

Draft Comprehensive Conservation Plan and Environmental Assessment

Medicine Lake National Wildlife Refuge Complex

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Prepared by the U.S. Fish and Wildlife Service

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Abbreviations

Administration Act	National Wildlife Refuge System Administration Act of 1966
ABC	American Bird Conservancy
BBS	breeding bird survey
BCR	Bird Conservation Regions
CCC	Civilian Conservation Corps
CCP	comprehensive conservation plan
CFR	Code of Federal Regulations
cfs	cubic feet per second
CRP	conservation reserve program
CWCS	comprehensive wildlife conservation strategy
DNC	dense nesting cover
DU	Ducks Unlimited
EA	environmental assessment
EO	executive order
EPA	U.S. Environmental Protection Agency
FHWA	Federal Highway Administration
FMP	fire management plan
FONSI	finding of no significant impact
FTE	full-time equivalent
GIS	geographic information system
GPS	global positioning system
GS	general schedule (employment)
HAPET	Habitat and Population Evaluation Team
HMP	habitat management plan
IMPROVE	interagency monitoring of protected visual environments
Improvement Act	National Wildlife Refuge System Improvement Act of 1997
LWCF	Land and Water Conservation Fund
LPP	land protection plan
main stem	main stem Missouri River ecosystem
MT	Montana
MFWP	Montana Fish, Wildlife, and Parks
MBCC	Migratory Bird Conservation Commission
MOYOCO Ecosystem	Upper Missouri/Yellowstone/Upper Columbia rivers ecosystem
NABCI	North American Bird Conservation Initiative
NAWCA	North American Wetlands Conservation Act

Abbreviations

NEPA	National Environmental Policy Act
NOI	notice of intent
NPPR	Northern Prairie and Parkland Region
NRCS	Natural Resources Conservation Service
NWI	national wetland inventory
NWR	national wildlife refuge
NWRS	National Wildlife Refuge System
PFW	Partners for Fish and Wildlife
PL	public law
PPJV	Prairie Pothole Joint Venture
PPR	prairie pothole region
Refuge System	National Wildlife Refuge System
region 6	“Mountain–Prairie Region” of the U.S. Fish and Wildlife Service
RONS	“Refuge Operating Needs System”
SAMMS	“Service Asset Maintenance Management System”
Service	U.S. Fish and Wildlife Service
SCCD	Sheridan County Conservation District
SUP	special use permit
SWG	“State Wildlife Grant”
TMDL	Total Maximum Daily Load
TNC	The Nature Conservancy
UGHEP	Upland gamebird habitat enhancement program
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WG	wage grade (employment)
WHIP	Wildlife habitat incentive program
WPA	Waterfowl Production Area
WMD	wetland management district
WUI	wildland–urban interface

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

Summary

Every spring and fall, the big sky country of northeast Montana is filled with the clamor of bird calls. Many migrating birds stop along the glaciated rolling plains between the Missouri River and the Canadian border, at the Medicine Lake National Wildlife Refuge (NWR), the Northeast Montana Wetland Management District (WMD), and the Lamesteer National Wildlife Refuge (NWR), which are managed together as one refuge complex. With a bird list that includes some 283 species, the refuge complex has been designated as one of the top 100 globally important bird areas in the United States by the American Bird Conservancy (Chipley 2001).

The primary role of the Medicine Lake NWR Complex is to conserve its diverse wetlands and grasslands as a “refuge and breeding ground for migratory birds and other wildlife.” This draft comprehensive conservation plan (CCP) and environmental assessment (EA) will guide management of these lands for the next 15 years.

The Refuge Complex

The refuge complex is part of the National Wildlife Refuge System (Refuge System) of the U.S. Fish and Wildlife Service (Service). It covers portions of Sheridan, Roosevelt, Daniels, and Wibaux counties in Montana. The 31,660-acre Medicine Lake NWR includes an 11,360-acre federal wilderness area. The Northeast Montana WMD includes 44 waterfowl production areas owned by the Service that protect 11,791 acres. Grassland and wetland easements protect another 19,556 acres. Lamesteer NWR is an 800-acre easement that is managed as a satellite refuge.

Historically, the bird community of northeast Montana was composed of prairie-nesting species, such as the chestnut-collared longspur, Baird’s sparrow, and Sprague’s pipit. The refuge complex protects critical habitat for the threatened piping plover. Its importance for breeding and migrating waterfowl has long been recognized and was the primary reason the refuge was established in 1935.

The density of breeding pairs of ducks is high in the Missouri Couteau, and the density and diversity of nesting waterfowl is outstanding. Common nesting ducks are mallard, gadwall, northern pintail, northern shoveler, blue-winged teal, and lesser scaup. Refuge wetlands provide habitat for many “colonial-nesting” waterbirds (or birds that nest in colonies), including western and eared grebe, California and ring-billed gulls, double-crested cormorant, great blue heron, and American white pelican. The refuge’s large pelican colony has been in

existence since at least 1939, and is one of the largest colonies in the United States, with about 3,000 to 5,000 nests each year.

Although nonnative pheasants draw the most hunters, nearly half of the refuge’s visitors (about 45 percent of an estimated 16,000 annual visitor days) come for a variety of hunting opportunities, including other upland birds like the plains sharp-tailed grouse, as well as deer and waterfowl. Many other visitors enjoy wildlife observation, fishing, and the education and interpretation programs the refuge offers.

Medicine Lake NWR provides for most of the visitor services and facilities. Interpretive exhibits at the headquarters office, an auto tour route, an observation tower, and a pelican observation area are just a few of the ways visitors can see and learn about the refuge.

Medicine Lake NWR Complex Visions and Goals

The vision for each refuge is based on the purposes for which it was established, the conditions of and potential for specific resources, its value as a natural system, and other issues. The goals direct refuge complex staff toward achieving the vision.



American white pelican.

Judy Wantulok/USFWS

Medicine Lake NWR Vision

Visitors to Medicine Lake NWR, on the western edge of the Missouri Coteau, experience wide-open grasslands, vast lakes and marshes, and one-of-a-kind sunsets. Diverse habitats for migratory birds and native wildlife are managed to simulate the natural processes that historically shaped the prairie landscape. The spring and fall migrations are awe-inspiring against the big Montana sky. The refuge team works collaboratively with partners and the community to conserve, protect, and restore the wildness of the rolling prairie and its natural solitude.

Northeast Montana WMD Vision

Waterfowl production areas and conservation easements within the Northeast Montana WMD, located in the glaciated Missouri Coteau, provide a network of wetlands and grasslands that preserve historic and vital waterfowl breeding grounds. Other migratory birds, threatened and endangered species, and resident wildlife also benefit from these prairie jewels of the Refuge System.

Our community and visitors value grasslands and marshes as a beneficial and important component of a diverse, healthy, and productive prairie landscape. Current and future generations enjoy wildlife-dependent uses of these lands, and partners actively support and encourage our habitat conservation programs.

Goals for the Refuge Complex

The Service developed a set of goals for the refuge based on the National Wildlife Refuge System Improvement Act, the refuge purpose, current conditions, and objectives for the refuge complex that were discussed during the CCP planning process. The goals direct work toward achieving the vision and purpose of the refuge, and outline approaches for managing refuge resources. The Service established eight goals for refuge management: Habitat and Wildlife Management; Endangered, Threatened, and Rare Species; Wilderness Management; Visitor Services; Refuge Operations; Partnerships; Cultural Resources; and Research. These goals are described fully in chapter 2.

The Draft Plan

The Service has prepared this EA and draft CCP with public participation and in cooperation with the Montana Fish, Wildlife, and Parks Department. After reviewing a wide range of public comments and management issues and concerns, the Service developed three alternatives for managing both the Medicine Lake NWR and the Northeast Montana

WMD, and two alternatives for managing the Lamesteer NWR. Alternative B is the proposed action for both sets of alternatives and is presented in chapter 6 as the draft comprehensive conservation plan.

Medicine Lake NWR and Northeast Montana WMD

Alternative A—Maintain Current Management (*No Action*)

Current management programs and efforts would continue. No significant increases in funding or personnel would take place. This alternative serves as the baseline to which other alternatives will be compared.

Alternative B—Increase Native Prairie Conservation and Restoration (*Proposed Action*)

Alternative B for Medicine Lake NWR and the Northeast Montana WMD would conserve natural resources by restoring or protecting native mixed-grass prairie and maintaining high-quality nesting habitats within the refuge complex. This alternative would focus funding for visitor services on developing access for visitors of all abilities and improving opportunities for wildlife-dependent uses (hunting, fishing, wildlife observation, photography, environmental education, and interpretation). It also would encourage a greater understanding and appreciation for migratory birds and other native wildlife, the mixed-grass prairie, the wilderness, and the Refuge System.

Alternative C—Maximize Native Prairie Conservation and Restoration

Alternative C would maximize staff resources for the conservation of natural resources by restoring or protecting native mixed-grass prairie and maintaining high-quality nesting habitats within the refuge complex. Visitor programs would be improved but would focus primarily on encouraging a greater understanding and appreciation for the mixed-grass prairie ecosystem while maintaining existing access and opportunities for wildlife-dependent uses (hunting, fishing, wildlife observation, photography, environmental education, and interpretation).

Lamesteer NWR

Alternative A—Current Management

Under this alternative, Lamesteer NWR would continue to be an easement refuge superimposed on privately owned lands and used primarily as a resting place for migratory birds while on migration. The Service would continue to maintain the dam and spillway, including underwriting all maintenance

costs. The landowner would continue to control access to the site, including all hunting access and other public uses.

Alternative B—Divestiture (*Proposed Action*)

Alternative B would take Lamesteer NWR out of the Refuge System and relinquish the easement to the current landowners. Under this alternative, the dam structure would be given up to the landowners or destroyed. The Service's easement requirements would no longer exist. The Service would divest its interest in the refuge. This would be carried out within the 15-year life of this comprehensive conservation plan.



The meadowlark is one of many grassland birds found at the refuge.
USFWS

1 Introduction

This document presents an environmental assessment (EA) that evaluates alternatives for, and expected consequences of, management of the Medicine Lake National Wildlife Refuge (NWR) Complex. Alternative B is the proposed action of the U.S. Fish and Wildlife Service (Service, USFWS), and is presented in chapter 6 as the draft comprehensive conservation plan (CCP) for the refuge complex. This chapter provides an introduction to the CCP process and describes the involvement of the Service, the State of Montana, the public, and others, as well as conservation issues and plans that affect the refuge complex.

The Service has developed this draft CCP to provide a foundation for the management and use of the Medicine Lake NWR Complex. The refuge complex consists of Medicine Lake NWR, a Wetland Management District (WMD), and Lamesteer National Wildlife Refuge, located in northeast Montana. The CCP is intended as a working guide for management programs and actions over the next 15 years (see figure 1).

The CCP was developed in compliance with the National Wildlife Refuge System Improvement Act of 1997 (Improvement Act) (16 USC 668dd et seq.) and Part 602 (National Wildlife Refuge System Planning) of the Fish and Wildlife Service Manual (USFWS 2000a). The actions described within this CCP also meet the requirements of the National Environmental Policy Act of 1969 (NEPA). Compliance with NEPA is being achieved by involving the public and including an integrated environmental assessment (EA).

When fully implemented, this CCP will strive to achieve the vision, goals, and purpose of each refuge. Fish and wildlife are the first priority in refuge management, and public use (wildlife-dependent recreation) is encouraged as long as it is compatible with a refuge's purpose.

The CCP has been prepared by a planning team composed of representatives from various Service programs and Montana Fish, Wildlife, and Parks (MFWP). In developing this plan, the planning team incorporated comments and suggestions from local residents and organizations. Public involvement and the planning process itself are described in this chapter in a section entitled "The Planning Process."

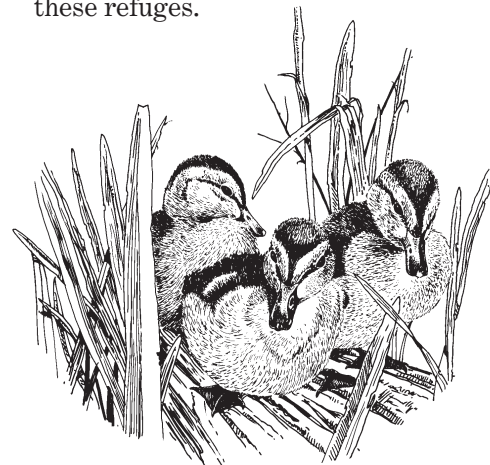
After reviewing a wide range of public comments and management needs, the planning team developed a proposed alternative. This alternative attempts to address all significant issues while

determining how best to achieve the intent and purpose of the refuge complex. The proposed alternative is the Service's recommended course of action for the future management of these refuges, and is embodied in this draft document.

1.1 PURPOSE AND NEED FOR PLAN

The purpose of this CCP is to identify the role the refuge complex, including Medicine Lake NWR, the Wetland Management District, and Lamesteer NWR, will play to support the mission of the National Wildlife Refuge System (Refuge System), and to provide long-term guidance for managing refuge programs and activities. The CCP is needed

- to provide a clear statement of direction for the future management of the refuge complex;
- to ensure that the Service's management actions are consistent with the mandates of the Improvement Act;
- to ensure that the management of the refuge complex is consistent with federal, state, and county plans;
- to provide a basis for the development of budget requests for the refuge complex's operation, maintenance, and capital improvement needs; and
- to provide neighbors, visitors, and government officials an understanding of the Service's management actions in and around these refuges.



A new brood in the wetlands.
USFWS

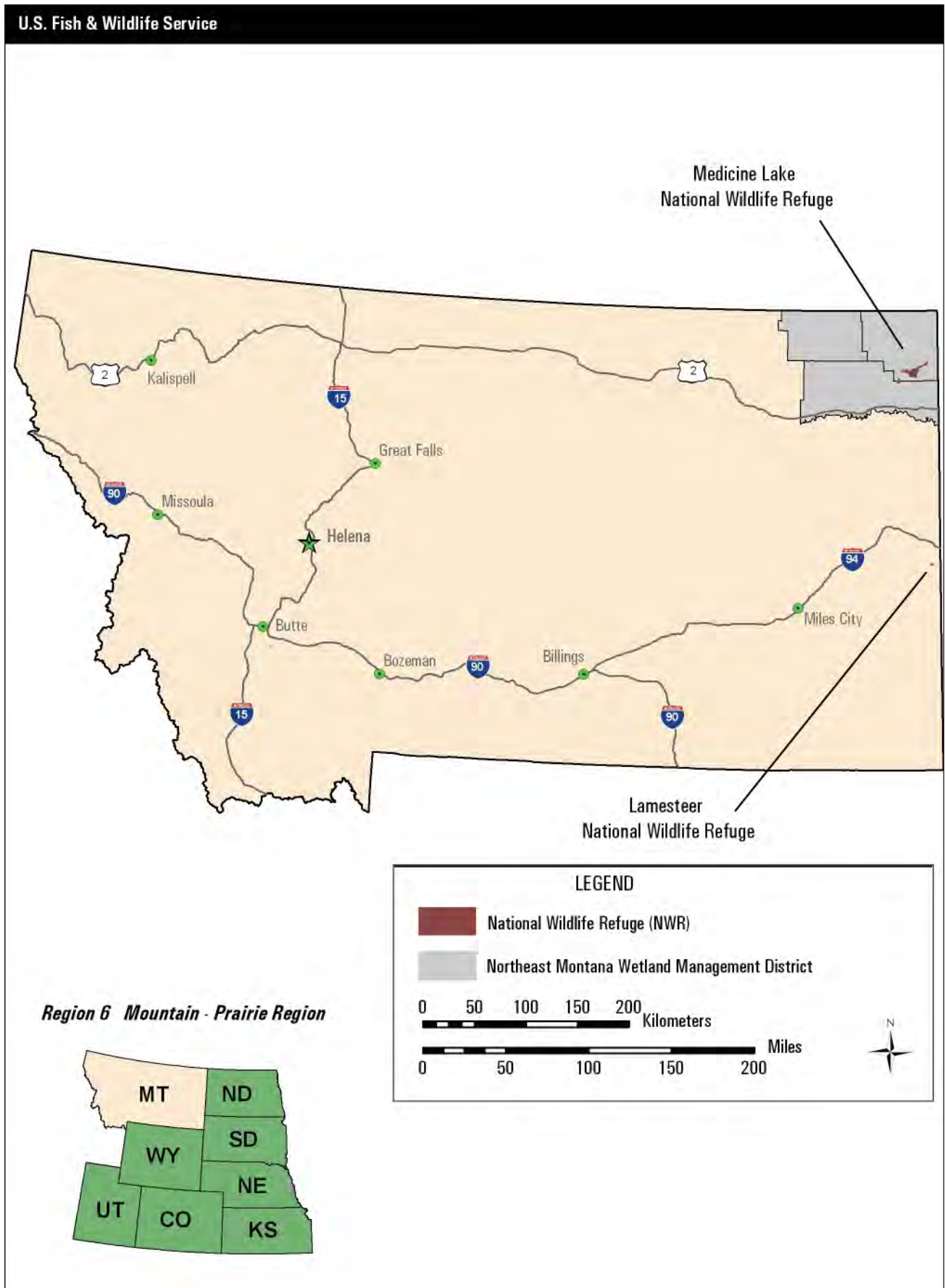


Figure 1. Vicinity map for Medicine Lake refuges, Montana.

Sustaining the nation's fish and wildlife resources 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 NATIONAL WILDLIFE REFUGE SYSTEM

The Service is the principal federal agency responsible for fish, wildlife, and plant conservation.

The 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 hundred years 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 our 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. It also administers a federal aid program that distributes to states hundreds of millions of dollars for fish and wildlife restoration, boating access, hunter education, and related programs across America.

The Service is the managing agency of the Medicine Lake National Wildlife Refuge Complex, along with the rest of the Refuge System, thousands of waterfowl production areas, and other special management areas. It also operates 66 national fish hatcheries and 78 ecological services field stations.

Service Activities in Montana

Service activities in Montana contribute to the state's economy, ecosystems, and education programs. The Service and state-related services in Montana (USFWS 2000b) provide the following:

- employment for 196 people
- over 25,246 hours donated by 432 volunteers for Service projects
- management of two National Fish Hatcheries, one Fisheries Technology Center, one Fish Health Center, and one

Fish and Wildlife Management Assistance Office

- contribution of 700,000 fish for stocking and 20 million eggs to other hatcheries to support recreational fishing
- management of 22 National Wildlife Refuges encompassing 1,186,384 acres (USFWS 2006a)
- administration of 5 wetland management districts totaling over 173,897 acres (USFWS 2006a)
- more than 506,000 visitors annually to Service-managed lands
- environmental education for more than 8,700 schoolchildren
- hunting access on refuges for 61,000 people
- 43,000 people fishing opportunities on refuges
- \$5.6 million for sport-fishing restoration and \$5.6 million for wildlife restoration
- \$336,726 (2006) in funds under the Refuge Revenue Sharing Act for Montana schools and roads (USFWS 2006b).

The 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 the sake of 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, encompassing over 96 million acres within 544 refuges and over 3,000 small areas for waterfowl breeding and nesting. Today, there is at least one refuge in every state in the nation, including Puerto Rico and the U.S. Virgin Islands.

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

“... 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 refuge shall be managed:

- to fulfill the mission of the Refuge System;
- to fulfill the individual purpose of each refuge;
- 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, biological 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.

The wildlife and habitat vision for each national wildlife refuge emphasizes the following principles:

- Wildlife comes first.
- Ecosystems, biodiversity, and wilderness are vital concepts in refuge management.
- Refuges must be healthy.
- Growth of refuges 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 began to implement the new legislation, including preparing CCPs for all refuges. These plans are now being developed nationwide. Consistent with the Improvement Act, all refuge CCPs are being prepared with public involvement. Every refuge is required to complete a CCP by 2012.

People and the National Wildlife Refuge System

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

Wildlife recreation also contributes millions of dollars to local economies through birdwatching, fishing, hunting, photography, and other wildlife pursuits. In 2002, approximately 35.5 million people visited a national wildlife refuge, mostly to observe wildlife in their natural habitats. Visitors most often are accommodated through nature trails, auto tours, interpretive programs, and hunting and fishing opportunities. Significant economic benefits are generated for the communities that surround the refuges. Economists have reported that national wildlife refuge visitors contribute more than \$792 million annually to local economies.

1.3 NATIONAL AND REGIONAL MANDATES

This section presents hierarchically, from the national level to the local level, highlights of legal mandates, Service policy, and existing resource plans that directly influenced development of this CCP.

Refuges are managed to achieve the mission and goals of the Refuge System and the designated purpose of the refuge unit as described in establishing legislation or executive orders, or other establishing documents. Key concepts and guidance of the System are provided in the Refuge System Administration Act of 1966 (P.L. 87-714), Title 50 of the Code of Federal Regulations, the Fish and Wildlife Service Manual and, most recently, through the National Wildlife Refuge System Improvement Act of 1997 (P.L. 105-57).

The Improvement Act amends the Refuge System Administration Act by providing a unifying mission for the Refuge System, a new process for determining compatible public uses on refuges, and a requirement that each refuge will 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, biological diversity, and environmental health of refuge lands are maintained. Each refuge must be managed to fulfill the Refuge System 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.

The National Wildlife Refuge System Improvement Act of 1997 declares that compatible wildlife-dependent recreational uses are legitimate and appropriate, priority, general public uses of the Refuge System. Six uses (hunting, fishing, wildlife observation, wildlife photography, environmental education, and environmental interpretation) are to receive enhanced consideration, in planning and management, over all other general public uses of the Refuge System.

A list of other laws and executive orders that may affect the Medicine Lake National Wildlife Refuge Complex CCP or the Service's implementation of the CCP is provided in appendix A. Service policies providing guidance on planning and the day-to-day management of a refuge are contained within the Refuge System Manual and the Service Manual.

1.4 REFUGE CONTRIBUTIONS TO NATIONAL AND REGIONAL PLANS

Fulfilling the Promise

A 1999 report entitled “Fulfilling the Promise, The National Wildlife Refuge System: Visions for Wildlife, Habitat, People and Leadership” (Service 1999a) is the culmination of a year-long process by teams of Service employees to evaluate the Refuge System nationwide. This report was the focus of the first National Refuge System Conference, held in October 1998 and 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 all three major topics, and the recommendations in the report provided guidance throughout the CCP process.

Bird Conservation

All bird conservation planning in North America is being achieved through the North American Bird Conservation Initiative (NABCI). Started in 1999, the NABCI Committee is a coalition of government agencies, private organizations, and bird initiatives in the United States working to advance integrated bird conservation. The committee's conservation work is based on sound science and cost-effective management that will benefit all birds in all habitats. Conservation of all birds is being accomplished under four planning initiatives: the North American Landbird Conservation Plan (Partners in Flight), the U.S. Shorebird Conservation Plan, the North American Waterbird Conservation Plan, and the North American Waterfowl Management Plan.

Partners in Flight

Partners in Flight began in 1990 with the recognition of the decline of many migratory bird species. The challenge, according to the Partners in Flight (PIF) Program, is managing human population growth while maintaining functional natural ecosystems. To meet this challenge, PIF began working to identify priority land-bird species and habitat types. PIF activity has resulted in the

production of 52 bird conservation plans covering all of the continental United States.

The primary goal of PIF is to provide for the long-term health of the bird life on this continent. The first priority is to prevent the rarest species from becoming extinct. The second is to prevent uncommon species from declining to threatened status. The third priority is to “keep common birds common.”

PIF splits North America into seven avifaunal biomes (birds of an ecological regional area) and 37 bird conservation regions (BCRs) for planning purposes (figure 2). Medicine Lake NWR Complex is within the prairie avifaunal biome in BCR 11, the Prairie Pothole Region.

Twenty-nine land birds are considered “species of regional importance” in the Prairie Pothole BCR (table 10, chapter 4). Birds within the refuge complex are discussed in greater detail in “Chapter 4, Affected Environment.” All of these species breed in the refuge complex, except for greater sage grouse. Nine of these species are on the PIF watch list, considered the most imperiled land birds in North America.

PIF conservation priorities in the prairie avifaunal biome focus on protecting remaining prairies, managing existing grasslands with fire and grazing, and controlling exotic and woody plant encroachment. Regionally, the refuge complex falls under the Montana PIF Bird Conservation Plan. This plan calls for protecting remaining native prairie from conversion to agriculture, improving management of grasslands through grazing and fire, and using partnerships to improve habitat conservation

U.S. Shorebird Conservation Plan

The refuge complex also lies within the Northern Plains Prairie Pothole Region of the U.S. Shorebird Conservation Plan (Skagen et al. 2006). Nine shorebird species are identified within the region as species of conservation concern: piping plover, mountain plover, American avocet, upland sandpiper, long-billed curlew, Hudsonian godwit, marbled godwit, American woodcock, and Wilson's phalarope (table 9, chapter 4). This region is also important to 10 shorebird species during migration.

North American Water Bird Conservation Plan

Medicine Lake NWR Complex falls within the Northern Prairie and Parkland Region (NPPR) for purposes of waterbird conservation. Canadian and U.S. partners developed the Northern Prairie and Parkland Waterbird Conservation Plan

(Beyersbergen et al. 2004) under the auspices of the North American Waterbird Conservation Plan (Kushlan et al. 2002) to provide an overview of the status and current knowledge of waterbirds and waterbird habitat in the region and to outline strategies and priorities for monitoring, research, and management.

Much wetland and upland habitat in the NPPR has been lost or degraded, primarily due to agriculture. Populations of many species of waterbirds thus are considered at risk. Least tern and whooping crane are listed as endangered species, and the least bittern is listed as threatened in portions of the NPPR. The plan identifies western grebe, Franklin's

gull, black tern, horned grebe, American bittern, yellow rail, and king rail as species of high concern (table 9, chapter 4). All these species except king rail and least bittern are found in the refuge complex.

North American Waterfowl Management Plan

The North American Waterfowl Management Plan (NAWMP), written in 1986 and revised several times (DOI and Environment Canada 1986), envisioned a 15-year effort to achieve landscape conditions that could sustain waterfowl populations.

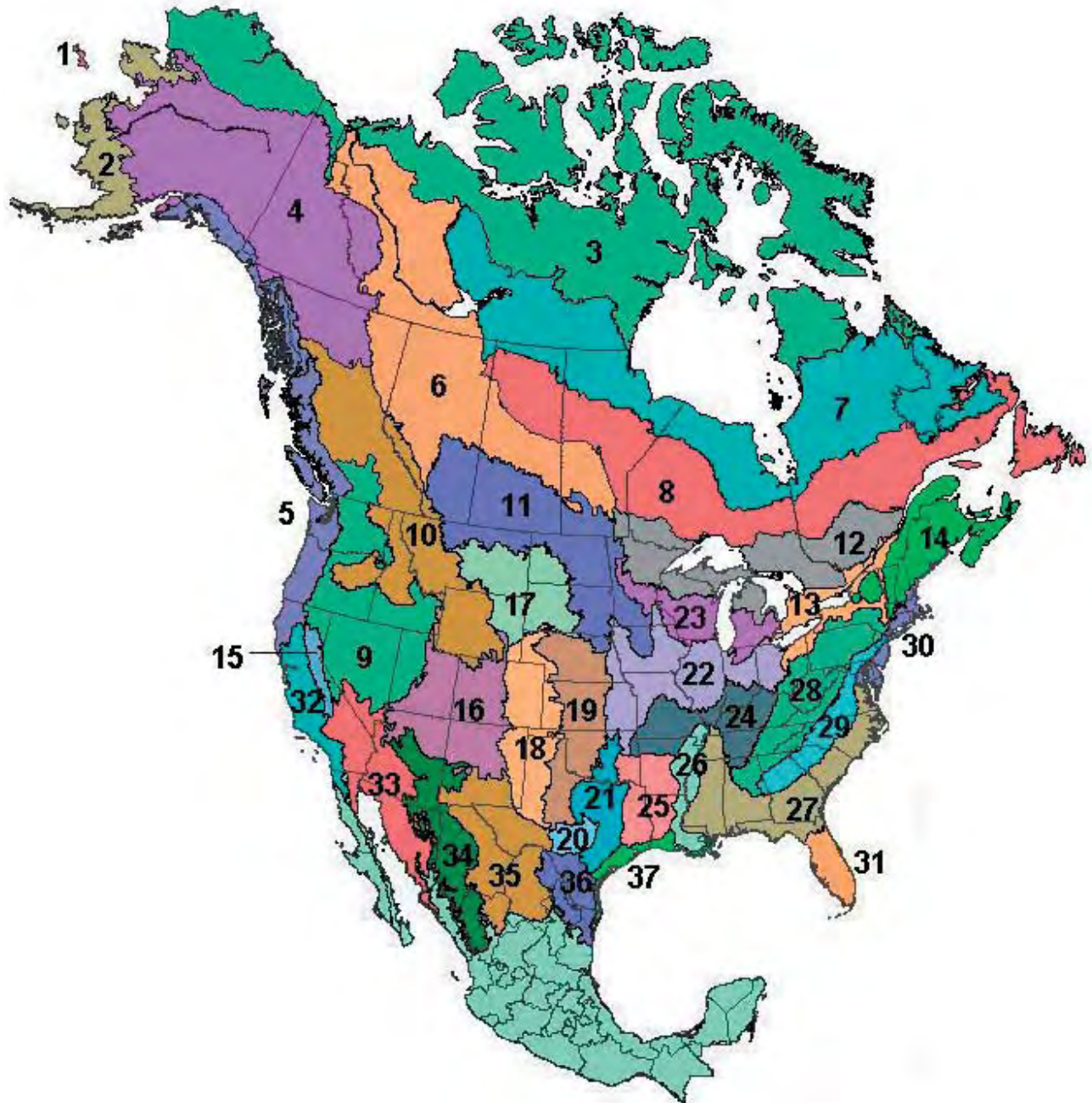


Figure 2. Bird conservation regions of the United States.

In 1985, waterfowl populations had plummeted to record lows. The habitat that waterfowl depend on for survival 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 U.S. and Canadian governments developed a strategy to restore waterfowl populations through habitat protection, restoration, and enhancement.

Specific NAWMP objectives are to increase and restore duck populations to the average levels of the 1970s—for examples, 62 million breeding ducks, and a fall flight of 100 million birds. In 1994, Mexico became a signatory of the plan.

Although the plan is international in scope, its implementation functions at the regional level. Its success is dependent upon the strength of partnerships, called “joint ventures,” involving federal, state, provincial, tribal, and local governments, businesses, conservation organizations, and individual citizens.

Joint ventures are regionally based, self-directed partnerships that carry out science-based conservation with extensive community participation. Joint ventures develop implementation plans focusing on areas of concern identified in the plan.

The NAWMP contains 11 habitat joint ventures in the United States and two in Canada with a wide variety of public and private partners. As of 2006, plan partners had invested more than \$4.5 billion to protect, restore, and enhance more than 15.7 million acres of habitat. The Medicine Lake NWR complex lies within the “Prairie Pothole Joint Venture” (PPJV). Lesser scaup, mallard, and northern pintail are the highest-priority waterfowl species for the PPJV.

Prairie Pothole Joint Venture Implementation Plan

The Prairie Pothole Region remains the most important waterfowl-producing region on the continent, generating more than half of North America’s ducks. Nearly 15 percent of the continental waterfowl population comes from the PPJV region (Montana, the Dakotas, Minnesota, and Iowa) (see figure 3).

As many as 10 million ducks and 2 million geese use the PPJV region during migration or for nesting. The wetlands and associated grassland habitat in the PPJV region provide breeding habitat to over 200 species of migratory birds. Bald eagles, peregrine falcons, whooping cranes, piping plovers, and

interior least terns frequent the PPJV region during migration and breeding periods.

The PPJV Implementation Plan (USFWS et. al, 2005) outlined a mission, goals, objectives, and strategies for joint venture activities. State action groups and steering committees prepared action plans that “stepped down,” or offered more specific direction, for joint venture activities at the state and local level.

The goal of the PPJV is to increase waterfowl populations through habitat conservation projects that improve natural diversity across the Prairie Pothole landscape of the United States. The joint venture attempts to implement landscape-level habitat projects so that waterfowl populations increase during the wet years and stabilize under moderate conditions. Since little can be done to stabilize breeding populations across the Prairie Pothole Region during extended drought, joint venture strategies are designed to carry out actions that take advantage of years when precipitation is at least normal.

Recovery Plans for Federally Listed Threatened or Endangered Species

Where federally listed threatened or endangered species occur on the Medicine Lake NWR complex, the management goals and strategies laid out in their respective recovery plans will be followed. The list of threatened or endangered species will change as new species are listed, delisted (or removed from the list), or discovered on refuge lands

At the time of plan approval, the refuge complex follows the 1994 Piping Plover (Great Plains) Recovery Plan (USFWS 1994a). It is currently within the area designated critical habitat for the federally listed piping plover.

State Comprehensive Wildlife Conservation Strategy

Montana’s Comprehensive Fish and Wildlife Conservation Strategy (CFWCS) includes all vertebrate species known to exist in Montana, including both game and nongame species, as well as some invertebrate species, such as freshwater mussels and crayfish. From the early years of fish and wildlife management, the focus has been placed on game animals and their related habitats because most of the agency’s funding has been provided by hunters and anglers.

