Draft Comprehensive Conservation Plan and Environmental Assessment

Sullys Hill National Game Preserve

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Prepared by

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Abbreviations

Administration Act	National Wildlife Refuge System Administration Act
AMSL	above mean sea level
CCP	comprehensive conservation plan
CO_2	carbon dioxide
CFR	Code of Federal Regulations
CWCS	comprehensive wildlife conservation strategy
CWD	chronic wasting disease
DNC	dense nesting cover
EA	environmental assessment
EPA	Environmental Protection Agency
F	Fahrenheit
FMP	fire management plan
FWS	U.S. Fish and Wildlife Service
GIS	Geographic Information System
Improvement Act	National Wildlife Refuge System Improvement Act of 1997
IPM	integrated pest management
NAWMP	North American Waterfowl Management Plan
ND	North Dakota
NDGF	North Dakota Game and Fish Department
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NOA	notice of availability
NOI	notice of intent
NRCS	Natural Resources Conservation Service (USDA)
ORP	outdoor recreation planner
pers. comm.	personal communication
PL	public law
PPR	Prairie Pothole Region
refuge	Sullys Hill National Gme Preserve
Refuge System	National Wildlife Refuge System
Service	U.S. Fish and Wildlife Service
spp.	species
SWG	state wildlife grant
UND	University of North Dakota
USC	United States Code
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOR	visual obstruction reading
WG	wage grade pay schedule (civil service employees)
WMA	waterfowl management area
WMD	wetland management district
WPA	wetlands production area
WUI	wildland-urban interface
YCC	Youth Conservation Corps

Summary

The following summary provides an overview of this draft comprehensive conservation plan (CCP) and environmental assessment for Sullys Hill National Game Preserve, including (1) a general description; (2) purposes of the refuge; (3) vision and goals; (4) alternatives considered, including the proposed action; and (5) the decision to be made regarding the proposed comprehensive conservation plan.

SULLYS HILL NATIONAL GAME PRESERVE LOCATION AND GENERAL DESCRIPTION

Sullys Hill National Game Preserve is a 1,675-acre national wildlife refuge sitting on the south shores of Devils Lake, about ten miles south of the city of Devils Lake, North Dakota. This refuge supports a unique community of habitats such as an oak, ash, basswood, and aspen woodland; mixed-grass prairie; and natural wetlands; along with beaver ponds and created wetlands. These diverse habitats create a large ecotone that provides "edge" habitat for over 250 species of migratory birds, plains bison, Rocky Mountain elk, white-tailed deer, turkeys, and prairie dogs.

The refuge is one of only 19 designated natural areas in North Dakota, of which only four are national wildlife refuges. It is also one of only four refuges established for national bison conservation.

USFWS

Entrance sign for Sullys Hill National Game Preserve

Sullys Hill National Game Preserve has a long history of visitation with over 60,000 annual visitors, making it the most visited refuge in North Dakota. The refuge is becoming a progressive regional conservation learning center, promoting the conservation role of the National Wildlife Refuge System while educating visitors about the functions and benefits of prairie wetlands and grasslands. The refuge uses both indoor and outdoor education with a focus on the sciences, biodiversity, and human dimensions in the environment, providing area educators an environment that makes learning more exciting and interesting.

SULLYS HILL NATIONAL GAME PRESERVE ESTABLISHMENT

The refuge was first established on April 27, 1904, through Public Law 179, that authorized President Theodore Roosevelt to set aside a portion of unallotted lands as a public park in the Devils Lake Indian Reservation, including the unallotted tract of land known as the Fort Totten Military Reservation. The final Proclamation No. 32, establishing Sullys Hill Park, was signed on June 2, 1904, by President Roosevelt and assigned management to the National Park Service. On June 30, 1914, appropriations were made for the creation of a big game preserve within the park.

On December 22, 1921, President Warren Harding, by Executive Order 3596, ordered that all lands in the boundaries of Sullys Hill National Park Game Preserve be reserved and set apart as a refuge and breeding grounds for birds.

In the Act of March 3, 1931, President Herbert Hoover transferred the preserve to the U.S. Fish and Wildlife Service (Service). It was renamed Sullys Hill National Game Preserve and administered as part of the National Wildlife Refuge System as a big game preserve, refuge, and breeding ground for wild animals and birds.

LEGISLATIVE PURPOSES

Every refuge has a purpose for which it was established. This purpose is the foundation upon

which to build all refuge programs, from biology and public use, to maintenance and facilities. No action that the Service or public takes may conflict with this purpose. The refuge purposes are found in legislative acts or administrative orders, which provide the authorities to transfer or acquire a piece of land for a refuge. Over time, an individual refuge may contain lands that have been acquired under a variety of transfer and acquisition authorities, giving a refuge more than one purpose. The goals, objectives, and strategies identified in the draft CCP are intended to support the individual purposes for which the refuge was established.

The purposes for Sullys Hill National Game Preserve are described in the following legislation and public land orders:

- "All the lands that are now reserved or may hereafter be included within the boundaries of the . . . Sullys Hill National Park Game Preserve . . . are hereby further reserved and set apart for the use . . . as refuges and breeding grounds for birds." (Executive Order 3596, December 21, 1921)
- "As a big game preserve, refuge, and breeding grounds for wild animals and birds . . . provided, that the said game preserve is to be made available to the public for recreational purposes in so far as consistent with the use of this area as a game preserve . . . provided further, that hunting shall not be permitted on said game preserve." (46 Stat. 1509, act of March 3, 1931)

REFUGE VISION

The vision for Sullys Hill National Game Preserve is based on the establishing purposes of the refuge, resource conditions and potential, and the issues.

Overlooking North Dakota's largest natural lake and riding the tops of a glacial thrust block formation, Sullys Hill National Game Preserve is dressed in undulating native woodlands and prairie. Teddy Roosevelt's vision and broad community support are largely responsible for the successful conservation of these habitats ensuring the preservation of the refuge's plains bison and Rocky Mountain elk while supporting migrating waves of warblers and other native bird species.

Sullys Hill National Game Preserve is renowned as a regional conservation learning center—greeting families, students, and outdoor enthusiasts of all abilities. Children are able to learn about their natural world using all their senses, which fosters their own environmental ethics. Each visitor's experience not only enriches their personal lives, but instills a unique understanding and appreciation for preserving native prairie and wetland habitats, the natural resources of the Devils Lake Basin, and the mission of the National Wildlife Refuge System to preserve America's wildlife heritage.

REFUGE GOALS

The goals described below reflect the vision for Sullys Hill National Game Preserve.

Goal 1. Prairie Habitat: Maintain prairie plant communities representative of the historical mixed-grass prairies to support healthy populations of grassland-dependent migratory birds in balance with bison, elk, and other indigenous wildlife.

Goal 2. Woodland Habitat: Manage for healthy native woodlands of various age classes and

structure to provide habitat for migratory birds, in balance with bison, elk, and other indigenous wildlife.

Goal 3. Wildlife Population Management: Carry out management practices that ensure healthy populations of Rocky Mountain elk, plains bison, and other indigenous wildlife species that exemplify the genetic integrity of historic prairie wildlife.

Goal 4. Environmental Education and Outreach: Deliver quality, interactive environmental education programming to regional schools, communities, organizations, and local governments to garner support and appreciation for Sullys Hill National Game Preserve, North Dakota's wetland and grassland resources, and the conservation role of the U.S. Fish and Wildlife Service

Goal 5. Visitor Services and Interpretation: Provide captivating visitor services facilities and activities for visitors of all abilities, as well as community groups, youth groups, and members of Spirit Lake Nation that result in a greater understanding and support for the preservation of native habitats and landscapes of North Dakota's Prairie Pothole Region and the mission of the National Wildlife Refuge System.

Goal 6. Protection and Maintenance: Provide for the safety of staff, volunteers, and the visiting public while ensuring the protection and maintenance of refuge facilities, lands, and cultural resources.

THE DRAFT PLAN

After reviewing a wide range of public comments and management needs, the Service developed three alternatives for management of the refuge. Alternative C is the proposed action of the Service and is presented in chapter 6 as the draft comprehensive conservation plan.

ALTERNATIVE ACTIONS

Alternative A—Current management (no action)

Alternative A, the no-action alternative, reflects the current habitat management of the refuge. It provides the baseline against which to compare other alternatives. It is also a requirement of the National Environmental Protection Act that a no-action alternative be addressed in the planning process.

Alternative B

Habitat management under alternative B would begin to address reduced forest regeneration by managing the uncontrolled browsing of captive bison, Rocky Mountain elk, and white-tailed deer within the big game forest, which has resulted in reduced habitat for forest interior birds. The environmental education program would be expanded to provide additional opportunities and improve quality, while providing a consistent message of protecting wetland and grassland habitats. Visitor safety and facility security would improve as a result of cooperative agreements with local law enforcement agencies, regular maintenance, and installing fire and security systems.

Alternative C—Proposed Action

Habitat management under alternative C would address reduced forest regeneration caused by browsing of captive bison, Rocky Mountain elk, and white-tailed deer, as well as deterioration of native prairie as a result of season-long grazing and lack of fire. The environmental education program would be expanded to include additional on-site and off-site opportunities. Visitor safety and facility security would improve as a result of improved staffing, cooperative agreements with local law enforcement agencies, regular maintenance, and installing fire and security systems.

DECISION TO BE MADE

The environmental assessment describes three alternatives for achieving the above goals. Based on the analysis described in the environmental assessment, a decision will be made by the U.S. Fish and Wildlife Service's regional director for region 6 (Mountain-Prairie Region) on which alternative will be selected to manage the refuge for the next 15 years.

1 Introduction

Scott Ralston/USFWS

Birders

This document presents an environmental assessment (EA) that evaluates three management alternatives for Sullys Hill National Game Preserve and potential environmental consequences of those alternatives. Alternative C is the proposed action of the U.S. Fish and Wildlife Service (Service) and is presented in chapter 6 as the draft comprehensive conservation plan (CCP) for the refuge. This chapter provides an introduction to the CCP process and describes the involvement of the Service, the state of North Dakota, the public, and others, as well as conservation issues and plans that affect Sullys Hill National Game Preserve.

The U.S. Fish and Wildlife Service has developed this draft CCP to provide a foundation for the management and use of Sullys Hill National Game Preserve, which is located in Benson County near the town of Fort Totten, North Dakota (see figure 1, vicinity map). When finalized, the CCP will serve as a working guide for management programs and actions over the next 15 years.

This draft CCP was developed in compliance with the National Wildlife Refuge System Improvement Act of 1997 (Improvement Act) and Part 602 (National Wildlife Refuge System Planning) of "The Fish and Wildlife Service Manual." The actions described in this draft CCP and EA meet the requirements of the Council on Environmental Quality regulations that implement the National Environmental Policy Act of 1969 (NEPA). Compliance with NEPA is also being achieved through involvement of the public.

The final CCP will specify the necessary actions to achieve the vision and purposes of the refuge. Wildlife is the first priority in refuge management, and public use (wildlife-dependent recreation) is allowed and encouraged as long as it is compatible with the refuge's purposes.

The draft CCP and EA have been prepared by a planning team comprised of representatives from various Service programs. In addition, the planning team used public input, public involvement, and the planning process as described in section 1.6, "The Planning Process."

After reviewing a wide range of public comments and management needs, the planning team developed alternatives for managing the refuge. The team recommended alternative C as the Service's proposed action for management of the refuge. This action addresses all substantive issues, while determining how best to achieve the

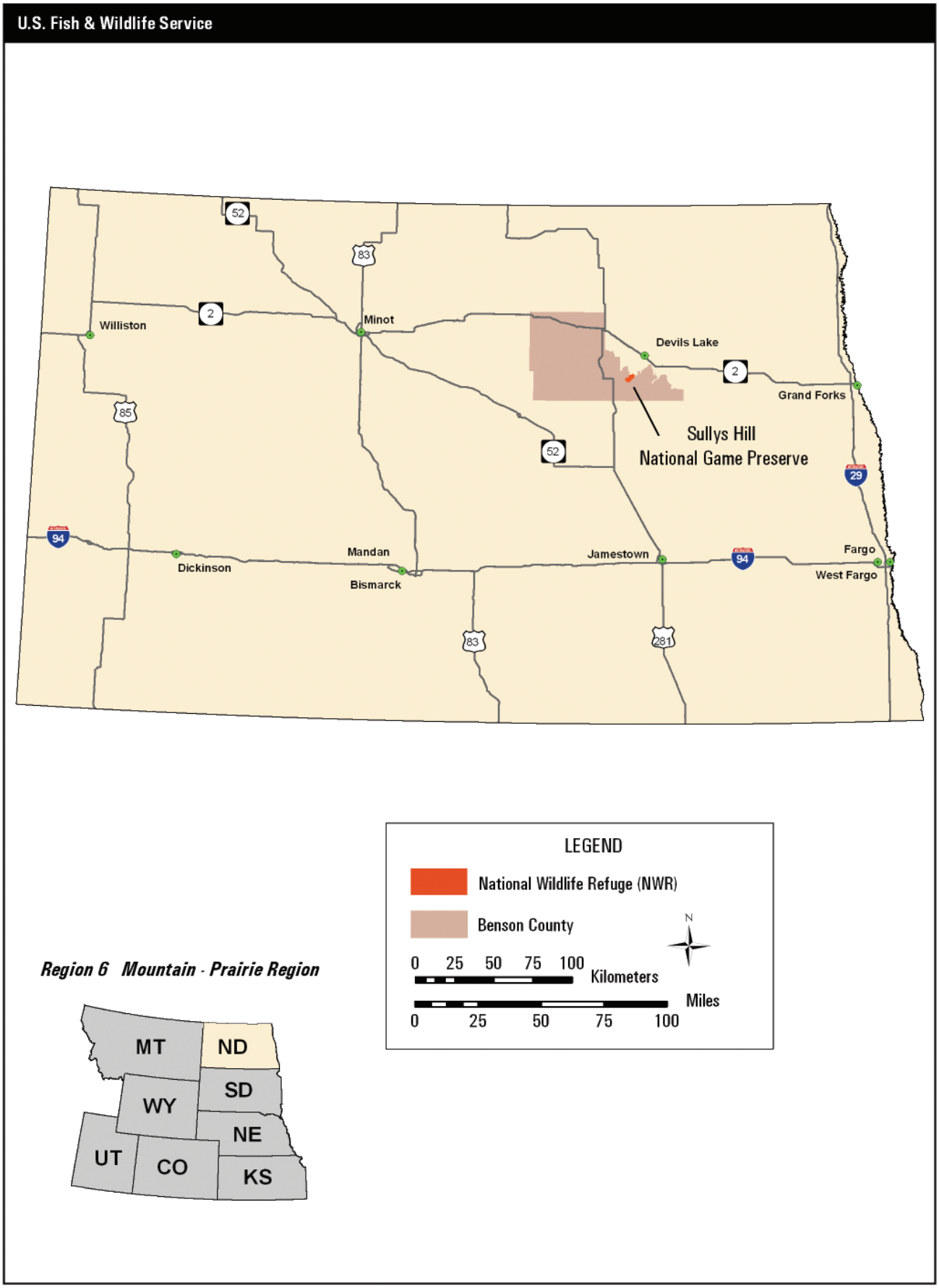


Figure 1. Vicinity map for Sullys Hill National Game Preserve, North Dakota.

purposes of the refuge. The proposed action and other alternatives are summarized in chapter 3. Chapter 4 describes the affected environment, and chapter 5 discusses the predicted effects (environmental consequences) of the proposed action and alternatives. Chapter 6 describes how the proposed action would be implemented.

1.1 PURPOSE AND NEED FOR THE PLAN

The purpose of this draft CCP is to identify the role that Sullys Hill National Game Preserve 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 order to carry out the mission of the Refuge System;
- to provide a clear statement of direction for management of the refuge;
- to provide neighbors, visitors, and government officials with an understanding of the Service's management actions on and around the refuge;
- to ensure that the Service's management actions are consistent with the mandates of the Improvement Act;
- to ensure that management of the refuge is consistent with federal, state, and county plans; and
- to 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 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

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.

Over a century ago, America's fish and wildlife resources were declining at an alarming rate. Concerned citizens, scientists, and hunting and angling groups joined together to restore and sustain America's national wildlife heritage. This was the genesis of the U.S. Fish and Wildlife Service.

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 America.

Service Activities In North Dakota (2005)

Service activities in North Dakota contribute to the state's economy, ecosystems, and education programs. The following list describes the Service's presence and activities:

- employed 201 people in North Dakota
- assisted by 623 volunteers who donated more than 14,245 hours in support of Service projects
- managed two national fish hatcheries and one fish and wildlife management assistance office
- managed 65 national wildlife refuges encompassing 342,799 acres (0.8 percent of the state)
- managed 12 wetland management districts (WMDs) including:
  - 284,317 acres of fee waterfowl production areas (0.6 percent of the state)
  - 1,046,358 wetland acres under various leases or easements (2.4 percent of the state)
- hosted more than 394,063 annual visitors to Service-managed lands including:

  - 152,160 hunting visits
  - 2,360 trapping visits
  - 83,650 fishing visits
  - 142,281 wildlife observation visits
  - environmental education programs for over 51,000 students
- provided $3.3 million to North Dakota Game and Fish Department (NDGF) for sport fish restoration and $3.4 million for wildlife restoration and hunter education
- helped private landowners restore more than 191,225 acres on 4,464 sites and restore 47.8 miles of river since 1987, through the Partners for Wildlife Program
- employed 11 Partners for Wildlife program managers
- paid North Dakota counties $352,271 under the Refuge Revenue Sharing Act (funds used for schools and roads)

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 brown pelicans and other 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 Refuge System.

One-hundred years later, the Refuge System has become the largest collection of lands in the world specifically managed for wildlife. It encompasses over 96 million acres within 547 refuges and over 3,000 small areas for waterfowl breeding and nesting. Today, there is at least one refuge in every state, including the territories of Puerto Rico and the U.S. Virgin Islands.

In 1997, the Improvement Act established a clear mission for the Refuge System.

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

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

- to fulfill the mission of the Refuge System;
- to fulfill the individual purposes of each refuge and district;
- to consider the needs of fish and wildlife first;
- to 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;
- to maintain the biological integrity, diversity, and environmental health of the Refuge System;
- to recognize that wildlife-dependent recreation activities including hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation, are legitimate and priority public uses; and
- to 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. Consistent with the Improvement Act, the Service prepares all CCPs in conjunction with public involvement. Each refuge and each district is required to complete its CCP within a 15-year timeframe (by 2012).

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 millions of dollars to local economies. In 2002, approximately 35.5 million people visited the Refuge System, mostly to observe wildlife in their natural habitats. Visitors are most often accommodated through nature trails, auto tours, interpretive programs, and hunting and fishing opportunities. Significant economic benefits are generated for the local communities that surround refuges and wetland management districts. Economists report that Refuge System visitors contribute more than $792 million annually to local economies.

1.3 NATIONAL AND REGIONAL MANDATES

Refuge System units are managed to achieve the mission and goals of the Refuge System, along with the designated purpose of the refuges and districts (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 Refuge System, a new process for determining compatible public uses on refuges and districts, and a requirement that each refuge and district 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 and 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 refuge and district.

A detailed description of these and other laws and executive orders that may affect the CCP or the Service's implementation of the CCP is in appendix A. Service policies on planning and day-to-day management of refuges and districts are in the "Refuge System Manual" and "The Fish and Wildlife Service Manual."

1.4 REFUGE CONTRIBUTIONS TO NATIONAL AND REGIONAL PLANS

Sullys Hill National Game Preserve contributes to the conservation efforts described here.

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—attended by refuge managers, other Service employees, and representatives from leading conservation organizations.

The report contains 42 recommendations packaged with three vision statements dealing with wildlife and habitat, people, and leadership—this CCP deals with these three major topics. The planning team reviewed the recommendations in the report for guidance during CCP planning.

Partners In Flight

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 land bird species and habitat types. Partners in Flight activities have resulted in the development of 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 the bird life of this continent. The first priority is to prevent the rarest species from becoming extinct. The second priority is to prevent uncommon species from descending into threatened status. The third priority is to "keep common birds common."

There are 58 physiographic areas, defined by similar physical geographic features, wholly or partially contained within the contiguous United States, and several others wholly or partially contained in Alaska. The Sullys Hill National Game Preserve lies within the physiographic area known as the northern mixed-grass prairie, area 37 (see figure 2, physiographic areas).

Physiographic Area Description

The northern mixed-grass prairie physiographic area includes almost the entire eastern half of South Dakota and central North Dakota, from the Red River Valley on the east, to the Missouri River and Montana border on the south and west. In Canada, it includes a small portion of southern

Manitoba and a swath that crosses Saskatchewan and extends into Alberta. The southern edge of this physiographic area is the terminus of a glacial moraine parallel to the course of the nearby Missouri River. To the north, prairie gives way to aspen parkland.

Precipitation declines and evaporation rates increase from east to west across the northern mixed-grass prairie, resulting in differences in the height of dominant grasses. To the east, the mixed grass begins as topography rises out of the tall-grass prairie of the Red River Valley. Grass height gradually decreases toward the western boundary of this physiographic area.

Because of the glacial history of the northern mixed-grass prairie and the relationship between precipitation and evapotranspiration, the area is dotted with thousands of depressions that range from permanently- to periodically-wet. This area is known as the Prairie Pothole Region.

Priority bird species and habitats of the northern mixed-grass prairie include the following:

Grassland

- Baird's sparrow
- greater prairie-chicken
- McCown's longspur
- Sprague's pipit
- Le Conte's sparrow

Wetland

- yellow rail
- Nelson's sharp-tailed sparrow
- marbled godwit

Riparian Woodland

- Bell's vireo

River Sandbars

- piping plover
- waterfowl
- shorebirds

Maintenance of large, unfragmented grassland ecosystems is the conservation objective for areas where agriculture is not dominant. On the drift prairie and other agricultural areas, conservation of discrete blocks of grassland-wetland complexes is recommended.

North American Waterfowl Management Plan

Written in 1986, the "North American Waterfowl Management Plan" (NAWMP) 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.

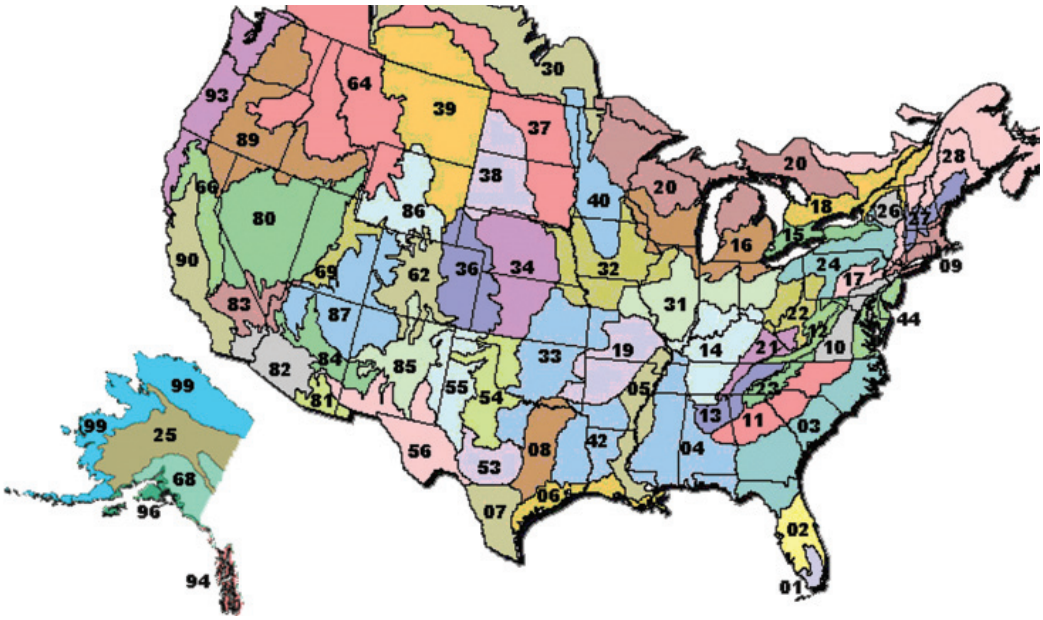


Figure 2. Physiographic areas of the United States.
(*Source: Partners in Flight*)

By 1985 waterfowl populations had plummeted to record lows. Habitat that waterfowl depend on 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 United States and Canadian governments 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, plus its implementation at the regional level. Its success depends on the strength of partnerships called "joint ventures," involving 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 projects through a wide array of community participation efforts. Joint ventures develop implementation plans focusing on areas of concern identified in the plan. Sullys Hill National Game Preserve is part of the "Prairie Pothole Joint Venture."

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 and territories with federal dollars to support conservation aimed at protecting wildlife and preventing species from becoming endangered 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 the SWG program, each state, territory, and the District of Columbia were required to complete a comprehensive wildlife conservation strategy (CWCS) by October 1, 2005, in order to receive future funding.

These strategies 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, ecosystems and landscape-oriented, fish and wildlife conservation effort. The Service approves CWCSs and administers SWG program funding.

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

1.5 ECOSYSTEM DESCRIPTION AND THREATS

Missouri Main Stem River Ecosystem

Sullys Hill National Game Preserve is located within the Hudson Bay watershed, which is part of the federally recognized "Missouri Main Stem River Ecosystem" (see figure 3, ecosystem map). This ecosystem includes portions of the Missouri River and Hudson Bay watersheds. An initial ecosystem management plan identified four focus areas needing the highest priority for protection and evaluation: wetlands, Missouri River, native prairie, and riparian areas. Priorities were based on significance in the ecosystem, species diversity, risk or threat to the entire focus area, public benefits, international values, and trust resources. Although a detailed analysis of habitats, threats, and priorities for this ecosystem has not been completed, a vision and set of goals and objectives have been developed for each focus area, as described in the following narrative.

Wetlands

Threats: The glaciated prairies on North Dakota, South Dakota, and northeastern Montana cover approximately 60 million acres. Once an abundance of prairie pothole wetlands in a sea of native prairie, the area is now the "breadbasket" of the country and intensively farmed. Drainage for agricultural purposes has reduced wetlands by over 40%—from 7.2 million acres to 3.9 million acres.

Vision: Diverse, wetland habitats and watersheds that provide an abundance and diversity of native flora and fauna in the ecosystem for the benefit of the American public.

Missouri River

Threats: Originating in the Rocky Mountains of southcentral Montana, the Missouri River is vastly different from the "untamed" floodplain system of even 50 years ago. The river flows 2,300 miles—traversing seven states and passing through seven main stem dams built and maintained by the federal government. Over 900 miles (nearly 60%) of the former upper river passing through Montana, North Dakota, South Dakota, and Nebraska now lie under permanent

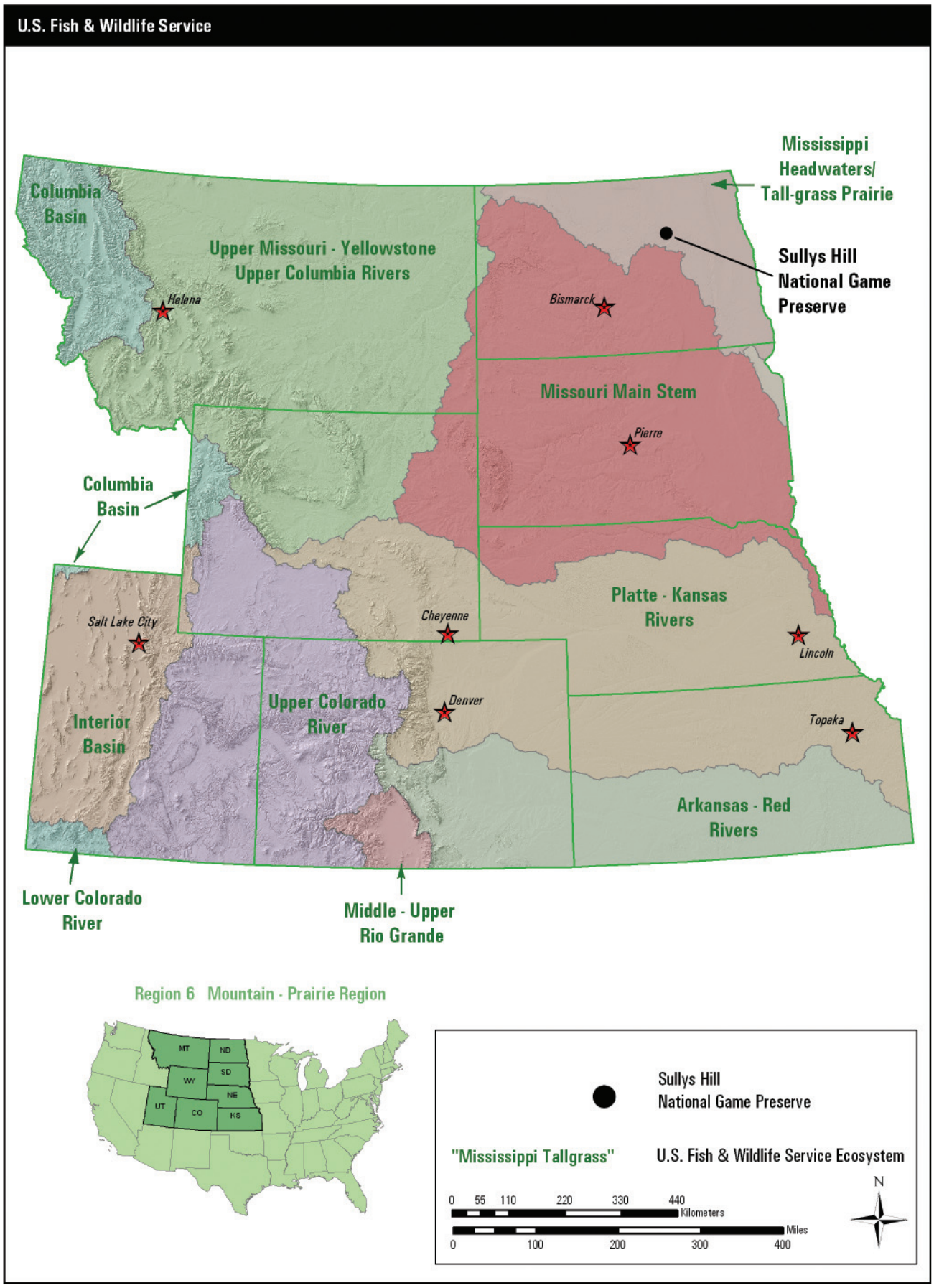


Figure 3. Missouri Main Stem River ecosystem map.

multipurpose reservoirs. As the Missouri River changed, so did the wildlife communities that depend on it. Currently, 8 species of fish, 15 species of birds, 6 species of mammals, 4 species of reptiles, 6 species of insects, 4 species of mollusks, and 7 species of plants native to the ecosystem are listed as either threatened or endangered, or are under status review for possible listing.

Vision: A healthy Missouri River capable of self-sustaining fish and wildlife resources.

Native Prairie

Threats: Native prairie in the Missouri Main Stem River Ecosystem consists of tall-grass, mid-grass, and short-grass prairies. Although the plant and wildlife species differ across the gradation from tall- to short-grass prairie, the threats and issues remain the same—conversion of prairie for other uses. The western river area of North Dakota has lost approximately 60% of the original 34 million acres of native prairie due to conversion to agricultural use.

Vision: Protect, restore, and maintain ecosystem native prairie and other grasslands ecosystems to ensure diversity and an abundance of native flora and fauna.

Riparian Areas

Threats: Riparian areas make up a small portion of the habitat in the Hudson Bay (Missouri Main Stem River) ecosystem. However, riparian and riverine wetland habitats are more important than other focus areas to fish and wildlife resources—migratory birds, threatened and endangered species, native fish, rare and declining fisheries, amphibians, and many mammals. Riparian habitats provide for much of the biodiversity in the ecosystem. Many of the species occurring in the ecosystem would be eliminated without healthy riparian areas. Sedimentation, contamination, invasive species, and development threaten the health of this diverse habitat.

Vision: Healthy riparian and floodplain ecosystems that provide an abundance and diversity of indigenous flora and fauna.

Refuge Relationship

Native plant species found in the refuge's mixed-grass prairie habitat is declining due to extensive infestation of invasive plants.

1.6 PLANNING PROCESS

This draft CCP and EA for Sullys Hill National Game Preserve are intended to comply with the Improvement Act, NEPA, and the implementing regulations of both acts. The Service issued its Refuge System planning policy in 2000, which established requirements and guidance for refuge and district plans—including CCPs and step-down management plans—to ensure that planning efforts comply with the Improvement Act. The planning policy identified several steps of the CCP and environmental analysis process (see figure 4, steps in the planning process).

Table 1 lists the specific steps in the planning process to date for the preparation of this draft CCP and EA.

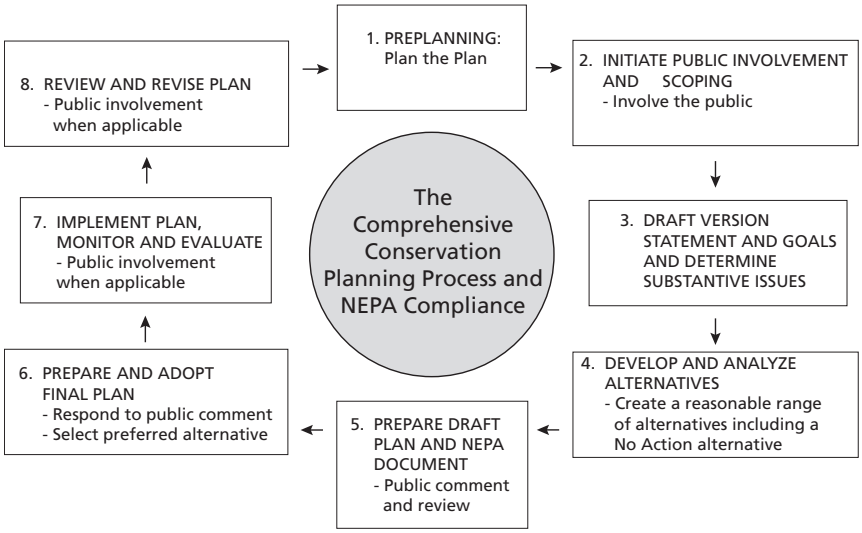


Figure 4. Steps in the planning process.

Table 1. Planning process summary and timeline for Sullys Hill National Game Preserve.

Date	*Event*	*Outcome*
June 23, 2005	Forest management review.	Forest management program review with the ND Forest Service, NRCS, and Service staff.
January 26, 2006	Kickoff meeting.	CCP overview developed; planning team list finalized; purposes identified; initial issues and qualities list developed; development of mailing list initiated.
January 26, 2006	Kickoff meeting.	Issues and qualities list updated; biological and mapping needs identified; public scoping planned.
May 1, 2006	Vision statement developed.	Worked with team members, including the NDGF, to develop first draft of vision statement for CCP.
May 23, 2006	NOI published.	NOI published in Federal Register initiating public scoping.
June 8, 2006	Planning update mailed.	First planning update sent to mailing list describing planning process and announcing upcoming public scoping meeting.
June 15, 2006	Focus group meeting (woodland birds).	Discussed woodland bird habitat needs and impacts of grazing by bison (Service nongame biologists).
June 17, 2006	Sullys Hill National Game Preserve Annual Birding Festival.	Presentations and displays reach over 1,200 attendees at the annual birding festival.
June 29, 2006	Public meeting, Sullys Hill National Game Preserve visitor center.	Public opportunity offered to learn about the CCP and provide comments.
August 1, 2006	Public scoping ends.	All public scoping comments were due. Comments were compiled for consideration by planning team.
August 1, 2006	Focus group meeting (disease control/ grazing).	Discussed ungulate grazing and disease control (Service, NRCS, and UND researchers).
August 23, 2006	Focus group meeting (disease control).	Discussed fenced animal disease issues with North Dakota Board of Animal Health.
August 29, 2006	Meeting with Spirit Lake Nation tribal council.	Presented CCP process and potential partnership proposals to Spirit Lake Nation tribal council members and chairwoman.
August 30–31, 2006	Vision and goals workshop.	Fine-tuned initial vision statement and developed goals to support it.

Table 1. Planning process summary and timeline for Sullys Hill National Game Preserve.

Date	*Event*	*Outcome*
September 20, 2006	Focus group meeting (visitor services).	Visitor Services Program experts from the USFWS and tribal members reviewed the current refuge program.
September 21–22, 2006	Alternatives workshop.	Alternatives table developed.
January 17–18, 2007	Objectives and strategies workshop.	Finalized alternatives table and began writing objectives/strategies for the proposed action.
February 2007–June 2007	Prepare draft plan.	Planning team prepared draft CCP/draft EA.
March 18–April 2, 2008	Internal review.	Draft CCP reviewed by other Service divisions along with interested state and tribal agencies.

A notice of intent (NOI) to prepare the draft CCP and EA was published in the "Federal Register" on May 23, 2006; this date also initiated the public scoping process. Scoping was announced to the public through news releases, and a public scoping meeting was held on June 29, 2006. The public scoping period was closed August 1, 2006.

At this same time, the first planning update was distributed. Over the course of pre-planning and public scoping, the planning team collected available information about the resources of the refuge and the surrounding areas. Chapter 4 summarizes this information.

Scott Ralston/USFWS

Visitors enjoying one of several presentations given at the annual Birding and Nature Festival.

Coordination With The Public

A mailing list was prepared during the preplanning phase. The list includes more than 320 names of private citizens; local, regional, and state government representatives and legislators; other federal agencies; and interested organizations, A summary of the nongovernmental, state, and federal organizations who participated in public involvement is in appendix C.

The first planning update issue was sent to everyone on the mailing list in June 2006. Information was provided on the history of the refuge and the CCP process, along with an invitation to the public scoping meeting. Each planning update included a comment form and postage-paid envelope to give the public an opportunity to provide written comments. Comments via email were also accepted at the refuge's email address.

Presentations about the CCP process were made during all public activities including the refuge annual birding festival, attended by over 1,200 individuals.

The public scoping meeting was held on June 29, 2006 at the refuge visitor center. There were 10 attendees including local citizens, local teachers, and members of the Spirit Lake Nation. After a presentation about the refuge and an overview of the CCP and NEPA process, attendees met with presenters to ask questions and offer comments. Each attendee was given a written comment form to submit additional thoughts or questions.

All written comments were due August 1, 2006. A total of 183 written comments were received throughout the scoping process. All comments were reviewed by the planning team and considered throughout the planning process.

State Coordination

The Service's region 6 director sent an invitation letter in April 2006 to the director of NDGF requesting the department's participation in the CCP process. Several representatives from the NDGF have participated in the planning process. Local NDGF wildlife managers and the refuge staff maintain excellent, ongoing working relations that preceded the start of the CCP process.

The NDGF's mission is to "protect, conserve, and enhance fish and wildlife populations and their habitats for sustained public consumptive and nonconsumptive uses." The NDGF 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. The state manages over 78,000 acres in support of wildlife, recreation, and fisheries.

Tribal Coordination

The Spirit Lake Tribal Council was sent a written invitation in April 2006 to participate in the CCP planning process. The Spirit Lake Nation Reservation surrounds the refuge boundary on three sides. Although no initial response was received, tribal members did attend the public scoping meeting. At that time another meeting was proposed for the tribal council meeting in August.

On August 28, 2006, the tribal chairwoman and 11 other members of the tribe, including 3 council members and tribal planning staff, met with refuge staff and the planning team leader at the Sullys Hill National Game Preserve Education and Visitor Center (visitor center). A presentation on the CCP process and a separate presentation outlining common goals and interests between the refuge and the tribe were presented. The tribe also attended the visitor services workshop held the following month. Their insights were valuable and all comments were considered during development of alternatives. In particular, the refuge staff recognized several opportunities to further incorporate the tribe's history and culture into future visitor services programs.

Results Of Scoping

Table 1 and appendix C summarize all scoping activities. Comments collected from scoping meetings and correspondence, including comment forms, were used in the development of a final list of issues to be addressed in this draft CCP and EA.

The Service determined which alternatives could best address the issues. The planning process ensured that issues with the greatest potential effect on the refuge would be resolved or given priority over the life of the final CCP. These issues are summarized in chapter 2.

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

2 The Refuge

Scott Ralston/USFWS

View of lower forest surrounding Sweetwater Lake.

This chapter discusses the history, purpose, and special values of Sullys Hill National Game Preserve, the proposed vision and goals, and planning issues.

2.1 ESTABLISHMENT, ACQUISITION, AND MANAGEMENT HISTORY

The establishment of Sullys Hill National Game Preserve was first addressed in April 27, 1904, by the Fifty-Eighth Congress of the United States. The Senate and House of Representatives enacted bill H.R.11128, known as Public Law No. 179, which authorized President Theodore Roosevelt to reserve a tract of land embracing Sullys Hill as a public park. It stated that a portion of unallotted lands within the Devils Lake Indian Reservation, including the unallotted tract of land known as the Fort Totten Military Reservation, would be set aside for this purpose. Much of the remaining unallotted lands would be disposed under the general provisions of the homestead and town site laws of the United States and opened to settlement by proclamation of the President. The final Proclamation, No. 32, was signed on June 2, 1904, by President Roosevelt, officially establishing Sullys Hill Park as part of the National Park Service system. Ten years later, on June 30, 1914, appropriations were made for the creation of a big-game preserve within the park.

On December 22, 1921, President Warren Harding, by Executive Order 3596, ordered that all lands within the boundaries of Sullys Hill National Park Game Preserve be reserved and set apart as a refuge and breeding grounds for birds.

In the Act of March 3, 1931, President Herbert Hoover transferred the preserve from the National Park Service to the U.S. Fish and Wildlife Service and renamed it Sullys Hill National Game Preserve. This transfer became law by the Seventy-First Congress where it was stated that the refuge should be administered "as a big game preserve, refuge and breeding grounds for wild animals and birds." Sullys Hill National Game Preserve is administered as part of the National Wildlife Refuge System.

Management History

Sullys Hill National Game Preserve has a rich history of management, primarily centered on the purposes of migratory birds, big game, and public use. Refuge management history indicates that regular timber management occurred throughout the woodlands by cutting and coppice regeneration (growth of new shoots from stumps). Defoliation of grasslands primarily occurred because of grazing and haying activities

associated with the management of the herds of bison, elk, and deer. Extensive visitor use continues to be a major component of the refuge.

Historical records show that through 1943, the refuge utilized the services of Works Project Administration personnel, a depression-era program that was used for many public projects. A shortage of material and human resources caused by World War II (1939–1945) made refuge management very difficult. Historical data from the manager's log indicates that staff did not have time to serve the public so they did their "work" during the daytime shift and then worked off-the-clock in the evenings to service visitors and maintain the facilities. Much of the historical visitation to the refuge was for wildlife viewing and social gatherings. Visitation during this broader public or "park" use was up to 90,000 visitors annually.

Current management of the refuge reflects its original purposes, and specifically supports the National Refuge System's vision of putting wildlife first. As an example, managing habitat for migratory birds is a major focus in managing the forest and prairie areas. Bison management has recently evolved to center upon Service-wide metapopulation management, focusing on the genetic conservation of this species. Public use is based on wildlife-dependent interpretative activities and education programs. The goal has been to use the refuge as a regional conservation learning center, keeping the refuge habitats and associated wildlife at the core. Approximately 5,000 students are taught each year in the indoor and outdoor classrooms, and there are 60,000 visitors annually.

