissioners (33)
Resource conservation districts (8)
Weed board offices (19)

D.7 Organizations

American Bird Conservancy, Plains, Virginia
American Rivers, Washington, DC
Animal Protection Institute, Sacramento, California
Beyond Pesticides, Washington, DC
Defenders of Wildlife, Washington, DC
Duck Unlimited, Great Plains Office, Bismarck, North
Dakota
Fund for Animals, Silver Springs, Maryland

Izaak Walton League, Gaithersburg, Maryland
Murie Audubon Society, Casper, Wyoming
National Audubon Society, Fargo, North Dakota
National Audubon Society, Washington DC and New
York, New York
National Trappers Association, New Martinsville,
West Virginia
National Wildlife Federation, Reston, Virginia
National Wildlife Refuge Association, Washington, DC
National Wild Turkey Federation, Bismarck, North
Dakota
Sierra Club, San Francisco, California and Sheridan,
Wyoming
The Nature Conservancy, Minneapolis, Minnesota
The U.S. Humane Society, Washington, DC
The Wilderness Society, Washington, DC
Union Pacific Railroad, Omaha, Nebraska
Wildlife Management Institute, Fort Collins, Colo-
rado; Corvallis, Oregon; Washington, DC

D.8 Schools

South Dakota State University

D.9 Media

Newspaper outlets (29)
Radio outlets (4)

D.10 Individuals

Individuals (600+)

Appendix E

Proposed Staff

<i>Position</i>	<i>Full-time equivalent</i>
Current Complex staff	
Wildlife refuge manager	1
Wildlife refuge specialist (wetland management district)	1
Wildlife biologist	1
Wildlife biologist (Partners for Fish and Wildlife)	1
Administrative officer	1
Maintenance worker	1
Maintenance worker (career seasonal)	.7
Total	6.7
Minimum Complex staff to implement alternative A	
Wildlife refuge manager	1
Deputy wildlife refuge manager	1
Wildlife refuge specialist (wetland management district)	1
Wildlife biologist	1
Wildlife biologist (Partners for Fish and Wildlife)	1
Administrative officer	1
Maintenance worker	1
Maintenance worker	1
Total	8
Recommended Complex staff to implement alternative B	
Wildlife refuge manager	1
Deputy wildlife refuge manager	1
Wildlife refuge specialist (wetland management district)	1
Wildlife biologist	1
Wildlife biologist (Partners for Fish and Wildlife)	1
Outdoor recreation planner	1
Park ranger	1
Biological technician	1
Prescribed fire technician	1
Administrative officer	1
Maintenance worker	1
Maintenance worker	1
Total	12
Recommended Complex staff to implement alternative C	
Wildlife refuge manager	1
Deputy wildlife refuge manager	1
Wildlife refuge specialist (wetland management district)	1

Wildlife biologist	1
Wildlife biologist (Partners for Fish and Wildlife)	1
Outdoor recreation planner	1
Park ranger	1
Wildlife refuge specialist	1
Biological technician	1
Prescribed fire technician	1
Administrative officer	1
Maintenance worker	1
Maintenance worker	1
Maintenance worker	1
Total	14

Appendix F

South Dakota Upland Plant Associations

- Updated July 27, 2009.
- Record 1 of below types.
- Based on Daubenmire dominant canopy cover.
- These categories are designed for monitoring plant community composition of native sod, planted natives, and DNC.
- Revised from Grant et al. 2004b, Hegstad 1973.
- Document robust patches of native forbs >50% with category 25 (i.e., lead plant, goldenrod, etc.). Alternatively, category 75 (other weeds) can be used to document weed patches that typically dominate disturbed sites.
- Litter is not a category in itself, therefore assign litter to category it applies to (for example, Kentucky bluegrass litter = 31).
- In the event of an apparent equal mix of Kentucky bluegrass and smooth brome—consider as code 41.
- Prairie rose and leadplant are considered native forbs with respect to these categories.

F.1 Shrub and Tree Types

LOW SHRUB

(generally 1.5–4.5 feet tall, for example, western snowberry)

- 11 dense low shrub, other plants few or none
- 12 low shrub, remainder native grass and forb
- 13 low shrub, remainder Kentucky bluegrass
- 14 low shrub, remainder brome or quackgrass
- 19 low shrub, remainder crested

TALL SHRUB

(generally 4.5–15 feet tall)

- 15 tall shrub, native
- 16 tall shrub, exotic

TREES

- 17 native trees (for example, cottonwood, green ash, bur oak)
- 18 nonnative trees (for example, Japanese elm, Russian olive)

F.2 Native Grass–Forb Types^a

- 21 cool-season grasses and forbs: (A) green needle, (B) western wheatgrass, (C) porcupine grass
- 22 warm-season grasses and forbs: (A) big bluestem, (B) switch, (C) Indian, (D) little bluestem
- 23 meadow (sedges, baltic rush, dock, smartweed, cordgrass, reedgrass, horsetail, foxtail barley, etc.)
- 24 wetland; robust emergent vegetation or open water (cattail, river bulrush, bur-reed, Phragmites, manna grass)
- 25 forb

F.3 Introduced, Invasive, or Plants of Management Concern

- 31 Kentucky bluegrass dominant
- 41 smooth brome dominant
- 51 crested wheatgrass dominant
- 52 quackgrass
- 53 reed canarygrass
- 61 tall, intermediate, or pubescent wheatgrass
- 62 other nonnative grass—user defined (downy/Japanese brome, etc.)

F.4 Noxious and Other Weed Types

- 71 leafy spurge
- 72 Canada thistle
- 73 sow thistle
- 74 wormwoods
- 75 other weeds (kochia, ragweed, cocklebur, etc.)
- 76 other noxious weed (user-defined)

F.5 Other

- 81 tall introduced legume (sweet clover or alfalfa)
- 83 cactus
- 84 clubmoss/lichen
- 91 barren, unvegetated (bare soil, gopher mound)
- 92 other (rock, manure, hole, ant hill)

^a *Optional Species Modifier: Document dominant native grass species using the respective letter*

Appendix G

South Dakota Species

BIRDS¹

<i>Common name</i>	<i>Scientific name</i>
Loons	
Common loon	<i>Gavia immer</i>
Grebes	
Pied-billed grebe	<i>Podilymbus podiceps</i>
Horned grebe ²	<i>Podiceps auritus</i>
Red-necked grebe	<i>Podiceps grisegena</i>
Eared grebe	<i>Podiceps nigricollis</i>
Western grebe	<i>Aechmophorus occidentalis</i>
Pelicans	
American white pelican	<i>Pelecanus erythrorhynchos</i>
Cormorants	
Double-crested cormorant	<i>Phalacrocorax auritus</i>
Hérons and bitterns	
American bittern ²	<i>Botaurus lentiginosus</i>
Least bittern ²	<i>Ixobrychus exilis</i>
Great blue heron	<i>Ardea herodias</i>
Great egret	<i>Ardea alba</i>
Snowy egret	<i>Egretta thula</i>
Cattle egret	<i>Bubulcus ibis</i>
Green heron	<i>Butorides virescens</i>
Black-crowned night-heron	<i>Nycticorax nycticorax</i>
Ibises	
White-faced ibis	<i>Plegadis chihi</i>
Vultures	
Turkey vulture	<i>Cathartes aura</i>
Swans, geese, and ducks	
Greater white-fronted goose	<i>Anser albifrons</i>
Snow goose	<i>Chen caerulescens</i>
Ross' goose	<i>Chen rossii</i>
Canada goose	<i>Branta canadensis</i>
Tundra swan	<i>Cygnus columbianus</i>
Wood duck	<i>Aix sponsa</i>
Gadwall	<i>Anas strepera</i>
American wigeon	<i>Anas americana</i>
Mallard	<i>Anas platyrhynchos</i>
Blue-winged teal	<i>Anas discors</i>
Northern shoveler	<i>Anas clypeata</i>
Northern pintail	<i>Anas acuta</i>

<i>Common name</i>	<i>Scientific name</i>
Green-winged teal	<i>Anas crecca</i>
Canvasback	<i>Aythya valisineria</i>
Redhead	<i>Aythya americana</i>
Ring-necked duck	<i>Aythya collaris</i>
Greater scaup	<i>Aythya marila</i>
Lesser scaup	<i>Aythya affinis</i>
Bufflehead	<i>Bucephala albeola</i>
Common goldeneye	<i>Bucephala clangula</i>
Hooded merganser	<i>Lophodytes cucullatus</i>
Common merganser	<i>Mergus merganser</i>
Red-breasted merganser	<i>Mergus serrator</i>
Ruddy duck	<i>Oxyura jamaicensis</i>
Kites, eagles, and hawks	
Osprey	<i>Pandion haliaetus</i>
Bald eagle ²	<i>Haliaeetus leucocephalus</i>
Northern harrier	<i>Circus cyaneus</i>
Sharp-shinned hawk	<i>Accipiter striatus</i>
Cooper's hawk	<i>Accipiter cooperii</i>
Northern goshawk	<i>Accipiter gentilis</i>
Broad-winged hawk	<i>Buteo platypterus</i>
Swainson's hawk ²	<i>Buteo swainsoni</i>
Red-tailed hawk	<i>Buteo jamaicensis</i>
Ferruginous hawk	<i>Buteo regalis</i>
Rough-legged hawk	<i>Buteo lagopus</i>
Golden eagle	<i>Aquila chrysaetos</i>
Falcons	
American kestrel	<i>Falco sparverius</i>
Merlin	<i>Falco columbarius</i>
Peregrine falcon ²	<i>Falco peregrinus</i>
Prairie falcon	<i>Falco mexicanus</i>
Partridge, pheasant, grouse, turkey, and quail	
Gray partridge (introduced)	<i>Perdix perdix</i>
Ring-necked pheasant (introduced)	<i>Phasianus colchicus</i>
Sharp-tailed grouse	<i>Tympanuchus phasianellus</i>
Greater prairie-chicken	<i>Tympanuchus cupido</i>
Wild turkey	<i>Meleagris gallopavo</i>
Rails, gallinules, and coots	
Virginia rail	<i>Rallus limicola</i>
Sora	<i>Porzana carolina</i>
American coot	<i>Fulica americana</i>
Cranes	
Sandhill crane	<i>Grus canadensis</i>
Whooping crane	<i>Grus americana</i>
Plovers	
Black-bellied plover	<i>Pluvialis squatarola</i>
American golden-plover	<i>Pluvialis dominica</i>

<i>Common name</i>	<i>Scientific name</i>
Semipalmated plover	<i>Charadrius semipalmatus</i>
Piping plover	<i>Charadrius melodus</i>
Killdeer	<i>Charadrius vociferus</i>
Stilts and avocets	
American avocet	<i>Recurvirostra americana</i>
Sandpipers and phalaropes	
Greater yellowlegs	<i>Tringa melanoleuca</i>
Lesser yellowlegs	<i>Tringa flavipes</i>
Solitary sandpiper	<i>Tringa solitaria</i>
Willet	<i>Catoptrophorus semipalmatus</i>
Spotted sandpiper	<i>Actitis macularia</i>
Upland sandpiper ²	<i>Bartramia longicauda</i>
Long-billed curlew ²	<i>Numenius americanus</i>
Hudsonian godwit	<i>Limosa haemastica</i>
Marbled godwit ²	<i>Limosa fedoa</i>
Ruddy turnstone	<i>Arenaria interpres</i>
Sanderling	<i>Calidris alba</i>
Semipalmated sandpiper	<i>Calidris pusilla</i>
Least sandpiper	<i>Calidris minutilla</i>
White-rumped sandpiper	<i>Calidris fuscicollis</i>
Baird's sandpiper	<i>Calidris bairdii</i>
Pectoral sandpiper	<i>Calidris melanotos</i>
Dunlin	<i>Calidris alpina</i>
Stilt sandpiper	<i>Calidris himantopus</i>
Short-billed dowitcher	<i>Limnodromus griseus</i>
Long-billed dowitcher	<i>Limnodromus scolopaceus</i>
Wilson's snipe	<i>Gallinago delicata</i>
American woodcock	<i>Scolopax minor</i>
Wilson's phalarope	<i>Phalaropus tricolor</i>
Red-necked phalarope	<i>Phalaropus lobatus</i>
Jaegers, gulls, and terns	
Franklin's gull	<i>Larus pipixcan</i>
Bonaparte's gull	<i>Larus philadelphia</i>
Ring-billed gull	<i>Larus delawarensis</i>
Herring gull	<i>Larus argentatus</i>
Common tern	<i>Sterna hirundo</i>
Forster's tern	<i>Sterna forsteri</i>
Least tern	<i>Sterna antillarum</i>
Black tern ²	<i>Chlidonias niger</i>
Pigeons and doves	
Rock pigeon (introduced)	<i>Columba livia</i>
Eurasian collared-dove (introduced)	<i>Streptopelia decaocto</i>
Mourning dove	<i>Zenaida macroura</i>
Cuckoos and anis	
Black-billed cuckoo ²	<i>Coccyzus erythrophthalmus</i>
Yellow-billed cuckoo	<i>Coccyzus americanus</i>

<i>Common name</i>	<i>Scientific name</i>
Typical owls	
Eastern screech-owl	<i>Otus asio</i>
Great horned owl	<i>Bubo virginianus</i>
Snowy owl	<i>Nyctea scandiaca</i>
Burrowing owl	<i>Athene cunicularia</i>
Long-eared owl	<i>Asio otus</i>
Short-eared owl ²	<i>Asio flammeus</i>
Goatsuckers	
Common nighthawk	<i>Chordeiles minor</i>
Whip-poor-will	<i>Caprimulgus vociferus</i>
Swifts	
Chimney swift	<i>Chaetura pelagica</i>
Hummingbirds	
Ruby-throated hummingbird	<i>Archilochus colubris</i>
Kingfishers	
Belted kingfisher	<i>Ceryle alcyon</i>
Woodpeckers	
Red-headed woodpecker ²	<i>Melanerpes erythrocephalus</i>
Red-bellied woodpecker	<i>Melanerpes carolinus</i>
Yellow-bellied sapsucker	<i>Sphyrapicus varius</i>
Downy woodpecker	<i>Picoides pubescens</i>
Hairy woodpecker	<i>Picoides villosus</i>
Northern flicker	<i>Colaptes auratus</i>
Tyrant flycatchers	
Eastern wood-pewee	<i>Contopus virens</i>
Alder flycatcher	<i>Empidonax alnorum</i>
Willow flycatcher	<i>Empidonax traillii</i>
Least flycatcher	<i>Empidonax minimus</i>
Eastern phoebe	<i>Sayornis phoebe</i>
Great crested flycatcher	<i>Myiarchus crinitus</i>
Western kingbird	<i>Tyrannus verticalis</i>
Eastern kingbird	<i>Tyrannus tyrannus</i>
Shrikes	
Loggerhead shrike	<i>Lanius ludovicianus</i>
Northern shrike	<i>Lanius excubitor</i>
Vireos	
Yellow-throated vireo	<i>Vireo flavifrons</i>
Blue-headed vireo	<i>Vireo solitarius</i>
Warbling vireo	<i>Vireo gilvus</i>
Red-eyed vireo	<i>Vireo olivaceus</i>
Jays, magpies, and crows	
Blue jay	<i>Cyanocitta cristata</i>
Black-billed magpie	<i>Pica hudsonia</i>
American crow	<i>Corvus brachyrhynchos</i>
Larks	
Horned lark	<i>Eremophila alpestris</i>

<i>Common name</i>	<i>Scientific name</i>
Swallows	
Purple martin	<i>Progne subis</i>
Tree swallow	<i>Tachycineta bicolor</i>
Northern rough-winged swallow	<i>Stelgidopteryx serripennis</i>
Bank swallow	<i>Riparia riparia</i>
Cliff swallow	<i>Petrochelidon pyrrhonota</i>
Barn swallow	<i>Hirundo rustica</i>
Titmice	
Black-capped chickadee	<i>Poecile atricapilla</i>
Nuthatches	
Red-breasted nuthatch	<i>Sitta canadensis</i>
White-breasted nuthatch	<i>Sitta carolinensis</i>
Creepers	
Brown creeper	<i>Certhia americana</i>
Wrens	
House wren	<i>Troglodytes aedon</i>
Sedge wren	<i>Cistothorus platensis</i>
Marsh wren	<i>Cistothorus palustris</i>
Kinglets	
Golden-crowned kinglet	<i>Regulus satrapa</i>
Ruby-crowned kinglet	<i>Regulus calendula</i>
Thrushes	
Eastern bluebird	<i>Sialia sialis</i>
Gray-cheeked thrush	<i>Catharus minimus</i>
Swainson's thrush	<i>Catharus ustulatus</i>
Hermit thrush	<i>Catharus guttatus</i>
Wood thrush	<i>Hylocichla mustelina</i>
American robin	<i>Turdus migratorius</i>
Mockingbirds and thrashers	
Gray catbird	<i>Dumetella carolinensis</i>
Brown thrasher	<i>Toxostoma rufum</i>
Starlings	
European starling (introduced)	<i>Sturnus vulgaris</i>
Pipits	
American pipit	<i>Anthus rubescens</i>
Sprague's pipit ²	<i>Anthus spragueii</i>
Waxwings	
Bohemian waxwing	<i>Bombycilla garrulus</i>
Cedar waxwing	<i>Bombycilla cedrorum</i>

<i>Common name</i>	<i>Scientific name</i>
Wood-warblers	
Tennessee warbler	<i>Vermivora peregrina</i>
Orange-crowned warbler	<i>Vermivora celata</i>
Nashville warbler	<i>Vermivora ruficapilla</i>
Yellow warbler	<i>Dendroica petechia</i>
Chestnut-sided warbler	<i>Dendroica pensylvanica</i>
Magnolia warbler	<i>Dendroica magnolia</i>
Yellow-rumped warbler	<i>Dendroica coronata</i>
Black-throated green warbler	<i>Dendroica virens</i>
Blackburnian warbler	<i>Dendroica fusca</i>
Palm warbler	<i>Dendroica palmarum</i>
Bay-breasted warbler	<i>Dendroica castanea</i>
Blackpoll warbler	<i>Dendroica striata</i>
Black-and-white warbler	<i>Mniotilta varia</i>
American redstart	<i>Setophaga ruticilla</i>
Ovenbird	<i>Seiurus aurocapillus</i>
Northern waterthrush	<i>Seiurus noveboracensis</i>
Mourning warbler	<i>Oporornis philadelphia</i>
Common yellowthroat	<i>Geothlypis trichas</i>
Wilson's warbler	<i>Wilsonia pusilla</i>
Canada warbler	<i>Wilsonia canadensis</i>
Tanagers	
Scarlet tanager	<i>Piranga olivacea</i>
Towhees, sparrows, juncos, and longspurs	
Spotted towhee	<i>Pipilo maculatus</i>
Eastern towhee	<i>Pipilo erythrophthalmus</i>
American tree sparrow	<i>Spizella arborea</i>
Chipping sparrow	<i>Spizella passerina</i>
Clay-colored sparrow	<i>Spizella pallida</i>
Field sparrow	<i>Spizella pusilla</i>
Vesper sparrow	<i>Pooecetes gramineus</i>
Lark sparrow	<i>Chondestes grammacus</i>
Lark bunting	<i>Calamospiza melanocorys</i>
Savannah sparrow	<i>Passerculus sandwichensis</i>
Grasshopper sparrow ²	<i>Ammodramus savannarum</i>
Baird's sparrow ²	<i>Ammodramus bairdii</i>
Le conte's sparrow	<i>Ammodramus leconteii</i>
Fox sparrow	<i>Passerelia iliaca</i>
Song sparrow	<i>Melospiza melodia</i>
Lincoln's sparrow	<i>Melospiza lincolni</i>
Swamp sparrow	<i>Melospiza georgiana</i>
White-throated sparrow	<i>Zonotrichia albicollis</i>
Harris' sparrow	<i>Zonotrichia querula</i>
White-crowned sparrow	<i>Zonotrichia leucophrys</i>
Dark-eyed junco	<i>Junco hyemalis</i>
Lapland longspur	<i>Calcarius lapponicus</i>