MFWP does not intend to reduce its focus on important game species, and maintains that conserving particular types of habitats will benefit a variety of game and nongame species. With this new funding mechanism and conservation

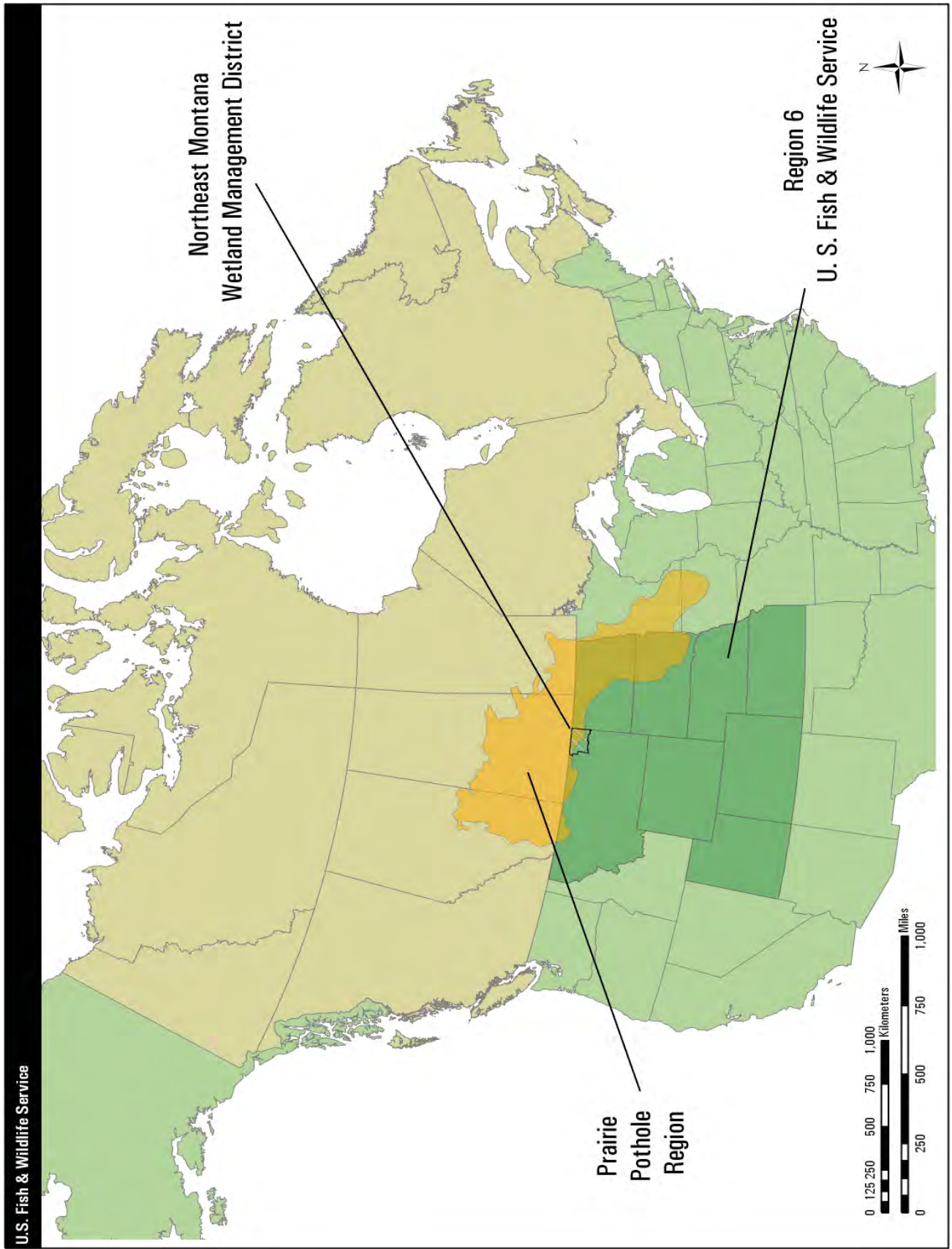


Figure 3. Prairie Pothole Region.

strategy in place, MFWP believes that managing fish and wildlife more comprehensively is a natural progression in the effective conservation of Montana's remarkable fish and wildlife resources (Montana CFWCS 2005).

Although game species are included in MFWP's conservation strategy, the priority is species and their related habitats "in greatest conservation need." This means focus areas, community types, and species that are significantly degraded or declining, federally listed, or where important distribution and occurrence information used to assess the status of individuals and groups of species is lacking. Because management of game species has been largely successful over the last 100 years, most species have populations that are stable or increasing, and fewer were identified as in greatest conservation need (49 nongame, 11 game).

MFWP's conservation strategy uses 5 ecotypes to describe the broad areas of Montana's landscape that have similar characteristics. Within each of the ecotypes, Tier 1 (greatest need of conservation) geographic focus areas were identified for all terrestrial and aquatic areas of the state. The Missouri Coteau Focus Area is a Tier 1 area that encompasses 5.3 million acres and includes the refuge complex. This portion of Montana's Prairie Pothole Region contains the highest density of natural wetlands. A total of 318 terrestrial vertebrate species are found within the Missouri Coteau Focus Area. Tier I wildlife species are: northern leopard frog, snapping turtle, spiny softshell, western hog-nosed snake, smooth greensnake, common loon, trumpeter swan, bald eagle, yellow rail, whooping crane, piping plover, long-billed curlew, interior least tern, black tern, burrowing owl, sedge wren, Nelson's sharp-tailed sparrow, Townsend's big-eared bat, and meadow jumping mouse.

The Montana CFWCS outlines 5 conservation concerns and strategies for the Missouri Coteau Focus Area. The key concerns are:

- loss of habitat due to conversion of native prairie to small grain crops
- drainage of natural wetlands
- invasive or exotic plant species
- disruption of natural disturbance processes, especially fire
- fragmentation of habitat due to fossil fuel exploration and development activities.

1.5 ECOSYSTEM DESCRIPTION AND THREATS

The Service has adopted an ecosystem approach to natural resource management and has identified 52 ecosystems in the United States. The refuge

complex lies within the main stem Missouri River (main stem) ecosystem and the Upper Missouri/ Yellowstone/ Upper Columbia rivers (MOYOCO) ecosystem (USFWS 2000e) (figure 4).

The main stem ecosystem is located primarily in South Dakota, with sections extending into southern North Dakota, northern Nebraska, northeastern Wyoming, and eastern Montana. Prairie potholes, a major land feature, were formed during the Pleistocene glaciations, a period 2 million years ago when glaciers swept through the region, scraping the landscape and creating depressions, or "potholes." The glaciated prairies of North Dakota, South Dakota, and Montana cover approximately 60 million acres.

Historically, the landscape of the main stem consisted of a vast expanse of tall and mixed grass prairie with numerous shallow and deep wetlands. A rich assortment of native plants and wildlife evolved with and were maintained by fire, periodic defoliation by large herds of grazing animals, and climate.

Numerous wetland basins are a prominent feature of this ecosystem, and are essential for producing the majority of game ducks in the country. Four flyways throughout the area denote major migration pathways that funnel waterfowl from wintering to breeding habitat and back. Canada geese and snow geese pass through the area every fall and spring, as do many other migratory birds that use the Central Flyway.

Native prairie and forests, woodlands, and savanna are the ecosystem's predominant vegetation habitats. Native prairie plant communities are dominated by grasses such as little bluestem, porcupine grass, sideouts grama, and western wheatgrass. Common forbs include leadplant, rigid goldenrod, and purple and prairie coneflowers.

Prairie insectivores and native mice common to prairie ecosystems are very abundant. Riparian areas make up a small portion of the ecosystem, but are more important than other focus areas to fish and wildlife resources. Riparian habitats provide for much of the biological diversity in the ecosystem, and many species occurring here would be eliminated without healthy riparian areas.

The original prairie grasslands have been rapidly dwindling as agriculture has come to dominate the landscape. Nonnative grasses were planted for pastures and hay, large portions of native prairie were plowed up for crop land, and wetlands were drained to make farming operations easier and more profitable.

Originating in the Rocky Mountains of south-central Montana, the Missouri River is vastly different from the "untamed" floodplain system of even 50 years ago. The river flows 2,300 miles, passing through 7

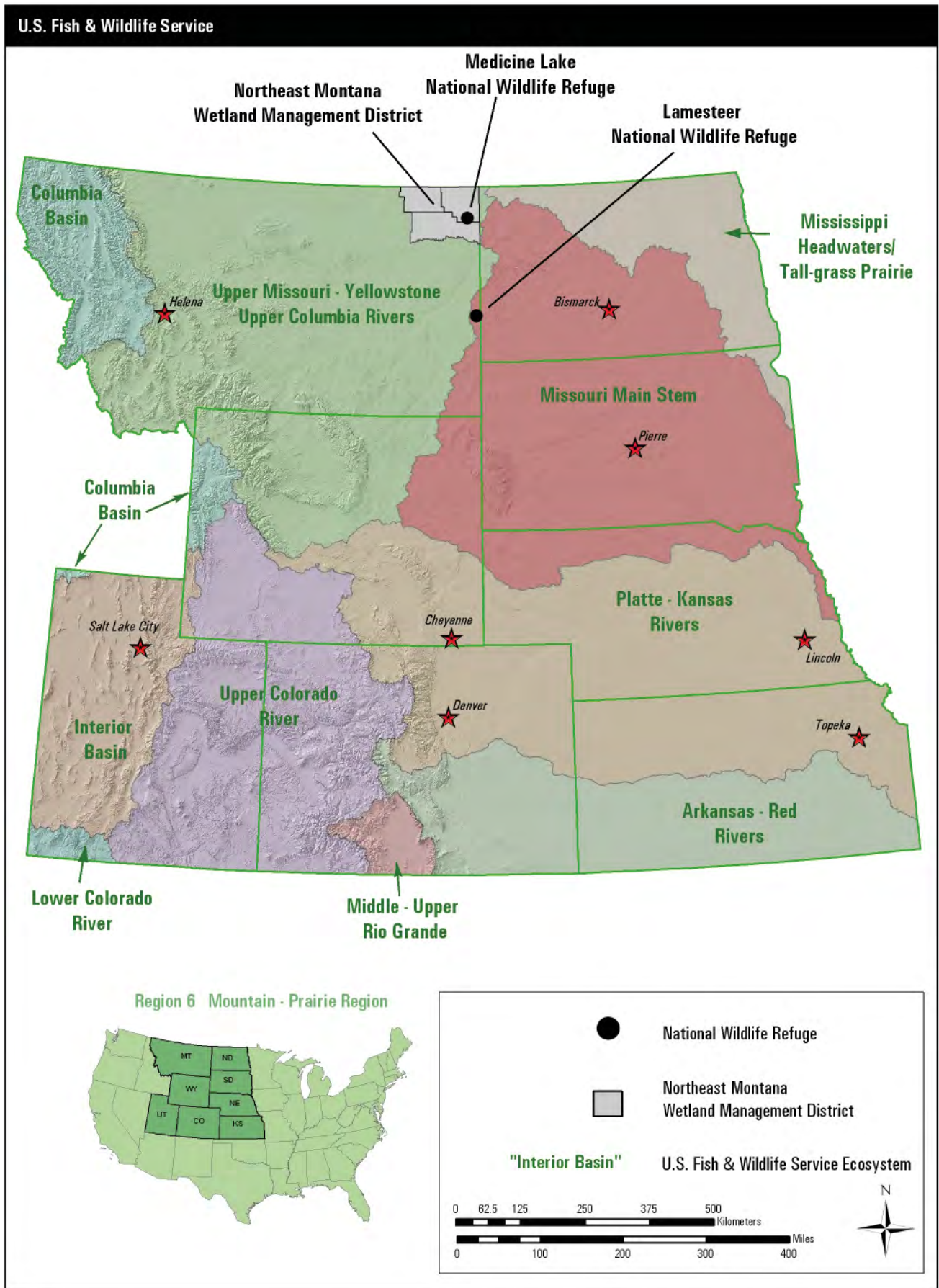


Figure 4. Ecosystem map.

main stem dams. Nearly 60 percent of what formerly was the upper river now lies under permanent multipurpose reservoirs.

As the Missouri River changed, so did the wildlife communities that depend on it. Currently 8 fishes, 15 birds, 6 mammals, 4 reptiles, 6 insects, 4 mollusks, and 7 plants native to the ecosystem are listed as either threatened or endangered. Sedimentation, contamination, invasive species, and development threaten the health of this diverse habitat.

The MOYOCO ecosystem encompasses parts of Montana, Wyoming, and North Dakota, and lies within the Rocky Mountain and Great Plains physiographic (or physical geographic) provinces. As the name implies, the ecosystem includes the Upper Missouri, Yellowstone, and Upper Columbia River basins. To the east of the Continental Divide, it encompasses the Upper Missouri and Yellowstone River drainages from their headwaters in the high mountains of western Montana and Wyoming to their confluence in western North Dakota. To the west of the Continental Divide in western Montana and northwestern Wyoming, the ecosystem includes the Upper Columbia River drainage from the mountain headwaters to the border with Idaho. This ecosystem is bounded on the north by the Canadian provinces of British Columbia, Alberta, and Saskatchewan; on the east by North Dakota; on the south by southern Wyoming and Idaho.

The proposed management vision and goals for the main stem and MOYOCO ecosystems focus on “national trust resources,” or endangered or threatened species, migratory birds, and habitat for trust species. Further, recreation is recognized as a high priority where conflicts with native species and their habitats do not occur.

A major priority for the main stem and MOYOCO ecosystems will be to ensure that future economic development complements environmental protection. Another goal will be to create healthy habitats that provide an abundance and diversity of native flora and fauna in the ecosystems. Key threats to the ecosystems include invasive species, conversion of native prairie to agriculture, and habitat fragmentation from development and population growth.

1.6 THE PLANNING PROCESS

This draft CCP and EA for the Medicine Lake National Wildlife Refuge Complex is intended to comply with the Improvement Act and the National Environmental Policy Act (NEPA). The Service issued a final refuge planning policy in 2000 (USFWS 2000a) that established requirements and guidance for Refuge System planning, including CCPs and step-down (or more specific) management

plans, ensuring that planning efforts comply with the provisions of the Improvement Act. The planning policy identified several steps of the CCP and EA process (figure 5):

- Form a planning team and conduct pre-planning activities such as creating a work plan.
- Initiate public involvement and scoping.
- Draft a vision statement and goals.
- Develop and analyze alternatives, including a proposed action.
- Prepare a draft CCP and EA.
- Prepare and adopt a final CCP and EA, and issue a “finding of no significant impact” (FONSI), or determine if an environmental impact statement (EIS) is needed.
- Implement the CCP, and monitor and evaluate the effectiveness of actions.
- Review the CCP every 5 years, and revise it every 15 years.

Early Planning Process

In 1998, the Service began the planning process for the Medicine Lake NWR Complex. A notice of intent (NOI) was published in the Federal Register on August 6, 1998, with a public meeting held at the refuge headquarters on October 17, 1998. In 2001, the process stalled for several years while the Service considered a preliminary land-acquisition proposal for the CCP. During the same time period, there were several staff changes at the refuge, including a new project leader who came on duty in 2005.

In October 2006, the planning process (see table 1) was restarted, and a planning team consisting of Service personnel from the refuge complex, the Division of Refuge Planning, and Montana Fish, Wildlife, and Parks was formed. Because of the extensive delay in the planning process, the planning effort essentially was started over. The planning team developed a new draft vision and set of goals, a planning schedule, and a public involvement plan. The team began an internal scoping process by identifying refuge qualities and issues over the course of several meetings and electronic correspondence.

Recent Planning Efforts

Prescoping and scoping began in November 2006. A notice of intent (NOI) was published in the Federal Register announcing the beginning of the CCP process.

During the planning process, the planning team developed a mailing list of over 120 names that included local residents, local, regional, and state government representatives, other federal agencies, and nonprofit organizations. In November 2006, a planning update was mailed to the public and placed on the planning website. The planning update provided a summary of the NWRS and the CCP process, along with an invitation to a public meeting, which was held at the Medicine Lake Fire Hall. The meeting was announced in the local newspapers, flyers were posted at businesses throughout the region, and announcements were made by refuge staff at a variety of meetings and through personal contact.

More than 20 people attended the meeting, despite minus-zero, blustery weather. At the start of the meeting, the CCP planner provided an overview of the process, and the project leader talked about the refuge and current management issues during a presentation and question-and-answer period. The overall response was very positive. People who attended were invited to submit additional comments or questions orally or in writing, and each was given a two-page comment form to complete. There was additional coverage about the planning process in the local newspaper, and by the end of the response deadline on February 8, 2007, the team recorded over 60 comments.

Comments from approximately 15 letters and comment sheets during the initial scoping process in 1998 were combined with the comments received during the fall and winter of 2006–2007 to create a list of significant issues to be addressed in this document.

State Coordination

In October 2006, the Service's region 6 director invited the director of the MFWP to participate in the CCP process. Local MFWP wildlife managers and refuge staff have maintained excellent ongoing working relations from before the CCP process. A MFWP representative was part of the core CCP planning team and participated in the planning process.

Coordination with Local Communities

The project leader initially contacted local elected officials in October 2006 and thereafter through planning updates that provided information on the CCP process, outlined the public meeting schedule, and included a summary of public comments received.

Tribal Coordination

In October 2006, the Service's region 6 director sent a letter to the Fort Peck Tribal Council (Assiniboine and Sioux tribes). The letter provided information about the upcoming CCP and invited recipients to serve on the core planning team. The Service did not receive a response from the tribe, but it sent the tribal council planning updates and other documents throughout the process.

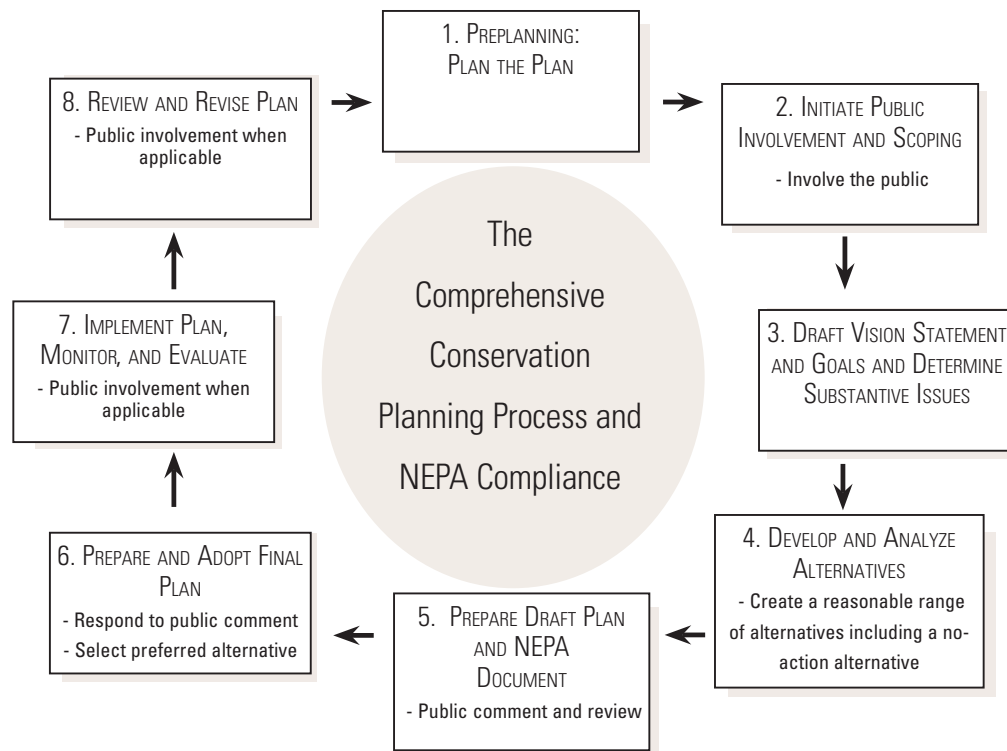


Figure 5. The planning process.

Results of Scoping

The comments collected from scoping meetings and correspondence were used to develop a list of key issues to address in the CCP. The team developed goals, objectives, and strategies and determined which alternatives would best address these issues. A summary of the issues and their impacts is discussed in chapter 2.

Selecting an Alternative

The Service's region 6 director will consider the environmental effects of each alternative and will select an alternative to implement as the Medicine Lake National Wildlife Complex CCP.

The decision will be disclosed in a finding of no significant impact (FONSI) included in the final CCP. Implementation of the CCP will begin with the regional director's signature and publication of the final CCP.

This CCP provides long-term guidance for management decisions. It establishes goals, objectives, and strategies needed to accomplish refuge purposes, and identifies the Service's best estimate of future needs. This CCP details program planning levels that are sometimes substantially above current budget allocations and thus are primarily for Service strategic planning purposes. This CCP does not constitute a commitment for staffing increases, operation and maintenance increases, or funding for future land acquisitions.

Table 1. Planning Process Summary for Medicine Lake NWR Complex, 2006–2007

<i>Date</i>	<i>Event</i>	<i>Outcome</i>
August 2006	Initial site meeting	Tour refuge. Discuss CCP process. Set a date for the project kickoff meeting and vision and goals workshop.
October 31- November 1, 2006	Kickoff meeting and vision and goals workshop	The Service develops a CCP overview, finalizes a planning team, and identifies a purposes, initial issues, and qualities list. The Service's regional staff, planning team, and others begin to develop a mailing list. The Service's regional staff, planning team, and others update the issues and qualities list, identify biological and mapping needs, and plan public scoping. They draft a vision statement and develop goals.
November 15, 2006	Scoping initiated	The planning team issues a planning update describing the CCP process, develops comment forms, and mails postage-paid envelopes.
November 29, 2006	Public scoping meeting, Medicine Lake, Montana	The planning team offers the public the opportunity to learn about the CCP and provide comments.
January 9, 2007	Notice of intent (NOI) published	The Service publishes a NOI in the Federal Register and extends scoping comments until February 9, 2007.
February 7-8, 2007	Objectives and strategies workshop	The Service's regional staff, planning team, and others draft objectives and strategies for the proposed action.
March April 2007	Draft CCP and EA preparation	The planning team prepares the first draft of the CCP and EA.
June 2007	Internal Service review of the draft CCP and EA	The Service's regional office staff, planning team, and others conduct a review and receive comments on the draft CCP and EA.
July 2007	Outreach plan preparation	The planning team conducts outreach with partners about issues in the draft CCP and EA.
August 2007	Public meeting, Medicine Lake, Montana	The planning team presents the draft CCP and EA and collects public comments.

2 The Refuge Complex

This chapter explains the history, purpose, and special values of the Medicine Lake NWR Complex, as well as the CCP planning process, including the development of a vision and goals and a discussion of issues that were and were not addressed.

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 refuge purpose. The refuge purposes are found in the legislative acts or administrative orders, which provide for the authorities to either 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 CCP are intended to support the individual purpose for which the refuge was established.

2.1 ESTABLISHMENT AND HISTORY OF MEDICINE LAKE NWR

On August 19, 1935, President Franklin D. Roosevelt signed Executive Order No. 7148, authorized the establishment of the Medicine Lake NWR. The order stated the purpose of the refuge was “to effectuate further the purposes of the Migratory Bird Conservation Act” (45 Stat. 1222) in Sheridan and Roosevelt Counties, Montana. The land was “reserved and set apart ... as a refuge and breeding ground for migratory birds and other wildlife.”

Originally known as “Medicine Lake Migratory Waterfowl Refuge,” it is located on the glaciated rolling plains of northeastern Montana and contains 31,660 acres. The major portion of the refuge (figure 4), with 19,953 acres, was acquired through emergency funds of the U.S. Resettlement Administration. Another 367 acres were acquired by primary withdrawal from public domain; 2,500 acres were acquired with Migratory Bird Hunting Stamp Act funds; 4 acres were gift; and 8,634 acres were “meandered lake” area (meaning the lake assumed a natural pattern within its floodplain).

The refuge consists of two noncontiguous areas:

- the 28,396-acre Main Unit containing the 8,218-acre Medicine Lake, as well as 17 smaller bodies of water and adjacent grasslands
- the 3,264-acre Homestead Unit, including 1,280 acres of wetlands in 5 water units and the rest in grassland habitat.

The refuge contains an 11,360-acre federal wilderness area that was established in 1976. The wilderness includes Medicine Lake with its natural islands and the 2,300-acre Sandhills Unit. Four research natural areas encompassing 762 acres were designated in 1972 (figure 6).

The town of Medicine Lake is located near the northwest boundary of the Medicine Lake NWR. The Fort Peck Indian Reservation borders the west boundary. The towns of Plentywood and Culbertson are about 20 miles equidistant north and south, respectively, along Montana State Highway 16. Table 2 highlights significant dates and events in the refuge’s history.



Jerry Rodriguez/USFWS

Winter wetland environment at Medicine Lake.

Table 2. Timeline of Significant Events for Medicine Lake NWR

Date	Event
1935	Medicine Lake NWR was established.
1936	The first refuge manager, Paul T. Kreager, reported for duty April 24. The lookout tower at headquarters was built.
1937	The refuge marked its first full year of operation. The Civilian Conservation Corps set up camp May 21, and 180 men began work. Medicine Lake was completely dry in June. Locals reported this year as the first since about 1900 that the lake was dry. Work began on constructing 42 nesting islands containing 220,000 cubic yards of earth, gravel, and rock.
1942	The refuge experienced a 208 percent increase in waterfowl due to the filling of all water areas. The refuge first documented nesting use by pelicans, cormorants, and great blue herons.
1942	Wartime travel restrictions reduced the number of visitors.
1943	Medicine Lake Canada-goose restoration project was initiated.

2.2 ESTABLISHMENT AND HISTORY OF LAMESTEER NWR

Executive Order No. 9166, dated May 19, 1942, authorized the establishment of the Lamesteer NWR. Signed by President Franklin D. Roosevelt, the order stated the purpose for the 800 acres of land in Wibaux County, Montana, was “as a refuge and breeding ground for migratory birds and other wildlife.”

Located 160 miles south of Medicine Lake NWR, and 20 miles southeast of Wibaux, Montana, Lamesteer NWR (figure 7) is managed as a “satellite

refuge” through the Medicine Lake NWR Complex office, with no staff on site. Lamesteer NWR’s 800 acres comprise a conservation easement area superimposed on privately owned lands. It is used primarily as a resting place for migrating wildlife. Waterfowl production both on the refuge and in the general area is very limited. The Service has no control of the uplands. Only water management and facilities maintenance rights are covered by the easement. Pumping for irrigation from the reservoir is allowed when surplus water is available (figure 7). Table 3 highlights significant dates and events in Lamesteer NWR’s history.

Table 3. Timeline of Significant Events for Lamesteer NWR

Date	Event
1938	The dam and spillway were constructed by the Works Progress Administration.
1944	The dam was damaged by water high flows and ice.
1953	The dam spillway was rebuilt.
1981	The refuge was opened to hunting, with landowners controlling access to the site.

Place Holder for
Figure 6 MDL
11x17 map



Figure 7. Lamesteer National Wildlife Refuge map.

2.3 ESTABLISHMENT AND HISTORY OF THE NORTHEAST MONTANA WMD

The Northeast Montana WMD, established in 1968, is located in Sheridan, Daniels, and Roosevelt counties. The WMD is bounded on the north by the Canadian province of Saskatchewan, on the east by North Dakota, on the west by the Fort Peck Indian Reservation, and on the south by the Missouri River. Refuge System lands within the WMD include:

- waterfowl production areas, which are acquired in fee title;
- wetland easements, which protect privately owned wetlands from being drained, filled, or leveled;
- grassland easements, which protect privately owned rangeland and hay land from conversion to cropland.

Early land acquisition efforts focused on purchasing waterfowl production areas and wetland easements. In recent years, more emphasis has been placed on obtaining grassland and wetland easements. In 2006, the WMD contained 44 waterfowl production areas

(11,791 acres), 8,588 wetland acres protected by easements, and 10,968 grassland acres protected by easements (figure 8).

The purpose of these acquired areas and easements is to provide breeding habitat for migratory birds and other wildlife. Hunting is allowed on these areas.

Waterfowl production areas and easements are purchased from willing sellers under the provisions of the Migratory Bird Hunting and Conservation Stamp Act (16 USC 718) and are funded by the sale of federal “duck stamps” and loans against future duck stamp sales. Waterfowl production areas are managed to provide breeding waterfowl high-quality wetlands for courtship and brood rearing, and suitable grasslands for nesting. Habitats are managed using techniques such as prescribed grazing, haying, prescribed burning, farming, and reseeded (former croplands only), and rest from crop production. These areas are open for public hunting, fishing, and trapping according to state seasons. Every fall, hunting opportunities for upland game birds, deer, and waterfowl attract hunters from across the U.S. and Canada. Table 4 highlights significant events in the development of the Northeast Montana WMD.



Northern pintail is one of many breeding birds found in the refuge complex.

Table 4. Timeline of Significant Events for the Northeast Montana WMD

Date	Event
1968	The Northeast Montana WMD was established.
1969	Some 38 waterfowl protection area tracts totaling 4,464 acres were purchased, and 2,280 wetland acres were protected by wetland easement.
1974	Over 20 miles of waterfowl protection area boundary fence was constructed to prevent trespass grazing during fall “open range.”
1975	The WMD included 40 waterfowl production areas totaling 8,719 acres, and 68 wetland easement contracts totaling 4,698 wet acres.
1980	Over 36 miles of waterfowl protection area boundary fence was constructed by refuge complex staff and contractors.
1980–5	An oil boom hit Williston Basin, and permits were issued for 3 new wells.
1983	The WMD participated in the Central Flyway duck recruitment study.
1985	Refuge staff constructed waterfowl nesting islands in Big Slough (10), Goose Lake (12), and Rivers (3) waterfowl production areas.
1986	Piping plovers, designated as a federally threatened wildlife species, were first documented nesting in the WMD in the Dog Leg waterfowl production area.
1987	The WMD began using the standardized “4-square-mile” waterfowl breeding-pair survey.
1988	The WMD began comprehensive breeding population surveys for piping plovers.
1989	The WMD was identified as a Prairie Pothole Joint Venture (PPJV) focus area under the North American Waterfowl Management Plan.
1990	The Service’s Partners for Fish and Wildlife (PFW) technician position was established, and 88 wetland restoration and creation projects were completed.
1991	The first grassland easement was acquired. The breeding piping plover population peaked at 181 adults. Ducks Unlimited, Inc. (DU) constructed waterfowl nesting islands on the Parry, Erickson, Dog Leg, and Northeast waterfowl production areas.
1994–5	The WMD participated in a study to evaluate the benefits of the USDA conservation reserve program (CRP) for nesting waterfowl across the Prairie Pothole Region.
1996	The WMD received \$640,000 in a Northeast Montana II PPJV North American Wetlands Conservation Act (NAWCA) grant for continued habitat work on private, tribal, and Service lands. The WMD formed partnerships with Montana Fish, Wildlife, and Parks (MFWP), The Nature Conservancy (TNC), and private landowners to carry out a piping plover recovery project. A sustained period of oil exploration activity began.
1998	National Wetland Inventory (NWI) maps were finalized and digitized for the WMD. A nontoxic shot was required for upland game bird hunting on WPAs.
2000	Private-lands habitat accomplishments included: 800 wetland acres restored, 1,200 wetland acres created, cost sharing arranged to establish 48,000 acres of high-quality CRP stands, and 6,500 acres of grazing systems developed.
2001	The WMD became a partner in a \$1million Montana Hi-Line North American Wetlands Conservation Act grant that funded continued habitat work and the acquisition of conservation easements.

2.4 VISIONS FOR THE REFUGE COMPLEX AND WMD

At the beginning of the planning process, the Service developed two visions, one for the refuge complex and another for the Northeast Montana WMD. A vision is a concept, including desired conditions for the future, that describes the essence of what 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 by the end of the 15-year CCP planning horizon.

Medicine Lake National Wildlife Refuge Complex Vision Statement

Visitors to Medicine Lake NWR, on the western edge of the Missouri Coteau, experience wide-open grasslands, vast lakes and marshes, and one-of-a-kind sunsets. Diverse habitats for migratory birds and native wildlife are managed to simulate natural processes that historically shaped the prairie landscape. The awe-inspiring spring and fall migrations are wonders to see against the big Montana sky. The refuge team works collaboratively with partners and the community to conserve, protect, and restore the wildness of the rolling prairie and its natural solitude.

Northeast Montana Wetland Management District Vision Statement

Waterfowl production areas and conservation easements within the Northeast Montana Wetland Management District, located in the glaciated Missouri Coteau, provide a network of wetlands and grasslands that preserve historic and vital waterfowl breeding grounds. Other migratory birds, threatened and endangered species, and resident wildlife also benefit from these prairie jewels of the Refuge System.

Our community and visitors value grasslands and marshes as a beneficial and important component of a diverse, health, and productive prairie landscape. Current and future generations enjoy wildlife-dependent uses of these lands, and partners actively support and encourage our habitat conservation programs.

2.5 GOALS

The Service also developed a set of goals for the refuge complex based on the National Wildlife Refuge System Improvement Act, the complex's purpose, and information developed during project planning. The goals direct work toward achieving

the vision and purpose of the refuge complex, and outline approaches for managing refuge resources. The Service established eight goals for refuge complex management.

Habitat and Wildlife Management

Conserve, restore, and enhance the ecological diversity of grasslands and wetlands of the glaciated mixed-grass prairie to support healthy populations of native wildlife, with an emphasis on migratory birds.

Endangered, Threatened, and Rare Species

Contribute to the preservation and restoration of endangered, threatened, rare, and unique plants and wildlife that occur or have historically occurred in the refuge complex.

Wilderness

Conserve the wilderness quality and associated natural processes of the 11,360-acre Medicine Lake Wilderness.

Visitor Services

Provide opportunities for visitors to enjoy wildlife-dependent recreation and to help visitors understand and appreciate the value of the mixed-grass prairie and the National Wildlife Refuge System.

Refuge Operations

Use staff, partnerships, volunteers, and funding efficiently through effective communication and innovation, to support the Medicine Lake NWR Complex and the National Wildlife Refuge System.

Partnerships

Develop partnerships to support research, conserve habitat, and foster awareness and appreciation of the mixed-grass prairie.

Cultural Resources

Preserve and value the cultural resources and history of Medicine Lake NWR Complex to connect staff, visitors, and the community to the area's past.

Research

Conduct innovative natural resource management using sound science and applied research to advance understanding of natural resource function and management within the northern Great Plains.

2.6 PLANNING ISSUES

The significant planning issues identified by the refuge staff and the public (chapter 1, Planning Process, and appendix C), and a review of the requirements of the Improvement Act and NEPA are identified below. These key issues were considered during the formulation of the alternatives for future management.

Place Holder for
Figure 8 WMD

11x17 map

Wildlife and Habitat Management

The refuge complex has outstanding ecological features, particularly the unique landforms such as the prairie potholes and sandhills that should be preserved. While there are different viewpoints expressed by the public as to how the refuge complex should be managed (treatment prescriptions), specific management practices—prescribed grazing, native plant restoration, preferences for specific wildlife and plant species, invasive species management, and prescribed burning—have ecologic and economic impacts that affect the refuge, the local community, and the region. At the same time, adjacent land practices, including increased oil and gas production and use of fertilizers for large-scale crop production, could have major implications for protecting the grasslands, lakes, and marshes on the refuge in the future.