2.2 SPECIAL VALUES OF THE REFUGE

Qualities are defined as the characteristics and features that make the areas special and worthy of refuge status. The planning team and the public identified the following outstanding qualities of Sullys Hill National Game Preserve:

- The refuge contains shallow wetland, deep lake, woodland, and grassland habitats, and together they provide for a wide variety of migratory birds, unique small mammals and furbearers, and large ungulates, such as bison and elk.
- The refuge protects an important piece of native woodland, a habitat type found only in 2% of North Dakota. This woodland likely includes the most western range of American basswood.
- The refuge attracts a diversity of woodland bird species, such as warblers, that are absent from the surrounding grassland ecosystem.
- Several unique plant species thrive on the undisturbed hills across the refuge, including ball cactus, downy paintbrush, Indian pipe, and marsh marigold.
- The woodlands of Sullys Hill National Game Preserve provide a significant acreage to support over 250 species of nesting and staging migratory birds unique to North Dakota.
- Sullys Hill National Game Preserve is one of only 19 designated natural areas in North Dakota of which only 4 are national wildlife refuges.
- Interactions with both flora and fauna are available to refuge visitors.
- The Service has a tremendous opportunity to educate the visiting public at the station's education and visitor center about the value of wetlands and grasslands, and about the refuges and wetland management districts in North Dakota and throughout the nation. There is no other place in this region of the country where the Service has this type of facility to accomplish this mission of outreach and environmental education.
- The education and visitor center has numerous outreach displays, tools, and techniques available to Service personnel, teachers, and other educators to conduct both student and adult environmental education and interpretation.
- The refuge is a great education and learning destination for both indoor and outdoor environmental education with a focus on the sciences, biodiversity, and human dimensions in the natural environment.
- Special events educate visitors from the surrounding areas and the nation on the values of the Refuge System for the purpose of garnering support for the Service's mission.
- The refuge is the Service's link to the local community. The outreach conducted through the refuge is instrumental in educating the public and garnering support for the work carried out by the Devils Lake WMD Complex, especially for the protection of wetlands and grasslands.
- The "friends group" at Sullys Hill National Game Preserve was the first formed in North Dakota and has been an active supporter of both the refuge and the

conservation activities conducted by the staff at Devils Lake WMD Complex.

- The refuge has several archaeological sites that reflect thousands of years of human occupation and use.

2.3 PURPOSES FOR THE REFUGE

Every refuge has a purpose for which it was established. This purpose is the foundation upon which to build all refuge programs, from biology and public use, to maintenance and facilities. No action that the Service or public takes may conflict with this purpose. The refuge purposes are found in legislative acts or administrative orders, which provide the authorities to transfer or acquire a piece of land for a refuge. Over time, an individual refuge may contain lands that have been acquired under a variety of transfer and acquisition authorities, giving a refuge more than one purpose. The goals, objectives, and strategies identified in the draft CCP are intended to support the individual purposes for which the refuge was established.

The purposes for Sullys Hill National Game Preserve are described in the following legislation and public land orders:

- "All the lands that are now reserved or may hereafter be included within the boundaries of the . . . Sullys Hill National Park Game Preserve . . . are hereby further reserved and set apart for the use . . . as refuges and breeding grounds for birds." (Executive Order 3596, December 21, 1921)

- "As a big game preserve, refuge, and breeding grounds for wild animals and birds . . . provided, that the said game preserve is to be made available to the public for recreational purposes in so far as consistent with the use of this area as a game preserve . . . provided further, that hunting shall not be permitted on said game preserve." (46 Stat. 1509, Act of March 3, 1931)

Scott Ralston/USFWS

Dragonfly on Lead Plant.

2.4 VISION

A vision is a concept and includes the desired conditions for the future that the Service is trying to accomplish at the refuge. The vision for a refuge is a future-oriented statement designed to be achieved through refuge management throughout the life of a CCP and beyond. This is the draft vision statement developed by the planning team for the Sullys Hill National Game Preserve.

Overlooking North Dakota's largest natural lake and riding the tops of a glacial thrust block formation, Sullys Hill National Game Preserve is dressed in undulating native woodlands and prairie. Teddy Roosevelt's vision and broad community support are largely responsible for the successful conservation of these habitats ensuring the preservation of the refuge's plains bison and Rocky Mountain elk while supporting migrating waves of warblers and other native bird species.

Sullys Hill National Game Preserve is renowned as a regional conservation learning center—greeting families, students, and outdoor enthusiasts of all abilities. Children are able to learn about their natural world using all their senses which fosters their own environmental ethics. Each visitor's experience not only enriches their personal lives, but instills a unique understanding and appreciation for preserving native prairie and wetland habitats, the natural resources of the Devils Lake Basin, and the mission of the National Wildlife Refuge System to preserve America's wildlife heritage.

2.5 GOALS

The Service developed a set of goals for Sullys Hill National Game Preserve based on the Improvement Act, the refuge's purposes, and information developed during CCP planning. The goals achieve the vision and purposes of the refuge and outline approaches for managing refuge resources. The Service established 6 goals for the refuge.

Prairie Habitat

Maintain prairie plant communities representative of the historical mixed-grass prairie to support healthy populations of grassland-dependent migratory birds in balance with bison, elk, and other indigenous wildlife.

Woodland Habitat

Manage for healthy native woodlands of various age classes and structure to provide habitat for migratory birds, in balance with bison, elk, and other indigenous wildlife.

Wildlife Population Management

Carry out management practices that ensure healthy populations of Rocky Mountain elk, plains bison, and other indigenous wildlife species that exemplify the genetic integrity of historical prairie wildlife.

Environmental Education And Outreach

Deliver quality interactive environmental education programming to regional schools, communities, organizations, and local governments to garner support and appreciation for the refuge, North Dakota's wetland and grassland resources, and the conservation role of the U.S. Fish and Wildlife Service.

Visitor Services And Interpretation

Provide captivating visitor services facilities and activities for visitors of all abilities, community groups, youth groups, and the members of Spirit Lake Nation that result in a greater understanding and support for the preservation of native habitats and landscapes of North Dakota's Prairie Pothole Region and the mission of the Refuge System.

Protection And Maintenance

Provide for the safety of staff, volunteers, and the visiting public while ensuring the protection and maintenance of refuge facilities, lands, and cultural resources.

2.6 PLANNING ISSUES

Although Sullys Hill National Game Preserve is well established, celebrating its 100th birthday on June 4, 2004, it is not without challenges or management issues that need to be addressed. These challenges include areas such as staffing, funding, visitor use and opportunities, accessibility, flooding, refuge support, biology, disease, and overall habitat and wildlife management. The following summarizes these issues and some of their effects:

Staffing Issues

- Serving as a conservation learning center is an important designation and direction for this refuge. Inadequate staff for conservation education has created a roadblock to the refuge reaching its full potential. Numerous opportunities have been lost to instill a greater understanding and appreciation for the important conservation role of the Refuge System here in the Devils Lake Basin and abroad.
- The refuge struggles to remain open in the winter season due to lack of staff to keep roads clear.
- This refuge has historically had only one full-time person dedicated to its management. The refuge hosts over 60,000 students and guests annually. Providing a safe and educational experience for these visitors is very important but leaves little time for wildlife and habitat management. The minimal staffing also prevents the expansion of programs into the surrounding schools and communities.
- Wildlife management needs at the refuge include herd management, disease prevention, genetics, population dynamics, and trust species needs.
- Given the small staff-size and budget, numerous habitat needs have not been addressed, including promoting forest regeneration, determining native prairie carrying capacities, plant inventories, habitat health, invasive species, and disease management.
- There is no administrative staff located at the refuge.
- Even though the refuge hosts 60,000 visitors annually, there is minimal law enforcement presence. There has been some vandalism, including fires set on refuge lands.

Visitor Services Programs Issues

- The refuge is part of the Devils Lake WMD Complex, responsible for protecting and restoring grassland and wetland habitats in the Devils Lake Basin. There has been some confusion and mistrust as to the role of the Service in protecting these

dwindling habitats. The refuge could serve as a resource to the community to provide a clearer understanding of the importance of protecting these resources, as well as acquiring rights from willing landowners.

- Improved communication is needed with the members of Spirit Lake Nation, along with assistance in development of education curriculum, technical assistance, fire training opportunities, cultural and religious needs, and overall marketing and outreach of our joint landscapes and resources.
- There is potential to significantly increase the number of students educated, but the current staff of 1 person limits the ability to reach these additional students.
- Approximately 20 different schools visit the refuge annually to participate in environmental education programs. The success of this program has relied on initiative from the schools due to lack of Service staff to facilitate visits, conduct programs, and conduct outreach to surrounding schools. This has resulted in a less structured program which does not provide a consistent message of wetland and grassland protection, and there have been missed opportunities to ensure students are aware of the Refuge System. There is much more potential to actively pursue partnerships with other schools within North Dakota if there were resources and a dedicated staff member.
- Because of the flooding that has occurred throughout the last 10–15 years, there have been many impacts to the accessible trails, hiking trails, amphitheater, outdoor classroom clearings, and remote classrooms. There is also a need for additional accessible trails.
- The Sullys Hill education and visitor center building has been completed, but the interpretive displays have not been addressed.
- Curriculum needs to complement the state and local schools' standards and education goals. Nature education could be used to improve math and science scores, while generating an overall understanding and support for the conservation role of the Refuge System.
- Part of the refuge's auto tour route needs to be resurfaced.
- The possibility of using funds from the sale of refuge elk for developing education and visitor services programs should be explored.
- The refuge staff and Spirit Lake Nation members should discuss how to complement and support each other's roles and activities and develop partnerships when possible.
- The auto tour route goes through the big game unit where bison and elk roam freely. Although there are signs warning visitors not to approach wildlife, there is always concern for the safety of both visitors and wildlife.

Wildlife And Habitat Issues

- There needs to be a better understanding of the carrying capacity of the area to support the populations of bison, elk, and white-tailed deer to ensure that forest and prairie management can improve migratory bird production.
- There is no complete plant inventory at the refuge.
- Invasive species such as brome, bluegrass, and other noxious weeds need to be reduced and native species restored.
- There needs to be a feral dog and prairie dog management plan.
- Habitat management plans need to be developed and implemented.
- There is a lack of forest regeneration as a result of grazing ungulates.
- Chronic Wasting Disease (CWD) continues to be a disease issue among cervids. This and other disease issues such as brainworm, lungworm, and parasites all need to be part of an overall management plan.
- There is a need for cross fencing, enclosures, and water development for better herd distribution and forest regeneration. Currently, the refuge land receives year-round grazing.
- The refuge should be part of the Service's program to maintain genetically-pure bison in the nation. The Service needs to define the refuge's role and then a plan needs to be developed to ensure the success of this program.
- A review needs to be completed on winter feeding operations and its efficacy to determine if it can be eliminated, reduced, or better managed.

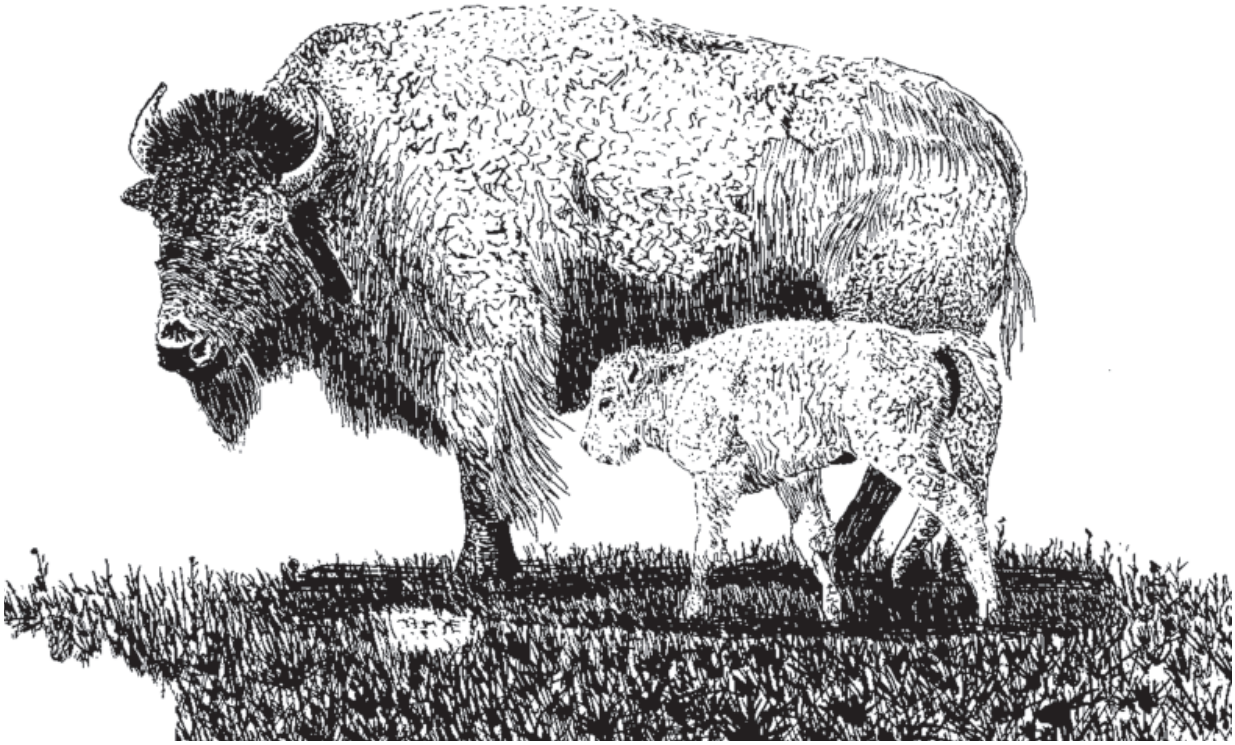
Protection And Facilities Maintenance Issues

- There are known occurrences of drug and alcohol use and vandalism on the refuge. The potential poses a danger to the visiting

public and facilities. Without consistent patrols, the refuge will continue to serve as a place for unlawful activities, putting wildlife, staff, and visitors at risk.

- Recreation fee compliance is based on a voluntary honor system with an estimated compliance rate of 40%, resulting in a loss of revenue for refuge programs.
- There is no on-site maintenance staff. Refuge facilities are maintained on an "as needed" basis if staff is available.
- There is no comprehensive survey of historical and cultural resources on the refuge, only sporadic documentation as sites are discovered.
- Due to minimal law enforcement resources, big game animals are vulnerable to illegal activities such as poaching and harassment.

Challenges abound in the refuge, and these issues will be dynamic over the years and will have to be reviewed, changed, and added to as management actions are put into place, and as environmental and social issues interact with refuge purposes and plans.



Bison

3 Alternatives

Cami Dixon/USFWS

Blooming purple coneflower on native prairie unit.

This chapter describes the management alternatives being considered for Sullys Hill National Game Preserve. Alternatives are different approaches to planning that are designed to achieve the refuge's purposes, vision and goals, the mission of the Refuge System, and the mission of the U.S. Fish and Wildlife Service. Alternatives are developed to address the substantive issues, concerns, and problems identified by the Service, the public, and government partners during public scoping, and throughout the development of the draft plan.

These alternatives represent different approaches for permanent protection and restoration of fish, wildlife, plants, habitats, and other resources. The planning team assessed the planning issues identified in chapter 2, the existing biological conditions, and external relationships affecting the refuge. This information contributed to the development of the alternatives. All of the alternatives incorporate concepts and approaches intended to achieve the goals outlined in chapter 2 and are discussed in terms of how they would meet each goal. Each alternative was evaluated according to how it would advance the vision and goals of the refuge and the Refuge System, and how it would address the planning issues. Alternative A, the no-action alternative, describes ongoing refuge management activities. Although the no-action alternative might not meet all of the CCP goals, it is provided as a basis for comparison with the other alternatives.

3.1 ALTERNATIVES DEVELOPMENT

A public meeting was held at the refuge visitor center in Fort Totten, North Dakota, on June 29, 2006. In addition, a newsletter and comment form were mailed out. When the scoping period ended on August 1, 2006, the planning team had received over 183 written comments. The comments identified biological, social, and economic concerns regarding refuge management.

3.2 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

After extensive analysis and discussion, the Service did not consider any alternatives other than the three that are fully developed in this chapter.

3.3 ELEMENTS COMMON TO ALL ALTERNATIVES

There are several common elements among all the alternatives being considered. For example, all alternatives, including the no-action alternative, would emphasize the same priority species or protect endangered species.

This section identifies key elements included in the CCP among all alternatives considered. Each alternative would incorporate the following:

- The Service would ensure that refuge management activities comply with all other federal laws and regulations that provide direction for managing units of the Refuge System.
- Each alternative would attempt to eradicate invasive species through an integrated pest management (IPM) approach including biological, chemical, and mechanical treatment methods.
- No adjacent landowners would be adversely impacted by any action taken by the Service without a mutual agreement and adequate compensation.

All three alternatives include cultural resource evaluations in response to activities that constitute an undertaking under Section 106 of the National Historic Preservation Act (NHPA). There would be compliance with NHPA and other pertinent cultural resource laws and, when possible, resources that are eligible to the National Register of Historic Places would be protected.

3.4 DESCRIPTION OF ALTERNATIVES

Alternative A: No Action (Current Management)

Alternative A, the no-action alternative, reflects the current habitat management of the refuge. It provides the baseline against which to compare the other alternatives. It is also fulfills the requirement in the National Environmental Policy Act that a no-action alternative be addressed in the analysis process.

Key elements of alternative A include the following:

- Ungulates would be maintained at historical levels (25–35 bison, 20–30 elk and 30–50 white-tailed deer). This is a deviation from the existing "Fenced Animal Management Plan" (Veilkly 1984). Season-long grazing with infrequent prescribed fire would continue, limiting forest regeneration and resulting in continued decline of native prairie. Available habitat for forest-interior breeding birds would be limited.
- Herd health history would continue to be collected and shared with applicable state and federal agencies. The environmental education and interpretation program would continue to take requests from a variety of organizations, schools (within a 90-mile radius), state, and other federal agencies wanting to participate in various teacher or Service staff-led on-site conservation programs. Visitor use would be limited to the seasonal auto tour route, nature trails, and education and visitor center depending on staff and volunteer availability.
- There would continue to be minimal law enforcement presence except during scheduled public use programs. Recreation fee compliance would continue to be based on a voluntary honor system, and the compliance rate would remain an estimated 40%. There would be no on-site maintenance staff and refuge facilities would be maintained on an "as needed" basis as staff is available. The effect on cultural resources would be evaluated in response to activities that constitute an undertaking under Section 106 of NHPA. There would be compliance with NHPA and other pertinent cultural resource laws and, when possible, resources that are eligible to the National Register of Historic Places would be protected.
- Only one GS-11 Park Ranger would be assigned to manage the refuge.

Alternative B

Habitat management under alternative B would begin to address reduced forest regeneration, which has resulted in reduced quality of habitat for forest-interior birds, by managing the uncontrolled browsing of bison, elk, and white-tailed deer within the big game forest. The environmental education program would be expanded to provide additional opportunities and improve quality, while providing a consistent message of protecting wetland and grassland habitats. Visitor safety and facility security would improve as a result of additional staffing, cooperative agreements with local law enforcement agencies, regular maintenance, and installed fire and security systems.

Key elements of alternative B include the following:

- Maintain ungulates as per the "Fenced Animal Management Plan" (25–40 bison; 15–25 elk; 10–30 white-tailed deer) and establish 80 acres of woodland restoration units using various management tools including exclusion fences and chemical, biological, and mechanical techniques (such as tillage and prescribed fire) for the benefit of forest-interior breeding birds.
- Visitors would be provided seasonal opportunities to view wildlife and learn about the refuge. All on-site educational programs (for up to 6,000 students) and special events would be developed and delivered ensuring they garner support and appreciation for the refuge, North Dakota's wetland and grassland resources, and the conservation role of the Refuge System. An interactive habitat diorama display would be constructed in the education and visitor center to demonstrate the inter-relationship of North Dakota's grasslands, wetlands, agricultural lands, and forest.
- There would be an increased law enforcement presence, particularly during peak visitor-use days. Background checks on volunteers would be initiated to ensure the safety of students, staff, and visitors. A recreation fee collection booth would be constructed and randomly staffed, and routine patrols and fee compliance monitoring would be initiated due to the increased availability of law enforcement. There would be compliance with NHPA and other pertinent cultural resource laws and National Register eligible properties would be protected when possible. In addition, a sensitivity model indicating areas with a high potential for cultural resources would be established and those areas would be surveyed.
- One GS-9 environmental education specialist, a GS-9 park ranger (a full time officer position shared with Devils Lake WMD Complex), and a career seasonal WG-6 maintenance worker would be recruited.

Alternative C (Proposed Action)

Habitat management under alternative C would address (1) reduced forest regeneration due to overbrowsing of captive bison, elk, and white-tailed deer; and (2) deterioration of native prairie as a result of season-long grazing and lack of fire. The environmental education program would be expanded to include additional on- and off-site opportunities. Visitor safety and facility security would be improved as a result of increased staffing, development of cooperative agreements with local law enforcement agencies, performance of regular maintenance, and installation of fire and security systems.

Bull elk.

Key elements of alternative C include the following:

- Widespread restoration of native woodland (totally 80 acres) and prairie habitat by manipulating ungulate populations (≤20 bison, ≤18 elk, and ≤18 white-tailed deer) and use of various management tools including exclusion fences and chemical, biological, and mechanical techniques (such as tillage and prescribed fire) for the benefit of forest-interior breeding and grassland-nesting birds.
- The ungulate herd health program would take a more active disease surveillance and treatment approach, including timely introduction of ungulates to maintain genetic health.
- Selected hayland acres would be dedicated to migratory bird habitat through restoration to a diverse native herbaceous prairie vegetation.
- There would be an increase in delivery and programming of both on- and off-site youth environmental education programs for up to 7,500 students. Development of a formal wetland and grassland conservation curriculum for targeted grade levels would foster a living conservation ethic in the Devils Lake Basin. Staff would incorporate modern concepts of environmental education by exposing children to the five senses of learning. Emphasis would be placed on developing education partnerships with Spirit Lake Nation schools and agencies.

- Visitor, facility, and wildlife safety would be improved beyond levels in alternative B to include a volunteer management plan, regular routine patrols during peak and off-peak public use, and an automated fee gate.
  - In compliance with historic preservation laws, protection of eligible sites would occur when possible. In addition, working with other federal, state, and tribal agencies and other organizations, the refuge would be systematically surveyed for cultural resources over the next 15 years.
  - One GS-9 environmental education specialist, a GS-9 park ranger (a full-time officer position shared with Devils Lake WMD Complex), a GS-9 wildlife biologist, and a WG-6 maintenance worker would be recruited to expand, develop, and conduct biological, visitor services, law enforcement, and maintenance programs.
- In compliance with historic preservation laws, protection of eligible sites would occur when possible. In addition, working with other federal, state and tribal agencies and other organizations, the refuge would be systematically surveyed for cultural resources over the next 15 years.
- One GS-9 environmental education specialist, a GS-9 park ranger (a full-time officer position shared with Devils Lake WMD Complex), a GS-9 wildlife biologist, and a WG-6 maintenance worker would be recruited to expand, develop, and conduct biological, visitor services, law enforcement, and maintenance programs.

3.5 SUMMARY OF ALTERNATIVES

Table 2 provides a summary of the three management alternatives under consideration in this CCP and the anticipated environmental consequences of each alternative.

Prairie dogs

Table 2. Summary of alternatives for the comprehensive conservation plan, Sullys Hill National Game Preserve, North Dakota

Alternative A (Current Management)	*Alternative B*	*Alternative C (Proposed Action)*
Woodland Habitat Goal Manage for healthy native woodlands of various age classes and structure to provide habitat for migratory birds, in balance with bison, elk, and other indigenous wildlife.		
Woodland Habitat, Big Game Forest—Management Actions		
Season-long grazing with infrequent prescribed fire would be used. Ungulates would be maintained at historic management levels (25–35 bison; 20–30 elk; and 30–50 white-tailed deer). This is a deviation from the existing "Fenced Animal Management Plan" (Veikley 1984).	Ungulates would be maintained as per the "Fenced Animal Management Plan" (25–40 bison; 15–25 elk; 10–30 white-tailed deer) (Veikly 1984). A total of 80 acres of woodland restoration units would be established using various management tools including exclusion fences and chemical, biological, and mechanical (such as tillage and prescribed fire) techniques. Fuels treatment (including prescribed fire or other mechanical means) would be used to reduce hazardous fuels.	*Same as alternative B, plus the following:* Ungulate populations would be further reduced to a lower level (≤ 20 bison, ≤18 elk, and ≤18 white-tailed deer) to restore native woodland habitat outside of woodland restoration units.
Woodland Habitat, Big Game Forest—Environmental Consequences		
Season-long browsing would continue, limiting forest regeneration and the development of understory and midstory forest layers. Ungulates would continue to be maintained at historical population levels, perpetuating the degradation of forest layers. Available habitat for forest-interior breeding birds would be limited.	Woodland restoration units would provide additional habitat for forest-interior breeding birds and aid development of improved successful forest regeneration techniques. Reducing hazardous fuels would minimize threats to life and property on the refuge and the surrounding private lands.	*Same as alternative B, plus the following:* Ungulate populations would be further reduced to levels that would allow for more understory and midstory growth in the entire woodland areas for the benefit of forest-interior breeding birds.
Woodland Habitat, Lower Forest—Management Actions		
Idleness and minimal prescribed fire would continue to be used.	Fuels treatment (including prescribed fire or other mechanical means) would be used to reduce hazardous fuels.	*Same as alternative B, plus the following:* Forestry stand improvements would provide optimal age classes and structure for migratory bird habitat

Table 2. Summary of alternatives for the comprehensive conservation plan, Sullys Hill National Game Preserve, North Dakota

Alternative A (Current Management)	*Alternative B*	*Alternative C (Proposed Action)*
Woodland Habitat, Lower Forest—Environmental Consequences		
The lower forest would continue to provide adequate habitat for forest-interior birds.	*Same as alternative A, plus the following:* Reducing hazardous fuels would minimize threats to life and property on the refuge and the surrounding private lands.	*Same as alternative B, plus the following:* Optimal habitat would be provided for migratory birds that utilize all levels of the forest structure.
Woodland Habitat, South (Isolated) Forest—Management Actions		
The forest would remain idle and susceptible to wildfires caused by arson.	Forest stands would remain idle but wildfires would be prevented and suppressed with assistance from the Eastern North Dakota Fire District. Fuels treatment (including prescribed fire or other mechanical means) would be used to reduce hazardous fuels.	*Same as alternative B, plus the following:* Forestry stand improvements would provide optimal age classes and structure for migratory bird habitat.
Woodland Habitat, South (Isolated) Forest—Environmental Consequences		
The area would continue to provide adequate habitat for forest-interior breeding birds.	*Same as alternative A, plus the following:* Reducing hazardous fuels would minimize threats to life and property on the refuge and the surrounding private lands.	*Same as alternative B, plus the following:* Optimal habitat would be provided for migratory birds that utilize all levels of the forest structure.
Woodland Habitat, Windbreaks on Hay and Native Units—Management Actions		
The only disturbance to the hay units would be wildfires caused by arson.	Wildfires would be prevented or actively suppressed with assistance from the Eastern North Dakota Fire District. Fuels treatment (including prescribed fire or other mechanical means) would be used to reduce hazardous fuels.	*Same as alternative B, plus the following:* The tree belt on the north side of the native prairie unit would be removed to create a more contiguous block of habitat for grassland-dependent migratory birds.
Woodland Habitat, Windbreaks on Hay and Native Units—Environmental Consequences		
Wildfires would continue to cause the tree rows to deteriorate and increase noxious weed invasion between, and adjacent, to the rows.	Wildfires would be reduced, allowing for increased sustainability of the tree rows and reduced noxious weed invasion. Reducing hazardous fuels would minimize threats to life and property on the refuge and the surrounding private lands.	*Same as alternative B, plus the following:* Removal of selected tree rows would increase the central core area of grasslands, benefiting grassland-nesting birds and decreasing fuels for wildfires.

Table 2. Summary of alternatives for the comprehensive conservation plan, Sullys Hill National Game Preserve, North Dakota

Alternative A (Current Management)	*Alternative B*	*Alternative C (Proposed Action)*
Woodland Habitat, Staff—Management Actions		
The only position assigned to the refuge would be one GS-11 park ranger.	*Same as alternative A, plus the following:* A seasonal career biological science technician would assist with biological and other management programs.	*Same as alternative B, plus the following:* A GS-9 wildlife biologist with visitor services skills would be recruited to assist with biology, visitor services, and management programs.
Woodland Habitat, Staff—Environmental Consequences		
Maintaining the current staffing level would prevent adequate management, monitoring, and research of refuge resources.	A seasonal biological science technician would allow for more data collection and implementation of proposed habitat improvements.	*Same as alternative B, plus the following:* A full-time biologist would be able to independently collect needed data and conduct analysis resulting in a greater understanding of the refuge habitats and wildlife. This biologist would also greatly enhance the quality of biological information presented in student and other visitor programs.

Table 2. Summary of alternatives for the comprehensive conservation plan, Sullys Hill National Game Preserve, North Dakota

Alternative A (Current Management)	*Alternative B*	*Alternative C (Proposed Action)*
Prairie Habitat Goal		
Maintain prairie plant communities representative of the historical mixed-grass prairie to support healthy populations of grassland-dependent migratory birds in balance with bison, elk and other indigenous wildlife.		
Prairie Habitat, Big Game Prairie—Management Actions		
Ungulates would be maintained at historical management levels (25–35 bison; 20–30 elk; and 30–50 white-tailed deer) permitting season-long grazing. There would continue to be minimal control of invasive species and noxious weeds. There would be infrequent use of prescribed fire to enhance grasslands.	*Same as alternative A, plus the following:* To reduce overgrazing, ungulates would be maintained as per the "Fenced Animal Management Plan" (25–40 bison; 15–25 elk; 10–30 white-tailed deer) (Veikley 1984). Prescribed fire would be used to maintain and enhance native vegetative structure and composition. A rotational grazing program would be implemented using exclusion fences. Fuels treatment (including prescribed fire or other mechanical means) would be used to reduce hazardous fuels. Invasive plants, pests, and noxious weeds would be effectively controlled by chemical, biological, and mechanical techniques.	*Same as alternative B, plus the following:* Grasslands would be managed and enhanced by further reducing ungulate populations (≤20 bison, ≤18 elk, and ≤18 white-tailed deer).
Prairie Habitat, Big Game Prairie—Environmental Consequences		
Undesirable plants, including invasive species, would increase. Loss of native grassland plant species and structure would make the area less attractive to migratory birds dependent on forest-edge habitat and other grassland-dependent wildlife and insects. There would be increased soil erosion, causing loss of nutrient-rich topsoil while increasing siltation in surrounding waters. Season-long grazing would reduce plant vigor and regrowth below a level necessary to sustain grazing ungulates, especially in dry years.	Reducing overgrazing would increase native grass and forb diversity. Invasive species, pests, and noxious weeds would be controlled, allowing for the restoration and enhancement of native plant species. Soil erosion would be reduced and topsoil stability would be improved. There would be increased plant vigor for ungulate grazing and wildlife use. Reducing hazardous fuels would minimize threats to life and property on the refuge and the surrounding private lands.	*Same as alternative B, plus the following:* Lower levels of ungulates would further reduce overgrazing, creating a more representative historical mixed-grass prairie grassland structure within the enhanced native prairie area. This would create more desirable habitat for forest-edge and grassland-dependent birds.

Table 2. Summary of alternatives for the comprehensive conservation plan, Sullys Hill National Game Preserve, North Dakota

Alternative A (Current Management)	*Alternative B*	*Alternative C (Proposed Action)*
Prairie Habitat, South (Isolated) Prairie—Management Actions		
Management activities would include periods of rest and disturbance using occasional prescribed fire. Wildfires caused by arson would continue. There would continue to be minimal treatment of invasive species and noxious weeds. Woody vegetation would be controlled.	Prescribed fire would regularly be used to maintain and enhance native vegetative structure and composition and woody vegetation would be controlled. Wildfires would be prevented and suppressed and prescribed grazing would be used as a management tool. Invasive species, noxious weeds, and encroaching woodlands would be effectively controlled using chemical, mechanical, and biological techniques. Fuels treatment (including prescribed fire or other mechanical means) would be used to reduce hazardous fuels.	*Same as alternative B, plus the following:* This area would be used as a demonstration native prairie tract with regular monitoring activities and participation in region-wide research projects.
Prairie Habitat, South (Isolated) Prairie—Environmental Consequences		
Infrequent prescribed fire would provide some disturbance that would increase native grassland vegetation diversity. Wildfires caused by arson occurring at inappropriate stages of vegetative growth may actually increase invasive species such as smooth brome, Kentucky bluegrass, and noxious weeds. These nonnative species have the potential to out-compete the native plant species, creating a monotypic stand of grass that is less attractive to grassland-dependent birds. Controlling woody vegetation would reduce its encroachment into grassland habitats.	Prevention of wildfire fires would reduce the opportunity for invasive and noxious weed growth. Prescribed grazing and fire would be used as a tool which may decrease the spread of invasive species such as smooth brome grass and provide necessary disturbance to invigorate the growth of native plant species. Invasive species, encroaching woodlands, pests, and noxious weeds would be controlled, allowing for the restoration and enhancement of native plant species. Reducing hazardous fuels would minimize threats to life and property on the refuge and the surrounding private lands.	*Same as alternative B, plus the following:* The tract would provide a unique opportunity to research and monitor healthy native prairie in the northeastern mixed-grass prairie zone. This monitoring would serve as a baseline for grassland restoration efforts across the Devils Lake WMD Complex and the region.

Table 2. Summary of alternatives for the comprehensive conservation plan, Sullys Hill National Game Preserve, North Dakota

Alternative A (Current Management)	*Alternative B*	*Alternative C (Proposed Action)*
Prairie Habitat, Hay Units—Management Actions		
Units would be hayed annually. There would continue to be frequent wildfires caused by arson. Invasive plant species, pests, and noxious weeds would be controlled using chemical, mechanical, and biological techniques.	Grassland would be managed using rotational haying and wildfires would be prevented. Control of invasive plants, pests, and noxious weeds by chemical, mechanical, and biological techniques would continue.	*Same as alternative B, plus the following:* Selected hayland acres would be restored to a diverse mixture of native herbaceous prairie vegetation.
Prairie Habitat, Hay Units—Environmental Consequences		
Annual haying of the unit would provide winter food for ungulates in the big game unit. However, because of the annual defoliation of the vegetation on this site, residual wildlife cover is limited. Wildfires caused by arson occurring at inappropriate stages of vegetative growth may actually increase invasive species. Invasive plant species, pests, and noxious weeds would be controlled, improving forage and reducing further spread to other refuge and neighboring lands.	*Same as alternative A, plus the following:* Ungulates would be provided adequate winter food, and improved residual cover would be available for wildlife on a rotating basis. Prevention of wildfire fires would reduce the opportunity for invasive and noxious weed growth.	*Same as alternative B, plus the following:* Additional native habitat would be created primarily for migratory birds and other grassland-dependent native wildlife.

Table 2. Summary of alternatives for the comprehensive conservation plan, Sullys Hill National Game Preserve, North Dakota

Alternative A (Current Management)	*Alternative B*	*Alternative C (Proposed Action)*
Wildlife Population Management Goal		
Carry out management practices that ensure healthy populations of Rocky Mountain elk, plains bison, and other indigenous wildlife species that exemplify the genetic integrity of historical prairie wildlife.		
Wildlife Population, Big Game Unit—Management Actions		
Maintain ungulates at historical management levels (25–35 bison; 20–30 elk; and 30–50 white-tailed deer). This is a deviation from the existing "Fenced Animal Management Plan" (Veikley 1984). Herd health history would be collected and shared with applicable state and federal agencies. Winter supplemental feeding would continue. Service staff would work collaboratively through the Service-wide bison initiative to conserve the genetic integrity of plains bison. Minimal prairie dog management would continue, allowing the town to expand. Regular boundary fence inspections and maintenance would continue.	*Same as alternative A, except:* Ungulates would be maintained per the "Fenced Animal Management Plan" (25–40 bison; 15–25 elk; 10–30 white-tailed deer) (Veikley 1984). The prairie dog population, a species introduced to the refuge in 1974 for educational purposes, would be confined to the original 1.5-acre town.	*Same as alternative B, plus the following:* Ungulate populations would be maintained at ≤20 bison, ≤18 elk, and ≤18 white-tailed deer to encourage restoration of the refuge floristics that support migratory bird nesting and migration habit. These limits may be adjusted as new data and science, including the results of monitoring these restoration efforts, become available. Winter supplemental feeding would be reduced (grain, in particular) to improve herd health and habitat. The ungulate herd health program would take a more active disease surveillance, treatment, and prevention approach including timely introduction of ungulates to maintain genetic health. Facilities would be managed and technology would be used to maximize bison genetic integrity.

Table 2. Summary of alternatives for the comprehensive conservation plan, Sullys Hill National Game Preserve, North Dakota

Alternative A (Current Management)	*Alternative B*	*Alternative C (Proposed Action)*
Wildlife Population, Big Game Unit—Environmental Consequences		
Current levels of overgrazing and overbrowsing would continue, and prairie and forest habitat would provide reduced benefits to targeted migratory birds. Monitoring herd health history would allow the refuge to react quickly to any health issues found in refuge ungulates. At current levels, winter supplemental feeding would put animals at higher risk for certain diseases and parasites. The refuge would continue to serve as a national resource for maintaining the genetic integrity of Service plains bison herds. Prairie dog populations would continue to expand to adjacent grassland areas, negatively impacting habitats. A functional boundary fence would maintain refuge barriers, reducing trespass, disease transmission, and animal escape.	*Same as alternative A, except:* Reduced ungulate numbers would decrease overgrazing and overbrowsing and provide improved habitat for migratory birds. The prairie dog population would not expand beyond the original 1.5-acre boundary, protecting adjacent grassland areas, while visitors would continue to view them safely.	*Same as alternative B, plus the following:* Lower levels of ungulates would further increase refuge floristics that support migratory bird nesting and migration habitat. Reduced supplemental feeding (grain in particular) would likely result in improved health of ungulates, specifically elk. Disease episodes would be reduced and prevented. Periodic ungulate introduction would maintain the current genetic health of both the refuge and other Service plains bison. Genetics of each bison on the refuge would be known and serve as the basis for transfer of animals to other refuges. Using the latest techniques and methods would assist in protecting the genetic integrity of both the refuge and other Service plains bison herds.

Table 2. Summary of alternatives for the comprehensive conservation plan, Sullys Hill National Game Preserve, North Dakota

Alternative A (Current Management)	*Alternative B*	*Alternative C (Proposed Action)*
Environmental Education and Outreach Goal		
Deliver quality, interactive environmental education programming to regional schools, communities, organizations, members of the Spirit Lake Nation, and local governments to garner support and appreciation for Sullys Hill National Game Preserve, North Dakota's wetland and grassland resources, and the conservation role of the U.S. Fish and Wildlife Service.		
Environmental Education and Outreach, Youth Environmental Education—Management Actions		
Requests would be taken from a variety of organizations, schools (within a 90-mile radius), state, and other federal agencies wanting to participate in various teacher or refuge staff-led on-site conservation programs. Opportunistic off-site programs presented at local schools would continue.	*Same as alternative A, plus the following:* Recruit an environmental education specialist to assist educators in the development, delivery, and review of all on-site youth educational programs, ensuring that most, if not all, meet state and local education standards. These programs would be designed to expose children to the wonders of nature while garnering support and appreciation for the refuge, North Dakota's wetland and grassland resources, and the conservation role of the Refuge System. All education programs presented on the refuge by other partners would support the refuge's environmental education themes of promoting wetland and grassland conservation. Limited off-site programs to local schools and youth organizations would be presented.	*Same as alternative B, plus the following:* Refuge staff would increase delivery and programming of on-site youth environmental education programs. Staff would incorporate the modern concepts of environmental education by exposing children to the five senses of learning. Refuge staff would plan and initiate regular off-site programming to local schools. In coordination with the school system, refuge staff would develop a formal wetland and grassland conservation curriculum for targeted grade levels (meeting local and state education standards) which fosters a conservation ethic. The semester-long curriculum would be delivered off-site but would be complemented by the outdoor classroom and facilities of the refuge and the Devils Lake WMD Complex. Pre- and post-evaluations would be incorporated into the curriculum.

Table 2. Summary of alternatives for the comprehensive conservation plan, Sullys Hill National Game Preserve, North Dakota

Alternative A (Current Management)	*Alternative B*	*Alternative C (Proposed Action)*
Environmental Education and Outreach, Youth Environmental Education—Environmental Consequences		
There would continue to be a lack of input into programs presented by outside partners, resulting in missed opportunities to educate the public about and garner support for the Refuge System, Sullys Hill National Game Preserve and its purposes, and the Service's mission of promoting wetland and grasslands conservation. While current off-site refuge programs are beneficial, they would remain limited and the refuge would miss opportunities to educate area students about the refuge and the mission of the Refuge System.	An effective outreach and education program would support state and local education standards, affecting a larger number of students. Through partnerships, there would be additional opportunities to educate youth about the importance of preserving wetland and grassland habitat. Limited off-site programs would provide additional opportunities to educate area youth about the conservation of wetlands and grasslands.	*Same as alternative B, plus the following:* On- and off-site programs developed and presented cooperatively by teachers and refuge staff would have the greatest effect on educating students about the Refuge System, the refuge, and wetland and grassland preservation. In addition, expanding programs off-site would reach a larger number of students in the surrounding area. Evaluations would help teachers and staff gauge the effectiveness of programs.
Environmental Education and Outreach, Adult and Family Environmental Education—Management Actions		
Annual events, including Birding Festival, Winterfest, and participation in the Chautauqua Program, would be completely dependent upon volunteers, annual staff, and funding levels. Visitor use would be limited to the seasonal auto tour route, nature trails, and education and visitor center, depending on staff and volunteer availability. Opportunistic press releases, radio and television coverage, and on- and off-site presentations would continue.	All programs and annual events would continue and be focused on garnering support and appreciation for the refuge, North Dakota's wetland and grassland resources, and the conservation role of the Refuge System. The education and visitor center would be open year-round. Regularly developed press releases, radio and television programming, and on- and off-site presentations would be provided. Additional volunteers and interns would be recruited to keep the education and visitor center open during key visitation times.	*Same as alternative B, plus the following:* Scheduled conservation programming would be conducted for adults and families throughout the year.