<i>Common name</i>	<i>Scientific name</i>
Chestnut-collared longspur ²	<i>Calcarius ornatus</i>
Snow bunting	<i>Plectrophenax nivalis</i>
Cardinals, grosbeaks, and buntings	
Northern cardinal	<i>Cardinalis cardinalis</i>
Rose-breasted grosbeak	<i>Pheucticus ludovicianus</i>
Indigo bunting	<i>Passerina cyanea</i>
Dickcissel ²	<i>Spiza americana</i>
Meadowlarks, blackbirds, and orioles	
Bobolink	<i>Dolichonyx oryzivorus</i>
Red-winged blackbird	<i>Agelaius phoeniceus</i>
Western meadowlark	<i>Sturnella neglecta</i>
Yellow-headed blackbird	<i>Xanthocephalus xanthocephalus</i>
Rusty blackbird	<i>Euphagus carolinus</i>
Brewer's blackbird	<i>Euphagus cyanocephalus</i>
Common grackle	<i>Quiscalus quiscula</i>
Brown-headed cowbird	<i>Molothrus ater</i>
Orchard oriole	<i>Icterus spurius</i>
Baltimore oriole	<i>Icterus galbula</i>
Finches	
Purple finch	<i>Carpodacus purpureus</i>
House finch	<i>Carpodacus mexicanus</i>
Red crossbill	<i>Loxia curvirostra</i>
White-winged crossbill	<i>Loxia leucoptera</i>
Common redpoll	<i>Carduelis flammea</i>
Pine siskin	<i>Carduelis pinus</i>
American goldfinch	<i>Carduelis tristis</i>
Evening grosbeak	<i>Coccothraustes vespertinus</i>
Old world sparrows	
House sparrow (introduced)	<i>Passer domesticus</i>

¹ This list based on “the birds of south dakota” (tallman et al. 2002) And “checklist of north american birds” (aou 1998) and limited to species classified as common (>25 individuals a day could be seen by a single observer in appropriate habitat) and uncommon (<25 individuals a day could be seen by a single observer in appropriate habitat). Species classified as rare (average fewer than 6 observations state or region-wide per season), casual (out of normal range [3–10 records statewide in past 10 years]), or accidental (far from normal range [0–2 records statewide in past 10 years]) are not listed.

² Birds of conservation concern (breeding) in the prairie potholes bird conservation region (usfws 2008a).

MAMMALS¹

<i>Common name</i>	<i>Scientific name</i>
Opossums	
Virginia Opossum	<i>Didelphis virginiana</i>
Insectivores	
Shrews	
Cinereus or Masked Shrew	<i>Sorex cinereus</i>
Northern Short-tailed Shrew	<i>Blarina brevicauda</i>
Arctic Shrew	<i>Sorex arcticus</i>
Hayden's Shrew	<i>Sorex haydeni</i>
Dwarf Shrew	<i>Sorex nanus</i>
Pygmy Shrew	<i>Sorex hoyi</i>
Moles	
Eastern Mole	<i>Scalopus aquaticus</i>
Bats	
Vespertilionid Bats	
Little Brown Myotis	<i>Myotis lucifugus</i>
Northern Myotis	<i>Myotis septentrionalis</i>
Eastern Red Bat	<i>Lasiurus borealis</i>
Hoary Bat	<i>Lasiurus cinereus</i>
Silver-haired Bat	<i>Lasionycteris noctivagans</i>
Big Brown Bat	<i>Eptesicus fuscus</i>
Lagomorphs	
Hares and Rabbits	
Eastern Cottontail	<i>Sylvilagus floridanus</i>
White-tailed Jackrabbit	<i>Lepus townsendii</i>
Rodents	
Squirrels	
Woodchuck	<i>Marmota monax</i>
Franklin's Ground Squirrel	<i>Spermophilus franklinii</i>
Richardson's Ground Squirrel	<i>Spermophilus richardsonii</i>
Thirteen-lined Ground Squirrel	<i>Spermophilus tridecemlineatus</i>
Black-Tailed Prairie Dog	<i>Cynomys ludovicianus</i>
Eastern Gray Squirrel	<i>Sciurus carolinensis</i>
Eastern Fox Squirrel	<i>Sciurus niger</i>
Pocket Gophers	
Northern Pocket Gopher	<i>Thomomys talpoides</i>
Plains Pocket Gopher	<i>Geomys bursarius</i>
Heteromyids	
Plains Pocket Mouse	<i>Perognathus flavescens</i>
Olive-Backed Pocket Mouse	<i>Perognathus fasciatus</i>
Hispid Pocket Mouse	<i>Chaetodipus hispidus</i>
Beavers	
American Beaver	<i>Castor canadensis</i>
Mice, Rats, and Voles	
Western Harvest Mouse	<i>Reithrodontomys megalotis</i>
White-footed Mouse	<i>Peromyscus leucopus</i>

<i>Common name</i>	<i>Scientific name</i>
Deer Mouse	<i>Peromyscus maniculatus</i>
Northern Grasshopper Mouse	<i>Onychomys leucogaster</i>
Norway Rat	<i>Rattus norvegicus</i>
House Mouse	<i>Mus musculus</i>
Southern Red-backed Vole	<i>Clethrionomys gapperi</i>
Prairie Vole	<i>Microtus ochrogaster</i>
Meadow Vole	<i>Microtus pennsylvanicus</i>
Common Muskrat	<i>Ondatra zibethicus</i>
Jumping Mice	
Meadow Jumping Mouse	<i>Zapus hudsonius</i>
New World Porcupines	
Common Porcupine	<i>Erethizon dorsatum</i>
Carnivores	
Canids	
Coyote	<i>Canis latrans</i>
Red Fox	<i>Vulpes vulpes</i>
Common Gray Fox	<i>Urocyon cinereoargenteus</i>
Procyonids	
Common Raccoon	<i>Procyon lotor</i>
Mustelids	
Ermine	<i>Mustela erminea</i>
Long-tailed Weasel	<i>Mustela frenata</i>
Least Weasel	<i>Mustela nivalis</i>
American Mink	<i>Mustela vison</i>
American Badger	<i>Taxidea taxus</i>
Mephitids	
Eastern Spotted Skunk	<i>Spilogale putorius</i>
Striped Skunk	<i>Mephitis mephitis</i>
Cats	
Bobcat	<i>Felis rufus</i>
Ungulates	
Cervids	
Mule or Black-tailed Deer	<i>Odocoileus hemionus</i>
White-tailed Deer	<i>Odocoileus virginianus</i>
Antelope Caprids	
Pronghorn	<i>Antilocapra americana</i>
Bovids	
Domestic cattle	<i>Bos taurus</i>

¹ This list is based on the reference “Wild Mammals of South Dakota” (Higgins et al. 2000) along with staff observations

AMPHIBIANS AND REPTILES¹

<i>Common name</i>	<i>Scientific name</i>
Salamanders	
Tiger Salamander	<i>Ambystoma tigrinum</i>
Frogs and toads	
Plains Spadefoot	<i>Spea bombifrons</i>
Boreal Chorus Frog	<i>Pseudacris maculata</i>
Northern Leopard Frog	<i>Rana pipiens</i>
Woodhouse's Toad	<i>Bufo woodhousei</i>
American Toad	<i>Bufo americanus</i>
Canadian Toad	<i>Bufo hemiophrys</i>
Great Plains Toad	<i>Bufo cognatus</i>
Turtles	
Western Painted Turtle	<i>Chrysemys picta bellii</i>
Snapping Turtle	<i>Chelydra serpentina</i>
Spiny Soft Shelled Turtle	<i>Trionyx spiniferus</i>
Skinks	
Prairie Skink	<i>Eumeces septentrionalis</i>
Snakes	
Racer	<i>Coluber constrictor</i>
Gophersnake	<i>Pituophis catenifer</i>
Eastern Garter Snake	<i>Thamnophis sirtalis sirtalis</i>
Plains Garter Snake	<i>Thamnophis radix</i>
Smooth Green Snake	<i>Ophedrys vernalis</i>
Western Hognose Snake	<i>Heterodon nasicus</i>
Bullsnake	<i>Pituophis melanoleucus</i>
Redbelly Snake	<i>Storeria occipitomaculata</i>
Common Garter Snake	<i>Thamnophis sirtalis</i>
Prairie Rattlesnake	<i>Crotalus viridis</i>

¹ This list is based on the reference "Field Guide to Amphibians and Reptiles of South Dakota" (Kiesow 2006) along with staff observations.

FISH¹

<i>Common name</i>	<i>Scientific name</i>
Logperch	<i>Percina caprodes</i>
Flathead Catfish	<i>Pylodictis olivaris</i>
Lake Trout	<i>Salvelinus namaycush</i>
Black Bullhead	<i>Ameiurus melas</i>
Yellow Bullhead	<i>Ameiurus natalis</i>
Stonecat	<i>Noturus flavus</i>
Channel Catfish	<i>Ictalurus punctatus</i>
Common Carp	<i>Cyprinus carpio</i>
White Sucker	<i>Catostomus commersoni</i>
Bigmouth Buffalo	<i>Ictiobus cyprinellus</i>

<i>Common name</i>	<i>Scientific name</i>
River Carpsucker	<i>Carpoides carpio</i>
Shorthead Redhorse	<i>Moxostoma macrolepidotum</i>
Freshwater Drum	<i>Aplodinotus grunniens</i>
Fathead Minnow	<i>Pimephales promelas</i>
Emerald Shiner	<i>Notropis atherinoides</i>
Common Shiner	<i>Luxilus cornutus</i>
Golden Shiner	<i>Notemigonus crysoleucas</i>
Creek Chub	<i>Semotilus atromaculatus</i>
Brook Stickleback	<i>Culaea inconstans</i>
Logperch	<i>Percina caprodes</i>
Johnny Darter	<i>Etheostoma nigrum</i>
White Bass	<i>Morone chrysops</i>
Rock Bass	<i>Ambloplites rupestris</i>
Smallmouth Bass	<i>Micropterus dolomieu</i>
Largemouth Bass	<i>Micropterus salmoides</i>
Bluegill	<i>Lepomis macrochirus</i>
Pumpkinseed	<i>Lepomis gibbosus</i>
Green Sunfish	<i>Lepomis cyanellus</i>
Orange-spotted Sunfish	<i>Lepomis humilis</i>
Black Crappie	<i>Pomoxis nigromaculatus</i>
White Crappie	<i>Pomoxis annularis</i>
Yellow Perch	<i>Perca flavescens</i>
Walleye	<i>Stizostedion vitreum</i>
Saugeye	<i>Stizostedion</i> spp.
Northern Pike	<i>Esox lucius</i>
Shortnose Gar	<i>Lepisosteus platostomus</i>
Gizzard Shad	<i>Dorosoma cepedianum</i>
Mooneyes	<i>Hiodon alosoides</i>

¹ This list is based on the reference “Guide to the Common Fishes of South Dakota” (Neumann and Willis 1994) along with staff observations.

BUTTERFLIES¹

<i>Common name</i>	<i>Scientific name</i>
Parnassians and swallowtails	
Giant Swallowtail	<i>Papilio cresphontes</i>
Eastern Tiger Swallowtail	<i>Papilio glaucus</i>
Black Swallowtail	<i>Papilio polyxenes asterius</i>
Whites and sulphurs	
Checkered White	<i>Pontia protodice</i>
Western White	<i>Pontia occidentalis</i>
Cabbage White	<i>Pieris rapae</i>
Olympia Marble	<i>Euchloe olympia</i>
Clouded Sulphur	<i>Colias philodice</i>
Orange Sulphur	<i>Colias eurytheme</i>
Dog Face	<i>Zerene cesonia</i>
Little Yellow	<i>Eurema lisa</i>
Dainty Sulphur	<i>Nathalis iole</i>
Harvesters, coppers, hairstreaks, and blues	
Gray Copper	<i>Lycaena dione</i>
Bronze Copper	<i>Lycaena hylus</i>
Purplish Copper	<i>Lycaena helloides</i>
Coral Hairstreak	<i>Satyrium titus</i>
Acadian Hairstreak	<i>Satyrium acadicum</i>
Striped Hairstreak	<i>Satyrium liparops aliparops</i>
Juniper Hairstreak	<i>Callophrys gryneus siva</i>
Gray Hairstreak	<i>Strymon melinus franki</i>
Marine Blue	<i>Leptotes marina</i>
Reakirt's Blue	<i>Hemiargus isola</i>
Eastern Tailed-Blue	<i>Everes comyntas</i>
Summer Azure	<i>Celastrina neglecta</i>
Silvery Blue	<i>Glaucopsyche lygdamus oro</i>
Melissa Blue	<i>Lycaeides melissa</i>
Skippers	
Silver-spotted Skipper	<i>Epargyreus clarus</i>
Common Checkered Skipper	<i>Pyrgus communis</i>
Common Sootywing	<i>Pholisora catullus</i>
Least Skipper	<i>Ancyloxypha numitor</i>
Poweshiek Skipperling	<i>Oarisma poweshiek</i>
Uncas Skipper	<i>Hesperia uncas</i>
Ottoe Skipper	<i>Hesperia ottoe</i>
Leonard's Skipper	<i>Herperia leonardus pawnee</i>
Dakota Skipper	<i>Hesperia dacotae</i>
Sachem	<i>Atalopedes campestris</i>
Peck's Skipper	<i>Polites peckius</i>
Tawny-edged Skipper	<i>Polites themistocles</i>
Crossline Skipper	<i>Polites origenes rhena</i>
Long Dash	<i>Polites mystic dacotah</i>

<i>Common name</i>	<i>Scientific name</i>
Arogos Skipper	<i>Atrytone arogos iowa</i>
Delaware Skipper	<i>Anatrytone logan lagus</i>
Hobomok Skipper	<i>Poanes hobomok</i>
Kiowa Skipper	<i>Euphyes vestries kiowah</i>
Common Roadside Skipper	<i>Amblyscirtes vialis</i>
Brushfoots	
American Snout	<i>Libytheana carinenta bachmanii</i>
Variiegated Fritillary	<i>Euptoieta claudia</i>
Great Spangled Fritillary	<i>Speyeria cybele</i>
Manitoba Fritillary	<i>Speyeria aphrodite manitoba</i>
Regal Fritillary	<i>Speyeria idalia</i>
Edwards' Fritillary	<i>Speyeria edwardsii</i>
Callippe Fritillary	<i>Speyeria callippe calgariana</i>
Myrina Fritillary	<i>Boloria selene myrina</i>
Meadow Fritillary	<i>Boloria bellona</i>
Gorgone Checkerspot	<i>Chlosyne gorgone carlota</i>
Silvery Checkerspot	<i>Chlosyne nycteis</i>
Pearl Crescent	<i>Phyciodes tharos</i>
Northern Crescent	<i>Phyciodes cocyta</i>
Question Mark	<i>Polygonia interrogationis</i>
Eastern Comma	<i>Polygonia comma</i>
Gray Comma	<i>Polygonia progne</i>
Mourning Cloak	<i>Nymphalis antiopa</i>
Milbert's Tortoiseshell	<i>Nymphalis milberti</i>
Red Admiral	<i>Vanessa atalanta rubria</i>
American Lady	<i>Vanessa virginiensis</i>
Painted Lady	<i>Vanessa cardui</i>
Common Buckeye	<i>Junonia coenia</i>
White Admiral	<i>Limenitis arthemis arthemis</i>
Red-spotted Purple	<i>Limenitis arthemis astyanax</i>
Viceroy	<i>Limenitis archippus</i>
Mountain Emperor	<i>Asterocampa celtis antonia</i>
Tawny Emperor	<i>Asterocampa clyton</i>
Northern Pearly-Eye	<i>Enodia anthedon</i>
Eyed Brown	<i>Satyrodes Eurydice</i>
Little Wood-Satyr	<i>Megisto cymela</i>
Prairie Ringlet	<i>Coenonympha tullia benjamini</i>
Common Wood-Nymph	<i>Cercyonis pegala nephele</i>
Monarch	<i>Danaus plexippus</i>
Uhler's Arctic	<i>Oeneis uhleri varuna</i>

¹ This list is based on the reference "Field Guide to Butterflies of South Dakota" (Marrone 2002) along with staff observations.