Lamesteer NWR possesses minimal habitat value and does not meet the mission and goals of the Refuge System. The Service has no control over the uplands. Upkeep of the dam structure could be costly for the refuge in the future, and could drain limited resources.

Visitor Services

The refuge complex has phenomenal bird watching opportunities and is considered a hidden jewel for hunting and for wildlife-oriented experiences that draw visitors from many states and Canada. There is a general lack of understanding about what the refuge complex and system are about. For example, pheasant hunting is popular, and some people want the refuge to manage far more pheasants, but pheasants are a nonnative species. Many people would like to see hunting, fishing, and education opportunities expanded and enhanced for the community and the region, including providing universal access (access for people of all abilities), and are concerned about how the wilderness designation affects those opportunities.

Water Management

Medicine Lake NWR is part of a bigger ecosystem, and the management of the refuge complex impacts the quality and quantity of water on and off the refuge, which has implications for the refuge and areas downstream. Adjacent farming practices, including increased use of fertilizers, ethanol conversion, more crop production, use of center pivots, and extraction of groundwater, could have significant environmental impacts to water quality on the refuge in the future. At the same time, the refuge complex has senior water rights, which during periods of long drought can affect the quantity and quality of water downstream.

Land Acquisition and Conservation

The Service's policy and intent for future land acquisition is of interest and concern to the local community. Some people would like to see the refuge complex pursue more conservation easements on

Prairie Pothole wetlands, with priority given to wetlands surrounded by native prairie.

Communication and Partnerships

Communication was a common issue raised during scoping. The community as a whole expressed concerns that, while the refuge staff has reached out more, the community would like to be kept better informed. Effective communication and partnerships are important for the refuge complex to be able to meet habitat and conservation goals and objectives.

Wilderness Management

Medicine Lake is a designated wilderness area, and some types of uses, particularly motorized access or tools, are prohibited on Medicine Lake. The community is concerned about the types of public access and uses that can be accommodated within the wilderness and the latitude the refuge has on allowing motorized and other access on Medicine Lake. Some people feel the Service should adopt a strong non-degradation policy for wilderness, with few, if any, signs or other structures. They demand that the Service adhere closely to the “minimum tool” philosophy (prohibiting mechanized tools or equipment) in its management practices in the wilderness area. How and why the Service manages the wilderness area as it does needs to be communicated to the community.

Refuge Operations

The Refuge staff remains below minimum staffing levels prescribed in 2000, and restoring funding levels is critical for implementing habitat management projects. The local community and visitors want to be informed about how the refuge complex allocates resources. How the refuge conducts daily operations and how the refuge manager engages with the community will affect the refuge complex's ability to achieve habitat and wildlife objectives.

2.7 ISSUES NOT ADDRESSED OR RESOLVED DURING THE CCP PROCESS

Some issues cannot be addressed or resolved in the draft CCP and EA because the authority to address them does not lie with the Service or with this public process. These issues are described below.

Use of Motorized Equipment on Medicine Lake for Recreation

Medicine Lake was designated as wilderness by public law on October 19, 1976. The text of the law does not contain any special provision for use of motorized equipment for recreation. To remove wilderness designation would take an act of Congress, which is beyond the scope of the CCP. Prohibiting motorized boats and power augers for recreational use protects the wilderness resource of the lake.

3 Alternatives

This chapter describes the management alternatives considered for the Medicine Lake NWR Complex. Alternatives are different approaches to planning unit management that are designed to achieve the refuge purpose(s), vision, and goals, the mission of the National Wildlife Refuge System, and the mission of the Fish and Wildlife Service. Alternatives are developed to address the significant issues, concerns, and problems identified by the Service, the public, and the government partners during public scoping and throughout the development of the draft plan. The alternatives for Medicine Lake NWR and the WMD were separated from the alternatives for Lamesteer NWR.

3.1 ALTERNATIVES DEVELOPMENT

The alternatives—three for Medicine Lake NWR and the WMD, and two for Lamesteer NWR—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 complex. This information contributed to the development of alternatives. As a result, each alternative presents different approaches to meet long-term goals. Each alternative was evaluated according to how it will advance the vision and goals of the refuge complex and the Refuge System, and how it will address the planning issues.

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. In each alternative, the first two CCP goals—Habitat and Wildlife Management, and Endangered, Threatened, and Rare Species—are discussed together because their issues overlap.

Alternative A, the “no action” alternative, describes ongoing refuge management activities. This alternative might not meet all the CCP goals. It is provided as a basis for comparison with the “action” alternatives.

3.2 ELEMENTS COMMON TO ALL ALTERNATIVES

This section identifies key elements included in the CCP regardless of the alternative selected. Several

elements of refuge management are common to all of the alternatives. All management activities that could impact natural resources, including subsurface mineral reservations, utility lines and easements, soil, water, air, contaminants, and archaeological and historical resources, will be managed to comply with all applicable laws, regulations, and policies. All alternatives would provide equal protection and management of cultural resources. Individual projects may require additional consultation with the State of Montana’s Historic Preservation Office. Additional consultation, surveys, and clearance may be required when project development would be conducted on the refuges or when activities would affect properties eligible for the National Register of Historic Places.

3.3 USES NOT CONSIDERED FURTHER

The planning team considered two other uses for the refuge complex, and determined that they would not be considered further. Discussions of the two uses—snowmobiling and overnight camping—follow in this section.

Snowmobiles

The Improvement Act found that compatible, wildlife-dependent uses are legitimate and appropriate uses of the Refuge System. The Improvement Act defined the priority public uses as hunting, fishing, wildlife observation, photography, environmental education, and interpretation, providing they are compatible with the purposes of the refuge (USFWS 2000d). Refuge managers may consider allowing other uses that are not wildlife-dependent recreational uses, but these would be lowest-priority because they are likely to divert resources from priority general public uses or other responsibilities. The refuge manager determines whether a proposed use is appropriate (USFWS 2006c). Snowmobiling is not a wildlife-dependent public use activity, nor is it an appropriate use for Medicine Lake NWR, and thus will not be considered for this CCP.

Overnight Camping

Similar to snowmobiling, camping may be permitted only when required to assist an approved wildlife-oriented recreational activity, providing it is determined to be appropriate (603 FW1) and compatible with refuge purposes (603 FW 2). The refuge is designated as a “day use area only.” Most

national wildlife refuges are day use only, with few exceptions. The exceptions are those that are so remote that visitors cannot use the refuge without camping overnight. Camping facilities are available near Medicine Lake. The staff makes off-site camping information available upon request.

3.4 ALTERNATIVES FOR MEDICINE LAKE NWR AND THE NORTHEAST MONTANA WMD

Three alternatives were developed for management of the Medicine Lake NWR and the Northeast Montana Wetland Management District.

Alternative A: No Action (Current Management)

Under alternative A, current management programs and efforts would continue throughout the refuge and wetland management district, requiring no significant increases in funding or staff. This alternative serves as the baseline to which other alternatives will be compared.

Habitat and Wildlife Management

Prairie and grassland habitat management would continue at the current level. Improvements of native prairie and “tame” grassland (composed of introduced but noninvasive pasture grasses) would be undertaken when and where they were feasible. Up to 5 percent of dense nesting cover (DNC) would be treated and restored annually. Control of nonnative plants would continue when feasible. Protection of native prairie and tame grasslands through easements and fee-title purchase from willing sellers would continue at the current approximate rate of 1,000 acres annually with an additional 4,000 acres receiving enhanced management through public outreach programs.

Wetlands management would continue to emphasize providing enough water and variety of wetlands conditions to sustain life requirements for migratory birds and to provide for diverse wildlife populations. Medicine Lake would be maintained in a “deepwater” condition (or as consistently deep as possible, rather than adjusting water levels). The refuge staff would conduct routine assessments of threats to wetlands and water tables.

Approximately 100 acres of privately-owned wetlands would be protected annually through easements or fee-title purchase from willing sellers. Another 330 wetland acres on private land would receive enhanced management through public outreach programs.

The refuge staff would continue to manage wildlife and maintain healthy populations of indigenous

fauna to the extent possible within the refuge boundaries. This includes maintaining current waterfowl nesting-success rates and population levels for waterfowl, passerines, shorebirds, colonial waterbirds (or waterbirds that nest in colonies), and sharp-tailed grouse.

Baseline data and threat assessments would be gathered on migratory birds, other birds of concern, and other wildlife, including mammals, amphibians, reptiles, and invertebrates.

A northern-pike sport fishery would be maintained at Medicine Lake. Some efforts would be made to restrict the establishment and spread of harmful nonnative species.

Endangered, Threatened, and Rare Species

The refuge complex would continue to contribute to preserving and restoring endangered, threatened, rare, and unique flora and fauna in the refuge complex. A breeding population of piping plover would be supported through site-specific plover habitat management plans, predator management, and cooperation with private landowners. The refuge hunting closure on sandhill cranes and tundra swans would continue to protect the whooping crane from accidental shootings.

Wilderness

Refuge staff would continue to preserve, manage, and protect the 11,360-acre Medicine Lake Wilderness. Management practices would continue to mimic historical natural disturbances, protect native plant communities, use the minimum tool concept, ensure compliance with class I air-quality standards, and protect the vista and aquatic resources of Medicine Lake.

Visitor Services

Current wildlife-dependent recreational opportunities and management of them would continue. Fishing on Medicine Lake and hunting for deer, upland game birds, waterfowl, and terrestrial furbearers would continue. Ice fishing would be continued only near the Highway 16 bridge or adjacent to refuge headquarters using temporary structures and no power equipment (structures must be pushed or dragged onto the lake by hand).

All refuge programs for interpretation, wildlife observation, outreach, and associated facilities would continue to operate on a limited basis (generally, there are no scheduled programs, but if staff resources are available, interpretive tours are provided), with no additional facilities or resources.

Environmental education opportunities would continue for schools and tour groups when feasible (these are conducted on a very limited basis, with no regularly scheduled programs), but the current

environmental education area near the Highway 16 bridge would remain open.

Annual visitor numbers would be expected to remain at approximately 16,000.

Refuge Operations

Staff levels would remain well below the minimum levels defined by region 6 in 2000, and several positions would remain vacant or be eliminated.

Partnerships

Existing partnerships would be maintained.

Cultural Resources

Cultural resources would continue to be minimally protected, as required by law. Cultural resource reviews, including possible inventories, would be done only in response to activities that constitute an undertaking under Section 106 of the National Historic Preservation Act (NHPA), and resources that are eligible to be listed on the National Register of Historic Places would be protected.

Research

Research projects would continue, but would not be considered priorities, based on habitat management objectives.

Alternative B: Increase Native Prairie Conservation and Restoration

Alternative B for Medicine Lake NWR and the Northeast Montana WMD would conserve natural resources by restoring or protecting native mixed-grass prairie and maintaining high-quality nesting habitats within the refuge complex. This alternative would focus funding for visitor services on developing access for visitors of all abilities and improving opportunities for wildlife-dependent uses (hunting, fishing, wildlife observation, photography, environmental education, and interpretation), while also encouraging a greater understanding and appreciation for migratory birds and other native wildlife, the mixed-grass prairie, the wilderness, and the Refuge System.

Habitat and Wildlife Management

Prairie and grassland habitat improvements would be increased moderately beyond current levels with a focus on protecting, enhancing, and restoring native species. The refuge staff would reduce populations of selected species of nonnative invasive plants and address crested wheatgrass, as a management priority (up to 50 percent of the refuge complex would be treated annually).

Wetlands management would emphasize maintaining enough water and creating a variety of wetlands

conditions to sustain a maximum range of migratory birds that use the refuge and wetland management district and provide for diverse wildlife populations, recognizing that many factors influencing bird populations extend beyond refuge boundaries or control.

Wildlife management would focus on habitat improvement for healthy populations. Management would include collecting baseline data and assessing threats on migratory birds, endangered and threatened species, and other birds of concern, as well as other wildlife. Active predator management would be continued as necessary.

The protection of native prairie, tame grasslands, and wetlands would be increased through easements and fee-title purchases. The approved refuge administrative boundary (figure 9 and appendix G) would be expanded through willing sellers or buyers, emphasizing three priority areas (approximately 1,784 acres total). Also, technical assistance and outreach programs would be expanded to enhance the management of privately owned grasslands (about 5,000 acres annually).

The refuge staff would continue baseline assessments of threats to wetlands, water tables, and water quality, and would expand water flow monitoring and identifying water needs at specific locations.

Endangered, Threatened, and Rare Species

The refuge and wetland management district would continue to contribute to preserving and restoring endangered, threatened, rare, and unique flora and fauna on the refuge complex. A breeding population of piping plover would be supported through site-specific plover habitat management plans, predator management, and cooperation with private landowners. The refuge hunting closure on sandhill cranes and tundra swans would continue to protect the whooping crane from accidental shootings, but an evaluation of the effect and need for closure would be made.

Wilderness

Similar to alternative A, refuge staff would continue to preserve, manage, and protect the 11,360-acre Medicine Lake Wilderness. Management practices would continue to mimic historical natural disturbances, protect native plant communities, use the minimum tool concept, ensure compliance with class I air-quality standards, and protect the vista and aquatic resources of Medicine Lake. The Service also would educate the community and visitors about the importance of the wilderness designation and how and why it is managed as it is (for example, allowing only nonmotorized vehicles).

Visitor Services

Management would emphasize improving and maintaining high-quality public opportunities for wildlife-dependent recreation for visitors of all abilities.

In general, most visitor facilities and activities would be limited to north of Medicine Lake except for the existing activities, such as ice fishing and environmental education, that occur next to the Highway 16 bridge. Closure of the road east of Gaffney Lake would be considered.

Visitor education would be expanded to ensure visitors are informed about existing rules and regulations. Visitor education also would provide more opportunities for visitors to learn about migratory birds and other wildlife, the mixed-grass prairie, the wilderness, and the Refuge System.

Similar to alternative A, hunting (deer, waterfowl, pheasants and other upland birds, and terrestrial furbearers) would continue.

Newly acquired land would be evaluated and, where feasible, opened to hunting. Additional compatible hunting opportunities would be evaluated. The current closure on tundra swans and sandhill cranes would continue.

The refuge staff would work collaboratively with Montana Fish, Wildlife, and Parks to maintain a sport fishery only on Medicine Lake for persons of all abilities.

It would identify potential new areas to open to the public for wildlife observation and photography.

The refuge staff also would re-establish regularly scheduled environmental education for schools and other groups (an average of between 15 and 20 programs would be offered annually).

A small-scale visitor contact station or other interpretive facilities would be developed (the location and size to be determined). Visitor brochures or signs would be updated as needed. The Service would initiate and foster a volunteer program.

Refuge Operations

Staffing levels would be increased to the levels approved by region 6, or approximately 20 full-time-equivalent staff members, including seasonal staff (table 5). Additional housing and office space would be developed to accommodate staff.

Habitat conservation would be a management priority for staff.

Partnerships

Public outreach would be enhanced by developing a refuge “friends group” and more volunteer opportunities. Existing partnerships would be strengthened, and new partners would be recruited to collaborate on wildlife and habitat conservation projects. Partnerships with private landowners, neighbors, and the surrounding community would be emphasized.

Cultural Resources

Similar to alternative A, cultural resources would continue to comply with all pertinent cultural resources laws, but would receive minimal attention. Cultural resource review, including possible inventories, would be done only in response to activities that constitute an undertaking under Section 106 of the NHPA. Resources that are eligible to be listed on the National Register of Historic Places would be protected.

Research

Applied research would be encouraged and would be supported if feasible. Research and monitoring would focus on measuring the effectiveness of habitat and wildlife management practices. Research on crested wheatgrass and other nonnative infestations would remain a priority.

Alternative C: Maximize Native Prairie Conservation and Restoration

Alternative C would maximize staff resources for conserving natural resources by restoring or protecting native mixed-grass prairie and maintaining high-quality nesting habitats within the refuge complex. Visitor programs would be improved but would focus primarily on encouraging a greater understanding of and appreciation for the mixed-grass prairie ecosystem while maintaining existing access and opportunities for wildlife-dependent uses.

Habitat and Wildlife Management

Prairie and grassland-habitat improvement and restoration activities would be increased significantly beyond current levels, using the latest scientific methods, such as remote sensing and satellite imaging. Reducing the populations of most invasive and nonnative plants would be the primary management priority (more than 50 percent of the refuge complex would be treated or restored annually).

Wetlands management would emphasize maintaining enough water and creating a variety of wetlands conditions to sustain migratory birds and

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Figure 9 land
11x17 map

provide for diverse wildlife populations. Protected diverse wetlands would be expanded, and technical assistance and public outreach to improve wetlands management on private lands would be increased.

Wildlife management would focus on improving habitats for healthy populations. Waterfowl nesting success rates would be increased through intensive predator management techniques. Baseline assessments would be more comprehensive than in alternative B, and would include all colonial waterbirds and breeding shorebirds.

The protection of native prairie, tame grasslands, and wetlands would be increased beyond the level of alternative B through additional easements and fee-title purchases and more refuge staff. On the refuge, the approved refuge administration boundary would be expanded to allow purchasing up to 8,400 acres primarily in the Big Muddy Creek floodplain corridor between the Medicine Lake and Homestead units. Also, technical assistance and outreach programs would be expanded significantly to enhance management of privately owned grasslands, comprising about 10,000 acres annually.

The refuge staff would continue baseline assessments of threats to wetlands, water tables, and water quality, and expand water flow monitoring and identifying water needs at specific locations.

Endangered, Threatened, and Rare Species

The refuge and wetland management district would continue to contribute to preserving and restoring endangered, threatened, rare, and unique flora and

fauna on the refuge complex. A breeding population of piping plover would be supported through site-specific plover habitat management plans, predator management, and cooperation with private landowners. The refuge hunting closure on sandhill cranes and tundra swans would continue to protect the whooping crane from accidental shootings.

Wilderness

Similar to Alternative A, refuge staff would continue to preserve, manage, and protect the 11,360-acre Medicine Lake Wilderness. Management practices would continue to mimic historical natural disturbances, protect native plant communities, use the minimum tool concept, ensure compliance with class I air-quality standards, and protect the vista and aquatic resources of Medicine Lake. The Service also would educate the community and visitors about the importance of the wilderness designation and how and why it is managed as it is (for example, allowing only nonmotorized vehicles).

Visitor Services

Management would emphasize promoting a greater understanding of the mixed-grass prairie ecosystem while maintaining the existing opportunities for wildlife-dependent recreation.

The refuge staff would increase visitor education to ensure visitors are informed about rules and regulations, visitor services opportunities, management activities, and the refuge complex's natural and cultural resources. The refuge staff specifically would inform visitors about the



Judy Wantulok/USFWS

Fire management programs support habitat management plans and their implementation at the refuge.

importance of the native prairie restoration efforts taking place within the refuge and wetland management district.

In general, most visitor facilities and activities would be limited to north of Medicine Lake except for the existing activities, such as ice fishing and environmental education, that occur next to the Highway 16 bridge. Closure of the road east of Gaffney Lake would be considered.

Similar to alternatives A and B, hunting (deer, waterfowl, pheasants and other upland birds, and terrestrial furbearers) would continue.

Newly acquired land would be evaluated and, where feasible, opened to hunting. Additional compatible hunting opportunities would be evaluated.

Similar to alternative B, the refuge would work collaboratively with Montana Fish, Wildlife, and Parks to maintain a sport fishery at Medicine Lake, as long as it was not dependent on refuge resources.

Some opportunities for wildlife observation and photography would be expanded. Environmental education for schools and other groups would be increased over alternative A, but would be less than alternative B (averaging between five and 10 programs annually). The primary focus of all interpretive and environmental education programs would be the refuge complex's native prairie restoration efforts.

Refuge Operations

Staffing levels would be increased above the levels defined by region 6, to about 21 full-time (permanent) staff members, plus additional seasonal staff. Additional restoration staff would be added. New housing and office space would be developed to accommodate staff. Habitat conservation would be a management priority for staff.

Partnerships (same as alternative B)

Public outreach would be enhanced by developing a refuge "friends group" and more volunteer opportunities. Existing partnerships would be strengthened, and new partners would be recruited to collaborate on wildlife and habitat conservation projects. Partnerships with private landowners, neighbors, and the surrounding community would be emphasized (see additional information under Visitor Services).

Cultural Resources

Similar to alternatives A and B, all cultural resources would be protected according to the NHPA and other laws. In addition, a sensitivity model indicating areas with a high potential for cultural resources would be established, and those areas would be surveyed.

Research (same as alternative B)

Applied research would become a priority and supported as feasible. Research and monitoring would focus on measuring the effectiveness of habitat and wildlife management practices. Research on crested wheatgrass and other infestations would remain a priority.

3.5 ALTERNATIVES FOR LAMESTEER NWR

Two alternatives were developed for Lamesteer NWR.

Alternative A: No Action (Current Management)

Under this alternative, Lamesteer NWR would continue to be an easement refuge superimposed on privately owned lands and used primarily as a resting place for wildlife while on migration. The dam and spillway would continue to be maintained by the Service, including all maintenance costs. The landowner would continue to control access to the site, including all hunting access or other visitor services.

Alternative B: Divestiture

Alternative B would take Lamesteer NWR out of the Refuge System and relinquish the easement to the current landowners. Under this alternative, the dam structure would be given up to the landowners or destroyed. The Service's easement requirements would no longer exist. The Service would divest its interest in the refuge. This would be carried out within the life of the plan. Once the CCP is approved, the managing station would work with the Division of Realty and the Land Protection Planning Branch within the Division of Planning to prepare a program proposal to divest the refuge. Appendix E identifies the criteria used in making the refuge analysis.

3.6 COMPARISON OF ALTERNATIVES

All of the alternatives outline courses for the future that are consistent with the purposes of the refuges, the Northeast Montana Wetland Management District, and with the mission and goals of the National Wildlife Refuge System. All alternatives would pursue the goals outlined in this CCP. Where alternatives are different is in the type and level of land management and protection they would offer to achieve long-term wildlife and habitat goals.

Table 5 compares the staffing requirements under each alternative for the Medicine Lake NWR complex.

Table 6 identifies and compares the management actions under each alternative for Medicine Lake NWR and the Northeast Montana WMD that would respond to the issues raised by Service manager, the public, and government partners.

Table 7 identifies and compares the management actions for two alternatives for Lamesteer NWR.

The management actions are summarized in the three alternatives for Medicine Lake NWR and the wetland management district (A, B, C) and the

two alternatives for Lanesteer NWR (A, B). Each alternative column provides a summary of actions; alternatives may be compared by reading across the page for each set of provisions and action. “Same as Alternative (A/B)” indicates management actions for that item are the same as the indicated alternative.

For Medicine Lake NWR and the WMD, alternative B and C are the action alternatives to be compared with the no-action alternative A. In most cases, management activities outlined in alternatives B and C increase from those in alternative A. Alternative B and C actions might be the same, similar, or quite different from alternative A and from each other.

Table 5. Comparison of Staffing Levels among Alternatives for Medicine Lake NWR and WMD

<i>Alternative A</i>	<i>Alternative B</i>	<i>Alternative C</i>
<i>No Action</i>	<i>Moderate</i>	<i>Enhanced</i>
Project Leader (485) (GS-13)	Project Leader (485) (GS-13)	Project Leader (485) (GS-13)
Deputy Project Leader (485) (GS-12)	Supervisory Resource Operations Specialist (485) (GS-12)	Supervisory Resource Operations Specialist (485) (GS-12)
Refuge Operations Specialist-(485) (GS-7/9) VACANT	Refuge Operations Specialist-(485) (GS-7/9) for WMD	Refuge Operations Specialist-(485) (GS-7/9) for WMD
NONE	Refuge Operations Specialist-(485) (GS-5/7/9) for Refuge	Refuge Operations Specialist-(485) (GS-5/7/9) for Refuge
Wildlife Biologist(486) (GS-11)	Wildlife Biologist (486) (GS-11)	Wildlife Biologist (486) (GS-12)
NONE	NONE	Wildlife Biologist (486) (GS-9/11)
NONE	NONE	Range Ecologist (455)(GS-11)
Biological Technician (404) (GS-5/7) VACANT	Biological Technician (404) (GS-5/7) WMD	Biological Technician (404) (GS-5/7) WMD
NONE	Biological Technician (404)(GS-5/7) Refuge	Biological Technician (404) (GS-5/7) Refuge
NONE	Resource Specialist (GS-9) Geographical Information Systems (GIS)	Resource Specialist (GS-9) Geographical Information Systems (GIS)
Administrative Officer (341) (GS-7/9)	Administrative Officer (341) (GS-9)	Administrative Officer (341) (GS-7/9)
NONE	Office Secretary (GS-5)	Office Secretary (GS-5)
VACANT	Park Ranger (025)(GS-9) Law Enforcement	Park Ranger (025)(GS-7/9) Law Enforcement
NONE	NONE	Park Ranger (025) (GS-7/9) Law Enforcement
NONE	Outdoor Recreation Planner (411)(GS-7/9)	Outdoor Recreation Planner (411)(GS-7/9)
Prescribed Fire Specialist (401) (GS-7/9)	Prescribed Fire Specialist (401)(GS-9)	Prescribed Fire Specialist (401)GS-7/9
VACANT	Fire Program Technician (455) (GS-5/7)	Fire Technician (455) (GS-5/6)
NONE	NONE	Fire Management Officer (401)(GS-9/11)
Maintenance Mechanic (4749) (WG-10)	Maintenance Mechanic (4749)(WG-10)	Maintenance Mechanic (4749)(WG-10)
Maintenance Worker (4749) (WG-8)	Maintenance Worker (4749) (WG-8)	Maintenance Worker (4749) (WG-8)
NONE	NONE	Seasonal Maintenance Worker (WG-8)

Table 6. Comparison of Alternatives for Medicine Lake NWR and Northeast Montana WMD

<i>Category</i>	<i>ALTERNATIVE A</i> <i>No Action (Maintain Current Management)</i>	<i>ALTERNATIVE B</i> <i>Increase Native Prairie Conservation and Restoration</i>	<i>ALTERNATIVE C</i> <i>Maximize Native Prairie Conservation and Restoration</i>
<i>Water Resources</i>	<p>Emphasize providing enough water and variety of wetland conditions to meet the needs of migratory birds, and provide for diversity of wildlife.</p> <p>Maintain Medicine Lake in deepwater condition.</p> <p>Routinely assess conditions.</p>	Same as alternative A	Same as alternative A
<i>Habitat--Native Prairie</i>	<p>Protect and improve existing native prairie where feasible. Maintain about 50% of native prairie on refuge complex lands in the desired plant community.</p> <p>Limit control of nonnatives where possible. Focus on reducing their spread across boundary areas.</p> <p>Use some treatments (prescribed fire, rest) on up to 25% of the refuge and WMD annually. No grazing.</p> <p>Reduce nonnative species only with staff availability, not routinely</p>	<p>Moderately increase restoration and enhancement efforts. Develop a habitat management plan (HMP) to determine the best prescriptions. Maintain about 75% of native prairie in the desired plant community.</p> <p>Continue control of all nonnative species, and emphasize crested wheatgrass as the highest priority.</p> <p>Increase treatments (prescribed fire, prescribed grazing, mowing, chemical controls) on up to 50% of refuge and WMD.</p> <p>Reduce Canada thistle by 40%, leafy spurge by 70%, crested wheatgrass by 15%, smooth brome grass by 30%, and Russian olive by 70% on refuge prairie.</p>	<p>Greatly increase restoration and enhancement efforts. Develop a habitat management plan (HMP) to determine the best prescriptions. Maintain 80% or more of the native prairie in the desired plant community.</p> <p>Control all invasive species and nonnative plants as a management priority.</p> <p>Increase treatments (fire, grazing, mowing, cutting, chemical controls) annually on >50% of the refuge and WMD.</p> <p>Reduce Canada thistle by >50%, leafy spurge by >80%, crested wheatgrass by >30%, smooth brome grass by >40%, and Russian olive by >80%.</p>

<i>Category</i>	<i>ALTERNATIVE A</i> <i>No Action (Maintain Current Management)</i>	<i>ALTERNATIVE B</i> <i>Increase Native Prairie Conservation and Restoration</i>	<i>ALTERNATIVE C</i> <i>Maximize Native Prairie Conservation and Restoration</i>
<i>Habitat--Native Prairie, cont.</i>	Protect at least 1,000 additional acres of native prairie on private lands through perpetual easements or fee-title purchases from willing sellers. Conserve the integrity of about 3,000 acres through technical assistance, education, and habitat improvement projects.	Over the life of the plan, protect at least 3,500 additional acres of native prairie on private lands through perpetual easements or fee-title purchases from willing sellers on the WMD. Through partnerships, provide technical assistance, education, and habitat improvement projects on an additional 5,000 acres.	Over the life of the plan, protect at least 10,000 additional acres of native prairie on private lands on the WMD through perpetual easements or fee-title purchases from willing sellers. Through partnerships, provide technical assistance, education, and habitat improvement projects, and conserve the integrity on an additional 10,000 acres throughout the complex.
<i>Habitat--Planted Grasslands</i>	Protect or restore up to 5% of dense nesting cover (DNC). Maintain high-quality plantings of DNC consisting of tall (>1 ft.), tame (noninvasive, introduced) wheat grasses with 20 to 40% legumes on at least 50% of previously cultivated areas. Convert about 100 acres annually to native prairie plant species when feasible. Assist in conserving the integrity of 1,000+ acres of tame grasslands on private lands in the refuge complex through outreach, technical assistance, education, and habitat improvement.	Emphasize DNC plantings less. Convert about 2,000 acres of land on the refuge complex that had produced crops to native prairie plant species, including warm and cool-season grasses and forbs, giving priority to areas that have become decadent and overrun by undesirable nonnative cool-season grasses. Annually conserve the integrity of 2,500+ acres of tame grasslands on private lands in the complex through outreach, technical assistance, education, and habitat improvement.	Emphasize DNC plantings less. Take actions similar to alternative B, but convert about 3,000 acres of tame grass plantings to native prairie. Annually conserve the integrity of up to 10,000 acres of tame grasslands on private lands through outreach, technical assistance, education, and habitat improvement.
<i>Wetlands</i>	<i>Managed wetlands:</i> Manage water levels to provide a variety of wetland conditions.	<i>Managed wetlands:</i> Manage water levels to provide a variety of wetland conditions.	<i>Managed wetlands:</i> Manage water levels to provide a variety of wetland conditions.