Table 2. Summary of alternatives for the comprehensive conservation plan, Sullys Hill National Game Preserve, North Dakota

Alternative A (Current Management)	*Alternative B*	*Alternative C (Proposed Action)*
Environmental Education and Outreach, Adult and Family Environmental Education—Environmental Consequences		
There would continue to be no guarantee that the two current annual events would continue. This would result in a net loss of reaching and educating over 2,500 adults and children annually. Seasonal visitation would continue to result in a loss of opportunities to educate and interact with the area's many winter visitors. Also, the current independent visitor experience affords no method to monitor and measure if the refuge's education and interpretation goals are being met.	Additional staff and resources would ensure the current annual events continue and expand, reaching even more visitors, while ensuring that a consistent message of wetland and grassland conservation is presented. Regular contact with the media would ensure that the public is kept informed on refuge programs and visitor services activities. Providing and maintaining more consistent education and visitor center hours would eliminate some frustrations expressed by disappointed visitors, while providing for additional education opportunities.	*Same as alternative B, plus the following:* Offering well-organized and consistent year-round programs would give adults and children multiple opportunities to learn about the refuge and its resources and expose them to conservation ethics in their communities and homes.
Environmental Education and Outreach, Partnerships with Teachers—Management Actions		
On- and off-site presentations and interaction with local teachers and administrators would continue on an opportunistic basis.	Facilities and general conservation message programs for teacher workshops such as "Project Wild" and "Project Learning Tree" would be provided. Teaching kits and a lending library would be provided and would focus on the natural resources of Sullys Hill National Game Preserve, North Dakota wetlands and grasslands, and the heritage of the Refuge System. A teacher resources website would be created, detailing available materials, programs, and facilities.	*Same as alternative B, plus the following:* Partnerships with teachers would be established in order to develop wetland and grassland curriculum that would meet grade requirements for state and local education standards. In coordination with the school system, a formal wetland and grassland conservation curriculum for targeted grade-level teachers would be developed. The semester-long curriculum would be delivered off-site but would be complemented by the outdoor classroom and facilities of the refuge and the Devils Lake WMD Complex. Pre- and post-evaluations would be incorporated into the curriculum.

Table 2. Summary of alternatives for the comprehensive conservation plan, Sullys Hill National Game Preserve, North Dakota

Alternative A (Current Management)	*Alternative B*	*Alternative C (Proposed Action)*
Environmental Education and Outreach, Partnerships with Teachers—Environmental Consequences		
There would continue to be a loss of opportunities to develop environmental education programs that schools can utilize to achieve curriculum objectives and meet state and local education standards. This would result in a continued loss of opportunities to reach and educate more students in the surrounding communities through consistent in-school programs.	Actively pursuing relationships with area teachers and providing them with specific programs and tools would target a larger number of students with a more consistent environmental education message.	*Same as alternative B, plus the following:* Working more closely with teachers and students while developing refuge and state-specific environmental education programs would ensure that the new programs meet curriculum needs, while ensuring the maximum number of students are reached with a consistent, relevant message focused on wetlands, grasslands, and the conservation role of the Refuge System.
Environmental Education and Outreach, Spirit Lake Nation—Management Actions		
American Indian programming at annual events would continue. Spirit Lake Nation fire personnel would be involved in all fire-specific training provided at the refuge.	*Same as alternative A, plus the following:* Adult and youth conservation education programming would be used for educating Spirit Lake Nation members about the goals and purposes of the refuge and the Refuge System. Service programs could compliment Spirit Lake Nation's own land management and visitor programs. An educational kit would be developed in cooperation with Spirit Lake Nation tribal members to detail their culture, traditional uses of natural material, and natural resource conservation.	*Same as alternative B, plus the following:* Partnerships with Spirit Lake Wildlife Department and Cankdeska Cikana Community College would be fostered to provide opportunities for American Indian students interested in conservation-related fields. Students would be recruited through the Student Career Experience Program to provide training and opportunities for future employment. Cankdeska Cikana Community College wildlife students would be invited to participate in active wildlife conservation practices at the refuge.

Table 2. Summary of alternatives for the comprehensive conservation plan, Sullys Hill National Game Preserve, North Dakota

Alternative A (Current Management)	*Alternative B*	*Alternative C (Proposed Action)*
Environmental Education and Outreach, Spirit Lake Nation—Environmental Consequences		
Visitors would continue to have an opportunity to learn about the culture and traditions of the Spirit Lake Nation and other Midwestern tribes. There would be additional education opportunities for Spirit Lake Nation fire staff while improving fire management techniques on Spirit Lake Nation lands.	*Same as alternative A, plus the following:* There would be a greater understanding of the vision and goals of both the refuge and Spirit Lake Nation. This understanding would serve as a foundation for developing future partnerships to achieve mutual interests. A more developed cultural program would reach more visitors and students, creating a greater understanding of Spirit Lake Nation's history and traditions.	*Same as alternative B, plus the following:* Opportunities would be expanded to recruit American Indian students for local and national employment within the Refuge System.
Environmental Education and Outreach, "Friends Group" and Volunteers—Management Actions		
The refuge would continue to be dependent on a small, but dedicated volunteer "friends group" to ensure that most of the refuge visitor services programs are carried out. The "friends group" would continue coordinating annual festivals, orient visitors to the refuge, foster community support, and conduct local outreach through media contacts. "Friends group" volunteers would continue to staff the education and visitor center on a limited basis.	*Same as alternative A, plus the following:* Refuge staff would assist the "friends group" in staffing the education and visitor center, preparing grant proposals, and developing community partnerships.	*Same as alternative B, plus the following:* The lead park ranger and "friends group" would coordinate and actively recruit volunteers to assist with the presentation of youth and adult conservation programming and staff the education and visitor center year-round. A volunteer development and management plan would be developed.
Environmental Education and Outreach, "Friends Group" and Volunteers—Environmental Consequences		
Depending on volunteers to run visitor services programs, including annual events would provide tremendous opportunities for visitors to interact with these dedicated volunteers. However using mostly volunteer assistance would make programs vulnerable and inconsistent. The loss of Service staff and public interaction would continue.	*Same as alternative A, plus the following:* Additional funding and support would be generated for refuge programs. Additional volunteer participation, support, and enthusiasm would be generated The public would have more opportunities to interact with and learn from Service staff.	*Same as alternative B, plus the following:* Additional volunteers would allow the refuge visitor services programs to expand, including year-round opportunities for the public to learn from and interact with knowledgeable refuge volunteers.

Table 2. Summary of alternatives for the comprehensive conservation plan, Sullys Hill National Game Preserve, North Dakota

Alternative A (Current Management)	*Alternative B*	*Alternative C (Proposed Action)*
Environmental Education and Outreach, Staffing—Management Actions		
The current GS-11 park ranger position would be maintained.	*Same as alternative A, plus the following:* One GS-9 environmental education specialist would be recruited to assist with education and visitor services programs.	*Same as alternative B, plus the following:* A GS-9 wildlife biologist with visitor services skills would be recruited to assist with biological, visitor services and other management programs (same position identified in the "Woodland Habitat" alternative).
Environmental Education and Outreach, Staffing—Environmental Consequences		
At current staffing levels, the refuge would not be able to guarantee that current programs would be maintained or expanded, resulting in lost opportunities to educate visitors and students. The loss of Service staff and public interaction would continue.	Recruiting an environmental education specialist would provide the necessary skills and focus needed to help the refuge achieve its vision of expanding visitor services programs and becoming a conservation learning center. This would allow the refuge to develop quality, relevant programs that would be used to educate a larger number of adults and students.	*Same as alternative B, plus the following:* Additional staff would provide the time and resources necessary to expand the refuge's on-site and off-site visitor and environmental education programs while ensuring visitors are able to interact with refuge staff.

Table 2. Summary of alternatives for the comprehensive conservation plan, Sullys Hill National Game Preserve, North Dakota

Alternative A (Current Management)	*Alternative B*	*Alternative C (Proposed Action)*
Visitor Services and Interpretation Goal		
Provide captivating visitor services facilities and activities for visitors of all abilities, community groups, youth groups, and the members of Spirit Lake Nation which result in a greater understanding and support for the preservation of native habitats and landscapes of North Dakota's Prairie Pothole Region and the mission of the Refuge System.		
Visitor Services and Interpretation, Education and Visitor Center and Outdoor Classroom—Management Actions		
The refuge staff and "friends group" volunteers would continue to be used to operate the education and visitor center May through September (approximately 25 hrs/week), manage the book store, greet visitors, and orient them to the refuge. Hours of operation would be sporadic. The education and visitor center interpretive displays would continue to be completed and regularly updated as resources become available. The birding garden would continue to be maintained. Maintenance of the education and visitor center and outdoor classrooms would occur only as time and staffing allows.	*Same as alternative A, plus the following:* Interpretive displays would consist of an interactive habitat diorama demonstrating North Dakota's grasslands, wetlands, agricultural lands and forest. In addition to volunteers, one environmental education specialist would be available for visitor contacts. Electricity and water would be provided to the outdoor classroom. A patio and seating for the outdoor birding garden would be constructed.	*Same as alternative B, plus the following:* Under the direction of additional Service staff, a full cadre of volunteers would be recruited to operate the education and visitor center (48 hrs/week) year-round—weather permitting, manage the bookstore, greet visitors, and orient them to the refuge. In addition to volunteers, refuge staff would be available for visitor contact and education, and visitor center operation. Dedicated audio visual equipment would be available for the education and visitor center and remote classrooms. Student equipment and wall displays for the education and visitor center classroom and remote classroom would be updated. The refuge's cultural resources and history would be interpreted. Through added maintenance staff and funding, facilities would be regularly maintained and upgraded as needed.

Table 2. Summary of alternatives for the comprehensive conservation plan, Sullys Hill National Game Preserve, North Dakota

Alternative A (Current Management)	*Alternative B*	*Alternative C (Proposed Action)*
Visitor Services and Interpretation, Education and Visitor Center and Outdoor Classroom—Environmental Consequences		
Visitors would continue to experience limited, inconsistent opportunities to interact with refuge staff and enjoy and learn about the refuge and surrounding resources through interpretive displays at the education and visitor center. Lack of maintenance may cause loss of building integrity.	There would be expanded education and visitor center hours and interpretive displays allowing for more contact with staff and volunteers, while providing additional opportunities for an increased hands-on experience for learning about the refuge, the Refuge System, and the importance of conservation, and how to conserve wetland and grassland habitats. Upgrading visitor services facilities would provide a higher quality experience and improve the visiting public's impression of the refuge.	*Same as alternative B, plus the following:* The education and visitor center and facilities would remain open year-round, which would greatly expand opportunities to educate a larger number of adults and children, while providing them a more complete perspective of the conservation role of the Refuge System. Additional educational equipment would enhance student experience and improve learning. Interpreting the refuge's cultural resources would create a greater understanding and appreciation of the history and culture of the area. Regular maintenance of refuge facilities would ensure there is no loss of structural integrity while ensuring visitors and staff are provided a safe and quality environment in which to learn and work.

Table 2. Summary of alternatives for the comprehensive conservation plan, Sullys Hill National Game Preserve, North Dakota

Alternative A (Current Management)	*Alternative B*	*Alternative C (Proposed Action)*
Visitor Services and Interpretation, Nature Trail—Management Actions		
The refuge and nature trail would continue to be closed between October 1 and May 1. One 1.6-mile nature trail would be minimally maintained, would lack interpretation, and would not be universally accessible. There would be no guided nature trail tours. One overlook would continue to be provided, with only minimal interpretation.	Refuge staff would maintain the winter trail system for cross country skiing and snow shoeing, for the purposes of environmental education and wildlife observation. One 1.6-mile nature trail would be maintained, properly signed, and interpreted. This would include removal of damaged concrete to make the trails accessible and benefit riparian restoration. A "tear sheet" interpretive map for trails would be developed. One overlook would be properly signed and interpreted. For a nominal fee, guided nature trail walks would be provided for groups of 15–25 people. An accessible trail loop and overlook would be constructed from the education and visitor center patio to the amphitheater to provide viewing of Fort Totten Bay and interpretation of refuge resources. A counter would be installed at trail heads for collection of accurate use data.	*Same as alternative B.*
Visitor Services and Interpretation, Nature Trail—Environmental Consequences		
Refuge trails would remain inaccessible and there would continue to be a loss of opportunities to educate children and adult utilizing refuge trails.	Accessible and interpreted trails, overlooks, and nature trail programs would greatly expand opportunities for visitors of all abilities to independently learn about and understand the refuge and its resources. There would be minimal loss of habitat through construction or upgrading of refuge nature trails.	*Same as alternative B.*

Table 2. Summary of alternatives for the comprehensive conservation plan, Sullys Hill National Game Preserve, North Dakota

Alternative A (Current Management)	*Alternative B*	*Alternative C (Proposed Action)*
Visitor Services and Interpretation, Auto Tour—Management Actions		
One seasonally maintained (May–September) 4.5 mile-long auto tour would continue to be routed through a variety of refuge habitats but would continue to provide only limited, obsolete interpretation. Directional rules and instructional signage would remain adequate. Two newly updated informational kiosks would remain along the route to orient visitors to the refuge and the Refuge System. Daily recreation fees would remain at $2.00/car, $10.00 for nonschool group bus, and $12.00 for an annual pass. Fees would continue to be collected through an honor system. Four overlooks would be provided along the tour route but would continue to provide minimal interpretation.	There would be year-round maintenance of a two-lane segment of the auto tour route (weather permitting). A single-lane segment would be closed during the winter. Interpretation would be enhanced with a self-guided "tear sheet" and improved signage. The daily recreation fee would be increased to $3.00 ($20.00 annual pass) and collected through an honor system, except when staff or volunteers were available, particularly during events and high-use periods. Counters would be installed on single- and double-lane portions of the route to provide accurate use data. Four overlooks would be provided along the tour route to provide enhanced interpretation.	*Same as alternative B, plus the following:* The auto tour route would remain open all winter. An automated recreation fee collection station would be installed to collect fees when staff are not present. A vehicle radio transmitter system would be developed for audio interpretation of the auto tour.
Visitor Services and Interpretation, Auto Tour—Environmental Consequences		
There would be missed opportunities for wildlife viewing and education, particularly during the winter months, and many missed opportunities to provide information about refuge resources and the Refuge System to adults and children. There would continue to be a loss of revenue (estimated at 40%) by continuing to collect recreation fees through the honor system. This fee was set prior to the expansion of visitor services facilities, such as the new education and visitor center.	Additional wildife viewing, photography, and interpretive opportunities would be created. Increased recreation fees would ensure funding is available for these additional programs and for maintenance.	*Same as alternative B, plus the following:* Keeping the auto tour route open all year would increase opportunities for the public to view and photograph wildlife, and to learn about seasonal changes in refuge resources. Improved fee compliance would allow refuge staff to maintain and improve environmental education facilities. An audio-based interpretive system would increase visitor's knowledge of refuge habitats and wildlife, while enhancing overall visitor experience.

Table 2. Summary of alternatives for the comprehensive conservation plan, Sullys Hill National Game Preserve, North Dakota

Alternative A (Current Management)	*Alternative B*	*Alternative C (Proposed Action)*
Visitor Services and Interpretation, Amphitheater—Management Actions		
The amphitheater, lost periodically due to flooding, would not be replaced, requiring the refuge to continue renting mobile stages and seating for large group events.	There would be construction of a universally-accessible 250-seat amphitheater with a covered stage, seating, electrical power, and expanded seating capabilities for special events.	*Same as alternative B.*
Visitor Services and Interpretation, Amphitheater—Environmental Consequences		
There would continue to be a loss of opportunities to provide outdoor interpretive programs due to the added cost and logistics of renting mobile stages and seating for refuge events.	Outdoor programs for visitors of all abilities would be expanded to provide additional quality programs and opportunities for visitors to learn about the refuge and the National Wildlife Refuge System.	*Same as alternative B.*
Visitor Services and Interpretation, Brochures and Directional Signage—Management Actions		
Updates to the refuge brochure would be completed, printed, and distributed. The directional signage for self-guided trails and auto tour routes would continue to be inadequate.	*Same as alternative A, plus the following:* The directional signage for trails and auto tour route would be updated and installed.	*Same as alternative B.*
Visitor Services and Interpretation, Brochures and Directional Signage—Environmental Consequences		
Refuge visitors would not be adequately oriented to the refuge and its visitor facilities.	Updated and expanded directional signage for trails and auto tour route would orient visitors, making them feel welcome. This would encourage visitors to come to the refuge and explore wildlife viewing and interpretation opportunities.	*Same as alternative B.*

Table 2. Summary of alternatives for the comprehensive conservation plan, Sullys Hill National Game Preserve, North Dakota

Alternative A (Current Management)	*Alternative B*	*Alternative C (Proposed Action)*
Protection and Maintenance Goal Ensure protection and maintenance of refuge facilities, lands, and cultural resources, while providing for the safety of staff, volunteers, and the visiting public.		
Protection and Maintenance, Visitor Safety—Management Actions		
Limited animal warning signage would be available. 25% of the park ranger's (refuge manager's) time would continue to be used for law enforcement patrols. Regulatory and directional signs would continue to be adequate. Closed areas would not have adequate signage.	*Same as alternative A, plus the following:* Additional animal warning and closed-area signage would be developed. With the addition of a full-time law enforcement officer, the GS-11 lead park ranger would no longer be responsible for maintaining law enforcement credentials, and would be able to focus more of his/her efforts on other visitor services programs. Adequate signage would clearly identifying areas closed to visitors. Both random and routine patrols would be conducted, especially during high visitation months and events. A cooperative agreement with local law enforcement agencies would be pursued to expand refuge patrols and ensure visitor safety. Background checks on volunteers would be conducted to ensure safety of students, visitors, and facilities. A visitor safety plan would be developed as part of the overall visitor services plan.	*Same as alternative B.*

Table 2. Summary of alternatives for the comprehensive conservation plan, Sullys Hill National Game Preserve, North Dakota

Alternative A (Current Management)	*Alternative B*	*Alternative C (Proposed Action)*
Protection and Maintenance, Visitor Safety—Environmental Consequences		
Unsafe encounters with large bison or elk may occur, harming visitors and wildlife. Without consistent patrols the refuge would continue to serve as a place for unlawful activities, putting wildlife, staff, and visitors at risk. Known occurrences of drug and alcohol use on the refuge are likely to continue.	Visitors would be made aware of closed areas and warnings regarding improper encounters with wildlife. This would increase visitor and wildlife safety. Increased law enforcement presence would encourage refuge visitors to comply with regulations, thus protecting visitors, staff, refuge habitats, facilities, and wildlife. Background checks of volunteers would ensure safety of students, visitors, and facilities. Completing a visitor safety plan would ensure all visitor safety issues are considered and addressed.	*Same as alternative B.*
Protection and Maintenance, Recreation Fee Compliance—Management Actions		
The honor system for fee collection would be continued.	A fee collection booth would be constructed and randomly staffed, particularly during high-use periods and events. Routine patrols and fee compliance monitoring would be conducted.	An automated fee collection station with would be installed to collect fees when staff are not present. A camera surveillance system would be installed at the station. (See Visitor Services and Interpretation, Auto Tour.)
Protection and Maintenance, Recreation Fee Compliance—Environmental Consequences		
There would continue to be a significant loss of revenue needed for refuge programs due to an estimated 40% loss of recreation fees.	Additional fees collected when the booth is staffed would help fund refuge programs	Collecting 100% of visitor fees would provide additional funds needed to enhance the refuge recreation program and improve security.

Table 2. Summary of alternatives for the comprehensive conservation plan, Sullys Hill National Game Preserve, North Dakota

Alternative A (Current Management)	*Alternative B*	*Alternative C (Proposed Action)*
Protection and Maintenance, Land and Facilities Protection—Management Actions		
There would be minimal year-round law enforcement presence to protect refuge lands and facilities. No security or fire alarm system would be available at the education and visitor center or shop and there would be no camera surveillance system.	A cooperative agreement with local law enforcement agencies would be pursued to expand land and facility protection. Both random and routine patrols would be conducted, particularly during high visitation months and events. Arson prevention patrols would be conducted during peak fire season. Security and fire alarm systems would be installed.	*Same as alternative B, plus the following:* A complete camera surveillance system would be installed.
Protection and Maintenance, Land and Facilities Protection—Environmental Consequences		
Refuge facilities and habitat would continue to be negatively impacted by illegal activities such as graffiti, trash dumping, property damage, and arson. Limited security and no fire alarm system would continue to make facilities and lands vulnerable to illegal activities and make apprehension and conviction difficult.	A more consistent law enforcement presence during high visitation peaks would further protect refuge resources and facilities A security system and regular refuge patrols would discourage and remove opportunities to harm refuge lands and facilities.	*Same as alternative B, plus the following:* A camera surveillance system would discourage illegal activities and allow refuge law enforcement to better apprehend and prosecute offenders.
Protection and Maintenance, Wildlife Safety—Management Actions		
There would continue to be limited routine patrols to monitor wildlife and people interactions. Sporadic fence checks and feral animal control would continue.	A full-time law enforcement officer would be hired and a cooperative agreement with local law enforcement agencies would be pursued to ensure wildlife safety. Routine boundary fence checks would be conducted and feral animal control would continue. There would be routine patrols during low visitation and evening hours. Interpretive programs, materials, and signage would provide information to people on how to view wildlife safely, without causing harm to wildlife or themselves.	*Same as alternative B.*

Table 2. Summary of alternatives for the comprehensive conservation plan, Sullys Hill National Game Preserve, North Dakota

Alternative A (Current Management)	*Alternative B*	*Alternative C (Proposed Action)*
Protection and Maintenance, Wildlife Safety—Environmental Consequences		
There would be no assurance that wildlife would not be harmed by illegal activities such as poaching and harassment.	Additional law enforcement presence would discourage illegal activities that would harm wildlife. Regular boundary fence inspections and repairs would minimize impacts from feral animals that would harm native wildlife. A more consistent law enforcement presence during low visitation periods would further protect wildlife at this most critical time period.	*Same as alternative B.*
Protection and Maintenance, Facility Maintenance—Management Actions		
There would continue to be no on-site maintenance staff. Refuge facilities would continue to be maintained on an "as needed" basis as district staff time permits. The Youth Conservation Corps would continue to perform seasonal basic maintenance of facilities and grounds. There would continue to be a limited year-round janitorial contract for the education and visitor center. There would continue to be snow removal only for general refuge operations and special events. During most of the winter season, the refuge would remain closed to visitors.	*Same as alternative A, plus the following:* Regular maintenance of facilities and grounds would be conducted during peak visitor times (May–September).	*Same as alternative B, plus the following:* Regular maintenance of facilities and grounds would be conducted all year. Regular and timely snow removal would be conducted for winter visitor access.
Protection and Maintenance, Facility Maintenance—Environmental Consequences		
Refuge facilities may deteriorate with limited maintenance. Many visitors come to the Devils Lake area to participate in winter sports. There would be loss of opportunity for these visitors to view wildlife and learn about the refuge and its resources.	Refuge facilities would remain safe and continue to function as intended.	*Same as alternative B, plus the following:* Visitors would be provided year-round opportunities to view wildlife and learn about the refuge.

Table 2. Summary of alternatives for the comprehensive conservation plan, Sullys Hill National Game Preserve, North Dakota

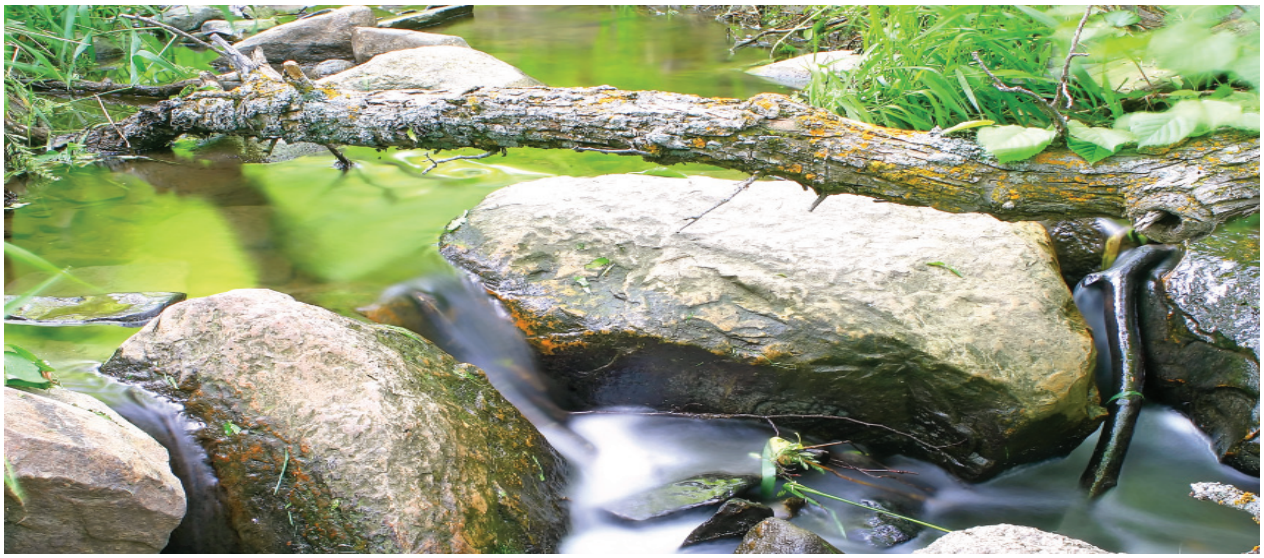
Alternative A (Current Management)	*Alternative B*	*Alternative C (Proposed Action)*
Protection and Maintenance, Cultural Resources—Management Actions		
Cultural resource evaluations would be done to fulfill compliance with historic preservation laws.	*Same as alternative A, plus the following:* Cultural resource surveys would be completed in high probability areas. Historical documents and information would be organized and protected.	*Same as alternative B, plus the following :* A comprehensive cultural resource survey of the refuge would be completed in partnership with other agencies and organizations. Monitoring patrols would be conducted to protect inventoried sensitive areas and known sites.
Protection and Maintenance, Cultural Resources—Environmental Consequences		
Cultural resources that would be potentially affected by an undertaking are identified and, if significant, preserved when possible.	*Same as alternative A, plus the following:* The addition of a more active survey and identification program would aid in planning and research. A comprehensive inventory would improve protection and planning. Loss and damage of historical documents needed to understand the history of the management of the refuge and document decisions would be prevented.	*Same as alternative B, plus the following:* The addition of a comprehensive survey and identification program would further aid in planning and research. There would be improved protection of all inventoried sensitive areas and known sites.
Protection and Maintenance, Staff—Management Actions		
No maintenance or full-time law enforcement staff would be assigned to the refuge.	One WG-6 career seasonal maintenance staff person would be recruited to seasonally maintain refuge facilities. One GS-9 park ranger would be recruited to conduct law enforcement. This position would be shared with the Devils Lake WMD Complex.	*Same as alternative B, plus the following:* One full time WG-6 maintenance worker would be recruited to maintain the real property (valued at $18 million) and keep roads open year-round.

Table 2. Summary of alternatives for the comprehensive conservation plan, Sullys Hill National Game Preserve, North Dakota

Alternative A (Current Management)	*Alternative B*	*Alternative C (Proposed Action)*
Protection and Maintenance, Staff—Environmental Consequences		
The refuge could not ensure adequate maintenance and protection of refuge visitors, volunteers, staff, facilities, lands, and wildlife.	The refuge would be able to seasonally maintain refuge facilities and equipment, particularly during peak visitor-use periods. A full-time law enforcement officer would significantly increase the safety of the refuge and reduce the occurrence of illegal activities.	*Same as alternative B, plus the following:* A full time maintenance worker would be able to more effectively maintain refuge facilities and operate refuge equipment year-round. The refuge roads would be maintained year-round, allowing visitors to come to the refuge and view wildlife and learn about seasonal changes.

Grass patch

4 Affected Environment



Scott Ralston/USFWS

Flowing stream.

This chapter describes the current characteristics and resources of Sullys Hill National Game Preserve. It specifically addresses physical, biological, cultural, and socioeconomic resources, as well as recreational opportunities.

4.1 GENERAL OVERVIEW

Sullys Hill National Game Preserve is a 1,675-acre national wildlife refuge sitting on the south shores of Devils Lake, about 10 miles south of the city of Devils Lake, North Dakota. The refuge supports a unique community of habitats such as an oak, ash, basswood and aspen woodland, mixed-grass prairie, and natural wetlands along with beaver ponds and created wetlands (see figure 5, boundary map). It is also one of only 19 identified sites to be listed in North Dakota's list of natural areas, of which only 4 are national wildlife refuges. In addition, the refuge is one of 4 refuges nationally established for the purpose of bison conservation.

Administratively, the refuge consists of two non-contiguous blocks of land (see figure 5, boundary map). The main unit of the refuge supports the big game forest, lower forest, big game prairie, several wetlands, and the public use and education infrastructure. The second block of land is comprised of windbreaks, south forest, south prairie, haylands and wetlands (see figure 6, management units map).

The refuge blends a unique plant community with a diverse mixture of wildlife in an area of historical, geological, and archaeological significance. The woods and prairies of the refuge sit atop the glacial moraine hills and rise to an elevation well above the level of Devils Lake. The area is a thrust block formation resulting from glaciers mining a large area, now called Devils Lake, and depositing all this material in the range of hills which includes the refuge. Thus, the refuge is a unique landform or anomaly within this flat prairie region. As such, this area is a large ecotone that provides "edge" habitat for many species of birds as well as plains bison, elk, white-tailed deer, turkeys, and prairie dogs. More specifically, this edge is the joining of palustrine (vegetated wetlands) and lacustrine (lake) wetlands with woodlands and grasslands. This ecotone is very attractive to many forms of wildlife, including over 250 species of migratory birds; unique small mammals, such as woodchucks and fishers and the large ungulates that have made the refuge a destination for many visitors. A primary purpose of the refuge is to provide habitat and breeding grounds for birds.

The unique topography of the refuge also provides for some unique plant species that are

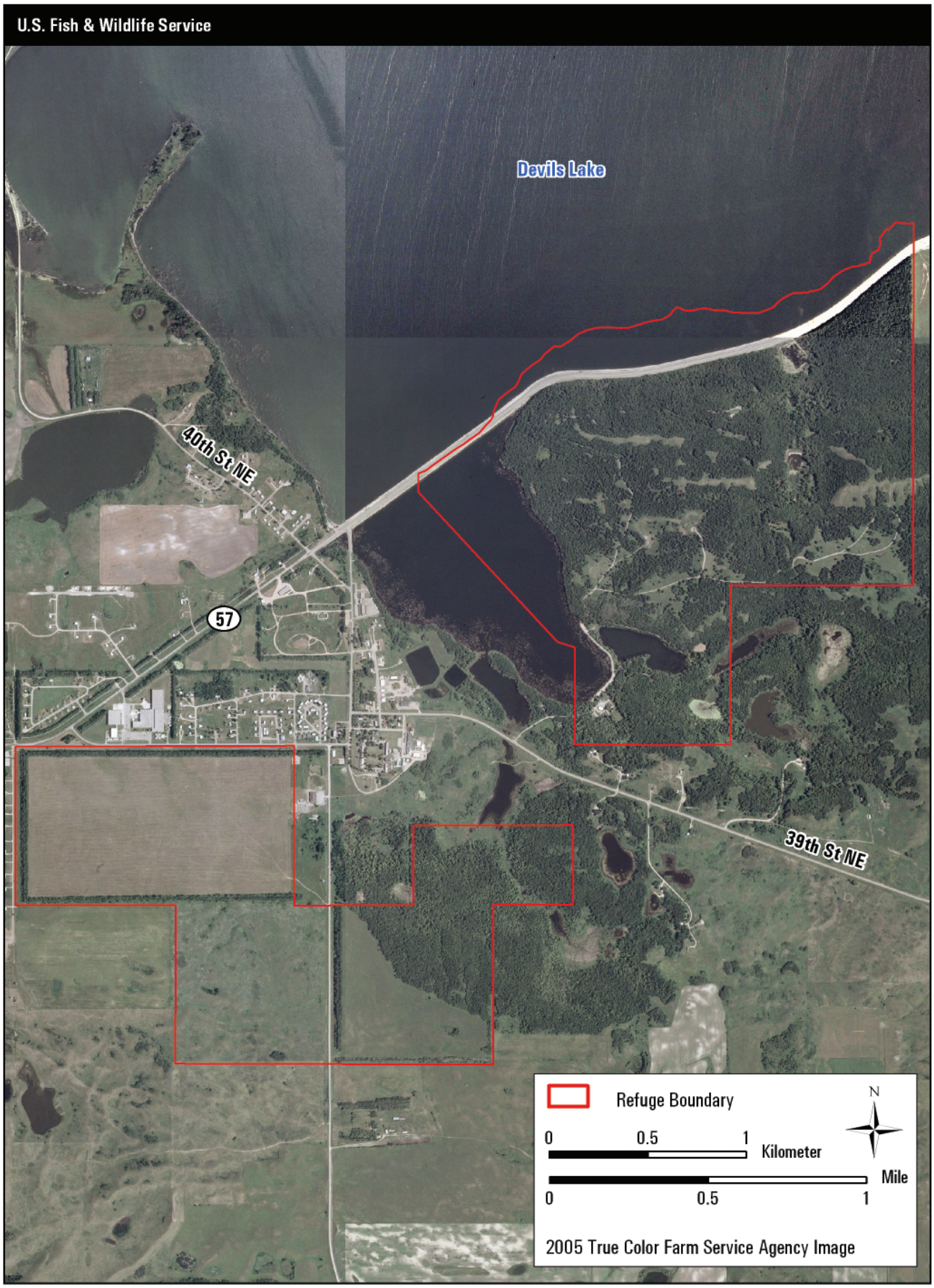


Figure 5. Sullys Hill National Game Preserve boundary map.

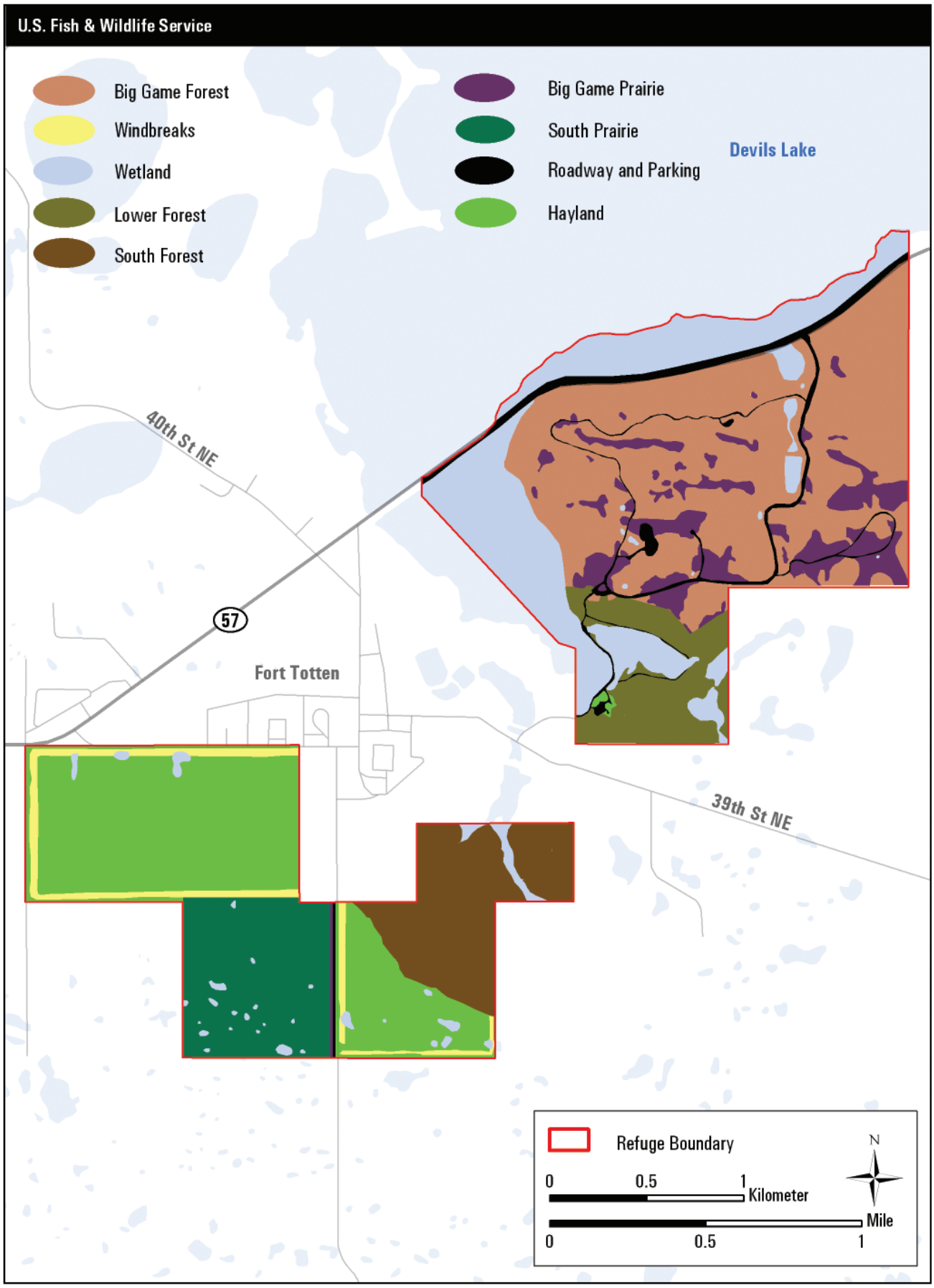


Figure 6. Sullys Hill National Game Preserve management units.

not common to the area. These plants include ferns, ball cactus, sarsaparilla, downy paintbrush, Indian pipe, showy lady's slipper, and marsh marigolds.

This exceptional mix of topography, vegetation, and wildlife attracts many visitors to the area because of the variety of interaction with easily-accessible flora and fauna (plants and animals). Visitation has long been a tradition at the refuge. In the early years, the area was frequented by visitors for picnics, enjoying the playgrounds, reunions, and other "park-type" activities. As the area transformed from a park into a game preserve and refuge, so did visitor activities. Gradually, the refuge is becoming a progressive regional conservation learning center, promoting the conservation role of the Refuge System, as well as educating the public about the functions and benefits of prairie wetlands and grasslands. Additional learning opportunities are available through hiking trails, scenic wildlife overlooks, a self-guided auto route, and the refuge education and visitor center. All activities support efforts to educate and provide interpretation to visitors through premier education facilities. Ultimately, the refuge uses the dual concept of indoor and outdoor environmental education with a focus on the sciences, biodiversity, and human dimensions in the environment and provides area educators an environment that makes learning more exciting and interesting.

Sullys Hill National Game Preserve has gained much community support and boasts North Dakota's first refuge "friends group." This group has supported special events such as the "Birding and Nature Festival" and "Sullys Hill Winterfest." The refuge has become the Service's link to the community and the traveling visitor. While visiting, they receive information on the values of wetland and grassland conservation and the roles of the Refuge System.

4.2 PHYSICAL ENVIRONMENT

The following sections describe physical environmental resources that may be impacted by the implementation of the CCP. Physical characteristics include physiography, geography, soils, water resources, climate, and the effects of global warming.

Introduction

Sullys Hill National Game Preserve's hilly terrain is a prominent fixture on the south shore of Devils Lake. Bluemle (1991) indicates that Devils Lake occupies the former valley of the ancestral Cannonball River, and that the large-scale glacial activity that occurred in North Dakota formed the lake and adjacent hills, including Sullys Hill. This part of North Dakota is situated in the drift prairie physiographic region, and Sullys Hill National Game Preserve is specifically included in the end-moraine complex ecoregion. The refuge is considered part of the Devils Lake Wetland Management District Complex, headquartered at Devils Lake, where greater than 250,000 acres of Refuge System lands in northeastern North Dakota are protected and managed.

Physiography, Geography, And Soils

The Devils Lake basin is a distinguishing feature of the drift prairie physiographic region, and according to Bluemle (1991) is one of the largest and best-defined glacially excavated depressions in central North America. By most accounts, it is considered an internally-drained basin that spans an area of around 3,810 square miles. When water levels rise to 1,446.5 feet above mean sea level (amsl), they overflow southeastward into the Stump Lake system. In the event that the combined waters of Devils Lake and Stump Lake rise to approximately 1,459 feet amsl, the southern moraines are breached and waters overflow into the Sheyenne River . Since 1993, Devils Lake has risen 25.5 feet in elevation, and the volume of water has quadrupled to a current acreage of 134,000 acres (U.S. Geological Service 2007).

In geological terms, Sullys Hill is considered an ice-thrust landform, consisting of a discrete hill of glacial deposits and Cretaceous shale down glacier from the Devils Lake basin. This landform was likely created as a result of the last known glacier, which occurred 12,000 years ago, and is known as the Late Wisconsinan Glacier. This moved over the Spiritwood aquifer, underlying the current day Sullys Hill/Devils Lake thrust complex, and pressurized the water with its tremendous weight. As a result, a large block containing brecciated shale and deformed glacial sediment was shoved up (creating Sullys Hill), and a lake-filled depression (now Devils Lake basin) formed in the area where the block was removed (Bluemle 1991). Bluemle (1991) indicates that the total relief between the bottom of Devils Lake to the adjacent ice-thrust Cretaceous blocks exceeds 650 feet.

The soils identified in Benson County are believed to be formed from glacial material derived from pre-glacial granite, gneiss, sandstone, shale, limestone, and basalt (Strum et al. 1977). Soils that underlie the refuge are those typical of deep, rolling, well-drained soils on glacial till plains

and moraines. The ridge tops and surrounding slopes of the refuge support hardwood trees and typically have a thin topsoil layer. Available water capacity in these areas may be high, and rapid runoff and water erosion regularly occurs. Other hardwood vegetated areas of the refuge are associated with alluvial soils present at the base of slopes and are often present in coulees that were formed by glaciation and erosion. Also prominent across these soils are thick layers of organic material. The latter is a direct result of plant material breakdown that occurs with high soil moisture content and humidity. This decomposition is supplemented by the continual erosion of uphill slopes which produces a layering affect of soil and organic matter.

The prairie areas of the refuge typically contain deep undulating to hilly, well-drained, medium-textured soils formed in loam glacial till. Map units included for these soils possess slow permeability, with high available water capacity and rapid runoff potential (Strum et al. 1977). These prairie areas are located in the noncontiguous portions of the refuge and in scattered areas throughout the woodland portions of the refuge.

Water Resources

Portions of the Devils Lake basin also are included within the boundary of the Sullys Hill National Game Preserve. Devils Lake is primarily an internally-drained basin that has been rising rapidly since a historical low around 1940. Lake levels in 1992 were approximately 1,423 feet, while current levels hover around 1,446 feet, and even reached 1,449 in 2006. Recent records and even prehistoric estimations indicate that the water levels in Devils Lake have fluctuated significantly, usually owing to the dynamic climate of the region. A primary factor in the most recent rise that started in 1993 was the above-normal precipitation that has continued for more than a decade. Unfortunately, because of the significant loss of wetlands in the upper basin, the capacity to store water has been reduced. This flooding has impacted tens of thousands of acres of the Devils Lake Basin, including towns, communities, roads, and agricultural land. The high water levels in recent years preempted the relocation of multiple refuge buildings.

In addition, the refuge is located within the Prairie Pothole Region of the United States. The scouring and shearing action of glaciers or the collapse of ice blocks left to melt after the glaciers retreated, formed shallow basins across the landscape, known today as prairie potholes (Kantrud et al. 1989). These potholes encompass myriad small wetlands ranging from wet meadows and shallow ponds to saline lakes, marshes, and fens. It is estimated that, in the late 1700s, between 7 and 8 million acres of wetlands existed in North and South Dakota combined (Dahl 1990). There are approximately 30 prairie pothole wetlands across Sullys Hill National Game Preserve.Water quality and water rights are not major issues at the refuge.