PLANTS¹

<i>Common name</i>	<i>Scientific name</i>
Absinth wormwood	<i>Artemisia absinthium</i>
Alfalfa	<i>Medicago</i> spp.
American elm	<i>Ulmus americana</i>
American Sloughgrass	<i>Beckmannia syzigachne</i>
Annual sunflower	<i>Helianthus annus</i>
Baltic rush	<i>Juncus balticus</i>
Barley	<i>Hordeum</i> spp.
Barnyardgrass	<i>Echinochloa muricata</i>
Big bluestem	<i>Andropogon gerardii</i>
Blanket flower	<i>Gaillardia aristata</i>
Bracted spiderwort	<i>Tradescantia bracteata</i>
Breadroot scurfpea	<i>Pedimelum esculentum</i>
Buffalo grass	<i>Buchloe dactyloides</i>
Bur oak	<i>Quercus macrocarpa</i>
Canada goldenrod	<i>Solidago canadensis</i>
Canada thistle	<i>Cirsium arvense</i>
Canada wildrye	<i>Elymus canadensis</i>
Cattail	<i>Typha</i> spp.
Cocklebur	<i>Xanthium strumarium</i>
Common dandelion	<i>Taraxacum officinale</i>
Common reed	<i>Phragmites australis</i>
Corn	<i>Zea mays</i>
Crested Wheatgrass	<i>Agropyron cristatum</i>
Cudweed sagewort	<i>Artemisia ludoviciana</i>
Curlycup gumweed	<i>Grindelia squarrosa</i>
Daisy fleabane	<i>Erigeron strigosus</i>
Downy brome	<i>Bromus tectorum</i>
False boneset	<i>Kuhnia eupatorioides</i>
Fescue sedge	<i>Carex brevior</i>
Field bindweed	<i>Convolvulus arvensis</i>
Field pussytoes	<i>Antennaria neglecta</i>
Foxtail barley	<i>Hordeum jubatum</i>
Goat's beard	<i>Tragopogon dubius</i>
Green ash	<i>Fraxinus pennsylvanica</i>
Green foxtail	<i>Setaria viridis</i>
Green muhly	<i>Muhlenbergia racemosa</i>
Green needlegrass	<i>Nassella viridula</i>
Green sagewort	<i>Artemisia campestris</i>
Hardstem bulrush	<i>Schoenoplectus acutus</i>
Heath aster	<i>Aster ericoides</i>
Indian breadroot	<i>Psoralea esculenta</i>
Indiangrass	<i>Sorghastrum</i> spp.
Intermediate wheatgrass	<i>Agropyron intermedium</i>
Japanese brome	<i>Bromus japonicus</i>

<i>Common name</i>	<i>Scientific name</i>
Junegrass	<i>Koeleria macrantha</i>
Kentucky bluegrass	<i>Poa pratensis</i>
Kochia	<i>Kochia scoparia</i>
Leadplant	<i>Amorpha canescens</i>
Leafy spurge	<i>Euphorbia esula</i>
Little bluestem	<i>Schizachyrium</i> spp.
Maximilian sunflower	<i>Helianthus maximilian</i>
Needle and thread	<i>Hesperostipa comata</i>
Pink wild onion	<i>Allium stellatum</i>
Plains cottonwood	<i>Populus deltoides</i>
Plains muhly	<i>Muhlenbergia cuspidate</i>
Porcupine grass	<i>Stipa spartea</i>
Prairie chickweed	<i>Cerastium arvense</i>
Prairie coneflower	<i>Ratibida columnifera</i>
Prairie cordgrass	<i>Spartina pectinata</i>
Prairie dropseed	<i>Sporobolus heterolepis</i>
Prairie junegrass	<i>Koeleria pyramidata</i>
Prairie wild rose	<i>Rosa arkansana</i>
Purple loosestrife	<i>Lythrum salicaria</i>
Purple meadowrue	<i>Thalictrum dasycarpum</i>
Purple prairie clover	<i>Dalea purpurea</i>
Quackgrass	<i>Elymus repens</i>
Redtop	<i>Agrostis stolonifera</i>
Reed canarygrass	<i>Phalaris arundinacea</i>
Rush	<i>Juncus</i> spp.
Russian olive	<i>Elaeagnus angustifolia</i>
Sandbur	<i>Cenchrus longispinus</i>
Sand dropseed	<i>Sporobolus cryptandrus</i>
Scarlet globemallow	<i>Sphaeralcea coccinea</i>
Sedge	<i>Carex</i> spp.
Sideoats grama	<i>Bouteloua curtipendula</i>
Silverleaf scurfpea	<i>Pedimelum argophyllum</i>
Slender wheatgrass	<i>Elymus trachycaulus</i>
Smooth brome	<i>Bromus inermis</i>
Stiff goldenrod	<i>Solidago rigida</i>
Stiff sunflower	<i>Helianthus pauciflorus</i>
Soybean	<i>Glycine</i> spp.
Spotted knapweed	<i>Centaurea biebersteinii</i>
Spring wheat	<i>Triticum</i> spp.
Sweetclover	<i>Melilotus officinalis</i>
Switchgrass	<i>Panicum virgatum</i>
Timothy	<i>Phleum pretense</i>
Torch flower	<i>Geum triflorum</i>
Water hemlock	<i>Cicuta maculata</i>
Western ragweed	<i>Ambrosia psilostachya</i>

<i>Common name</i>	<i>Scientific name</i>
Western snowberry	<i>Symphoricarpos occidentalis</i>
Western wheatgrass	<i>Agropyron smithii</i>
White beardtongue	<i>Penstemon albidus</i>
White prairie clover	<i>Dalea candida</i>
Willow	<i>Salix</i> spp.
Witchgrass	<i>Panicum capillare</i>
Wormwood sage	<i>Artemisia absinthium</i>
Yellow foxtail	<i>Setaria glauca</i>

¹ *This list is based on the reference Grassland Plants of South Dakota and the Northern Great Plains (Johnson and Larson 2007) and Selected North Dakota and Minnesota Range Plants (Sedivec and Barker) along with staff observations.*

Appendix H

Compatibility Determinations

H.1 Compatibility Determination for Wildlife Observation and Wildlife Photography

USES

Wildlife observation and wildlife photography

UNIT NAMES

Lake Andes National Wildlife Refuge, Karl E. Mundt National Wildlife Refuge, Lake Andes Wetland Management District

COUNTIES

Aurora, Bon Homme, Brule, Charles Mix, Clay, Davison, Douglas, Gregory, Hanson, Hutchison, Lincoln, Turner, Union, and Yankton Counties, South Dakota

ESTABLISHING AND ACQUISITION AUTHORITIES

Executive Order 7292 (Lake Andes National Wildlife Refuge, 1936)
Migratory Bird Conservation Act
Executive Order 5782
Endangered Species Act

REFUGE COMPLEX PURPOSES

The Lake Andes National Wildlife Refuge was created to protect habitat important to migratory birds.

The Karl E. Mundt National Wildlife Refuge was created to protect habitat important to bald eagles and other endangered species.

The Lake Andes Wetland Management District was created to administer the Small Wetlands Acquisition Program to save wetlands from various threats—particularly drainage. The main authorities in establishment of the program are briefly discussed below:

- Migratory Bird Hunting and Conservation Stamp Act (16 [United States Code] U.S.C. 718d[c])—“as waterfowl production areas subject to all provisions of the Migratory Bird Conservation Act ... except the inviolate sanctuary provisions.” The Duck Stamp Act provides for the conservation, protection, and propagation of native species of fish and wildlife, including migratory birds that are threatened with extinction.

- Migratory Bird Conservation Act (16 U.S.C. 715d[2])—“for any other management purposes, for migratory birds.” This act addresses the obligations of the United States under the Migratory Bird Treaty Act through the following mechanisms:

- lessening the dangers threatening migratory gamebirds from drainage and other causes
- the acquisition of areas of land and water to furnish in perpetuity reservations for the adequate protection of such birds
- authorizing appropriations for the establishment of such areas, their maintenance and improvement, and for other purposes

The purpose of the district is “to assure the long-term viability of the breeding waterfowl population and production through the acquisition and management of waterfowl production areas, while considering the needs of other migratory birds, threatened and endangered species, and other wildlife” (USFWS 2006). This purpose statement was developed for all Region 6 wetland management districts.

NATIONAL WILDLIFE REFUGE SYSTEM MISSION

The mission of the 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 USES

These uses would provide opportunities that support wildlife-dependent recreation. Wildlife observation and wildlife photography would be allowed year-round on Lake Andes National Wildlife Refuge Complex (Complex) lands. Rules, restrictions, and other information would be made available to the public through publication of tear sheets and brochures and posting information on Complex kiosks. Foot trails and photography blinds would be provided for visitors. Wildlife observation and wildlife photography are two of the six wildlife-dependent, priority public uses specified in the National Wildlife Refuge System Improvement Act of 1997 (Improvement Act). These uses and their supporting access-related uses can be allowed without interfering with the migratory bird resource.

AVAILABILITY OF RESOURCES

Currently, the programs for wildlife observation and wildlife photography are administered using available resources. Implementation of new programs, activities, and facilities outlined in the document, “Draft Comprehensive Conservation Plan and Environmental Assessment: Lake Andes National Wildlife Refuge Complex,” is tied to funding requests in the form of Refuge Operating Needs System and Service Asset Maintenance Management System projects.

ANTICIPATED IMPACTS OF THE USES

Short-Term Impacts

There may exist temporary disturbance to wildlife near the activities. Direct, short-term impacts may include minor damage from traffic to roads and trails when wet and muddy, minor damage to vegetation, littering, increased maintenance activity, and potential conflicts with other visitors. These activities would have only minor impacts on wildlife and would not detract from the primary purposes of the Complex.

Long-Term Impacts

None

Cumulative Impacts

There would be no direct or indirect cumulative impacts anticipated with these uses.

PUBLIC REVIEW AND COMMENT

This compatibility determination was prepared concurrently with the draft comprehensive conservation plan (CCP) and environmental assessment (EA) for the Complex. Public review and comment will be achieved concurrently with the public review and comment period for the draft CCP and EA.

DETERMINATION

Wildlife observation and wildlife photography, along with their supporting uses, are compatible uses at Lake Andes National Wildlife Refuge Complex.

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY

Stipulations regarding the public use program would be made available in published brochures. Dates, closed areas, and other information would be specified. Vehicles would be restricted to designated roads and trails, and vehicle use would be monitored for wildlife disturbance and law enforcement violations. Complex staff would also monitor use, regulate access, and maintain necessary facilities to prevent habitat degradation and minimize wildlife disturbance.

JUSTIFICATION

Based on the anticipated biological impacts above and in the EA, wildlife observation and wildlife photography

on the Complex would not interfere with the habitat goals and objectives or purposes for which it was established. Wildlife observation and wildlife photography are priority wildlife-dependent public uses acknowledged in the Improvement Act. These uses promote an appreciation for the natural resources found on the Complex. Increased public stewardship will support and complement the Service’s actions in achieving the purposes of the Complex and the mission of the Refuge System.

SUBMITTED

Michael J. Bryant Date
Project Leader, Lake Andes National Wildlife Refuge Complex
USFWS, Region 6

REVIEW

Bernie Peterson Date
Refuge Supervisor, North and South Dakota
USFWS, Region 6

APPROVAL

Matt Hogan Date
Assistant Regional Director, Refuges
National Wildlife Refuge System
USFWS, Region 6

MANDATORY 15-YEAR REEVALUATION DATE: 2026

H.2 Compatibility Determination for Glyphosate-Tolerant Soybeans and Corn for Habitat Restoration and Management on National Wildlife Refuge System (System) Owned or Managed Lands in Region 6

USE

Use of glyphosate-tolerant soybeans and corn for habitat restoration and management on National Wildlife Refuge System (System) owned or managed lands in Region 6.

REFUGE NAME

- Arrowwood Complex
- Audubon Complex
- Devils Lake Complex
- Flint Hills National Wildlife Refuge
- Huron Wetland Management District
- Kirwin National Wildlife Refuge
- Kulm Wetland Management District
- Lake Andes Complex
- Long Lake Complex
- Madison Wetland Management District
- Marais des Cygnes National Wildlife Refuge
- Quivira National Wildlife Refuge
- Rainwater Basin Wetland Management District
- Souris River Basin Complex
- Sand Lake Complex
- Tewaukon Complex
- Waubay Complex

COUNTIES

All counties within national wildlife refuges and wetland management districts listed above in Region 6.

ESTABLISHING AND ACQUISITION AUTHORITIES

System lands are managed consistent with a number of federal statutes, regulations, policies, and other guidance. The National Wildlife Refuge System Administration Act of 1966, as amended (16 United States

Code [U.S.C.] 668dd–668ee) (Administration Act) is the core statute guiding management of the System.

The National Wildlife Refuge System Improvement Act of 1997 (Public Law [P.L.] 105-57) made important amendments to the Administration Act, one of which was the mandate that a comprehensive conservation plan be completed for every unit of the System. Among other things, comprehensive conservation planning has required field stations to assess their current farming program and establish objectives for the future.

The Migratory Bird Hunting Stamp Act of March 16, 1934, as amended by section 3 of the Act of August 1, 1958 (72 Stat. 486, 16 U.S.C. sec. 716 d[c]), authorized the Secretary of Interior to acquire small wetland or pothole areas suitable as Waterfowl Production Areas.

Additional Authorities include the following: Consolidated Farm and Rural Development Act, Migratory Bird Conservation Act, North American Wetlands Conservation Act, and the Emergency Wetlands Resources Act.

REFUGE PURPOSES

- As “a refuge and breeding ground for migratory birds and other wildlife, for use as an inviolate sanctuary, or for any other management purpose for migratory birds.” *Migratory Bird Conservation Act*
- As “Waterfowl Production Areas” subject to “[...] all of the provisions of such Act [*Migratory Bird Conservation Act*] [...] except the inviolate sanctuary provisions.” 16 U.S.C. 718(c) *Migratory Bird Hunting and Conservation Stamp*
- For “any other management purpose, for migratory birds.” 16 U.S.C. sec. 715d *Migratory Bird Conservation Act*
- For “conservation purposes [...]” 7 U.S.C. sec. 2002 *Consolidated Farm and Rural Development Act*

Establishing Authorities and Refuge Purposes for individual Units may be obtained online at www.fws.gov/refuges/policiesandbudget/purposes/Purposes_Search.cfm.

NATIONAL WILDLIFE REFUGE SYSTEM MISSION

The mission of the 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

What is the use? Is the use a wildlife-dependent public use? The use is as follows: use of glyphosate-tolerant corn and soybeans for habitat restoration and

management purposes on lands owned in fee title or managed through agreement by the National Wildlife Refuge System in Region 6. The primary use will be to prepare a seedbed on previously or currently cropped sites for prairie reconstruction purposes. An additional use would include incorporation into a station's integrated pest management program for the control of invasive and noxious plant species. An example would be use on System-managed lands behind flood control dams where prairie restoration would not be warranted due to the likelihood of future flooding.

The use is not a wildlife-dependent public use.

Where would the use be conducted? The use would be conducted on lands owned in fee title or managed through agreement by the System in Region 6, in Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming, that are currently farmed or have previously been farmed and contain soils and receive average precipitation to support growth of agricultural soybeans and corn.

When would the use be conducted? Use would be ongoing. The use of glyphosate-tolerant soybeans and corn would be allowed as part of an integrated pest management program used to prepare a seedbed for habitat restoration and management and/or to control noxious and invasive vegetation.

How would the use be conducted? Use would be conducted by cooperative farmers through a cooperative farming agreement or by SUP.

Why is this use being proposed? Refuge managers' experience combined with published literature indicates that use of glyphosate-tolerant soybeans and corn—which allows for the application of an herbicide containing the active ingredient glyphosate during the growing season—is very effective at killing invasive cool season grasses and other noxious and invasive species. This results in a weed-free seedbed used for habitat restoration purposes, which increases the possibility of successful habitat reconstruction efforts on System-managed and -owned lands.

AVAILABILITY OF RESOURCES

Resources involved in the administration and management of the use:

- No additional management or administrative costs will be associated with this activity.
- Special equipment, facilities, or improvements necessary to support the use: none
- Maintenance costs: none
- Monitoring costs: none
- Offsetting revenues: none

ANTICIPATED IMPACTS OF THE USE

Short-Term Impacts. The use of glyphosate-tolerant soybeans and corn will increase the likelihood that conservation tillage can be successfully conducted, reducing soil erosion.

Long-Term Impacts. The effective reconstruction of degraded and weed-infested habitats on System lands to native mixed-grass and tallgrass prairie which can be managed through the historical ecological processes of prescribed fire and prescribed grazing, will cumulatively reduce needed expenditures of labor and funds for weed control efforts on System lands in Region 6 over the long term.

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY

1. Refuge managers will comply with all existing and current policies regarding the use of genetically modified crops (glyphosate-tolerant soybeans and corn).
2. Activity will occur only on currently farmed or previously farmed System-owned or -managed lands.

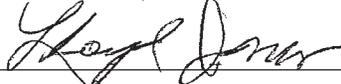
PUBLIC REVIEW AND COMMENT

The period of public review and comment was held from February 2, 2011 through March 4, 2011. A total of eleven written comments were received. Responses to substantive comments can be found in appendix F.

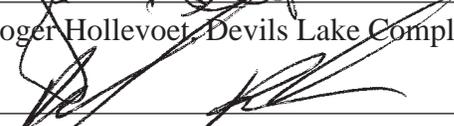
Why was this level of public review and comment selected? It is appropriate to provide opportunity to comment on this compatibility determination at the same time as the draft environmental assessment. The proposed activity has a national as well as local level of interest, and it was felt that a full month with wide distribution should be given to review.

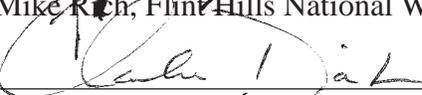
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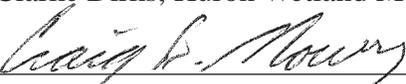
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 Kim Hanson, Arrowwood Complex (Signature) (Date)

 3/28/11
 Lloyd Jones, Audubon Complex (Signature) (Date)

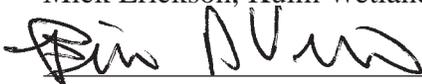
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 Roger Hollevoet, Devils Lake Complex (Signature) (Date)

 3/24/11
 Mike Rich, Flint Hills National Wildlife Refuge (Signature) (Date)

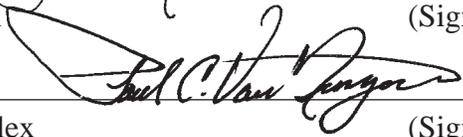
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 Clarke Dirks, Huron Wetland Management District (Signature) (Date)

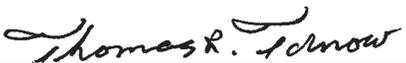
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 Craig Mowry, Kirwin National Wildlife Refuge (Signature) (Date)

 3/29/2011
 Mick Erickson, Kulm Wetland Management District (Signature) (Date)

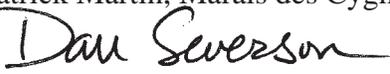
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 Brian DeVries, Lacreek National Wildlife Refuge (Signature) (Date)

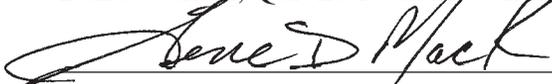
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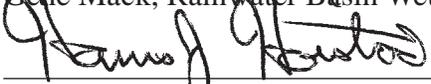
 3/25/2011
 Paul VanNingen, Long Lake Complex (Signature) (Date)

 3-25-11
 Tom Turnow, Madison Wetland Management District (Signature) (Date)

 3/28/2011
 Patrick Martin, Marais des Cygnes National Wildlife Refuge (Signature) (Date)

 4/6/2011
 Dan Severson, Quivira National Wildlife Refuge (Signature) (Date)

 3-29-11
 Gene Mack, Rainwater Basin Wetland Management District (Signature) (Date)

 3-28-11
 Harris Hoistad, Sand Lake Complex (Signature) (Date)

Kelly M. Hogan 3/25/11
Kelly Hogan, Souris River Basin Complex (Signature) (Date)

Rob Bundy 3/25/11
Rob Bundy, Tewaukon Complex (Signature) (Date)

Larry D Martin 29 March 2
Larry Martin, Waubay Complex (Signature) (Date)

Review: Regional Compatibility Coordinator Lloyd Jones 3/22/11
Lloyd Jones (Date)

Review: Zone Supervisor J. Paul Cornes 4-18-11
Paul Cornes (Date)

Review: Zone Supervisor Barbara Boyle 4-18-11
Concurrence: Regional Chief Richard A Coleman 4/18/11
Rick Coleman (Date)

Mandatory 10- or 15-year Re-Evaluation Date: 2021

Compatibility Determination

Use: Buried waterlines on grassland easements to provide livestock watering

Refuge Name:

Arrowwood Wetland Management District
 Audubon Wetland Management District
 Chase Lake Wetland Management District
 Crosby Wetland Management District
 Devils Lake Wetland Management District
 Huron Wetland Management District
 J. Clark Salyer Wetland Management District
 Kulm Wetland Management District
 Lake Andes Wetland Management District
 Long Lake Wetland Management District
 Lostwood Wetland Management District
 Madison Wetland Management District
 Sand Lake Wetland Management District
 Tewaukon Wetland Management District
 Valley City Wetland Management District
 Waubay Wetland Management District

County: all counties within the Districts

Establishing and Acquisition Authority(ies):

Consolidated Farm and Rural Development Act, Migratory Bird Conservation Act, Migratory Bird Hunting and Conservation Stamp Tax, North American Wetlands Conservation Act, Emergency Wetlands Resources Act

Refuge Purpose(s):

“...as Waterfowl Production Areas” subject to” ...all of the provisions of such Act [Migratory Bird Conservation Act] ...except the inviolate sanctuary provisions...” 16 U.S.C. 718(c) (Migratory Bird Hunting and Conservation Stamp)

“...for any other management purpose, for migratory birds.” 16 U.S.C. § 715d (Migratory Bird Conservation Act)

“...for conservation purposes ... “7 U.S.C. § 2002 (Consolidated Farm and Rural Development Act)

National Wildlife Refuge System Mission:

“The mission of the 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:

What is the use? Is the use a wildlife-dependent public use?