<i>Category</i>	<i>ALTERNATIVE A</i> <i>No Action (Maintain Current Management)</i>	<i>ALTERNATIVE B</i> <i>Increase Native Prairie Conservation and Restoration</i>	<i>ALTERNATIVE C</i> <i>Maximize Native Prairie Conservation and Restoration</i>
<i>Wetlands, cont.</i>	<i>Nonmanaged wetlands:</i> Protect 100 acres of privately owned wetlands annually through easements or fee-title purchases from willing sellers in the WMD and approved acquisition boundary. Enhance 330 acres by public outreach.	<i>Nonmanaged wetlands:</i> annually conserve 500 acres of wetlands on private land through technical assistance, outreach and habitat-improvement projects. Within 5 years, begin comprehensive monitoring of wetlands within the complex to assess threats and impacts to water quality and quantity.	<i>Nonmanaged wetlands:</i> Emphasize and expand conservation on private lands within the complex, and provide technical assistance and outreach to improve wetlands management on private lands. Same as alternative B
<i>Wildlife Management</i>	Emphasize maintenance of healthy populations of indigenous fauna. Maintain current Mayfield waterfowl nesting rates of 25% in uplands, 50% on islands, and 70% in predator exclusion areas. Gather baseline data on other migratory birds and birds of concern, as well as other wildlife. Control predators as necessary. Continue to pick up dead birds during botulism outbreaks.	Focus on improving habitat conditions for native wildlife and not species-specific management. Work with others to identify key species that occupy native prairie, and monitor other populations of mammals, amphibians, reptiles, and invertebrates to evaluate the success of habitat management activities. Same as alternative A Pick up dead birds only if determined necessary.	Increase waterfowl nesting success rates through intensive predator management techniques. Conduct more comprehensive baseline surveys than alternative B, and include all colonial waterbirds and breeding shorebirds. Same as alternative A Same as alternative A
<i>Threatened and Endangered Species</i>	Continue to preserve and restore threatened and endangered flora and fauna within the refuge complex, including piping plovers.	Same as alternative A	Same as alternative A

<i>Category</i>	<i>ALTERNATIVE A</i> <i>No Action (Maintain Current Management)</i>	<i>ALTERNATIVE B</i> <i>Increase Native Prairie Conservation and Restoration</i>	<i>ALTERNATIVE C</i> <i>Maximize Native Prairie Conservation and Restoration</i>
<i>Threatened and Endangered Species, cont.</i>	Continue the hunting closure on sandhill cranes and tundra swans on the refuge to protect whooping cranes.	Same as alternative A	Same as alternative A
<i>Land Acquisition</i>	Continue to protect native prairie and other grasslands within the approved acquisition boundary and WMD (maximum 1,500 acres annually) through easements and fee-title purchases from willing sellers. Introduce other enhancements through public outreach.	Same as alternative A, plus expand the administrative boundary by about 1,784 acres, and emphasize acquiring priority acres with high-quality grasslands or unbroken prairie (figure 9, table 14).	Same as alternative A, but increase protection of native prairie, tame grasslands, and wetlands. Expand administrative boundary by about 8,400 acres. Connect the Homestead area with the main part of refuge in the Muddy Creek floodplain corridor.
<i>Wilderness</i>	Continue to protect 11,360-acre Medicine Lake Wilderness. Comply with Class 1 air-quality standards, and protect vistas.	<p>Same as alternative A</p> <p>Use management practices that mimic historic natural disturbances, protect native plant and aquatic communities, and observe minimum tool practices.</p> <p>Evaluate all artificial islands for migratory bird production potential. Remove artificial islands not essential for habitat or harmful to migratory birds.</p> <p>Educate the public and community about differences and reasons for management practices within the designated wilderness, including nonmotorized uses.</p>	<p>Same as alternative A</p> <p>Same as alternative B</p> <p>Same as alternative B</p> <p>Same as alternative B</p>

<i>Category</i>	<i>ALTERNATIVE A</i> <i>No Action (Maintain Current Management)</i>	<i>ALTERNATIVE B</i> <i>Increase Native Prairie Conservation and Restoration</i>	<i>ALTERNATIVE C</i> <i>Maximize Native Prairie Conservation and Restoration</i>
<i>Visitor Services--Hunting</i>	Hunting opportunities for deer, upland game birds, waterfowl, and terrestrial furbearers would continue with the same access and opportunities.	Any newly acquired land would be evaluated and, where feasible, opened to hunting. Additional compatible hunting opportunities would be evaluated.	Similar to alternative B
<i>Visitor Services--Fishing</i>	<p>Maintain a northern-pike sport fishery. Restrict to some extent the establishment and spread of harmful nonnative fish species.</p> <p>Allow ice fishing during winter months next to the Highway 16 bridge area or refuge headquarters area. Do not allow power equipment or permanent structures; temporary structures must be hand pushed or pulled onto ice.</p>	<p>Provide a maximum of 10 months per year of public sport fishing on Medicine Lake when resources needed for the program do not adversely affect the refuge's ability to implement habitat and wildlife management.</p> <p>Same as alternative A. Provide anglers safe and reasonable access for visitors of all abilities, minimal conflicts with others, and satisfying experiences.</p>	<p>Generally same as alternative B</p> <p>Same as alternatives A and B</p>
<i>Visitor Services--Wildlife Observation, Photography, and Wildlife-dependent Recreation</i>	Maintain current levels of services--such as the auto tour route (also called wildlife drive), observation tower, pelican observation area, visitor exhibits at the headquarters building, and few improvements for access.	<p>Same as alternative A, but consider other opportunities, such as walking and cross-country skiing on auto tour route in areas north of Medicine Lake.</p> <p>Enhance and increase opportunities for access by all people.</p> <p>Emphasize quality over quantity, and link programs to habitat management.</p>	<p>Same as alternative A</p> <p>Provide more opportunities than alternative A, but fewer than alternative B.</p> <p>Emphasize promoting greater understanding of the short-grass prairie ecosystem.</p>

<i>Category</i>	<i>ALTERNATIVE A</i> <i>No Action (Maintain Current Management)</i>	<i>ALTERNATIVE B</i> <i>Increase Native Prairie Conservation and Restoration</i>	<i>ALTERNATIVE C</i> <i>Maximize Native Prairie Conservation and Restoration</i>
<i>Visitor Services-- Interpretation and Environmental Education</i>	<p>Continue tours and environmental education programs when feasible and on a sporadic basis.</p> <p>Maintain existing environmental education area next to Highway 16 bridge.</p>	<p>Within 3 years of writing an HMP and Visitor Services Plan, re-establish a minimum of at least 5 annual interpretive and/or environmental education programs.</p> <p>Focus funding for programs on education and appreciation of the refuge's natural and cultural resources; primary interpretive themes to be centered on the native prairie restoration efforts, the importance of the mixed-grass prairie ecosystem, and other refuge operations.</p> <p>By year 15, conduct an annual average of between 15 and 20 environmental education or interpretive programs. Maintain environmental education area next Highway 16 bridge.</p>	<p>Provide more opportunities than alternative A but fewer than alternative B.</p> <p>Similar to alternative B but fewer programs and resources allocated.</p> <p>By year 15, conduct an annual average of between 5 and 10 environmental education programs. Maintain existing environmental education area.</p>
<i>Refuge Operations</i>	<p>Maintain staffing levels below the minimum set by region 6 in 2000 (currently 11 full-time-equivalent positions [FTEs], with several vacant FTEs and some seasonal staff).</p>	<p>Increase staffing levels to levels defined by region 6 (approximately 16 FTEs, plus seasonal staff as needed to equal about 20 FTEs).</p> <p>Make habitat conservation a management priority for filling staff positions. Provide housing as needed.</p> <p>Develop a small-scale visitor contact station and other interpretive facilities.</p>	<p>Increase staffing levels (about 21 FTEs, plus additional seasonal staff as needed beyond 20 FTEs).</p> <p>Add habitat restoration staff. Develop new housing and office space to accommodate staff. Conserving habitat would be the management priority.</p>

<i>Category</i>	<i>ALTERNATIVE A</i> <i>No Action (Maintain Current Management)</i>	<i>ALTERNATIVE B</i> <i>Increase Native Prairie Conservation and Restoration</i>	<i>ALTERNATIVE C</i> <i>Maximize Native Prairie Conservation and Restoration</i>
<i>Cultural Resources</i>	Conduct cultural resource reviews, including possible inventories in response to activities that constitute an undertaking under the NHPA. Comply with all cultural resource laws, and protect resources that are eligible to be on the National Register of Historic Places.	Same as alternative A	Same as alternative A, plus establish sensitivity model (to determine areas that likely have obscured or buried cultural resources) and survey those areas.
<i>Partnerships and Public Outreach</i>	Continue outreach at current levels. Maintain existing partnerships with state, local, and other organizations.	Enhance public outreach by creating a refuge “friends” group. Increase volunteer opportunities. Increase community involvement. Strengthen existing partnerships, focusing on private landowners, neighbors, and the surrounding community. Recruit new partners for wildlife and habitat conservation projects. Annually reach at least 200 individuals through formal and informal events and activities. Focus outreach to increase awareness, appreciation, and understanding of natural resource conservation and management practices. Promote the significance of the remaining native prairie grasslands and wetlands among area landowners and the local and regional community.	Similar to alternative B Same as alternative B Same as alternative B Same as alternative B Same as alternative B

<i>Category</i>	<i>ALTERNATIVE A</i> <i>No Action (Maintain Current Management)</i>	<i>ALTERNATIVE B</i> <i>Increase Native Prairie Conservation and Restoration</i>	<i>ALTERNATIVE C</i> <i>Maximize Native Prairie Conservation and Restoration</i>
<i>Research</i>	Continue research projects, though they would not necessarily be based on refuge priorities.	Conduct applied research projects on the basis of priority need, and support them as feasible. Focus on measuring the effectiveness of habitat and management practices. Conduct research on crested wheatgrass and other infestations as a higher priority.	Same as alternative B Same as alternative B

Table 7. Comparison of Alternatives for Lamesteer NWR

<i>Issue</i>	<i>Alternative A (No Action)</i>	<i>Alternative B (Relinquish Easement to Current Landowners)</i>
Habitat and Wildlife	Maintain passive management with no management of upland habitat by the Service (the refuge offers minimal habitat value and is primarily a resting place for some birds).	The landowner has sole responsibility for managing habitat and wildlife.
Visitor Services	Hunting allowed with the permission of the private landowner.	Same as alternative A
Cultural Resources	Provide minimum protection as required by existing laws.	The landowner has sole responsibility to protect cultural resources.
Operations and Maintenance	Rehabilitate the dam structure.	No dam rehabilitation by Service; transfer responsibility for operating and maintaining the dam to the landowner.
Partnerships	None	Up to landowner
Easement Rights	Maintain the right to impound water.	Relinquish all easement rights, including the right to impound water.

4 Affected Environment

This chapter describes the characteristics and resources of the Medicine Lake NWR Complex. It specifically addresses physical, biological, cultural, and socioeconomic resources, as well as recreational opportunities.

4.1 GEOGRAPHIC AND ECOSYSTEM SETTING

The refuge complex is located in northeastern Montana, and includes the 31,660-acre Medicine Lake NWR (figure 6, chapter 2) and the Northeast Montana WMD (figure 8, chapter 2). The refuge and WMD are bounded on the south by the Missouri River, on the north by Saskatchewan, Canada, and on the east by North Dakota. The refuge complex lies within the highly productive Prairie Pothole Region (figure 3, chapter 1) of the Northern Great Plains and has topography typical of the glacial drift prairie, with relatively gentle rolling plains and numerous shallow wetland depressions. The 800-acre Lamesteer NWR (figure 7, chapter 2), located in Wibaux County, Montana, is a limited-interest easement refuge, and the third component of the refuge complex.

For Service administrative and planning purposes, the refuge complex is considered within both the main stem Missouri ecosystem and the Missouri/Yellowstone/Columbia Rivers (MOYOCO) ecosystem (figure 4, chapter 1). Vegetation is primarily the wheatgrass-needlegrass association of the mixed-grass prairie (Coupland 1950, Kuchler 1966), but transitions into short-grass prairie, mostly grama-wheatgrass association, in western portions of the refuge complex.

Historically, this area was a treeless expanse of prairie, with plants kept in relatively short stature by frequent fires and grazing by native mammals, most notably bison (Coues 1878, Murphy 1993, Bragg 1995). In 1805, the explorer Captain William Clark wrote in his journal that the southern end of the Big Muddy valley was “a beautiful and extensive valley as far as can be seen.” Clark wrote that he saw “only a single tree in this fertile valley” (Moulton 1986). Other early explorers also describe a “barren” landscape, with little or no woody vegetation (Cooper 1869, Coues 1878, Preble 1910). Trees and shrubs were restricted to draws and other fire sheltered areas. These prairies supported an estimated 5- to 10-year fire return interval (Wright and Bailey 1982, Murphy 1993, Bragg 1995). Climatic variation and periodic rest from wildland fires and

grazing resulted in a mosaic of vegetation types across the landscape at any given time.

Settlement of the area by Europeans during the early 1900s brought extreme changes that impacted the vegetation. These changes included suppression of wildland fires, extirpation (or wiping out) of bison and their replacement by domestic livestock, and the tilling and farming of the prairies. Settlers also planted trees as windbreaks, and introduced exotic plants to the landscape. Approximately 60 percent of this area is now cultivated, primarily for small grains, with recent increases in oil seed crops such as safflower and canola (figures 6, 7, 8, chapter 2). About 25 percent of the cropland base is enrolled in the conservation reserve program. The land use for noncultivated areas is primarily livestock grazing and hay production.

The Northeast Montana WMD encompasses a total of 11,791 acres in 44 waterfowl production areas that range in size from 4 to 2,012 acres. An additional 8,588 acres of privately owned wetlands are protected from drainage, burning, leveling, and filling by perpetual wetland easements. Perpetual grassland easements protect 10,968 acres from cultivation.

The WMD lies within the Williston Oil Basin, which was one of the most active oil regions in the lower 48 states during the early 1980s. Oil exploration and development is widespread throughout the area. Recent advances such as horizontal drilling and 3-D seismic technology resulted in renewed oil exploration activity in the mid-1990s. The majority of waterfowl production area tracts were acquired without mineral rights. Reservations for development of the subsurface minerals were retained by the owners or their assigned third party. For this reason, seismic exploration and oil well development is common in waterfowl production areas.

4.2 CLIMATE

The climate of the region is continental and characteristic of the northern Great Plains, with cold winters, hot summers, and peak rainfall during the early-to-mid growing season. Weather is often extreme and variable, with periodic drought, severe blizzards, great fluctuations in temperature both annually and daily, and frequent strong winds. The growing season is usually 110 to 125 days long, with

about 80 percent of annual precipitation occurring during this time. Annual precipitation averages 13 inches (1911–2000), but fluctuates greatly.

For example, at Medicine Lake NWR, 1 year in 10 has average precipitation of less than 9.5 inches or more than 19.1 inches (Richardson and Hanson 1977). Total annual snowfall averages 27 inches (1911–2000). Evapotranspiration losses from water areas are about 50 inches per year. Average daily minimum and maximum temperatures are minus 4 degrees Fahrenheit in January and 85 degrees Fahrenheit in July.

4.3 GLOBAL WARMING

The U.S. Department of the Interior issued an order in January 2001 (DOI 1999) requiring federal agencies under its direction that have land management responsibilities to consider potential climate change effects as part of long-range planning endeavors.

A Department of Energy report, “Carbon Sequestration Research and Development,” (DOE 1999) 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 (CO₂) within the earth’s atmosphere has been linked to the gradual rise in surface temperature commonly referred to as “global warming.” Carbon sequestration constitutes the primary climate-related effect to be considered in comprehensive conservation planning for Refuge System units.

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 CO₂.

One Service activity in particular—prescribed burning—releases CO₂ directly into 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 an amount of carbon approximately equal to the amount emitted into 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.

4.4 AIR QUALITY

A recently initiated monitoring program will provide an air-quality assessment, though air quality is believed to be good due to the refuge complex’s remoteness from significant industrial or urban pollution sources. The Medicine Lake Wilderness is a Class I Air Quality Area, and receives special protections against air pollution under the federal Clean Air Act. The refuge is a member of the IMPROVE (Interagency Monitoring of Protected Visual Environments) network, a cooperative program of federal and state agencies whose primary purpose is to protect visibility in Class I areas and to characterize regional haze.

4.5 GEOLOGY AND SOILS

The plains landscape of northeast Montana was shaped by repeated advances and retreats of glaciers. Prominent landforms are the Missouri Coteau and associated “prairie potholes,” the Big Muddy Creek channel, and the Medicine Lake-Dagmar channel (explanations follow). Elevation in Sheridan County ranges from 1,933 to 2,600 feet (Richardson and Hanson 1977).

The northeast corner of the refuge complex experienced at least three episodes of glacial advances (Heidel et al. 2000), with the most recent leaving the distinctive, hummocky, collapsed glacial moraine known as the Missouri Coteau. This steep, irregular terrain produced a high density of wetland basins of assorted shapes and sizes, known as “prairie potholes.” Outwash channels fringe the glacial sediments. Here, bedded glacial sediments lie in low points of the topography in closed-basin watersheds, and form some of the most extensive alkali lake systems in Montana (Heidel et al. 2000). Soils over much of the moraine deposits are mapped

as Zahill-Williams-Dimmick association, and are characterized as well-drained to poorly drained clay loams, loams, and silty clays, with sand and gravel layers in the outwash deposits (Richardson and Hanson 1977).

The present-day Big Muddy Creek is a narrow (approximately 20 to 30 feet wide) perennial prairie stream, the largest in Sheridan County. These floodplain soils were formed primarily from glacial outwash and alluvial deposits, are moderately to poorly drained, and are saline or salt-affected in many locations. Numerous wetlands were formed from shallow depressions, oxbow cutoffs, and a high water table from underground aquifers. Big Muddy Creek has its headwaters in Saskatchewan and the northwestern corner of Sheridan County, and flows southward through the refuge complex into the Missouri River. The broad 1- to 3-mile wide valley is a major outwash channel formed by a glacial front more than 12,000 years ago (Clayton et al. 1980), and is bordered by pre- and postglacial terraces.

Another major outwash channel is the Dagmar Channel, which runs southwest–northeast from Medicine Lake through the Lake Creek drainage. This broad channel is now nearly filled with glacial outwash and alluvium, but is believed to have been the pre-glacial route of the Missouri River into Hudson Bay.

Medicine Lake is a large (8,218-acre) shallow lake filling this ancient valley. The lake was designated a National Natural Landmark by the National Park Service in 1980 to recognize the area's "exceptional value as an illustration of the nation's natural heritage."

To the southeast of the lake are large sand deposits that formed as the wind scoured sand out of the lake bed. Gentle sand plains and small ridge systems developed parallel to the prevailing northwest wind, with resulting choppy sand dunes ranging between 20 and 40 feet in height. This area, known as the Medicine Lake Sandhills, comprises over 20 square miles, and is one of the most extensive sandhills formations in Montana.

Soils in the Medicine Lake area include the Blanchard association throughout the sandhills, composed of well-drained and droughty, fine and loamy sands, and the Lihen-Parshall association throughout the gentle sand plains, composed of well-drained, loamy, fine sands and fine sandy loams. The Dagmar channel area has the contrasting McKenzie association, with poorly drained, silty, clay loams in lowlands (Heidel et al. 2000).

An extensive aquifer system underlies the eastern portion of the refuge complex, including the refuge. This system is referred to as the Clear Lake Aquifer, and is composed of several buried glacial outwash channels and the buried ancestral Missouri

River channel (Reiten 2001). The aquifer extends northeast and southwest for approximately 40 miles, with 28 miles in Montana and the remaining 12 miles in North Dakota. The width of the aquifer ranges from more than 3 miles wide east of Medicine Lake to 0.6 miles at its narrowest in North Dakota.

4.6 REFUGE COMPLEX RESOURCES

The refuge encompasses 31,660 acres in Sheridan and Roosevelt counties, and includes about 13,010 acres of open water and marsh, 14,890 acres of native prairie and 3,760 acres of previously cultivated lands now maintained mostly in perennial grass plantings. Most of the surrounding private land is intensively farmed for small grain.

The refuge consists of two noncontiguous tracts. The main tract includes the 8,218-acre Medicine Lake, five smaller lakes, and numerous potholes. The smaller tract to the south contains the 1,280-acre Homestead Lake. Within the main tract of the refuge, the 11,360-acre Medicine Lake Wilderness was established by Congress in 1976. This area includes the main water body of the lake, the islands within, and the 2,320-acre Sandhills Unit, with rolling hills, native grass, brush patches, and a few relic stands of quaking aspen.

Four locations on the refuge were designated as research natural areas in 1972. They include Bruce's Island (367 acres), Big Island (251 acres), Teepee Hills (95 acres), and Homestead (39 acres).

Within the Northeast Montana WMD, most (40 of 44) of the waterfowl production areas are located in Sheridan County, with three in Daniels and one in Roosevelt County. They generally have a significant wetland component, interspersed with native prairie and perennial grass plantings in the uplands.

Located 160 miles south of Medicine Lake NWR, Lamesteer NWR was established in 1941 as an easement refuge. However, the Service purchased from the landowner only about 2 of the 800 acres to construct a dam and for the rights to hunt and trap the land. Only water management and facilities maintenance rights currently are covered by the easement. The refuge consists of about 110 acres of marsh habitat, 350 acres of grassland, and 340 acres of cropland.

Water Resources and Associated Wetlands

Wetlands in the refuge complex are diverse in size and type (figure 10). On the refuge, wetland types include: lakes (11,430 acres), semi-permanent wetlands (1,470 acres), seasonal wetlands (464 acres), temporary wetlands (660 acres), and river (46 acres).

The Big Muddy Creek runs along the western boundary of the refuge. A diversion canal was constructed to bring Big Muddy Creek waters into Medicine Lake. A dam adjacent to the Homestead Unit allows a diversion of Big Muddy Creek into Homestead Lake. The Lake Creek drainage originates in North Dakota and flows southwest into the refuge, receiving inflow from ephemeral creeks and overflows from numerous lakes. Water is also provided to the eastern refuge water units from Cottonwood and Sand Creeks and eventually flows into Medicine Lake and Big Muddy Creek. The Homestead Unit receives water from Big Muddy Creek on the western boundary and spring season flows from Lost and Sheep Creeks to the east.

The watershed for Medicine Lake is approximately 2,447 square miles, 214 square miles of which are in Canada. This includes the Big Muddy Creek and the

tributaries that feed it. Elevation of the drainage varies from 2,910 mean sea level (msl) at the highest point to 1,920 msl at the confluence with the Missouri River.

The waterfowl production areas in the refuge complex contain 3,841 acres of wetlands ranging from small temporary areas that hold water for only a few weeks, to large permanent lakes. Waterfowl production areas are concentrated in the Missouri Coteau, Prairie Pothole Region of northeast Sheridan County. The outwash terrain around Westby and the collapsed moraine landscape around Comertown contain a particularly high density and diversity of wetlands. The Westby area has some of the most extensive alkali lake systems in the state of Montana.



Judy Wantulok/USFWS

Wetland management contributes to the preservation of unique flora and fauna that attract butterflies to the refuge complex.

Place Holder for
Figure 10 habitat

11x17 map

Eighty percent of the refuge complex water comes by way of snowmelt from the watershed. Although spring and summer rains contribute to the water supply, most rain is absorbed in the soil or lost through evapotranspiration. Significant runoff from rainfall can occur if the soil is frozen or an extremely heavy rainstorm occurs.

Montana water law dates back to territorial days and is based on the doctrine of “prior appropriation.” Under this doctrine, the first landowner to put water to beneficial use has the most senior right. When adequate water supplies are available for all users, the issue of water rights is minor. However, when water resources are limited, it becomes an important issue.

On November 7, 1936, the Bureau of Biological Survey filed Notices of Appropriations of water for use on the refuge. Table 8 indicates sources and water appropriations by stream.

In 1970, an additional appropriation of 300 cubic feet per second was made on Sheep Creek for Homestead Lake. The only total water volume stated in any filing for Medicine Lake was in the appropriations for Big Muddy Creek, which was 55,000 acre-feet.

As a result of 1979 Senate Bill 76 and a 1979 Montana Supreme Court order, every person claiming ownership of a state-based water right from before July 1, 1973, had to file a statement of claim before January 1, 1982, or risk losing the water right. (Small livestock water claims, domestic claims for groundwater, and instream flow claims were exempted from this requirement.) Thirty claims were filed for a total of 146,715 acre-feet of water. Included were applications for refuge complex stream diversions, water wells, and small ponds. The claims are supplemental to each other, because the bulk of the water is retained in lakes, where the total capacity, at desired management levels, is approximately 108,811 acre-feet. No final action has been taken by the Montana Water Court on any of the water rights claims the Service submitted for the refuge.

There have been numerous filings for water rights on Big Muddy Creek, and several are senior to the refuge. By law, these senior water right holders have a right to water coming down the creek. Once they have had an opportunity to take their share of the water, the refuge can take its share. In the past there has not been a problem with senior water right holders, and there has been enough water to fill their needs. The Assiniboine and Sioux Native American tribes hold a senior downstream right to the Big Muddy Creek, known as the “Fort Peck Compact.” However, with the exception of the irrigation of 523 acres of tribal lands, the tribal right is subordinate to the refuge’s rights. In addition, there are junior water right holders upstream of the refuge that cannot divert if the refuge’s senior rights are not whole and the refuge needs water. In dry years, the refuge sends letters to junior users, requesting they refrain from taking water until refuge needs are met. In every year that letters have been sent, the junior water right holders upstream have been cooperative in respecting the refuge’s request.

The Clear Lake Aquifer underlies much of the refuge complex, and the Sheridan County Conservation District (SCCD) manages a reserved water right for irrigation from this aquifer (Reiten 2001). Precipitation recharges the aquifer, and the amount and distribution of recharge are beginning to be understood, including water losses from the aquifer. Water evaporates from the aquifer system, where it reaches the surface at sloughs and lakes. Groundwater is consumed by some plants, called “phreatophytes,” whose roots can tap the water table.

The effect of irrigation pumping on aquifer levels is more understood through monitoring of wells and documenting use. In 2005, documented water use was approximately 3,881 acre-feet of water extracted from the Clear Lake Aquifer (Reiten 2006). This is the twelfth-highest reported usage in the past 26 years, in a year with heavy summer rains, hail damage to some crops under irrigation

Table 8. Water Appropriations by Streams at Medicine Lake NWR

<i>Source</i>	<i>Amount in cubic feet per second (cfs)</i>
Big Muddy Creek (to Medicine Lake)	1,200 cfs
Big Muddy Creek (to Homestead)	50 cfs
Cottonwood Creek	100 cfs
Sand Creek	75 cfs
Lost Creek	25 cfs
Sheep Creek	20 cfs
Lake Creek	100 cfs

systems, and a cooler-than-normal average temperature, resulting in lower water demand (Reiten 2006).

The SCCD has managed a moderate growth of irrigation development so that any evidence showing over-allocation of water resources can be evaluated before the development has an impact on other water resources. The refuge is a voting member on a technical oversight committee that evaluates water resource data before approving permit applications for drilling new wells.

Water Quality

Agriculture is the most extensive land use in the Big Muddy watershed. Fifty-three and 43 percent of the acreage is classified as range land and dry land agriculture, respectively (SCCD 2006). Another 3 percent of the land is used for irrigated agriculture. Less than 1 percent of the watershed is mapped for urban land use.

The SCCD conducted a study of Big Muddy Creek in 2000 to assess the general conditions of the creek. Thorough analyses of inorganic constituents and measurable total maximum daily load in the creek water still need to be addressed. A total maximum daily load (or TMDL) is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards. At all sampling sites, flow measurements are being performed to evaluate flow alterations to the drainage.

The full inorganic suite includes nutrients, salinity, total dissolved solids (TDS), chlorides, suspended solids (SS), temperature, pH, and metals, which are listed under TMDL parameters for Big Muddy Creek (SCCD 2006; USFWS 2006d).

Probable causes of water quality degradation are agriculture, crop production, rangeland, and flow modification of receiving streams due to surface water discharges. The discharges of ground water into the Big Muddy probably have significant controls on the creek at most times other than during episodes of runoff. Potential degradation of these groundwater resources by oil development and agricultural practices may significantly impact the surface water resources.

Vegetation

Approximately 40 percent of the landscape in the 3-county refuge complex remains in native prairie, with most used as livestock pasture or hay land. On the refuge, about 14,000 acres is native mixed-grass prairie, of which approximately 3,600 acres were farmed or otherwise disturbed before the Service acquired the land in 1935 (figure 10).

Most of these acres have been replanted since the

1960s as dense nesting cover (DNC), a mixture of several tame wheatgrasses and legumes that is particularly attractive to nesting waterfowl. Old shelterbelt plantings of trees and shrubs, such as cottonwoods, junipers, Russian olives, and green ash, are scattered throughout the refuge complex, although most have succumbed to drought over the years. Today, the only tree plantings that are maintained are the windbreaks at the refuge headquarters. In the WMD, the 44 waterfowl production areas contain about 5,500 acres of planted tame grasses and 3,400 acres of native prairie.

The native mixed-grass prairie is dominated primarily by western wheatgrass, needle and thread, and blue grama, but plant associations fluctuate greatly in time and space with annual moisture, slope, aspect, and soil type. Grasses are interspersed with a diversity of forbs and patches of low shrubs, especially in the sandhills where chokecherry and snowberry patches are common on slopes and flats between dunes. Subirrigated, wet meadow areas are dominated by prairie cordgrass, switchgrass, western wheatgrass, rushes and sedges, and abundant forbs. More than 42 plant associations have been identified and described for Sheridan County (appendix H, Heidel et al. 2000). Herbaceous groups make up the majority of these, but two woodland and seven shrub land groups were also identified.

Of the herbaceous types, more than 20 are wetland plant associations. Hard stem bulrush is the most prevalent deep-marsh emergent on Medicine Lake NWR and the WMD wetlands, and is well adapted to the area's brackish water. Alkali bulrush dominates the wetlands with higher dissolved salt levels, while cattail species are locally abundant in fresher basins. Common, shallow-marsh, emergent plants include smartweeds, spikerushes, and sedges. Whitetop is a common dominant in seasonal wetlands in the Missouri Coteau, but is rare in the refuge complex.

Wetland margins (riparian zones) exhibit the greatest diversity of grasses, sedges and rushes, and forbs. Species composition is influenced largely by water quality, water permanence, and soils. Sago pondweed is probably the most abundant submerged aquatic, but other species of pondweeds, water milfoil, and common bladderwort are also common.

For management purposes, upland vegetation of the refuge complex is summarized in the following six groups.

Sparse Mixed-grass Prairie

Dominant grasses are needle and thread, blue grama, threadleaf sedge, and prairie Junegrass. Prairie muhly grass is a codominant in some settings. Other less-dominant grasses include western wheatgrass and prairie sandreed. Clubmoss is common. The Big Muddy headwaters area also might host the little bluestem-prairie muhly

association. Sparse mixed-grass prairie is found in well-drained upland sites, especially hilltops and glaciated areas, and includes thin, hilly, shallow-to-gravel and thin-breaks range sites.

Mixed-grass Prairie

Dominant grasses are needle and thread, western wheatgrass, and blue grama. This is a prevalent upland type that includes silty and shallow-to-gravel range sites. Mixed-grass prairie is found on slopes and wetter sites than sparse prairie.

Northern Mixed-grass Prairie

Dominant grasses are thick-spike, northern porcupine grass (often on north-facing slopes), western wheatgrass, and green needlegrass. Blue grama grass drops out, and upland sedge cover is generally low. Needle and thread is codominant in some associations. Big and little bluestem may be present but probably do not codominate in well-developed plant communities. The northern mixed-grass prairie includes silty and clay range sites, and is prevalent in the Prairie Pothole Region and some of the outwash channel areas of the landscape.

Sand Prairie

Dominant grasses are prairie sandreed and needle and thread, with blue grama, threadleaf sedge, sand dropseed and sand bluestem grasses common. Western wheatgrass is among the codominants in swales and on gentle plains. The sand prairie includes sandhills and sandy range sites. Sand blowouts (small active nonvegetated areas of moving sand) are often dominated by an Indian ricegrass–scurf pea association, commonly with less than 5 percent vegetation cover.

Wet Meadow

Dominant grasses are prairie cordgrass, northern reedgrass, and sedges and rushes, as well as switchgrass, mat muhly, clustered field sedge, slender and western wheatgrass, and sometimes codominant little bluestem. Tall forbs (wild licorice, sow thistle, dock) are abundant even if they do not dominate in natural conditions. Wet meadows are found in subirrigated, overflow, and dense-clay range sites. Monotypic stands of western wheatgrass (without other upland grasses) are wet meadow features on dense clay, as found in the Big Muddy floodplain.

Saline Lowland

Dominant grasses are alkali grass and salt grass. Slender and western wheatgrasses, mat muhly, foxtail barley, sedges and rushes, and greasewood are also found in saline lowland and dense-clay range sites.

Plants of Special Concern

Fifteen plant species of special concern have been identified in the refuge complex (Heidel et al. 2000). The Medicine Lake sandhills harbor five plant species of special concern, at least three of which—Schweinitz' flatsedge, Fendler cats eye, and plains phlox—have their highest known numbers for the state in this area.

Five Montana wetland plant species of special concern have been found in the Missouri Coteau area of the refuge complex. Four occupy the dynamic wetland edge: many headed sedge, chaffweed, pale spike lobelia and northern blue-eyed grass. Two woodland plant species that are on the state watch list, lavender hyssop and common agrimony, are found in the Big Muddy headwaters area.

Integrity of native vegetation has been compromised by the planting and subsequent spread of exotic invasive plants. Crested wheatgrass dominates much of the refuge grasslands. It was planted extensively on retired cropland in the 1930s and 1940s, and has subsequently spread to many areas beyond the original seeding. Smooth brome is another introduced grass that is prominent in more mesic (moderately moist) sites throughout the refuge complex, and quackgrass and Kentucky bluegrass are present to a lesser degree. Russian olive, an exotic invasive tree originally planted in shelterbelts, has become established in native prairie throughout the refuge complex.

Four state-listed invasive plants are found in the refuge complex. Leafy spurge infests approximately 50 acres, mostly in the sandhills, the Big Island on Medicine Lake, and the Parry waterfowl production area. Canada thistle is widespread, especially in low-lying and disturbed areas, and infestations fluctuate with precipitation. Small (<0.1-acre) patches of spotted knapweed and dalmation toadflax on the refuge and Carlson Waterfowl Production Area are being intensively managed for eradication.

Grasslands in the refuge complex are maintained and enhanced with prescribed grazing and fire, haying, and rest. These management tools mimic the natural processes (naturally caused fires and grazing by bison) that historically maintained vegetation in the northern Great Plains, by removing accumulations of litter, increasing native plant vigor, inhibiting many exotic plants, and fostering plant-soil feedback mechanisms, such as fast and slow nutrient cycling (Wright and Bailey 1982, Higgins et al. 1989, Braff and Steuter 1996).

Wildlife

Wildlife of the refuge complex is typified by a rich fauna of native prairie and wetland associated species. Although most of the larger native mammals, such as bison, elk, gray wolf, and grizzly bear, were extirpated from the area, many other

wildlife species historically found in the area are still present today. Species lists and scientific names for birds, mammals, amphibians, reptiles, and fishes are found in appendix H.

Birds

The refuge complex provides breeding and migration habitat for a diverse group of bird species. In fact, the refuge complex has been designated one of the top 100 Globally Important Bird Areas in the United States by the American Bird Conservancy (ABC) (Chiple 2001). The refuge complex bird list includes 283 species, of which 126 are documented breeders, 5 are introduced species, 1 is extinct, and 2 extirpated from the area (appendix H). Four species are listed as endangered or threatened under the federal Endangered Species Act. Twenty-seven species are Service nongame migratory bird species of management concern (USFWS 2002, table 9), and 20 of those breed within the refuge complex.

Historically, the bird community of Northeast Montana was composed of prairie nesting species. Endemic chestnut-collared longspur, Baird's sparrow, Sprague's pipit, and lark buntings were among the most common songbirds, and ground nesting ferruginous hawks, burrowing owls, short-eared owls, northern harriers, and Swainson's hawks dominated the raptor community (Coues 1878, Allen 1874, Preble 1910, Murphy 1993). Sharp-tailed grouse and mourning doves were common upland game birds (Allen 1874, Preble 1910).

The changes wrought by agriculture and human settlement greatly decreased the abundances of most native prairie-nesting species, while fostering some increases in tree-nesting species such as great-horned owls, red-tailed hawks, black-billed magpie, crows, and many nonendemic songbirds (Houston and Bechard 1983, Murphy 1993, Igl and Johnson 1997).

The refuge complex is central to the breeding ranges of the passerine birds (or songbirds) endemic to the northern Great Plains, many of which are experiencing alarming population declines (Sauer et al. 1997). From 1995 to 2000, the most abundant breeding passerines in refuge grasslands were grasshopper sparrow, Baird's sparrow, chestnut-collared longspur, and Savannah sparrow. Western meadowlarks, clay-colored sparrows, lark buntings, Sprague's pipits, and bobolinks were also common.

From 1998 to 2000, waterfowl production areas in Sheridan County hosted similar large bird communities, except that Sprague's pipits were far more abundant than on the refuge (USFWS 2000c). The composition of these prairie songbird communities is similar to the historic descriptions for the area (Coues 1878, Allen 1874, Preble 1910), except that McCown's longspur is not commonly found here now, but breeds further west in Montana.

All of these species are showing continental declines, mostly due to loss of native grassland habitats. Many are also "area sensitive," meaning they disappear from an area once grasslands are fragmented to less than a minimum size. Much of the reason these species still occur in high numbers in northeast Montana may be the relatively intact nature and size of remaining prairie areas.

The importance of this area to breeding and migrating waterfowl has long been recognized and was the primary reason for the purchase of the refuge in 1935. The density of breeding duck pairs is highest in the Missouri Coteau and the refuge complex (figure 11). Most common nesting ducks are mallard, gadwall, northern pintail, northern shoveler, blue-winged teal, and lesser scaup, with a total of 14 species breeding locally.