Climate

Sullys Hill National Game Preserve has a continental climate characterized by relatively warm short summers, long cold winters, and rapidly changing weather patterns. January is the coldest month, with an average mean temperature of -6°Fahrenheit (F), while July is the warmest, averaging 81°F. The average growing season varies from 98 to 106 days.

The average high temperature for the year is 49°F with the average low being 28°F. The average daily summer temperature ranges from 5°F to a high of 81°F with 10.8 days above 90°F. The average winter temperatures range from -6°F to a high of 34°F, with 189 days below freezing (32°F or below). High winds are prevalent all year and can create extreme wind chills.

Average annual precipitation is 17.5 inches. Average snowfall is 35.7 inches per year, with the greatest amount normally received during December. In the winter, snow and high winds can bring frequent blizzard conditions to the area. The frost-free season generally runs from May 20 to September 15.

Global Warming

The U.S. Department of the Interior issued an order in January 2001 requiring federal agencies under its direction that have land management responsibilities to consider potential climate change effects as part of long-range planning endeavors. The Department of Energy's report, "Carbon Sequestration Research and Development," concluded that ecosystem protection is important to carbon sequestration and may reduce or prevent loss of carbon currently stored in the terrestrial biosphere. The report defines carbon sequestration as "the capture and secure storage of carbon that would otherwise be emitted to or remain in the atmosphere."

The increase of carbon dioxide (CO_2) within the earth's atmosphere has been linked to the gradual rise in surface temperature commonly referred to as "global warming." In relation to comprehensive conservation planning for

Refuge System units, carbon sequestration constitutes the primary climate-related effect to be considered in planning.

Vegetated land is a tremendous factor in carbon sequestration. Large, naturally-occurring communities of plants and animals that occupy major habitats—grasslands, forests, wetlands, tundra, and desert—are effective both in preventing carbon emission and in acting as biological "scrubbers" of atmospheric CO_2.

One Service activity in particular—prescribed burning—releases CO_2, directly to the atmosphere from the biomass consumed during combustion. However, there is no net loss of carbon because new vegetation quickly germinates and sprouts to replace the burned-up biomass. This vegetation sequesters approximately an equal amount of carbon as is lost to the air (Dai et al. 2006).

Several other effects of climate change may need to be considered in the future:

- Habitat available in lakes and streams for cold-water fish such as trout and salmon could be reduced.
- Forests may change, with some plant species shifting their range northward or dying out and other trees moving in to take their place.
- Ducks and other waterfowl could lose breeding habitat because of stronger and more frequent droughts.
- Changes in the timing of migration and nesting could put some birds out of synchronization with the life cycles of their prey.

4.3 BIOLOGICAL RESOURCES

The following sections describe the biological resources that may be impacted by the implementation of the CCP. Biological characteristics include vegetation communities, birds, mammals, insects, reptiles, and amphibians.

Introduction

The Sullys Hill National Game Preserve landscape is distinguished by the prominence of native hardwood forest habitat, interspersed with pockets of mixed-grass prairie and associated wetlands (see figure 6, management units map). The refuge supports a diversity of wildlife, including naturally-occurring species such as migratory birds, as well as reintroduced species including bison, Rocky Mountain elk, and white-tailed deer. The climax forest on Sullys Hill National Game Preserve is dominated by American elm and basswood, while cooler, dry areas and north-facing slopes are covered with bur oak and green ash. The mixed-grass prairie areas support species typical of this prairie type, including porcupine grass species and even big bluestem species.

Vegetation Communities

This section describes the three vegetation communities present at Sullys Hill National Game Preserve, namely woodlands, grasslands, and wetlands. Spatial distributions of these habitats are shown on a map (see figure 7, vegetative communities map).

Woodlands

Although the mixed-grass prairie is typically considered the climax vegetation of the northern Great Plains (Clements and Shelford 1939), native woodlands occur where moisture and soil regimes provide necessary support (Hopkins 1984), and where protection (such as lakes and rivers) from fires would have existed. Stewart (1975) indicated that only about 2% of North Dakota is forest habitat. The majority of this was in the Turtle Mountains, Killdeer Mountains, Pembina Hills, and the Devils Lake area, as well as along major rivers and associated tributaries (Haugen et al. 2004). The Pembina Hills in northeastern North Dakota and the Turtle Mountains in northcentral North Dakota are considered the two major deciduous forest ecosystems in the state (Faanes and Andrew 1983). Sullys Hill National Game Preserve is also part of this unique habitat across the state with its nearly 700 acres of native deciduous forest. The refuge was likely protected by the nearby river valleys and Devils Lake basin and therefore did not endure frequent fires as did the surrounding grasslands. In addition, Heidt (1977) indicates that differences in soil parent material at the refuge also played a role in supporting the occurrence of woody vegetation. Severson and Sieg (2006) indicate that possible tree species in the Devils Lake area from 1797–1871 were quaking aspen, white oak, black oak, bur oak, ash, elm, linden, and box elder. The big game forest, lower forest, and south forest are native woodlands with mixed deciduous hardwood trees. Predominant woodland species across the refuge include:

- bur oak
- American elm
- box elder
- American basswood
- green ash

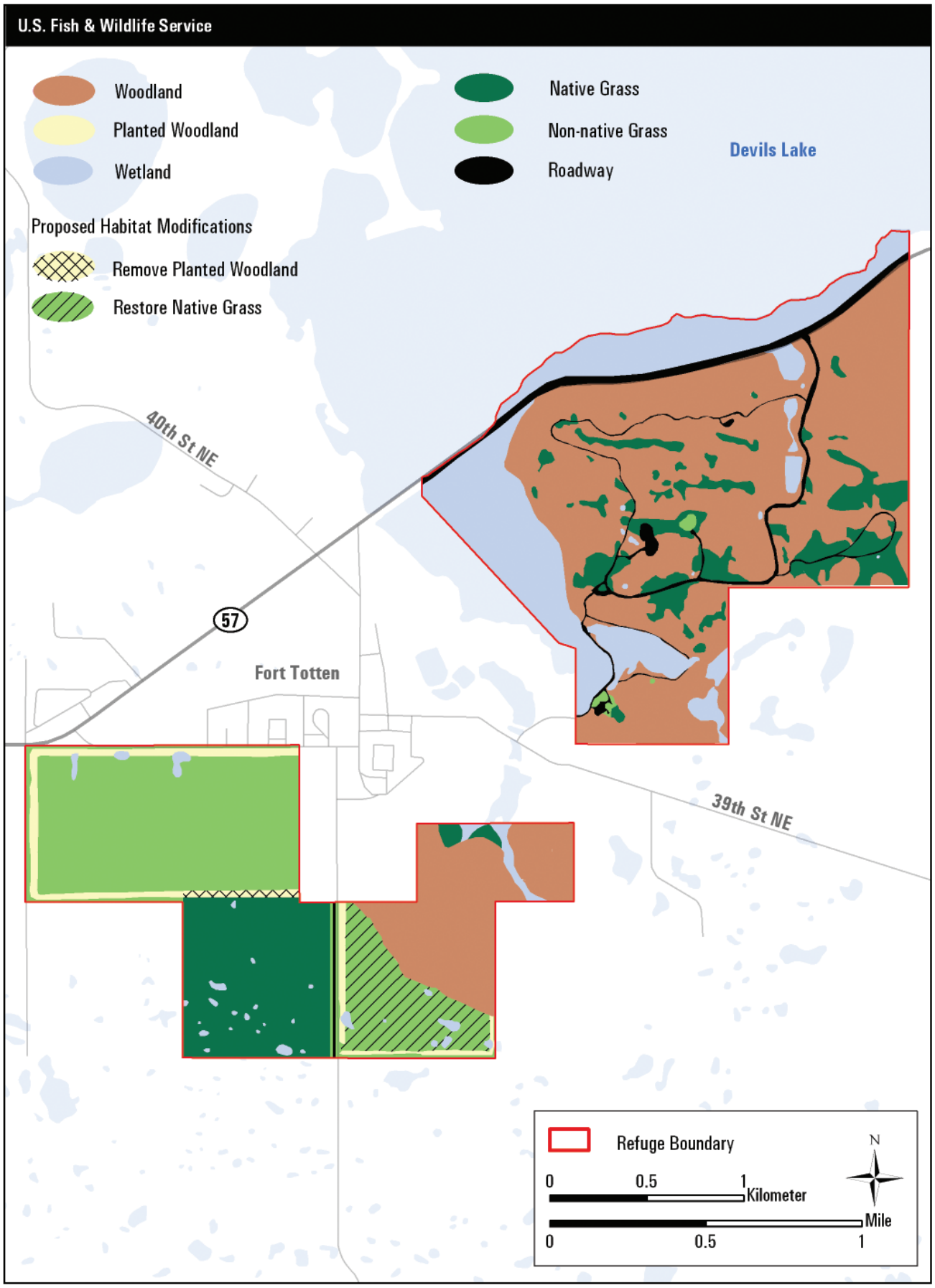


Figure 7. Vegetative communities within the Sullys Hill National Game Preserve.

- cottonwood aspen
- chokecherry
- paper birch
- hawthorn
- wild plum
- western snowberry

There are stands of hardwood trees within the big game forest that are located on the ridge tops and surrounding slopes. Throughout this CCP, these areas are referred to as oak-dominated areas. Overstory species in these areas are bur oak and green ash, and possibly an occasional American elm or American basswood. The predominant understory species is chokecherry, while western snowberry is the primary shrub species. The predominant herbaceous species covering the forest floor are sedge species, Virginia wildrye, and smooth brome. Throughout the big game forest are hardwood trees found on the bottom and side slopes of ravines and adjacent overflow sites. Throughout this CCP, these areas are referred to as basswood-dominated areas. Overstory species in these areas are American basswood, bur oak, green ash, box elder, and an occasional American elm. The most prevalent understory species are overwhelmingly chokecherry, intermixed with American basswood, American elm, and box elder. Western snowberry is the major shrub species, and forest floor cover mainly consists of sedge species. The primary management activity implemented throughout this forest is ungulate grazing, with infrequent fire and occasional selective harvesting activities.

Similar species exist in the lower and south forests, which are not accessible to the ungulates in the big game forest. For oak-dominated areas, the bur oak and green ash are the most prevalent overstory species, mixed with a few American basswood and box elder trees. Dominant understory species are bur oak, green ash, basswood, and chokecherry. Shrub species also occur in these areas, including western snowberry and Juneberry. In the basswood-dominated hardwood forest areas, the dominant overstory species are green ash, American elm, and basswood, intermixed with other species such as white birch, bur oak, and aspen. The two dominant species in the understory are green ash and chokecherry. Other species that occur in the understory are bur oak, American elm, and aspen. Western snowberry is the primary shrub species, however, a few Juneberry shrubs also occur. Forbs also flourish in the understory, including species such as wild sarsaparilla, poison ivy, meadow rue, cow parsnip, golden alexander, and even a few unique orchids. Past management in these forests was primarily idleness, with an occasional fire and minor selective harvesting activities.

Grasslands

Grassland acreage lost in North Dakota since settlement is estimated at upwards of 70% (Conner et al. 2001). More vividly stated, <1% of the original eastern tall-grass prairie and about 32% of the mixed-grass prairie remain in North Dakota (Samson and Knopf 1994, Samson et al. 1998). Grasslands throughout Sullys Hill National Game Preserve are situated in the mixed-grass prairie of the drift prairie physiographic region; however, the tall-grass prairie can be found just east of the refuge boundary. Plants of the refuge's prairie are characterized by the warm-season grasses of the short-grass prairie to the west and the tall-, cool- and warm-season grasses to the east. This ecotonal mixing from the west and east causes the mixed-grass prairie to possess more plant species than other types of prairies, including short-, intermediate-, and tall-grass species (Samson et al. 1998).

Vegetation composition at the regional and local levels was determined by several interrelated factors, including elevation, topography, climate, soil characteristics, herbivory, and fire (Coupland 1950, Hanson and Whitman 1938). Based on the locality of the refuge, local vegetative associations would have been more mesic (adapted to an environment having a balanced supply of moisture) than areas to the west. The drift prairie physiographic region of North Dakota is classified in the wheatgrass—bluestem—needlegrass category. Species characteristic of this region include slender wheatgrass, little bluestem, fringed sage, white sage, white prairie aster, side-oat grama, blue grama, purple coneflower, prairie junegrass, blazing star species, silver-leaf scurf-pea, prairie rose, goldenrod species, needle-and-thread grass, and green needle grass (Kuchler 1964). With influence from the adjacent tall-grass prairie, many notable grasses from this grassland type are present, including big bluestem, Indian grass, and switch grass.

Prairie grasslands function similar to a living organism by responding to activities within the ecosystem. They evolved with natural disturbances such as fire and herbivore grazing, and changes or interruptions in these processes, coupled with variations in climate, alter species composition. The prairie forbs and grasses have developed biological adaptations that enable them to thrive with herbivore grazing. Manske (2000) states that grazing pressures actually increased grassland expansion through co-evolution with mammals. The evidence of fire as a historical

natural disturbance suggests that native people used fire in hunting, and often natural fires occurred with lightning strikes. Fire continues to serve as a valuable tool to rejuvenate the growth of native plants and reduce woody and exotic plant invasion. Another significant change after burning is the increase in the number of plant species, which likely attracts several species of indigenous wildlife as vegetation structure (height, density) is diversified and the range of potential food resources is increased. Several sources indicate that native grasslands devoid of grazing and fire deteriorate quickly (Anderson et al. 1970, Kirsch and Kruse 1973, Schacht and Stubbendieck 1985).

Across North Dakota, these natural disturbance regimes are necessary to sustain ecosystems, but are mostly absent due to human interventions that modified the physical and biotic conditions of the landscape (Hobbs and Huenneke 1992). Domestic cattle replaced native grazers such as the American bison and prairie dog, which exhibit different grazing behaviors and affect vegetation differently (Schwartz and Ellis 1981). Uncontrolled fires were another natural process that maintained the biotic integrity of prairie grasslands, but are not currently a regular part of sustaining the ecosystem. Even though native remnants remain in the mixed-grass prairies, most tracks of land are extremely degraded (Johnson and Igl 2001). Rather than a diverse and varying habitat structure across the landscape, the current patches of grassland are relatively simple and uniform and not necessarily advantageous to the indigenous wildlife that evolved within this ecosystem.

Grasslands across Sullys Hill National Game Preserve cover 580 acres, including 252 acres of native sod and 328 acres of old cropland. For the purpose of this CCP, native sod is defined as grassland that has never been broken by mechanical means (that is, plowed). Conversely, old cropland areas were previously cultivated and reseeded to smooth brome and alfalfa for the purpose of ungulate forage. The distinction between grassland types is critical because the system potential (for example, what plants will be favored or discouraged under the given environmental conditions) and associated management options (the use of mechanical disturbances) differ between lands that have and have not been previously plowed. The big game prairie is native sod managed by the grazing of Rocky Mountain elk and bison since 1917 and 1918, respectively. These areas of native sod are isolated patches embedded within the big game forest of the refuge. According to the refuge's "Fenced Animal Management Plan" (Veikley 1984), the elk population ranges from 15–20 animals in the winter to 20–25 animals in the summer. Similarly, the bison population ranges from 25–30 in the winter and 30–40 in the summer. Grazing by these animals has been the primary management for these native sod areas in the big game prairie. Although invaded by smooth brome and Kentucky bluegrass, these areas support several native grasses such as western wheatgrass, bearded wheatgrass, greenneedle grass, and big bluestem, along with several native forbs including prairie smoke, goldenrod, white sage, and scarlet gaura.

Another tract of native sod associated with Sullys Hill National Game Preserve is the south prairie (see figure 6, management units map). Historically, this area was under a management regime of idleness except for sporadic wildfires, primarily caused by arson. In the past few years, prescribed fire has been consistently used in an attempt to reduce the smooth brome, Kentucky bluegrass, and woody species present. Baseline data collected in 2007 using the belt-transect method (Grant et al. 2004) indicates that current vegetative composition includes 31.4% smooth brome and Kentucky bluegrass groupings, nearly 7% silverberry and western snowberry groupings, and slightly more than 61% native grass and forb groupings. The primary native grass identified across this field is porcupine grass, as well as plains muhly, bearded wheatgrass, upland sedges, and big bluestem. Also prevalent are a diversity of forbs, notably wood lily, pasque flower, prairie smoke, blanket flower, black-eyed Susan, northern bedstraw, goldenrod, and many more. The plant association sheet utilized for the baseline data is included in appendix D. The 328 acres of old cropland that occur at the refuge have been historically hayed annually as winter forage for the ungulates in the big game forest and prairie units. Dominant plant species in these fields are smooth brome and alfalfa. These areas were last seeded to these introduced species more than 15 years ago.

Wetlands

Wetlands are areas 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 to both migratory birds and other resident wildlife. They serve as breeding and nesting habitat for migratory birds and as wintering habitat for many species of resident wildlife. Humans also benefit from wetlands because these habitats improve water quality and quantity, reduce the effects of flooding, and provide areas for recreation. Wetlands associated with the refuge

are located in the Prairie Pothole Region. They are characterized by numerous depressions that are relatively shallow and dominated by emergent plants. These are referred to as palustrine wetlands, and specifically in North Dakota, these wetlands occupied the millions of shallow basins that resulted from glacial scouring and the melting of buried blocks of glacial ice (Kantrud 1983).

The refuge is located within the Devils Lake Basin and bordered by Devils Lake, proper. Unlike the other wetlands across the refuge, Devils Lake is a lacustrine wetland, meaning it typically includes large areas of open water with active, wave-formed shorelines and no persistent emergent vegetation in the central or deepest zones (Kantrud 1983). With the current record-high water levels of Devils Lake, over 200 acres of the refuge are underwater as of the writing of this document.

Finally, several fresh water springs occur throughout the refuge with moderate out-flows. One spring was developed for use as a permanent watering site for big game in 1940, but is no longer functional for this purpose. These springs are perhaps an option for wildlife watering in the future.

Wildlife

Birds

Although prairie woodlands occupy only about 1% of the northern Great Plains (Girard et al.1989), their significance to the natural resources is disproportionate (Rumble and Gobeille 1998). These woodlands contribute to local and regional avian diversity (Knopf and Samson 1994) and serve as important breeding and migratory habitat (Moore et al. 1995, Rodenhouse et al. 1995). The forested areas of the refuge contribute to local avian diversity and likely provide habitat for forest species (such as red-eyed vireo, rose-breasted grosbeak, veery, and overnbird) that have shown regional or continental population declines. Collected baseline data identified 184 bird species across the prairie, woodland, and wetland communities of the refuge (see appendix D). However, considering these varying habitats, it is estimated that up to 270 species may use the refuge for both breeding and as a stopover site. Several of the species that use the woodlands are considered forest-interior breeding birds and require large unfragmented blocks of forested habitat, which the refuge provides. A few birds characteristic of this habitat include ovenbird, pileated woodpecker, hairy woodpecker, black and white warbler, veery, and red-eyed vireo. The red-eyed vireo, yellow warbler, common yellowthroat, eastern wood peewee, ovenbird, and least flycatcher are the most frequently detected woodland species recorded during refuge baseline data collections. In addition, bald eagles frequent the refuge as a staging area during the spring and fall migration and typically use the edge of Devils Lake that borders the east of the lower forest.

The grasslands of the refuge likely provide limited habitat for grassland-dependent birds, especially those species with high area sensitivity. The largest contiguous block of grassland habitat is currently the south prairie, at 150 acres in size, with other blocks throughout the refuge ranging from 1–15 acres. These latter areas are buffered by the woodlands that typically surround the grasslands throughout the refuge. Bird species characteristic of the contemporary mixed-grass prairie of the drift prairie region of North Dakota are the Savannah sparrow, clay-colored sparrow, and bobolink. Based on baseline data collected throughout the grasslands of the refuge, the most frequently detected grassland birds are the bobolink, grasshopper sparrow, and clay-colored sparrow.

The wetlands of the refuge support several species of waterfowl as well as other wetland-dependent birds. Canada geese, mallards, wood ducks, blue-winged teal, hooded mergansers, northern shovelers, and gadwalls are all considered abundant or common at the refuge during the breeding season (USFWS 2004). Several wading birds also use the refuge wetlands, most commonly the black-crowned night heron and less commonly the great blue heron. In addition, double-crested cormorants and American white pelicans are considered abundant, especially on the wetlands contiguous with Devils Lake.

Wild turkeys were brought to North Dakota over a half-century ago through an introduction program spearheaded by the Izaak Walton League (Wilson 2004). At Sullys Hill National Game Preserve, turkeys were first introduced in 1989 and again in 1998. In 1989, 24 Meriam's turkeys were transferred from J. Clark Salyer National Wildlife Refuge, and in 1998, 16 Eastern turkeys were transplanted from Judson, North Dakota. This species remains a prominent wildlife species in the big game forest of the refuge, with the population averaging 20–50 animals, dependent upon several variables such as climate and sex ratios.

Mammals

Sullys Hill National Game Preserve is prominently known for its resident plains bison

and Rocky Mountain elk, the preservation and protection of which is a purpose of the refuge. The following sections describe these and other mammals that use refuge resources.

Bison

In eastern North Dakota, it is hypothesized that bison existed, at one time or another, within every square mile of the eastern part of the state. The examination of journals and diaries of explorers and adventurers to the area indicate that bison, prior to 1880, were plentiful all the way up the Sheyenne River to Devils Lake. Although considered a creature of the open grasslands, there is evidence that bison used woodland and riparian areas in search of water and shelter from winter storms in the region. It is suggested that bison regularly moved between seasonal ranges, wintering in the aspen parklands or woodland areas and summering on the open prairie (Epp 1988, Moodie and Ray 1976; Morgan 1980). Some theories disagree with the concept that all bison were this migratory, while other sources indicate that some herds migrated and some did not. A synthesis of historical records conclude that bison moved in response to local conditions of forage availability, influenced by weather, fire, and previous grazing. For example, Epp (1988) states that bison would remain in wooded areas for the duration of the year if their needs for forage, water, and shelter were met. Year-to-year variations in environmental conditions, including weather, fires, and human interference, would have driven the migratory behaviors of bison (Severson and Sieg 2006). Considering this information, it is evident that bison were present in the region of Devils Lake and likely would have used woodland habitats at least for protection during winter months, and possibly more frequently on a variable and sporadic basis.

Estimates of the number of North American bison, pre-European settlement, vary significantly, but bison likely occurred in the tens of millions (Shaw 1995). A variety of theories exist as to the reasons for the rapid decline of bison, including the following: the mid-1800s commercial slaughter, American Indian hunting, trade pressures, the introduction of horses to native cultures, the division of the plains by railroads, and finally, newly introduced bovine diseases. Commercial slaughter of bison in the mid-1800s likely played the most significant role in the bison population reduction of the 1800s. Estimates of remaining bison in the late 1800s vary between approximately 600 and 1300. Formation of the American Bison Society in 1905 resulted in Congressional establishment of six federally managed public bison conservation herds between 1907 and 1919. Four of these herds are currently managed by the U.S. Fish and Wildlife Service, while both the Yellowstone and Wind Cave National Park herds, established in 1902 and 1913, are managed by the National Park Service (Boyd 2003, Halbert 2003).

Six bison were introduced into the refuge in October 1918 from the Portland City Park, Portland, Oregon. Herd structure included the herd matriarch and her offspring (2 bulls and 3 cows). Based on historical documentation, it is believed that the herd matriarch was obtained by the Portland City Park from the Conrad herd around 1906 through a trader named B.H. Denison in Ravilli, Montana. In 1932, the first introduction since the establishment of these 6 occurred with a bull from Wind Cave National Park. Nine other introductions are recorded between 1941 and 1997, including bison from the National Bison Range, Fort Niobrara National Wildlife Refuge, and Theodore Roosevelt National Park. Since 1980, herd numbers averaged 30 animals at the refuge, with the highest population of 40 occurring in 2006. Recent genetic testing on the herd indicates that there is possibly no hybridization with domestic cattle, making this the only Service herd with such potential based on current methods of testing. In 2006, this herd was transported to Fort Niobrara National Wildlife Refuge in Valentine, Nebraska, for propagation into a "minimum viable population" which would include several hundred to a couple thousand animals. Subsequently, 7 bison from the National Bison Range in Moise, Montana were transferred to the refuge to start a new herd. Based on current methods of genetic testing and analysis, these new animals do not possess cattle hybridization and come from a herd that holds more unique alleles than any other herd across the U.S. Fish and Wildlife Service.

Rocky Mountain Elk

Records indicate that elk were also plentiful throughout the region prior to European settlement. According to Severson and Sieg (2006), they appeared nearly everywhere, specifically in habitats close to woodland cover, including the Red River Valley and its tributaries, such as the James River and Devils Lake. During the 1860s, it is recorded that elk were especially common along the wooded areas of the Sheyenne River and Devils Lake. Based on a review of early documentation of the region, elk were mentioned more frequently than any other animal except bison. Most sources agree that elk did not migrate and likely spent significant amounts of time in the wooded areas rather than in the open grasslands. By the 1880s, they

appeared to be extirpated from the region east of the Missouri River (Severson and Sieg 2006).

Refuge records indicate that 15 elk were brought from Yellowstone National Park to the refuge in 1917. Historical data specifies that subsequent introductions of elk did not occur until 1941, when a bull elk was brought in from Fort Niobrara National Wildlife Refuge in Valentine, Nebraska. It appears that approximately 5 other animals were brought in between 1949 and 1991, mostly bulls from Fort Niobrara. In 1993, 3 elk (2 females and 1 male) were transferred from Teddy Roosevelt National Park, in Medora, North Dakota, to the refuge. Currently the refuge maintains about 20–25 elk.

White-tailed Deer

Records specify that only a few scattered populations of white-tailed deer occurred in suitable habitat across eastern North Dakota. It is possible that the abundant elk populations may have been a factor in the limited number of deer (Severson and Sieg 2006). According to Roger Johnson, a big game biologist, NDGF, pre-settlement deer populations were notably lower than current day numbers. As an example, currently deer numbers in the area average 2–3 animals per acre. Even 20 years ago, deer populations were less then 1 animal per acre (Roger Johnson, NDGF, personal communication).

Historical data evidences that 4 white-tailed deer were introduced into the refuge around 1917 from Fargo, North Dakota. Later introductions occurred in 1947 with a buck from the Camp Grafton National Guard campus near Devils Lake, North Dakota, and a local buck from the Devils Lake area in 1952. Populations of deer have ranged from 10–50 animals since introduction, with current numbers around 15–30.

Prairie Dogs

Prairie dogs are native to North Dakota but primarily are found in western expanses of the state. The black-tailed prairie dog was introduced into the refuge in 1974. The current prairie dog town covers about 1.5 acres in the big game forest and prairie and includes several hundred dogs. Prairie dogs can significantly alter habitat and can quickly expand their range if they are not monitored and managed.

Other Mammals

Sullys Hill National Game Preserve also supports several other less conspicuous mammals for which active management is not implemented.

©Cindie Brunner

Tiger swallowtail butterfly.

Representative species using the refuge include coyote, grey squirrel, red fox, eastern cottontail, badger, beaver, raccoon, striped skunk, fisher, muskrat, fox squirrel, weasel, mink, woodchuck, deer mouse, and meadow vole. Based on the checklist of state mammals (Wiehe and Cassel 1978), it is anticipated that more than 35 mammal species could occur across the refuge. Extremely limited data are available for these mammals in this area of North Dakota and specifically at the refuge. One study was completed in 1979–1980 on fox squirrel activity and time budgets on the refuge (Nelson 1981), and a current study is underway to census fishers across the refuge and in eastern North Dakota.

Insects, Reptiles, and Amphibians

Inventories of other wildlife, such as invertebrates and reptiles and amphibians, are limited. The only known survey in this category was completed by Royer et al. (1998), who developed a comprehensive butterfly list for the refuge (see appendix D). Throughout the woodland and grassland habitats of the refuge 50 species were identified and it is speculated that up to 19 more species could likely occur. Royer et al. (1998) indicated that there is a remote possibility that a Dakota skipper could occur on the south prairie, perhaps among the purple coneflowers.

Several species of fish also occur at the refuge in areas that interconnect with Devils Lake. Although fish surveys or inventories have not occurred on the refuge, common species present across Devils Lake include walleye, northern pike, yellow perch, white sucker, white bass, and black crappie.

4.4 CULTURAL RESOURCES

The following information concerning cultural resources is taken directly from the following document, "Sullys Hill National Game Preserve: 2003 Archaeological Survey and Test Excavations, Benson County, North Dakota" (Jackson et al. 2004).

Human occupation of the northern plains is documented as early as 12,000 years ago, first by American Indians and much later by Euro-Americans. The various human adaptations to the northern plains environment that have taken place over time, in what is North Dakota today, have come in response to basic changes in climate and the movements of people, technology, and ideas. Prehistoric cultural traditions that reflect essential settlement-subsistence patterns and technological complexes have been defined on the basis of archeological investigations at sites in the northern plains, particularly North Dakota (Frison 1991, Gregg 1984, Lehmer 1971, Schneider 1982). Such cultural traditions are generally sequential, but often exhibit some temporal overlap.

The cultural environment of what is now North Dakota is described within the framework of a regional cultural chronology that is continually being expanded and refined as archaeological and historical research produces new information on past human occupation of the area. It is organized into periods that are, for the most part, named for the cultural traditions that dominated those times. Cultural periods also imply differences in certain aspects of material culture, particularly basic technology, as represented by distinctive artifact types and assemblages. The project area is located in the Sheyenne River Study Unit of the "North Dakota Comprehensive Plan for Historic Preservation: Archeological Component" (Haury 1990). The reader is referred to this document for additional information on the cultural-historical setting of the refuge. More detailed information specific to the Devils Lake area is also available in recent archeological reports (Jackson and Toom 2002, Toom et al. 2000). A brief outline of the region's cultural history of the project area follows.

The regional chronology, as it exists today, is useful for organizing and describing identified cultural manifestations. It is presented within a framework of five basic periods: (1) Paleo-Indian, (2) Plains Archaic, (3) Plains Woodland, (4) Plains Village, and (5) Historic. The names of the first four periods also refer to mainly prehistoric American Indian cultural traditions, with the Plains Village tradition extending into early historical times. The Historic period encompassed that span of time following the decline of the Plains Village tradition and the rise of the Plains Equestrian tradition, as a result of the introduction of the horse and Euro-American manufactured trade goods among native peoples. It subsumed American Indian lifeways during protohistoric and early historic times in the northern plains, from about A.D. 1780–1880 (State Historical Society of North Dakota 1990). Later in the Historic period, at the end of the Plains Equestrian tradition—A.D. 1880, the Euro-American tradition became dominant.

The dominant historical influence in the specific project area was the 1867 establishment of Fort Totten. It served as a military base to control and protect the Sioux residents of the newly formed reservation on the south shore of Devils Lake. Fort Totten functioned as a military fort until 1890, and soon after that the post consolidated with the Catholic mission school and served as an industrial school for the reservation (DeNoyer 1910, Robinson 1966, Wertenberger 1967). The industrial school was closed in 1935 and the post served as a tuberculosis sanitarium until 1939 (Friends of Fort Totten Historic Site, no date). The fort then served as a community school until 1959 and in 1960 it was formally transferred to the State Historical Society of North Dakota as a state historic site. Fort Totten is listed on the National Register of Historic Places and the North Dakota State Historic Sites Registry.

Sullys Hill National Game Preserve was originally part of the old military reservation. In 1904 these lands were proclaimed as a national park by President Theodore Roosevelt and removed from military jurisdiction. Congress established the area as a big game preserve in 1914, jointly administered as a national park and game preserve by the Departments of Interior and Agriculture. In 1921, it was also made a bird refuge. The refuge was transferred from the National Park Service to the U.S. Fish and Wildlife Service in 1931.

Known Archaeological Resources

The earliest archeological reporting in what is now Sullys Hill National Game Preserve was done by T. H. Lewis in 1886 (Lewis 1898). Contracted by Alfred J. Hill of St. Paul, Lewis conducted "field surveys of rapidly disappearing antiquities" for the privately funded Northwestern Archaeological Survey (Keyes 1928). Three mound sites (32BE1, 32BE2, and 32BE27) within the present-day refuge were originally reported by Lewis. Two of these mound sites (32BE1 and 32BE2) were formally recorded by the Smithsonian Institution River Basin Surveys in 1946 (Mallory 1966). All three

mound sites were revisited by a 1989 University of North Dakota (UND) survey crew to document and update information concerning all of the mound sites in North Dakota reported by T.H. Lewis (Haury 1990).

The Irvin Nelson site (32BE208) was originally recorded by Mallory (1966) after prehistoric artifacts and human bone had been found in the yard of the refuge manager's residence. Prior to construction of a new headquarters building and maintenance shop at the site location, auger test excavations were conducted by UND in 1979 (Fox 1979). Based on the positive results, a formal test excavation program was recommended. Those investigations were conducted by North Dakota State University (NDSU) personnel in 1980 (Fox 1982). The cultural materials collected from the site are currently being reexamined by UND (Toom 2002).

Archaeological investigations conducted in 1991 by the North Dakota Department of Transportation along Highway 57 resulted in the recordation of two sites (32BE45 and 32BE46) and one site lead (32BEX74) within Sullys Hill National Game Preserve (Christensen 1991, 1992). Only the site lead (32BEX74) is within the project areas reported herein. Lead site 32BEX74 was upgraded to an archaeological site and re-recorded as part of site 32BE126.

In 1997, an emergency dike was slated for construction using fill from two borrow areas within the refuge. The removal of fill from the two borrow areas was carefully monitored, and the area to be impacted by dike construction was inspected for archaeological materials (Kinney 1997). Monitoring was conducted during the stripping operations until the excavators were below potentially culture-bearing strata. No archaeological sites were found during the course of this work.

Service archeologist Rhoda Lewis conducted several cultural resource inventories prior to refuge improvements during the 1990s (Lewis 1995, 1999a, 1999b, 1999c, 1999d). No archaeological sites were recorded over the course of these surveys. Four proposed project areas at the refuge were inventoried in 2002 by Lewis. The location of a new education and visitor center and an access road from Highway 57 were essentially the same locations as those investigated during the current survey project. The location of a residence and shop that was surveyed at that time is no longer a candidate for construction. Also, the stone pillared entrance gate to the refuge was recorded in 2002 as site 32BE114. It was recommended that subsurface excavations be conducted at the proposed education and visitor center location (Lewis 2002).

4.5 SPECIAL MANAGEMENT AREAS

In addition to refuge status, lands may have additional designations which overlay refuge status.

Natural Area

Sullys Hill National Game Preserve was designated by the state as one of only 19 natural areas in North Dakota. Four of these 19 areas are national wildlife refuges, including Sullys Hill National Game Preserve. Areas given this designation have special qualities found only on undeveloped land. These qualities represent glimpses through a window in time on a portion of North Dakota's presettlement landscape—a "living history." This designation also signifies the existence of a diverse array of native plants and wildlife that belong together in finely-tuned natural communities, places of inherent beauty and interest, outdoor classrooms for teaching life sciences and earth sciences, outdoor laboratories, and benchmarks against which to gauge landscape changes (Umber 1988). The refuge possesses all of these unique qualities.

Wilderness Review

Although Sullys Hill National Game Preserve reflects some of the qualities desired in wilderness, at 1,675 acres, the refuge does not meet the size criteria for wilderness designation, plus it has several miles of roads and trails within its boundary.

Scott Ralston/USFWS

Children's activity.

4.6 VISITOR SERVICES

The Act of March 3, 1931 established recreation as one of the purposes of Sullys Hill National Game Preserve.

Hunting And Fishing

The legislative purposes for Sullys Hill National Game Preserve do not allow hunting on the refuge. Currently, public fishing is not permitted on the refuge due to a lack of available resources to manage this use and its impacts to the refuge. In addition, the refuge fishery is minimal but is bordered by one of the most popular fishing areas in the state and the nation, Devils Lake. The refuge has used its limited fishery as an education tool to educate youth about the life cycles of fish and fishing techniques.

Wildlife Observation And Photography

Sullys Hill National Game Preserve hosts over 60,000 visitors annually, most of which come to observe and photograph wildlife. The refuge provides outstanding opportunities due to the unique mix of prairie, forest, and wetland habitats that attract a rich diversity of resident and migratory wildlife. To accommodate these visitors, the refuge offers a 4-mile self-guided auto tour that travels down winding forest roads and eventually breaks into open prairie and savanna areas. Visitors on the auto tour can only leave their vehicles to venture onto five observation platforms: the wetland, prairie dog town, Devils Lake vista, nature trail, and Sullys Hill overlooks. While on the auto tour, visitors have the opportunity to view and photograph plains bison, Rocky Mountain elk, white-tailed deer, turkey, and prairie dogs.

The refuge features a mile-long nature trail and 1.6 miles of trails for hiking and cross-country skiing, with 1 observation platform to observe a host of resident and migratory wildlife. The forests, interspersed with wetlands, provide opportunity to observe a host of bird species, including numerous warblers, wood ducks, kingfishers, hooded mergansers, and black-crowned night herons. Birding opportunities are available all year. While warbler numbers peak in the month of May and in late October, bald eagles commonly stage on the refuge in late winter. Hardy species like pileated woodpeckers are also present in the winter.

The fully-accessible education and visitor center features a full wall of windows and an outside patio to observe a host of species frequenting the birding garden. Common species include rose breasted grosbeak, American gold finch, black capped chickadee, and hairy woodpecker.

Environmental Education

A 6,000 square foot education and visitor center was constructed in 2004. The center features a waterfowl photo gallery, a Rocky Mountain elk exhibit, and a birding garden. Facilities for learning also include two classrooms with dedicated audiovisual equipment, teaching aids, and instructional materials. This center has quickly become a regional conservation learning center for students and adults within a 90-mile radius of the refuge. Refuge staff, in cooperation with local teachers, provide educational presentations to over 5,000 students and other groups annually. The refuge also has a remote classroom to facilitate field-based learning opportunities. Currently, most of the environmental education is on-site.

Interpretation

The refuge hosts two annual events, “Sullys Hill Birding and Nature Festival” and “Winterfest,” with activities for both adults and children. The birding and nature festival has been attracting 1,200–2,100 visitors from all over the country for the 3-day event. Winterfest is a one-day youth-focused festival that attracts over 100–200 participants each year. To plan and execute these festivals, refuge staff work closely with the Sullys Hill Wildlife Refuge Society, the refuge “friends group.” In addition to these special events, interpretive presentations and tours are provided upon request. The refuge also features an outdoor amphitheater to host interpretive programming.

The five observation platforms on the auto tour and nature trail include site-specific interpretive displays. The refuge also has two information and interpretive kiosks located at the refuge entrance and the education and visitor center.

4.7 CURRENT SOCIOECONOMIC CONDITIONS

The goals and objectives of the CCP were developed after considering the socioeconomic conditions of the area surrounding the refuge.

Population And Demographics

The population in Benson County, North Dakota was estimated at 6,997 in 2006. Since 2000, there has been a 0.5% gain in the county’s population. Although this number is low, this is actually better than the state of North Dakota, which saw an overall net loss of 0.1% in its population. There

are 5 people per square mile in Benson County (U.S. Census Bureau 2006).

The majority of the land in the county is used for farming and livestock ranching. There are 567 farms, totaling 732,870 acres (53% of the county lands), with an average size of 1,294 acres. Major crops are corn, grains, soy beans, sunflowers, and sorghum grown on 558,127 acres. The remaining acres are used for various livestock grazing. The market value of the products produced on these farms totals over $55 million (USDA 2002).

The refuge is surrounded on three sides by the Spirit Lake Nation's reservation boundary. The major race in the county is American Indian at 51.2%. The remaining residents are 48.1% White, 2.5% Hispanic, and 0.1% African American. (U.S. Census Bureau 2006). In 2000, 73.8% of county residents were high school graduates, while 10.9% had obtained a bachelors degree or higher.

Employment And Income

The median household income in Benson County in 2004 was $28,058, with 22.4% (national average is 9.2%) of the population below the poverty level. Educational, health, and social services employ the majority of the county residents. The greatest source of income for the county is federal spending at $126 million in 2004. The unemployment rate in the county is 7.4% (U.S. Census Bureau 2006).

Staff

Historically, the refuge was a stand-alone station and had a manager and biological technician located on-site. Approximately 35 years ago, the refuge became part of the Devils Lake Wetland Management District Complex. The staff was cut in half, leaving only a manager assigned to the refuge. The overall budget is quite modest, including the salary for the manager and a very modest operating budget. The success of the refuge program is heavily dependent upon the "friends group" and other volunteers to conduct refuge programs.

Facilities

Facilities have remained fairly updated over the years. Overall, facilities are used to carry out habitat and wildlife management, as well as the popular environmental education, interpretation, and wildlife-oriented visitor services program. Current total visitation is 60,000 visitors annually. Refuge visitors are charged an entrance fee of $2.00 or may use their annual refuge pass. Most of these funds remain at the refuge to maintain facilities and conduct visitor services programs.

Facilities on site include the following:

- 6,000 square foot education and visitor center with office
- 40-foot by 100-foot maintenance shop and storage facility
- 3 bedroom manager's quarters
- 2 buildings for fire operations and 1 for biological equipment storage
- 3 bedroom bunkhouse for seasonal fire staff
- 5 overlooks
  - Devil's Lake Vista
  - Sullys Hill overlook
  - Wetland overlook
  - Prairie dog town overlook
  - Nature trail overlook
- 4-mile asphalt auto tour route and parking lot
- 28-foot by 32-foot remote classroom
- Nature trail
- Amphitheater
- Fenced boundary including electric entrance gate with timer
- Kiosks and interpretive signs
- Entrance sign with lighting
- 2 remote self-contained restrooms
- Hay pen
- Fuel tanks
- 2 trailer pads with water and power (for volunteers)

Visitor Spending

Sullys Hill National Game Preserve is one of the primary economic engines in the lake region for recreation and tourism. The Devils Lake region is well known for its fishing, hunting, bird watching, camping, history, culture, and other associated outdoor recreation. The refuge, in consort with myriad other outdoor adventures, provides a total and unique experience for the visitor, while generating important revenues for the local economy.

The refuge attracts 60,000 visitors annually. In a 2006 review of visitation, guests from 44 states used the refuge, and 45% of the total visitors that year were from outside North Dakota.

There have been many studies on the economic benefits of national wildlife refuges and the outdoor recreation industry. A 2006 report by the Outdoor Industry Foundation did a review of eight outdoor activities, including bicycling, camping, fishing, hunting, paddling, snow sports,

trails and hiking, and wildlife viewing. The report states that these activities contributed $730 billion annually to the United States economy. The industry generates $289 billion in retail sales and services across the country while supporting 6.5 million jobs. The sector that had the highest participation was wildlife viewing, with 66 million citizens. Sullys Hill National Game Preserve is most known for its wildlife viewing opportunities.