The activity requested involves burying waterlines to provide for livestock watering on areas encumbered by Service grassland easements in North and South Dakota. The buried waterline is a new use of the grassland easement because of the surface grass disturbance which would be considered an economic use. There are approximately 2,500 individual grassland contract holders in the two states. It is estimated that no more than 10% or 250 will ever make a request for a buried waterline. In those cases where additional water supplies are provided there is a better distribution of grazing on the easement tract and overall health and sustainability of the grass is improved. The waterlines are installed by either a chisel plow or narrow trenching (not exceeding 2 feet) equipment to a depth of 6-8 feet. Minor and very temporary disturbance to the grass is confined to an area no greater than 10 feet on either side of the pipe location. The waterlines are polyethylene pipe of approximately 2 inches in diameter. The disturbance to grass is minimal (generally not exceeding 1 acre of disturbance) in relation to the acreage involved in the easement tract (average 600 acres). The disturbance caused by the trench is immediately restored and with residual and seeded grasses, the activity disturbance is temporary within 1-2 years little to no evidence remains of the activity. The activity will be permitted with a Special Use Permit and stipulations provided to ensure special and limiting conditions are adhered to and restoration is complete. The waterline will deliver water to a holding tank and gravel pad causing permanent disturbance to grass on an area of approximately 60 feet by 60 feet, representing less than one-tenth of one acre or less than 0.00001 percent of the average grassland easement tract.

Where would the use be conducted?

The use will be conducted on grassland easements in all the Wetland Management Districts listed including both North Dakota and South Dakota. Generally the grassland easement tracts are native grassland areas that are used predominately for cattle grazing. There will be minimal or non detected disturbance to wildlife as a result of the activity and what does occur will be very temporary. The disturbance to the average grassland easement tract will represent less than 0.002 percent of the average easement tract.

When would the use be conducted?

The use will be conducted as a one time event in the summer season when frost no longer exists and conditions have dried sufficiently to minimize grass disturbance. There is little to no future maintenance.

How would the use be conducted?

The activity will be conducted with either trenching equipment such as a back hoe or a chisel plow. Disturbance will not exceed 2 feet in width or be less if the chisel plow is used.

Why is this use being proposed?

It will be the grassland easement holder requesting the use. The request will be to provide better water availability for improved grass utilization due to more equal grazing distribution. Buried waterlines for livestock watering is a cost effective and reliable alternative to traditional stock watering dams, especially in times of drought or low precipitation conditions.

Availability of Resources:

Resource involved in the administration and management of the use:

No additional management or administrative costs will be associated with this activity.

Special equipment, facilities, or improvements necessary to support the use: None

Maintenance costs: None

Monitoring costs: None

Offsetting revenues: None

Anticipated Impacts of the Use:

Short-term impacts:

There will be only temporary disturbance to the grass from the construction activities so all impacts will be short-term. In 1-2 years little to no evidence exists of the activity. There will be no indirect impacts associated with this activity.

Long-term impacts:

There will be no long term impacts associated with this activity.

Cumulative impacts:

The only cumulative direct impact will be the loss of grassland from the installation of water holding facilities, estimated to be approximately 360 square feet, representing 0.008 of an acre or 0.00001 percent of the average grassland easement (600 acres). There are no indirect impacts from the proposed activity.

Public Review and Comment:

The period of public review and comment began 8/9/2004 and ended 8/13/2004.

The following methods were used to solicit public review and comment:

Posted notices in public places.

Why was this level of public review and comment selected?

The proposed activity is considered minor, incidental, one-time with minimal temporary disturbance.

Summarize comments received and any actions taken or not taken because of comments received.

No comments were received.

Determination:

Use is compatible with the following stipulations.

Stipulations Necessary to Ensure Compatibility:

1. Soil, if removed through trenching, will be replaced in the same soil profile as it was removed. Topsoil will be replaced and all soils compacted.
2. Activity will occur during the time when soils are dry and equipment activity will have reduced impact to grasses and soils.
3. Any areas that are disturbed will be reseeded to the appropriate grass mixture if determined necessary for reestablishment by the Refuge Manager.

Justification:

There will be minimal and temporary disturbance to the grassland resources protected by

the Service's easement by this activity. The use will not detract from or materially interfere with the mission or purpose of the NWRS. It is an economic use and as such the activity will benefit the Service mission and purpose through better management of the grassland community by providing improved grazing distribution.

If the proposed use is an economic use of refuge natural resources, how would it contribute to the purposes of the refuge or the mission of the National Wildlife Refuge System?

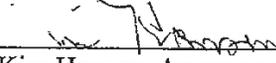
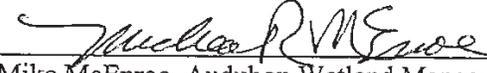
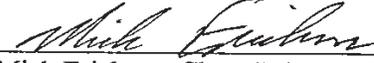
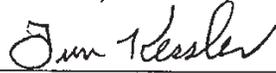
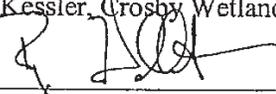
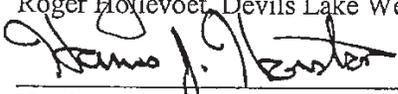
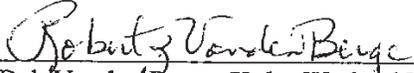
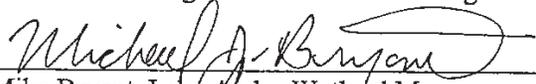
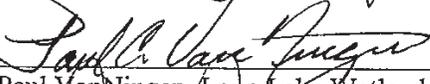
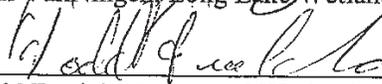
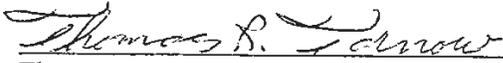
The activity of providing water for livestock grazing will contribute to the mission by providing improved grazing distribution and better range management of the grassland resources protected by the Service's easement.

Text of Public Notice:

The U.S. Fish and Wildlife Service (Service) is soliciting public comments on whether to allow buried waterlines to provide for livestock watering on Service Grassland Easements in North and South Dakota. The activity will cause minor and temporary disturbance to the grassland area. Restoration will be ensured through stipulations defined in a Special Use Permit agreed to by the landowner. Through better distribution of livestock grazing the health and sustainability to the grasslands will be better ensured. People wishing to provide comments can do so by August 13th by submitting them to the Wetland Habitat Office, 3425 Miriam Avenue, Bismarck, ND 58501. For more information contact Lloyd Jones at (701) 355-8529.

Compatibility Determination

Signature: Refuge Manager:

		8/17/04
Kim Hanson, Arrowwood Wetland Management District	(Signature)	(Date)
		8/17/04
Mike McEnroe, Audubon Wetland Management District	(Signature)	(Date)
		8/17/04
Mick Erickson, Chase Lake Wetland Management District	(Signature)	(Date)
		8/17/04
Tim Kessler, Crosby Wetland Management District	(Signature)	(Date)
		8/17/04
Roger Hollevoet, Devils Lake Wetland Management District	(Signature)	(Date)
		8-17-04
Harris Hoistad, Huron Wetland Management District	(Signature)	(Date)
		8-17-04
Lee Albright, J. Clark Salyer Wetland Management District	(Signature)	(Date)
		8/17/04
Bob VandenBerge, Kulm Wetland Management District	(Signature)	(Date)
		8/17/04
Mike Bryant, Lake Andes Wetland Management District	(Signature)	(Date)
		8/17/04
Paul VanNingen, Long Lake Wetland Management District	(Signature)	(Date)
		8-17-04
Todd Frerichs, Lostwood Wetland Management District	(Signature)	(Date)
		8-17-04
Thomas Turnow, Madison Wetland Management District	(Signature)	(Date)

Gene Williams
 Gene Williams, Sand Lake Wetland Management District (Signature) 8-19-04
 (Date)

Jack Lalor
 Jack Lalor, Tewaukon Wetland Management District (Signature) 8/18/04
 (Date)

Sory Richardson
 Sory Richardson, Valley City Wetland Management District (Signature) 8-18-04
 (Date)

Larry Martin
 Larry Martin, Waubay Wetland Management District (Signature) 17 Aug. 2004
 (Date)

Review: Regional Compatibility Coordinator Lloyd Jones 8/18/04
 (Date)

Review: Zone Supervisor Rod Krey 8/18/04
 (Date)

Concurrence: Regional Chief Rick Coleman 8/19/04
 (Date)

Mandatory 10- or 15- year Re-Evaluation Date: 2019

**COMPATIBILITY DETERMINATION
for
Authorized Curtilage Expansion
or Structural Additions on Grassland Easements**

Use: Authorized expansion or construction of additional buildings or structures on a grassland or FmHA easement. Examples of proposed uses include additions to farmstead buildings, livestock facilities, storage sheds, or the planting of farmstead windbreaks.

Station Names:

South Dakota Wetland Management Districts:

Lake Andes WMD, SD
Madison WMD, SD
Huron WMD, SD
Waubay WMD, SD
Sand Lake WMD, SD
Lacreek NWR, SD

North Dakota Wetland Management Districts:

Tewaukon WMD, ND
Kulm WMD, ND
Arrowwood WMD, ND
Valley City WMD, ND
Chase Lake WMD, ND
Audubon WMD, ND
Long Lake WMD, ND
J Clark Salyer WMD, ND
Devils Lake WMD, ND
Lostwood WMD, ND
Crosby WMD, ND

Montana Wetland Management Districts:

Northeast Montana WMD, MT
Bowdoin WMD, MT
Benton Lake WMD, MT

Northwest Montana WMD, MT
Charles M. Russell WMD, MT

Establishing and Acquisition Authorities:

Waterfowl Production Areas, Wetland Easements, Grassland Easements - The Migratory Bird Hunting and Conservation Stamp Act, March 16, 1934, (16 USC Sec. 718-718h, 48 Stat. 452) as amended August 1, 1958, (PL 85-585; 72 Stat. 486) for acquisition of “Waterfowl Production Areas”; the Wetlands Loan Act, October 4, 1961, as amended (16 USC 715k-3 - 715k-5, Stat. 813), funds appropriated under the Wetlands Loan Act are merged with duck stamp receipts in the fund and appropriated to the Secretary for the acquisition of migratory bird refuges under the provisions of the Migratory Bird Conservation Act, February 18, 1929, (16 USC Sec. 715, 715d - 715r, as amended).

FmHA deed restricted properties - Consolidated Farm and Rural Development Act - (7 USC Para. 2002).

Tall Grass Prairie Tracts - Land and Water Conservation Fund Act of 1965, as amended (16 U.S.C. 460l-4 through 460l-11)

Refuge Purpose(s):

“...as Waterfowl Production Areas” subject to “...all of the provisions of such Act [Migratory Bird Conservation Act] ...except the inviolate sanctuary provisions...” 16 USC 718(c) (Migratory Bird Hunting and Conservation Stamp)

“...for any other management purpose, for migratory birds.” 16 USC 715d (Migratory Bird Conservation Act)

“...for conservation purposes...” 7 USC 2002 (Consolidated Farm and Rural Development Act)

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” (National Wildlife Refuge System Administration Act of 1966, as amended) [16 USC 668(dd)-668(ee)].

Description of Use:

A landowner may have need to increase the size of his/her home and increase the size or number of buildings and facilities on the farm or ranch operation in order to more efficiently continue the agricultural operation of the property, or to plant and develop a windbreak planting of trees to protect the farm house or livestock facilities. Such an expansion may be requested on upland areas adjacent to the existing farmstead, the base of operations for the farm/ranch, or on a former building site where buildings are no longer present, on lands that are included within a grassland or FmHA conservation easement. In order to be permitted, such a request must be shown to be consistent with existing agricultural uses or practices on the property, have no other reasonable location or alternative, essential to the farm/ranch operation, not be able to be accommodated by a temporary (less than one year) permit, and be judged not to materially interfere with or detract from the easement or the purpose and mission of the NWRs.

Availability of Resources:

Financial and staff resources are determined to be sufficient at each field station to administer these requests. Staff time will be needed to evaluate the proposed use, to prepare the site-specific permits, and to insure compliance with the permit authorization and stipulations necessary to insure compatibility.

Anticipated Impacts of the Use:

Authorized use of easement protected grasslands for expanded farmstead, farm or ranch facilities, or a farmstead windbreak, will result in a loss or destruction of the grassland where the facilities are built. The remainder of the easement tract will not be affected. The disturbance caused by the expanded farmstead, additional buildings or facilities, new or expanded windbreak, on an existing building site or a former building site is not expected to be significantly greater than that caused by the previous structures, and will not contribute to the fragmentation of existing habitats.

The impacts associated with this authorized use will be minimal due to the relatively small size or acreage of the proposed facilities. If multiple requests are received from the same landowner, or for the same easement by different or subsequent landowners, they will each be evaluated on its own merits. Each grassland easement may be authorized up to a threshold level of 8 acres of total impact, whether it occurs at one time or through different approved requests. Therefore, only up to 8 acres of potential grassland impact may be authorized for each grassland easement for authorized expansion or construction of additional buildings or structures, or a proposed tree planting for farmstead windbreak purposes.

In addition, there will be no secondary impacts allowed within this Compatibility Determination. Fragmentation of grasslands habitats is minimized by allowing curtilage expansion only on existing or former building sites, or for farm/ranch operations. If the

potentially affected grassland provides habitat for wildlife species with management concerns, such as a grouse lek or burrowing owl nesting site, or some unique feature, the use may not be allowed, or it may be permitted only with stipulations that would eliminate the secondary or indirect impact. The Region 6 states of South Dakota, North Dakota, and Montana have over 500,000 acres of grasslands protected by Service easements. It is anticipated that between five and ten requests annually may be received to allow curtilage expansion. Under this scenario, a maximum of between 40 and 80 acres annually could be affected. This is an immaterial impact to the acreage included within the grassland easement program.

If multiple requests are received from the same landowner, or on the same easement, each will be evaluated on its own merits. Each grassland easement contract may be authorized up to one threshold level (8.0 acres) of total impact, whether it occurs at one time or in different request authorizations. Therefore, only up to 8.0 acres of encumbered grassland per easement contract (regardless of its size), may be authorized for curtilage expansion or other authorized uses.

Public Review and Comment:

The period of public review and comment began April 10, 2005 and ended April 17, 2005.

Posted notices were made in public places for each of the field stations listed on this Compatibility Determination. This method was selected because the proposed activity is considered minor, incidental, infrequent, with only minimal impacts. No comments were received as a result of the posted notices.

Determination:

Compatibility Threshold: In order to be compatible, this use must not exceed the upper threshold limit of 8 acres on grassland. To achieve compatibility, the proposed use must not interfere with nor detract from the mission or the purposed for which the easement areas were established.

_____ Use is Not Compatible

XXX Use is Compatible with the Following Stipulations

Stipulations Necessary to Ensure Compatibility:

1. Issuance of a permit does not preclude the requirements for obtaining necessary permits and/or approvals from other County, State, or Federal Agencies and from local landowners.

2. The permit is issued subject to the revocation and appeals procedure contained in Title 50, Part 25 of the Code of Federal Regulations.
3. Storage of building materials or disposal of fill material from the construction project will not be allowed on easement protected grassland areas.
4. Additional stipulations may be added or included to address specific concerns with individual projects or requests or to address any secondary impacts which may occur as a result of the proposed use.

Justification:

The expansion of curtilage or the construction of additional structures for agricultural or farmstead use is expected to be permitted only rarely, perhaps five to ten times per year for ALL the stations listed within this CD.

Data from the Habitat and Population Evaluation Team (HAPET) in the Bismarck FWS office can be used to predict the waterfowl response to the permitted upland changes. Evaluating grassland loss from a waterfowl population perspective is not precise, because we are estimating the loss of productivity of a hen that may or may not nest on a grassland site because of a disturbance or a slightly smaller size. HAPET used the Mallard Model to evaluate the change in the productivity of the affected grassland habitat. The land cover composition of a grassland easement (160 acres) and 1990 acres of cropland within a four-square mile landscape (2,560 acres), was incrementally reduced by the amount of grassland necessary to cause a production decline of two ducks (one pair). This size grassland easement was chosen because it represents the smallest individual tract to be considered for a stand-alone easement purchase, and the impact of grassland loss is proportionally greater on a smaller tract. The loss of two ducks produced equates to a replacement pair of ducks for the following breeding season. The average decrease in native grassland required to achieve a one pair reduction was 10 acres.

In a second modeling analysis, Breeding Bird Survey data were used to estimate the average breeding bird population on 160 acres of native grassland. A modeled loss of 5 acres of 160 acres of grassland showed no discernable change (positive or negative) in the breeding bird population of the 160 acre easement tract.

The working group proposes that the threshold level of grassland impact is 8 acres, in order to build in a margin of safety. The 8-acre figure (80 % of the actual determination made by HAPET for nesting ducks) corresponds with the 80% value developed for the wetland threshold. In conclusion, a proposed use that passes all the filters in the flowchart, and results in a grassland impact of 8 acres or less, may be determined to be less than a "material impact" which would interfere with or detract from the Mission or the purpose

for which the grassland easement was purchased.

Mandatory 10-Year Reevaluation Date: 10 years from the date of APPROVAL signature

Enter Re-evaluation date: May 15th, 2015.

Signatures:

<u>Submitted:</u> <u>Michael Bryant</u>	<u>4/26/05</u>
Michael Bryant, Project Leader Lake Andes WMD	Date
<u>Thomas R. Tornow</u>	<u>4-26-05</u>
Tom Tornow, Project Leader Madison WMD	Date
<u>Harris Hoistad</u>	<u>4-26-05</u>
Harris Hoistad, Project Leader Huron WMD	Date
<u>Larry Martin</u>	<u>26 April 2005</u>
Larry Martin, Project Leader Waubay WMD	Date
<u>Gene Williams</u>	<u>4-26-05</u>
Gene Williams, Project Leader Sand Lake WMD	Date
<u>Tom Koerner</u>	<u>4-26-05</u>
Tom Koerner, Project Leader Lacreek NWR	Date
<u>Jack Lalor</u>	<u>4/26/05</u>
Jack Lalor, Acting Project Leader Tewaukon WMD	Date
<u>Dave Azure</u>	<u>4/26/05</u>
Dave Azure, Acting Project Leader Kulm WMD	Date
<u>Kim D. Hanson</u>	<u>4/26/05</u>
Kim D. Hanson, Project Leader Arrowwood WMD Chase Lake WMD Valley City WMD	Date
<u>Gary Williams</u>	<u>4/26/05</u>
Gary Williams, Acting Project Leader Audubon WMD	Date

Paul C. Van Ningen
 Paul Van Ningen, Project Leader
 Long Lake WMD
 Date 4/26/05

Theodore Gutzke
 Tedd Gutzke, Project Leader
 J Clark Salver WMD
 Date April 26, 2005

R. Hollevoet
 Roger Hollevoet, Project Leader
 Devils Lake WMD
 Date 4/26/05

Fred G. Giese
 Fred G. Giese, Project Leader
 Lostwood WMD
 Crosby WMD
 Date 04/26/05

Michael Rabenberg
 Michael Rabenberg, Acting Project Leader
 Medicine Lake WMD
 Date 04/26/05

Carmen R. Luna
 Carmen Luna, Project Leader
 Bowdoin WMD
 Date 4/26/05

David Gillund
 David Gillund, Project Leader
 Benton Lake WMD
 Date 4/26/05

Steve W. Kallan
 Steve Kallan, Project Leader
 NW Montana WMD
 Date 4/26/05

Review: *Lloyd Jones*
 Lloyd Jones
 Regional Compatibility Coordinator
 Date 4.27.05

Rodney F. Freese
 Rodney Freese, Refuge Supervisor
 Date 4/28/05

Approval: *Ronald D. Shupe*
 Ronald D. Shupe, Region 6
 Acting Chief of Refuges
 Date April 27, 2005

**Compatibility Determination
for
Allowing Dogs on Fish & Wildlife Service Fee-Owned WPA's**

Use: We encourage the use of dogs for hunting. We allow dogs for other recreational activities only if the dog is confined to a vehicle, boat, ice house, or is on a leash controlled by the handler. We prohibit dog training and dogs roaming freely.