Although the density and diversity of nesting waterfowl is outstanding, more remarkable are the area's high rates of success for nesting birds and recruitment (successful reproduction)—among the highest recorded in the Prairie Pothole Region. Unlike more intensively farmed areas of the region, this area retains extensive contiguous tracts of publicly and privately owned grasslands, and has a predator community composed primarily of coyotes, rather than red foxes, raccoons, and striped skunks. Nest success thus is relatively high. Recorded nest success on refuge grasslands from 1975 to 1999 averaged between 35 and 40 percent (the typical range is between 12 and 78 percent). Nest success on islands and predator-excluded peninsulas averaged 56 percent and 64 percent, respectively, from 1990 to 1999, compared to a typical range of between 38 and 83 percent.

Recruitment rates for mallards (0.97 female ducklings fledged per nestling hen), and likely other dabblers, are the highest of any WMD lands in the Prairie Pothole Region (USFWS 1996), and make it an important "source" breeding area. Up to 40,000 ducks have been produced annually on the refuge complex. A breeding population of Great Plains Canada geese, previously extirpated from this area, was reestablished on the refuge from a captive flock in the 1940s. More than 300 pairs now breed in the refuge complex. Spring and fall migrations bring thousands of waterfowl to the refuge, mostly ducks, Canada and white-fronted geese, and tundra swans, with a smaller number of snow geese.

Refuge wetlands provide habitat for many colonial-nesting waterbirds, including western and eared grebes, California and ring-billed gulls, double-crested cormorants, great blue herons, and American white pelicans. The large pelican colony on Big Island and Bridgerman Point has been in existence since at least 1939, and is one of the largest colonies in the United States, with about 3,000 to 5,000 nests each year.

Table 9. Bird Species of Conservation Concern for the Medicine Lake NWR Complex, based on National Bird Conservation Initiative (NABCI) planning efforts (Landbird Plan, Shorebird Plan, Waterbird Plan, NA Waterfowl Management Plan). Status B= Breeding, M= Migration, No=Not found. Abundance A = Abundant, C= Common, U= Uncommon, O = Occasional, R= Rare. (Source)

<i>Bird Species</i>	<i>Status MDL</i>	<i>Abundance MDL</i>	<i>Other conservation status (state,Service, other)</i>
greater sage-grouse	No	—	PIF Watch List
greater prairie-chicken	Extirpated	—	PIF Watch List
Swainson's hawk	B	C	PIF Watch List
short-eared owl	B	U	PIF Watch List
red-headed woodpecker	B	O	PIF Watch List
willow flycatcher	B	U	PIF Watch List
Sprague's pipit	B	C	PIF Watch List
Baird's sparrow	B	A	PIF Watch List
Nelson's sharp-tailed sparrow	B	U	PIF Watch List
McCown's longspur	B	O	PIF Watch List
dickcissel	B	R	PIF Watch List
sharp-tailed grouse	B	C	
northern harrier	B	C	
ferruginous hawk	B	U	
golden eagle	B	U	
prairie falcon	B	U	
black-billed cuckoo	B	R	
burrowing owl	B	U	
northern flicker	B	C	
loggerhead shrike	B	U	
horned lark	B	A	
brown thrasher	B	C	
clay-colored sparrow	B	A	
lark bunting	B	C	
grasshopper sparrow	B	A	
Le Conte's sparrow	B	U	
chestnut-collared longspur	B	A	
western meadowlark	B	A	
black-billed magpie	B	U	
sedge wren	B	O	
piping plover	B	U	Federally threatened
mountain plover	No	—	

<i>Bird Species</i>	<i>Status MDL</i>	<i>Abundance MDL</i>	<i>Other conservation status (state,Service, other)</i>
American avocet	B	A	
upland sandpiper	B	C	
long-billed curlew	B	U	
Hudsonian godwit	M	R	
marbled godwit	B	A	
American woodcock	No	—	
Wilson's phalarope	B	C	
migrant shorebirds (10)	M	A	
least tern	No	—	Federally threatened
whooping crane	M	R	Federally endangered
least bittern	No	—	Federally threatened
western grebe	B	A	
Franklin's gull	B	A	
black tern	B	U	
horned grebe	B	C	
American bittern	B	U	
yellow rail	B	R	
king rail	No	—	
lesser scaup	B	A	
mallard	B	A	
northern pintail	B	A	

Place Holder for
Figure 11 duck pair
11x17 map



Judy Wantulok/USFWS

Water quality is important to piping plovers and other wetland birds.

Other marsh-nesting birds breeding in the refuge complex include American bittern, rails (Sora, yellow, and Virginia), and terns (black, common, Caspian, and Forster's). A large (40-60 acre) breeding colony of Franklin's gulls is located on Manning Lake, an expansive, temporary and semipermanent wetland complex in the floodplain of Big Muddy Creek, on the Fort Peck Indian Reservation. Annual nest surveys from 1997 to 2000 revealed 1,500 to 6,000 gull nests. Other colonial waterbirds nesting within this colony include white-faced ibis, black-crowned night-heron, black and common tern, and eared grebe.

Especially in drier years, when low water levels leave large areas of exposed shoreline, concentrations of thousands of migrating shorebirds are found throughout the refuge complex. Thirty-five species of shorebirds have been observed in the refuge complex, and 12 species breed there. Several upland-nesting shorebirds are common breeders in native prairie habitats: marbled godwit, willet, upland sandpiper, and Wilson's phalarope (table 9). American avocet, killdeer, spotted sandpiper, and piping plover are the most common wetland breeders.

Sharp-tailed grouse are one of the few native prairie birds that are year-round residents. They breed commonly throughout the refuge complex with at least 30 leks (or "dancing grounds" for bird display and courtship behavior) in the refuge complex, and approximately 20 are located on waterfowl production areas in Sheridan County. Leks on the refuge annually averaged 11 displaying males from 1990 to 1999.

Table 10 lists land birds in the Prairie Pothole Region that are of importance to the Service.

Several nonnative bird species introduced from other countries, including house sparrow, European starling, and rock dove, have spread to Montana. Some nonnative bird species, such as ring-necked pheasant and gray partridge, were introduced early in the twentieth century as game birds for hunting. Both species are native to Asia, and have adapted well to North America. Ring-necked pheasants and gray partridge are managed by Montana Fish, Wildlife, and Parks because they are considered nonmigratory game birds.

Table 10. Landbirds of Regional Importance to USFWS in the Prairie Pothole Region (Birds of Conservation Concern, 2002)

American bittern	black-billed cuckoo
northern harrier	Wilson's phalarope
Swainson's hawk	burrowing owl
ferruginous hawk	short-eared owl
peregrine falcon	Red-headed woodpecker
yellow rail	loggerhead shrike
solitary sandpiper	Sprague's pipit
willet	grasshopper sparrow
upland sandpiper	Baird's sparrow
long-billed curlew	Henslow's sparrow
marbled godwit	Le Conte's sparrow
sanderling	Nelson's sharp-tailed sparrow
white-rumped sandpiper	McCown's longspur
chestnut-collared longspur	Hudsonian godwit
buff-breasted sandpiper	

Avian Diseases

Avian botulism has affected waterbirds in the complex since the refuge was established. The summer outbreaks vary from none to thousands of mortalities. No preventative measures for botulism have been developed. More recently, birds in the complex have been affected by West Nile virus. It was first detected in the pelican breeding colony in 2003, and has been present there in varying degrees every year since. Swainson's hawk nestlings also tested positive for West Nile virus in 2004. The magnitude with which the virus affects other species is unknown. West Nile virus monitoring and research began in 2003 and is ongoing, in cooperation with the U.S. Geological Survey and Montana State University. Sampling for Avian Influenza was initiated as part of a national effort in 2006.

Mammals

Many of the large mammals native to northeast Montana were extirpated from the area during late 1800s and early 1900s by bounty hunters and settlers. Wolves, elk, bison, swift fox, and grizzly bear were abundant in this area when the Lewis and Clark expedition traveled through in 1805. Lewis and Clark killed the first grizzly bear of their expedition 25 miles south of Medicine Lake near Culbertson, Montana (Moulton 1986).

With European settlement and agricultural development came an increase in sheltered spots, such as abandoned buildings, shelterbelts, culverts, and rock piles. These new den and hibernation sites, coupled with decreases in large predators such as wolves and coyotes, fostered increases in midsized mammals such as red fox, raccoon, and skunk. These species had historically been excluded or kept in low numbers by wolves and coyotes. Swift fox were declared extinct in Montana in 1969, but the refuge complex is within their historic range. Swift fox have been reintroduced in Saskatchewan and on the nearby Fort Peck Indian Reservation. They have re-established populations in some prairie areas, and are expanding their range. One sighting was reported in the refuge complex, in northern Sheridan County (Montana Natural Heritage Program, unpublished report, 1999).

Thirty-eight species of mammals have been observed in the refuge complex in recent years, according to information in refuge files (appendix H). White-tailed jackrabbit, beaver, muskrats, and many small mammals are common. Richardson's ground squirrels are an important species, providing a prey base for other prairie species, such as ferruginous hawks and badgers, and burrows for burrowing owls and various reptiles and amphibians. Little is known about the distribution of bat species within the refuge complex. White-tailed deer have increased with agricultural development and are now abundant. Mule deer and pronghorn antelope

are sighted occasionally in or around the refuge complex, and are more common in the western portion of the WMD. Pronghorn numbers have declined dramatically on grasslands.

Amphibians and Reptiles

At least 17 species of amphibians and reptiles are found within the refuge complex (appendix H), although little inventory work has been done, according to the limited information in refuge files. Tiger salamanders, northern leopard frogs, and chorus frogs are the most common amphibians. Painted turtles and garter snakes are the most common reptiles. The smooth green snake, locally common, is found nowhere else in Montana. Western hog-nosed and smooth green snakes, and northern leopard frogs are considered state species of special concern. (Montana Natural Heritage Program and MFWP 2006). While northern leopard frogs are experiencing widespread declines in other parts of Montana and North America, they remain relatively abundant in the refuge complex.

Fishes

More than 26 species of fish have been documented as occurring within the Big Muddy Basin in the refuge complex (appendix H; Brown 1971, Holton and Johnson 1996). On the refuge, fewer fish were present before the development of water management facilities, because wetlands periodically dried up completely.

After installation of refuge dikes and water control structures, more permanent water was maintained. Fish gained access to the refuge water units by migrating from the Big Muddy Creek and other tributaries. Most common species were fathead minnow and carp.

Several attempts were made over the years to establish a fishery, and stocking northern pike to control large numbers of carp was successful in the late 1960s. An exceptional northern pike fishery developed in Medicine Lake, and the refuge became well-known. However, little reproduction occurred, and restocking was required annually. The fishery was eliminated during the drought of the late 1980s and early 1990s due to low water levels and winterkill in succeeding years.

The return of high water flows in 1993 and 1994 again brought forage fish back into the refuge. White pelicans, great blue herons, grebes, and other birds feed extensively on these fish. Stocking of northern pike resumed in 1996, and the northern pike fishery is again well-established at Medicine Lake. Few, if any, fish inhabit wetlands in waterfowl production areas, since the basins are not deep enough for fish to survive the winter.

Invertebrates

The diversity of invertebrates in the refuge complex has not been quantified. Refuge wetlands produce huge numbers of invertebrates such as midges, dragonflies, amphipods, copepods, and water boatmen. Prairies and tame grasslands produce large numbers of insects (notably grasshoppers, leafhoppers, butterflies, beetles), and spiders. These invertebrates are the food base for nearly all breeding bird species. Two butterfly species of special concern, *Ottoe skipper* and *tawny crescent*, have been collected in the refuge complex (Heidel et al. 2000). In recent years the butterflies and moths have been surveyed, and a species list has been started.

Threatened and Endangered Species

One migrant bird species, the whooping crane, and two breeding bird species, the piping plover and least tern, found in the refuge complex are listed as threatened or endangered under the Endangered Species Act. Endangered whooping cranes occasionally migrate through the refuge complex, using area wetlands and grain fields for foraging.

Endangered interior least terns nest on islands and gravel bars in the Missouri River, the southern boundary of the refuge complex.

A significant portion of the threatened Great Plains population of piping plover breeds in the refuge complex. A network of closed alkali lake basins in the northeast part of the refuge complex typically supports 85 percent of Montana's breeding plover population and 5 to 10 percent of the entire Great Plains population. This population was listed as threatened in 1985.

Plovers nesting in northeast Montana have the highest breeding recruitment of the Great Plains population, due largely to the relatively intact wetland-prairie refuge complexes found in the area (Murphy et al. 2000). Comprehensive surveys of breeding adults have been conducted annually since 1988. Breeding populations have averaged approximately 153 adult plovers with 60 breeding pairs. About 60 percent of the plovers nest on private and state land, and about 40 percent on waterfowl production areas and the refuge. In 1991, a peak number of 276 adults with 95 pairs was found in the refuge complex.

Plovers in the refuge complex typically nest along the shorelines of shallow, semipermanent, "hyper-saline" to "eusaline" wetlands, or water with salinity of 30 to 40 parts per thousand due to land-derived salts (Cowardin et al. 1979) that are generally associated with the Missouri Coteau. Beaches with some gravel or scattered cobble are preferred. Plovers increasingly use waterfowl production areas and the refuge for nesting during periods of severe drought, as additional shoreline is exposed, and the

more shallow alkali lakes go dry. Between 28 and 34 pairs nested on the refuge from 1990 to 1993, the last sustained drought period. Twenty-one alkali lakes and wetlands in the refuge complex have been identified as critical habitat for breeding piping plover (70FR57637).

Recruitment has averaged approximately 1.1 fledglings produced per nesting pair, a higher rate than most other areas, but still only approximately the level needed to maintain a stable population. Since 1996, the refuge complex has participated in a larger cooperative recovery effort with The Nature Conservancy, Montana Fish, Wildlife, and Parks, the North Dakota Game and Fish Department, and private landowners to increase fledging rates throughout the Missouri Coteau. Use of wire mesh cages and temporary electric fencing to exclude predators has increased recruitment to more than 1.4 fledglings produced per pair.

One endangered fish species, the pallid sturgeon, occurs in the Missouri River along the southern boundary of the refuge complex. No threatened or endangered plants are found in the refuge complex.

4.7 CULTURAL RESOURCES

Cultural resource files indicate that 57 acres of Medicine Lake have been archaeologically surveyed for cultural resources. Historic structures in the refuge complex also were partially described in a regionwide report on Roosevelt Era public works projects in 2001. Several of the known sites on the refuge were reported by refuge staff.

Although few datable artifacts have been found on the refuge, archaeological resources investigated outside the refuge can be used to make inferences about the people who have lived at Medicine Lake for the past 11,000 years. Until the last 150 years, the region was occupied predominantly by Native Americans whose economy was based on hunting large animals. By the mid-eighteenth century the influx of nonnative peoples significantly began to alter this traditional way of life and to reshape the landscape of the region. Evidence of both the prehistory (precontact) and the history (postcontact) is found in the archaeological sites and historic buildings on the refuge.

Occupation of the region began with the Paleo-Indian Period approximately 11,000 years ago and extended through the late Prehistoric Period to about A.D. 1700. During most of this time, the population consisted of nomadic hunters primarily exploiting bison. Archaeologically, prehistoric plains hunters are distinguished through projectile points (spear and arrowheads), some of which represent technological shifts. This shift represents the use of spears, then atlatls (spear throwers), and finally

the bow and arrow. Few artifacts have been found that directly link specific cultures to refuge lands. However, archaeological sites and surface finds provide evidence that prehistoric people inhabited the refuge. At this time, nine campsites with stone tool scatters, stone circles or tipi rings, and bison bones have been documented.

Tipi Hills, one example of these occupations, has evidence of at least 15 stone circles. It was recorded by refuge staff, who determined the site eligible for the National Register of Historic Places, and submitted it for listing on the register. The remaining eight recorded prehistoric sites consist of isolated or small groupings of tipi rings or stone cairns. These sites have not been evaluated for the National Register, and should be protected from disturbances until further work demonstrates their potential for research. Sites with surface indications, such as tipi rings and cairns, are more easily identified than those without stone features, and it is expected that many more sites are located on the refuge. On the basis of what is known about archaeological sites outside the refuge, there is potential for sites representing the habitation of early hunters of the plains that predate the use of tipis.

The presence at various times of several historic Native American tribes in the area is well documented, predominantly various bands of the Arapaho, Assiniboine, Blackfeet, Cheyenne, Crow, and Gros Ventre (also called the Atsina or White Clay People). Because some of these people still live nearby, it is probable that they have interests in traditional uses of the refuge. No traditional cultural properties have been identified in the refuge complex, though the Little Rocky Mountains Traditional Cultural Property used by the Assiniboine and Gros Ventre tribes is located in nearby Phillips County.



The historic period began with the appearance of Euro-American explorers, horses, and associated trade goods in the area about A.D. 1700, although permanent settlement did not occur until the late 1800s. Horses and guns were the major trade goods that influenced the lives of the native peoples.

Horses were introduced by the Spanish and initially arrived through trade from the Southwest. Guns were initially obtained through trading with the Hudson's Bay Company which was extending its influence from Canada to the area. The combination of guns and horses made bison hunting more effective. However, it also increased competition for territories to obtain furs and areas to hunt the migrating bison. Conflicts among the Native American groups increased, resulting in shifting control of these resources.

Although the fur trade brought the early settlers into contact with the native people, these were not well-documented until the Lewis and Clark expedition passed through the area in 1805, and the explorers made notes in their journals. On April 29, 1805, near present day Culbertson, Montana, Lewis and another expedition member wounded two grizzly bears. Lewis wrote: "We fell in with two brown or yellow bear; both of which we wounded; one of them made his escape, the other after my firing on him pursued me seventy or eighty yards." Lewis later notes, "Game is still very abundant. We can scarcely cast our eyes in any direction without perceiving deer, Elk, Buffalo or Antelopes."

Lewis and Clark stayed on the Missouri River and made a small excursion up Martha's River (later called Big Muddy Creek) a short distance, but did not venture as far as the refuge. Later explorers of the region included American Fur Company trader Alexander Culbertson (1809-1879), who founded Fort Benton and was the first white American to live among the Blackfeet Indians; German explorer Prince Maximilian (1782-1867); Swiss painter Karl Bodmer (1809-1892); and American ornithologist and painter John James Audubon (1785-1851). Most of the early explorers avoided the area north of the Missouri drainage, mainly due to the adversarial relations with the native tribes, fuel and water shortages, and the preference for river travel rather than overland passage.

An early writing from this period (1855) by fur trader and chronologer of Native American life of the region, Edwin Thompson Denig, indicated that the territories around Medicine Lake were occupied in particular by the Assiniboine Tribe (Denig 2000). Other tribes known to be present in the area include the Blackfeet, Cree, and Gros Ventre.

By the late 1800s, settlers were slowly moving into the region and leaving their mark on the landscape. Most of the early evidence for this period relates to homesteading and agriculture. Among the more common site types are farmsteads, homesteads, dugouts, small rural communities, bridges, schools, and railroads. The remains of several of these homesteads are found on the refuge. Two examples are the Erickson Place and the Bock House. During evaluations by professionals, the Bock house was determined to be eligible for the National Register,

while the Erickson Place was found not eligible for the National Register.

The establishment and early success of the refuge is tied to the Civilian Conservation Corps (CCC) and Works Progress Administration (WPA) programs of the mid-1930s. President Franklin D. Roosevelt created these programs during the Great Depression as a means to employ people to work in forests, parks, rangelands, and wildlife refuges.

WPA crews were at Medicine Lake from 1936 to 1938 and again in 1941. The CCC crews arrived at the refuge in 1937 and stayed for four years. During this short period, much of the infrastructure for the refuge was established, including most of the major wetlands. Projects completed on the refuge include: planting more than 18,000 trees and shrubs, installing telephone lines and fences, constructing roads, establishing trails and recreation areas, and building residences, barns, sheds, a fire tower, water control structures, and other outbuildings.

Many of these are still standing and in use, and several are eligible for the National Register of Historic Places. In 2001 the Service documented many of the public works buildings in the refuge complex, but some of the larger projects of the period, such as the Muddy Creek Diversion and other water control structures have not been documented. The Service developed a memorandum of agreement with the Montana State Historic Preservation Office to replace the water control structure from Dam 4 (Medicine Lake). The terms of this agreement required the Service to completely document the structure using historic plans because preservation was not an option.

4.8 VISITOR SERVICES

Medicine Lake NWR and the Northeast Montana WMD provide the public many opportunities to observe and experience the numerous wildlife resources of the area.

General Visitor Services

The refuge has several access points (figure 12), which make it difficult to estimate with certainty the total number of visitors. Annual visitation is estimated at 16,000 visits. This number is based on the number of people who stop into the refuge complex office and sign the visitors' registration, along with observations of visitors throughout the refuge complex during the year.

Most of the refuge complex visitors can be grouped into four categories: hunters and anglers, wildlife observers and birdwatchers, school groups, and day visitors looking for a scenic drive or diversion from a trip.

The refuge complex office is open Monday to Friday, 7:00 am to 3:30 pm. Information and accessible restrooms are available during these hours, and are available 7 days a week at the Environmental Education Area.

Facilities

Most of the refuge complex's current visitor service facilities are found on the refuge. The WMD has no visitor services facilities except for parking lots that are next to county or township roads. A few vehicle trails traverse some waterfowl production areas, but these existed before Service ownership, and have not been improved.

The current refuge road system consists of 50 miles of designated roads; 31 miles are classified as administrative roads, and 19 miles are classified as open public roads. A 14-mile auto tour route, Wildlife Drive, is located on the refuge. This route is passable by passenger vehicles approximately 8 months of the year, and often is open at other times of the year, depending on weather conditions. The 2.3-mile entrance road is an improved all-weather gravel road from Montana State Highway 16 to the refuge complex office. The county administers an additional 8 miles of roads transecting the refuge.

All other public roads are only seasonally passable, are not improved, and are maintained on a periodic basis. Four-wheel-drive or high-clearance vehicles are recommended. Seasonal closures are imposed. For protection of habitat, vehicles are allowed only on established open roads and must be parked in designated locations.

A 99-foot-high observation tower is located at the refuge complex office site. It provides visitors a unique vista to the western half of the refuge. It is open most of the year, but closes when climatic conditions prohibit climbing the 135 steps to the top.

The Environmental Education Area is located off of Montana State Highway 16. A 0.25-mile road leads to a mowed grass loop with benches, interpretive signs, lake access, and an outdoor restroom.

Three kiosks exist on the refuge to provide the public general information and direction, interpretation, and brochures. They are located at the entrance to the Environmental Education Area off of Montana State Highway 16; at the junction of Wildlife Drive and the headquarters access road; and at the junction of East Lake Highway and Lakeside Road. New interpretive exhibits were installed at the visitor center in 2007.

The Pelican Overlook site is located at the end of the 1.2-mile vehicle trail leading to Bridgerman Point. An elevated platform overlooks a breeding colony of pelicans, cormorants, and herons. All-season fixed binoculars are provided on the deck for observation. The colony is protected from mammal predators by a 6-foot-high electric fence.

Interpretive signs are located at various locations along the Wildlife Drive. Many of these depict wildlife management activities that change annually, thus the signs are moved to correspond with current activities at a specific location.

Compatible Wildlife-Dependent Recreation

The refuge complex offers visitors a wide selection of self-guided and dispersed recreation opportunities. The 1997 Improvement Act states that public use of a refuge may be allowed only where the use is “compatible” with the Refuge System mission and the purpose for which the refuge was established. The Act also sets forth a current standard by which the Secretary of the Interior shall determine whether such uses are compatible. The term “compatible use” means an existing or proposed “wildlife-dependent recreational use” or any other use of a refuge that in the professional judgment of the Service, would not materially interfere with, nor detract from, the fulfillment of the System’s mission or the purpose of the refuge. Hunting, fishing, wildlife observation, photography, environmental education, and interpretation are the priority general public uses of the Refuge System.

Before a new use is allowed on a refuge, the Service must determine that the use is compatible and not inconsistent with public safety. To determine if a new use is compatible, a refuge must estimate the time frame, location, and purpose of each use. Furthermore, the refuge staff must identify the direct and indirect impacts of each use on refuge resources, and evaluate the use relative to the refuge’s purpose.

Wildlife Observation and Photography

Wildlife observation is one of the most popular public use activities within the refuge complex. Most wildlife observation occurs on the refuge along the Wildlife Drive, which begins Montana State Highway 16 along the north shore of Medicine Lake. Wildlife Drive traverses various habitats from freshwater to alkaline wetlands, and native prairie to planted tame grass. All of these habitats and the wildlife that occupy them can be viewed from a vehicle. A favorite location is the Pelican Overlook, which has an observation platform that allows viewing of the refuge complex’s 10,000-bird white pelican colony.

Hunting

Hunting seasons occur between September 1 and late December. Hunting is permitted for select game species, according to state regulations. The most common species hunted are white-tailed deer, ducks and geese, ring-necked pheasant, sharp-tailed grouse, and Hungarian partridge. Other species in the refuge complex that are open to hunting under state regulations include red fox, coyote, white-

tailed jackrabbit, coots, and mourning doves. A special hunting season for white-tailed deer and upland game birds opens every year on November 15 for the Homestead and Lake Creek areas of the refuge (figure 12). These areas are closed before November 15 to protect populations of migratory birds that congregate in these areas for rest and feeding before continuing their fall migration. By November 15th, these units are usually frozen, and migratory birds have continued on their migration, so other hunting can take place.

Certain areas are closed to hunting to protect refuge facilities and to provide resting and feeding habitat for migratory birds (figure 12). Areas closed to hunting are clearly posted with signs.

All waterfowl production areas are open for the hunting of any game species legal to hunt in Montana.

There are an estimated 7,200 hunter visits on refuge lands each year, totaling about 45 percent of annual visits. Actual harvest numbers are unavailable for the refuge complex. Refuge staff observes a small number of waterfowl hunters each year. Staff estimates the number of hunter visits for deer at fewer than 50. The MFWP annual report for upland bird harvests for all of Sheridan County in 2003, the latest year for which numbers are available (MFWP 2003), estimated 21,786 hunter visits and 26,648 birds harvested for all upland game species. The refuge probably accounts for a small percentage of the total number of hunter visits and harvest. In 2003 for Sheridan County, pheasants accounted for 14,947 birds harvested and 9,637 hunter visits (MFWP 2003).

Fishing

Fishing takes place primarily on Medicine Lake. Although fishing does occur on Lake 12 and Gaffney and Swanson lakes, (figure 12), the fish populations are low or nonexistent, and thus these lakes are rarely used for fishing. Due to the wilderness status of Medicine Lake, power boats are not allowed, nor are powered augers during the ice-fishing season. Canoes and rowboats are permitted on Medicine Lake, but few people use them because of the high winds that can arise at any time, creating safety concerns.

Eight public access points for fishing are located around Medicine Lake. The most used areas are those off of Montana State Highway 16 and along the Environmental Education Area shoreline. Most fishing is done from the shore. Winter ice fishing is very common with the aid of an icehouse. These temporary shelters, in essence hard-sided, tent-like structures, must be hand pushed or dragged out onto the ice and removed before ice-out in the spring. They are allowed only near the Highway 16 bridge and refuge headquarters. Northern pike is the only game species available to the public, and

Place Holder for
Figure 12 public

11x17 map

is a much sought-after species. Due to the lack of available fishing lakes in northeastern Montana, Medicine Lake is a popular place for anglers. Fishing within the refuge complex is subject to state regulations. Refuge-specific regulations are included in the state fishing regulations, which are updated every 2 years.

Environmental Education

Environmental education is usually conducted while touring the refuge with school, scout, and civic groups. Off-site programs are conducted by the refuge complex staff when time is available and are very popular with various groups. However some requests for educational programs and technical assistance must be denied due to staffing limitations.

Interpretation

The refuge complex office contains indoor exhibits that include a wall mounted map, a touch table, several archaeological and historic pieces, and several bird and mammal mounts. Interpretive signs and information kiosks are situated at various locations along Wildlife Drive.

4.9 CURRENT SOCIOECONOMIC CONDITIONS

The Medicine Lake NWR is located in Roosevelt and Sheridan counties in northeastern Montana, near the borders with Canada and North Dakota. It includes two tracts of land that contain Medicine and Homestead lakes. Neighboring Daniels County is also included in the study area because it experiences public use related to the greater Northeastern Montana WMD that contains the Medicine Lake NWR. This 3-county study area is shown in figure 13.

Population

The 3-county district encompassing Medicine Lake NWR is gradually declining in population. The population of Montana, by comparison, has increased at a steady pace since 2000 (figure 14). The gradual loss of residents affects the socioeconomic conditions of the area (figures 14, 15, 16). In the future, the population of the 3-county study area is expected to remain stagnant, while the population of Montana experiences steady growth.

Employment

The study area employs people primarily in service, retail, and public administration jobs. Education was the largest employer, employing 23 percent of the workforce, followed by public administration (18 percent), health care and social services (14 percent), and retail trade (12 percent). The agriculture

industry in the study region is very small, employing only about 1 percent of the workforce. Figure 16 shows employment by sector in the study area.

The civilian workforce for the 3-county district remained stagnant at approximately 5,400 people between 2001 and 2005. Estimates from the year 2005 calculated the unemployment rate for Roosevelt County at 6.4 percent, Sheridan County at 3.6 percent, and Daniels County at 3.5 percent. These compare to a statewide unemployment level of 4 percent (DOL 2005).

Figure 15 illustrates the aging population of the 3-county district. In 1990, about 32 percent of the population was between 35 and 64 years, while that same demographic constituted 40 percent of the population in 2005. The median age for the 3-county district increased by about 2 years in the 5-year period from 2000 to 2005.

Federal Employment

Current federal employment at Medicine Lake NWR includes 9 permanent full-time and 7 to 10 seasonal employees April through September. Medicine Lake NWR had a budget of approximately \$900,000 in FY 2006. The combined annual salaries of employees is \$423,000. Medicine Lake NWR does not collect any fees for recreational use of its facilities, and does not directly generate any basic local revenue.

Activities

There are many recreational opportunities at Medicine Lake NWR, including hunting, fishing, wildlife observation, photography, and hiking.

Hunting represents about 45 percent of visitation (7,200 hunter days). Approximately one-third of the Medicine Lake NWR is open to hunting of waterfowl, upland game bird, and deer. The most popular animal hunted in the NWR is the ringed-neck pheasant. The major hunting season for all species is September through mid-December, with the greatest spike in visitation occurring in October. On November 15, an additional two areas of the refuge are opened for late-season hunting of upland game bird and deer.

Fishing is a popular activity in the refuge complex, representing about 10 percent of visitation. The popular ice fishing season extends from November through February, and the spring fishing season spans March through May. It is estimated that about 95 percent of all visitation for fishing takes place from November to May.

Wildlife viewing represents about 45 percent of visitation to the refuge. The most popular season for wildlife observation is during the spring migration, which lasts from April through June.



Figure 13. Medicine Lake National Wildlife Refuge and surrounding counties.
 Source: Microsoft MapPoint North America

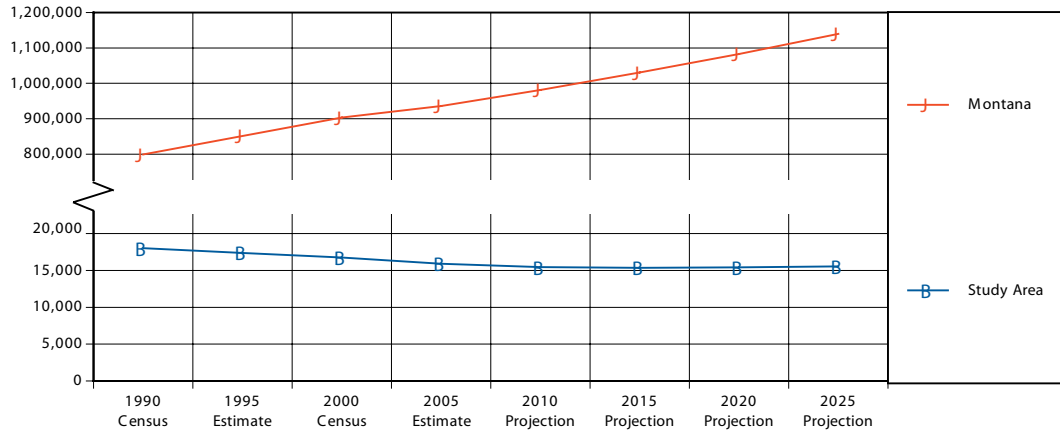


Figure 14. Montana and 3-county study area by population age.
 Source: U.S. Census Bureau and NPA Data Services, Inc.

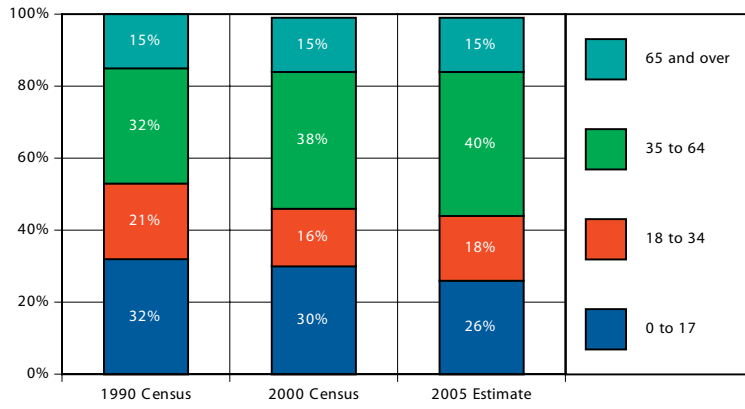


Figure 15. 3-county study area age composition.