The "National Survey of Fishing, Hunting, and Wildlife Associated Recreation" has been completed every five years since 1955. In 2006, 87 million Americans 16 years old and older (38% of the U.S. population) enjoyed some recreational activity related to fish and wildlife. Dollars expended by this group in 2006 for wildlife-related recreation was $120.1 billion. The largest component of this survey was also wildlife watching, with the average wildlife watcher spending $628.00 annually on this activity. In the northcentral region of the survey area, which includes North Dakota, 44% of this population participated in wildlife watching activities. The report states that $20.5 million was spent on wildlife watching in North Dakota.

Another study looked at the economic impact of birding ecotourism on communities surrounding 8 national wildlife refuges in 1993–1994 (Kerlinger 1994). Birder visitation at these refuges ranged from 17,000 to 200,000 annually. The average age of visitors was mid-40s to lower 50s. Family incomes and education levels were far greater than the national average. More than 70% reported they had attended some college. More than 50% of visitors were traveling with a spouse. Two measures of economic activity were calculated: total amount spent by visitors and total economic impact of visitors on the communities surrounding a refuge. The actual economic impact of visitors on communities surrounding each of the refuges ranged from slightly less than $1 million to $14 million (Kerlinger 1994). One refuge that had some similarities to Sullys Hill National Game Preserve was Salton Sea National Wildlife Refuge, which had an annual visitation of 60,000 (same as Sullys Hill National Game Preserve). The average amount spent on a visitor's entire trip to Salton Sea was $670 per person and the average visitor was worth between $38 and $57 to the local community. If this figure is averaged at $47.5 per visitor and 60,000 visitors to the refuge, the economic impact to the local community is $2.8 million in 1993–94 dollars.

A 2004 report completed by Hodur, Leistritz, and Wolfe looked at a local birding festival in Jamestown, North Dakota. Total expenditures for all participants averaged $235 during the course of the 4-day event. Expenditures in the local Jamestown area were $162 per participant.

Sullys Hill National Game Preserve is an important refuge for migratory birds, as well as large mammals such as plains bison and Rocky Mountain elk. This refuge is also an important location for tourism and a vital attraction that brings money into the surrounding communities.

Partnerships

Sullys Hill National Game Preserve is able to accomplish much of the work and mission through the use of various partnerships, friends, volunteers, and supporting agencies.

The Sullys Hill Wildlife Refuge Society was North Dakota's first refuge "friends group." This organization is instrumental in facilitating special events such as the "Sullys Hill Birding and Nature Festival" and "Winterfest." This group is also a cooperating association and supports the refuge in many ways, including advocacy, the refuge gift shop, and staffing the education and visitor center.

The refuge receives much needed assistance through grants or matching money from nongovernmental associations, internships, and research, university partnerships, various volunteers, school system partnerships, and help from local and state agencies or organizations.

5 Environmental Consequences

Scott Ralston/USFWS

Forest prairie view from hiking trail.

This chapter provides an analysis of the potential effects on environmental resources associated with the implementation of the management alternatives for Sullys Hill National Game Preserve. The Service assessed the environmental consequences of implementing each of the alternatives on the biological, physical, social, economical, cultural, and historical resources of the refuge.

5.1 METHODS

The determination of effects is evaluated at several levels, including whether the effects are adverse or beneficial and whether the effects are direct, indirect, or cumulative with other independent actions. The duration of effects also is used in the evaluation of environmental consequences.

Direct effects are those where the impact on resource would be immediate and a direct result of a specific action or activity. Examples of a direct effect include the effect of trail construction on vegetation along the trail or the effect of hunting on wildlife.

Indirect, or secondary effects, are those that are induced by implementation actions, but occur later in time or farther removed from the place of action through a series of interconnected effects. Examples of indirect effects include the downstream water quality effects from an upstream surface disturbance or the impact that recreational use along a trail may have on nearby plant communities.

A cumulative effect is defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future action regardless of what agency (federal or nonfederal) or person undertakes such other actions" (40 CFR 1508.7).

Impacts are often described in terms of their context, intensity, and duration. The duration of effects are described as either short term or long term. Short-term effects would persist for a period of 3–5 years and consist primarily of temporary disturbance to habitat restoration or facility construction and subsequent revegetation efforts. Long-term effects would last more than 5 years after project initiation and may outlast the 15-year life of the CCP. Many long-term effects would be in the form of long-term benefits to wildlife habitat resulting from habitat management actions.

5.2 EFFECTS COMMON TO ALL ALTERNATIVES

A few potential effects would be similar under each of the alternatives.

- The implementation of any of the alternatives would follow the refuge's best management practices.
- The alternatives would avoid and minimize impacts on federally threatened and endangered species, to the extent possible and practicable.
- The refuge, contractors, researchers, and other consultants would continue to acquire all applicable permits, such as for future construction activities.

The sections below describe other effects expected to be similar for each alternative.

Regulatory Effects

As indicated in chapter 1, the Service must comply with a number of federal laws, administrative orders, and policies in the development and implementation of its management actions and programs. Among these mandates are the National Wildlife Refuge System Improvement Act of 1997, the Endangered Species Act of 1973, the Clean Water Act of 1977, and compliance with Executive Orders 11990 (Protection of Wetlands) and 11988 (Floodplain Management), and the National Historic Preservation Act, etc. The implementation of any of the alternatives described in this environmental assessment would not lead to a violation of these or other mandates.

Environmental Justice

Within the spirit and intent of Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations," no actions being considered in this environmental assessment would disproportionately place any adverse environmental, economic, social, or health effects on minority or low-income populations compared to the general public.

The Service is committed to ensuring that all members of the public have equal access to America's fish and wildlife resources, as well as equal access to information that would enable them to participate meaningfully in activities and policy shaping.

Cultural Resources

As a whole, cultural resources would be enhanced through protecting known significant resources and extending protections to newly discovered significant cultural resources.

Cultural resource investigations at the refuge have been limited and there are probably many unrecorded resources. All undertakings (as defined by Section 106 of NHPA) require cultural resource review and may necessitate survey, research, and/or excavation to satisfy provisions of NHPA, NEPA, and other applicable historic preservation acts and laws.

Potential adverse effects to a significant resource from an undertaking would be addressed by the regional archaeologist (region 6) in consultation with the North Dakota State Historic Preservation Office, tribal historic preservation offices, and other interested parties.

Global Warming

The actions proposed in this draft CCP and EA would conserve or restore land and habitat, thus retaining existing carbon sequestration at the refuge. This action would contribute positively to efforts to mitigate human-induced global climate change.

The use of prescribed fire, which releases CO_2, would result in no net loss of carbon because new vegetation would quickly replace the burned-up biomass. Overall, there should be little to no net change for carbon sequestered at the refuge from any of the management 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.

Geology And Soils

All alternatives would positively affect soil formation processes on the refuge lands. Some disturbances to surface soils and topography would occur at those locations selected for (1) administrative, maintenance, and visitor facilities; (2) introduced and invasive species removal and eradication; and (3) restoration of native habitat.

Water Quality, Wetlands, And Floodplains

All alternatives would positively affect water quality. Positive effects are anticipated from protecting groundwater recharge, preventing

runoff, retaining sediment, and minimizing nonpoint source pollution. The management alternatives are not anticipated to have any adverse effects on the area's wetlands and floodplains.

5.3 DESCRIPTION OF CONSEQUENCES BY ALTERNATIVE

Management actions are prescribed as a means for responding to problems and issues raised by Service managers, the public, and governmental partners. Because management would differ for each alternative, the environmental and social effects resulting from implementation would likely differ as well.

The following section provides an analysis of the effects estimated to result from alternative A (no action), alternative B, and alternative C (proposed action). A summary of this narrative is contained in table 2 in chapter 3.

Woodland Habitat

Alternative A (No Action)

Ungulates would be maintained at historical levels and allowed to graze all season, with no time or space restrictions. This would continue to impede the development of understory and midstory forest layers and inhibit forest regeneration, thus limiting available habitat for forest-interior breeding birds.

Wildfires (primarily caused by vandalism) would continue to cause the tree rows in shelterbelts to deteriorate and increase noxious weed invasion between and adjacent to the rows. Until these trees die and decay, these tree rows would also continue to fragment grassland habitats.

With current staffing limited management, monitoring, and research would occur, making it difficult to monitor the impacts of management decisions and take the necessary management actions to correct them.

Alternative B

Most of the forested lands would continue to provide adequate forest-breeding bird habitat. Establishing woodland restoration units, totaling 80 acres, and using exclusion fences and appropriate management techniques would provide additional habitat for interior-forest breeding birds. Wildfires would be reduced in the windbreaks in the hay units, allowing for increased sustainability of the tree rows and reduced noxious weed invasion.

Increased staffing would allow for the implementation of proposed management of habitat improvement.

Alternative C (Proposed Action)

Consequences would remain the same as those for alternative B except that ungulate populations would be reduced to levels that would allow for more understory and midstory growth in the woodland areas outside of the 80-acre restoration units, for the benefit of interior-forest breeding birds. Forestry stand improvements would provide optimal habitat for migratory birds that use all levels of the forest structure.

Removal of selected tree rows would increase the central core area of grasslands, benefitting grassland-nesting birds and decreasing fuels for wildfires, while allowing the refuge to control invasive plants on newly-exposed ground.

Prairie Habitat

Alternative A (No Action)

If ungulates are allowed to continue to graze without restrictions of time or space, undesirable plants would increase, including invasive species. There would be a loss of native grassland plant species and structure, making the area less attractive to migratory birds dependent on forest-edge habitat and other grassland-dependent wildlife and insects.

Extensive grazing would result in an increase in soil erosion, causing a loss of nutrient-rich topsoil while increasing siltation in surrounding waters. There would be a reduction in plant vigor and regrowth, especially in dry years. This would not only impact grassland-dependent migratory birds, but would also reduce the quality and quantity of forage for the refuge's ungulates.

Prescribed fires would continue to be used at appropriate times as a disturbance tool to mimic natural processes and stimulate the regrowth and diversity of native vegetation. However, uncontrolled wildfires (caused by vandalism) occurring at inappropriate stages of vegetation growth may actually increase invasive species such as smooth brome, Kentucky bluegrass, and noxious weeds. These nonnative species have the potential to out-compete the native plant species, creating a monotypic stand of grass that is less attractive to grassland-dependent birds.

Noxious weeds and encroaching woody species would continue to be controlled, maintaining the integrity and structure of the grassland.

Annual haying of the hay unit would provide winter food for ungulates in the big game unit; however, because of the annual defoliation of the vegetation on this site, residual wildlife cover would be limited.

Alternative B

The use of prescribed grazing (controlling numbers of ungulates, rotation, and exclusion fences) and prescribed fire would improve the emulation of historical conditions under which the wildlife and vegetation of the prairie evolved, while improving the diversity of native grasses and forbs. These management tools will control invasive species, such as smooth brome grass, provide necessary disturbance to invigorate the growth of native plant species, and prevent the encroachment of woody species into the grasslands.

Installing and rotating exclusion fences would be labor intensive and costly but would also control grazing in less than ideal habitats, reduce soil erosion, and improve wetland water quality. Controlling noxious weeds and invasive plant species would allow for restoration of native plants. All of these activities would increase plant vigor for ungulate grazing and wildlife use.

Reducing hazardous fuels through prescribed burning and mechanical methods would minimize threats to life and property on the refuge and surrounding land. Rotational haying would provide ungulates with adequate winter food and improve residual cover for wildlife.

Alternative C (Proposed Action)

Consequences would remain the same as those for alternative B except that the structure of the enhanced native prairie would be more representative of a historical mixed-grass prairie, providing increased opportunities for forest-edge and grassland-dependent bird use and a unique opportunity to research and monitor healthy native prairie in the northeastern mixed-grass prairie zone. This monitoring would serve as a baseline for grassland restoration efforts across the Devils Lake WMD Complex and the region. Selected hayland acres would be dedicated to migratory bird habitat through the restoration to a diverse mixture of native herbaceous prairie vegetation.

Wildlife Population Management

Alternative A (No Action)

The current level of overgrazing and overbrowsing would continue, and prairie and forest habitat would provide reduced benefits to targeted migratory birds. Herd health history would continue to be provided to appropriate state and federal agencies so that diseases, such as CWD, may be monitored and controlled. At current levels, winter supplemental feeding would put animals at higher risk for certain diseases and parasites.

The refuge would continue to participate in the bison conservation initiative by monitoring and maintaining the genetic integrity of its bison herd. Prairie dog populations would continue to expand in adjacent grassland areas, altering grassland habitats and leaving them devoid of vegetation. The refuge's boundary fences would be maintained, thereby reducing trespass, disease transmission, and animal escape.

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Photographer.

Alternative B

Consequences would remain the same as those for alternative A except that reduced ungulate numbers would provide improved habitat for migratory birds by reducing demands on forest browse and grassland plants. The prairie dog population would not expand beyond the original 1.5 acre boundary and would not negatively impact adjacent grassland areas.

Alternative C (Proposed Action)

Consequences would remain the same as those for alternative B except that lower levels of ungulates would further increase refuge floristics that support migratory bird nesting and migration habitat. Reduced supplemental feeding of ungulates would result in improved health, specifically for elk. Disease episodes would be reduced and prevented as surveillance increases, and necessary and appropriate treatments are used.

Genetics of each bison on the refuge would be known and would be the basis for transfers of animals to other refuges. Genetic health would be maintained with periodic ungulate introduction.

Environmental Education And Outreach

Alternative A (No Action)

There would continue to be a lack of input into programs presented in the refuge classrooms by outside partners, resulting in missed opportunities to educate the public about the refuge and its purposes, promote wetland and grasslands conservation, and gain support for the Refuge System.

A lack of staff and structured programs would result in lost opportunities to reach and educate more students in the surrounding communities through consistent in-school programs. Without adequate staff available, there would be no guarantee that the current two annual events would continue. This would result in a net loss of reaching and educating over 2,500 adult and children annually.

Continued seasonal visitation would result in a loss of opportunities to reach the area's winter visitors. Also, this independent visitor experience affords no methods to monitor and evaluate the visitor's experience at the refuge to ensure that the refuge's education and outreach goals are being met.

Continuing to provide American Indian programs at refuge events would allow visitors to learn about the culture and traditions of the Spirit Lake Nation.

Sullys Hill National Game Preserve is very dependent on the volunteer "friends group" to ensure that refuge visitor services programs are carried out. Although this makes the programs somewhat vulnerable, it has also been a great asset to each and every program.

Alternative B

Consequences would remain the same as those for alternative A except that this alternative would ensure that all education programs presented on the refuge by other partners support the refuge's environmental education themes of promoting wetland and grassland conservation. Limited off-site programs would expand environmental education opportunities for surrounding youth, teaching them about the benefits of conserving wetlands and grasslands. Actively pursuing relationships with surrounding teachers and providing them with specific programs would impact a larger group of area students with a consistent environmental education message.

Additional visitor services staff and resources would allow the current annual events to continue while ensuring that a consistent message is presented at each of these events. Providing and maintaining more consistent education and visitor center hours would eliminate some frustrations expressed by disappointed visitors while providing for additional environmental education opportunities.

A more developed cultural program would reach more visitors and students, creating a greater understanding of the Spirit Lake Nation's history and traditions. Regular contact with the media would ensure that the public is kept informed on refuge programs and visitor services activities. Providing support to the "friends group would generate additional funding support for refuge programs.

Alternative C (Proposed Action)

Consequences would remain the same as those for alternative A except that programs developed and presented by refuge staff would have the greatest effect on educating students, on- and off-site, about the refuge system, the refuge, and wetland and grassland preservation. In addition, expanding programs off-site would reach the maximum number of students in the surrounding area. Offering well-organized, consistent programs would give adults and children multiple opportunities to learn about Sullys Hill National Game Preserve and its resources and expose

them to conservation opportunities in their communities and homes. Working more closely with the teachers and students while developing refuge and state-specific environmental education programs, would ensure that the maximum number of students are reached with a consistent, relevant message that focuses on wetlands, grasslands, and the conservation role of the Refuge System.

Opportunities would be expanded to recruit American Indian students into local and national employment in the refuge system.

Additional volunteers would allow the refuge visitor services programs to expand, including additional opportunities for the public to learn from and interact with knowledgeable refuge volunteers.

Visitor Services And Interpretation

Alternative A (No Action)

Visitors would continue to be provided limited, inconsistent opportunities to enjoy and learn about the refuge and surrounding resources through interpretive displays and occasional interactions with the refuge staff. There would be lost opportunities for children and adults to independently learn about and explore the refuge and its resources and the many benefits of the National Wildlife Refuge System.

The seasonal closing of the refuge in the winter would continue to result in a significant loss of wildlife viewing and interpretation opportunities during the winter months and many missed opportunities to reach adults and children.

Staff-led interpretive programs would continue to take added time and staff to present information and facilitate the visitor's experience. A lack of staff would continue to result in limited outdoor classroom programs and lost opportunities to provide outdoor interpretive programs highlighting wetland and grassland conservation.

Lack of maintenance may cause loss of building integrity.

Alternative B

Expanded education and visitor center hours and upgraded interpretive displays would provide a more hands-on experience for the visitor to learn about the importance of conserving, and how to conserve wetlands and grassland habitats. The accessible and interpreted trails and overlooks would greatly expand opportunities for visitors of all abilities to independently learn about and understand the refuge and its resources. Students would be provided expanded opportunities to learn in nature, not just about nature. Upgraded interpretive displays would provide visitors with the most relevant, up-to-date information.

Increased entrance fees and fee compliance would generate the resources needed to provide additional interpretive opportunities. Outdoor programs for visitors of all abilities would be expanded, providing additional quality programs and opportunities. Upgrading visitor services facilities would provide a higher quality experience and improve the visiting public's impression of the refuge.

Alternative C (Proposed Action)

Consequences would remain the same as those for alternative A except that keeping the education and visitor center and facilities open year-round would greatly expand the opportunities to educate more adults and children while providing them a more complete perspective of the conservation role of the refuge and the Refuge System. Additional environmental education equipment would improve the quality of programs while enhancing the visitors experience and ability to learn and understand.

An automated fee collection point would improve fee compliance, thereby generating more revenue and increasing the ability of refuge staff to maintain and improve environmental education and interpretation facilities. An audio-based interpretive system for the auto tour would increase visitor's knowledge of refuge habitats and wildlife, while enhancing overall visitor experience. Regular maintenance of refuge facilities would ensure there is no loss of structural integrity while ensuring visitors and staff are provided a safe and quality environment in which to learn and work.

Law Enforcement, Facilities, And Maintenance

Alternative A (No Action)

It would continue to be a challenge to ensure visitors keep a safe distance from wildlife, particularly bison and elk. Close encounters would continue to be dangerous for both visitors and wildlife. Although there are informational signs, there would continue to be no comprehensive program to inform visitors about the dangers of wildlife encounters to themselves and the wildlife they encounter.

Without consistent patrols, the refuge would continue to serve as a place for unlawful activities, putting wildlife, staff, and visitors at

risk. The lack of law enforcement presence would increase the likelihood that wildlife would be harmed by illegal activities such as poaching.

There would continue to be a significant loss of revenue for refuge programs from loss of entrance fees due to noncompliance with the honor system fee collection program.

Facilities and lands would continue to be at risk due to limited security, the lack of a fire alarm system, and deterioration through lack of maintenance. This lack of maintenance staff would also continue to limit the refuge's ability to keep the roads open in the winter. This results in a loss of opportunities for visitors to view wildlife and learn about the refuge during the winter months.

The locations of all sensitive cultural resource sites would still be unknown, which would inhibit operations and programs and threaten the protection of these sites.

Alternative B

Visitors would be aware of refuge closed areas and warnings regarding improper encounters with wildlife. This would result in an increase in visitor and wildlife safety. Increased law enforcement presence would encourage refuge visitors to comply with regulations, thus protecting visitors, staff, refuge habitats and facilities, and wildlife. Background checks would be conducted on all volunteers to ensure safety of students, visitors, and facilities.

Additional funds would be available for refuge programs if the fee collection booth at the entrance is staffed.

Added maintenance staff and resources would ensure that refuge facilities receive seasonal maintenance. Refuge facilities would remain safe and continue to function as intended. Keeping refuge roads and education and visitor center open in the winter would provide visitors with year-round opportunities to view wildlife and learn about the refuge.

Initiating a comprehensive cultural resources inventory would improve protection and planning for projects and ensure protection of cultural resources. Protecting and cataloging historical documents would retain a written history of Sullys Hill National Game Preserve, management decisions and actions, and the changes in habitat.

Alternative C (Proposed Action)

Consequences would remain the same as those for alternative A except that a more consistent law enforcement presence during all seasons would further protect refuge resources and improve security, including reducing vandalism and other illegal activities. Collecting 100% of visitor fees would provide additional funds needed to enhance the refuge recreation program and improve visitor and wildlife safety. Regular boundary fence inspections and repairs would minimize impacts from feral animals that could harm native wildlife. Regularly and timely snow removal would provide visitors year-round opportunities to view wildlife and learn about the refuge.

Socioeconomic Impacts

Alternative A (No Action)

Alternative A may have negative impacts on the local economy because there would be no certainty that refuge programs, including annual events, and facilities would be maintained, given the lack of staff and resources. The education and visitor center hours would continue to be sporadic and opportunistic, dependent on the availability of volunteers. This sporadic schedule would make it difficult for local communities to capitalize on tourism opportunities. In addition, the refuge would remain closed in the winter months because resources would not be available to clear snow from the roads.

Alternative B

Alternative B would provide additional seasonal staff and more emphasis on expanding visitor services programs. Annual events would continue with assistance from the "friends group" and volunteers. This additional staff would recruit more volunteers to provide more consistent education and visitor center hours, making the refuge more attractive, thus bringing more visitors into the local communities.

Alternative C (Proposed Action)

Alternative C would expand the staff by an additional 3.5 positions. These added employment opportunities would have some positive effects on the local economy, but the real benefit would be the added refuge visitor services programs, year-round access to the refuge, and the addition of guided refuge tours. These expanded visitor service opportunities could be promoted by the local chamber of commerce, bringing visitors from outside the area and state to spend their resources at the local restaurants, motels, and other complementary businesses.

Cumulative Impacts

Cumulative impacts include the incremental effects of the actions for an alternative, when these are added to past, present, and reasonably foreseeable future actions. Cumulative impacts can be the result of individually minor impacts, which can become significant when added over time.

The Council on Environmental Quality regulations which implement the National Environmental Protection Act require development of mitigation measures when the environmental analysis process predicts potentially significant impacts on habitat, wildlife, or the human environment. None of the activities proposed are expected to produce significant levels of cumulative environmental impacts that would require mitigation measures. Nevertheless, the final CCP would contain the following measures to preclude significant environmental impacts from occurring:

- Federally listed species would be protected from intentional or unintended impacts by having activities banned where these species occur.
- All proposed activities would be regulated to lessen potential impacts on wildlife and plant species, especially during sensitive reproductive cycles.
- Monitoring protocols would be established to determine goal achievement levels and possible unforeseen impacts on resources, for application of adaptive resource management to ensure wildlife and habitat resources, as well as the human environment, are preserved.
- The CCP could be revised and amended after 5 years of implementation, for application of adaptive resource management to correct unforeseen impacts that occur during the first years of the plan.

Scott Ralston/USFWS

Black-tailed prairie dog pups.

6 Implementation of the Proposed Action (Draft CCP)

Scott Ralston/USFWS

Group on trail.

The draft CCP described in this chapter presents the details of how the Service would carry out its proposed action (alternative C) for management of Sullys Hill National Game Preserve.

The planning team recommends a proposed action that best achieves the refuge purposes, vision, and goals and helps fulfill the Refuge System mission. The implementation of the final CCP begins once the Service selects and finalizes the preferred management alternative, the CCP has been approved by the regional director, and the Service has notified the public of its decision. If alternative C is selected as the preferred alternative, the objectives and strategies presented in this chapter would become the final plan to be carried out over the next 15 years. The CCP would serve as the primary management document for the refuge until it is formally revised. The Service would carry out the final CCP with assistance from partner agencies, organizations, and the public. The management direction in this chapter meets the purposes, vision, and goals of the refuge. This chapter also discusses objectives and strategies that serve as the steps needed to achieve the CCP goals.

6.1 PROPOSED GOALS, OBJECTIVES, AND STRATEGIES

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 that indicates what is to be achieved, the extent of the achievement, who is responsible, and when and where the objective should be achieved.

The *rationale* for each objective provides context, such as background information, assumptions, and technical details.

The *strategies* describe the actions needed to achieve the objectives.

Note: The overall guidance for use of prescribed fire and management of wildland fire is found in the description of the fire management program (appendix E).

Woodland Goal

Manage for healthy native woodlands of various age classes and structure to provide habitat for migratory birds, in balance with bison, elk, and other indigenous wildlife.

Woodland Objective 1

Develop woodland restoration units with a target of 80 acres in 15 years within the big game forest. Place emphasis on increasing the understory species composition to approximately 500 bur oak seedlings/saplings per acre, 1000 green ash seedlings/saplings per acre, 200 American elm seedlings/saplings per acre, and 500 basswood seedlings/saplings per acre.

Strategies

- Define and identify priority restoration units within the big game forest.
- Establish exclusion barriers to prevent ungulate browsing on these selected restoration units.
- Initiate scarification techniques within the restoration units, including prescribed fire, selective harvest efforts to stimulate copious sprouting, hand planting of native stock, and direct seeding of tree species.
- Fuel treatments (including prescribed fire and other mechanical treatments) will be used to reduce hazardous fuels to minimize the threat to life and property.
- Partner with the North Dakota Forest Service for monitoring the described understory species, approximately every 5 years, within the restoration units.
- Use IPM strategies to control leafy spurge, wormwood, and Canada thistle that occur in the big game forest.

Rationale

Some populations of woodland birds who use prairie woodlands have declined in the past several decades (Peterjohn et al. 1995, Rodenhouse et al. 1995). Numerous forest-interior breeding species, as well as Neotropical migrants, are considered highly area-sensitive and will respond negatively to fragmentation of woodland habitats (Robbins et al. 1989). It is evident that the total densities and species richness of forest-interior birds and Neotropical migrants are greater per area in large blocks of habitat; however, the presence of many individual species is dependent on localized vegetation structure, composition, or diversity (Finch 1991). As an example, the density of breeding birds in bur oak forests is related to several factors, including successional stage, canopy cover, and density of the shrub layer (Faanes and Andrew 1983). Further, North Dakota woodlands that are comprised of green ash are considered critical habitats for breeding birds in the state (Faanes 1984, Gaines and Kohn 1982, Hopkins et al. 1986). One study on green ash woodlands in South Dakota determined that closed-canopy stands possess greater densities of trees and shrubs than open-canopy stands, correlating with higher bird numbers in the closed-canopy stands (Hodorff et al. 1988). Based on research by Hodorff et al. (1988), the overall number of birds in closed-canopy stands of woodlands is significantly greater than in open-canopy stands. Birds likely use the dense, multiple layers for courtship and display stations, nesting sites, protection from predators, shelter from physiological stress, and additional substrates for food (Wiens and Rotenberry 1981). Closed-canopy stands with a diversity of size and age classes of trees likely perpetuate themselves, compared to the open-canopy stands with a sparse over-story and absent midstory (Hodorff et al. 1988).

Overgrazing of woodland areas by cattle may result in negative impacts, most seriously, a reduction in vegetation height profiles that may cause a change in bird species composition (Medin and Clary 1990, Verner 1984). A primary impact of overgrazing is the creation of open-canopy stands that consist of a low shrub layer, a sparse overstory, and an almost complete absence of intermediate vegetation layers. A disappearing tree canopy reduces biological diversity, as wildlife such as birds that are dependent on the vegetative composition and structure are displaced (Irby et al. 2000). In addition, large openings may impact the nesting success of focal species (those with particular management concern) because these areas attract nest parasites such as the brown-headed cowbird, and egg/chick predators such as blue jays and common grackles. Faanes (1987) also determined that avian species diversity and foliage volume in the high-ground layer, consisting of taller grasses and forbs, larger woody seedlings, and young shrubs, were significantly correlated. Ironically, this layer is often the first to be impacted by overgrazing activity. In extreme situations, lack of successful reproduction and replacement by trees and shrubs may lead to the conversion of woodlands into grass/forb communities (Dobkin 1992).

Sullys Hill National Game Preserve represents a unique native woodland community in the drift prairie physiographic region of North Dakota. Many forest-interior breeding birds (such as broad-winged hawk, veery, and ovenbird) that are absent from more open, small woodlands of the surrounding region are present at the refuge. Many of these species are long-distance Nearctic-Neotropical migrants. A recent forest inventory at the refuge estimated that regeneration levels were below 1%, likely due to overgrazing by refuge ungulates (Harsel 2006). If this percentage is maintained or decreased, the native woodland

habitat will continue to be degraded and possibly even lost. Several degraded areas within the big game forest primarily attract generalist types of bird species such as house wrens, blue jays, and cowbirds, rather than specific forest species. As a result, this associated objective describes a method to restore various blocks across the big game forest, with the intent that such an effort can increase the habitat functionality for forest-breeding birds. According to Hoover et al. (2001), a positive response is possible with exclusion of grazing by using fenced exclosures on riparian communities. They saw results within two years, especially in restoring understory vegetation. The size of the restoration units at the refuge will vary across the big game forest, totaling 80 acres. It is estimated that restoration of 80 acres every 15 years will result in the entire big game forest being restored in less than a 100-year time period (acres of the big game forest are approximately 467). This 80-acre restoration determination seemed reasonable based on the needs of browsing ungulates in balance with the necessary workload and efforts required for the restoration units. In addition, the restoration units need to be large enough blocks to positively impact migratory bird habitat use.

Based on data gleaned from the "Forest Resource Management Plan" (Harsel 2006), it is estimated that ungulate exclusion from 80 acres of habitat throughout the big game forest will increase seedlings and saplings in the understory. If seedlings and saplings develop and persist, it is likely the efforts to create a multilayer, closed forest canopy in the restoration units are progressing. To establish a baseline, targeted numbers of seedlings and saplings were obtained from data collected in the lower and south forests of the refuge, which are ungrazed and possess trees of varying age classes throughout the layers of the canopy (Harsel 2006). Essentially, the lower and south forests of the refuge are considered the most optimal habitat for forest-breeding birds that can be attained within the native woodlands of the refuge. The refuge plans to partner with the North Dakota Forest Service to do the appropriate monitoring using protocols used in the Harsel (2006) management plan.

Woodland Objective 2

Establish 5-year interval surveys to monitor the presence and density of birds in the ungrazed forests (lower and south forest units), the restoration areas outlined in objective 1, and current grazed areas of the big game forest using American redstart, red-eyed vireo, and ovenbirds as target species. This presence and density data across three survey areas will be used to evaluate the avian response to restoration efforts.

Strategies

- Partner with a university, the U.S. Geological Survey, or the Habitat and Population Evaluation Team to develop survey protocol.
- Recruit one GS-9 wildlife biologist to conduct surveys and other biological studies and management programs.
- Synthesize data and use the results to assess management efforts and identify further research needs.
- Recruit a graduate student to study ovenbird reproduction in the restoration units at least 5 years into the restoration.

Rationale

Limited baseline data exists on woodland birds at the refuge, with the primary data being an inventory conducted 2003–2004 (Cutting 2004). Using results from this inventory, input from experts, and data from the literature, the listed target species were selected. These three birds are considered breeding species that use various layers of the forest. Specifically, the American redstart requires a closed overstory, dense midstory and understory, and well-developed undergrowth. Nests usually occur in an upright fork of a deciduous understory sapling, shrub, or tree (Sallabanks 1998). Baseline data results indicate that the American redstart was identified 54 times across the 2-year survey period in the woodland habitats across the refuge. The American restart is considered a species of "High Sensitivity" based on Herkert et al. (1993), indicating they are least tolerant of habitat fragmentation. Next, the red-eyed vireo is considered a species of "Moderate Sensitivity," meaning they demonstrate an intermediate response to habitat fragmentation. This species occurred 227 times over the duration of the bird inventory at the refuge. The red-eyed vireo also nests in a forked tree branch and depends heavily on the midstory layer of the forest (Cimprich et al. 2000, Rosenberg et al. 2003). Finally, the ovenbird possesses a 'High Sensitivity' to fragmentation (Herkert et al. 1993) and was readily detectable across the woodland habitat of the refuge, with 169 individuals recorded over the two seasons of the survey. The ovenbird is considered a ground nesting bird and therefore uses the forest floor and associated materials to build its nest (Van Horn and Donovan 1994). The assumption is that if restoration units provide habitat for these three species, it is likely other forest birds will benefit as well.

As indicated in the objective, the surveys will be established in three areas of the refuge that are

under varying management regimes. First, the actual woodland restoration units described in objective 1 will be surveyed. Next, the portions of the big game forest that are not part of the restoration units which will still be grazed by bison, elk, and deer will be surveyed. Finally, the lower forest unit that is not under active management or undergoing restoration will be surveyed. Collecting data from these three areas should allow for comparison of results, while considering certain spatial, temporal, and climatic variables. To expand this monitoring effort, a graduate student will be recruited to determine the avian reproduction response in the restoration units. This project will not occur until 5 years after restoration has been implemented, and the target species will be the ovenbird. Such a project should give immediate feedback on the success of restoring understory and closed canopies when considering avian reproduction on the forest floor.

Prairie Habitat Goal

Maintain prairie plant communities representative of the historical mixed-grass prairie to support healthy populations of grassland-dependent migratory birds in balance with bison, elk and other indigenous wildlife.

Big Game Prairie Unit Objective

Create a diverse vegetative composition and structure that contains ≥50% native grasses (cool and warm season), 5–15% native forbs, ≤2% native shrubs, while controlling invasive cool season grasses at ≤30%, and controlling noxious weed infestations to <10% coverage on the grazed prairie areas within the big game prairie. This managed native prairie will be utilized over the next 15 years by grazing bison and elk while still providing habitat for migratory birds dependent on forest-edge habitat.

Strategies

- Implement typical prairie management activities, including prescribed fire, prescribed grazing, and various IPM strategies that are appropriately timed to enhance native plants while reducing the presence of invasive species. Where possible, fire will be permitted to burn into woodland margins and from one native grass remnant to another.
- Mow and cut to remove brush and shrub for maintenance of subsequent prairie and savanna-like areas.
- Develop another water source for better disbursement of ungulates.
- Partner with the Natural Resource Conservation Service to establish "Natural Resource Inventory" survey points within the big game prairie to monitor the results of management.
- Fuel treatments (including prescribed fire and other mechanical treatments) will be used to reduce hazardous fuels to minimize the threat to life and property.
- Overgrazing of grasslands would be managed by reducing ungulate populations (<20 bison, <18 elk, and <18 white-tailed deer).

Rationale

Prairie areas throughout North America continue to decline in quantity and quality, due in part to invasion by exotic plant species (Bragg and Steuter 1995, Samson and Knopf 1994). Such degradation is likely a principal factor in declines of several grassland birds (Johnson and Igl 2001). Multiple invasive plants occur across the native prairie areas within the big game prairie region of the refuge. Smooth brome is a rhizomatous, sod-forming species that is also a prolific seed producer (Willson and Stubbendieck 1997). It often excludes other plant species, effectively altering the species composition, native species diversity, and biomass of native prairie areas (Willson 1990, Willson and Stubbdieck 1997). Kentucky bluegrass frequently impacts native prairie in a similar way once invasion occurs (Grace et al. 2001). Christian and Wilson (1999) indicate that certain introduced grasses not only displace native species and consequently reduce diversity, but they also alter pools and flows of energy and nutrients in the prairie ecosystem. These species tend to dominate and overtake native species, essentially degrading the habitat. Wilson and Belcher (1989) evidenced that Eurasian plant species in the North American prairie not only replace the native plant community but also impact species compositions at higher trophic levels (the position that a species occupies in a food chain). Smooth brome poses a particularly serious management problem on the drift prairie. Because it seems more difficult to control than other introduced cool-season grasses (Murphy and Grant 2005), smooth brome more significantly alters the quality and structure of a prairie (Blankespoor 1987) and can alter the soil environment to further its own invasion (Jordan et al. 2008).

Noxious weeds, such as leafy spurge, Canada thistle, and absinth wormwood, occur across prairie regions throughout the refuge. These species also threaten the prairie biodiversity, tending to form monotypic stands through rapid

spread and growth (Bedunah 1992, Hutchison 1992, Svedarsky and Van Amburg 1996, Trammel and Butler 1995, Watson 1985, Wrage and Kinch 1981). State law mandates the eradication and control of these species. IPM practices have been implemented, such as biological controls for leafy spurge, mowing of weed patches, and herbicide treatment.

Another threat to the integrity of the refuge's prairie is the expansion of woody species into native prairie and savanna-like areas resulting from suppression of fire. According to Murphy (2005), invasion of native prairie by shrub species like western snowberry and silverberry is a principal threat to native plant diversity in North Dakota. Long-term episodes of rest (such as limited grazing and burning on prairie areas) allow for the expansion of woody species.

Burning and grazing are instrumental in maintaining prairie and producing optimal grassland bird habitat (Powell 2006). Bison are an appropriate herbivore for management of current-day northern mixed-grass prairie areas (Plumb and Dodd 1994). Historical references indicate that bison grazed heavily on a localized scale, and along with their wallowing, trampling, and rubbing activities would have created a vegetative mosaic across the prairie. Such use patterns regulated the occurrence of particular vegetation, altered vegetative structure, and produced ecosystem conditions to which other wildlife adapted (England and DeVos 1969). Grazing, at a minimum, is a tool to manipulate the grass community to reduce invasive plants, maintain vigor in the grasses, enhance forb production, and increase or decrease fuels for prescribed fire. Prescribed fire can also be used to stimulate and increase climax plant species and reduce invasive species (Franklin and Brand 1991).

Across the native prairie areas of the refuge, staff will strive to implement management that will reduce invasion of exotic and invasive species and maintain and increase native species. Historically, grazing occurred throughout the year at varying intensities across the big game forest and prairie. Recently, the high numbers of bison held at the refuge resulted in overgrazing of the prairie areas. Such management left an increase in Kentucky bluegrass, which can be reduced with prescribed fire (Murphy and Grant 2005). In addition, using prescribed fire on these areas will likely also reduce the woody species encroachment of species like western snowberry, silverberry, and chokecherry into the prairie and savanna areas. Specifically on the big game prairie, prescribed burns will occur from one native grass remnant to another, often burning into the woodland margins in between. Combining bison and elk grazing management with appropriately-timed prescribed fire should achieve the vegetation composition percentages indicated in the objective. Both of these management techniques will be necessary, especially as numbers of grazing ungulates are planned to be decreased in this CCP.

Monitoring plant species composition changes will be an integral part of management efforts to determine whether the refuge's management practices (such as burning and grazing) and their associated timing (for example, late fall four- to five-leaf stage of smooth brome) benefit or harm native plant communities. For the big game prairie areas, the U.S. Department of Agriculture (USDA) NRCS will train the refuge staff, and in some cases, conduct monitoring according to the standards of the "Natural Resources Inventory." The USDA, NRCS "Field Office Technical Guide" (1975) provided baseline information on expected species composition for the big game prairie. This information, along with input from Jeff Printz, State Range Conservationist for NRCS North Dakota, provided the percentages documented in this objective.

South Prairie Unit Objective

Increase native grass and forb grouping to >70%, decrease Kentucky bluegrass and smooth brome grass groupings each to <5%, and decrease shrub component to <5% on the 150-acre south prairie to provide habitat for grassland-nesting birds.

Strategies

- Recruit one GS-9 wildlife biologist to conduct surveys and other biological studies and management programs (same position described in woodland strategies).
- Implement typical prairie management activities, including prescribed fire, prescribed grazing, and various IPM strategies that are appropriately timed to enhance the native plants and reduce the prevalence of invasive plants.
- Fuel treatments (including prescribed fire and other mechanical treatments) will be used to reduce hazardous fuels to minimize the threat to life and property.
- Use mowing and burning to manage western snowberry and silverberry shrubs.
- Remove the tree belt on the north boundary of the south prairie (see figure 7, vegetative communities map).
- Use the belt-transect (Grant et al. 2004) method to monitor vegetative response to

management (see current plant association sheet in appendix D).

- Use point counts to monitor singing male bird presence and densities to evaluate management actions.
- Use transects and protocol established by Dr. Ron Royer to monitor butterfly response to management (Royer et al. 1998).

Rationale

Grasslands are recognized as one of the most imperiled ecosystems across the globe. The bird species that use these areas have shown dramatic and consistent declines (Knopf 1994). According to Knopf (1995) and Rich et al. (2004), as an overall group, grassland birds show higher declines than birds of other North American vegetative associations. Breeding bird survey data from 1966–1996 indicate that populations of 13 species of North American grassland birds declined significantly, and conversely, populations of only two species increased (Peterjohn and Sauer 1999). It is hypothesized that major contributing factors to this decline are grassland fragmentation and habitat loss. In this region, the native sod conversion to cropland directly impacted wetland and grassland birds by reducing and fragmenting the available breeding cover for grassland-nesting species (Batt et al. 1989, Sugden and Beyersbergen 1984). Further, many grassland- and wetland-dependent birds have few alternatives to the Great Plains (Igl and Johnson 1995); whereas birds associated with woody vegetation appear to have larger distributions across the continent (Johnson et al. 1994).

The background information regarding invasive plant species presented in the previous objective's rationale also applies to this discussion. Specifically, most of the native prairie in the region is heavily invaded by a number of exotic invasive grasses (such as smooth brome and Kentucky bluegrass) and forbs (such as Canada thistle and leafy spurge). Across Service lands, these and other exotic species have greatly reduced the coverage of native grasses and forbs, leading to reduced species composition and structural (height-density) diversity that is generally equated to a reduction in use by breeding grassland-dependent birds. Invasion by greater-than-historical extent by certain native low shrub species (for example, western snowberry, silverberry) also prevails on native prairie areas. Due to past management, or lack thereof, these native low shrub species have greatly increased their coverage compared to the pre-settlement era when frequent fire and herbivore grazing would have kept woody species to a minimum.

The refuge's south prairie is still a fairly intact native prairie community, with notable invasion by invasive and introduced plants. Through targeted and science-driven management, refuge staff will continue to strive to reverse the declines in vegetative heterogeneity and to resist invasion by exotic cool-season grasses and other plants. The assumption is that maintaining this area to approximate pre-settlement conditions will likely provide favorable habitat for grassland-dependent birds such as bobolink, grasshopper sparrow, and Sprague's pipit, to name a few. Prescribed fire occurred on this unit for three subsequent years, using the Willson and Stubbendieck (2000) model for smooth brome reduction. In addition, patches of silverberry were mowed as post-fire treatment to reduce encroachment. Future burning intervals will be based on data from several sources that recommend intervals of approximately every 3–5 years (Higgins 1986, Johnson and Temple 1990, Kirsch and Higgins 1976, Miller 1971, Svedarsky and Van Amberg 1996, Wright and Bailey 1982), as well as whatever is necessary to maintain the optimal floristics and ecological functionality of this site, considering exotic plant invasion. Efforts will also be made to pursue grazing management as another treatment to maintain and improve this site.

Bluestem.