Refuge Name:

North Dakota Wetland Management Districts:

Arrowwood Wetland Management District
Audubon Wetland Management District
Chase Lake Wetland Management District
Crosby Wetland Management District
Devils Lake Wetland Management District
J. Clark Salyer Wetland Management District
Kulm Wetland Management District
Long Lake Wetland Management District
Lostwood Wetland Management District
Tewaukon Wetland Management District
Valley City Wetland Management District

South Dakota Wetland Management Districts:

Huron Wetland Management District
Lake Andes Wetland Management District
Madison Wetland Management District
Sand Lake Wetland Management District
Waubay Wetland Management District

County: All counties within the Districts listed above

Establishing and Acquisition Authority(ies):

Consolidated Farm and Rural Development Act, Migratory Bird Conservation Act, Migratory Bird Hunting and Conservation Stamp Tax, North American Wetlands Conservation Act, Emergency Wetlands Resources Act

Refuge Purpose(s):

“...as Waterfowl Production Areas” subject to “...all of the provisions of such Act [Migratory Bird Conservation Act] ...except the inviolate sanctuary provisions...” 16 U.S.C. 718(c) (Migratory Bird Hunting and Conservation Stamp)

“...for any other management purpose, for migratory birds.” 16 U.S.C § 715d (Migratory Bird Conservation Act)

“...for conservation purposes...” 7 U.S.C. § 2002 (Consolidated Farm and Rural Development Act)

National Wildlife Refuge Mission:

“The mission of the 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:

What is the use? Is the use a wildlife-dependent public use?

Dogs are allowed for hunting. With the increase in urban encroachment, more people are recreating on WPAs, and bringing their dogs with them while hunting, ice fishing, boating, fishing, running, walking trails, etc. Controlled use of dogs on WPAs will not threaten wildlife. This is a wildlife dependent use.

Where would the use be conducted?

The use would be conducted on WPAs in all the Wetland Management Districts listed.

When would the use be conducted?

The use could be conducted at any time of the year.

How would the use be conducted?

The use would be conducted as long as the owner maintains control of the dog. Confined and controlled dogs are expected to have little to no effect on our wildlife resources.

Why is this use being proposed?

Recreational users are requesting this use to allow the companionship of their dogs while they are visiting WPAs for consumptive and non consumptive uses.

Availability of Resources:

Resources involved in the administration and management of the use:

No additional management of administrative costs will be associated with this activity.

Special equipment, facilities, or improvements necessary to support the use:

None

Maintenance Costs: None

Monitoring Costs: None

Offsetting revenues: None

Anticipated Impacts of the Use:

Short-term impacts:

There would be minimal or non-detected disturbance to wildlife as a result of the activity, and what would occur would be very temporary.

Long-term impacts:

Confined and controlled dogs are expected to have little to no effect on the wildlife resources. There would be no long-term impacts.

Cumulative impacts:

There would be no negative cumulative impacts to WPAs. The use may provide an increase in visitor use as the users can now bring along their family pet dog.

Public Review and Comment:

The period of public review and comment began 06/18/2010 and ended 07/02/2010.

The following methods were used to solicit public review and comment:

Posted notices in public places.

Why was this level of public review and comment selected?

The proposed activity is considered minor, with minimal temporary disturbance and no negative permanent and cumulative impacts.

Summarize comments received and any actions taken or not taken because of comments received:

Received: No Comments were received during period of public review. Attached are comments received prior to the public review that resulted in the proposed change in wording on dog uses.

Determination:

Use is compatible with the following stipulations:

Stipulations Necessary to Ensure Compatibility:

Dogs are allowed for hunting. Dogs used for other activities must be confined to a vehicle, boat, or ice house, or is on a leash controlled by the handler. We prohibit dog training and dogs allowed to roam freely.

Justification:

There will be minimal temporary disturbance and/or permanent impact to WPAs by this activity. The use will not materially interfere with or detract from the mission or purpose of the NWRS.

If the proposed use is an economic use of refuge natural resources, how would it contribute to the purposes of the refuge or the mission of the National Wildlife Refuge System?

It is not an economic use.

Text of Public Notice:

The U.S. Fish and Wildlife Service (Service) is soliciting public comments on General Regulations on the uses of dogs in addition to hunting on Waterfowl Production Areas in North Dakota and South Dakota. The regulation on the use of dogs will state: “We encourage the use of dogs for hunting. We allow dogs for other activities, only if the dog is confined to a vehicle, boat, or ice house, or is on a leash controlled by the handler. We prohibit dog training and dogs roaming freely.”

People wishing to provide comments can do so by July 2 by submitting them to the Zone Law Enforcement Office, P.O. Box 48 Madison SD or Zone Law Enforcement, 3425 Miriam Avenue, Bismarck, ND 58501. For more information, contact Ray Portwood at 605 256-2974 or David Bonham at (701) 355-8572.

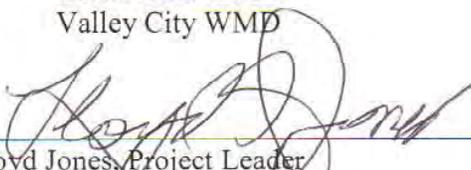
Submitted:



Kim Hanson, Project Leader
Arrowwood WMD
Chase Lake WMD
Valley City WMD

7/15/2010

Date



Lloyd Jones, Project Leader
Audubon WMD

7/15/10

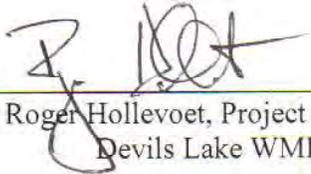
Date



Dave Giffund, Project Leader
Crosby WMD
Lostwood WMD

7/15/10

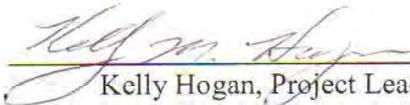
Date



Roger Hollevoet, Project Leader
Devils Lake WMD

7/16/2010

Date



Kelly Hogan, Project Leader
J. Clark Salyer WMD

7/15/2010

Date



Mick Erickson, Project Leader
Kulm WMD

7/15/2010

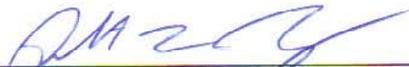
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Paul Van Ningen, Project Leader
Long Lake WMD

7/15/2010

Date

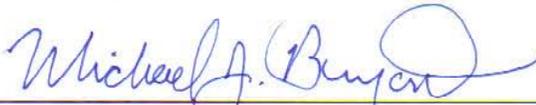


Rob Bundy, Project Leader
Tewaukon WMD

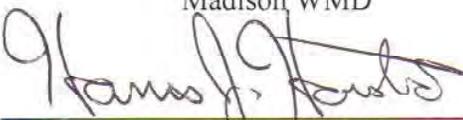
7/15/2010

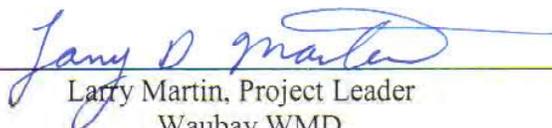
Date


 Clark Dirks, Project Leader
 Huron WMD
 Date: 7/15/2010

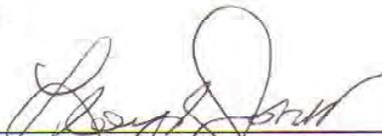

 Mike Bryant, Project Leader
 Lake Andes WMD
 Date: 7-15-2010

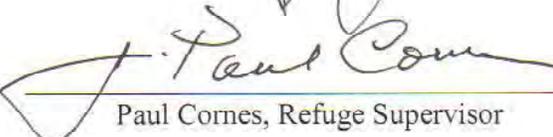

 Tom Tornow, Project Leader
 Madison WMD
 Date: 7-15-2010


 Harris Hoistad, Project Leader
 Sand Lake WMD
 Date: 7-15-10


 Larry Martin, Project Leader
 Waubay WMD
 Date: 7-15-10

Reviewed:


 Lloyd Jones, Regional Compatibility Coordinator
 Date: 9/17/10


 Paul Cornes, Refuge Supervisor
 Date: 9-27-10

Approved:


 Rick Coleman, ARD – Refuges/Partners for Fish & Wildlife
 Region 6
 Date: 9/28/10

Mandatory 10-year Re-Evaluation Date:

10 years from the date of the “Approved” signature

COMPATIBILITY DETERMINATION
for
PUBLIC AND PRIVATE
BURIED UTILITY LINES
OCCURRING ON
FWS
EASEMENT PROPERTIES
or Fee-Owned WPA's

Use: Projects associated with buried utility lines and/or cables where impacts to Service lands and interests are only temporary and minor. Requests from utility companies, rural water systems, and minor impacts associated with some highway improvement projects, and certain requests from private landowners. The use covered by this compatibility determination is in conjunction with the Region 6 Policy Memorandum of April 5, 2002, entitled "Rights-of Way and Permits for Minor Disturbance Projects". See Exhibit XII-7 for a copy of the Policy Memorandum.

Station Names:

South Dakota Wetland Management Districts:

Lake Andes WMD, SD
Madison WMD, SD
Huron WMD, SD
Waubay WMD, SD
Sand Lake WMD, SD
Lacreek NWR, SD

North Dakota Wetland Management Districts:

Tewaukon WMD, ND
Kulm WMD, ND
Arrowwood WMD, ND
Valley City WMD, ND
Chase Lake WMD, ND
Audubon WMD, ND
Long Lake WMD, ND
J Clark Salyer WMD, ND
Devils Lake WMD, ND
Lostwood WMD, ND
Crosby WMD, ND

Montana Wetland Management Districts:

Medicine Lake WMD, MT
 Bowdoin WMD, MT
 Benton Lake WMD, MT
 Northwest Montana WMD, MT

Establishing and Acquisition Authorities:

Waterfowl Production Areas Wetland Easements, Grassland Easements - The Migratory Bird Hunting and Conservation Stamp Act, March 16, 1934, (16 USC Sec. 718-718h, 48 Stat. 452) as amended August 1, 1958, (PL 85-585; 72 Stat. 486) for acquisition of “Waterfowl Production Areas”; the Wetlands Loan Act, October 4, 1961, as amended (16 USC 715k-3 - 715k-5, Stat. 813), funds appropriated under the Wetlands Loan Act are merged with duck stamp receipts in the fund and appropriated to the Secretary for the acquisition of migratory bird refuges under the provisions of the Migratory Bird Conservation Act, February 18, 1929, (16 USC Sec. 715, 715d - 715r, as amended.

FmHA deed restricted properties - Consolidated Farm and Rural Development Act - (7 USC Para. 2002).

Tall Grass Prairie Tracts - Land and Water Conservation Fund Act of 1965, as amended (16 U.S.C. 460l-4 through 460l-11)

Refuge Purpose(s):

“...as Waterfowl Production Areas” subject to “...all of the provisions of such Act [Migratory Bird Conservation Act] ...except the inviolate sanctuary provisions...” 16 USC 718(c) (Migratory Bird Hunting and Conservation Stamp)

“...for any other management purpose, for migratory birds.” 16 USC 715d (Migratory Bird Conservation Act)

“...for conservation purposes...” 7 USC 2002 (Consolidated Farm and Rural Development Act)

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” (National Wildlife Refuge System Administration Act of 1966, as amended) [16 USC 668(dd)-668(ee)].

Description of Use:

Wetland Management Districts receive frequent requests from utility companies to cross fee and easement properties with buried pipelines, electric cables, communications lines, natural gas lines, and/or rural or potable water lines or systems. These requests are generally part of an overall area-wide project to provide better services to the people residing in the area. When these types of projects are proposed in the Prairie Pothole Region, it may not be possible to avoid all Service land interests (fee and easement), and therefore, some Service property interests may be temporarily impacted during the construction period. This use includes requests for projects on wetland, grassland, FmHA, or conservation easements or fee-owned Waterfowl Production Areas. Construction methods may include cable-plowing, utilizing a vibrating cable-plow, or narrow trenching equipment. In each case, the surface disturbance is minimal, and the temporary cable or trenching scar will grow over with grass or marsh vegetation within a year or two.

A second area covered by this Compatibility Determination is requests received to temporarily alter upland sites in conjunction with highway maintenance projects to improve highway safety. These activities may be outside the existing highway right-of-way, but a formal ROW expansion is not needed because of the only temporary impacts to Service interests. An example of this type of request is for back-sloping a hill adjacent to the ROW to remove a snow catch area. Construction methods here include stripping away the vegetation and topsoil, removing enough of the hill to satisfy the sloping requirements, re-spreading the topsoil, and reseeding the vegetation to the manager's specifications.

It is expected that the use will be conducted as a one time event in the summer season when frost no longer exists and conditions have dried sufficiently to minimize grass disturbance. There is little to no future maintenance.

Availability of Resources:

Financial and staff resources are determined to be sufficient at each field station to administer these requests. Staff time will be needed to evaluate the proposed use, to prepare the site-specific permits, and to insure compliance with the permit authorization and stipulations, as well as checking for satisfactory restoration of any disturbed sites after the reseeded areas have had a chance to grow in.

No specialized equipment will be necessary, as the work requirement associated with these projects is monitoring and compliance checking only. Actual work, including restoration needs, will be completed by the applicant as specified by the wetlands manager.

Anticipated Impacts of the Use:

The uses authorized under this compatibility determination must result in impacts that are only very minor and temporary in nature. In other words, there will be NO long term negative impacts to Service land or water interests.

Examples of work authorized under this Compatibility Determination include:

- trenched and backfilled areas to accommodate buried pipelines and cables
- buried utility lines or PVC water lines using a cable plow
- excavated trenches using a backhoe equipped with a “trenching” bucket (approximately 8 inches wide).
- use of crawler-type equipment to shave hills and back-sloping associated with highway safety projects which may extend beyond the existing ROW.

Anticipated impacts are as follows:

- temporary disturbance to the grassland area during and for a period of time following the backfilled trench
- some wildlife may be temporarily displaced during the actual construction
- water quality may be temporarily and slightly reduced due to possible silt deposition if a rainstorm washes the exposed areas for a short period of time after backfilling the trenches or washing of the exposed back-sloped areas.

There will be no long-term impacts nor will there be any cumulative impacts to Service lands or interests.

Public Review and Comment:

The period of public review and comment began April 10, 2005 and ended April 17, 2005.

Posted notices were made in public places for each of the field stations listed on this Compatibility Determination. This method was selected because the proposed activity is considered minor, incidental, infrequent, with only short-term disturbance, and/or displacement of wildlife. No comments were received as a result of the posted notices.

Determination:

Compatibility Threshold: Material Interference of Detraction from the Purposes and/or Mission of the NWRS.

_____ Use is Not Compatible

XXX Use is Compatible with the Following Stipulations

Stipulations Necessary to Ensure Compatibility:

1. Issuance of a permit does not preclude the requirements for obtaining necessary permits and/or approvals from other County, State, or Federal Agencies and from local landowners.
2. The permit is issued subject to the revocation and appeals procedure contained in Title 50, Part 25 of the Code of Federal Regulations.
3. The proposed activity will result in no impacts to wetlands protected by FWS easements. No wetlands or any part thereof will be filled with any material, leveled by any equipment, drained by any means including pumping or by diverting water, or burned.
4. Any work within protected wetland basins will be backfilled and compacted to the normal contour of the wetland bottom. No excess, non-compacted fill will be permitted.
5. Upland impacts to areas protected by FWS grassland easements will be only temporary. Any disturbed areas will be leveled, seeded, and restored to pre-work condition as specified by the Refuge Manager.
6. Additional stipulations may be added to address specific concerns with individual projects.
7. The authorization under the permit issued in accordance with this determination is for the initial construction only; any future maintenance or repairs will require additional consultation with the Wetland Management District office, and will require a supplemental permit issued prior to the initiation of any remedial work.

Justification:

There will be minimal and temporary disturbance to the wetland and grassland resources protected by the Service's fee or easement by this activity. The use will not detract from or materially interfere with the mission or purpose of the NWRS. The uses covered by this CD are considered NOT to be an economic use under the guidelines found in 50CFR29.1.

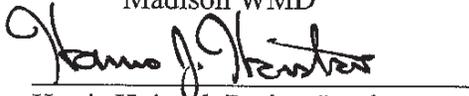
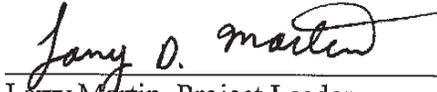
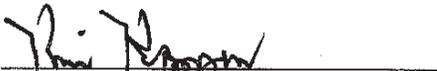
Prior to issuing any permit, the manager will have worked with the applicant to avoid as many impacts as possible, and then to minimize any impacts to Service interests. The impacts are deemed to be minor and only temporary, and complete site restoration will occur, usually with the next growing season.

Where possible, and without compromising any preservation program goal or objective, and without affecting (in the long term) any land interest held by the Service, it is critically important that field stations be able to accommodate these requested uses which are designed to improve highway safety or the quality of life in rural America.

Mandatory 10-Year Reevaluation Date:

10 years from the date of APPROVAL signature.