Source: U.S. Census Bureau

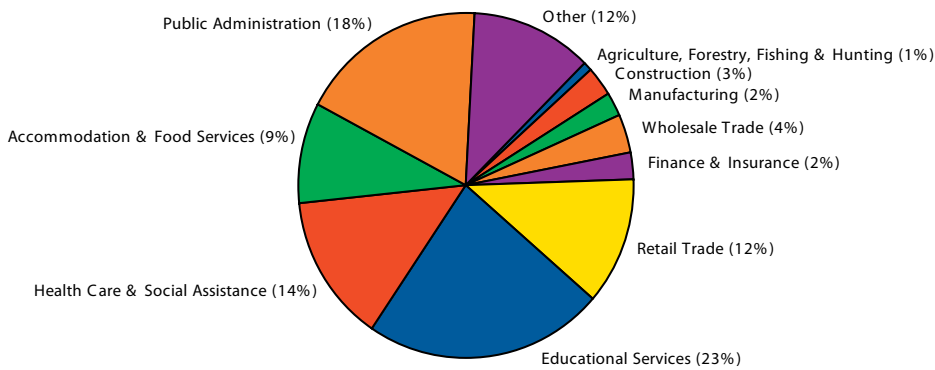


Figure 16. Area employment distribution, 2004.

Source: U.S. Census Bureau, 2005 Quarterly Workforce Indicators

Visitation Levels

The refuge complex records about 16,000 visitor days per year. Visitation is heavily concentrated during hunting season in the fall and wildlife viewing season in the spring.

Only an estimated 15 percent of visitors live in the 3-county Medicine Lake region. Local residents do not comprise a significant proportion of the visitors who come to the refuge for hunting and wildlife viewing. The only activity in the refuge that attracts a large following of local residents is fishing.

VISITOR SPENDING

Off-site spending by visitors helps support local lodging and retail establishments in surrounding towns. Very little lodging is available in the area surrounding Medicine Lake. In Sheridan County, the towns of Medicine Lake (2 miles from the refuge) and Plentywood (28 miles north of the refuge) each have one motel. Culbertson, 30 miles south of the refuge in Roosevelt County, has two motels. The lack of lodging is said to be an issue in the area, and all motels are regularly booked well in advance during the peak hunting seasons.

The lack of motel lodging has led many residents to begin renting out their homes, primarily to hunters in the fall hunting seasons, for about \$100 per night for up to 4 people and \$150 per night for 4 to 6 people.

Baseline Economic Activity

The Medicine Lake NWR affects the local economy through the visitor spending it generates and the employment it supports. According to the Service's "Banking on Nature 2004" study (Caudill et al. 2005), 16,000 visitor days supported \$192,600 in direct local spending. Assuming a 2.5 percent annual rate of inflation, Medicine Lake NWR in 2006 contributed an estimated \$202,350 in visitor spending to the local economy.

Medicine Lake NWR currently supports 9 full-time permanent employees and between 7 and 10 seasonal employees whose average tenure is 4 months per year. This equates to about 12 full-time-equivalent (FTEs) staff positions. In 2006, the combined salary of these employees was \$423,000, or \$35,250 per FTE.

Using the U.S. Bureau of Labor Statistic's Consumer Expenditure Survey data for individuals in this income category, and considering the commercial offerings in the study area, this study assumes that 79 percent of annual income is spent locally. Medicine Lake NWR Complex therefore brings \$332,500 to the local economy in employee spending.

Combining visitor and employee spending, the total economic activity generated by Medicine Lake NWR in local economy is estimated at \$535,000 for 2006.

4.10 REASONABLY FORESEEABLE ACTIVITIES

Reasonably foreseeable actions are actions and activities that are independent of the proposed action for the refuge complex, but could result in cumulative or additive effects when combined with the proposed alternatives. They are anticipated to occur regardless of which alternative is selected. The cumulative effects of these activities are described in the "Cumulative Impacts" sections under each impact topic in chapter 5. Oil and gas development is the primary reasonably foreseeable action occurring near or around the refuge complex and is discussed in detail below.

Oil and Gas Development on Medicine Lake NWR

The Montana Minerals Management Bureau is responsible for leasing, permitting, and managing agreements related to extractions of oil and gas, metals, nonmetals, coal, sand, and gravel on 6.2 million acres of school trust lands and approximately 1,800 acres of other state-owned lands throughout Montana. The state owns the mineral rights on several school trust lands within the refuge complex boundaries, including several tracts that fall within the Medicine Lake wilderness area.

In FY 2006, record high oil and gas prices resulted in a significant increase in leasing activity on state lands (Montana Trust Land Management Division 2006a). The primary mineral resources that are feasible for development are oil and gas (table 11). In December 2006, two tracts on the Medicine Lakebed

Table 11. Mines, Oil and Gas Wells within Refuge Complex, May 2007

	<i>WMD Total</i>	<i>MDLNWR</i>	<i>MDLWPAs (Fee)</i>	<i>Approved Acquisition Boundary</i>	<i>Proposed Acquisition MDLNWR</i>
Mines	157	0	0	0	0
Oil/Gas Wells	2,236	4	19	0	0

were offered for lease and sold (Montana Trust Land Management Division 2006b). These are within the wilderness boundary, located under Bruce's Island (figure 17). It is not known when these resources would be extracted or from where, but horizontal or directional drilling will be used. The state has placed a "no surface occupancy" stipulation on this lease, and therefore no above-ground disturbance or infrastructure will be permitted.

Oil and Gas Development on the Wetland Management District

The Northeast Montana WMD is located in the Williston Oil Basin. The Williston Oil Basin is Montana's top oil producing area, accounting for 81 percent of all oil produced in the state (Montana Oil and Gas Conservation Division, 2000). The overlap of oil production activities has created concerns for the WMD (figures 18a and 18b). The majority of the waterfowl production areas were purchased without underground mineral rights, and perpetual wetland and grassland easements do not prevent oil exploration or drilling activities. The Williston Oil Basin was first discovered in North Dakota in 1951, but the first oil boom in this area did not occur until the early 1960s, when several large fields were developed. A second oil boom occurred in the 1970s, when deeper oil formations were targeted.

Renewed oil exploration activity began in the mid-1990s with the advent of horizontal drilling and 3-dimensional seismic technology (USFWS 2006d). In addition to concerns associated with oil drilling, the Williston Oil Basin produces some of the most saline water in the United States (saline or brackish water called "produced water" is generated during oil drilling). In fact, the oil field brines produced from within the Williston Oil Basin can be up to 10 times saltier than seawater (Reiten, 2002).

The majority of the waterfowl production areas occur in the eastern portion of Sheridan County, which also contains the largest concentration of oil wells. Approximately 900 oil wells have been drilled in Sheridan County, and over half of these are located in the eastern third of the county (Reiten and Tischmak 1993). In addition to oil wells and their associated tank batteries, Sheridan County also has a large number of oil and produced-water pipelines (Montana Oil and Gas Conservation Division 2000). Spills from produced-water lines are common, and impacts to wetlands in the area are visually evident (USFWS 2006d).

Adverse effects from environmental contaminants generated in conjunction with oil exploration and production include drilling muds, produced water, and production activity wastes. Congress exempted these wastes from the more stringent requirements of the hazardous waste management provision of the Resource Conservation and Recovery Act (RCRA).

Consequently, reserve pits, re-injection wells, and well-site abandonment procedures are less stringent than they otherwise would be (USFWS 2006d).

The dominant waste product from the oil production process is produced water. Contaminants in produced water vary by region, depth-to-production zone, and age of the well. Frequently occurring production- water contaminants include oil, trace elements, radionuclides, additives, and salt. In the Williston Oil Basin, the disposal of drilling wastes and contaminated produced waters in unlined pits is the most common scenario resulting in impacts, although this practice changed in the late 1970s, and all reserve pits are now supposed to be lined (USFWS 2006d).

The influx of salts from produced waters to wetlands can impact waterfowl and shorebirds dependent on these systems in several ways. Invertebrate populations can shift so that an important food source is eliminated from the wetlands. Waters can become directly toxic, or physical degradation of the feathers from salts can occur.

The Service's Environmental Contaminants Program is conducting an investigation, with Montana Bureau of Mines and Geology, the SCCD, and others, of the number of waterfowl production areas impacted by oil field waste, and will determine which wetlands contain potentially toxic concentrations of contaminants from oil exploration and production activities (USFWS 2006d). The investigation will determine which wetlands contain potentially toxic concentrations of ions and co-occurring contaminants from oil exploration and production activities, and could influence which wetlands the Service would want to acquire in the future. A final report is expected in August 2008, including additional recommendations to address contaminant issues disclosed in the investigation. Another investigation will be evaluating oil field waste impacts to Big Muddy Creek for future total maximum daily load development.

Operation and maintenance of oil and gas wells throughout the Northeast Montana WMD require companies to have access roads and utility lines. Refuge staff spend considerable time, equal to about three-quarters of 1 full-time position, working with oil and gas companies to limit the impact of roads and other utility lines on the WMD.

4.11 LAMESTEER NWR

Condition of Dam

The Lamesteer dam is classified as an intermediate size, low hazard dam (USFWS 2005). An intermediate size dam is defined by the Service

as having a storage capacity ranging from 1,000 acre-feet to 50,000 acre-feet. The storage capacity of the Lamesteer dam is about 1,470 acre-feet. The dam was last inspected in 2005. A low hazard classification means that there does not appear to be potential “lives in jeopardy” in the downstream flood path.

Hydrologic and hydraulic analyses conducted by the Service confirmed that no permanent-living structures exist in the downstream floodplain, and property damage from failure of the dam would be minimal (USFWS 2005). The overall safety classification of the dam is considered “poor,” and corrective actions to resolve the deficiencies in the dam were recommended. The “poor” classification was based primarily on the absence of low-level outlet works, the deteriorated condition of the service spillway walls, the low areas of the dam crest, and uncontrolled seepage areas located at the toe of the dam (USFWS 2005).

Recommendations in the last inspection report (USFWS 2005) included a range of maintenance priorities, such as removing Russian olive trees and other shrubs, establishing a vegetation control program for the dam crest and slopes up and down stream, and continual monitoring. Recommendations also included construction projects, such as filling and compacting low areas on the dam crest, installing a low-level outlet works to provide a means to lower the reservoir, and repairs to the spillway wall. The total cost for all repairs and construction were estimated at \$950,000 (appendix I).

agency did not find any breeding birds or nests at Lamesteer NWR during the survey period (MFWP 2007).

Adjacent Water Resources

The Lamesteer reservoir measures about 70.48 acres (surface area). Figure 19 shows other water resources within a 25- to 50-mile radius of Lamesteer NWR. Within 25 miles of the refuge, there are approximately 127 lakes, ponds, and stock tanks, totally 1,179 acres. Within a 50-mile radius, there are approximately 425 lakes or 3,980 acres of lakes. The majority of other water resources near Lamesteer NWR are in eastern Montana.

Habitat

As explained in chapter 2, the Service does not control any of the uplands surrounding Lamesteer NWR. Figure 7 indicates that almost all of the adjacent uplands are croplands.

Migratory Bird Resources

MFWP conducted an avian inventory of shallow wetlands in eastern Montana in 2006 and found 28 bird species at Lamesteer NWR. None were uncommon species or species of concern (table 8), and most are considered abundant or common. The

Place Holder for
Figure 17 oil
11x17 map

Place Holder for
Figure 18a oil west
11x17 map

Place Holder for
Figure 18b oil east
11x17 map

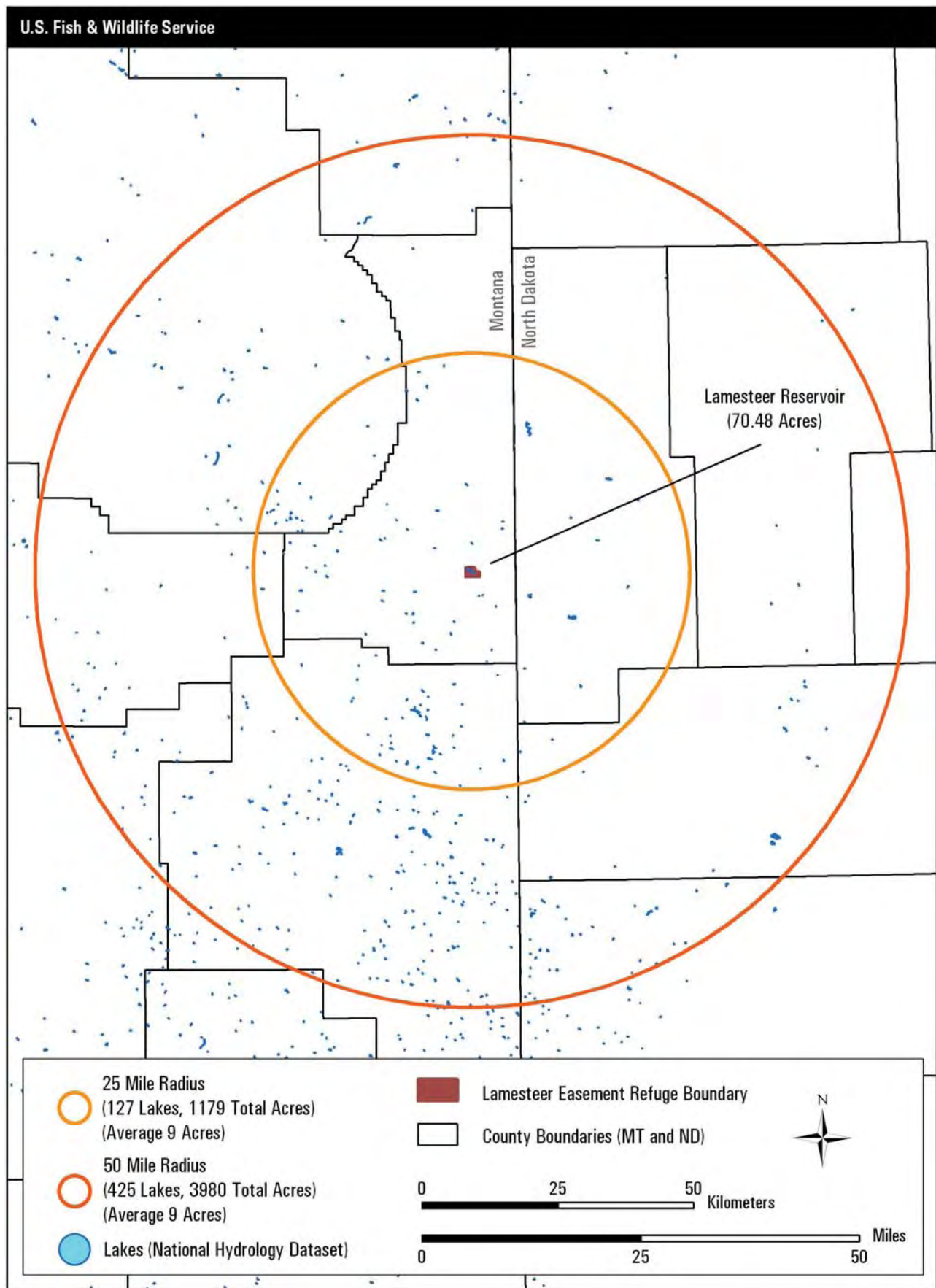


Figure 19. Water within a 50-mile radius of Lamesteer National Wildlife Refuge.

5 Environmental Consequences

This chapter provides an analysis of the potential effect on environmental resources associated with implementing the management alternatives for the refuge complex. Medicine Lake NWR and the Northeast Montana WMD are combined because the actions and impacts for alternatives are similar. Lamesteer NWR is separated because the actions and impacts are different. Potential impacts are identified for each alternative on the basis of the conditions for each site, a review of relevant scientific literature, and the best professional judgment of Service staff and other resource specialists. Table 12, at the end of this chapter, summarizes the environmental consequences for each alternative for comparison.

5.1 METHODS

This chapter is organized by resource. Each alternative was evaluated on the basis of its physical, biological, economical, and social factors, as well as how well it addresses the refuge purpose. Many of the potential management actions and resource impacts are similar among the alternatives; these are identified and combined. Differences in management actions and resource impacts are also discussed. Tables 12 and 13 provide a summary of consequences for comparing the alternatives.

Effects are evaluated at several levels, including whether they are adverse (negative) or beneficial (positive), and whether they are direct, indirect, or result in cumulative effects when combined with other reasonably foreseeable actions.

Direct effects are consequences for which the impact on the resource is immediate and is a direct result of a specific action or activity. Examples of direct effects include prescribed fire on habitat or hunting on wildlife. Indirect effects result from an action but are further removed in space or time. Examples include the upstream or downstream effect on water quality from diverting water on the refuge for management purposes, and the use of fertilizers upstream and its impact on the refuge. A cumulative effect is defined by the Council on Environmental Quality as “the impact of the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of which agency (federal or nonfederal) or person undertakes such other actions” (40 CFR 1508.7). Reasonably foreseeable future actions are described at the end of chapter 3, Affected Environment.

Impacts are often described in terms of their context, intensity, and duration. Where possible, the planning team used objective data, but where it was not available, relative comparisons were used. Although sometimes subjective, comparisons are helpful for understanding the level of impact. The planning team used the following impact threshold definitions:

Negligible—The impacts would be at the lower levels of detection (< 5 percent change).

Minor—The impact would be detectable (a change of 5-24 percent).

Moderate—Impacts would be readily apparent (change of 25-50 percent).

Major—Impacts would be severe, or if positive, would have exceptional beneficial effects (a change of >50 percent).

Impacts are often described as either short-term or long-term. Short-term effects would persist for a period of between 3 and 5 years, and would consist primarily of temporary disturbance due to habitat restoration or facility construction and subsequent revegetation efforts. Long-term effects would last more than 5 years after the project was initiated, and could outlast the 15-year life of the CCP.



Jerry Rodriguez/USFWS

The amount of prescribed fire varies by alternative.

5.2 EFFECTS COMMON TO ALL ALTERNATIVES

Effects common to all alternatives are discussed under three main topics: environmental justice, physical environment (air, geology, soils, and water), and cultural resources. Under some alternatives, the effects would be similar if not the same.

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 affect one or more minority groups compared to the general public. The Service is committed to ensure 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.

Physical Environment (Air, Geology, Soils, and Water)

Air quality, geology, soil, and water are all components of the physical environment. Several of the management alternatives would result in similar impacts to these resources.

Habitat and Wildlife Management

None of the alternatives would result in long-term effects on air quality. Class I air quality would be maintained.

Under all alternatives, the use of prescribed fire would be conducted under approved fire management plans (appendix F). While the amount of prescribed fire varies by alternative, the use of prescribed fire under any alternative could result in localized, short-term releases of soil particles (or dust) into the air. As the section “Global Warming” in Chapter 4 states, the use of prescribed fire releases CO₂ directly into the atmosphere from the biomass consumed during combustion. However, this causes no net loss of carbon, because new vegetation quickly replaces lost vegetation (Dai et al. 2006). Alternative C would result in the most amount of smoke and particle releases in the air, followed by alternative B. Alternative A (no action or current management) would result in the least amount of prescribed fire.

In alternatives B and C, the use of habitat restoration tools, such as prescribed fire or grazing,

temporarily would reduce above ground vegetation cover in a treatment area and could result in localized short-term erosion and soil loss. However, vegetation would recover quickly and stimulate root growth; fire typically stimulates new plant growth and increases the vigor of existing plant communities, thus improving soil conditions.

Visitor Services

Under all alternatives, hunting, fishing, and other wildlife-dependent recreational activities would have negligible impacts on environmental factors such as air quality, geology, and soils.

Refuge Operations

Under all alternatives, refuge operations, including maintenance of existing roads and development of visitor services facilities, could result in negligible-to-minor, short-term erosion and soil losses. Successful revegetation and planned use of erosion control measures during soil disturbances would minimize any short-term impacts.

Wilderness Management

All current water rights held by the Service that affect the wilderness area would continue to be protected, and water quality sampling would continue on a quarterly basis.

Cumulative Impacts

The cumulative impacts are similar for all alternatives.

Oil and Gas Development

None of the management activities for any of the alternatives would contribute measurably to the cumulative effects on air quality, soils, and water resources from oil and gas development within the Medicine Lake NWR and the Northeast Montana WMD. Under alternatives B and C, increased staff would be available to develop partnerships with the petroleum industry, environmental groups, and interested parties to ensure desired air and water quality is maintained.

Cultural Resources

Under all alternatives, there would be compliance with the NHPA and other pertinent cultural resource laws. Alternative C would include a cultural resource survey in areas of the refuge complex that have a high potential for cultural resources.

Cumulative Impacts

None of the management activities for any of the alternatives would contribute measurably to any cumulative effects on cultural resources within the refuge complex.

5.3 ENVIRONMENTAL CONSEQUENCES FOR MEDICINE LAKE NWR

The environmental consequences of implementing alternative A are discussed for the following: Habitat and Wildlife; Endangered, Threatened, and Rare Species; Wilderness Management; Visitor Services; Research; Refuge Operations; and Socioeconomic Resources.

Habitat and Wildlife Management

Habitat and wildlife management activities under alternative A would affect the native prairie, planted grasslands, managed wetlands, wildlife, endangered species, and land acquisition as described in the following sections.

Native Prairie

At the current level of management, at least 50 percent of native prairie habitat on refuge complex lands would be maintained in the desired native plant community for that site. Some management treatments that mimic natural disturbance regimes, such as prescribed fire, control of invasive species, and rest, would be used to enhance native species. However, annual treatments would be minimal; very limited grazing has been used, and this would be eliminated.

Under alternative A, management treatments would result in some minor short-term reductions in the amount of available habitat, and could negatively affect some individuals of a species. In the long term, any treatments would result in minor beneficial effects for native species.

Prescribed fires would be conducted according to approved vegetation and fire management plans. Depending on timing, prescribed fire can improve plant vigor and help control weeds and maintain desired species composition.

Using herbicides to control weeds would provide a long-term benefit to native plant communities by reducing weed competition, maintaining desired species composition, and improving the production of grasses and sedges. Herbicides may result in reduced plant growth after the initial application, but vegetation would be expected to recover quickly in subsequent growing seasons.

Treatment applications would not be spread evenly throughout the refuge complex, and many prairie areas would remain untreated, due to lack of time, money, or staff. Many areas would continue to be left unmanaged, and prairie vegetation quality likely would deteriorate.

In the long term, without disturbances needed to maintain diverse and healthy prairies, native plant diversity would decrease, and invasions of nonnative vegetation grasses would increase. Residual vegetation would build up and suppress new growth. Nonnative plants would increase due to the decreased health of the native plants and their inability to compete. An overall long-term decline in native prairie quality throughout the refuge complex would occur, and some prairie nesting habitat cover would lose its attractiveness and effectiveness for many species of migratory birds, especially species of management concern.

Under this alternative, management of nonnative, invasive plants would be conducted when feasible, at levels required to meet legislative mandates. Emphasis would be on ensuring that negative impacts to neighboring landowners do not increase. It would not be possible to adequately manage invasive plants on refuge complex lands, and the spread of most invasive plants would increase over time.

Protection and conservation of native prairie on privately owned lands would increase on 1,000 or more acres annually through easements, fee-title purchases and other partnerships. These protection measures extending refuge management would have minor beneficial effects for grassland species.

Planted Grasslands

Currently, the refuge complex maintains plantings of dense nesting cover consisting of tall (>1 foot) tame (noninvasive, introduced) wheatgrasses with between 20 and 40 percent legumes on at least 50 percent of previously cultivated areas. Stands receiving appropriate management through haying, burning, interseeding, and cultivating would provide nesting habitat for waterfowl and numerous other bird species.

In sites that do not receive these periodic treatments, the physical structure and plant species composition degrade, and the quality of habitat for nesting waterfowl would decline over the long term. At current staffing and funding levels, it would not be possible to adequately manage all sites, and management would be sporadic. Each year, up to 5 percent of dense nesting cover plantings at the most degraded sites would be hayed, cultivated and reseeded to restore the stand's health. Many declining plantings seldom would receive treatment, and grassland quality and nesting bird habitat would

deteriorate. Any long-term beneficial effects from periodic treatments would be minimal.

Attempts to plant native species on previously cultivated lands would be limited because of the high costs of native seeds and the intensive management required for successful plantings. Fewer than 100 acres per year would be planted with native species.

Managed Wetlands

Impacts to wetlands may include agricultural runoff, sedimentation, surface and ground water contaminations, oil and gas contaminants, changes in the volume of ground and surface water, alkalinity, and influences of artificial nitrogen. These threats apply to all wetlands, not just actively managed or naturally influenced wetlands. There is little the refuge can do to reduce many of these threats and impacts outside of managing water levels, monitoring quality and quantity, and working with others to limit impacts.

Managing water levels to provide for a variety of wetland conditions would better protect and enhance the wetlands and would provide long-term benefits. When necessary, spring runoff would be diverted from Big Muddy Creek into Medicine Lake. Active management of water levels throughout the year could reduce the amount of water needed for the wetlands at various times of the year, allowing for more base flows downstream of the refuge. Dewatering wetlands that historically have experienced avian botulism outbreaks would make them unattractive for waterfowl and could minimize the number of bird deaths.

Wildlife

Over time, populations of waterfowl and other nesting grassland birds likely would decrease in the refuge complex, as the long-term health of grasslands declined, making high-quality nesting habitat less available. Predators still would be controlled in priority areas of the refuge to maintain good-to-excellent densities of nesting waterfowl and colonies of island-nesting birds. Refuge complex wetlands would continue to provide good brood-rearing, foraging, and migration habitat for waterbirds.

For grassland-nesting songbirds, refuge complex staff would have no information about limiting factors, threats, or reproductive success. Without this information, the refuge staff likely would have less management success for improving habitat conditions for these declining species. Some wildlife species would benefit from the limited acquisition of more habitat.

Endangered, Threatened, and Rare Species

The population of threatened piping plovers breeding in the refuge complex is the focus of site-specific management that would continue through a cooperative effort with The Nature Conservancy, state agencies, and private landowners. At current population objectives of 100 adults and a fledging rate of 1 chick per nesting pair, breeding piping plover populations could decrease within the refuge complex over time because of the overall decline in habitat quality. Fledgling rates must be at least 1.30 chicks per nesting pair for the population to remain stable, and higher for it to increase.

Whooping cranes would continue to be protected from accidental shooting through a refuge closure on sandhill crane and tundra swan hunting. Bald eagles, recently removed from the list of threatened species determined by the Endangered Species Act (June 2007), would continue to use the refuge complex during migration, and would be protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. Other, as yet undocumented, rare flora and fauna might be negatively affected if the quality of refuge complex grasslands declines over time. However, land acquisitions could help protect additional populations of rare flora and fauna.

Land Acquisition (Northeast Montana WMD)

The quantity of privately owned wetlands within the refuge complex would increase by a negligible degree, due to the acquisition of wetland easements on up to 100 acres annually from willing sellers, and through outreach, education, and habitat improvement projects on up to 330 acres annually. This would result in minor beneficial effects in the long term for habitat and wildlife.

Wilderness Management

Minimal management of the wilderness would continue to protect wilderness resources from environmental degradation. Any planned action would attempt to mimic historic natural disturbances, such as prescribed fire every 10 to 15 years. Invasive plants would expand due to lack of resources for adequate control. The quality of wilderness habitat would decline slowly due to lack of management actions. When time and staff budgets allow, the refuge complex could conduct an inventory of plant resources and develop partnerships with groups and individuals to protect the wilderness.

Visitor Services

Areas of the refuge that are closed to the public would remain closed to limit disturbance to migratory birds and resident wildlife. Visitation would remain about the same. Law enforcement would be sporadic due to lack of staff resources, which could result in some negative impacts to wildlife. Trampling of vegetation due to public use would be minor. Refuge staff would not be able to address many of the issues, such as hunting opportunities and better access, that might be raised by the public during the planning process.

Research

Projects would continue as opportunities arose, but would not be a priority. There would be limited value in monitoring and evaluating the success of habitat restoration. Projects generally would result in negligible, short-term, direct effects on habitat and wildlife as a result of disturbance.

Refuge Operations

Operating at below-minimum staffing levels set by the regional office would have moderate to major negative impacts on the refuge complex's habitat, wildlife, and wilderness resources in the long term. Existing staff levels would not be able to provide adequate law enforcement coverage or provide adequate level of visitor services.

Socioeconomic Resources

Alternative A assumes continued management for habitat conservation and public use. Management of wildlife-dependent recreational activities would stay the same, and visitation would remain at current levels.

For purposes of evaluating and comparing the alternatives, staff would increase from 9 to 14 full-time employees (filling vacant positions would account for most of these increases), and the current level of between 7 and 10 part-time employees would stay the same, for a total increase of 5 FTEs.

Under alternative A, there would be no significant change to the local economy from the net economic contribution of Medicine Lake NWR and the Northeast Montana WMD through visitor spending, although staff increases would result in some positive impacts.

Current visitation levels are expected to remain the same, contributing about \$202,350 to the local economy in visitor spending.

Refuge employment would vary between 12 and 17 FTEs, including seasonal staff. Filling vacant positions would increase employment, resulting in a total annual salary amount of \$600,000. Assuming 79 percent of employee earnings are spent locally, employee spending would contribute about \$471,000 to the local economy.

Combining visitation and employment effects, the total economic impact of alternative A would be approximately \$673,000. This represents an increase of \$138,500 over current conditions, considering several positions are vacant.

Cumulative Impacts

The implementation of alternative A would not contribute measurably to cumulative effects on socioeconomic conditions found within the refuge complex.

Alternative B—(Proposed) Increase Native Prairie Conservation and Restoration

The environmental consequences of implementing alternative B are discussed for the following goal topics: Habitat and Wildlife; Wilderness Management; Visitor Services; Research; Refuge Operations; and Socioeconomic Resources. The impacts on endangered, threatened, and rare species are discussed under Habitat and Wildlife Management because many of the impacts are related to habitat management activities.

Habitat and Wildlife Management

Habitat and wildlife management activities under alternative B would affect the native prairie, planted grasslands, managed wetlands, wildlife, endangered species, and land acquisition as described in the following sections.

Native Prairie

Implementing the CCP under alternative B would improve protection, enhancement, and restoration of native prairie within the refuge complex. At least 75 percent of native prairie on refuge complex lands would be maintained in the desired plant community. Prairie currently declining in quality would be managed with prescribed grazing, fire, and rest to maintain and restore the health of native plant species and associated fauna.

Similar to alternative A, management treatments would result in minor short-term impacts, including temporary losses of available habitat. In the

long term, however, treatments would result in moderate-to-major benefits for habitat and wildlife. Management efforts would be spread evenly throughout the refuge complex, and about 50 percent of the refuge could have some disturbance treatments each year.

Under alternative B, there would be a moderate increase in the amount of short-term disturbance within the refuge and WMD. With increased staffing and funding, regularly prescribed disturbances, such as fire and grazing, would help maintain long-term prairie health. Native plant diversity would increase, and nonnative plants would decrease in the long term due to improved health of native plants and management treatments.

Additional staff would allow for more progress toward reducing invasive species, rather than merely holding them in check within the refuge complex borders. More staff would allow for better monitoring to detect new infestations. The amount of useable habitat for prairie fauna would increase by a moderate amount.

Protection and conservation of native prairie on privately owned lands would increase under this alternative. Alternative B over 15 years would add 3,500 acres within the WMD through easements and fee-title purchases. Another 5,000 acres of privately-owned lands would benefit from outreach, technical assistance, education, and habitat improvement projects. Protection efforts would result in moderate-to-major benefits for grassland wildlife species on and off the refuge complex.

Preventing prairie lands from being converted to agriculture crops and other uses, and enhancing the quality of remaining prairies would provide long-term beneficial effects for declining native prairie birds, such as Sprague's pipit, Baird's sparrow, lark bunting, chestnut-collared longspur, marbled godwit and burrowing owl, and all types of prairie wildlife.

Planted Grasslands

Under alternative B, there would be minimal emphasis on dense nesting cover plantings. Instead, 2,000 acres of land that previously was cultivated would be restored to native prairie plant species. This effort would reduce cover for some bird species, but would increase habitat for native birds by a moderate amount, compared to alternative A. Native prairie plants would be expensive to establish in the short term, but are ecologically superior to seed sources from genetically altered plants (cultivars) and introduced plants established in old croplands. Restoration of native grassland would eliminate the need for frequent cover reseeding, haying, and disking. It would include warm and cool-season grasses and forbs, with priority given to areas that have become decadent

and overrun by undesirable nonnative cool-season grasses.

Under alternative B, increased staffing and funding would improve management of planted grasslands. As many as 2,000 acres would be reseeded with native species, improving the diversity of grassland habitat for prairie wildlife. Outreach and technical assistance would increase from 1,000-plus acres in alternative A to more than 2,500 acres on private lands in alternative B. Tame grass plantings would convert highly erodible cropland or other environmentally sensitive acreage to year-round vegetative cover. They also would reduce soil erosion and wetland sediments, improve water quality, and establish better wildlife habitat. Conserving these lands would provide long-term benefits for migratory bird populations and provide substantial habitat for resident birds and other wildlife.

Managed Wetlands

The management strategy for alternative B would be similar to alternative A, and the long-term beneficial effects would be similar.

Wildlife

Native wildlife populations, particularly migratory grasslands bird species, would benefit from a moderate amount of wildlife management, compared to alternative A. Large increases in the amount of grassland and wetland habitat available to nesting birds would increase nesting populations, and continued strategic predator control would improve the nesting success of all migratory birds on the refuge and the WMD. Because there would be less emphasis on dense nesting cover plantings, some bird species could be negatively affected to some degree. Monitoring key species or groups of species would help evaluate habitat improvement activities. Expanded wildlife monitoring would cover a greater array of bird species, including all colony-nesting and shorebirds, and other prairie wildlife species.

Long-term wildlife diversity and health would be improved by better management of refuge complex grassland habitat and more high-quality protected grasslands and wetlands on privately owned lands. Grassland birds and other prairie fauna would benefit from more control of invasive plants in the refuge complex grasslands, because more useable habitat would be available. As in alternative A, continued predator management of land mammals and gulls would improve nesting success for many bird species. By identifying limiting factors and effects of management on breeding grassland songbirds and shorebirds, the refuge complex could focus on improving nest-success rates for species of concern.

Endangered, Threatened, and Rare Species

Similar to alternative A, the population of threatened piping plovers breeding in the refuge complex would continue to be the focus of site-specific management through a cooperative effort with The Nature Conservancy, state agencies, and private landowners. Under alternative B, fledgling rates of at least 1.13 chicks per nesting pair could be maintained through more conservation and restoration measures within the refuge complex and adjacent lands and more staff to work with oil companies.