The south prairie supports both cool- and warm-season native graminoid species (such as greenneedle, blue grama, junegrass, porcupine, little bluestem, and big bluestem) and forb species (such as purple coneflower, blanket flower, prairie lily, blazing star species, prairie coneflower, prairie turnip, and pasque flower). Baseline data indicates that 24.43% of the unit is comprised of Kentucky bluegrass groups, and 7.08% is smooth brome groupings based on the belt-transect method (Grant et al. 2004). Groupings that were used are listed on the plant association sheet in appendix D. These two invasive grasses will continue to pose challenges in management, and properly timed fire and grazing activities are necessary to achieve the percentages listed in the objective. Native grass and forb type groupings occurred at 61.45% across the unit, and low shrub types occurred at about 7%. Maintaining or reducing this shrub percentage will also be a focus of management. Western snowberry and silverberry are native shrubs that sometimes dominate grasslands devoid of management such as prescribed fire and grazing at regular intervals. As indicated by the objective, the intent is to manage these shrubs at a level where they do not dominate or expand across this native prairie. According to NRCS range site descriptions applicable to this site, the small shrub component should make up <10% by weight and only a few percent (2%–3%) composition by cover (Jeff Printz, USDA, NRCS, personal communication; USDA 1975). In addition, management to reduce smooth brome, Kentucky bluegrass, and small shrubs should enhance and ultimately increase the native grass and forb groupings to 70% as indicated in the objective.

The core area of this grassland is also intended for expansion by the removal of the planted tree row that borders the north end of the south prairie and south end of the western hayland (figure 7, vegetative communities map). With this removal, the size of this area will go from 150 acres to approximate 250 acres. According to Bakker's (2003) synthesis of the literature, most pertinent research indicate that woody vegetation negatively affects the presence, abundance, and nesting success of nongame grassland birds. A few studies suggested that woody vegetation did not effect grassland birds; however, few demonstrated a positive association (Bakker 2003). Regardless, patterns of area sensitivity probably vary for grassland birds (Davis et al. 2006), and likely this native prairie area will provide appropriate habitat size and composition for certain grassland-dependent birds including grasshopper sparrow, Savannah sparrow, bobolink, Le Conte's sparrow, sedge wren, spragues pipit, Nelson's sharp-tailed sparrow, upland-nesting shorebirds, and various waterfowl.

East Hayland Unit Objective

Restore eastern hayland to diverse, multiple species seed mixtures that after establishment maintain >60% cover of native grassland groupings based on the belt transect method (Grant et al. 2004) by year 15.

Strategies

- Prepare sites for seeding using multiple years of seed bed preparation (for example, cropping followed by multiple years of chemical fallowing using glyphosate-based herbicides).
- Develop a seed mixture with a nearly equal cool- to warm-season grass and forb component.
- Drill or broadcast the native flora mixture on-site.
- Implement a variety of tools in post-seeding management, including clipping, prescribed fire, prescribed grazing, and necessary IPM strategies.
- Fuel treatments (including prescribed fire and other mechanical treatments) will be used to reduce hazardous fuels to minimize the threat to life and property.
- Use the belt-transect (Grant et al. 2004) method to monitor restoration.
- Use point counts to monitor bird singing male presence and densities to assess the response to restoration.
- Establish transects to monitor butterfly response to restoration using Royer et al. (1998) protocol.
- Recruit partners to research the establishment of native vegetation and monitor the wildlife response.

Rationale

Both of the hayland units at the refuge are formerly cultivated areas and will therefore be referred to as "old cropland" throughout this document. These areas were reseeded to herbaceous mixtures that included species such as cool-season introduced grasses and legumes (intermediate wheatgrass, tall wheatgrass, smooth brome, and alfalfa or sweetclover), and primarily provided nesting cover for mallards and other ducks. This seed mixture has been referred to as dense nesting cover (DNC). Although a viable mixture and beneficial on multiple levels,

this mixture requires intensive inputs to maintain long-term. First, DNC has a limited lifespan, providing attractive cover to nesting ducks for perhaps only 6–8 years after seeding and up to 15 years with certain management (Higgins and Barker 1982, Lokemoen 1984). At the end of the DNC lifecycle, the field is typically cultivated and farmed for 2–3 years and then reseeded. This leads to a rotation of seeding—managing—farming—seeding and so on into perpetuity. Often times, these fields are not re-seeded at the prescribed frequencies, leaving decadent, weed-infested uplands across the landscape that are limited in attractiveness to migratory birds. The need to repeat this rotation on a regular basis negatively impacts other ecological factors in the surrounding environment such as promoting soil erosion when the area is cultivated, and necessitating herbicide use to prepare the seedbed for each new seeding.

In this CCP the refuge will reclaim the eastern hayland of old cropland by revegetating it with a diversity of native flora that, with modest management, is relatively resistant to invasion by introduced species and noxious weeds. This is seen as a benefit to grassland and wetland birds because providing habitat that is closest to the historical vegetative condition likely provides habitat for more obligate grassland wildlife. According to Howell (1988) re-creating the elements found in the original communities quite possibly is the optimal method for ensuring continued species interactions and natural selection. As an example, Baird's sparrows and Sprague's pipits appear to use short, sparse grass structure, and mostly associate with native bunch grasses, rather than the broad-leaved, introduced species used for DNC mixes (Madden et al. 2000). Further, according to Stewart (1975), and Kantrud and Higgins (1992), marbled godwits and willets typically select native grass cover over tame-grass cover. Native prairie areas that have not been cultivated typically possess a diversity of plant forms including short rhizomatous graminoids, taller bunchgrasses, a low shrub component, and finally a variety of forbs. This structural diversity is usually lower in fields dominated by introduced vegetation (most commonly, smooth brome, Kentucky bluegrass, and noxious weeds such as wormwood or leafy spurge), which possess a more homogeneous height across a field (Wilson and Belcher 1989). Grassland-obligate birds adapt to the diverse native prairie structure, whereas DNC-type mixtures limit this diversity, likely attracting only bird species that key in on this tall, dense cover.

Another notable benefit of using native seed mixtures to restore former cropland areas compared to using a DNC mixture is longevity. In theory, native seed mixtures should persist into perpetuity under appropriate management, including disturbances that emulate natural regimes at frequencies that sustained wildlife populations prior to human interventions. Management of refuge lands in North Dakota typically involves various tools to emulate the defoliation activities under which prairie plants evolved, including prescribed fire and rotational grazing. The frequency of certain activities depends on the particular habitat components; a pristine native prairie tract may require a burn every 3–5 years and intermittent, rotational grazing of domestic cattle. This is distinctly less activity over time than the rotation required to sustain DNC-seeded fields.

Experimentation with native seeding that took place 10–20 years ago in the Drift Prairie and Red River Valley areas of North Dakota usually included 3–5 native warm-season grasses. Current research indicates that this may not be an optimal mixture for successful establishment and management. Tilman et al. (1996) state that biological diversity is dependent on the functionality and sustainability of the ecosystem, leading to the idea that grassland restorations should attempt to include diverse seed mixtures. Guo et al. (2006) completed their research in North Dakota and indicate that the saturation rate for one of their studied sites was determined to be somewhere between 16 and 32 species. Inclusion of forbs in native mixtures appears to be necessary in attempts to restore variables such as nutrient cycling and energy flow (Pokorny et al. 2005). Sheley and Half (2006) indicate that seeding a wide range of forbs increases the likelihood that more niches will be filled and facilitates overall survival of the forbs. The use of multiple forbs may help to overcome temporal weather variations because at least some species should germinate and respond to the dynamic weather conditions that annually persist (Sheley and Half 2006). More specifically, varying numbers and combinations of species in differing developmental phases may be a requirement for a native-seeded area to achieve the best possible results. It is likely also that as a stand matures, a diverse mixture may play an important role in the below-ground community, providing a well-developed root system for sustainability over time (Guo et al. 2006). Further, another benefit to native flora establishment is the suggestion that species-rich seed mixtures may reduce weed invasion on restored grasslands (Blumenthal et al. 2003, Carpinelli 2001, Pokorny 2002, Sheley and Half 2006, Tilman 1996). A study by Pokorny et al. (2005) determined that indigenous forbs resisted invasion by spotted knapweed better than grasses. The overall theory in the literature indicates that seeding a diverse seed mixture

increases the inclusion of various functional groups among plant species. With extremely limited data on the reestablishment of native flora mixtures in North Dakota, there is a need to initiate long-term research in this area. Ensuring science-based management for re-seeding these areas is paramount to the perpetuation of grassland resources. The Devils Lake WMD Complex staff will continue to monitor and study this concept on refuge lands, not only at Sullys Hill National Game Preserve, but throughout the district.

With the establishment of native seed mixtures, challenges exist with controlling noxious and invasive plants. In the event that the previously mentioned management techniques fail to control weeds such as Canada thistle, IPM strategies will be used to control the infestation. It is anticipated that smooth brome will persist as a problematic invasive species. The anticipated plan is to reduce the impacts of this species by following the model provided by Willson and Stubbendieck (2000). Similar protocol will be followed to reduce Kentucky bluegrass invasion.

As a final impetus for the refuge staff to focus on using native plants to restore this hayland, are the mandates in the Improvement Act. This includes an "Integrity Policy," stating that refuges are to promote biological integrity, diversity, and environmental health and attempt the restoration of historical conditions on refuge lands.

Western Hayland Unit Objective

Provide habitat structure of > 9.8-inch visual obstruction reading (VOR) (Robel et al. 1970) on the western hayland during the primary avian nesting season (approximately May 1–August 1), and continue to provide winter forage for refuge ungulates.

Strategies

- Use rotational haying so the same area is not hayed each year.
- Use a flushing bar on the swather to reduce negative impact on nesting bird species.
- Reseed area with warm-season grasses and a forb component such as alfalfa, purple prairie clover, or vetch.
- Monitor bird use of this hay field using Robel readings to identify the VOR using Robel et al. (1970) methodology.
- Implement typical prairie management activities, including prescribed fire, prescribed grazing, and various IPM strategies that are appropriately timed to enhance the native plants and reduce the prevalence of invasive plants.
- Fuel treatments (including prescribed fire and other mechanical treatments) will be used to reduce hazardous fuels to minimize the threat to life and property.

Rationale

Currently, the primary vegetative cover of this hayland is smooth brome grass interspersed with alfalfa. Although this area lacks floristic diversity, the presence of perennial grass cover likely supports several species of birds that are considered generalists and may be more tolerant of forest edge effects. Species that may use this area include songbirds such as clay-colored sparrow, chipping sparrow, common yellow throat, as well as some species of waterfowl. By waiting until August 1 to implement defoliation through haying, most of the ground-nesting birds should have completed nesting by this date, reducing one potential negative impact of this management activity.

Reseeding the area with warm-season grasses will increase the opportunity to reduce smooth brome invasion. The addition of the legume component will increase the structure (height and density) to provide more attractive nesting cover for certain bird species, allowing for the attainment of the planned VOR.

Aaron Mize/USFWS

Antler in marsh marigolds.

Wildlife Population Management Goal

Carry out management practices that ensure healthy populations of Rocky Mountain elk, plains bison, and other indigenous wildlife species that exemplify the genetic integrity of historical prairie wildlife.

Wildlife Population Management Objective 1

Maintain the purpose of the refuge as a big game preserve by retaining a bison herd size of <20 animals, an elk herd size of ≤18 animals, and a white-tailed deer herd size of ≤18 animals for the purpose of improved habitat conditions while maintaining public viewing and interpretive opportunities.

Strategies

- Use the draft carrying-capacity study and associated model developed by Bertie and Sweitzer (2008) to maintain ungulate populations within carrying-capacity levels.
- Use prescribed fire and grazing to manage grassland areas to maintain refuge floristics (see prairie habitat and woodland habitat objectives) and provide optimal forage for grazing bison and elk.
- Adaptively manage ungulate populations based on monitoring the ungulate-induced habitat impacts (methods for monitoring habitat and migratory birds are documented under prairie and woodland objectives).
- Transfer and reduce bison herd based on the Service-wide meta-population management plan as outlined in the document, "A Framework for Bison Conservation in the Department of the Interior."
- Reduce elk and deer at appropriate intervals to maintain the populations stated in the objective.

Scott Ralston/USFWS

Yellow warbler in oak tree.

Rationale

Large ungulates such as bison, elk, and deer often impact their associated ecological systems through disturbances (horning, rubbing, wallowing), grazing, and nutrient deposition (Campbell et al. 1994, Coppedge and Shaw 1997). Although these and other activities of native ungulates are a natural part of large, open ecosystems, in relatively small, fenced, or semi-isolated areas such as Sullys Hill National Game Preserve, these activities may cause damage when ungulate densities are too high (Howell et al. 2002, Zeigenfuss et al. 2002). In small confined systems, detailed information on ungulate movements, habitat use, behavior, and diets can provide critical data for estimating habitat carrying capacity (Norland et al. 1985). Behavior is considerably more important in closed systems compared to large free-range situations because large ungulates may habitually damage habitat in these relatively small enclosures. Monitoring data will provide management guidelines for determining appropriate populations of ungulates, balanced with other multiple-use management directives.

In the past, ungulate populations at the refuge were based on the refuge's "Fenced Animal Management Plan" (Veikley 1984). This document states that, dependent on the time of the year (winter versus summer), bison numbers should range from 25–40 animals, elk from 15–25 animals, and white-tailed deer from 10–30 animals. These estimates are based on the best professional judgment at the time. Currently, to ensure that ungulate numbers within the big game forest and prairie are in balance with the needs of other wildlife at the refuge, including migratory birds, refuge staff partnered with the University of North Dakota to conduct population management research. Results of this study provide a multi-species model of the carrying capacity for the three large ungulates at the refuge and recommendations for management of herd sizes under different scenarios of weather and public viewing. In addition, the refuge also received detailed habitat GIS layers to provide baseline data on refuge floristics, which also serve as an aid for habitat management decisions (Bertie and Sweitzer 2008).

Briefly, the model uses data on diets and seasonal annual forage requirements for each ungulate, along with the annual forage production for the different plants consumed by bison, elk, and white-tailed deer as inputs. The outputs of the model provide population size scenarios predicted to be within overall carrying capacity. A primary reason for initiating this study was to study overbrowsing throughout the forest habitat, and determine methods for improving forest regeneration in the big game forest. The "standard livestock" model seemed somewhat liberal in considering forest recovery, therefore, four different management scenarios for recovery were developed. The estimates for recovery were labeled "standard," "moderate," "management," and "recovery" and were determined by using forage production estimates for unfavorable years. These categories were based on USDA NRCS data on range site use. These categories, as defined for the Bertie and Sweitzer (2008) model, are listed as standard = 70% use, moderate = 50% use, management = 30% use, and recovery = 10% use. The intent is that the majority of the grazed areas of the big game forest will be in recovery mode, meaning that the habitat is practically undisturbed and only key forage species are grazed (Bertie and Sweitzer 2008).

Based on the results of running the preliminary model, keeping 70% of the big game forest in the recovery category allows for 15 elk, 5 deer, and 19 bison. Since the described model focused more on the woodland habitat, there are under-use concerns for the big game prairie. Grasslands devoid of appropriate management will deteriorate, as described in rationales under the prairie habitat goal. A study by Norland et al. (1985) indicates that the major detrimental effect of maintaining the bison herd at the Teddy Roosevelt National Park to a base level was the underuse of certain plant communities. Excessive accumulation of litter may suppress the native grass stands and create an environment more conducive to Kentucky bluegrass, smooth brome, and woody plant establishment. Further, bison may actually avoid areas of excessive litter build-up despite the presence of adequate forage (Norland et al. 1985). As documented in the prairie habitat objectives, fire will be employed as a tool to control litter build-up, which according to Norton et al. (1985), might increase the attractiveness of these areas to bison. On areas of the big game prairie, prescribed fire will be used to maintain the native prairie vegetation and manipulate bison distribution. Further, the placement of mineral blocks (listed in the next objective) will be focused on prairie areas to attract ungulates to those areas.

The herd sizes listed in the objective were developed after considering the concerns for underuse of the prairies and overuse of the forests, and factoring in the Bertie and Sweitzer (2008) model. The indicated population sizes will allow for adaptive management of the ungulates based on the planned monitoring documented in all of the biological objectives. As an example, one strategy of decreasing brainworm on Sullys Hill National Game Preserve is to drastically decrease or eliminate the deer population. This objective allows for the reduction of deer depending on the herd health issues discussed in the following objective. In addition, if prairie areas are showing signs of underuse, the bison population could be increased to 20 animals using the described methods for attracting them to the prairie areas. If monitoring determines that the forested areas are still showing limited regeneration, bison numbers could be reduced (see woodland habitat objective for proposed monitoring). The associated monitoring will drive the management of the ungulates, and this objective provides the flexibility to respond to both habitat and herd health needs.

Wildlife Population Management Objective 2

Reduce the prevalence of brainworm and lungworm in elk so no animals exhibit clinical infection externally over the life of this CCP. Also, reduce and where possible, eliminate introgression risks of CWD, brucellosis, and any other non-endemic disease of wild native ungulates or cattle.

Strategies

- Determine alternatives to current winter feeding operations.
- Reduce ungulate populations to within habitat carrying capacities and monitor habitat conditions (indicated in the prairie and woodland objective sections) to adaptively manage ungulate populations. Specific species (such as bison and elk) will be preferentially conserved over another native species (deer) in keeping with the refuge purposes.
- Continue to use elevated feeders to keep food off the ground in years where feeding is necessary.
- Rotate feeding grounds to varying sites across the big game forest and prairie.
- Remove accumulated manure as needed around feeding grounds.
- Use medicated mineral blocks and other methods of treatment for nematode parasites.

- Recruit a graduate student to conduct a study on lungworm to determine its significance in elk and find measures for reducing its impact.
- Regularly communicate with NDGF and the Service's Wildlife Heath Office to identify and reduce the risk factors related to CWD infection and reduce the risk of introduction of other non-endemic diseases.
- Keep gates closed in the winter when cattle guards fill with snow, to reduce co-mingling with ungulates outside the refuge.
- Conduct opportunistic CWD surveillance through sampling found-dead or euthanized cervids.
- Submit CWD samples under the NDGF's direction to ensure appropriate coordination for prevention of this disease.
- Reduce feral dog and cat entrance into the refuge.
- Conduct a herd health surveillance program in coordination with the Wildlife Health Office.
- Monitor brucellosis status at the refuge through sampling of euthanized or recently deceased bison, and also bison relocated to other sites.
- Introduce new animals into the refuge, that are compliant with all state and federal regulations, at appropriate intervals to maintain the overall genetic health of the herds.
- Eliminate or drastically reduce the population of white-tailed deer.

Rationale

As of 2004, disease testing on ungulates residing in Sullys Hill National Game Preserve became more frequent with the hiring of a regional wildlife veterinarian. During this same time period, there were heightened concerns about CWD. Dr. Tom Roffe and refuge staff have conducted 14 complete necropsies (post mortem examinations) on elk, and 1 complete necropsy on a bison. Overall, the 22 CWD samples collected from elk and 31 samples collected from white-tailed deer have been negative.

Elk necropsy results positively indicate that lungworm occurs regularly in animals at the refuge. Two classes of lungworm have been identified in refuge elk, *Dictyocaulus* (likely species *hadweni*) and *Protostronglyus*. *Dictyocaulus* has a direct lifecycle (does not require an intermediate host) and can infect bison, deer, and elk. Adult *Dictyocaulus* live in the lungs, producing eggs which are coughed up and then swallowed. They are excreted through feces, mature in about a one-week time period into a third stage (L3), and are then consumed by the host during foraging. The maturation period from L1 to L3 can be extended by cooler temperatures. In addition, L3 larva can invade the fungus *Pilobolus spp.* Fungal sporulation can disperse *Dictyocaulus* L3 larvae up to 10 feet, thereby widening the infected area. After ingestion by the host ungulate, L3 larvae mature into L4 larvae, which migrate to the lungs through blood and lymphatic vessels, mature to adults, and the cycle is completed. Because *Dictyocaulus* has a direct life cycle, management strategies that enhance animal density, fecal contamination, and repeated use of the same ground increase this parasite's impact on host populations (Dr. Tom Roffe, USFWS, personal communication).

Protostrongylus also infects deer, elk, and other ungulates but requires an intermediate gastropod (typically snail) host to complete its lifecycle. Adult *Protostrongylus* live in the lungs, migrate to the stomach, and are excreted in the L1 stage through feces. Once on the ground, they must contact and penetrate the intermediate host, where they mature to L3. Infective L3 larva reenter the host when the infected gastropod is ingested during grazing. Once released from the snail, L3 larvae penetrate the intestinal wall, migrate through the lymphatic system while maturing to L4, and eventually make their way to the lungs through blood and lymph vessels. Because of the requirement for specific intermediate hosts, *Protostrongylus* distribution is limited by the distribution of specific species of snails. Management strategies that affect both host and snail distributions can reduce this parasite. Because most intermediate hosts require moist environmental conditions, dry environments tend to have less *Protostrongylus*. In addition, *Protostrongylus* tends to be more pathogenic (disease-causing) in sheep than in other wild ungulates (Dr. Tom Roffe, USFWS, personal communication).

Lungworm infections generally are asymptomatic to the casual observer. Their primary pathological impact is airway obstruction and minor tissue damage from migrating L4 larvae. Adult, egg, and larval irritation of airways results in accumulation of exudate. Symptoms are directly related to the total parasite burden, with clinical cases generally only observable with large numbers of worm accumulations. Minor infections can be unapparent while the animal is at rest, but the animal is subject to exercise intolerance. Secondary bacterial infections can occur, complicating verminous pneumonia with bacterial pneumonia as well (Dr. Tom Roffe, USFWS, personal communication).

In wild unrestricted wildlife herds, lungworm is generally not significant because densities are low enough that the wildlife are less likely to forage in areas during the approximate one-week time period of maturation of the larva from L1 to L3. Where wildlife movements are restricted, or environmental carrying capacities exceeded (resulting in regrazing of contaminated areas), lungworm infestations can rapidly increase and cause clinical disease in the host (Dr. Tom Roffe, USFWS, personal communication).

Lungworm infection is diagnosed by detecting larvae in feces using Baermann's sedimentation method. Fresh (< 24 hours old) fecal material can be collected in early spring and shipped, chilled, to a diagnostic lab to determine if lungworms are present, which class of lungworm constitute the infection, and how much is present. Management methods to reduce infestation include redistributing wildlife across larger landscapes, eliminating feeding programs, altering habitats to minimize intense focal aggregations, and other similar measures. Treatment, using medicated blocks, has been tried in free-ranging bighorn sheep but has not proven effective (Dr. Tom Roffe, USFWS, personal communication).

Of the nine Sullys Hill National Game Preserve elk sampled between January 2004 and February 2007, five had positive results for lungworm at low levels. Four of the five came from a single January 2006 culling sample. None of 4 bison sampled in January 2005, or 40 bison sampled in November and December 2006, had detectable lungworm infections. These data suggest bison, at this point, are not affected by the species of lungworm on site. Lungworm species, however, tend to be host specific, and therefore, further investigation of the prevalence and quantitative parasite burdens in elk are warranted. Because of the small habitat base and historical use of winter grain feeding at Sullys Hill National Game Preserve, both elk and bison should be monitored. Wildlife health, and parasitic problems in particular, would be best managed by maintaining ungulate populations within winter habitat carrying capacity, manipulating habitat to increase forage for grazing ungulates, encouraging wildlife dispersal across the refuge, and elimination of winter grain feeding (Dr. Tom Roffe, USFWS, personal communication).

Brainworm/meningeal worm *(Parelaphostrongylus tenuis)* also appears to persist at the refuge. This nematode parasite occurs in parts of the cranium of its host (Anderson and Prestwood 1981). The normal definitive host for *P. tenuis* is the white-tailed deer, while several other ungulate species demonstrate susceptibility to infection by this parasite. The host becomes infected when they ingest a gastropod infected with third-stage larvae (L3) of *P. tenuis* (Anderson 1963, 1965). The larva travels from the stomach to the cranium approximately 40 days after initial ingestion. Worms continue to mature and migrate into the cranium, staying in the subdural space or entering the venous sinuses. Worms mate and eggs are deposited in the veins and travel to the lungs where they hatch into L1 larvae. These larvae cross the bronchial tree, are swallowed by the host and are passed out with the feces. The period between initial infection and the first diagnostic stage is typically 82–92 days but can be 115 days or more (Anderson and Prestwood 1981, Samuel et al. 1992).

Maskey and Sweitzer (2004) estimated that *P. tenuis* prevalence in the white-tailed deer population at the refuge was at 83.3% based on their assessment of 17 deer heads and fecal samples. Environmental conditions such as temperature and rainfall, along with deer density likely effect the prevalence of this parasite at a particular site (Behrend and Witter 1968, Gilbert 1973, Karns 1967, Schmitt et al. 1989). There is no evidence that *P. tenuis* is a significant pathogen of white-tailed deer, as deer typically tolerate infection very well. The most serious implication of *P. tenuis* infection in white-tailed deer is lung damage caused by eggs and larvae that may make deer more susceptible to other minor infections.

USFWS

Winter on Devil's Lake.

P. tenuis causes fatal neurological disease in hosts other than white-tailed deer, including elk. Neurological disease in other hosts is the result of prolonged migration through neural tissue which causes tissue destruction. Worms can also invade and damage the central spinal cord canal (Anderson and Prestwood 1981). Signs of neurological disease include loss of fear, blindness, holding head to one side, walking aimlessly or in circles, weakness in hindquarters, and paralysis (Anderson 1965, Carpenter et al. 1973, Olson and Woolf 1978). Elk calves are especially susceptible to fatal infection (Anderson et al. 1965, Samuel et al. 1992, Woolf et al. 1977). *P. tenuis* may limit host populations; although there is no documentation of extirpation caused by this parasite (Carpenter et al. 1973, Raskevitz et al. 1991

Since refuge staff began consistently recording elk mortality incidences in 2001, approximately eight elk had clinical signs and/or pathology consistent with *P. tenuis* or *Dictyocaulus spp.* infection. Several of these observed animals possessed a declining body condition, loss of fear, and a slow, stiff gait. On necropsy, several elk had remnant chronic pleuritis and fibrous nodules throughout the lungs (chronic pneumonia). Lungworm has been frequently observed during necropsy and brainworm occurs frequently across the refuge (Maskey and Sweitzer 2004). Refuge staff will assess the impact of these parasites and implement management to reduce their prevalence across the refuge. The goal is to have elk free of clinical disease. Necropsies and consistent field monitoring of ungulate populations for clinical disease will be important components of this effort. If less invasive management strategies do not reduce brainworm prevelance, more dramatic measures like the reduction and elimination of white-tailed deer will be necessary.

At the time of this CCP, CWD has not been detected in North Dakota. Specific details of this disease and the refuge's contingency planning for possible infection are documented in the associated step-down plan. Annual surveillance will continue to occur at the refuge in cooperation with NDGF.

North Dakota is currently a certified brucellosis-free state. Testing on bison at the refuge has occurred since the early 1980s on dispatched bison, with samples being sent in to the USDA Animal and Plant Health Inspection Service. More recently, the Regional Wildlife Health Office has processed samples, with results being provided to the North Dakota Bureau of Animal Health. All sampled refuge bison tested negative for brucellosis.

North Dakota is also currently considered a bovine tuberculosis-free state. During necropsies on bison, lungs will be examined for any indication of this disease, and any transferred bison will be tested in accordance with North Dakota Bureau of Animal Health regulations.

Several of the strategies address changes in feeding operations at the refuge, which directly impact the overall health of the ungulates. Currently, winter feeding includes a mixture of grains and hay fed to animals from approximately November to April. Based on necropsies conducted, elk and bison on the refuge possess more than an adequate amount of fat reserves for optimal health. Considering this, winter feeding will be reduced to grassland hay only, except for short periods when grain feed will be used as a tool in animal handling operations or during an extreme winter. Such an effort should not only reduce the occurrence of digestive tract problems such as acidosis, but also reduce parasitic worm ingestion. The hay, because of its roughage, is excellent for good ruminant digestive health, and in comparison to the grain, is most similar to the grassland plants that animals ingest throughout the spring, summer, and fall at the refuge. Concerns related to winter survival without grain can be addressed by considering the physiology of digestion. Aside from the digestible energy in hay, energy is provided through volatile fatty acids produced by rumen flora fermentation. These fatty acids in turn are absorbed into the blood stream and are optimal sources for energy in ruminants. In addition, one byproduct of rumen fermentation is heat, which helps keep the animals warm in the winter (Dr. Tom Roffe, USFWS, personal communication).

Wildlife Population Management Objective 3

Retain a bison herd at Sullys Hill National Game Preserve that meets the standards of the "Management of Bison in the National Wildlife Refuge System" document and actively participate in the meta-population management of bison genetics.

Strategies

- Annually report on statistics of the herd and transfer needs.
- With input from the Regional Wildlife Health Office, refuges with bison will make decisions on meta-population management annually.
- Attend the annual refuge bison coordination meeting.
- Participate in continued genetic testing.

- Establish infrastructure at the refuge for safely handling animals for herd health and transfer purposes.

Rationale

With the recent transfer of the refuge's original bison herd to Fort Niobrara National Wildlife Refuge, Sullys Hill National Game Preserve is already an active participant in the Service-wide plan to manage bison across the Refuge System as a meta-population. It is recognized that Sullys Hill National Game Preserve will play a small role with limited habitat and its intentions to maintain a small herd, however, the bison currently in residence have no detectable cattle hybridization and are from the National Bison Range herd, which possess several private alleles unique to the National Wildlife Refuge System. The surplus bison from the current herd can serve as a source of genetic material to other Service herds that can use the augmentation for diversity purposes. Similarly, as needed, Sullys Hill National Game Preserve staff will work with the Regional Wildlife Health Office to bring in new genes from appropriate herds to reduce inbreeding issues and maintain germplasm (a collection of genetic resources) that may be most beneficial to the overall meta-population. Additional details can be found in the Service-wide meta-population initiative entitled, "A Framework for Bison Conservation in the Department of the Interior."

Refuge limitations to participation in meta-population management may be caused by the absence of permanent facilities for round-up and transfer. For past genetic testing and recent transfer of the original herd, staff set up temporary corral systems and baited the animals into the facilities. This is costly and labor intensive and likely will not meet the overall objectives in the future as needs arise to implement further genetic testing, animal transfer, and herd health management. As the meta-population initiative progresses, this should be addressed and funding found to obtain the necessary infrastructure.

Wildlife Population Management Objective 4

Manage the black-tailed prairie dog population to provide appropriate environmental education and outreach opportunities while protecting habitats by maintaining a town size of 1.5 acres.

Strategies

- Develop a prairie dog management plan.
- Survey population regularly to identify average annual recruitment levels.
- Reduce the population as necessary to maintain a size of 1.5 acres.

Rationale

The established prairie dog town at the refuge has an estimated population of several hundred. This species was introduced to the refuge in 1974, primarily as a tool for interpretation and education. Across North Dakota, the historical range for prairie dogs is west and south of the Missouri River (Sidle et al. 2001) and not necessarily in the wetter mixed-grass and tall-grass prairies of the state. The original acreage for the town at Sullys Hill was 1.5 acres, and currently the town has expanded to nearly double this size. With very few natural predators, the town will continue to expand, with possible adverse impacts to surrounding woodland and prairie habitats, and cultural resources. A step-down plan will be developed to address this issue and balance the size of the dog town with outreach needs and habitat preservation.

Environmental Education, Interpretation, And Outreach Goal

Deliver quality, interactive environmental education programming to regional schools, communities, organizations, Spirit Lake Nation, and local governments to garner support and appreciation for Sullys Hill National Game Preserve, North Dakota's wetland and grassland resources, and the conservation role of the U.S. Fish and Wildlife Service. Appendix F contains a draft compatibility determination for the environmental education and interpretation uses proposed for Sullys Hill National Game Preserve.

Environmental Education, Interpretation, and Outreach Objective 1

Develop wetland and grassland conservation education programs for 7,500 elementary and high school students within the Devils Lake Watershed, fostering an environmental ethic to aid future conservation efforts within the Devils Lake WMD Complex.

Strategies

- The current GS-11 series 025 park ranger position would have a job title of visitor services manager.
- The GS-9 wildlife biologist would assist in developing environmental education programs (position identified in woodland strategies).

- Recruit additional volunteers to assist with environmental education programs.
- Service staff, educators, and partners will develop a wetland and grassland conservation curriculum and use existing environmental education team trunks. The curriculum will emphasize current wetland and grassland conservation issues, dependent wildlife species, and ecological functions of these habitats. The curriculum will be structured with multiple lessons that build upon previous lesson plans.
- Develop a partnership with a local teacher to serve as a dedicated environmental educator.
- The curriculum will focus 1/3 on wetland science and conservation; 1/3 on grassland science and conservation; and the remaining 1/3 would focus on Sullys Hill National Game Preserve, the Refuge System, and general wildlife conservation programming.
- All environmental education programs will be designed to engage students in the process of learning by incorporating the use of all five senses: sight, hearing, touch, smell, and taste. Programming will be designed to use the outdoor classroom of the refuge when practical.
- Develop a set of lesson plans that teachers will be able to use in their classrooms. These lesson plans will focus on topics such as wetlands, grasslands, forests, migratory birds, fisheries, and big game and include all necessary teaching aids such as a teacher's guide, student workbooks, video presentations, props, and testing materials. These lesson plans will be available for loan to teachers with preference given to those teachers that will teach on-site at the Sullys Hill education and visitor center.
- Develop a partnership with the Spirit Lake Nation wildlife department to assist with environmental education programming.
- Monitor the success of these programs by including pre- and post-testing (including asking simple questions at the end of a session to gauge understanding), teacher incorporation of materials into existing curriculum, and student participation.
- Refuge staff will plan and initiate regular off-site programming to local schools within a 90-mile radius of the refuge.
- Use refuge waters that support a viable fishery to provide environmental education programs on fish species and their lifecycles, along with an introduction to fishing techniques.
- Recruit local students to participate in Youth Conservation Corps (YCC).
- Environmental education programs will be designed to meet state and local education standards.

Rationale

The children of today are tomorrow's landowners and like many adults, lack the general knowledge of wetlands and grasslands and how they function. They often do not recognize the environmental benefits these systems provide and do not understand that these critical habitats support many of our continent's migratory bird populations. Additionally, students are generally unaware of the perils facing the wetland and grassland habitats of the Prairie Pothole Region. The educational experience offered at Sullys Hill National Game Preserve contributes to the long-term effort to conserve wetland and grassland habitats within the Devils Lake WMD Complex.

In addition, today's life is electrified with computers, televisions, and video games that reduce children's sensory experience of nature. Nature is about smelling, hearing, tasting, and seeing (Louv 2006). The challenge is to link these modern modes of conservation education with outdoor education and hands-on learning (Hudson 2001). Children have to experience nature directly in order to learn and develop in healthy and appropriate ways (Rivkin 1995). "Time in nature is not leisure time; it's an essential investment in our children's health" (Louv 2006).

Sullys Hill National Game Preserve would provide the opportunity for students to experience and learn from nature through educational programs and first-hand experiences with their natural surroundings. The refuge provides opportunity for students to complement the traditional indoor classroom and truly experience science and conservation biology in actual wetland and grassland habitats.

Education, Interpretation, and Outreach Objective 2

Sullys Hill National Game Preserve will serve to educate students and refuge visitors of all abilities about the values of wildlife and habitat conservation. Seventy-five percent of refuge visitors and students that participate in programs at the refuge will be able to understand the conservation role of the Devils Lake WMD Complex and the Refuge System.

Strategies

- Annually recruit local students to participate in YCC. Participation will expose students to the management of public lands for wildlife and people. The program will be headquartered at Sullys Hill National Game Preserve but will allow participants to work on Waterfowl Production Areas (WPAs) and refuges across the Devils Lake WMD Complex.
- Annually recruit volunteers, in partnership with the Sullys Hill Wildlife Refuge Society, to assist with various refuge education activities.
- Annually recruit students interested in the natural resource conservation profession to be interns, through the university system, including Cankdeska Cikana Community College to assist with various refuge education activities.
- Serve as a critical environmental education outlet for the Devils Lake WMD Complex, developing 24 media releases per year for the general public on the importance of wetland and grassland conservation, dependent wildlife species (specifically waterfowl), and the critical role of the Service in this arena.
- Continue to conduct annual events in partnership with the Sullys Hill Wildlife Refuge Society and others. Such events include the Birding and Nature Festival, Winterfest, and participation in the Chautauqua Program.
- Use various techniques to evaluate whether students and visitors are able to better understand the conservation role of the Devils Lake WMD Complex and the Refuge System.
- Electricity and water will be provided to the remote classroom.

Rationale

Many students and refuge visitors have an awareness of the need for wildlife conservation; however, they lack a complete understanding of the role of the U.S Fish and Wildlife Service in wildlife conservation. Additionally they often do not recognize their personal role in the conservation of our nation's natural resources.

Sullys Hill National Game Preserve would provide an opportunity for the public to engage with wildlife and expand their appreciation for natural resource conservation and develop their own environmental ethics. The refuge programming will provide opportunities for students and visitors to gain knowledge of how their actions protect or harm habitats (particularly wetland and grassland habitats), associated wildlife, and why that should matter to them. Opportunities would be presented on avenues to participate with the Refuge System in the conservation of wildlife and habitats, even on their own properties.

Environmental Education, Interpretation, and Outreach Objective 3

Educate adults in the agricultural community on conservation opportunities associated with farming in the Prairie Pothole Region and farming technology that will benefit the environment and promote natural resource conservation.

Strategies

- Partner with NDSU Extension, NRCS, agricultural chemical companies and others to conduct one annual information exchange between conservation and agricultural producers. The exchange will focus on such topics as grassland/livestock/waterfowl interactions, invasive species management, and farming "Best Management Practices."
- Dedicate one portion of the habitat diorama display to be placed in the education and visitor center to interpret agricultural landscapes.
- Work with partners to develop information packets on "Best Management Practices" to be used for interactions with farming/ranching and wildlife/agricultural producers.
- Hold presentations for area landowners on refuge and WPA management and regulations.

Rationale

The Devils Lake WMD Complex has a mission of preserving and restoring the native wetlands and grasslands within the Devils Lake Basin. They accomplish this primarily by acquiring wetland and grassland easements from willing sellers. Although this program has been very successful in protecting thousands of acres of habitat, the easement program's conservation role is regularly overlooked and misunderstood. The refuge has the potential to not only provide information to the local communities and students about habitat conservation, but could also create a bridge to potential landowners who might otherwise be unaware these compensated programs exist. Developing this mutual awareness, knowledge, and appreciation for protecting these natural resources while understanding the challenges

of farmers and ranchers, will create a greater appreciation of each other's needs and should ultimately aid in future wetland and grassland protection and restoration efforts within the Devils Lake WMD Complex.

Visitor Services Goal

Provide captivating visitor services facilities and activities for visitors of all abilities, community groups, youth groups, and the members of Spirit Lake Nation to provide enjoyment that results in a greater understanding and support of the preservation of native habitats and landscapes of North Dakota's Prairie Pothole Region and the mission of the Refuge System. Appendices G and H contain draft compatibility determinations for the fishing and wildlife observation and wildlife photography uses proposed for Sullys Hill National Game Preserve.

Visitor Services Objective 1

Annually, 60,000 visitors, including 7,500 youth and adult students, will visit and explore Sullys Hill National Game Preserve. This experience will create a greater awareness and understanding of the national wildlife refuge system while fostering a personal environmental ethic and developing skills to further understand wildlife and engage with nature.

Strategies

- Staff will work with volunteers and other partners to develop a year-round educational program that will highlight the Refuge System's priority public uses of wildlife observation and photography techniques, hunting, fishing, interpretation, and environmental education. Staff will use a website and media to provide public advance notice of programming. Typical programming will include birding walks, plant identification tours, photography field trips, guided hay rack rides, elk bulging tours, and fishing and hunter education courses.
- Through partnerships, the Service will develop and maintain an interactive habitat diorama display to be located in the education and visitor center. The display will include static and dynamic components to engage and educate visitors of all ages and abilities. The diorama will cover grassland, wetland, agricultural, and forest landscapes.
- Staff the education and visitor center year-round providing consistent hours of operation (up to 48 hours per week). This will be accomplished through added staff and the expanded use of partners, volunteers, seasonal staff, and the YCC program.
- Provide environmental education materials in the education and visitor center bookstore. The bookstore will be administered by the Sullys Hill Wildlife Refuge Society through a cooperative agreement with the Service. The materials must meet the mission of the Service and be approved by the refuge manager.
- Develop a remote camera and video system that will allow students in the education and visitor center to observe wildlife on the refuge. This system will be linked to the website for the general public to view from remote locations.
- Maintain the trail system for year-round use for hikers, snowshoers, and cross-country skiers (see figure 8, public use map). A "tear sheet" map will be developed for navigation as well as an interpretation tool. The trail system will be properly signed correlating with the "tear sheet".
- Maintain the auto tour network for year-round use (see figure 8, public use map). A "tear sheet" map will be developed for navigation as well as a self-guided interpretive tool. The auto tour will be properly signed, correlating with the "tear sheet." The "tear sheet" will also direct visitors to the refuge's four observation platforms.
- To ensure visitor safety and assist in maintenance, complete a chip and seal on refuge roads.
- Maintain two newly constructed informational kiosks at the entrance and the education and visitor center to inform and orient visitors (see figure 8, public use map).
- Finish updating the refuge brochure and distribute it to visitors at key locations within the refuge.
- Maintain the five observation platforms along the auto tour and nature trail with proper interpretive panels (see figure 8, public use map). These platforms are the Devils Lake vista, wetland overlook, Sullys Hill, nature trail, and the prairie dog town overlooks.
- Replace the temporary outdoor amphitheater adjacent to the education and visitor center with one that is accessible and consists of a covered stage and permanent seating for 250 people with space to include additional temporary seating (see figure 8, public use map).