Enter Reevaluation Date: _____

Signatures:Submitted:Michael Bryant, Project Leader
Lake Andes WMD3/10/2005
DateTom Tornow, Project Leader
Madison WMD3-10-05
DateHarris Hoistad, Project Leader
Huron WMD3-10-05
DateLarry Martin, Project Leader
Waubay WMD3-10-05
DateGene Williams, Project Leader
Sand Lake WMD3-10-05
DateTom Koerner, Project Leader
Lacreek NWR3-10-05
DateJack Lalor, Acting Project Leader
Tewaukon WMD4/26/05
DateDave Azure, Acting Project Leader
Kulm WMD3-10-05
DateKim D. Hanson, Project Leader
Arrowwood WMD
Chase Lake WMD
Valley City WMD3/10/05
DateGary Williams, Acting Project Leader
Audubon WMD3/10/05
Date

Paul Van Ningen
 Paul Van Ningen, Project Leader
 Long Lake WMD
 Date 3/10/2005

Tedd Gutzke
 Tedd Gutzke, Project Leader
 J Clark Salyer WMD
 Date 3/10/2005

R. Hollevoet
 Roger Hollevoet, Project Leader
 Devils Lake WMD
 Date 3/10/05

Fred G. Giese
 Fred G. Giese, Project Leader
 Lostwood WMD
 Crosby WMD
 Date 04/26/05

Michael D. Rabenberg
 Michael Rabenberg, Acting Project Leader
 Medicine Lake WMD
 Date 04/26/05

Carmen R. Luna
 Carmen Luna, Project Leader
 Bowdoin WMD
 Date 4/26/05

David Gilland
 David Gilland, Project Leader
 Benton Lake WMD
 Date 4/26/05

Steven W. Kallan
 Steve Kallan, Project Leader
 NW Montana WMD
 Date 4/26/05

Review: *Lloyd Jones*
 Lloyd Jones
 Regional Compatibility Coordinator
 Date 4/27/05

Steve Bunch
4/28/05
Refuge Supervisor
 Date 4/28/05

Approval: *Ronald D. Shupe*
 Ronald D. Shupe, Region 6
 Acting Chief of Refuges
 Date 2/10/15, 2005

COMPATIBILITY DETERMINATION
for
Authorized Health and Safety Needs
Associated with FWS Wetland Easements
resulting in NO Permanent Impacts

Use: Approved requests to temporarily pump or drain an easement protected wetland which is causing a Health and Safety problem or a major threat to personal or public property, such as flooding a road, driveway, resulting in seepage in a basement, surface waters affecting a domestic well or a sanitation system, or surface waters affecting a feed storage area or feedlot. The landowner's right to drain or otherwise alter the natural characteristics of the wetland is one of the rights the Service acquired with the easement. The use authorized under this CD is to permit temporary dewatering of protected wetlands which are posing a health and/or safety threat.

Station Names:

South Dakota Wetland Management Districts:

Lake Andes WMD, SD
Madison WMD, SD
Huron WMD, SD
Waubay WMD, SD
Sand Lake WMD, SD
Lacreek NWR, SD

North Dakota Wetland Management Districts:

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Kulm WMD, ND
Arrowwood WMD, ND
Valley City WMD, ND
Chase Lake WMD, ND
Audubon WMD, ND
Long Lake WMD, ND
J Clark Salyer WMD, ND
Devils Lake WMD, ND
Lostwood WMD, ND
Crosby WMD, ND

Montana Wetland Management Districts:

Medicine Lake WMD, MT
 Bowdoin WMD, MT
 Benton Lake WMD, MT
 Northwest Montana WMD, MT

Establishing and Acquisition Authorities:

Waterfowl Production Areas Wetland Easements, Grassland Easements - The Migratory Bird Hunting and Conservation Stamp Act, March 16, 1934, (16 USC Sec. 718-718h, 48 Stat. 452) as amended August 1, 1958, (PL 85-585; 72 Stat. 486) for acquisition of “Waterfowl Production Areas”; the Wetlands Loan Act, October 4, 1961, as amended (16 USC 715k-3 - 715k-5, Stat. 813), funds appropriated under the Wetlands Loan Act are merged with duck stamp receipts in the fund and appropriated to the Secretary for the acquisition of migratory bird refuges under the provisions of the Migratory Bird Conservation Act, February 18, 1929, (16 USC Sec. 715, 715d - 715r, as amended.

FmHA deed restricted properties - Consolidated Farm and Rural Development Act - (7 USC Para. 2002).

Tall Grass Prairie Tracts - Land and Water Conservation Fund Act of 1965, as amended (16 U.S.C. 460l-4 through 460l-11)

Refuge Purpose(s):

“...as Waterfowl Production Areas” subject to “...all of the provisions of such Act [Migratory Bird Conservation Act] ...except the inviolate sanctuary provisions...” 16 USC 718(c) (Migratory Bird Hunting and Conservation Stamp)

“...for any other management purpose, for migratory birds.” 16 USC 715d (Migratory Bird Conservation Act)

“...for conservation purposes...” 7 USC 2002 (Consolidated Farm and Rural Development Act)

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” (National Wildlife Refuge System Administration Act of 1966, as amended) [16 USC 668(dd)-668(ee)].

Description of Use:

During times of high water cycles or excessive runoff, prairie wetlands can temporarily swell to an oversized condition. The easement agreements provide for this natural fluctuation in wetland hydrology and relief is generally not authorized. However, when the over-full wetland basins result in situations which involve health, safety, or major threats to public or landowner appurtenances which cannot be resolved without violating the easement and for which no reasonable alternative exists, then the Service is authorized to provide relief to nullify the Health and Safety threat. The use associated with this category of request results in either pumping or draining the problem-causing wetland, lowering its elevation to a point that the problem is resolved. Situations involving Health and Safety include: major threats to buildings, roads, and infrastructure; basement flooding caused by high water in a nearby wetland, barnyard or feedlot flooding, driveway or other road flooding, or threat to domestic water supply or sewer system

The use results in ONLY a temporary lowering of the wetland. If a drainage ditch was used to lower the wetland, it must be filled to the original contour of the land after the wetland has been lowered, and the threat has subsided.

The use could occur in any of the Wetland Management Districts listed within the CD, and would likely occur during or shortly after the spring runoff or after a large rainstorm event. These are the conditions which sometimes result in the protected wetland basins becoming larger than the historic photo record would indicate.

Any requested use to lower the water levels of protected wetlands will result in ONLY temporary impacts, lasting a year or two.

Availability of Resources:

Financial and staff resources are determined to be sufficient at each field station to administer these requests. Staff time will be needed to evaluate the proposed use, to prepare the site-specific permits, and to insure compliance with the permit authorization and stipulations, as well as checking for satisfactory restoration of any disturbed sites after the wetland areas have returned to more historical elevations.

No specialized equipment will be necessary, as any work associated with these projects involves monitoring and compliance checking only. Actual work, including restoration needs, will be completed by the applicant as specified by the wetlands manager.

Anticipated Impacts of the Use:**Short-term Impacts:**

Short-term impacts include the temporary loss of some wetlands habitat because of the authorized lowering of the wetland causing the Health and Safety problem. Since this is only a temporary authorization, limitations of the amount of lowering needed will not be imposed except to require the least amount necessary to resolve the issue. The length of time will be “until the situation is resolved” NTE one year. Permits can be extended if necessary.

After the situation has been resolved, the wetland’s hydrology will be restored, and if drainage was used to reduce the wetlands’s volume, then the drainage facilities will be restored to a “pre-work” condition.

Long-term Impacts:

There will be no long-term impacts associated with this authorization to resolve a Health and Safety issue.

Cumulative Impacts:

There will be no cumulative impacts as a result of possible numerous authorizations because there are no permanent impacts. The authorization will be granted only to resolve the issue at hand.

Public Review and Comment:

The period of public review and comment began April 10, 2005 and ended April 17, 2005.

Posted notices were made in public places for each of the field stations listed on this Compatibility Determination. This method was selected because the proposed activity is considered minor, incidental, infrequent, with only short-term disturbance, and/or displacement of wildlife. No comments were received as a result of the posted notices.

Determination:

Compatibility Threshold: Material Interference of Detraction from the Purposes and/or Mission of the NWRS.

_____ Use is Not Compatible

XXX Use is Compatible with the Following Stipulations

Stipulations Necessary to Ensure Compatibility:

1. Issuance of a permit does not preclude the requirements for obtaining necessary permits and/or approvals from other County, State, or Federal Agencies and from local landowners.
2. The permit is issued subject to the revocation and appeals procedure contained in Title 50, Part 25 of the Code of Federal Regulations.
3. When the Health and Safety threat has subsided, the wetland will be allowed to function under natural hydrological cycles. Any drainage facilities which were installed to lower the wetland will be restored, compacted, and rendered non-functional.
4. If the area is also protected with a Service grassland easement, then the backfilled ditch will also be reseeded to the specifications of the wetland manager.

Justification:

There will be only temporary disturbance to the wetland and possible grassland resources protected by the Service's easement by this activity. The use will not detract from or materially interfere with the mission or purpose of the NWRS. The uses covered by this CD are considered NOT to be an economic use under the guidelines found in 50CFR29.1.

Where possible, and without compromising any preservation program goal or objective, and without affecting (in the long term) any land interest held by the Service, it is critically important that field stations be able to accommodate these requested uses which are designed to avert a human health and/or safety issue or a major threat to personal or public property.

Mandatory 10-Year Reevaluation Date:

10 years from the date of APPROVAL signature. Enter Reevaluation Date: _____

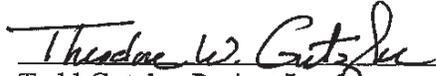
Signatures:

<u>Submitted:</u> <u>Michael J. Bryant</u> Michael Bryant, Project Leader Lake Andes WMD	<u>3/10/2005</u> Date
<u>Thomas R. Tornow</u> Tom Tornow, Project Leader Madison WMD	<u>3-10-05</u> Date
<u>Harris J. Hoistad</u> Harris Hoistad, Project Leader Huron WMD	<u>3-10-05</u> Date
<u>Larry D. Martin</u> Larry Martin, Project Leader Waubay WMD	<u>3-10-05</u> Date
<u>Gene Williams</u> Gene Williams, Project Leader Sand Lake WMD	<u>3-10-05</u> Date
<u>Tom Koerner</u> Tom Koerner, Project Leader Lacreek NWR	<u>3-10-05</u> Date
<u>Jack Lalor</u> Jack Lalor, Acting Project Leader Tewaukon WMD	<u>4/26/05</u> Date
<u>Dave Azure</u> Dave Azure, Acting Project Leader Kulm WMD	<u>3-10-05</u> Date
<u>Kim D. Hanson</u> Kim D. Hanson, Project Leader Arrowwood WMD Chase Lake WMD Valley City WMD	<u>3/10/05</u> Date
<u>Gary Williams</u> Gary Williams, Acting Project Leader Audubon WMD	<u>3/10/05</u> Date



Paul Van Ningen, Project Leader
Long Lake WMD

3/10/2005
Date



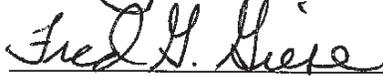
Tedd Gutzke, Project Leader
I Clark Sawyer WMD

3/10/2005
Date



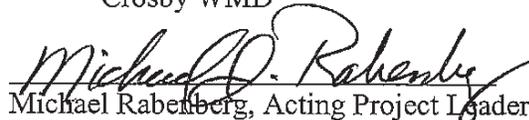
Roger Hollevoet, Project Leader
Devils Lake WMD

3/10/05
Date



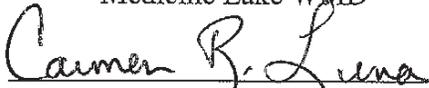
Fred G. Giese, Project Leader
Lostwood WMD
Crosby WMD

04/26/05
Date



Michael Rabenberg, Acting Project Leader
Medicine Lake WMD

04/26/05
Date



Carmen Luna, Project Leader
Bowdoin WMD

4/26/05
Date



David Gilland, Project Leader
Benton Lake WMD

4/26/05
Date



Steve Kallan, Project Leader
NW Montana WMD

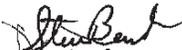
4/26/05
Date

Review:

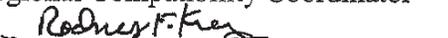


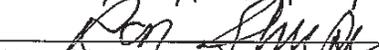
Lloyd Jones
Regional Compatibility Coordinator

4.27.05
Date


4/28/05

Approval:


Rodney Krey / Refuge Supervisor


Ronald D. Shupe, Region 6
Acting Chief of Refuges

4/28/05

5/10/15, 2005
Date

COMPATIBILITY DETERMINATION
for
Authorized Early Haying
of Grassland Easements
for
Management Purposes

Use: Authorized Early Haying of Grassland Easements and FmHA Conservation Easements.

Station Names:

South Dakota Wetland Management Districts:

Lake Andes WMD, SD
Madison WMD, SD
Huron WMD, SD
Waubay WMD, SD
Sand Lake WMD, SD
Lacreek NWR, SD

North Dakota Wetland Management Districts:

Tewaukon WMD, ND
Kulm WMD, ND
Arrowwood WMD, ND
Valley City WMD, ND
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Lostwood WMD, ND
Crosby WMD, ND

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Bowdoin WMD, MT
Benton Lake WMD, MT
Northwest Montana WMD, MT

Establishing and Acquisition Authorities:

Waterfowl Production Areas, Wetland Easements, Grassland Easements - The Migratory Bird Hunting and Conservation Stamp Act, March 16, 1934, (16 USC Sec. 718-718h, 48 Stat. 452) as amended August 1, 1958, (PL 85-585; 72 Stat. 486) for acquisition of "Waterfowl Production Areas"; the Wetlands Loan Act, October 4, 1961, as amended (16 USC 715k-3 - 715k-5, Stat. 813), funds appropriated under the Wetlands Loan Act are merged with duck stamp receipts in the fund and appropriated to the Secretary for the acquisition of migratory bird refuges under the provisions of the Migratory Bird Conservation Act, February 18, 1929, (16 USC Sec. 715, 715d - 715r, as amended).

FmHA deed restricted properties - Consolidated Farm and Rural Development Act - (7 USC Para. 2002).

Tall Grass Prairie Tracts - Land and Water Conservation Fund Act of 1965, as amended (16 U.S.C. 460l-4 through 460l-11)

Refuge Purpose(s):

"...as Waterfowl Production Areas" subject to "...all of the provisions of such Act [Migratory Bird Conservation Act] ...except the inviolate sanctuary provisions..." 16 USC 718(c) (Migratory Bird Hunting and Conservation Stamp)

"...for any other management purpose, for migratory birds." 16 USC 715d (Migratory Bird Conservation Act)

"...for conservation purposes..." 7 USC 2002 (Consolidated Farm and Rural Development Act)

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" (National Wildlife Refuge System Administration Act of 1966, as amended) [16 USC 668(dd)-668(ee)].

Description of Use:

Haying is the cutting and removal, by baling or stacking, and transport to an off-site location, of grass and/or forb species. Haying of grassland easement-protected properties is not restricted after July 15 each year. Landowners may hay their lands every year after

this date without compromising the terms of the easement. However, the use described in this compatibility determination is to permit early haying (prior to July 15) of the uplands to accomplish some management purpose on the land. The control of noxious weeds is primarily the target of early haying agreements. Canada thistle, a perennial, primary noxious weed, is required by state law to be controlled by each landowner. Haying can be an effective tool in controlling the seed dispersal of Canada thistle, but it must be done before the thistle flowers mature and develop wind-dispersed seeds. In many years, the thistle plants have matured and dispersed their seeds prior to July 15, and haying after seed dispersal would not be effective as a management tool.

Periodic early haying may also be authorized to help improve the vigor and health of the grass stand. It is expected that the authorized use of early haying for this purpose will be used very infrequently.

Haying prior to July 15th to increase plant density is also a management tool occasionally used. This is primarily done the first few years after a new seeding to encourage tillering and to accelerate establishment. Haying, rather than just mowing, the plants helps to prevent shading caused by the mowed vegetation left in the field. Haying done just prior to seed head development will stimulate most grass plants to propagate vegetatively by rhizomes rather than by seed production. This generally encourages grass plants to fill in bare soil areas between plants, compete more favorably with invasive species, and shorten the overall establishment period on new grass seedings.

Availability of Resources:

Financial and staff resources are determined to be sufficient at each field station to administer these requests. Staff time will be needed to evaluate the proposed use, to prepare the site-specific permits, and to insure compliance with the permit authorization and stipulations necessary to insure compatibility.

Anticipated Impacts of the Use:

Authorized early haying of grassland easements may displace some wildlife species during the time period the haying operation is being performed. It is possible, also, that some nesting migratory birds may be disturbed, and abandon their nests as a result of the haying operation. The decision to authorize early haying must weigh the potential benefits of legally required weed control, plant density management, and other management gains, against these short-term losses associated with the early haying.

Cutting and removal of standing grasses prior to July 15 will also result in short-term loss of habitat for those species requiring tall grasses for feeding and perching.

The impacts associated with this authorized use will be minimal since the area will likely be hayed after July 15 anyway, which is not prohibited by the easement agreement. Therefore, the impacts of the use are only between the time of authorized early haying, and July 16 in any given year.

Public Review and Comment:

The period of public review and comment began April 10, 2005 and ended April 17, 2005.

Posted notices were made in public places for each of the field stations listed on this Compatibility Determination. This method was selected because the proposed activity is considered minor, incidental, infrequent, with only short-term disturbance, and/or displacement of wildlife. No comments were received as a result of the posted notices.

Determination:

Compatibility Threshold: As this activity is an economic use, it must meet the compatibility threshold of “contributing to the Mission and Purposes” of the Refuge System and the Refuge Area.

_____ Use is Not Compatible

XXX Use is Compatible with the Following Stipulations

Stipulations Necessary to Ensure Compatibility:

1. Issuance of a permit does not preclude the requirements for obtaining necessary permits and/or approvals from other County, State, or Federal Agencies and from local landowners.
2. The permit is issued subject to the revocation and appeals procedure contained in Title 50, Part 25 of the Code of Federal Regulations.
3. Permits for early haying will not be issued in consecutive years for the same land.
4. If a permit is issued for weed control on tame grassland, a condition of the permit must include a required fall herbicide treatment of the regrown noxious weeds at the permittee's expense.
5. Bales or stacks must be removed from the area within two weeks after baling.

6. Early haying to encourage tillering on new grass seedings should leave at least 5" of stubble to ensure sufficient leaf area needed for the responding growth.

Justification:

The control of noxious weeds is required of every landowner by state law, even on grassland easement-encumbered property. If infestations are severe, then a measure of weed control can be achieved by haying the lands with the infestation to limit the seed dispersal. Seed dispersal in Canada thistle often happens prior to July 15, so knocking the plants down prior to seed maturation and dispersal can help control the invading plants.

Additionally, more effective weed control can be achieved by removing the overstory of grass, allowing the tap-rooted noxious weeds to regrow, then applying a herbicide treatment. The grass will not regrow as quickly as the forb (weed) species, and the spraying application will be more effective, especially going into the fall season when the thistle plants are storing their root reserves for the winter dormant period.

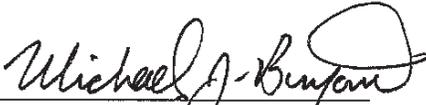
Early haying to encourage tillering can shorten the establishment period of new grass seedings. Obtaining the best stand of grass in the shortest time period possible will increase wildlife use and minimize the need for weed control in subsequent years.

As such, it is concluded that the accrued benefits of more effective weed control and shorter establishment periods more than compensate for the potential short-term loss associated with authorized weed control and plant density management accomplished by haying the grassland area prior to July 15.