Whooping cranes would continue to be protected from accidental shooting through a refuge closure on sandhill crane and tundra swan hunting. Bald eagles would continue to use the refuge complex during migration. Over time, the quality of refuge complex grasslands would improve by a moderate amount, compared to alternative A, which likely would protect undocumented, rare prairie flora and fauna. Future land acquisitions in the Northeast Montana WMD, conservation easements, or habitat improvement projects on private lands also would help protect additional populations of rare plants and wildlife.

Land Acquisition (Refuge)

Under alternative B, the Service would purchase fee-title conservation easements on approximately 1,780 acres from willing landowners within the approved boundaries, increasing the size of the Medicine Lake NWR. The intent would be to maintain biological diversity and related wildlife values, and to conserve the natural systems and processes of the refuge. The land parcels would range in size from 37 acres to 612 acres.

The Service would purchase important wetland and grassland acres in fee-title or through conservation easements to expand protected conservation lands within the project area. Long-term benefits would include protecting habitat integrity, reducing fragmentation, and enhancing historic plant, animal, and insect biological diversity of native prairie habitats (figure 9, appendix G).

Wilderness Management

The quality of wildlife habitat would be enhanced by a moderate amount in alternative B, with greater emphasis on management practices. These would mimic historic natural disturbances, such as prescribed fire every 4 to 8 years. Invasive plants would be controlled faster with fewer and smaller infestations. With more professional staff, the refuge complex would conduct additional inventories to determine the numbers, kinds, and extent of plant and wildlife resources.

Visitor Services

Under this alternative, public use could increase by between 50 and 60 percent, from 16,000 to 25,000 visitors annually, due to additional opportunities for hunting, fishing, interpretation, wildlife observation, photography, and environmental education. These moderate-to-major increases would occur over the 15-year plan. An increase in public use would be accommodated by facility improvements and more staff, partnerships, and outreach. With more public use, there would be more potential for negative impacts to native prairie and wildlife, but an increase in law enforcement and education would offset impacts to habitat and wildlife to some degree. Most visitor activities would occur north and east of Medicine Lake (figure 12). The Homestead Unit would remain open to hunting.

The refuge complex generally would not experience significant increases in trail or road development unless it was necessary to minimize habitat or wildlife disturbance or for other safety-related reasons. Trail development would not be a priority, and only new foot-trail construction would be considered for restored prairie sites. Constructing trails would result in the direct long-term loss of vegetation, although this would be negligible-to-minor in the long term. More trail and road use could result in some fragmentation for wildlife or invertebrate species, trampling and soil erosion, and the introduction of noxious weeds. Appropriate trail maintenance and visitor management would limit those impacts.

Areas of the refuge that are closed to the public would remain closed to limit disturbance to migratory birds and resident wildlife. However, most of the new lands would be open to hunting, providing more public access. An increase in hunting opportunities could reduce disturbance to habitat and wildlife by dispersing hunters, but also could increase disturbances in areas that were not hunted previously. The species of wildlife hunted on the refuge probably would not change, and it is not likely that increased hunting would have more than a negligible-to-minor impact in additional wildlife taken during the hunting seasons (chapter 4, Affected Environment, Hunting). Even with habitat restoration activities, ring-necked pheasants would continue to be the most popular species hunted.

Visitor facilities would be upgraded. This could include developing additional interpretive signs, an observation blind, improved public access points, and a contact station that would be open weekly during normal business hours. These upgrades would result in direct short- and long-term impacts to vegetation, but they likely would be negligible overall. Upgrading facilities in existing disturbed areas would minimize additional habitat impacts and wildlife disturbance.

Research

Research projects would continue under alternative B but would be ranked according to priorities and focused on measuring the effectiveness of native habitat restoration. Research projects generally would result in negligible, short-term, direct effects on habitat and wildlife as a result of disturbance.

Refuge Operations

Increased staff levels under alternative B would enable the refuge staff to achieve more habitat conservation and restoration efforts, including working with partners and the community, and would have moderate-to-major beneficial effects for habitat, wildlife, and the wilderness area. Improved visitor services would lead to greater support and appreciation for the refuge resources over time. More resources could be used to work with oil and gas companies, which could lead to greater protection of refuge complex resources.

Socioeconomic Resources

Alternative B would lead to moderate improvements in natural resource management in terms of the amount, quality, and diversity of habitat, as well as a greater emphasis on public use and visitation in management. Wildlife-dependent recreational opportunities would be enhanced to minimize visitor congestion. Hunting and fishing opportunities would expand with additional new lands opening to hunters and anglers. Wildlife observation opportunities would be enhanced with an observation blind over Medicine Lake and a staffed visitor-contact station. Education opportunities would be enhanced through better outreach to schools, volunteer opportunities, and interpretative programs on the refuge.

This alternative could increase visitation from the current level of 16,000 to 25,000 visitor days annually. The new services would require staffing to increase from 9 to 18 full-time employees, and from 14 to 20 part-time employees; an increase of about 12 positions.

Under alternative B, the refuge would experience growth in visitation and employment. The increased visits predicted under alternative B would support about \$316,000 in visitor spending annually.

Employment under alternative B could increase from 12 to about 24 FTEs. Increased employment would raise the total salary for refuge employees to about \$834,000. Assuming 79 percent of earnings are spent locally, employee spending would contribute about \$656,000 to the local economy.

Combining visitation and employment effects, the total economic impact of alternative B would be \$972,000. This represents an increase of \$437,000 from current conditions.

Cumulative Impacts

The implementation of alternative B would not contribute measurably to cumulative effects on socioeconomic conditions found within the refuge complex.

Alternative C—Maximize Native Prairie Conservation and Restoration

The environmental consequences of implementing alternative C are discussed for the following goal topics: Habitat and Wildlife, Wilderness Management; Visitor Services; Research; Refuge Operations; and Socioeconomic Resources. The impacts on endangered, threatened, and rare species are discussed under Habitat and Wildlife Management because many of the impacts are related to habitat management activities.

Habitat and Wildlife Management

Under alternative C, the effects of habitat and wildlife management activities on the native prairie, planted grasslands, managed wetlands, wildlife, endangered species, and land acquisition are described in the following sections.

Native Prairie

Under alternative C, many of the long-term benefits would be similar to alternative B. The amount of native prairie that is protected, enhanced, and restored within the refuge complex would be increased by between 80 and 85 percent, 30 percent greater than alternative A, and 5 to 10 percent more than alternative B.

There would be bigger increases in staff and funding, and most staff operations would be focused on achieving restoration objectives. Of all alternatives, control of nonnative invasive species would be the greatest under alternative C, and would include state-of-the-art control methods. Canada thistle would be reduced by 60 percent, leafy spurge by 90 percent, crested wheatgrass by 30 percent, smooth brome grass by 50 percent, and Russian olive by 95 percent. This would greatly improve the health of native prairie communities and increase useable habitat for wildlife.

Planted Grassland

Under alternative C, there would be less emphasis on dense nesting cover plantings compared to alternative A, and about the same emphasis as alternative B. Some 3,000 acres of land that had produced crops would be restored to native prairie plant species, compared to 2,000 acres in alternative B. This would reduce cover for some species, but

would increase habitat for native species by a major amount compared to alternative A, and a moderate amount compared to alternative B. More staff and funding would assist in managing planted grasslands. More plantings—up to 10,000 acres—would be reseeded with native species, improving the diversity of grassland habitat for prairie wildlife. Outreach and technical assistance would increase to more than 10,000 acres on private lands.

Managed Wetlands

The management strategy for alternative C would be similar to alternative A, and the long-term benefits would be expected to be the same.

Wildlife

Native wildlife populations would be expected to benefit by a moderate-to-major degree compared to alternative A, and by a minor degree compared to alternative B. Large increases in the amount of grassland and wetland habitat available to nesting birds would increase nesting populations, and continued predator control would improve the nesting success of these birds in the refuge and the WMD.

Expanded wildlife monitoring would cover a greater array of bird species, including all colony-nesting and shorebirds, and other wildlife species. Intensive efforts would be carried out by an expanded biology-oriented staff. Additional law enforcement and a modest addition in interpretation and education would further protect wildlife from disturbance.

Endangered, Threatened, and Rare Species

Protection of endangered, threatened, and rare species would provide benefits similar to alternative B. For piping plovers, fledgling rates of at least 1.13 chicks per nesting pair likely would be maintained through more conservation measures within the complex and adjacent lands and more staff to work with oil companies.

Over time, the quality of refuge complex grasslands would improve by a moderate amount compared to alternative A, and a minor amount compared to alternative B.

Land Acquisition (Refuge)

Under Alternative C, the refuge boundary would increase by about 8,400 acres through fee-title acquisition from willing sellers, compared to about 1,784 acres in alternative B. Much of the acreage in alternative C would connect the Homestead Unit with the main boundary of Medicine Lake NWR, although some acquisition would occur around the main unit of the refuge. About 2,900 of the 8,400 acres are within the Big Muddy floodplain. About 2,168 acres are planted grassland (CRP), 3,118 acres are native prairie, and 3,548 are cropland.

This new acreage would unite the refuge into one unit while protecting from development a river floodplain and native mixed-grass prairie. It would increase the amount of protected habitat within the refuge boundary and improve protection of habitat. Although more acreage would be acquired (about four times more than under alternative B), land within the floodplain likely would be at less risk for development regardless of whether it were acquired. The highest priority lands for habitat and wildlife values would be protected under both alternatives B and C.

Wilderness Management

Similar to alternative B, the quality of wildlife habitat would be enhanced by a moderate to major amount in alternative C as a result of the greater emphasis on habitat management practices. These practices would mimic historic natural disturbances with the use of prescribed fire every 4 to 8 years. Invasive plants would be controlled more quickly with fewer and smaller infestations. With more professional staff, the refuge complex would conduct additional inventories to determine the numbers, kinds, and extent of plant and wildlife resources.

Visitor Services

Under this alternative, public use could increase by between 50 and 60 percent, from 16,000 to 23,000 visitors annually, from additional opportunities for hunting, fishing, interpretation, wildlife observation, photography, and environmental education. Unlike alternative B, a visitor contact station would not be built. Similar to alternative B, these moderate increases would occur over the 15-year plan. An increase in public use would be accommodated by modest improvements and more staff, partnerships, and outreach. With more public use, there would be more potential for negative impacts to native prairie and wildlife, but an increase in law enforcement and education to some degree would offset impacts to habitat and wildlife. Almost all of the visitor activities would occur north of Medicine Lake (figure 12).

The refuge complex generally would not experience increases in trail or road development unless it were necessary to minimize habitat or wildlife disturbance or for other safety-related reasons. Constructing trails would result in the direct long-term loss of vegetation, although this would be negligible-to-minor in the long term. More trail use could result in some fragmentation for wildlife or invertebrate species, trampling and soil erosion, and the introduction of noxious weeds. Appropriate trail maintenance and visitor management would limit those impacts.

Areas of the refuge that are closed to the public would remain closed to limit disturbance to

migratory birds and resident wildlife. However, most of the new lands would be open to hunting, providing more public access. An increase in hunting opportunities could reduce disturbance to habitat and wildlife by dispersing hunters, but also could increase disturbances in areas that were not hunted previously. The species of wildlife hunted on the refuge probably would not change, and it is not likely that increased hunting would have more than a negligible-to-minor impact in additional wildlife taken during the hunting seasons (chapter 4, Affected Environment, Hunting). Even with habitat restoration activities, nonnative pheasants would continue to be the most popular species hunted.

Visitor facilities would be upgraded. This could include developing additional interpretive signs, an observation blind, and improved public access points. These upgrades would result in direct short- and long-term impacts to vegetation, but they likely would be negligible overall. Upgrading facilities in existing disturbed areas would minimize additional habitat impacts and wildlife disturbance.

Research

Similar to alternative B, research projects would be ranked according to priorities and focused on measuring the effectiveness of native habitat restoration. Research projects generally would result in negligible, short-term, direct effects on habitat and wildlife as a result of disturbance.

Refuge Operations

Similar to alternative B, increased staff levels under alternative C would enable the refuge staff to achieve more habitat conservation and restoration efforts, including working with partners and the community and would have moderate to major beneficial effects for habitat, wildlife, and the wilderness area. Improved visitor services would lead to greater support and appreciation for the refuge resources over time. More resources could be used to work with oil and gas companies, which could lead to greater protection of refuge complex resources.

Socioeconomic Resources

Compared to alternative A, alternative C would offer major improvements in natural resource management to increase the amount, quality, and diversity of habitat. Alternative C also provides moderate emphasis on public use and visitation compared to alternative A, but less than alternative B, because staff will focus primarily on habitat restoration and conservation efforts.

Wildlife-dependent recreation opportunities would be enhanced to minimize visitor congestion. Hunting and fishing opportunities would improve through acquisition of additional lands that would be open for hunting. Wildlife observation opportunities would be enhanced with better facilities and access. Education offerings would be enhanced over alternative A by greater outreach to schools, volunteer opportunities, and interpretative programs.

This alternative could increase visitation from the current level 16,000 to 23,000 visitor days annually. The increased visitor days predicted under alternative C would be similar to alternative B, producing \$316,000 or less, depending on the type of visitor, in visitor spending annually.

Employment under alternative C is expected to increase from 12 to 29 FTEs. The increased employment would increase the refuge complex salaries for all employees to about \$1,022,000. Assuming 79 percent of employee earnings are spent locally, employee spending would contribute about \$803,500 to the local economy.

Combining visitation and employment effects, the total economic impact of alternative C would be \$1,119,500. This represents an increase of \$446,500 from current conditions.

Cumulative Impacts

The implementation of alternative C would not contribute measurably to cumulative effects on socioeconomic conditions found within the refuge complex.



Western grebe.

Table 12. Summary of the Environmental Consequences for Medicine Lake NWR and Northeast Montana WMD

<i>Impact Topic</i>	<i>Impact Category</i>	<i>ALTERNATIVE A</i> <i>No Action (Current Management)</i>	<i>ALTERNATIVE B</i> <i>Increase Native Prairie Conservation and Restoration</i>	<i>ALTERNATIVE C</i> <i>Maximize Native Prairie Conservation and Restoration</i>
Effects Common to All Alternatives				
<i>Air Quality</i> <i>Geology</i> <i>Soils</i>	<i>Habitat</i> <i>Wildlife</i> <i>Management</i>	Minor short-term localized impacts (smoke particles, erosion) from use of prescribed fire would occur, with long-term beneficial effects. Class 1 air quality would be maintained.	Minor short-term impacts from use of prescribed fire would occur, with long-term beneficial effects. Class 1 air quality would be maintained.	Minor short-term impacts from use of prescribed fire would occur, with long-term beneficial effects. Most amount of fire used. Class 1 air quality would be maintained.
	<i>Wilderness</i> <i>Management</i> <i>Visitor</i> <i>Services</i> <i>Refuge</i> <i>Operations</i>	Consequences would be negligible-to-minor negative impacts from public use or refuge activities and operations.	Consequences would be negligible-to-minor negative impacts from public use or refuge activities and operations.	Consequences would be negligible-to-minor negative impacts from public use or refuge activities and operations.
	<i>Cumulative</i> <i>Impacts-</i> <i>Oil/Gas</i> <i>Development</i>	None	Same as alternative A	Same as alternative A
<i>Water</i> <i>Resources</i>	<i>All</i>	All current water rights held by the Service would be protected, and active management of water resources would reduce impacts on and off the refuge.	Same as alternative A	Same as alternative A
<i>Cultural</i> <i>Resources</i>		Only cultural resources associated with an undertaking would be reviewed. There would be no pro-active identification of new resources.	Same as alternative A	Resources would be identified in high probability areas, increasing the likelihood of better planning, protection, and research opportunities.
	<i>Cumulative</i> <i>Impacts</i>	None	Same as alternative A	Same as alternative A

<i>Impact Topic</i>	<i>Impact Category</i>	<i>ALTERNATIVE A</i> <i>No Action (Current Management)</i>	<i>ALTERNATIVE B</i> <i>Increase Native Prairie Conservation and Restoration</i>	<i>ALTERNATIVE C</i> <i>Maximize Native Prairie Conservation and Restoration</i>
Impacts on Refuge Resources				
<i>Habitat and Wildlife</i>	<i>Native Prairie</i>	Negligible-to-minor short-term reductions in the amount of available habitat during restoration activities could negatively affect some individuals of a species. Minor beneficial effects include minimal invasive species control, and protection and conservation of lands within the complex and adjacent private lands.	Minor short-term reductions in the amount of available habitat during restoration activities could negatively affect some individuals of a species. Moderate long-term beneficial effects include increased protection and conservation within the complex and private lands projects, plus increased invasive species control.	Minor-to-moderate reductions in the amount of available habitat during restoration activities could negatively affect some individuals of a species. Moderate-to-major long-term beneficial effects include increased protection and conservation within the complex and private lands projects, plus increased invasive species control.
	<i>Planted Grasslands</i>	Little restoration of cultivated lands and lack of adequate management treatments (haying, fire, interseeding, disking, grazing) would result in overall deterioration of grassland quality and amount of nesting-bird habitat.	Restoration of 2,000 acres of land with crop production history to native prairie plant species would reduce cover for some wildlife species, but would increase habitat quality and quantity for native species by a moderate amount compared to alternative A.	Restoration of 3,000 acres of land with crop production history to native prairie plant species would reduce cover for some wildlife species, but would increase habitat quality and quantity for native species by a major amount compared to alternative A and a moderate amount compared to alternative B.
	<i>Wetlands</i>	Careful management of water levels for a variety of conditions would improve protection and enhancement of the wetlands, could reduce some impacts and threats, and could minimize some impacts downstream.	Same as alternative A	Same as alternative A

<i>Impact Topic</i>	<i>Impact Category</i>	<i>ALTERNATIVE A</i> <i>No Action (Current Management)</i>	<i>ALTERNATIVE B</i> <i>Increase Native Prairie Conservation and Restoration</i>	<i>ALTERNATIVE C</i> <i>Maximize Native Prairie Conservation and Restoration</i>
<i>Impacts on Refuge Resources, cont.</i>				
<i>Habitat and Wildlife, cont.</i>	<i>Threatened and Endangered Species</i> <i>Land Acquisition</i>	Focus would be on management of piping plovers breeding in the complex. Other species would be protected. Other rare flora and fauna could be adversely affected if the quality of refuge complex grasslands declines over time. Only wetland acquisitions would be within the authorized boundary (2007) or the Northeast Montana WMD (about 100 acres annually). This alternative would have a minor long-term beneficial effect within the WMD, but important wetland and grassland habitats next to the main refuge and Homestead Unit would be at risk for development or other disturbances.	Same as alternative A, except moderate improvements to refuge complex grassland would protect undocumented, rare prairie flora and fauna. 1,780 acres acquired from a willing seller would protect the most important wetland and grassland habitats adjacent to the main refuge and Homestead Unit. Long-term beneficial effects include increased habitat integrity, reduced fragmentation, and enhanced flora and fauna diversity.	Similar to alternative B 8,400 acres acquired from a willing seller would protect important wetland and grassland habitats and connect the Homestead Unit with the main refuge. Long-term beneficial effects include habitat integrity, reduced fragmentation, and enhanced flora and fauna diversity. This would provide the greatest protection for lands between the two units and important wetland and grassland habitats.
<i>Wilderness Management</i>		Minimal management of habitat would result in degradation of habitat over time from invasive species and lack of fire and grazing.	The quality of habitat in the wilderness area would be enhanced by a moderate amount. Practices would follow historical natural disturbances.	The quality of habitat in the wilderness area would be enhanced by a moderate to major amount. Practices would follow historical natural disturbances.
<i>Visitor Services</i>	<i>Hunting</i>	Areas currently closed to hunting would remain closed to protect migratory birds or wildlife.	Same as alternative A	Same as alternative A

<i>Impact Topic</i>	<i>Impact Category</i>	<i>ALTERNATIVE A No Action (Current Management)</i>	<i>ALTERNATIVE B Increase Native Prairie Conservation and Restoration</i>	<i>ALTERNATIVE C Maximize Native Prairie Conservation and Restoration</i>
Impacts on Refuge Resources, cont.				
<i>Visitor Services, cont.</i>	<i>Fishing</i>	Medicine Lake is large but shallow, and the water is alkaline by nature, so the lake is not suited for a self-sustaining sport fishery. Direct and indirect effects from wildlife disturbance would occur, but these generally would be temporary and minor.	Fishing on Medicine Lake only would reduce disturbances to wildlife on other lakes.	Same as alternative B
	<i>Wildlife Observation and Photography</i>	Limited activities would occur on the refuge, with negligible impacts overall.	Most activities would occur on the north and east side of Medicine Lake (the Homestead Unit would remain open to hunting) . This would reduce impacts to wildlife from increased visitation and improvements to facilities.	Same as alternative B
	<i>Interpretation Outreach Environmental Education</i>	Limited improved services likely would reduce the overall level of support for refuge management activities.	Improvements in facilities, access, outreach, and programs would result in better support for the refuge complex’s restoration efforts. Improvements to visitor facilities would result in direct short- and long-term impacts to habitat, but the overall effect is negligible. Using existing disturbed areas would reduce disturbances to wildlife and minimize impacts to vegetation.	Same as alternative B
	<i>Cumulative Impacts</i>	None	Same as alternative A	Same as alternative A

<i>Impact Topic</i>	<i>Impact Category</i>	<i>ALTERNATIVE A No Action (Current Management)</i>	<i>ALTERNATIVE B Increase Native Prairie Conservation and Restoration</i>	<i>ALTERNATIVE C Maximize Native Prairie Conservation and Restoration</i>
Impacts on Refuge Resources, cont.				
<i>Refuge Operations and Staffing</i>	<i>Cumulative Impacts</i>	Operating at below minimum staffing levels set by the region would have moderate-to-major negative effects to the complex's resources in the long term.	Increased staff would enable the refuge to achieve habitat conservation and restoration efforts, improve visitor services, and gain support and appreciation for refuge programs. More staff resources could work with oil and gas companies to reduce impacts to the refuge complex.	Similar to alternative B, but more resources would allow for extensive habitat conservation and restoration and enable staff resources to work with oil and gas companies to reduce impacts to the refuge complex. Visitor service improvements would be more modest compared to alternative B, and could result in less support and appreciation by the public.
<i>Socio-economic Resources</i>	<i>Cumulative Impacts</i>	Combining visitation and employment effects, the total economic impact would be about \$673,000. None	Combining visitation and employment effects, the total economic impact would be about \$972,000. None	Combining visitation and employment effects, the total economic impact would be about \$1,119,500. None

5.4 ENVIRONMENTAL CONSEQUENCES FOR LAMESTEER

Table 13 summarizes the environmental consequences by alternative for Lamesteer NWR.

Table 13. Description of Consequences by Alternative for Lamesteer NWR

<i>Issue</i>	<i>Alternative A (No Action)</i>	<i>Alternative B (Proposed Action)</i>
Water Management	Continued dependence on annual rainfall and maintenance of dam structure is required.	Same as alternative A, except the cooperative agreement would no longer be in place, and the easement would be removed.
Habitats and Wildlife	This provides minimal habitat value for migratory birds.	Same as alternative A
Visitor Services	Hunting would continue by permission from the landowner.	Current visitor activities, including nonwildlife-dependent activities, would continue. Noncompliance with the Improvement Act no longer would be an issue.
Cultural Resources	No cultural resource management is provided unless it is initiated by the landowner.	Same as alternative A
Operations and Maintenance	This continues the current level of operations and maintenance by the Service.	Maintenance would be taken over by the landowner.
Socioeconomic Impacts	No change would occur regarding socioeconomic climate.	No change would occur regarding socioeconomic climate.

6 Implementation of the Proposed Action (Draft CCP)

The draft CCP described in this chapter presents the details of how the Service would carry out its proposed action—alternative B for management of Medicine Lake NWR and the Northeast Montana WMD, and alternative B for Lamesteer NWR.

The planning team recommends a proposed action that best achieves the refuge complex’s 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, and the Service has notified the public of its decision.

If both alternative B’s are selected (Medicine Lake; WMD and Lamesteer), the objectives and strategies presented in this chapter would 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 to help the refuge staff reach the CCP goals.

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.

Strategies provide ways to achieve objectives.



Jerry Rodriguez/USFWS

Bird watching at the refuge is a popular activity.

6.1 MEDICINE LAKE NWR AND THE NORTHEAST MONTANA WMD

Service’s Proposed Action

The planning team proposed alternative B for Medicine Lake NWR and the Northeast Montana WMD after determining that it does the following:

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

6.2 LAMESTEER NWR

Service’s Proposed Action

Alternative B would take the refuge out of the Refuge System and relinquish the easement to the current landowner. Under this alternative, the dam structure would be given over to the landowner or destroyed. The Service’s easement requirements would no longer exist. The Service would divest its interest in the refuge. This would be carried out within the 15-year life of the plan.

Management Direction and Rationale for Lamesteer NWR

Once the CCP is approved, the managing station would work with the Division of Realty and the Land Protection Planning Branch within the Division of Planning to prepare a combined program proposal to divest this refuge. Within 5 years of CCP approval, the Service would relinquish the refuge to the current landowner to manage. The Service would work with the state, county, and landowner to divest the Service’s interest. It would revoke all

refuge and easement agreements and transfer full control to the current landowner.

Through the CCP process, the Service evaluated the level of national trust resource values represented by Lamesteer NWR to determine if those values and associated risks are sufficient to justify continuing the easement. Trust resources are resources that through law or administrative act are held in trust for the people by the government. It was determined that Lamesteer NWR possesses no trust resource values and minimal habitat value for wildlife. The Service has no management authority on the uplands surrounding the easement, and public access is by permission of the landowner. Further, the dam structure is in need of substantial repairs to meet State of Montana and regional dam safety standards. Given the minimal habitat value of the refuge, it makes little sense to spend limited resources on costly dam repairs.

The planning division of the Service's regional office brought together refuge managers, supervisors, a regional biologist, planners, realty staff, and the senior management team to develop a model to help the Service determine whether a refuge should remain part of the Refuge System. The model was designed for field-level refuge staff to use during the CCP planning process. When the model was applied to Lamesteer NWR, it did not pass the test to remain as a refuge in the Refuge System.

6.3 MEDICINE LAKE NWR AND NORTHEAST MONTANA WMD—GOALS, OBJECTIVES, STRATEGIES

The goals, objectives, and strategies for Habitat and Wildlife Management and Endangered, Threatened, and Rare Species are discussed together because issues for both are similar.

Habitat and Wildlife Management Goal

Conserve, restore, and enhance the ecological diversity of grasslands and wetlands of the glaciated mixed-grass prairie to support healthy populations of native wildlife, with an emphasis on migratory birds.

Objective 1: Habitat Management

Within 3 years of the CCP approval, begin to develop and implement a habitat management plan (HMP) for the refuge complex. The HMP would include more detailed and specific information than the CCP, such as additional data gathered for the upland and wetland habitats. The HMP would serve as the principal management document to direct all of the habitat management at the refuge complex.

Rationale:

This objective focuses on the development of a HMP to further guide and direct habitat management for the next 15 years. The HMP is more detailed because it focuses only on habitat and would not include other administrative functions of the refuge complex. Current habitat management plans such as the "Grassland Management Plan" and "Water Management Plan" are outdated, and ongoing research and monitoring have provided new information to guide the management of the refuge complex. The HMP includes all habitat types and would serve as a working document for staff and partners.

Strategies:

- Analyze existing information and data.
- Collect additional data on gaps related to vegetative composition and condition on uplands and wetlands.
- Focus staff efforts to collect data, including geographic information system (GIS) data, that can provide guidance for the HMP.

Objective 2: Native Prairie Communities

Maintain and improve native prairie habitat on refuge complex lands for the duration of this CCP so that at least 75 percent (or 13,000 acres) of habitat composition is of the desired native plant community for that site.

Rationale:

The largest threat to the integrity of the native prairie found on refuge complex lands is the invasion of nonnative plants, such as crested wheatgrass and smooth brome. Over the past 20 years, the lack of disturbances, such as prescribed fire and livestock grazing, have enabled these plants to out-compete the native prairie plants and expand their range.

The refuge would re-establish a livestock grazing system that would restore plant vigor and root health through periodic grazing that mimics grazing from historic bison herds. Prescribed fire would be applied to refuge complex lands to remove an overabundance of decadent vegetation. The northern Great Plains have a fire dependent ecosystem that evolved over thousands of years with wildland fires, browsing, and grazing. In addition, herbicides would be applied where applicable to control invasive plant species in the plant community descriptions (chapter 4, Vegetation) to encourage native plant recolonization. The HMP described in Objective 1 would discuss the management treatments in more detail.

Strategies:

- Apply appropriate treatments that mimic natural disturbance regimes, such as prescribed grazing and fire, and invasive plant control, to enhance native species.
- Conduct plant surveys annually on existing native prairie to monitor plant communities until adequate data is collected.
- Document vegetation structure and plant community response to management treatments. Use belt transect monitoring protocol every 5 years.
- Evaluate high-priority native prairie areas every 3 to 5 years and other areas every 4 to 7 years.
- Apply appropriate management treatments that mimic natural disturbance regimes, such as prescribed grazing and fire, rest, and invasive plant control, to enhance native species.
- Use a variety of media (brochures, outreach, signs or other ways) to educate the public about the importance of the native prairie.

Objective 3: Diverse Grassland Structure

Apply annual management treatments such as prescribed grazing and fire to promote diverse vegetative structure for migratory-bird nesting habitat. Up to 50 percent of native prairie may receive management treatment annually based on climate and plant community responses to treatments.

Rationale:

This objective focuses on vegetative structure and not just composition, and emphasizes the importance of providing a variety of habitat types in different developmental (successional) stages. Migratory birds have diverse habitat requirements, including distinct vegetative structure and composition. Refuge complex habitats should not all look alike; they should offer a mosaic of vegetative structure and composition. Diverse vegetative structure implies habitat with varying degree of structure. Some areas would have no vegetative litter (residual plant material) from recent grazing or burning, and others would be characterized by tall dense vegetation where no disturbances have occurred for some time.

During the past 20 or more years, only a limited amount of disturbance has occurred on refuge lands. Some areas have a prescribed fire and grazing history, while others have no recent history of disturbance, and therefore have large unhealthy accumulations of vegetative litter. The northern Great Plains have evolved over hundreds of

years with grazing from large herbivores such as bison, and have been burned from fires caused by thunderstorms and humans. The lack of disturbance on refuge complex lands has allowed invasive nonnative-plant species to expand at the expense of native prairie plants. The HMP would further explain and define how disturbance would be applied to refuge complex lands to improve migratory-bird nesting habitat.

Some migratory bird species are more specific to certain vegetative structure, while others are more adaptable.

Strategies:

- Evaluate high-priority native prairie areas every 3 to 5 years and other areas every 4 to 6 years, and assess their condition.
- Apply appropriate management treatments that mimic natural disturbance regimes (prescribed grazing and fire, rest, and invasive plant control) to improve grassland conditions, while meeting the life requirements of migratory birds.
- Initiate and develop multiyear grazing systems on private and refuge complex lands to improve migratory bird habitat.
- Use adaptive resource management to improve the native prairie on the basis of climate and vegetation response to various treatments.

Objective 4: Managed Wetlands

For the duration of the plan, manage water levels to provide a variety of wetland conditions to meet the life requirements of wetland-associated migratory birds. Identify management needs, and manipulate water levels as prescribed in the annual water plan.

Rationale:

Prolonged static water levels can create anaerobic conditions that limit decomposition and nutrient cycling. High water levels can also adversely influence the growth and development of aquatic vegetation by limiting light penetration and oxygen availability, and allowing water temperatures to remain cool. Continuous high-level water management also causes increased rates of erosion to shores and islands.

Appropriate water-level manipulations can create habitats that provide open-water areas with submerged vegetation and shallow areas with emergent food resources and cover for many wetland-dependent species. The exposure of wetland sediments to the atmosphere increases decomposition of organic material and improves the overall biological production potential. Refuge

wetlands would be managed to emulate the natural wet-dry cycles of the Great Plains. These natural water cycles provide a mosaic of habitats for shorebirds, amphibians, reptiles, waterfowl, invertebrates, water birds, and other wildlife, and also help recycle nutrients.

Strategies:

- Monitor and manipulate water levels throughout the year to provide planned wildlife habitat to follow the annual water management plan.
- Use water from Medicine Lake to supplement smaller units requiring water after a drawdown, or replenish losses due to evapotranspiration.
- Remove sediments from canals to allow for better water movement and wetland water-level management.
- Actively manage water units with historic outbreaks of avian botulism by removing water from these wetlands. Lower water levels make wetlands unattractive to migratory birds, and thus will reduce bird deaths.
- Maintain and repair existing water-control structures as needed, remove nuisance burrowing furbearers to reduce physical damage, and, where feasible, install new control structures to create or enhance managed wetlands.
- Work cooperatively with private individuals to remove nuisance burrowing furbearers to reduce physical damage to dikes and impoundments.
- Protect and maintain water rights in Cottonwood Creek, Lake Creek, and Sand Creek to manage Medicine Lake for the benefit of migratory birds.
- When necessary, divert runoff from Big Muddy Creek into Medicine Lake.

Objective 5: Invasive Species

Over the 15-year life of the plan, reduce crested wheatgrass by 15 percent, Canada thistle by 20 percent, leafy spurge by 25 percent, baby's breath by 70 percent, smooth brome grass by 30 percent, and nonnative trees and shrubs by 90 percent in the 18,220 acres of refuge complex native prairie. Strive to eliminate small infestations of spotted knapweed, dalmation toadflax, and white top. Evaluate any new infestations of species not recorded in this list, and identify a control target.

Rationale:

Nonnative invasive plant species pose a large threat to the remaining native prairie on the refuge complex. Prolonged rest has encouraged encroachment from many of these aggressive plants, thus reducing the quality of habitat available to many migratory bird species. Some of these birds, such as Baird's sparrow, chestnut-collared longspur, Sprague's pipit, burrowing owl, and upland sandpiper, have documented declining populations, and are dependent on intact mixed-grass prairie tracts.

Historically, the northern Great Plains mixed-grass prairie was a treeless landscape. Trees and tall shrubs can reduce the survival of grassland birds by providing suitable nesting habitat for predators such as great horned owl and black-billed magpie. They also provide perches for parasitic nesters, such as brown-headed cowbirds, which use the nests of other birds to lay their eggs. Recent data from the Souris River refuges in eastern North Dakota suggests that relatively small areas of tall woody vegetation can effectively fragment grassland habitats and cause many grassland bird species to avoid these areas (USFWS 2007). Elimination of tall woody vegetation is a biologically sound strategy to restore the landscape and improve habitat for a variety of grassland-dependent breeding bird species.