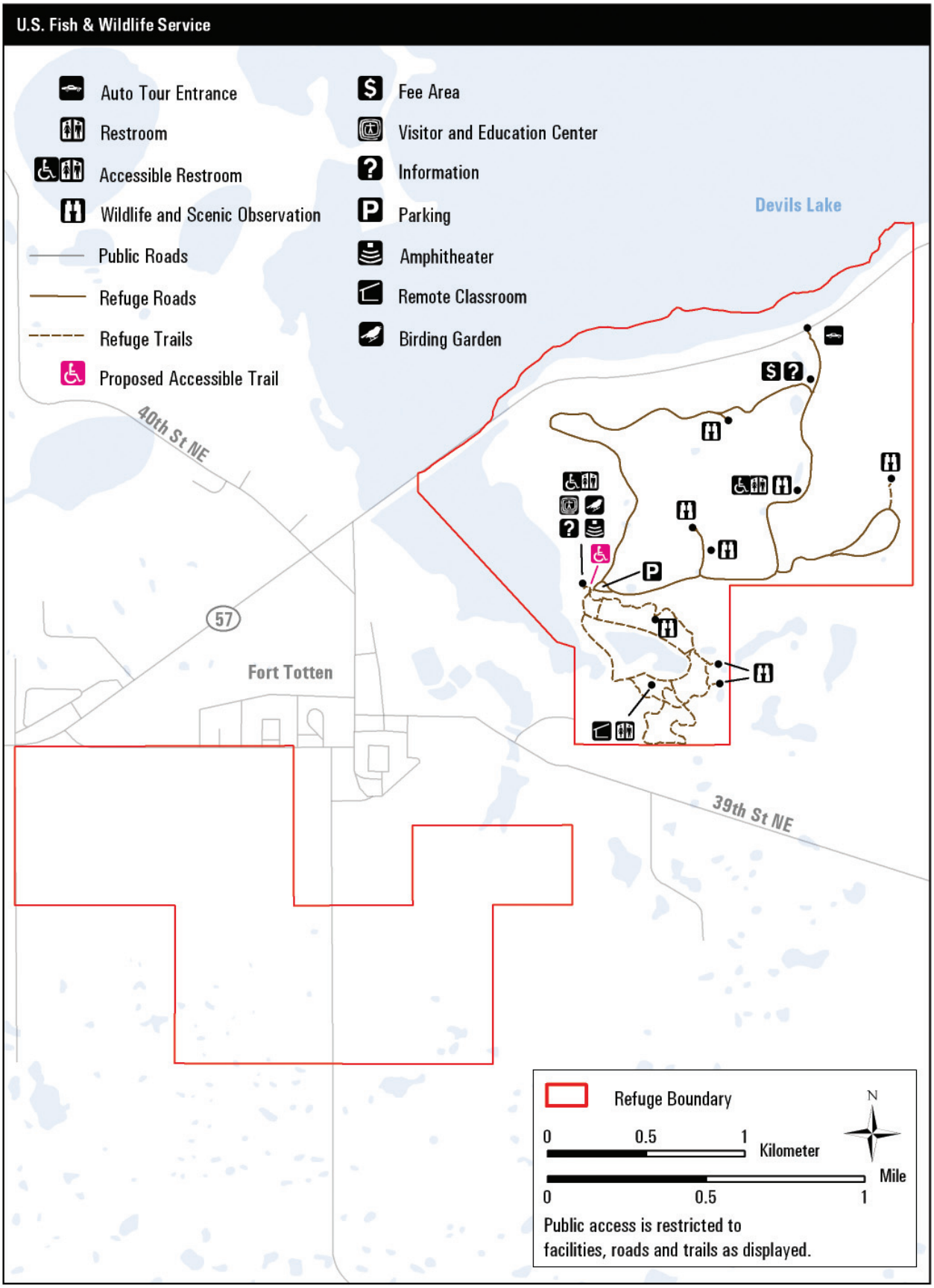

Figure 8. Sullys Hill National Game Preserve public use map.

- Replace an accessible trail and overlook that was lost to Devils Lake flooding. The trail and overlook will be located adjacent to the education and visitor center and outdoor amphitheater, providing a link to these facilities while providing an opportunity for visitors of all abilities to enjoy nature (see figure 8, public use map).
- Continue to monitor public use of the refuge and facilities. Weekly auto tour and trail system use data will be collected and recorded. Education and visitor center use will be recorded through a guest book and by education and visitor center staff and volunteers. Classroom use, including the number of visitors and topics presented, will be documented and monitored to ensure the refuge is achieving its vision, goals, and objectives.
- A patio and seating area for the outdoor birding garden would be constructed.
- Counters would be installed on single- and double-lane portions of the auto tour route for accurate use data.
- The daily recreation fee would be increased to $3.00 ($20.00 calendar year annual pass) and collected through an automated collection booth.
- A vehicle radio transmitter system would be developed for audio interpretation of the auto tour.
- The directional signage for trails and auto tour route would be updated and installed.

Rationale

Over the last century, the percentage of people living in the United States in urban areas rose from 39% to more than 73% (National Aeronautics and Space Administration 2000). This urbanization results in a general disconnect between humans and the natural world. Surprisingly, adults have more opportunities to interact directly with nature than children, yet children have more access to information about the environment through nature shows, computer games, and graphics (Hudson 2001).

Sullys Hill National Game Preserve will expand opportunities for visitors and students to experience wildlife and nature first-hand. The refuge will serve as a vehicle to foster an environmental ethic through the opportunities of wildlife observation, photography, interpretation, and environmental education.

Protection And Maintenance Goal

Refuge visitors, staff, and volunteers will have a safe, protected, and well-maintained environment in which to learn about, work with, understand, and appreciate the importance of protecting the unique natural and cultural resources of Sullys Hill National Game Preserve.

Protection and Maintenance Objective 1

100% of all refuge visitors, volunteers, and staff will report feeling safe when visiting or working on the refuge. These same visitors will fully comprehend the laws and regulations in place for their protection and the protection of the refuge's wildlife, lands, facilities, and cultural resources (throughout the 15-year CCP).

Strategies

- Recruit one GS-9 park ranger for law enforcement duties to provide regular routine patrols and provide for visitor and staff safety, and facilities and resource protection.
- Pursue a cooperative agreement with local law enforcement agencies to add resources that will help achieve a high-visibility law enforcement presence to deter vandalism and other inappropriate behavior on the refuge and protect refuge visitors, staff, volunteers, facilities, lands, and wildlife.
- Provide proper signage and an outreach program that will clearly warn visitors of the dangers of approaching wildlife.
- Initiate a background check for volunteers to ensure a safe environment for environmental education programs, facilities, and visitors.
- Develop a visitor safety section for the visitor services plan.
- Interpretive programs, materials, and signage will be developed to provide visitors with information on how to view wildlife safely without causing harm to the wildlife or themselves.
- Arson patrols will be conducted to prevent wildfires during peak fire seasons.
- Security, including camera surveillance, and fire alarm systems will be installed.

Rationale

There are few resources available to provide a safe environment for staff, volunteers, visitors, wildlife, facilities, and cultural resources. If management of Sullys Hill National Game Preserve includes plans to invite visitors;

increase the number of staff and volunteers; maintain and protect facilities; and protect wildlife, habitat, and cultural resources, then the Service is required to provide a minimum level of safety. Providing a minimum level of safety is the most fundamental responsibility of refuge managers (National Wildlife Refuge System Improvement Act 1997).

Protection and Maintenance Objective 2

All refuge equipment and facilities will be maintained at a level that will adequately support and will not hinder visitor, habitat management, and programs while ensuring the safety of all staff and visitors.

Strategies

- Recruit one full-time maintenance worker, WG-8, to maintain the refuge infrastructure, including the education and visitor center, roads, snow removal, plumbing, carpentry, electrical, masonry, painting, groundskeeping, enclosure fence, and general operations.
- Recruit one career-seasonal maintenance worker, WG-6, to help meet peak maintenance needs during the high visitor services field season (April–November). Duties will include maintaining roads, trails, kiosks, amphitheater, and grounds, and supervise YCC and other temporary staff to meet the maintenance demand of the refuge's peak season.
- Routine boundary fence checks will be conducted and feral animals that harm native wildlife will be controlled.

Rationale

There is no dedicated maintenance staff for Sullys Hill National Game Preserve. The refuge does receive some assistance from the two Devils Lake WMD Complex maintenance staff. The refuge has over $18 million in real property assets, not including personal property, that needs regular daily maintenance. Some of the facilities that need routine and consistent maintenance include the following:

- A 6-mile, 7-foot-high big-game exclusion fence
- Sullys Hill overlook interpretive platform
- Devils Lake interpretive overlook
- wetland overlook
- prairie dog overlook
- two residences
- 5-mile paved auto tour route
- 1.2 mile interpretive trail
- 3,120 square foot fire maintenance shop
- 32-foot by 28-foot environmental classroom
- 380-foot accessible nature trail
- amphitheater
- 1,600 square foot fire storage building
- kiosks, entrance signs, interpretive signs
- 6,094 square foot education and visitor center
- 6,900 square foot shop/cold storage building

Protection and Maintenance Objective 3

Within two years of initiation of this plan, generate additional entrance fees and increase payment compliance to 90% to ensure resources are available for maintenance and safety of visitor facilities.

Strategies

- Use random recreation fee compliance patrols conducted by on-site law enforcement officer (GS-9 park ranger).
- Install an automatic fee collection booth eliminating the unreliable volunteer fee program.
- Increase entrance fee initially to $3.00 per visit ($20.00 annually) and then increase as needed over the next 15 years.

Rationale

Entrance fees have been collected through an honor system with only an estimated 40% of visitors actually paying the $2.00 fee. Given that 60,000 visitors come to the refuge each year, that is a significant loss of revenue. In addition, the fee has not increased for years, while visitor services have continued to expand, including the construction of the new education and visitor center and classrooms. If fee compliance were improved along with a nominal increase in the entrance fee, additional revenue could be generated to provide the resources necessary to maintain visitor facilities and fund additional law enforcement support.

Protection and Maintenance Objective 4

Adverse effects to significant cultural resources are avoided, or when necessary, are mitigated in compliance with Section 106 of the National Historic Preservation Act 100% of the time.

Strategies

- Cultural resources that would be potentially affected by an undertaking are identified and, if significant, preserved when possible.
- Cultural resource evaluations will be done to fulfill compliance with historic preservation laws.
- Consult the regional archaeologist to ensure proper implementation of Section 106 into all applicable refuge projects.
- Cultural resource surveys will first be completed in high probability areas.
- Complete a comprehensive cultural resource survey of the refuge in partnership with other agencies and organizations.
- Historical documents and information will be organized and protected.
- Maintain all buildings, structures, objects, and sites designated as a "historic properties" as defined in Section 106 of NHPA. All significant cultural resources will be protected from refuge activities and vandalism.

Rationale

Federal laws and policies mandate the identification and protection of cultural resources. Ideally, a comprehensive inventory of the refuge's cultural resources would be useful for ensuring their protection. However, these inventories are costly and time-consuming and require special abilities, such as those of an archaeologist to complete. Although the refuge does not have such an inventory, it is still necessary to protect these resources. To meet this requirement, a cultural resources investigation must be completed on any site proposed for excavation, prior to any action that may disturb the site.

6.2 PERSONNEL AND FUNDING

One full-time person is assigned to Sullys Hill National Game Preserve. This person primarily has a background in outdoor education. The overall budget for the refuge is quite modest ($116,000) and primarily pays the salary of this one staff person. Most of the current work is carried out by a volunteer workforce.

Table 3 lists this position along with 3.5 new full-time equivalent positions (specifically assigned to Sullys Hill National Game Preserve) that are needed for full implementation of the CCP.

Table 3. Current and proposed staff for Sullys Hill National Game Preserve.

	Current Staff	*Proposed Position*
Management/ Visitor Services Staff	Park Ranger, GS-11	Change the title of this current position to visitor services manager
Environmental Education Specialist	None	GS-9 environmental education specialist
Biological Staff	None	GS-9 wildlife biologist
Administrative Staff	None	No change
Maintenance Staff	None	WG-6 full time maintenance worker
Law Enforcement Staff	None	GS-9 park ranger (shared position with Devils Lake WMD Complex)

6.3 MONITORING AND EVALUATION

Adaptive management is a flexible approach to long-term management of biotic resources. It allows for management to be shaped and directed over time by the results of ongoing monitoring activities and other discovered information. More specifically, adaptive management is a process by which projects are implemented within a framework of scientifically-driven experiments to test the predictions and assumptions outlined within a plan. On-the-ground observations of responses to management by habitats and wildlife are also factored in. Analysis of results helps managers determine whether current management should continue "as-is" or whether it should be modified to achieve desired conditions. Changes and adjustments to management and operations are considered using the best information currently available.

To apply adaptive management, specific survey, inventory, and monitoring protocols will be adopted for Sullys Hill National Game Preserve. The habitat management strategies will be systematically evaluated to determine management effects on wildlife populations. This information will be used to refine approaches

and determine how effectively the objectives are being accomplished. If monitoring and evaluation indicate undesirable effects for target and nontarget species or communities, the management projects would be altered accordingly. Subsequently, the CCP would be revised.

Step-down Management Plans

Specific monitoring and evaluation activities will be described in step-down management plans. This CCP is intended as a broad umbrella plan that provides general concepts and specific wildlife, habitat, endangered species, public use, and partnership objectives over the next 15 years.

The purpose of a step-down management plan is to provide greater detail to managers and employees who will implement the strategies described in the CCP. Step-down management plans provide greater detail for implementing specific actions authorized by the CCP. Table 4 presents those plans needed for Sullys Hill National Game Preserve, their current status, and the next revision date.

Plan Amendment And Revision

This CCP will be reviewed annually to determine the need for revision. A revision will occur if and when significant information becomes available, such as a change in ecological conditions. The final CCP will be augmented by detailed step-down management plans to address the completion of specific strategies in support of the CCP goals and objectives. Revisions to the CCP and the step-down management plans will be subject to public review and NEPA compliance. At a minimum, this plan will be evaluated every 5 years and revised after 15 years.

Table 4. Step-down management plans for Sullys Hill National Game Preserve

Plan/Proposal	*Completed Plan, Year Approved*	*New or Revised Plan, Completion Year*
Disease Management Plan	2006	2012
Chronic Wasting Disease Plan	2004	2012
Black-tailed Prairie Dog Management Plan	—	2009
Big Game Management Plan	1984	2011
Habitat Management Plan		2011
Integrated Pest Management Plan	2005	2011
Prescribed Burning (Annual)	2007	2011
Forest Plan	—	2011
Grassland Plan	—	2011
Migratory Bird Plan	—	2011
Wildlife Inventory and Monitoring Plan	—	2010
Visitor Services Plan	1993	2010
Sign Plan	—	—
Refuge Safety Plan	—	2009
Law Enforcement Plan	—	—
Occupant Emergency Plan	—	—
Fire Management Plan	2002	2009
Spill Prevention Control and Countermeasures Plan	2002	2012

Adaptive Management

Adaptive management is a rigorous application of management, research, and monitoring to

- gain information and experience necessary to assess and modify management activities;
- use feedback from research, monitoring, and evaluation of management actions to support or modify objectives and strategies at all planning levels; and
- determine which policy decisions are implemented within a framework of scientifically driven experiments to test predictions and assumptions inherent in management plan (see figure 9, adaptive management process).

Analysis of results helps managers determine whether current management should continue as is or whether it should be modified to achieve desired conditions.

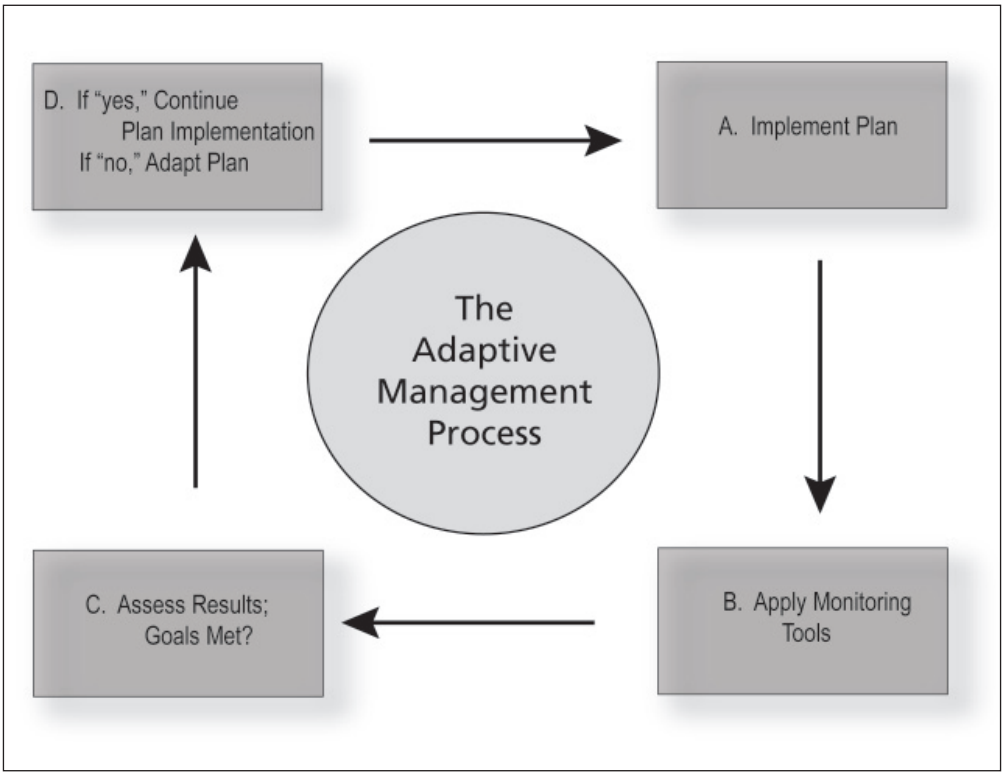

Figure 9. Adaptive management process.

Glossary

accessible—Pertaining to physical access to areas and activities for people of different abilities, especially those with physical impairments.

adaptive resource management—The 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 management plans. 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.

alternative—A reasonable way to solve an identified problem or satisfy the stated need (40 CFR 1500.2); one of several different means of accomplishing refuge purposes and goals and contributing to the Refuge System mission (Draft Service Manual 602 FW 1.5).

alleles—An alternative form of a gene that is one member of a pair.

alluvial—Relating to, found in, or composed of sand, silt, clay, gravel, or other matter deposited by flowing water.

amphibian—A class of cold-blooded vertebrates including frogs, toads or salamanders.

annual—A plant that flowers and dies within 1 year of germination.

baseline—A set of critical observations, data, or information used for comparison or as a control.

belt-transect method—An ecological survey method which divides the area being surveyed into long, narrow, rectangular plots, which is further divided into regular blocks.

biological control—The use of organisms or viruses to control invasive plants or other pests.

biological diversity, also **biodiversity**—The 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 (Service Manual 052 FW 1.12B). The National Wildlife Refuge System's focus is on indigenous species, biotic communities, and ecological processes.

biotic—Pertaining to life or living organisms; caused, produced by, or comprised of living organisms.

canopy—A 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.

biotic—Pertaining to life or living organisms; caused, produced by, or comprised of living organisms.

carbon sequestration—The capture and secure storage of carbon that would otherwise be emitted or remain in the atmosphere.

cervids—Any of various hoofed mammals of the family Cervidae.

Code of Federal Regulations (**CFR**)—The 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.

compatibility determination—See compatible use.

compatible use—A 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 Service Manual 603 FW 3.6). A compatibility determination supports the selection of compatible uses and identified stipulations or limits necessary to ensure compatibility.

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 Service Manual 602 FW 1.5).

concern—See issue.

cool-season grasses—Grasses that begin growth earlier in the season and often become dormant in the summer. These grasses will germinate at lower temperatures. Examples of cool-season grasses at the refuge are western wheatgrass, needle and thread, and green needlegrass.

coulee—A valley or drainage landform such as a pond or creek.

cover, also **cover type**, **canopy cover**—Present vegetation of an area.

cultural resources—Sites, buildings, structures and objects that are the result of human activities and are over 50 years old. They include prehistoric, historic, and architectural sites, artifacts, historical records, and traditional cultural properties—including traditional use areas for American Indians—that may or may not have material evidence.

dense nesting cover (**DNC**)—A composition of grasses and forbs that allows for a dense stand of vegetation to protect nesting birds from the view of predators, usually consisting of one to two species of wheatgrass, alfalfa, and sweetclover.

district—Wetlands management district.

ecosystem—A 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.

ecotonal—Transitioning between two plant communities, such as forest to prairie.

emergent—A plant rooted in shallow water and having most of the vegetative growth above water such as cattail and hardstem bulrush.

endangered species, federal—A plant or animal species listed under the Endangered Species Act of 1973, as amended, that is in danger of extinction throughout all or throughout a significant portion of its range.

endangered species, state—A 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—Occurs naturally in a certain region or whose distribution is relatively limited to a particular locality.

environmental assessment (**EA**)—A 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 a finding of no significant impact (40 CFR 1508.9).

extirpation—The extinction of a population; complete eradication of a species within a specified area.

exudate—Fluid found in lesions or areas of inflammation.

fauna—All the vertebrate and invertebrate animals of an area.

federal trust resource—A trust is something managed by one entity for another who holds the ownership. The Service holds in trust many natural resources for the people of the United States of America as a result of federal acts and treaties. Examples are species listed under the Endangered Species Act, migratory birds protected by international treaties, and native plant or wildlife species found on a national wildlife refuge.

federal trust species—All species where the federal government has primary jurisdiction including federally endangered or threatened species, migratory birds, anadromous fish, and certain marine mammals.

flora—All the plant species of an area.

floristics—The composition of plant associations.

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.

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.

"friends group"—Any formal organization whose mission is to support the goals and purposes of its

associated refuge and the National Wildlife Refuge Association overall; "friends" organizations and cooperative and interpretive associations.

germplasm—A collection of genetic resources for an organism.

geographic information system (**GIS**)—A computer system capable of storing and manipulating spatial data; a set of computer hardware and software for analyzing and displaying spatially referenced features (such as points, lines and polygons) with nongeographic attributes such as species and age.

goal—A descriptive, open-ended, and often broad statement of desired future conditions that conveys a purpose but does not define measurable units (Draft Service Manual 620 FW 1.5).

graminoid—Grasses or grasslike plants such as sedges and rushes.

grassland tract—A contiguous area of grassland without fragmentation.

habitat—A suite of existing environmental conditions required by an organism for survival and reproduction; the place where an organism typically lives and grows.

habitat disturbance—Significant alteration of habitat structure or composition; may be natural (for example, wildland fire) or a human-caused events (for example, timber harvest and disking).

habitat type, also **vegetation type**, **cover type**—A land classification system based on the concept of distinct plant associations.

Improvement Act—National Wildlife Refuge System Improvement Act of 1997.

indigenous—Originating or occurring naturally in a particular place.

integrated pest management (**IPM**)—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.

introduced species—A species present in an area due to intentional or unintentional escape, release, dissemination, or placement into an ecosystem as a result of human activity.

invasive plant, also noxious weed—A 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.

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 Service Manual 602 FW 1.5).

lacustrine—Of or pertaining to a lake.

management alternative—See alternative.

mesic—Of, pertaining to, or adapted to an environment having a balanced supply of moisture.

meta-population—A group of spatially separated populations of the same species which interact in some way.

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 birds—Birds that follow a seasonal movement from their breeding grounds to their wintering grounds. Waterfowl, shorebirds, raptors, and songbirds are all migratory birds.

mission—Succinct statement of purpose and/or reason for being.

mitigation—Measure designed to counteract an environmental impact or to make an impact less severe.

mixed-grass prairie—A 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—The process of collecting information to track changes of selected parameters over time.

moraine—Unconsolidated debris deposited by a glacier.

national wildlife refuge—A designated area of land, water, or an interest in land or water within the National Wildlife 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 National Wildlife 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—A species that historically occurred or currently occurs in that ecosystem; does not include species that are present in an ecosystem as a result of an introduction.

necropsy—A postmortem examination.

Neotropical migrant—A bird species that breeds north of the United States and Mexican border and winters primarily south of this border.

nongovernmental organization—Any group that is not composed of federal, state, tribal, county, city, town, local, or other governmental entities.

noxious weed, also **invasive plant**—Any living stage (including seeds and reproductive parts) of a parasitic or other plant 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 (such as an 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 U.S. and to public health.

objective—Concise target statement of what will be achieved, how much will be achieved, when and where it will be achieved, and who is responsible for the work; derived from goals and provide the basis for determining management strategies. Objectives should be attainable and time-specific and should be stated quantitatively to the extent possible. If objectives cannot be stated quantitatively, they may be stated qualitatively (Draft Service Manual 602 FW 1.5).

palustrine—Relating to a system of inland, nontidal wetlands characterized by the presence of trees, shrubs, and emergent vegetation (vegetation that is rooted below water but grows above the surface). Palustrine wetlands range from permanently saturated or flooded land (as in marshes, swamps, and lake shores) to land that is wet only seasonally.

patch—An 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 two years.

plant community—An 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, such as ponderosa pine or bunchgrass.

prescribed fire—The skillful application of fire to natural fuels under conditions such as weather, fuel moisture, and soil moisture that allow confinement of the fire to a predetermined area and produces the intensity of heat and rate of spread to accomplish planned benefits to one or more objectives of habitat management, wildlife management, or hazard reduction.

priority public use—One of six uses authorized by the National Wildlife Refuge System Improvement Act of 1997 to have priority if found to be compatible with a refuge's purposes. This includes hunting, fishing, wildlife observation, wildlife photography, environmental education, and interpretation.

proposed action—The 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).

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—A 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.

purpose of the refuge—The purpose of a refuge is 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 Service Manual 602 FW 1.5).

raptor—A carnivorous bird such as a hawk, a falcon, or a vulture that feeds wholly or chiefly on meat taken by hunting or on carrion (carcasses).

refuge—Sullys Hill National Game Preserve.

refuge purpose—See purpose of the refuge.

Refuge System—See National Wildlife Refuge System.

refuge use—Any activity on a refuge, except administrative or law enforcement activity, carried out by or under the direction of an authorized Service employee.

rest—Free from biological, mechanical, or chemical manipulation, in reference to refuge lands.

restoration—Management emphasis designed to move ecosystems to desired conditions and processes, such as healthy upland habitats and aquatic systems.

riparian area or riparian zone—An 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.

scoping—The process of obtaining information from the public for input into the planning process.

scouring—Removal of earth or rock by the action of running water or wind-eroding material.

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 (*Charadrii*) of birds, such as a plover or a snipe, that frequent the seashore or mud flat areas.

spatial—Relating to, occupying, or having the character of space.

step-down management plan—A plan that provides the details necessary to implement management strategies identified in the comprehensive conservation plan (Draft Service Manual 602 FW 1.5).

strategy—A specific action, tool, or technique or combination of actions, tools, and techniques used to meet unit objectives (Draft Service Manual 602 FW 1.5).

threatened species, federal—Species listed under the Endangered Species Act of 1973, as amended, that are likely to become endangered within the foreseeable future throughout all or a significant portion of their range.

threatened species, state—A plant or animal species likely to become endangered in a particular state within the near future if factors contributing to population decline or habitat degradation or loss continue.

trophic level—The position a species occupies in a food chain.

trust resource—See federal trust resource.

trust species—See federal trust species.

U.S. Fish and Wildlife Service (**Service, USFWS, FWS**)—The 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 comprised 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. Geological Survey (**USGS**)—A 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.

ungulate—A hooved animal such as a white-tailed deer or bison.

vision statement—A concise statement of the desired future condition of the planning unit, based primarily on the Refuge System mission, specific refuge purposes, and other relevant mandates (Draft Service Manual 602 FW 1.5).

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**)—A method of visually quantifying vegetative structure and composition.

wading birds—These birds have long legs that enable them to wade in shallow water; wading birds include egrets, great blue herons, black-crowned night-herons, and bitterns.

waterfowl—A category of birds that includes ducks, geese, and swans.

watershed—The region draining into a river, a river system, or a body of water.

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.

wildland fire—A free-burning fire requiring a suppression response; all fire other than prescribed fire that occurs on wildlands (Service Manual 621 FW 1.7).

wildlife-dependent recreational use—Use of a refuge involving hunting, fishing, wildlife observation, wildlife photography, environmental education, or interpretation. The National Wildlife Refuge System Improvement Act of 1997 specifies that these are the six priority general public uses of the Refuge System.

woodland—Open stands of trees with crowns which do not usually touch, generally forming 25–60% cover.

Appendix A

Key Legislation and Policies

This appendix describes the guidance for the National Wildlife Refuge System and other policies and key legislation that guide the management of Sullys Hill National Game Preserve.

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

- To fulfill our statutory duty to achieve refuge purposes and further the 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, inter-jurisdictional 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.
- To foster understanding and instill appreciation of fish, wildlife, and plants, and their conservation, by providing the public with safe, high quality, and compatible wildlife-dependent public use. Such use includes hunting, fishing, wildlife observation 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.

Legal and Policy Guidance

Management actions on national wildlife refuges 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 have the greatest effect on refuge management 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 No. 3596 (1921)—Establishes Sullys Hill National Game Preserve "as a refuge and breeding ground for birds…"

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 nonfederal, 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 nonfederal 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

Preparers

This document is the result of the extensive, collaborative, and enthusiastic efforts by members of the planning team shown below.

Team Member	*Position*	*Work Unit*
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Roger Hollevoet	Project leader	Devils Lake WMD Complex, Devils Lake, ND
Laura King	Planning team leader	Division of Planning, Region 6, Cayuga, ND
Susan Hale	Editor	TBC Solutions, Clinton, TN

Many organizations, agencies, and individuals provided invaluable assistance with the preparation of this CCP. The Service acknowledges the efforts of the following individuals and groups towards the completion of this plan. The diversity, talent, and knowledge contributed dramatically improved the vision and completeness of this document.

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Sheri Fetherman	Chief, Division of Education and Visitor Services	USFWS
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Contributor	*Position*	*Work Unit*
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Joe Maxwell	*Former* Refuge manager, Sullys Hill National Game Preserve, transferred July 2006	USFWS
Russ McDonald	Planner	Spirit Lake Nation
Andrew Morin	Fish and wildlife director	Spirit Lake Nation
Neil Niemuth	Wildlife biologist	USFWS
Myra Pearson	Tribal chairwoman	Spirit Lake Nation
Jeff Printz	State range conservationist	NRCS
David Redhorse	*Former* Native American liason	USFWS
Dr. Tom Roffe	Region 6 Chief, wildlife health	USFWS
Rick Schroeder	Wildlife biologist	USGS
Michael Spratt	Chief, Division of Refuge Planning	USFWS
Craig Stange	State forester	NRCS
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Craig Tanner	Refuge manager, Sullys Hill National Game Preserve, arrived April 2007	USFWS
Meg Van Ness	Regional archaeologist	USFWS

Appendix C

Public Involvement

Public scoping was initiated for Sullys Hill National Game Preserve in a notice of intent (NOI) dated May 23, 2006. The NOI announced the public scoping meeting that was held for public input on management of the refuge and development of the CCP. In addition, a newsletter, comment and mailing list forms, along with a postage paid envelope, were mailed to over 320 individuals on the refuge planning mailing list.

The public scoping meeting was held at the refuge education and visitor center in Fort Totten, North Dakota, on June 29, 2006. This meeting was attended by 10 community members who provided verbal and written comments. When the scoping period ended on August 1, 2006, the planning team received over 183 written comments. Comments received identified biological, social, and economic concerns regarding refuge management. The mailing list for federal, state, local organizations,, governments, tribes, other agencies, schools and universities, media, and national organizations follows:

FEDERAL OFFICIALS

U.S. Representative Earl Pomeroy, Washington DC
Rep. Pomeroy's Area Director, Bismarck, ND

U.S. Senator Kent Conrad, Washington DC
Sen. Conrad's Area Director, Bismarck, ND

U.S. Senator Byron Dorgan, Washington DC
Sen. Dorgan's Area Director, Minot, ND
Sen. Dorgan's Area Director, Bismarck, ND

FEDERAL AGENCIES

USFWS Ecological Services, Bismarck, ND
USFWS Habitat and Population Evaluation Team, Bismarck, ND
USGS-Northern Prairie Wildlife Research Center, Jamestown, ND

TRIBAL OFFICIALS

Spirit Lake Tribal Council, Fort Totten, ND
Three Affiliated Tribes, New Town, ND
Turtle Mountain Band of Chippewa, Belcourt, ND

STATE OFFICIALS

Governor John Hoeven, Bismarck, ND
Lance Gaebe, Governor's Office, Bismarck, ND
Representative Thomas Brusegard, Gilby, ND
Representative Lois Delmore, Grand Forks, ND
Representative William Devlin, Finley, ND
Representative Eliot Glassheim, Grand Forks, ND
Representative Gil Herbel, Grafton, ND
Representative Dennis Johnson, Devils Lake, ND
Representative Joyce Kingsbury, Grafton, ND
Representative David Monson, Osnanbrock, ND
Representative Jon Nelson, Wolford, ND
Representative Eugene Nicholas, Cando, ND
Representative Darrell Nottestad, Grand Forks, ND
Representative Louise Potter, Grand Forks, ND
Representative Jo Ann Rodenbiker, Rock Lake, ND
Representative Arlo Schmidt, Maddock, ND
Representative Ken Svedjan, Grand Forks, ND
Representative Gerald Uglem, Northwood, ND
Representative Don Vigesaa, Cooperstown, ND
Representative Amy Wamke, Grand Forks, ND
Representative Lonny Winrich, Grand Forks, ND
Senator Duane Espegard, Grand Forks, ND
Senator Michael Every, Minnewauken, ND
Senator Ray Holmberg, Grand Forks, ND
Senator Duane Mutch, Larimore, ND
Senator Harvey Tallackson, Grafton, ND
Senator Ryan Taylor, Towner, ND
Senator John Traynor, Devils Lake, ND
Senator Thomas Trenbeath, Cavalier, ND

STATE AGENCIES

NDGF, Bismarck, ND
State Historical Society, Bismarck, ND
Pembina State Museum, Pembina, ND
North Dakota Department of Transportation, Devils Lake, ND
North Dakota Tourism Division, Bismarck, ND

North Dakota State Water Commission, Bismarck, ND
North Dakota Forest Service
Devils Lake Basin Joint Water Board, Devils Lake, ND
Lake Region Human Service Center, Devils Lake, ND

LOCAL GOVERNMENT

Nelson County Commission Chair Jack Davidson, Lakota, ND
Towner County Commission Chair Terry Johnson, Cando, ND
Grand Forks County Commission Chair Constance Triplett, Grand Forks, ND
Benson County Commissioner Chair Dwain Brown, Minnewaukan, ND
Walsh County Commission Chair Tork Kilichowski, Grafton, ND
Ramsey County Commission Chair Joe Belford, Devils Lake, ND
Ramsey County Housing Authority, Devils Lake, ND

ORGANIZATIONS

Sullys Hill Wildlife Refuge Society, Devils Lake, ND
Prairie Wetlands Resource Center, Bismarck, ND
Grand Cities Bird Club, Grand Forks, ND
Fort Totten State Historical Society
The Wildlife Society, Bismarck, ND
Audubon Society, Washington D.C. and Fargo, ND
ND Natural Resources Trust, Devils Lake, ND
Ducks Unlimited, Bismarck, ND
The Nature Conservancy, Minneapolis, MN
Sierra Club, Bismarck, ND
North American Nature Photography Association
Animal Protection Institute
Beyond Pesticides
Wildlife Management Institute
Defenders of Wildlife, Washington DC
The Wilderness Society, Washington DC
National Trappers Association
Fund for Animals
Bird Watchers Digest
Devils Lake Area Foundation, Devils Lake, ND
Grand Forks Convention and Visitors Bureau, Grand Forks, ND
Devils Lake Chamber of Commerce, Devils Lake, ND
Devils Lake Visitor Bureau, Devils Lake, ND

UNIVERSITIES, COLLEGES, AND SCHOOLS

Lake Region State College, Devils Lake, ND
North Dakota State University, Fargo, ND
The University of North Dakota, Grand Forks, ND
Edmore Public School, Edmore, ND
St. Josephs School, Devils Lake, ND
Minnewauken Public School, Minnewauken, ND
Midkota High School, Glenfield, ND
Prairie View Elementary School, Devils Lake, ND
Central Middle School, Devils Lake, ND
Lake Region Special Education, Devils Lake, ND
Neche School District, Neche, ND
Lakota Elementary, Lakota, ND
Warwick Public School, Warwick, ND
Nash Public School, Grafton, ND
Cando Elementary, Cando, ND
Sheyenne Elementary School, Sheyenne, ND
Fordville-Lankin High School, Fordville, ND
Four Winds School, Fort Totten, ND
Edmore Public School, Edmore, ND
Devils Lake Public School, Devils Lake, ND
Ely Elementary School, Rugby, ND
Langdon Middle School, Langdon, ND
Minnie H School, Devils Lake, ND
Carrington Elementary School, Carrington, ND
Adams Public School, Adams, ND

MEDIA

KZZY/KQZZ Radio
Grand Forks Herald
Devils Lake Journal
KDLR/KDVL Radio
North Dakota Living

INDIVIDUALS

194 private individuals

Appendix D

Species List

Below is a list of resident and migrant wildlife species that occur or have the potential to occur on or adjacent to Sullys Hill National Game Preserve. Following the wildlife list is a plant list that includes species mentioned throughout this CCP, as well as species confirmed and likely to occur at the refuge.

Refuge baseline and anecdotal data were used where possible to develop these lists; however much of the information used to develop the lists was obtained from various sources that provided species lists and occurrences for North Dakota, including Wiehe and Cassel (1978), Iverson et al. (1967), McLaren (2001), Hoberg and Gause (1992), and Royer et al. (1998). The amphibians, reptiles, mammals, and fish are listed in taxonomic order following Banks et al. (1987). Bird species are listed in taxonomic order based on the "Check-list of North American Birds" (American Ornithologists Union 2005).

CLASS AMPHIBIA

Order	*Common Name*	*Scientific Name*
Caudata	Tiger salamander	*Ambystoma tigrinum*
Anura	Canadian toad	*Bufo hemiophrys*
Anura	Great Plains toad	*Bufo cognatus*
Anura	Northern leopard frog	*Rana pipiens*
Anura	Western chorus frog	*Pseudacris triseriata*
Anura	Wood frog	*Rana sylvatica*

CLASS REPTILIA

Order	*Common Name*	*Scientific Name*
Testudines	Common snapping turtle	*Chelydra serpentina*
Testudines	Western painted turtle	*Chrysemys picta belli*
Squamata	Common garter snake	*Thamnophis sirtalis*
Squamata	Plains garter snake	*Thamnophis radix*
Squamata	Redbelly snake	*Storeria occipitomaculata*
Squamata	Smooth green snake	*Opheodrys vernalis*
Squamata	Western hognose snake	*Heterdon nasicus*

CLASS AVES

Order	*Common Name*	*Scientific Name*
Anseriformes	American black duck	*Anas rubripes*
Anseriformes	American pidgeon	*Anas Americana*
Anseriformes	Blue-winged teal	*Anas discors*
Anseriformes	Bufflehead	*Bucephala albeola*
Anseriformes	Canada goose	*Branta Canadensis*
Anseriformes	Canvasback	*Aythya valisineria*
Anseriformes	Common goldeneye	*Bucephala clangula*
Anseriformes	Common merganser	*Mergus merganser*
Anseriformes	Gadwall	*Anas strepara*

CLASS AVES CONTINUED

Order	*Common Name*	*Scientific Name*
Anseriformes	Green-winged teal	*Anas crecca*
Anseriformes	Hooded merganser	*Lophodytes cucullatus*
Anseriformes	Lesser scaup	*Aythya afinis*
Anseriformes	Mallard	*Anas platyrhynchos*
Anseriformes	Northern pintail	*Anas acuta*
Anseriformes	Northern shoveler	*Anas clypeata*
Anseriformes	Redhead	*Aythya Americana*
Anseriformes	Ring-necked duck	*Aythya collaris*
Anseriformes	Ruddy duck	*Oxyura jamaicensis*
Anseriformes	Tundra swan	*Cygnus columbianus*
Anseriformes	Wood duck	*Aix sponsa*
Galliformes	Gray partridge	*Perdix perdix*
Galliformes	Ring-necked pheasant	*Phasianus colchicus*
Galliformes	Sharp-tailed grouse	*Tympanuchus cupido*
Galliformes	Wild Turkey	*Meleagris gallopavo*
Podicipediformes	Eared grebe	*Podiceps nigricollis*
Podicipediformes	Horned grebe	*Podiceps auritus*
Podicipediformes	Pied-billed grebe	*Podylimbus podiceps*
Podicipediformes	Western grebe	*Aechmophorus occidentalis*
Pelicaniformes	American white pelican	*Pelicanus erythrocephalus*
Pelicaniformes	Double-crested cormorant	*Phalacrocorax auritus*
Ciconiiformes	American bittern	*Botarus lentiginosus*
Ciconiiformes	Black-crowned night heron	*Nycticorax nycticorax*
Ciconiiformes	Great blue heron	*Ardea Herodias*
Ciconiiformes	Great egret	*Ardea alba*
Ciconiiformes	Green heron	*Boturides striatus*
Ciconiiformes	Turkey vulture	*Cathartes aura*
Falconiformes	American kestrel	*Falco sparverius*
Falconiformes	Bald eagle	*Haliaeetus leukocephalus*
Falconiformes	Broad-winged hawk	*Buteo platypterus*
Falconiformes	Cooper's hawk	*Accipitor cooperii*
Falconiformes	Golden eagle	*Aquila chrysaetos*
Falconiformes	Merlin	*Falco columbarius*
Falconiformes	Northern goshawk	*Accipiter gentiles*
Falconiformes	Northern harrier	*Circus cyaneus*
Falconiformes	Osprey	*Pandion haliaetus*
Falconiformes	Peregrine falcon	*Falco peregrinus*
Falconiformes	Red-tailed hawk	*Buteo jamaicensis*
Falconiformes	Sharp-shinned hawk	*Accipitor striatus*
Falconiformes	Swainson's hawk	*Buteo swainsoni*
Gruiformes	American coot	*Fulica Americana*
Gruiformes	Sora	*Porzana carolina*
Gruiformes	Virginia rail	*Coturnicops noveboracensis*
Charadriiformes	American avocet	*Recurvirostra americana*
Charadriiformes	American woodcock	*Scolopax minor*
Charadriiformes	Black tern	*Sterna niger*

CLASS AVES CONTINUED

Order	*Common Name*	*Scientific Name*
Charadriiformes	California gull	*Larus californicus*
Charadriiformes	Common tern	*Sterna hirundo*
Charadriiformes	Forster's tern	*Sterna forsteri*
Charadriiformes	Franklin's gull	*Larus pipixcan*
Charadriiformes	Greater yellowlegs	*Tringa melanoleuca*
Charadriiformes	Killdeer	*Charadrius vociferous*
Charadriiformes	Lesser yellowlegs	*Tringa flavipes*
Charadriiformes	Marbled godwit	*Limosa fedoa*
Charadriiformes	Ring-billed gull	*Larus delawarensis*
Charadriiformes	Solitary sandpiper	*Tringa solitaria*
Charadriiformes	Spotted sandpiper	*Actitis macularia*
Charadriiformes	Upland sandpiper	*Bartamia longicauda*
Charadriiformes	Wilson's snipe	*Gallanago delicate*
Columbiformes	Mourning dove	*Zenaida macroura*
Columbiformes	Rock dove	*Columba livia*
Cuculiformes	Black-billed cuckoo	*Coccyzus erythropthalmus*
Cuculiformes	Yellow-billed cuckoo	*Coccyzus americanus*
Strigiformes	Eastern screech owl	*Otus asio*
Strigiformes	Great horned owl	*Bubo virginianus*
Strigiformes	Norther saw-whet owl	*Aegolius acadicus*
Strigiformes	Snowy owl	*Nyctea scandiaca*
Caprimulgiformes	Common nighthawk	*Chordeiles minor*
Apodiformes	Chimney swift	*Chaetura pelagica*
Apodiformes	Ruby-throated hummingbird	*Archilochus colubris*
Coraciiformes	Belted kingfisher	*Ceryle alcyon*
Piciformes	Downy woodpecker	*Picoides pubescens*
Piciformes	Hairy woodpecker	*Picoides villosus*
Piciformes	Lewis' woodpecker	*Melanerpes lewis*
Piciformes	Northern flicker	*Colaptes auratus*
Piciformes	Pileated woodpecker	*Dryocopus pileatus*
Piciformes	Red-bellied woodpecker	*Melanerpes carolinus*
Piciformes	Red-headed woodpecker	*Melanerpes erythrocephalus*
Piciformes	Yellow-bellied sapsucker	*Sphyrapicus varius*
Passeriformes	Alder flycatcher	*Empidonax alnorum*
Passeriformes	American crow	*Corvus brachyrhynchos*
Passeriformes	American goldfinch	*Carduelis tristis*
Passeriformes	American redstart	*Setophaga ruticilla*
Passeriformes	American robin	*Turdus migratorius*
Passeriformes	American tree sparrow	*Spizella arborea*
Passeriformes	Baltimore oriole	*Icterus galbula*
Passeriformes	Bank swallow	*Riparia riparia*
Passeriformes	Barn swallow	*Hirundo rustica*
Passeriformes	Bay-breasted warbler	*Dendroica castanea*
Passeriformes	Black-and-white warbler	*Mniotilta varia*
Passeriformes	Black-billed magpie	*Pica hudsonia*
Passeriformes	Blackburnian warbler	*Dendroica fusca*