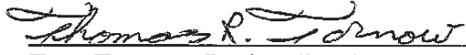
Mandatory 10-Year Reevaluation Date:

10 years from the date of APPROVAL signature

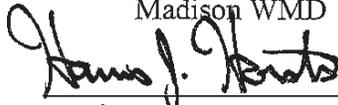
Enter date: _____

Signatures:Submitted:Michael Bryant, Project Leader
Lake Andes WMD3/10/2005

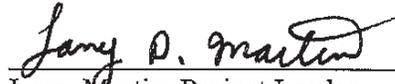
Date

Tom Tornow, Project Leader
Madison WMD3-10-05

Date

Harris Horstad, Project Leader
Huron WMD3-10-05

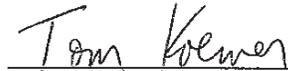
Date

Larry Martin, Project Leader
Waubay WMD3-10-05

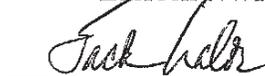
Date

Gene Williams, Project Leader
Sand Lake WMD3-10-05

Date

Tom Koerner, Project Leader
Laereek NWR3-10-05

Date

Jack Lalor, Acting Project Leader
Tewaukon WMD4/26/05

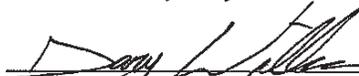
Date

Dave Azure, Acting Project Leader
Kulm WMD3-10-05

Date

Kim D. Hanson, Project Leader
Arrowwood WMD
Chase Lake WMD
Valley City WMD3/10/05

Date

Gary Williams, Acting Project Leader
Audubon WMD3/10/05

Date

Paul Van Ningen
 Paul Van Ningen, Project Leader
 Long Lake WMD
 3/10/2005
 Date

Tedd W. Gutzke
 Tedd Gutzke, Project Leader
 J. Clark Salyer WMD
 3/10/2005
 Date

Roger Hollevoet
 Roger Hollevoet, Project Leader
 Devils Lake WMD
 3/10/05
 Date

Fred G. Giese
 Fred G. Giese, Project Leader
 Lostwood WMD
 Crosby WMD
 04/26/05
 Date

Michael Rabenberg
 Michael Rabenberg, Acting Project Leader
 Medicine Lake WMD
 04/26/05
 Date

Carmen B. Luna
 Carmen Luna, Project Leader
 Bowdoin WMD
 4/26/05
 Date

David Gilland
 David Gilland, Project Leader
 Benton Lake WMD
 4/26/05
 Date

Steve W. Kallan
 Steve Kallan, Project Leader
 NW Montana WMD
 4/26/05
 Date

Review: Lloyd Jones
 Lloyd Jones
 Regional Compatibility Coordinator
 4-27-05
 Date

Steve Burt
 3/28/05
Rodney F. Krey
 Rodney Krey / Ref. Sup
 4/22/05

Approval: Ronald D. Shupe
 Ronald D. Shupe, Region 6
 Acting Chief of Refuges
 4/21/05
 Date

COMPATIBILITY DETERMINATION
for
the Cooperative Farming Program on
National Wildlife Refuges and Waterfowl Production Areas
for Management Purposes

Use: Cooperative farming on National Wildlife Refuges and Waterfowl Production Areas in North and South Dakota.

Station Names:

South Dakota Wetland Management Districts:

Lake Andes NWR and WMD, SD
 Madison WMD, SD
 Huron WMD, SD
 Waubay NWR and WMD, SD
 Sand Lake NWR and WMD, SD
 LaCreek NWR and WMD, SD

North Dakota Wetland Management Districts:

Tewaukon NWR and WMD, ND
 Kulm WMD, ND
 Arrowwood NWR and WMD, ND
 Valley City WMD, ND
 Chase Lake NWR and WMD, ND
 Audubon NWR and WMD, ND
 Long Lake NWR and WMD, ND
 J Clark Salyer NWR and WMD, ND
 Devils Lake WMD, ND
 Lostwood NWR and WMD, ND
 Crosby WMD, ND
 Des Lacs NWR, ND
 Upper Souris NWR, ND

Establishing and Acquisition Authorities:

Arrowwood NWR; Executive Order (E.O.) 7168, Sept. 4, 1935
 Audubon NWR; 16 USC §664 (Fish and Wildlife Coord. Act)
 Chase Lake NWR; E.O. 932, Aug. 28, 1908
 Des Lacs NWR; E.O. 7154-A, Aug. 22, 1935
 Florence Lake NWR; E.O. 8119, May 10, 1939
 J. Clark Salyer NWR; E.O. 7170, Sept. 4, 1935

Kellys Slough NWR; E.O. 7320, Mar. 19, 1936
 Lake Alice NWR; 16 USC § 715d (Mig. Bird Cons. Act)
 Lake Ilo NWR; E.O. 8154, June 12, 1939
 Lake Nettie NWR; E. O. 8155, June 12, 1939
 Lake Zahl NWR; E. O. 8158, June 12, 1939
 Long Lake NWR; E.O. 5808, Feb. 25, 1932
 Lostwood NWR; E.O. 7171, Sept. 4, 1935
 McLean NWR; 16 USC § 715d (Mig. Bird Cons. Act)
 Slade NWR; 16 USC 715d (Mig. Bird Cons. Act)
 Sullys Hill NGP; E. O. 3596, Dec. 22, 1921
 Tewaukon NWR; Public Land Order (PLO) 286, June 26, 1945
 Upper Souris NWR; E.O. 7161, Aug. 27, 1935

LaCreek NWR; E.O. 7160, Aug. 26, 1935
 Lake Andes NWR; E. O. 7292, Feb. 14, 1936
 Sand Lake NWR; E. O. 7169, Sept. 4, 1935
 Waubay NWR; E. O. 7245, Dec. 10, 1935

Waterfowl Production Areas, Wetland Easements, Grassland Easements - The Migratory Bird Hunting and Conservation Stamp Act, March 16, 1934, (16 USC Sec. 718-718h, 48 Stat. 452) as amended August 1, 1958, (PL 85-585; 72 Stat. 486) for acquisition of “Waterfowl Production Areas”; the Wetlands Loan Act, October 4, 1961, as amended (16 USC 715k-3 - 715k-5, Stat. 813), funds appropriated under the Wetlands Loan Act are merged with duck stamp receipts in the fund and appropriated to the Secretary for the acquisition of migratory bird refuges under the provisions of the Migratory Bird Conservation Act, February 18, 1929, (16 USC Sec. 715, 715d - 715r, as amended.

Refuge Purpose(s):

The Executive Orders for most of the refuges state the purpose “as a refuge and breeding ground for migratory birds and other wildlife.”

“...as Waterfowl Production Areas” subject to “...all of the provisions of such Act [Migratory Bird Conservation Act] ...except the inviolate sanctuary provisions...” 16 USC 718(c) (Migratory Bird Hunting and Conservation Stamp)

“...for any other management purpose, for migratory birds.” 16 USC 715d (Migratory Bird Conservation Act)

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” (National Wildlife Refuge System Administration Act of 1966, as amended) [16 USC 668(dd)-668(ee)].

Description of Use:

Cooperative farming is the term used for cropping activities done by a third party on lands that are owned in fee-title by the U. S. Fish and Wildlife Service (Service) or controlled by the Service through a conservation easement (wetland, grassland, or FmHA). This activity is usually done on a short-term basis (3-4 years or less) to provide an optimum seed bed for the establishment of native grasses and forbs or other more desirable planted cover for wildlife. Cooperative farming may also be used on certain tracts to provide a fall food source for migratory waterfowl or a winter food source for resident wildlife.

The farming is done under the terms and conditions of a Cooperative Farming Agreement or Special Use Permit (SUP) issued by the Project Leader, Refuge Manager, or Wetland District Manager. Terms of the agreement insure that all current Service and District restrictions are followed.

Cooperative farming activities are generally limited to areas of former cropland or poor quality stands of tame or cool season exotic grasses. Service policies do not allow highly erodible soils to be tilled or cropped without an approved NRCS Conservation Plan. Waterfowl Production Areas (WPAs) in the Dakotas average about 200 acres in size. Generally, areas to be cooperatively farmed at one time prior to reseeding to more desirable plant species will not be more than 50 percent of the tract. Areas on WPAs and Refuges planted for food plots will be limited to the size needed to provide sufficient food for the targeted wildlife species.

Availability of Resources:

Staff time for development and administration of Cooperative Farming Agreements is already available. Most of the needed field work to prepare and plan for this use would be done as part of routine grassland management duties. The decision to use a cooperating farmer would occur as part of the overall strategy for managing lands on the Refuge or within the WMD. The additional time needed to coordinate issuance of the SUP or Cooperative Farming Agreement and oversight of the permit is relatively minor and within Refuge or WMD resources. In addition, the use of a cooperating farmer frees up other staff time from conducting the farming operation through force account.

Cooperative farming of Service lands in most cases is done on a share basis rather than for a fee. The Service typically receives its share as harvested grain used for other management purposes, as standing grain left for wildlife food, or as additional work such as

weed control, cultivation, or additional seed bed preparation, or for supplies such as herbicide or grass seed to be used on the same tract of land. Any fees or cash income received by the Service would be deposited in the Refuge Revenue Sharing Account. The Service will receive fair market value consideration from cooperating farmers, but the generation of income is a secondary consideration when developing the terms and conditions of a cooperative farming agreement or SUP.

To lessen any appearance of favoritism or impropriety, managers should follow Refuge Manual procedures for establishing rental rates and cooperator selection.

Anticipated Impacts of the Use:

Cooperative farming to prepare suitable seed beds for planting better cover and habitat will result in short-term disturbances and long-term benefits to both resident and migratory wildlife using the Refuges, WPAs, and easements. Short-term impacts include disturbance and displacement of wildlife typical of any noisy heavy equipment operation, and the loss of poor quality cover while the tract is farmed. Wildlife may also use the farmed area as an additional food source for the period which it is farmed. Long-term benefits are extremely positive due to the establishment of diverse or more desirable habitat for nesting, escape cover, perching, or non-crop feeding activities. The resulting habitat will generally improve conditions for most of the species negatively affected by the short period of farming activity.

In 2004, approximately 2900 acres of Service lands were farmed under SUPs in South Dakota. North Dakota refuges and WPAs permitted an average of 6,400 acres of cooperative farming during the 1996-2000 period.

Public Review and Comment:

The period of public review and comment began May 1, 2005 and ended on May 14, 2005.

Notices were posted in public places at each of the field stations listed on this Compatibility Determination. This method was selected because the proposed activity is considered minor, incidental, infrequent, with only short-term disturbance.

Determination:

Compatibility Threshold: As this activity is an economic use, it must meet the compatibility threshold of “contributing to the Mission and Purposes” of the Refuge System and the Refuge Area. Cooperative farming is used to benefit Refuge and Waterfowl Production Area uplands and the migratory birds and other wildlife that use these lands.

_____ Use is Not Compatible

XXX Use is Compatible with the Following Stipulations

Stipulations Necessary to Ensure Compatibility:

1. SUPs or Cooperative Farming Agreements will specify the type of crop to be planted and describe the refuges' share.
2. The SUP may specify any herbicide or agricultural restrictions of the tract.
3. The SUP may specify timing constraints to insure that the proper field work is completed at the appropriate time.
4. The permit is issued subject to the revocation and appeals procedure contained in Title 50, Part 25 of the Code of Federal Regulations.

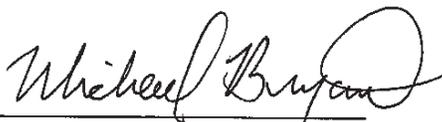
Justification:

The cooperative farming of Service lands or easements is done to develop or reseed better wildlife cover and habitat than was previously on the area. Only areas that have been previously cropped, or are seeded to decadent stands of cool season grasses (brome or crested wheatgrass), or decadent tame grass-legume mixes will be included in a cooperative farming plan. Cooperative farming in most cases provides the fastest, most cost effective means to establish native grasses or re-seeded cover on the Service property. In many cases, tracts are located many miles away from the Refuge or WMD headquarters, making force account labor a very time-consuming effort. The long-term benefits of managed, quality cover offset the short-term impacts and disturbance while the tract is farmed prior to seeding or re-seeding.

Mandatory 10-Year Reevaluation Date: 10 years from the date of APPROVAL signature

Signatures:

Submitted:


 Michael Bryant, Project Leader
 Lake Andes Complex

4/26/03
 Date

Thomas R. Tornow
Tom Tornow, Project Leader
Madison WMD

4-26-05
Date

Harris D. Hoistad
Harris Hoistad, Project Leader
Huron WMD

4-26-05
Date

Larry D. Martin
Larry Martin, Project Leader
Waubay Complex

26 April 2005
Date

Gene Williams
Gene Williams, Project Leader
Sand Lake Complex

4-26-05
Date

Tom Koerner
Tom Koerner, Project Leader
LaCreek Complex

4-26-05
Date

Jack Lalor
Jack Lalor, Acting Project Leader
Tewaukon Complex

4/26/05
Date

Dave Azure
Dave Azure, Acting Project Leader
Kulm WMD

4/26/05
Date

Kim D. Hanson
Kim D. Hanson, Project Leader
Arrowwood Complex
Chase Lake WMD
Valley City WMD

4/26/05
Date

Gary Williams
Gary Williams, Acting Project Leader
Audubon Complex

4/26/05
Date

Paul C. Van Ningen
Paul Van Ningen, Project Leader
Long Lake Complex

4/26/05
Date

Theodore Gutzke
Tedd Gutzke, Project Leader
J Clark Salyer Complex

April 26, 2005
Date

R. Hollevoet
Roger Hollevoet, Project Leader
Devils Lake Complex

4/26/05
Date

Fred G. Giese
Fred G. Giese, Project Leader
Des Lacs Complex

04/26/05
Date

Dean Knauer
Dean Knauer, Project Leader
Upper Souris NWR

4-27-05
Date

Review:

Lloyd Jones
Lloyd Jones
Regional Compatibility Coordinator

4.27.05
Date

Rodney F. Krey
Rod Krey
Refuge Supervisor, ND-SD

4/28/05
Date

Approval:

Ronald D. Shupe
Ronald D. Shupe, Region 6
Acting Chief of Refuges

May 15, 2005
Date

COMPATIBILITY DETERMINATION
for
Prescribed Haying of Grasslands
on National Wildlife Refuges and Waterfowl Production Areas
for Management Purposes

Use: Prescribed Haying of Grasslands on National Wildlife Refuges and Waterfowl Production Areas in North and South Dakota.

Station Names:

South Dakota Refuges and Wetland Management Districts:

Lake Andes NWR and WMD, SD
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 Sand Lake NWR and WMD, SD
 LaCreek NWR and WMD, SD

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 Kulm WMD, ND
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 Valley City WMD, ND
 Chase Lake NWR and WMD, ND
 Audubon NWR and WMD, ND
 Long Lake NWR and WMD, ND
 J Clark Salyer NWR and WMD, ND
 Devils Lake WMD, ND
 Lostwood NWR and WMD, ND
 Crosby WMD, ND
 Des Lacs NWR, ND
 Upper Souris NWR, ND

Establishing and Acquisition Authorities:

Arrowwood NWR; Executive Order (E.O.) 7168, Sept. 4, 1935
 Audubon NWR; 16 USC §664 (Fish and Wildlife Coord. Act)
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 Des Lacs NWR; E.O. 7154-A, Aug. 22, 1935
 Florence Lake NWR; E.O. 8119, May 10, 1939

J. Clark Salyer NWR; E.O. 7170, Sept. 4, 1935
 Kellys Slough NWR; E.O. 7320, Mar. 19, 1936
 Lake Alice NWR; 16 USC § 715d (Mig. Bird Cons. Act)
 Lake Ilo NWR; E.O. 8154, June 12, 1939
 Lake Nettie NWR; E. O. 8155, June 12, 1939
 Lake Zahl NWR; E. O. 8158, June 12, 1939
 Long Lake NWR; E.O. 5808, Feb. 25, 1932
 Lostwood NWR; E.O. 7171, Sept. 4, 1935
 McLean NWR; 16 USC § 715d (Mig. Bird Cons. Act)
 Slade NWR; 16 USC 715d (Mig. Bird Cons. Act)
 Sullys Hill NGP; E. O. 3596, Dec. 22, 1921
 Tewaukon NWR; Public Land Order (PLO) 286, June 26, 1945
 Upper Souris NWR; E.O. 7161, Aug. 27, 1935

LaCreek NWR; E.O. 7160, Aug. 26, 1935
 Lake Andes NWR; E. O. 7292, Feb. 14, 1936
 Sand Lake NWR; E. O. 7169, Sept. 4, 1935
 Waubay NWR; E. O. 7245, Dec. 10, 1935

Waterfowl Production Areas, Wetland Easements, Grassland Easements - The Migratory Bird Hunting and Conservation Stamp Act, March 16, 1934, (16 USC Sec. 718-718h, 48 Stat. 452) as amended August 1, 1958, (PL 85-585; 72 Stat. 486) for acquisition of "Waterfowl Production Areas"; the Wetlands Loan Act, October 4, 1961, as amended (16 USC 715k-3 - 715k-5, Stat. 813), funds appropriated under the Wetlands Loan Act are merged with duck stamp receipts in the fund and appropriated to the Secretary for the acquisition of migratory bird refuges under the provisions of the Migratory Bird Conservation Act, February 18, 1929, (16 USC Sec. 715, 715d - 715r, as amended.

Refuge Purpose(s):

The Executive Orders for most of the refuges state the purpose "as a refuge and breeding ground for migratory birds and other wildlife."

"...as Waterfowl Production Areas" subject to "...all of the provisions of such Act [Migratory Bird Conservation Act] ...except the inviolate sanctuary provisions..." 16 USC 718(c) (Migratory Bird Hunting and Conservation Stamp)

"...for any other management purpose, for migratory birds." 16 USC 715d (Migratory Bird Conservation Act)

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” (National Wildlife Refuge System Administration Act of 1966, as amended) [16 USC 668(dd)-668(ee)].

Description of Use:

Haying is the cutting and removal, by baling and transport to an off-site location, of grass or other upland vegetation for the production of livestock forage. Haying for this purpose is typically done by a cooperating farmer acting under authority of a Cooperative Farming Agreement or Special Use Permit (SUP) issued by the Project Leader, Refuge Manager or Wetland District Manager.

Haying is an effective management tool as part of an overall grassland management plan to improve and maintain Fish and Wildlife Service (Service)-managed grasslands for the benefit of migratory birds and other wildlife. Grasslands require periodic renovation to maintain vigor, diversity, and the structure necessary for migratory bird nesting. Haying can be an alternative to prescribed burning or grazing, which are the two other methods used to manage grassland habitats. If local conditions preclude the use of prescribed fire, or livestock numbers are not available, removal of biomass through haying serves to reduce unwanted overstory, reduce woody plant invasion, and open the soil surface up to sunlight. Such removal of vegetation allows for more vigorous regrowth of desirable species following the haying although results are neither as dramatic nor positive as with fire or grazing.

Haying may also be used as part of a native grass seeding strategy on newly acquired lands or on tame grass stands on older lands needing renovation. To reduce weed or undesirable species competition and minimize herbicide applications, a cooperating farmer may be used to seed the native grass seed mix and interseed with a cover crop. As a requirement of the SUP, the cooperator would be required to cut, bale, and remove the cover crop before it matures and goes to seed. The resultant hay can be used for livestock feed and haying serves the biological purpose of releasing young native grass and forb seedlings for growth with minimal competition.

A third possible use of haying on FWS-managed grasslands involves the initial steps of removing unwanted vegetation prior to seeding the tract to native grasses. Haying of a nonnative cool season stand of grass is an effective step in advance of spraying the field with herbicide to kill all existing vegetation. Removal of the heavy grass overstory by haying allows the herbicide to more effectively reach and treat the remaining target plants. Better removal of the unwanted grasses will in turn ensure better success of the planted grasses and forbs whether they are interseeded into the sod or into the soil turned over and leveled prior to seeding.

Haying is sometimes used prior to a noxious weed treatment; the tract is hayed and after a period of time, the “flush” of noxious weeds is treated with a herbicide application. Removing the vegetation through haying allows the herbicide to more effectively reach and treat the target weeds.

A more limited application of haying on FWS-managed lands involves its use for establishing fire breaks for prescribed burning. A cooperative farmer would be permitted to hay the firebreak strips in the fall. That area would then have little standing dead vegetation in the early spring, or would green up earlier in the spring and allow use as a fire break.

Prescribed haying in North Dakota averaged about 13,500 acres per year (1996-2000). In South Dakota, FWS managers use prescribed haying on about 2450 acres annually (2004 estimates).

Availability of Resources:

Financial and staff resources are determined to be sufficient at each field station to administer these requests. Staff time will be needed to evaluate the proposed use, to prepare the site-specific SUPs, and to insure compliance with the permit authorization and stipulations necessary to insure compatibility.

To lessen any appearance of favoritism or impropriety, managers should follow Refuge Manual procedures for establishing rental rates and cooperator selection.

Anticipated Impacts of the Use:

Haying will result in short-term disturbances to wildlife and long-term benefits to grasslands and the wildlife species that use these grasslands. Short-term impacts will include disturbance and displacement of wildlife typical of any noisy heavy equipment operation. Cutting and removal of standing grass will result in the short-term loss (late-summer to mid-summer the following year of habitat for those species requiring taller grass for feeding and perching. Prescribed haying will typically be scheduled after July 31 to avoid impacts to most nesting birds. Long-term benefits will accrue due to the increased vigor of the regrown grasses or the establishment of highly desirable native grass and forb species, which will improve habitat conditions for the same species affected by the short-term removal of the cover. Longer-term negative impacts may occur to some resident wildlife species such as pheasant that may lose overwinter habitat in hayed areas. Strict time constraints, and limiting grass stands to no more than 50 percent being hayed at any one time will limit the anticipated impacts to these areas.

Public Review and Comment:

The period of public review and comment began May 1, 2005 and ended on May 14, 2005.

Notices were posted in public places at each of the field stations listed on this Compatibility Determination. This method was selected because the proposed activity is considered minor, incidental, infrequent, with only short-term disturbance.

Determination:

Compatibility Threshold: As this activity is an economic use, it must meet the compatibility threshold of “contributing to the Mission and Purposes” of the Refuge System and the Refuge Area. Prescribed haying is used to benefit Refuge and Waterfowl Production Area grasslands and the migratory birds and other wildlife that use these grasslands.

_____ Use is Not Compatible

XXX Use is Compatible with the Following Stipulations

Stipulations Necessary to Ensure Compatibility:

1. Prescribed haying will generally not take place before August 1 in any given year, unless there are documented management reasons for prescribing an earlier hay date.
2. The permit is issued subject to the revocation and appeals procedure contained in Title 50, Part 25 of the Code of Federal Regulations.
3. Generally, not more than 50 percent of a tract may be hayed in any one year, unless size restrictions or habitat conditions warrant haying of more than half of the area.
4. Prescribed haying can be coupled with a light discing or dragging operation, or an interseeding of desirable species of grass or legumes to further increase the vigor of the grass stand.
5. Bales or stacks must be removed from the area by September 10.

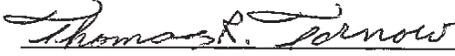
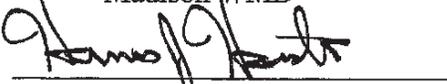
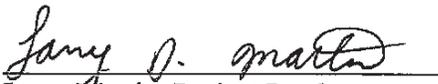
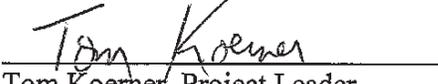
Justification:

Haying will not materially interfere with or detract from the purposes for which these NWRS lands were acquired or established. Haying creates temporary disturbance to vegetation. This disturbance is desirable for grassland management. Haying produces an undesirable but short-term impact to grassland nesting birds and site aesthetics. In the long-term, haying increases grassland vigor, species diversity, and habitat quality. Haying is an alternative management tool that can be used to replace or compliment prescribed burning, mowing, or grazing of Service grasslands. Without periodic disturbance caused by haying, burning, or grazing, the health of the grassland community would decline, as would an areas potential for waterfowl and other migratory bird nesting.

Mandatory 10-Year Reevaluation Date: 10 years from the date of APPROVAL signature

Signatures:

Submitted:

 Michael Bryant, Project Leader Lake Andes Complex	<u>4/26/05</u> Date
 Tom Tornow, Project Leader Madison WMD	<u>4-26-05</u> Date
 Harris Hoistad, Project Leader Huron WMD	<u>4-26-05</u> Date
 Larry Martin, Project Leader Waubay Complex	<u>26 April 2005</u> Date
 Gene Williams, Project Leader Sand Lake Complex	<u>4-26-05</u> Date
 Tom Koerner, Project Leader LaCreek Complex	<u>4-26-05</u> Date



Jack Lalor, Acting Project Leader
Tewaukon Complex

4/26/05

Date



Dave Azure, Acting Project Leader
Kulim WMD

4/26/05

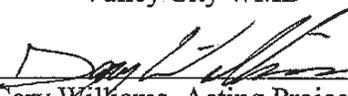
Date



Kim D. Hanson, Project Leader
Arrowwood Complex
Chase Lake WMD
Valley City WMD

4/26/05

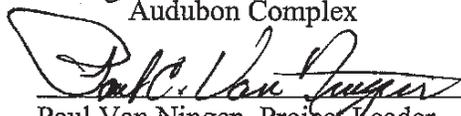
Date



Gary Williams, Acting Project Leader
Audubon Complex

4/26/05

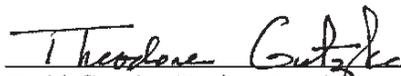
Date



Paul Van Ningen, Project Leader
Long Lake Complex

4/26/05

Date



Tedd Gutzke, Project Leader
J Clark Salyer Complex

April 26, 2005

Date



Roger Hollevoet, Project Leader
Devils Lake Complex

4/26/05

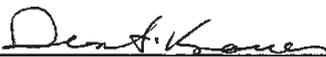
Date



Fred G. Giese, Project Leader
Des Lacs NWR
Lostwood WMD
Crosby WMD

04/26/05

Date

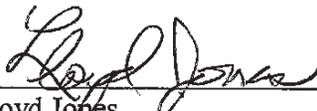


Dean Knauer, Project Leader
Upper Souris NWR

04-27-05

Date

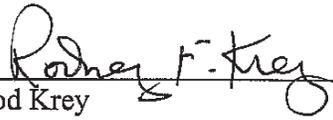
Review:



Lloyd Jones
Regional Compatibility Coordinator

4-27-05

Date

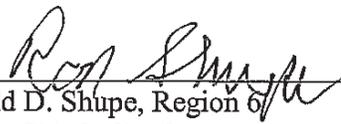


Rod Krey
Refuge Supervisor, ND-SD

4/28/05

Date

Approval:



Ronald D. Shupe, Region 6
Acting Chief of Refuges

May 15, 2005

Date

COMPATIBILITY DETERMINATION
for
Prescribed Grazing on
National Wildlife Refuges and Waterfowl Production Areas
for Management Purposes

Use: Prescribed grazing on National Wildlife Refuges and Waterfowl Production Areas in North and South Dakota.

Station Names:

South Dakota Refuges and Wetland Management Districts:

Lake Andes NWR and WMD, SD
 Madison WMD, SD
 Huron WMD, SD
 Waubay NWR and WMD, SD
 Sand Lake NWR and WMD, SD
 LaCreek NWR and WMD, SD

North Dakota Refuges and Wetland Management Districts:

Tewaukon NWR and WMD, ND
 Kulm WMD, ND
 Arrowwood NWR and WMD, ND
 Valley City WMD, ND
 Chase Lake NWR and WMD, ND
 Audubon NWR and WMD, ND
 Long Lake NWR and WMD, ND
 J Clark Salyer NWR and WMD, ND
 Devils Lake WMD, ND
 Lostwood NWR and WMD, ND
 Crosby WMD, ND
 Des Lacs NWR, ND
 Upper Souris NWR, ND

Establishing and Acquisition Authorities:

Arrowwood NWR; Executive Order (E.O.) 7168, Sept. 4, 1935
 Audubon NWR; 16 USC §664 (Fish and Wildlife Coord. Act)
 Chase Lake NWR; E.O. 932, Aug. 28, 1908
 Des Lacs NWR; E.O. 7154-A, Aug. 22, 1935
 Florence Lake NWR; E.O. 8119, May 10, 1939

J. Clark Salyer NWR; E.O. 7170, Sept. 4, 1935
 Kellys Slough NWR; E.O. 7320, Mar. 19, 1936
 Lake Alice NWR; 16 USC § 715d (Mig. Bird Cons. Act)
 Lake Ilo NWR; E.O. 8154, June 12, 1939
 Lake Nettie NWR; E. O. 8155, June 12, 1939
 Lake Zahl NWR; E. O. 8158, June 12, 1939
 Long Lake NWR; E.O. 5808, Feb. 25, 1932
 Lostwood NWR; E.O. 7171, Sept. 4, 1935
 McLean NWR; 16 USC § 715d (Mig. Bird Cons. Act)
 Slade NWR; 16 USC 715d (Mig. Bird Cons. Act)
 Sullys Hill NGP; E. O. 3596, Dec. 22, 1921
 Tewaukon NWR; Public Land Order (PLO) 286, June 26, 1945
 Upper Souris NWR; E.O. 7161, Aug. 27, 1935

LaCreek NWR; E.O. 7160, Aug. 26, 1935
 Lake Andes NWR; E. O. 7292, Feb. 14, 1936
 Sand Lake NWR; E. O. 7169, Sept. 4, 1935
 Waubay NWR; E. O. 7245, Dec. 10, 1935

Waterfowl Production Areas, Wetland Easements, Grassland Easements - The Migratory Bird Hunting and Conservation Stamp Act, March 16, 1934, (16 USC Sec. 718-718h, 48 Stat. 452) as amended August 1, 1958, (PL 85-585; 72 Stat. 486) for acquisition of "Waterfowl Production Areas"; the Wetlands Loan Act, October 4, 1961, as amended (16 USC 715k-3 - 715k-5, Stat. 813), funds appropriated under the Wetlands Loan Act are merged with duck stamp receipts in the fund and appropriated to the Secretary for the acquisition of migratory bird refuges under the provisions of the Migratory Bird Conservation Act, February 18, 1929, (16 USC Sec. 715, 715d - 715r, as amended.

Refuge Purpose(s):

The Executive Orders for most of the refuges state the purpose "as a refuge and breeding ground for migratory birds and other wildlife."

"...as Waterfowl Production Areas" subject to "...all of the provisions of such Act [Migratory Bird Conservation Act] ...except the inviolate sanctuary provisions..." 16 USC 718(c) (Migratory Bird Hunting and Conservation Stamp)

"...for any other management purpose, for migratory birds." 16 USC 715d (Migratory Bird Conservation Act)

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” (National Wildlife Refuge System Administration Act of 1966, as amended) [16 USC 668(dd)-668(ee)].

Description of Use:

Prescribed grazing is the use of livestock, usually cattle, to remove standing vegetation, reduce vegetative litter, suppress woody vegetation or noxious weeds, open up vegetation-choked wetlands, or open up areas to sunlight and encourage native grass seedlings and growth. Prescribed grazing is carefully timed, and usually of short duration (usually 2-4 weeks), to target certain species for grazing impacts in order to benefit other species for growth after the competing vegetation has been removed.

The prescribed grazing period generally will take place between April and September. Early spring grazing (mid-April through late May) is targeted at cool season exotic species and encourages warm season native grasses and forbs. Mid-season grazing (June and July), especially on non-native grasslands, stimulates fall regrowth. Late-season grazing (August and September) removes litter and encourages spring growth of cool season natives or other cool season species.

Fence construction and maintenance, often temporary electric fence, and control and rotation of the livestock, are the responsibility of cooperating private party. Market rate grazing fees are determined by the Regional Office, but may include standard deductions for fence construction and maintenance, frequent livestock rotations, construction of water gaps, or hauling/providing additional water in dry pastures.

The frequency and duration of prescribed grazing on any Refuge or WPA will be based on site-specific evaluations of the grassland being managed.

Availability of Resources:

Developing grazing plans and Special Use Permits (SUPs) and monitoring compliance and biological effects requires some Service resources. Most grazing management costs; fencing labor, monitoring and moving the livestock, hauling water; are provided by the cooperator or permittee. Evaluating the grasslands for grazing prescriptions and grassland response is already a part of the stations grassland management responsibilities. Some alternative form of grassland management, prescribed burning or haying, may be used if the areas are not treated with prescribed grazing. Managing grasslands through permitted haying has comparable costs to managing a prescribed grazing program. Managed mowing is more expensive since all the labor costs are assumed by the Service. Prescribed burning can be an effective grassland management tool, but there are personnel and weather

limitations on a burning program, as well the fact the some tracts are just not suited to burning management. In addition, there is an ecological benefit to rotating grassland management techniques, such as grazing, burning, and haying, at different seasons, rather than just relying on one technique.

Anticipated Impacts of the Use:

Grazing by domestic livestock has the short-term effect of removing some or much of the standing vegetation from a tract of grassland. Properly prescribed, the effect of this removal of vegetation increases the vigor of the grassland, stimulates the growth of desired species of grass and forbs, and reduces the abundance of targeted species such as cool season exotics, woody species, noxious weeds or invasive species, or cattails. Grazing in the spring may cause the loss of some bird nests due to trampling, and may cause some birds not to nest in areas being grazed. Grazing on public wildlife lands can create an aesthetic issue of concern for some people or visitors who do not understand grassland management. Prescribed grazing is usually of short duration and enhanced, most diverse and vigorous grassland habitats are the end result. Grazing livestock may create a minor and temporary disturbance to wildlife but generally do no harm. There is a slight potential for conflict between the visiting public and the livestock or the permittee, particularly during fall hunting seasons. These situations can be limited by having the livestock removed by the anticipated beginning of fall hunting seasons.

In 2004, prescribed grazing occurred on approximately 17,500 acres of Refuges and WPAs in South Dakota (202,000 fee acres). During the 1996-2000 period, approximately 39,700 acres of grasslands on North Dakota Refuges and WPAs (470,000 fee acres) were treated annually by prescribed grazing treatments.

To eliminate any appearance of favoritism or impropriety, managers should follow Refuge Manual procedures for cooperator or permittee selection.

Public Review and Comment:

The period of public review and comment began May 1, 2005 and ended on May 14, 2005.

Notices were posted in public places at each of the field stations listed on this Compatibility Determination. This method was selected because the proposed activity is considered minor, incidental, infrequent, with only short-term disturbance.

Determination:

Compatibility Threshold: As this activity is an economic use, it must meet the compatibility threshold of “contributing to the Mission and Purposes” of the Refuge System and the Refuge Area. Prescribed grazing is used to improve and manage grassland habitats

on Refuges and Waterfowl Production Areas and the migratory birds and other wildlife that use these habitats.

_____ Use is Not Compatible

XXX Use is Compatible with the Following Stipulations

Stipulations Necessary to Ensure Compatibility:

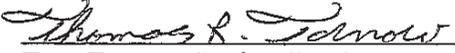
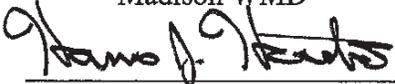
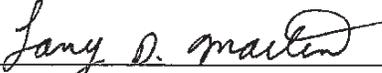
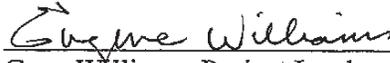
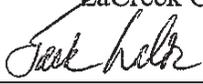
1. SUPs will specify the stocking rate, dates of use, and timing for each unit or grazing cell on the Refuge or WPA.
2. The standard grazing fee, as determined for each state by the Regional Office, and any standard deductions for any labor or work done on the Service lands will be included on the SUP.
3. Grazing permittees must comply with all applicable State Livestock Health laws.
4. No supplemental feeding will be allowed without authorization from the Project Leader/Manager.
5. Control and confinement of livestock will be the responsibility of the permittee.
6. The permit is issued subject to the revocation and appeals procedure contained in Title 50, Part 25 of the Code of Federal Regulations.

Justification:

Controlled grazing by domestic livestock will not materially interfere or detract from the purposes for which these NWRS lands were acquired or established. Prescribed livestock grazing creates temporary disturbances to vegetation. Many of these disturbances are desirable for grassland management. Grazing produces an undesirable but short-term impact to grassland nesting birds and site aesthetics. In the long-term, prescribed grazing increases grassland vigor, species diversity, and habitat quality. Prescribed grazing is an alternative management tool that can be used to replace or complement prescribed burning, mowing, or haying of Service grasslands. Without periodic disturbance caused by haying, burning, or grazing, the health of the grassland community would decline, as would an areas potential for waterfowl and other migratory bird nesting.

Mandatory 10-Year Reevaluation Date: 10 years from the date of APPROVAL signature

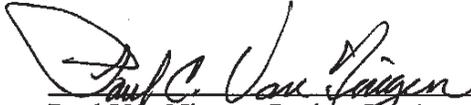
Signatures:Submitted:

	<u>4/26/05</u>
Michael Bryant, Project Leader Lake Andes Complex	Date
	<u>4-26-05</u>
Tom Tornow, Project Leader Madison WMD	Date
	<u>4-26-05</u>
Harris Hoistad, Project Leader Huron WMD	Date
	<u>26 April 2005</u>
Larry Martin, Project Leader Waubay Complex	Date
	<u>4-26-05</u>
Gene Williams, Project Leader Sand Lake Complex	Date
	<u>4-26-05</u>
Tom Koerner, Project Leader LaCreek Complex	Date
	<u>4/26/05</u>
Jack Lalor, Acting Project Leader Tewaukon Complex	Date
	<u>4/26/05</u>
Dave Azure, Acting Project Leader Kulm WMD	Date
	<u>4/24/05</u>
Kim D. Hanson, Project Leader Arrowwood NWR Chase Lake WMD Valley City WMD	Date


 Gary Williams, Acting Project Leader
 Audubon Complex

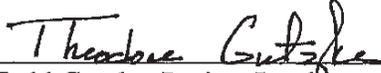
Date

4/26/05


 Paul Van Ningen, Project Leader
 Long Lake Complex

Date

4/26/05


 Tedd Gutzke, Project Leader
 J Clark Salyer Complex

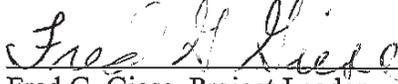
Date

April 26, 2005


 Roger Hollevoet, Project Leader
 Devils Lake Complex

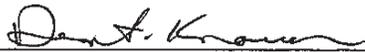
Date

4/26/05


 Fred G. Giese, Project Leader
 Des Lacs NWR
 Lostwood WMD
 Crosby WMD

Date

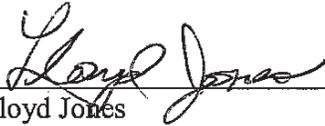
04/26/05


 Dean Knauer, Project Leader
 Upper Souris NWR

Date

4-27-05

Review:


 Lloyd Jones
 Regional Compatibility Coordinator

Date

4-27-05


 Rod Krey
 Refuge Supervisor, ND-SD

Date

4/28/05

Approval:



Ronald D. Shupe, Region 6
Acting Chief of Refuges

Date May 15, 2005

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