CLASS AVES CONTINUED

Order	*Common Name*	*Scientific Name*
Passeriformes	Black-capped chickadee	*Poecile atricappila*
Passeriformes	Blackpoll warbler	*Dendroica striata*
Passeriformes	Black-throated green warbler	*Dendroica virens*
Passeriformes	Blue-headed vireo	*Vireo solitarius*
Passeriformes	Blue jay	*Cyanocitta cristata*
Passeriformes	Bobolink	*Dolichonyx oryzivorus*
Passeriformes	Bohemian waxwing	*Bombycilla garrulous*
Passeriformes	Brewer's blackbird	*Euphagus cyanocephalis*
Passeriformes	Brown creeper	*Certhia americana*
Passeriformes	Brown-headed cowbird	*Molothrus ater*
Passeriformes	Brown thrasher	*Toostoma rufum*
Passeriformes	Canada warbler	*Wilsonia Canadensis*
Passeriformes	Cape May warbler	*Dendroica tigrina*
Passeriformes	Cedar waxwing	*Bombycilla cedrorum*
Passeriformes	Chestnut-sided warbler	*Dendroica pensylvanica*
Passeriformes	Chipping sparrow	*Spizella passerina*
Passeriformes	Clay-colored sparrow	*Spizella pallida*
Passeriformes	Cliff swallow	*Petrochelidon pyrrhonota*
Passeriformes	Common grackle	*Quiscalus quiscula*
Passeriformes	Common redpoll	*Carduelis flammea*
Passeriformes	Common yellowthroat	*Geothlipis trichas*
Passeriformes	Dark-eyed junco	*Junco hyemalis*
Passeriformes	Eastern bluebird	*Sialia sialis*
Passeriformes	Eastern kingbird	*Tyrannus forficatus*
Passeriformes	Eastern phoebe	*Saynoris phoebe*
Passeriformes	Eastern wood-pewee	*Contopus virens*
Passeriformes	Eastern towhee	*Pipilo erythrophthalmus*
Passeriformes	European starling	*Sturnus vulgaris*
Passeriformes	Evening grosbeak	*Coccothraustes vespertinus*
Passeriformes	Field sparrow	*Spizella pusilla*
Passeriformes	Fox sparrow	*Passerelia iliaca*
Passeriformes	Golden-crowned kinglet	*Regulus satrapa*
Passeriformes	Golden-winged warbler	*Vermivora chrysoptera*
Passeriformes	Grasshopper sparrow	*Ammodramus savannarum*
Passeriformes	Gray catbird	*Dumetella carolinensis*
Passeriformes	Gray-cheeked thrush	*Catharus minimus*
Passeriformes	Great crested flycatcher	*Myiarchus crinitus*
Passeriformes	Hermit thrush	*Catharus guttatus*
Passeriformes	Horned lark	*Eremophila alpestris*
Passeriformes	House finch	*Carpodacus mexicanus*
Passeriformes	House sparrow	*Passer domesticus*
Passeriformes	House wren	*Troglodytes aedon*
Passeriformes	Indigo bunting	*Passerina ciris*
Passeriformes	Lark sparrow	*Chondestes grammacus*
Passeriformes	Least flycatcher	*Empidonax minimus*
Passeriformes	Le Conte's sparrow	*Ammodramus leconteii*

CLASS AVES CONTINUED

Order	*Common Name*	*Scientific Name*
Passeriformes	Lincoln sparrow	*Melospiza lincolnii*
Passeriformes	Magnolia warbler	*Dendroica magnolia*
Passeriformes	Marsh wren	*Cistothorus palustris*
Passeriformes	Mountain bluebird	*Sialia currucoides*
Passeriformes	Nashville warbler	*Vermivora ruficapilla*
Passeriformes	Nelson's shart-tailed sparrow	*Ammodramus nelsoni*
Passeriformes	Northern cardinal	*Cardinalis cardinalis*
Passeriformes	Northern mockingbird	*Mimus polyglottos*
Passeriformes	Northern rough-winged swallow	*Stelgidopteryx serripennis*
Passeriformes	Northern shrike	*Lanius excubitor*
Passeriformes	Northern waterthrush	*Seiurus noveboracensis*
Passeriformes	Olive-sided flycatcher	*Contopus cooperi*
Passeriformes	Orange-crowned warbler	*Vermivora celata*
Passeriformes	Orchard oriole	*Icterus spurius*
Passeriformes	Ovenbird	*Seiurus aurocapillus*
Passeriformes	Palm warbler	*Dendroica palmarum*
Passeriformes	Philadelphia vireo	*Vireo philadelphicus*
Passeriformes	Pine siskin	*(Carduelis pinus*
Passeriformes	Purple finch	*Carpodacus purpureus*
Passeriformes	Purple martin	*Progne subis*
Passeriformes	Red-eyed vireo	*Vireo olivaceus*
Passeriformes	Red-winged blackbird	*Agelaius phoeniceus*
Passeriformes	Red-breasted nuthatch	*Sitta canadensis*
Passeriformes	Rose-breasted grosbeak	*Pheuticus ludovicianus*
Passeriformes	Ruby-crowned kinglet	*Regulus calendula*
Passeriformes	Rusty blackbird	*Euphagus carolinus*
Passeriformes	Savannah sparrow	*Passerculus sandwichensis*
Passeriformes	Scarlet tanager	*Piranga olivavea*
Passeriformes	Sedge wren	*Cistothorus platensis*
Passeriformes	Snow bunting	*Plectrophenax nivalis*
Passeriformes	Song sparrow	*Melospiza melodia*
Passeriformes	Sprague's pipit	*Anthus spragueii*
Passeriformes	Swainson's thrush	*Catharus ustulatus*
Passeriformes	Swamp sparrow	*Melospiza georgiana*
Passeriformes	Tennessee warbler	*Vermivora peregrina*
Passeriformes	Tree swallow	*Tachycineta bicolor*
Passeriformes	Veery	*Catharus fuscescens*
Passeriformes	Vesper sparrow	*Pooecetes gramineus*
Passeriformes	Warbling vireo	*Vireo gilvus*
Passeriformes	Western kingbird	*Tyrannus verticalis*
Passeriformes	Western meadowlark	*Sturnella neglecta*
Passeriformes	White-breasted nuthatch	*Sitta carolinensis*
Passeriformes	White-throated sparrow	*Zonotrichia laucophrys*
Passeriformes	White-winged crossbill	*Loxia leucoptera*
Passeriformes	Willow flycatcher	*Empidonax traillii*
Passeriformes	Wilson's warbler	*Wilsonia pusilla*

CLASS AVES CONTINUED

Order	*Common Name*	*Scientific Name*
Passeriformes	Yellow-headed blackbird	*Xanthocephalus xanthocephalus*
Passeriformes	Yellow-rumped warbler	*Dendroica coronata*
Passeriformes	Yellow-throated vireo	*Vireo flavifrons*
Passeriformes	Yellow warbler	*Dendroica petechia*

CLASS MAMMALIA

Order	*Common Name*	*Scientific Name*
Insectivora	Arctic shrew	*Sorex arcticus*
Insectivora	Masked shrew	*Sorex cinereus*
Insectivora	Northern short-tailed shrew	*Blarina brevicauda*
Insectivora	Pygmy shrew	*Sorex hoyi*
Chiroptera	Big brown bat	*Eptesicus fuscus*
Chiroptera	Hoary bat	*Lasiurus cinereus*
Chiroptera	Little brown bat	*Myotis lucifugus*
Chiroptera	Long-eared myotis	*Myotis evotis*
Chiroptera	Red bat	*Lasiurus borealis*
Chiroptera	Silver-haired bat	*Lasionycteris noctivagans*
Chiroptera	Western small-footed myotis	*Myotis ciliolabrum*
Carnivora	Badger	*Taxidea taxus*
Carnivora	Coyote	*Canis latrans*
Carnivora	Ermine	*Mustela erminea*
Carnivora	Fisher	*Martes pennanti*
Carnivora	Gray fox	*Urocyon cinereoargenteus*
Carnivora	Least weasel	*Mustela nivalis*
Carnivora	Long-tailed weasel	*Mustela frenata*
Carnivora	Marten	*Martes americana*
Carnivora	Mink	*Mustela vision*
Carnivora	Raccoon	*Procyon lotor*
Carnivora	Red fox	*Vulpes vulpes*
Carnivora	Striped skunk	*Mephitis mephitis*
Artiodactyla	American elk	*Cervus elaphus*
Artiodactyla	Bison	*Bison bison*
Artiodactyla	Pronghorn	*Antilocapra americana*
Artiodactyla	White-tailed deer	*Odocoileus virginianus*
Rodentia	Beaver	*Castor canadensis*
Rodentia	Deer mouse	*Peromyscus maniculatus*
Rodentia	Eastern chipmunk	*Tamias striatus*
Rodentia	Fox squirrel	*Sciurus niger*
Rodentia	Franklin's ground squirrel	*Mus musculus*
Rodentia	Gray squirrel	*Spermophilus franklinii*
Rodentia	House mouse	*Sciurus*
Rodentia	Meadow jumping mouse	*Zapus hudsonius*
Rodentia	Meadow vole	*Microtus pennsylvanicus*
Rodentia	Muskrat	*Ondatra zibethicus*
Rodentia	Northern grasshopper mouse	*Onychomys leuchogaster*
Rodentia	Northern pocket gopher	*Thomomys talpoides*

CLASS MAMMALIA CONTINUED

Order	*Common Name*	*Scientific Name*
Rodentia	Norway rat	*Rattus norvegicus*
Rodentia	Prairie dog	*Cynomys ludovicianus*
Rodentia	Prairie vole	*Microtus ochrogaster*
Rodentia	Richardson's ground squirrel	*Spermophilus richardsonii*
Rodentia	Southern red-backed vole	*Clethrionomys gapperi*
Rodentia	Thirteen-lined ground squirrel	*Spermophilus tridecemlineatus*
Rodentia	Western harvest mouse	*Reithrodontomys megalotis*
Rodentia	White-footed mouse	*Peromyscus leucopus*
Rodentia	Woodchuck	*Marmota monax*
Lagomorpha	Eastern cottontail	*Sylvilagus floridanus*
Lagomorpha	Nuttall's cottontail	*Sylvilagus nuttallii*
Lagomorpha	Snowshoe hare	*Lepus americanus*
Lagomorpha	White-tailed jackrabbit	*Lepus townsendii*

CLASS OSTEICHTHYES

Order	*Common Name*	*Scientific Name*
Salmoniformes	Northern pike	*Esox lucius*
Cypriniformes	Common carp	*Cyprinus carpio*
Cypriniformes	Fathead minnow	*Pimephales promelas*
Cypriniformes	White sucker	*Catostomus commersoni*
Siluriformes	Black bullhead	*Ameiurus melas*
Perciformes	Yellow perch	*Perca flavescens*
Perciformes	Walleye	*Stizostedion vitreum*

CLASS INSECTA

Order	*Common Name*	*Scientific Name*
Lepidoptera	Aphrodite fritillary	*Speyeria aphrodite*
Lepidoptera	Banded hairstreak	*Satyrium calanus*
Lepidoptera	Black swallowtail	*Papilio polyxenes*
Lepidoptera	Callippe fritillary	*Speyeria callippe*
Lepidoptera	Canadian tiger swallowtail	*Pterourus canadensis*
Lepidoptera	Checkered skipper	*Pyrgus communis*
Lepidoptera	Checkered white	*Pontia protodice*
Lepidoptera	Clouded sulphur	*Colias philodice*
Lepidoptera	Common branded skipper	*Hesperia comma*
Lepidoptera	Common sooty wing	*Pholisora catullus*
Lepidoptera	Common wood nymph	*Cercyonis pegala*
Lepidoptera	Compton tortoise shell	*Nymphalis vaualbum*
Lepidoptera	Coral hairstreak	*Harkenclenus titus*
Lepidoptera	Delaware skipper	*Anatryone logan*
Lepidoptera	Dreamy dusky wing	*Erynnis icelus*
Lepidoptera	Dun skipper	*Euphyes vestris*
Lepidoptera	Dusted skipper	*Atrytonopsis hianna*
Lepidoptera	Eastern tiger swallowtail	*Pterourus glaucus*

CLASS INSECTA CONTINUED

Order	*Common Name*	*Scientific Name*
Lepidoptera	Edwards' hairstreak	*Satyrium edwardsii*
Lepidoptera	European cabbage butterfly	*Artogeia rapae*
Lepidoptera	Eyed Brown	*Satyrodes eurydice*
Lepidoptera	Garita skipperling	*Oarisma garita*
Lepidoptera	Gorgone Checkerspot	*Charidryas gorgone*
Lepidoptera	Gray comma	*Polygonia proge*
Lepidoptera	Great spangled fritillary	*Speyeria cybele*
Lepidoptera	Hackberry butterfly	*Asterocampa celtis*
Lepidoptera	Harris' checkerspot	*Charidryas harrisii*
Lepidoptera	Hobomok Skipper	*Poanes hobomok*
Lepidoptera	Hop merchant	*Polygonia comma*
Lepidoptera	Inornate ringlet	*Coenonympha inornata*
Lepidoptera	Juvenal's dusky wing	*Erynnis juvenalis*
Lepidoptera	Least skipper	*Ancyloxypha numitor*
Lepidoptera	Little wood satyr	*Megisto cymela*
Lepidoptera	Long dash	*Polites mystic*
Lepidoptera	Meadow fritillary	*Clossiana bellona*
Lepidoptera	Melissa blue	*Lycaeides melissa*
Lepidoptera	Milbert's tortoise shell	*Aglais milberti*
Lepidoptera	Monarch	*Danaus plexippus*
Lepidoptera	Mourning cloak	*Nymphalis antiopa*
Lepidoptera	Mustard white	*Artogeia napi oleracea*
Lepidoptera	Northern cloudy wing	*Thorybes pylades*
Lepidoptera	Northern pearl crescent	*Phyciodes tharos*
Lepidoptera	Northern pearly eye	*Enodia anthedon*
Lepidoptera	Orange sulphur	*Colias eurytheme*
Lepidoptera	Ottoe skipper	*Hesperia ottoe*
Lepidoptera	Painted lady	*Vanessa cardui*
Lepidoptera	Pawnee skipper	*Hesperia pawnee*
Lepidoptera	Pearl crescent	*Phyciodes tharos*
Lepidoptera	Peck's skipper	*Polites peckius*
Lepidoptera	Red admiral	*Vanessa atalanta*
Lepidoptera	Regal fritillary	*Speyeria idalia*
Lepidoptera	Roadside skipper	*Amblyscirtes vialis*
Lepidoptera	Saepiolus blue	*Plebejus saepiolus*
Lepidoptera	Silver-bordered fritillary	*Clossiana selene*
Lepidoptera	Silver-spotted skipper	*Epargyreus clarus*
Lepidoptera	Silvery blue	*Glaucopsyche lygdamus*
Lepidoptera	Silvery checkerspot	*Charidryas nycteis*
Lepidoptera	Sleepy dusky wing	*Erynnis brizo*
Lepidoptera	Spring azure	*Celastrina argiolus*
Lepidoptera	Striped hairstreak	*Satyrium liparops*
Lepidoptera	Tawny crescent	*Phyciodes batesii*
Lepidoptera	Tawny-edged skipper	*Polites themistocles*
Lepidoptera	Uhler's arctic	*Oeneis uhleri*
Lepidoptera	Variegated fritillary	*Euptoieta claudia*

CLASS INSECTA CONTINUED

Order	*Common Name*	*Scientific Name*
Lepidoptera	Viceroy	*Basilarchia archippus*
Lepidoptera	Western tailed blue	*Everes amyntula*
Lepidoptera	White admiral	*Basilarchia arthemis arthemis*

PLANTS

Plants are listed in alphabetical order by common name, and introduced species are noted with an "I."

Common Name	*Scientific Name*
Absinth wormwood	*Artemisia absinthium*–I
Alum root	*Heuchera richardsoniii)*
Alfalfa	*Medicago sativa*–I
Alumroot	*Heuchera richardsonii*
American basswood	*Tilia americana*
American elm	*Ulmus americana*
American plum	*Prunus Americana*
Aspen	*Populus spp.*
Awned wheatgrass	*Agropyron subsecundum*
Beaked hazel	*Corylus cornuta*
Beggarticks	*Bidens spp.*
Big bluestem	*Andropogon gerardii*
Black-eyed susan	*Rudbeckia hirta*
Blanket flower	*Gaillardia aristata*
Blue-eyed grass	*Sisyrichium campestre*
Blue flax	*Linum perenne*
Blue grama	*Bouteloua gracilis*
Boxelder	*Acer negundo*
Breadroot	*Psoralea esculenta*
Buffaloberry	*Shepherdia argentea*
Bulrush	*Schoenoplectus spp.*
Bushy vetchling	*Lathyrus venosus*
Bur oak	*Quercus macrocarpa*
Burreed	*Sparganium spp.*
Canada anemone	*Anemone canadensis*
Canada goldenrod	*Solidago canadensis*
Canada thistle	*Cirsium arvense*–I
Caragana	*Caragana arborescens*
Cattail	*Typha spp.*
Chokecherry	*Prunus virginiana*
Cleavers	*Galium aparine*
Common bladderwort	*Utricularia vulgaris*
Common dandelion	*Taraxacum officinale*–I
Common milkweed	*Asclepias syriaca*
Common reed	*Phragmites australis*
Common yarrow	*Achillea millefolium*

PLANTS CONTINUED

Plants are listed in alphabetical order by common name, and introduced species are noted with an "I."

Common Name	*Scientific Name*
Coontail	*Ceratophyllum demersum*
Coralroot	*Corallorhiza spp.*
Cottonwood	*Populus deltoids*
Cow parsnip	*Heracleum sphondylium*
Crested wheatgrass	*Agropyron cristatum*
Daisy fleabane	*Erigeron philadelphicus*
Dogbane	*Apocynum cannabinum*
Dotted blazing star	*Liatris punctata*
Downy paintbrush	*Castilleja sessiliflora*
Duckweed	*Lemna spp.*
Fall rosette grass	*Dichanthelium wilcoxianum*
False dandylion	*Agoseris glauca*
False gromwell	*Onosmodium molle*
Floodman's thistle	*Cirsium flodmanii*
Foxtail barley	*Hordeum jubatun*
Fringed puccoon	*Lithspermum incisum*
Goat's beard	*Tragopogon dubius*
Goldan Alexander	*Zizia aurea*
Golden aster	*Chrysopsis villosa*
Goldenrod	*Solidago spp.*
Green ash	*Fraxinus pennsylvanica*
Green foxtail	*Setaria veridis*–I
Green milkweed	*Asclepias viridiflora*
Green needlegrass	*Nasella viridula*
Groundplum milkvetch	*Astragalus crassicarpus*
Harebell	*Campanula rotundifolia*
Hawksbeard	*Crepis runcinata*
Heath aster	*Aster ericoides*
Hedge nettle	*Stachys palustris*
Hoary puccoon	*Lithospermum canescens*
Hooker's oat grass	*Helictotrichon hookeri*
Intermediate wheatgrass	*Agropyron intermedium*–I
Juneberry	*Amelanchier alnifolia*
Kentucky bluegrass	*Poa pratensis*–I
Lamb's quarters	*Chenopodium album*–I
Large beardtongue	*Penstemon grandiflorus*
Lead plant	*Amorpha canescens*
Leafy spurge	*Euphorbia esula*–I
Lichens	*Lycopodium spp.*
Little bluestem	*Schizachyrium scoparium*
Marsh marigold	*Caltha palustris*
Marsh muhly	*Muhlenbergia racemosa*
Maximilian sunflower	*Helianthus maximiliani*

PLANTS CONTINUED

Plants are listed in alphabetical order by common name, and introduced species are noted with an "I."

Common Name	*Scientific Name*
Meadow rue	*Thalictrum spp.*
Meadow-sweet	*Spirea alba*
Mustard	*spp.*–I
Needlegrass	*Hesperostipa curtiseta*
Northern bedstraw	*Galium boreale*
Northern hawthorn	*Crataegus rotundifolia*
Pasque flower	*Anemone patens*
Pin cushion cactus	*Coryphantha vivipara*
Pineapple weed	*Matricaria matricarioides*–I
Plains muhly	*Muhlenbergia cuspidata*
Pliant milkvetch	*Astragalus flexuosus*
Poison ivy	*Toxicodendron redicans*
Pondweeds	*Potamogeton spp.*
Porcupine grass	*Hesperostipa spartea*
Prairie cordgrass	*Spartina pectinata*
Prairie coneflower	*Ratibida columnifera*
Prairie goldenrod	*Solidago missouriensis*
Prairie junegrass	*Koeleria macrantha*
Prairie sagewort	*Artemisia frigida*
Prairie sandreed	*Calamovilfa longifolia*
Prairie smoke	*Geum triflorum*
Prairie wild rose	*Rosa arkansana*
Purple coneflower	*Echinacea angustifolia*
Purple prairie clover	*Dalea purpurea*
Redoiser dogwood	*Cornus stolonifera*
Red raspberry	*Rubus idaeus*
River-bank grape	*Vitis riparia*
Rushes	*Juncus spp.*
Scarlet gaura	*Gaura coccinea*
Sedges	*Carex spp.*
Showy lady's slipper	*Cypripredium reginae*
Sideoats grama	*Bouteloua curtipendula*
Silky wormwood	*Artemisia dracunculus*
Silverberry	*Elaeagnus commutate*
Silverleaf scurfpea	*Psoralea argophylla*
Slender penstemon	*Penstemon gracilis*
Sloughgrass	*Beckmannia syzigachne*
Smartweed	*Polygonum spp.*
Smooth brome	*Bromus inermis*–I
Smooth sumac	*Rhus glabra*
Softstem bulrush	*Schoenoplectus validus*
Sow thistle	*Sonchus arvensis*–I
Stiff goldenrod	*Solidago rigida*

PLANTS CONTINUED

Plants are listed in alphabetical order by common name, and introduced species are noted with an "I."

Common Name	*Scientific Name*
Stiff sunflower	*Helianthus rigidus*
Stinging nettle	*Urtica dioica*
Sun sedge	*Carex heliophyila*
Swamp vervain	*Verbena hastata*
Sweet clover	*Melilotus spp.*
Switchgrass	*Panicum virgatum*
Tall cinquefoil	*Potentilla arguta*
Thimbleweed	*Anemone cylindrica*
Three-square bulrush	*Schoenoplectus americanus*
Toothed evening primrose	*Calylophus serrulatus*
Virginia creeper	*Parthenocissus quinquefolia*
Western ragweed	*Ambrosia psilostachya*
Western snowberry	*Symphoricarpos occidentalis*
Western wild rose; Woods' rose	*Rosa woodsii*
Western wheatgrass	*Agropyron smithii*
White birch	*Betula spp.*
White sage	*Artemisia ludoviciana*
Wild bergamot	*Mondara fistulosa*
Wild licorice	*Glycyrrhiza lepidota*
Wild onion	*Allium stellatum*
Wild sarsaparilla	*Aralia nudicaulis*
Wood anemone	*Anemone quinquefolia*
Wood lily	*Lilium philadelphicum*
Yellow coneflower	*Ratibida columnifera*

Appendix E

Fire Management Program

The Service has administrative responsibility including fire management for Sullys Hill National Game Preserve, which covers approximately 1,675 acres.

THE ROLE OF FIRE

In ecosystems of the Great Plains, vegetation has evolved under periodic disturbance and defoliation from grazing, fire, drought, and floods. This periodic disturbance is what kept the ecosystem diverse and healthy while maintaining significant biodiversity for thousands of years.

Historically, natural fire and Native American ignitions have played an important disturbance role in many ecosystems by removing fuel accumulations, decreasing the impacts of insects and diseases, stimulating regeneration, cycling nutrients, and providing a diversity of habitats for plants and wildlife.

When fire and/or grazing are excluded from prairie landscapes, fuel loadings increase due to a build-up of thatch and invasion of woody vegetation. This increase in fuel loadings leads to an increase in a fire's resistance to control which threatens firefighter and public safety as well as federal and private facilities.

However, fire when properly utilized, can:

- reduce hazardous fuels build-up in both wildland urban interface (WUI) and non-WUI areas;
- improve wildlife habitats by reducing density of vegetation and/or changing plant species composition;
- sustain and/or increase biological diversity;
- improve woodlands and shrublands by reducing plant density;
- reduce susceptibility of plants to insect and disease outbreaks;
- improve quality and quantity of livestock forage; and
- improve the quantity of water available for municipalities and activities dependent on wildlands for their water supply.

WILDLAND FIRE MANAGEMENT POLICY AND GUIDANCE

In 2001, an update of the 1995 "Federal Fire Policy" was completed and approved by the Secretaries of Interior and Agriculture.The 2001 "Federal Wildland Fire Management Policy" directs federal agencies to achieve a balance between fire suppression to protect life, property, and resources and fire use to regulate fuels and maintain healthy ecosystems. In addition, it directs agencies to use the appropriate management response for all wildland fire regardless of the ignition source. This policy provides eight guiding principles that are fundamental to the success of the fire management program:

1. Firefighter and public safety is the first priority in every fire management activity.
2. The role of wildland fires as an ecological process and natural change agent will be incorporated into the planning process.
3. Fire management plans (FMPs), programs, and activities support land and resource management plans and their implementation.
4. Sound risk management is a foundation for all fire management activities.
5. Fire management programs and activities are economically viable, based on the values to be protected, costs, and land and resource management objectives.
6. FMPs and activities are based on the best available science.
7. FMPs and activities incorporate public health and environmental quality considerations.
8. Federal, state, tribal, local, interagency, and international coordination and cooperation are essential.

The standardization of policies and procedures among federal agencies is an ongoing objective.

The fire management considerations, guidance, and direction should be addressed in the land

use resource plans (for example, the CCP). FMPs are step-down processes from the land use plans and habitat plans, with more detail on fire suppression, fire use, and fire management activities.

MANAGEMENT DIRECTION

The Devils Lake WMD Complex office and the Eastern North Dakota Fire District will protect life, property, and other resources from wildland fire by safely suppressing all wildfires. Prescribed fire, as well as manual and mechanical fuel treatments, will be used in an ecosystem context to protect both federal and private property and for habitat management purposes. Fuel reduction activities will be applied in collaboration with federal, state, private, and NGO partners. In addition, fuel treatments will be prioritized based on the guidance for prioritization established in the goals and strategies outlined in the "U.S. Fish & Wildlife Service National Wildlife Refuge System Wildland Fire Management Program Strategic Plan 2003–2010" and "Region 6 Refuges Regional Priorities FY07–11." For WUI treatments, areas with community wildfire protection plans (CWPPs) and communities at risk (CARs) will be the primary focus. The following CARs are located near the refuges and were identified in the Federal Register (8/17/2001): Ft. Totten, North Dakota; St. Michael, North Dakota; Tokio, North Dakota; and Crow Hill, North Dakota.

The development of CWPPs is an ongoing process. As of October 9, 2007, the four communities listed above have developed CWPPs or CWPP-equivalent documents required by the Bureau of Indian Affairs.

All aspects of the fire management program will be conducted in a manner consistent with applicable laws, policies, and regulations. Sullys Hill National Game Preserve will be included in the "Eastern North Dakota Fire District Fire Management Plan" to accomplish the fire management goals described below. Prescribed fire and manual and mechanical fuel treatments will be applied in a scientific way under selected weather and environmental conditions.

FIRE MANAGEMENT GOALS

The goals and strategies of the "U.S. Fish & Wildlife Service National Wildlife Refuge System Wildland Fire Management Program Strategic Plan" are consistent with Department and Service policies, National Fire Plan direction, the President's Healthy Forest Initiative, the 10-Year Comprehensive Strategy and Implementation Plan, National Wildfire Coordinating Group guidelines, initiatives of the Wildland Fire Leadership Council, and Interagency Standards for Fire and Aviation Operations.

The "Region 6 Refuges Regional Priorities FY07–11" are consistent with the refuges vision statement for region 6, "to maintain and improve the biological integrity of the region, ensure the ecological condition of the region's public and private lands are better understood, and endorse sustainable use of habitats that support native wildlife and people's livelihoods." The fire management goals for Sullys Hill National Game Preserve are to use prescribed fire and manual and mechanical treatments to (1) reduce the threat to life and property through hazardous fuels reduction treatments; and (2) meet the habitat goals and objectives identified in this CCP.

FIRE MANAGEMENT OBJECTIVE

The objective of the fire management program is to use prescribed fire and manual and mechanical treatment methods to treat between 100 and 500 acres over a 5-year average.

STRATEGIES

Strategies and tactics that consider public and firefighter safety, as well as resource values at risk, will be used. Wildland fire suppression, prescribed fire methods, manual and mechanical means, timing, and monitoring are described in more detail within the step-down FMPs.

All management actions would use prescribed fire, manual or mechanical means to reduce hazardous fuels, restore and maintain desired habitat conditions, control nonnative vegetation, and control the spread of woody vegetation within the diverse ecosystem habitats. The fuels treatment program will be site specific and follow the most recent interagency burn plan template.

Prescribed fire temporarily reduces air quality by reducing visibility and releasing components through combustion. The refuges will meet the Clean Air Act emission standards by adhering to the "North Dakota State Implementation Plan" requirements during all prescribed fire activities.

FIRE MANAGEMENT ORGANIZATION, CONTACTS, AND COOPERATION

Qualified fire management technical oversight for the refuges will be established by region 6 of the Service, using the fire management district approach. Under this approach, fire management staff will be determined by established modeling

systems based on the fire management workload of a group of refuges, and possibly that of interagency partners. The fire management workload consists of historical wildland fire suppression activities as well as historical and planned fuels treatments.

Depending on budgets, fire management staffing and support equipment may be located at the administrative station or at other refuges within the district and shared between all units. Fire management activities will be conducted in a coordinated and collaborative manner with federal and nonfederal partners.

On approval of this CCP, new FMPs will be developed for the Eastern North Dakota Fire District. The FMPs may be prepared as a (1) FMP that covers each individual refuge and wetland management district; (2) FMP that covers the area identified within this CCP; (3) FMP that covers the Fire Management District;

Appendix F

Draft Compatibility Determination for Environmental Education and Interpretation

Use: Interpretation and environmental education

Refuge Name: Sullys Hill National Game Preserve

County: Benson County, North Dakota

Establishing and Acquisition Authorities: Migratory Bird Conservation Act, Executive Order 7168

Refuge Purposes:

- "All the lands that are now reserved or may hereafter be included within the boundaries of the … Sullys Hill National Park Game Preserve … are hereby further reserved and set apart for the use … as refuges and breeding grounds for birds." (Executive Order 3596, December 21, 1921)

- "As a big game preserve, refuge, and breeding grounds for wild animals and birds … provided, that the said game preserve is to be made available to the public for recreational purposes in so far as consistent with the use of this area as a game preserve … provided further, that hunting shall not be permitted on said game preserve." (46 Stat. 1509, act of March 3, 1931)

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

What are the uses? Are the uses wildlife-dependent public uses?

The uses would be continuation of interpretative and environmental education programs at current and increased levels. The refuge would be used as an outdoor classroom and tour site for visiting school and nonprofit groups. Interpretation and environmental education are two of the six wildlife-dependent public uses specified in the Improvement Act.

Where would the uses be conducted?

Environmental education and interpretation would take place over the entire refuge. However, most activities would be on the auto tour route, and the refuge education and visitor center and its facilities will be used in presenting programs. In addition, the refuge's hiking, snowshoeing, and ski trails will be incorporated into the overall program.

When would the uses be conducted?

These activities would primarily be held during the daytime, most frequently while school is in session (September–May). Less frequently, nonprofit groups and other groups would be hosted throughout the year.

How would the uses be conducted?

Refuge staff and volunteers would provide the instruction and host classroom tours in most cases. Someone other than refuge personnel may lead activities.

Why are these uses being proposed?

Interpretation and environmental education are two of the six wildlife-dependent, priority public uses specified in the Improvement Act. These uses can be allowed at the refuge without interfering with the migratory bird and big game resources.

Availability of Resources

Resources involved in the administration and management of the uses: This use requires 50% of a full time GS-9 park ranger, 25% of a seasonal biological technician (6 months), and 50% of a YCC crew (3–4 members) for 3 months. Two district maintenance staff spend approximately 5% each of their time associated with this use. Private cleaning contractor.

Special equipment, facilities, or improvements necessary to support the uses: None.

Annual maintenance costs: Cleaning contract $1,617; YCC $4,435; biological technician $2,395; two maintenance staff $6,322; ranger $40,826.

Materials: $5,000.

Total: $60,595.

Monitoring costs: Minimal; visitor use data collection.

Offsetting revenues: Volunteer program, grants, recreational fee collection.

Anticipated Impacts of the Uses

Short-term impacts: There may be temporary disturbance to wildlife near the activities.

Long-term impacts: These activities would increase local support of the refuge and increase knowledge of stewardship of natural resources to students young and old.

Cumulative impacts: There would be no direct nor indirect cumulative impacts anticipated with the continuation of these uses.

Public Review and Comment

This compatibility determination was prepared concurrently with the draft CCP and EA for the refuge. Public review and comment will be achieved concurrently with the public review and comment period for the draft CCP and EA.

Determination

Interpretation and environmental education are compatible uses at Sullys Hill National Game Preserve.

Stipulations Necessary to Ensure Compatibility

Anticipated impacts are assumed to be light; however, stipulations would still be necessary to ensure that wildlife resources are adequately protected. Disturbance is almost an unavoidable impact of the interpretive and environmental education programs. However, it is through these activities that visitors would receive an understanding of proper etiquette while visiting the refuge and the impact people have on habitat and wildlife. This information and refuge-specific regulations would be available through visitor contacts, brochures, and kiosks. Periodic law enforcement would ensure compliance with regulations and area closures.

Justification

Interpretation and environmental education are legislated, wildlife-dependent priority public uses. Other than minor disturbance, these uses would have no impact on resources. These uses would contribute to the mission of the Refuge System by increasing knowledge and support of the stewardship of natural resources.

The refuge contains unique habitats and supports wildlife populations—particularly migratory birds, upland game birds, and big game animals—in excess of what can be observed on neighboring private lands. These uses promote an appreciation for natural resources and support for conservation programs at the refuge.

Signature

Roger Hollevoet — Date
Project Leader
Sullys Hill National Game Preserve
USFWS, Region 6

Review

Lloyd Jones — Date
Regional Compatibility Coordinator
USFWS, Region 6

Review

Paul Cornes Date
Refuge Supervisor (ND, SD, NE)
USFWS, Region 6

Concurrence

Richard A. Coleman, PhD Date
Assistant Regional Director
National Wildlife Refuge System
USFWS, Region 6

Mandatory 10- or 15-Year Reevaluation Date: 2023

Appendix G

Draft Compatibility Determination for Fishing

Use: Fishing

Refuge Name: Sullys Hill National Game Preserve

County: Benson, North Dakota

Establishing and Acquisition Authorities: Migratory Bird Conservation Act, Executive Order 7168

Refuge Purposes:

- "All the lands that are now reserved or may hereafter be included within the boundaries of the … Sullys Hill National Park Game Preserve … are hereby further reserved and set apart for the use … as refuges and breeding grounds for birds." (Executive Order 3596, December 21, 1921)

- "As a big game preserve, refuge, and breeding grounds for wild animals and birds … provided, that the said game preserve is to be made available to the public for recreational purposes in so far as consistent with the use of this area as a game preserve … provided further, that hunting shall not be permitted on said game preserve." (46 Stat. 1509, act of March 3, 1931)

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?

Fishing is one of the six wildlife-dependent public uses specified in the Improvement Act.

Where would the use be conducted?

The use would be restricted to Sweet Water Lake and those areas of Fort Totten Bay (Devils Lake) accessible by refuge lands.

When would the use be conducted?

Fishing would be permitted only during special events for environmental education purposes.

How would the use be conducted?

All of the access to fishing opportunities would be walk-in only.

Why is this use being proposed?

Fishing is one of the six wildlife-dependent, priority public uses specified in the Improvement Act. It can be allowed at the refuge without interfering with the migratory bird and big game resources. It also provides an opportunity to educate youth on the benefits of and how to enjoy natural resources in an environmentally-conscience manner.

Availability of Resources

Resources involved in the administration and management of the use: Minimal. Fishing will be part of the environmental education program on Sullys Hill National Game Preserve and will be administered by the refuge staff.

Special equipment, facilities, or improvements necessary to support the use: Minimal.

Maintenance costs: Minimal.

Monitoring costs: None.

Offsetting revenues: None.

Anticipated Impacts of the Use

Short-term impacts: There would be temporary disturbance to wildlife near the activity.

Long-term impacts: None.

Cumulative impacts: There would be no direct or indirect cumulative impacts anticipated with this use.

Public Review and Comment

This compatibility determination was prepared concurrently with the draft CCP and EA for the refuge. Public review and comment will be achieved concurrently with the public review and comment period for the draft CCP and EA.

Determination

Fishing is a compatible use at Sullys Hill National Game Preserve.

Stipulations Necessary to Ensure Compatibility

Fishing would be offered only on a special youth event basis. Fishing will be allowed primarily for environmental education purposes to complement the existing outdoor education program. Fishing techniques and regulations would comply with NDGF regulations and must be observed while fishing at the refuge. Refuge will determine days or seasons when fishing is open.

Justification

Fishing is a legislated, wildlife-dependent, priority public use. No long-term or significant adverse impacts on wildlife resource are expected from the primary or supporting uses.

Signature

Roger Hollevoet Date
Project Leader
Sullys Hill National Game Preserve
USFWS, Region 6

Review

Lloyd Jones Date
Regional Compatibility Coordinator
USFWS, Region 6

Review

Paul Cornes Date
Refuge Supervisor (ND, SD, NE, KS)
USFWS, Region 6

Concurrence

Richard A. Coleman, PhD Date
Assistant Regional Director
National Wildlife Refuge System
USFWS, Region 6

Mandatory 10- or 15-Year Reevaluation Date: 2023

Appendix H

Draft Compatibility Determination for Wildlife Observation and Wildlife Photography

Uses: Wildlife observation and photography

Refuge Name: Sullys Hill National Game Preserve

County: Benson County, North Dakota

Establishing and Acquisition Authorities: Migratory Bird Conservation Act, Executive Order 7168

Refuge Purposes:

- "All the lands that are now reserved or may hereafter be included within the boundaries of the … Sullys Hill National Park Game Preserve … are hereby further reserved and set apart for the use … as refuges and breeding grounds for birds." (Executive Order 3596, December 21, 1921)

- "As a big game preserve, refuge, and breeding grounds for wild animals and birds … provided, that the said game preserve is to be made available to the public for recreational purposes in so far as consistent with the use of this area as a game preserve … provided further, that hunting shall not be permitted on said game preserve." (46 Stat. 1509, act of March 3, 1931)

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

What are the uses? Are the uses wildlife-dependent public uses?

The uses would be continuation of existing public use programs and activities of and related to wildlife observation and photography. Wildlife observation and photography would be the primary uses. Vehicle access, walk-in-access (including the hiking trail), snowshoeing, and cross country skiing would be supporting uses.

Wildlife observation and photography are two of the six wildlife-dependent public uses specified in the Improvement Act.

Where would the uses be conducted?

The uses would occur over the entire refuge, with the exception of the area closed to the public surrounding the residences and shop. Vehicle access would be restricted to the auto tour route. Walk-in access would be restricted to existing refuge trails and not allowed in areas closed to foot traffic (big game enclosure area and other limited access area).

When would the uses be conducted?

Wildlife observation and photography would be allowed year-round. However, access into the refuge would be limited during inclement weather and from sunrise thru sunset conditional on the refuge being open.

The refuge manager would open and close the auto tour route as road conditions allow.

How would the uses be conducted?

The refuge would be open for wildlife observation and photography. Their supporting use (access) would be controlled and regulated through brochures, the education and visitor center desk, and through information posted at the kiosks. The auto tour route and the hiking trail would be maintained by refuge staff.

Why are these uses being proposed?

Wildlife observation and photography are two of the six wildlife-dependent, priority public uses specified in the Improvement Act. These uses and their supporting access-related uses can be allowed at the refuge without interfering with the migratory bird and big game resources. They also provides an opportunity to educate visitors on the benefits of National Wildlife Refuges.

Availability of Resources

Resources involved in the administration and management of the uses: This use would require 10% of a full-time GS-9 park ranger, 20% of a seasonal biological technician, and 50% of a YCC crew (3–4 members) for 3 months. Two district maintenance staff would spend approximately 2% of the their time associated with this use.

Special equipment, facilities, or improvements necessary to support the uses: This use requires the maintenance of the auto tour, trail system, four viewing platforms, two restrooms, eight waste barrels, and directional signage.

Maintenance costs: YCC $4,435; biological technician $1,915; two maintenance staff $2,529; ranger $8,165.

Materials $500.

Total: $17,544.

Monitoring costs: Minimal, traffic counter data collection random law enforcement patrols.

Offsetting revenues: Recreational fee collection.

Anticipated Impacts of the Uses

Short-term impacts: There may be temporary disturbance to wildlife near the activity. Direct short-term impacts may include minor damage from traffic to refuge roads and trails when wet and muddy.

Long-term impacts: None.

Cumulative impacts: There would be no direct nor indirect cumulative impacts anticipated with these uses.

Public Review and Comment

This compatibility determination was prepared concurrently with the draft CCP and EA for the refuge. 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 photography, along with their supporting uses and stipulations are compatible uses at Sullys Hill National Game Preserve.

Stipulations Necessary to Ensure Compatibility

Stipulations regarding the public use program would be made available in published refuge brochures. Dates, closed areas, and other information would be specified.

Justification

Wildlife observation and photography are legislated, wildlife-dependent public uses. No long-term or significant adverse impacts on wildlife resource are expected from the primary or supporting uses.

The refuge contains unique habitats and supports wildlife populations—particularly migratory birds, waterfowl, upland game birds, and big game animals—in excess of what can be observed on neighboring private lands. These uses promote an appreciation for the natural resources at the refuge. In addition, these uses support conservation programs at the refuge.

Signature

Roger Hollevoet Date
Project Leader
Sullys Hill National Game Preserve
USFWS, Region 6

Review

Lloyd Jones Date
Regional Compatibility Coordinator
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Paul Cornes
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Mandatory 10- or 15-Year Reevaluation Date: 2023

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