Strategies:

- Continue to gather information about improved techniques and the efficacy of invasive-plant control techniques.
- Within 1 year of plan implementation, begin mapping the locations and acreage of Canada thistle, especially in waterfowl production areas and any other newly identified infestations.
- Increase control and reduce infestations of invasive species using an integrated approach of mechanical, biological, and chemical techniques.
- Maintain nonnative tree plantings only at refuge complex headquarters to function as windbreaks for administrative buildings.
- Remap noxious weed infestations twice during the life of the plan to determine the progress of control work, focusing on leafy spurge, Canada thistle, white-top, and dalmation toadflax.
- Provide invasive plant management only for fee-title lands and not easements.

Objective 6: Land Acquisition and Easements

Over the life of the plan, protect at least 3,500 additional acres of native prairie on private lands in the refuge complex through perpetual easements or fee-title purchase from willing sellers.

Rationale:

The central grasslands were once North America's most extensive ecosystem (Johnson and Igl 2001). Grasslands are one of the two major habitat components (the other is wetlands) in the Prairie Pothole Region that influence the productivity of waterfowl (Dixon and Hollevoet 2005). Other bird species, such as marbled godwit and Wilson's phalarope, depend on both wetland and grassland areas during various parts of their life cycle.

With the large-scale conversion of native prairie to crop production or development, there has been a related change in grassland-dependent birds and other wildlife, such as Richardson's ground squirrel (Johnson and Igl 2001). It was not until the 1960s that widespread and systematic surveys of most bird species were initiated, in the form of the North American Breeding Bird Survey (BBS) (Robins et al. 1986). Quantitative evidence of grassland bird species population changes consequently exist for only the past 40 years, long after most grassland losses occurred. BBS data indicates that populations of many grassland bird species have been in decline since then. Grassland-nesting birds have shown more consistent population declines during this period than any other group of birds in North America (Sauer et al. 2001).

Although the Prairie Pothole Region supports a wide diversity of birdlife, prairie potholes are known for their role in waterfowl production. Although the region occupies only 10 percent of North America's waterfowl breeding range, it produces approximately 50 percent of the continent's waterfowl population (Kantrud 1983). Many species of waterfowl, such as mallard, northern pintail, gadwall, blue-winged teal, and northern shoveler, commonly nest in the grassed uplands that surround wetland basins. Grassland losses thus equate to reduced productivity for these species.

Converting native prairie areas of the region to cropland has impacted waterfowl by increasing habitat fragmentation and reducing the overall area of breeding cover for grassland nesting species (Sugden and Beyersbergen 1984, Batt et al. 1989). Greenwood et al. (1995) determined that duck nesting success in the Prairie Pothole Region increases as the amount of grassland in the landscape increases. Furthermore, it has been determined that increased grassland cover increases the daily survival rate for multiple duck species (Reynolds et al. 2001).

Unprotected grassland areas in cropland dominated landscapes often are converted to cropland, and

associated wetlands are drained or converted to other uses (Dixon and Hollevoet 2005). Striving to protect what remains of the presettlement prairie landscape is an integral part of the Service's wildlife conservation efforts.

Despite the extensive loss of grasslands that has already occurred throughout the state, there is an opportunity for the Service, and more specifically for the refuge complex, to protect a large percentage of the area's remaining grasslands by establishing perpetual and long-term easements and purchasing waterfowl production areas and refuges. There is strong public interest in protecting wildlife habitats, and a disproportionately large amount of private land includes grassland habitat, compared to the funding available to acquire easements and waterfowl production areas. Refuge complex staff decisions can benefit from science-driven habitat models, such as those developed by the Habitat and Population Evaluation Team (HAPET).

Preference should be given to purchasing easements and fee-title lands comprising unprotected grassland patches that are deemed priority by HAPET models or are located in close proximity to already protected tracts of grassland.

Strategies

- Identify high-priority areas for protection using waterfowl breeding pair distribution (figure 11) maps (commonly referred to as Thunderstorm maps), land-use cover maps, "National Wetland Inventory" data, grassland priority-protection maps, piping plover critical habitat, grassland bird conservation-area maps, and other tools.
- Pursue other funding sources and partnerships to protect native prairie tracts because there is no funding mechanism for purchasing native prairie tracts that do not qualify as migratory waterfowl habitat.
- Acquire private inholdings from willing sellers within the approved Migratory Bird Conservation Commission (MBCC) boundary of the Medicine Lake NWR.
- Acquire select high-priority lands as waterfowl production areas.
- Continue to partner with Montana Fish, Wildlife, and Parks (MFWP), Ducks Unlimited (DU), National Resources Conservation Service (NRCS), The Nature Conservancy (TNC), and other organizations to secure land acquisition funding through the North American Wetland Conservation Act (NAWCA), Land and Water Conservation Funds (LWCF), USDA conservation programs, and other sources.

- Enforce provisions of all grassland and wetland easement contracts through annual monitoring, and correct as necessary.

Objective 7: Native Prairie Conservation on Private Land

Collaborate with partners to annually conserve, restore, and enhance at least 5,000 acres of native prairie on private lands throughout the refuge complex through outreach, technical assistance, education, and habitat improvement projects.

Rationale:

It is unlikely this objective could be achieved relying on Service efforts only. Collaborating with many partners to fulfill wildlife habitat goals is necessary. This objective aims to conserve and enhance native prairie within the refuge complex, which allows Service personnel to provide technical expertise. Protecting private lands becomes paramount to restoring the overall health of native prairie and wildlife populations.

The Service promotes grassland easements and technical assistance regarding grazing systems, which provide economic benefits to landowners by increasing forage production and promoting sustainable operations to help keep ranchers and wildlife on the landscape. Restoring and conserving native prairie would aid in capturing precipitation to recharge wetlands, prevent sediment and chemical runoff into wetlands, and preserve wetland function.

Wetland-associated grassland habitat within the refuge complex is especially critical for grassland nesting waterfowl such as blue-winged teals, mallards, and northern pintails, grassland nesting shorebirds, such as marbled godwits, Wilson's phalaropes, and long-billed curlews, and grassland nesting passerine species, such as Baird's sparrow, Sprague's pipit, and chestnut-collared longspur.

Although a sizeable proportion of untilled prairie remains in the refuge complex in private ownership, much of it is heavily grazed with little residual cover available in the spring for nesting migratory birds. The implementation of rotational grazing systems on native and tame grasslands would improve the condition of upland nesting habitat and reduce silt and agrochemical runoff entering wetlands. This rest-rotation grazing system would result in a diversity of vegetation structure providing habitat for many different species at different times of the season.

Some important programs administered by Service partners that may require assistance include NRCS, primarily through the Environmental Quality Incentive Program (EQIP) and sometimes the Wildlife Habitat Incentive Program (WHIP), Montana Fish, Wildlife, and Parks, primarily through the Upland Gamebird Habitat

Enhancement Program (UGHEP), the Farm Services Agency, through the Conservation Reserve Program (CRP).

Strategies:

- Work cooperatively with private landowners to design and implement grazing systems that promote healthy native prairie.
- Provide private landowners technical assistance on practices and programs that protect grasslands and highlight native prairie values.
- Continue to provide logistical support, technical expertise, and office space and supplies to support a Partners for Fish and Wildlife biologist.
- Work cooperatively to protect and enhance grasslands within the Fort Peck Indian Reservation boundary.
- Continue to partner with the MFWP, DU, NRCS, TNC, Fort Peck tribes, and other organizations to secure funding through the NAWCA, LWCF, and other sources for habitat enhancement and protection.

Objective 8: Wetlands Conservation on Private Land

Conserve annually 500 acres of wetlands on private land within the refuge complex through outreach, technical assistance, education, and habitat improvement projects.

Rationale:

Wetlands are among the most productive ecosystems in the world, and are essential to the ecological health of northeastern Montana. Wetlands play an important role in the landscape. They improve water quality, aide in floodwater storage, recharge aquifers, provide fish and wildlife habitat, support recreational and aesthetic appreciation, and offer significant biological diversity and productivity. Many species of birds, reptiles, amphibians, insects, crustaceans, and mammals rely on wetlands for food, water, and shelter, and as a place to brood and rear their young. Most of the Prairie Pothole Region is in private ownership, and the productivity of the wetlands is determined by the activities occurring around them. Assisting landowners in maintaining the biological integrity of their properties is beneficial to everyone.

Strategies:

- Work cooperatively with private landowners to design and carry out conservation practices that promote healthy wetlands.
- Provide technical assistance to private landowners about programs and practices

available to protect wetlands, and highlight wetland values.

- Participate in partnership efforts to improve water quality within the Big Muddy Creek watershed and in other land use projects that could benefit refuge complex wetlands.
- Provide technical expertise, office space, and supplies to support a Montana Partners for Fish and Wildlife biologist.
- Work cooperatively to protect and enhance wetlands within the Fort Peck Indian Reservation boundary.
- Continue to partner with the Fort Peck tribes, MFWP, DU, USDA, TNC, and other organizations to secure funding through the NAWCA, LWCF, and other sources for habitat enhancement and protection.

Objective 9: Wetlands Water-Quality Monitoring

Within 5 years of the plan's approval, implement a comprehensive monitoring program encompassing the refuge complex wetlands to assess and evaluate threats and impacts to water quality and water quantity.

Rationale:

The foundation for strong biological diversity begins with water quality and the productivity and health of the micro-organisms found in all wetlands. These micro-organisms are affected by contaminants and other water-quality threats and impacts, such as agricultural runoff, sedimentation, surface and groundwater contaminations, oil and gas contaminants, volume (ground and surface water), alkalinity, and influences of artificial nitrogen and sodium. These threats apply to all wetlands, not just actively managed or naturally influenced wetlands.

Strategies:

- Continue to study the Clear Lake aquifer in cooperation with the SCCD, Montana Bureau of Mines and Geology, and the United States Geologic Survey (USGS), to determine its function and effects on surface wetlands.
- Determine monitoring parameters to identify external threats to water quality from oil and gas contaminants and agricultural influences, and gather baseline information on existing wetland conditions. Monitoring trends in alkalinity is especially important due to the nature of many wetlands found throughout the refuge complex.

- Monitor the most threatened wetlands every 5 years.
- Evaluate potential oil and gas contaminants throughout the refuge complex by collaborating with an environmental specialist provided by the Service.
- Use existing data as a baseline on water quality and quantity by referring to the Water Management Plan (table 16) and the water samples collected in the early 1990s.

Objective 10: Artificial Islands

Within 5 years of CCP implementation and in conjunction with development of the HMP, evaluate all artificial islands for migratory bird production potential. Consider removal of any artificial island that is not essential habitat or that might damage migratory bird populations.

Rationale:

Productive nesting islands must have adequate nesting cover for waterfowl and other migratory birds and provide security from mammal predators. Approximately 150 islands have been constructed on refuge complex wetlands. New research has revealed that many types of artificial islands are ineffective and do not meet the cover and safety criteria required for successful migratory bird nesting. Some islands can attract more predators and reduce brood survival. All artificial islands would be assessed for their nesting value and would either be removed or repaired. In particular, the islands in Goose Lake, Knudson Bay, Homestead Lake, and Katy's Lake would be addressed.

Strategies:

- Identify and map all artificial islands.
- Develop evaluation criteria based on scientific research.
- Initiate incremental removal or repair of islands based on the assessment and budget permits.

Objective 11: Native Prairie Restoration

Within 15 years after CCP approval, restore up to 2,000 acres on the refuge complex that previously produced crops to native-prairie plant species. Prairie plant species would include warm- and cool-season grasses and forbs, and priority would be given to areas that have become decadent and overrun by undesirable, nonnative, cool-season grasses.

Rationale:

Over the long term, native prairie plants are economically and ecologically superior to genetically altered (cultivars) on previously cropped areas. Permanent native vegetation eliminates frequent (every 8 to 10 years) management treatments (hay, disking, and reseeding) of decadent stands of nonnative planted species. Native vegetation reduces local habitat fragmentation, eliminates the “edge” effect associated with crop fields, and improves migratory-bird nesting and other wildlife habitat.

A native-species planting strategy vastly improves the capacity for grouping of plants to out compete nonnative grasses. Native species plantings also reduce “source sites” from which introduced and weedy plants invade adjoining native prairie. Native grasses have better and longer-lasting structural diversity within stands.

Long-term management of native species plantings requires disturbance using prescribed grazing and burning during the growing season. Native species plantings are in compliance with Service policy that discourages planting of introduced species on Fish and Wildlife Service lands and stresses planting native species (USFWS 2001a).

Strategies:

- Evaluate high-priority locations for replanting native grasses and forbs, taking into consideration location, wildlife values, and habitat diversity.
- Convert crested wheatgrass as a priority, but also consider old dense nesting cover fields. Determine accurate estimates of crested wheatgrass.
- To ensure seed source is locally adapted to various soil types of the refuge complex, establish seed production plots of local native grasses and forbs, and harvest seed from these plots and other refuge and private-land seed sources near the refuge.
- Use crop farming and herbicide to eliminate existing nonnative vegetation, and prepare the seedbed for planting native species. Nonnative species are extremely aggressive and may require 2 or more years to eliminate the seed source before native species can be seeded.
- Develop an HMP with specific information related to converting nonnative areas to native vegetation.

Objective 12: Privately-owned Grasslands

Conserve annually the 2,500 acres of nonnative and noninvasive (tame) grasslands on private

land in the 3-county refuge complex area through outreach, technical assistance, education, and habitat improvement projects.

Rationale:

Tame grass plantings convert highly erodible cropland acreage to year-long vegetative cover to reduce soil erosion and sediment in wetlands, improve water quality, and establish wildlife habitat. The conservation of these lands contributes to migratory bird populations and provides habitat for resident birds and other wildlife. The development of ethanol and other crop-based fuels may have a negative impact on the continuation of these programs and would directly impact wildlife populations in northeast Montana. Maintaining the lands in year-round grass cover is important.

Strategies:

- Provide technical assistance to private landowners interested in state and federal programs that restore and enhance grasslands.
- Work cooperatively with private landowners to design and implement grazing systems that promote healthy grasslands, with an emphasis on incorporating expiring CRP tracts into those systems.
- Provide support and office space for a Montana Partners for Fish and Wildlife biologist.
- Work with the Fort Peck tribes and individual landowners to protect and enhance grasslands within the Fort Peck Indian Reservation boundary.
- Continue to partner with the Fort Peck Tribes, MFWP, DU, USDA, TNC, and other organizations to secure funding through the NAWCA, LWCF, and other sources for habitat enhancement and protection.

Objective 13: Conservation Easements

Within 15 years, purchase fee-title or conservation easements on approximately 1,780 acres, based on priority considerations from willing sellers within the approved boundary (figure 9 in chapter 3), to maintain biological diversity and related wildlife values, and to conserve the relatively naturally functioning systems and processes of the refuge complex.

Rationale:

As part of the CCP, the refuge complex staff evaluated the future habitat protection needs of the Medicine Lake NWR. The refuge complex’s land-acquisition project proposal is part of a conservation strategy to protect highly productive wildlife

habitat, including both wetlands and uplands on lands adjoining and surrounding the refuge complex. The greatest threats to these lands are agricultural conversions of grasslands to cropland, conversions from grasslands to groundwater-irrigated cropland, and drainage of wetlands. For example, from 1982 to 1997, more than 1.2 million acres of native prairie were converted to agricultural production in Montana (Johnson 2000).

Strategies:

- Acquire lands from willing sellers through fee-title or easement purchases, according to the following priorities (see table 14):

Priority 1 Zone—This includes the area on the northeast side of the refuge. Priority 1 area lies within the highly productive Prairie Pothole Region and has topography typical of the glacial drift prairie—relatively gentle rolling plains with occasional shallow depressions. This is an area of high wetland density, and resulting prairie-wetland complexes contain a high diversity of wetland types and sizes.

Priority 2 Zone—Areas included in Priority 2 Zone also have protective wetlands and remnant native grassland species. Vegetation is primarily the wheatgrass-needlegrass association of the mixed-grass prairie (Coupland 1950), but plant associations are diverse and fluctuate greatly with annual moisture, slope, aspect, and soil type. Subirrigated, wet meadow areas are dominated by prairie cordgrass, switchgrass, western wheatgrass, rushes and sedges, and abundant tall forbs.

Priority 3 Zone—Priority 3 Zone is influenced by Big Muddy Creek, a meandering narrow (~20–30 feet wide), perennial prairie stream, the largest in this area. This floodplain consists primarily of soils formed in deposits from glacial outwash and alluvial deposits, are moderately to poorly drained, and are saline or salt-affected in many locations. Numerous wetlands were formed from shallow depressions, oxbow cutoffs, and a high water table from underground aquifers.

Table 14. Land Acquisition by Priority (figure 9 in chapter 3)

<i>Description</i>	<i>Total Area</i>
Priority 1 Zone	1,092
Priority 2 Zone	477
Priority 3 Zone	215
Total (acres)	1,784

Endangered, Threatened, and Rare Species Goal

Contribute to the preservation and restoration of endangered, threatened, rare, and unique plants and wildlife that occur or have historically occurred in the refuge complex.

Objective 1: Piping Plovers

Annually support an average piping plover breeding population of 175 adults with a fledging rate >1.3 chicks per nesting pair in the refuge complex.

Rationale:

The recovery plan (USFWS 1994) outlines the goals for recovering piping plovers, including designation of critical habitat.

Strategies:

- Assist in the annual monitoring of breeding populations and reproductive success on the refuge complex and private lands.
- Develop site-specific management prescriptions for plover habitat in the refuge complex.
- Maintain an active role in the ongoing partnership recovery effort on the Missouri Coteau Alkali Lakes Core Area.
- Provide technical assistance to landowners of available programs and practices to protect piping plover habitat and surrounding grasslands.
- Purchase grassland easements or obtain voluntary agreements to protect native grasslands associated with piping plover critical habitat.
- Use proven predation management techniques, such as nest cages and temporary and permanent electric fences, to increase recruitment.
- Manipulate water levels where possible to prevent inundation of active nests.
- Use methods such as grazing systems, prescribed fire, salt deposition, and gravel hauling (as appropriate) to enhance or create nesting habitat.
- Continue working with private land owners to remove predatory habitats such as tree rows, old houses and out buildings, and rock piles.

Wilderness Goal

Conserve the wilderness quality and associated natural processes of the 11,360-acre Medicine Lake Wilderness, including the Sandhills portion of the designated area.

Objective 1: Wilderness Protection

Over the next 15 years, maintain the high quality of the wilderness by adhering to “minimum tool” concepts and following Service guidelines for wilderness management. Manage wildlife habitat, achieve class I air-quality standards, and maintain and protect the lake vista.

Rationale:

The Medicine Lake NWR wilderness is managed according to the Wilderness Act of 1964. The act requires wilderness areas be managed in a natural condition, with opportunities for solitude and a primitive and unconfined type of recreation. Visitors to the Sandhills portion of the wilderness area is primarily by hikers and hunters, largely for wildlife observation. Public use of Medicine Lake is primarily for wildlife observation, fishing, and canoeing.

The Service’s wilderness policy (USFWS, 2001b) describes how the refuge manager preserves the character and qualities of designated wilderness while managing for the establishing purposes of the refuge. This policy, like the Wilderness Act, states that wilderness is maintained with outstanding opportunities for solitude and a primitive and unconfined type of recreation. The refuge manager conducts minimum requirements analyses before taking any action that may impact wilderness character. In general, the manager would not modify habitat, species population levels, or natural ecological processes in refuge wilderness unless doing so maintains or restores ecological integrity that has been degraded by human influence or is necessary to protect or recover threatened or endangered species.

Strategies:

- Remove garbage, old implements, and other debris, such as pipes, fence enclosures, and farm site remnants, from Bruce’s Island and other wilderness areas.
- Using the minimum requirements decision guide, and following wilderness management policy, protect the pristine grassland qualities of the 2,320-acre Sandhills area, 695 acres on islands, and the 18-acre Bridgerman Point peninsula. Employ land management practices such as prescribed grazing and fire that mimic

natural occurrences that historically shaped the area.

- Using the minimum requirements decision guide, and following wilderness management policy, continue to maintain the vista of the 11,366-acre Medicine Lake wilderness area.
- Continue to monitor the air quality as required in the Clean Air Act to verify that class I standards are being achieved.
- Conduct plant surveys to determine plant communities and species composition.
- Protect grasslands from negative human impacts, such as invasive plants and vehicle trespass.
- Protect and maintain water rights on Cottonwood, Lake, and Sand creeks to allow full access of spring runoff into Medicine Lake.
- When necessary, divert spring runoff from Big Muddy Creek into Medicine Lake.
- Monitor water quality to determine that Clean Water Act standards are being met and that water is of sufficient quality for associated biota.
- Update the current Wilderness Refuge Plan (table 16), referring to the Service draft policy on Wilderness Management Plan contents and formats.
- Use a variety of media and tools to educate the public about the important value of the Wilderness Area designation.
- Continue to allow for ice fishing on Medicine Lake near the Highway 16 bridge using temporary tent-like structures (no permanent structures allowed).

Visitor Services Goal

Provide opportunities for visitors to enjoy wildlife-dependent recreation and to help visitors understand and appreciate the value of the mixed-grass prairie and the Refuge System.

Safe and adequate access, low hunting pressure, and the opportunity to find solitude may be all that is required for most hunters to consider their hunt a success. For many hunters, a reasonable opportunity to harvest game is another indication of a high-quality experience. Hunters that have experienced a high-quality hunt likely will develop an appreciation for the wildlife, the land, fellow hunters, and the Refuge System.

Objective 1: Management Plan

Within 5 years of the CCP approval, initiate a visitor services management plan for the refuge complex. The plan would include more detailed and specific information than the CCP related to recreation uses. It would serve as the principal management document directing the public-use program for the refuge complex.

Rationale:

This objective focuses on the development of a visitor services management plan to further define and direct the public-use management program for the next 15 years. The plan would be more detailed than the CCP because it would focus only on public use and would not include other administrative functions. The refuge does not have a current approved plan. With additional monitoring, the plan would ensure that all public uses are compatible with the purposes of the refuge.

Strategies:

- Assess current public uses for compatibility.
- Gather additional information from the public pertaining to recreational use.
- Promote wildlife-dependent recreational uses to increase awareness and appreciation of the natural resources of the native, mixed-grass prairie and the wilderness area, and the value of native prairie.
- Provide for most public-use activities on the north and east side of Medicine Lake.

Objective 2: Hunting

Provide high-quality hunting opportunities in refuge complex hunting areas. At least 90 percent of hunters pursuing big game, upland game, and migratory birds have indicated they are satisfied with their experience. Hunters therefore have a great awareness and appreciation for refuge resources and the value of the Refuge System.

Rationale:

The Medicine Lake NWR Complex offers exceptional opportunities for hunting waterfowl on a secluded prairie pothole in the remote sections of the WMD, tracking whitetail deer in the wide-open sandhills prairie, and pursuing the elusive sharp-tailed grouse. The refuge complex works to create a safe hunting environment by allowing appropriate areas to be opened to hunting and carefully managing hunting pressure and hunter congestion.

Strategies:

- Until the HMP and Visitor Services Management Plan are completed, continue to maintain three hunting areas on the refuge. Area 2 would be open for big game, upland game bird, and waterfowl hunting, according to state seasons. Waterfowl sanctuary areas would remain closed, providing a safe feeding and resting area for migratory birds until November 15, when these areas are frozen and would open for deer and upland game-bird hunting only.
- Keep waterfowl sanctuary areas closed to provide a safe feeding and resting area for migratory birds until November 15. Open for deer and upland game-bird hunting after areas are frozen.
- Provide opportunities to find solitude by continuing the “walk-in hunting only” status at selected refuge roads that are closed to vehicles.
- Provide handicapped-accessible hunting opportunities. Investigate creating accessible blinds and offering hunts for people with disabilities.
- Encourage youth hunting opportunities, and explore the possibilities for additional seasons, unique areas, and special-season dates for youth that would be outlined in the Visitor Services Management Plan.
- Continue to provide adequate parking areas to allow hunters access and disperse hunter concentrations among hunting areas.
- Evaluate land acquired by the refuge, and where feasible, open new areas to hunting.
- Continue to work cooperatively with Montana Fish, Wildlife, and Parks to conduct law enforcement patrols to ensure compliance with regulations and provide a safe experience for all visitors.
- Keep waterfowl production areas open for public hunting and trapping, according to state and federal regulations.
- Develop new brochures for the WMD that provide information on refuge-complex hunting regulations and access.
- Conduct annual informal surveys of hunters to gauge the quality of hunting experiences. Use the information from the surveys to make improvements to the hunting experience.

Objective 3: Fishing

Until the Habitat Management Plan and the Visitor Services Management Plan are completed, provide a maximum of 10 months per year of public sport fishing on Medicine Lake, when resources needed to administer this program do not adversely affect the refuge complex’s ability to implement habitat and wildlife management. Continue to provide anglers safe, reasonable access, minimal conflicts with others, and general satisfaction with their experiences.

Rationale:

The Service manages Medicine Lake as an open-water area for breeding and resting migratory birds. Because Medicine Lake is large (8,200 acres) and is the refuge’s deepest lake (average 6-foot depth), it offers the best opportunity for recreational sport fishing. Though fish are found in other refuge areas, management objectives for the wetlands are to benefit migratory birds and not to provide for sport fishing. Recreational fisheries would be managed on Medicine Lake only, and all other refuge pools would be managed for the benefit of migratory birds.

Medicine Lake is large but shallow, and the water is alkaline by nature, so the lake is not suited for a self-sustaining sport fishery. Before the refuge was established and the water control structure and diversion canal were constructed, water levels in late summer were very low and sometimes dry. Montana Fish, Wildlife, and Parks now stocks Medicine Lake annually with young northern pike to sustain a fishery on the lake. The refuge would continue to allow stocking as long as the cost to stock fish is not incurred by the refuge.

The Service allocates the refuge limited annual resources in terms of funding and staff, and its priority is to manage upland and wetland habitat. Fishing programs would continue if resources needed do not detract from funding and staff needed for habitat management. Most fishing opportunities occur as ice-fishing in the winter from shore and bank locations near the bridge at Montana Highway 16 or close to the refuge headquarters. Costs to administer this program are limited to law enforcement and brochure printing. No additional expenses are anticipated.

The refuge intends to keep the present level of fishing access, unless funding and staffing shortfalls require closures of fishing access. However, partnerships with local groups and outdoor clubs could be used to enhance access for shore anglers.

Strategies:

- Provide accessible fishing opportunities for persons of all abilities. Investigate creating an accessible fishing area at the Montana Highway 16 kiosk, pending

coordination with the Montana Department of Transportation.

- Continue to maintain fishing access points and parking areas.
- Develop new brochures with information on refuge fishing opportunities, regulations, and access.
- Educate anglers about the Medicine Lake wilderness designation and use policy by placing interpretive panels and/or brochures in the fishing area at the Highway 16 bridge.
- Continue to work cooperatively with Montana Fish, Wildlife, and Parks regarding law enforcement, regulations, stocking fish, and other issues.
- Continue to maintain the fishery at Medicine Lake, and close Gaffney Lake, Swanson Lake, and Lake 12 to fishing and manage for migratory birds.

Objective 4: Environmental Education and Interpretation

Within 3 years of the CCP approval and depending on additional staff and funding, re-establish a minimum of at least five annual interpretive and environmental education programs. Focus programs on refuge complex natural and cultural resources, as well as habitat and wildlife management practices. By year 15, annually conduct an average of 15 environmental education and interpretation programs.

Rationale:

Environmental education and interpretation are two of the six wildlife-dependent recreational activities specified in the Refuge System Improvement Act. The refuge complex features a 14-mile interpretive wildlife drive with information kiosks, interpretive signs, and pull-outs. Due to budget constraints, the Service currently conducts minimal environmental education activities, typically when local school teachers contact the staff. The conservation and restoration of native prairie would be the primary management direction over the next 15 years. Environmental education programs would focus on teaching children and adults the importance of protecting the mixed-grass prairie and wildlife. Today's children are the landowners and land stewards of the future, and they are essential in accomplishing conservation efforts in northeastern Montana.

Strategies:

- Update the general brochures for Medicine Lake NWR and the Northeast Montana WMD.

- Develop a refuge complex fact sheet.
- Provide educational opportunities and events during National Wildlife Refuge week, International Migratory Bird Day, and at county fairs.
- Construct a visitor contact station with offices at a future location to be determined, and create seasonal and permanent displays and exhibits for the refuge complex.
- Conduct interpretive programs such as guided tours, films, and nature talks.
- Maintain interpretive panels, and develop new panels for the refuge complex.
- Continue to maintain the refuge's 14-mile wildlife drive to provide a safe and enjoyable experience for all visitors.
- Continue to operate the Youth Conservation Corps program.
- Foster a volunteer program, and actively recruit student interns.
- Develop environmental education materials, and carry out programs that explain various management activities, habitats, and wildlife.
- Continue to provide access to refuge lands for "hands-on" environmental education experience.
- Continue to maintain an environmental education area with restrooms and information kiosks near the Highway 16 bridge.

Objective 5: Wildlife Observation and Photography

Within 5 years of development of a Visitor Services Management Plan, provide 90 percent of visitors a high-quality experience, with many opportunities to view and photograph wildlife.

Rationale:

Wildlife observation and photography are compatible wildlife-dependent recreational uses on portions of the refuge, and directly relate to the mission of the Refuge System. These activities help foster an appreciation and understanding of wildlife and the outdoors in the local, regional, and national communities.

The beautiful landscapes, wetlands, and skies at Medicine Lake NWR and Northeast Montana WMD afford people the opportunity for viewing and photographing hundreds of wildlife and plant species. To ensure that visitors continue to have high-quality experiences, the refuge would provide

information on where to observe wildlife in a safe and undisturbed manner.

Strategies:

- Define areas where wildlife observation and photography would be permitted in the Visitor Services Management Plan.
- Maintain the refuge's 14-mile wildlife drive (auto tour route).
- Provide a safe and enjoyable wildlife experience for all visitors.
- Explore the feasibility of constructing a boardwalk and an observation blind at Sayer Bay.
- Continue to maintain an accessible colony-nesting bird observation platform with mounted binoculars near Bridgerman Point.
- Maintain an observation blind near an active sharp-tailed grouse "dancing" ground.
- Construct a walking trail from the proposed visitor contact station to the lakeshore that includes a viewing blind.
- Conduct informal surveys, and solicit feedback from visitors to determine progress in achieving this objective.

Refuge Operations Goal

Use staff, partnerships, volunteers, and funding efficiently through effective communication and innovation, to support the National Wildlife Refuge System.

Objective 1: Support

Over the life of the plan, focus refuge staff efforts on fulfilling migratory bird and habitat management responsibilities. However, since the number of employees has decreased since 2000, this objective focuses on increasing staff to the year 2000 level, and seeking more funding and other support for the refuge complex.

Rationale:

The Service allocates limited annual resources (funds and staff) to the refuge, and the priority for these resources is to manage upland and wetland habitats. Staff would accomplish fewer objectives and strategies if the refuge does not reach the target (minimum) staffing level and obtain adequate funding. The current and proposed staffing chart (table 15) defines minimum staff levels.

Strategies:

- Create priorities for filling all positions identified on the current and proposed staffing chart, and determine which positions to fill first when funding is restored.
- Host an annual open house for local and regional communities to increase the transparency of refuge operations and management.
- Upon approval of the CCP, establish a minimum staffing level for seasonal employees.
- Continue to support and recruit youths from local schools for the Youth Conservation Corps program.
- By year 5, identify needs for more office space, housing, and equipment storage when minimum staffing levels are realized.
- Foster a local volunteer program, and actively recruit student interns.

Objective 2: Priorities

Within 15 years of CCP approval, secure additional funding to complete 100 percent of intended habitat restoration. Include restoration with the following priorities: (1) intensive management of existing native prairie, including reducing invasive species and increasing prescribed grazing and fire; (2) native prairie reseeding; and (3) maintenance of nonnative planted areas to improve migratory-bird nesting habitat.

Rationale:

The refuge has limited funding and staff, and needs to target operations funding for the highest priority habitats on the refuge complex. Staff members would focus their efforts on the priority habitats and units. Additional staff and funding would be necessary to restore the mixed-grass prairie.

Strategies:

- Use additional funding to purchase herbicides to control invasive species and remove or control nonnative woody plants.
- Continue to use maintenance funding to maintain or replace equipment and facilities to meet Service standards.
- Secure additional funding to construct an equipment storage building to protect existing equipment and tools, thus extending their useful life. Equipment is necessary for habitat protection, restoration, and maintenance of existing facilities.

- Maintain existing facilities and equipment to Service standards, including roads, dikes, water control structures, buildings, and fences (all of which are critical in habitat management and protection).

Partnerships Goal

Develop partnerships to support research, conserve habitat, and foster awareness and appreciation of the mixed-grass prairie.

Objective 1: Strong Partnerships

For the duration of the plan, strengthen existing partnerships and create opportunities for new partnerships with federal, state, and local agencies, organizations, schools, corporations, and communities to promote the understanding and conservation of the mixed-grass prairie ecosystem and refuge complex resources, activities, and management.

Rationale:

Partnerships require extensive time to coordinate, develop, and maintain. Long-term commitments, including funding and staff time, are needed to maintain a strong and lasting relationship with our partners, such as Montana Fish, Wildlife, and Parks, the counties of Sheridan, Daniels, and Roosevelt, the cities of Medicine Lake and Plentywood, Ducks Unlimited, and The Nature Conservancy.

Without adequate staffing, the refuge complex might compromise its current partnerships and not develop new partners. Several CCP objectives depend on partner support and funding. Many of our wildlife, habitat, and Visitor Services programs would not continue without the additional funding and support from partners. Without partners, many of the habitat protection, restoration, and enhancement projects would go unfunded. Partners thus are essential in fully implementing the CCP.

The complex reaches across the 3-county landscape on privately owned land with wetland and grassland easement programs and habitat management activities on Service owned lands. Management activities such as prescribed grazing and burning and upland restoration can affect neighbors and the surrounding communities. Communication through individuals and organizations, and staff participation in local events, meetings, and activities build and maintain support for the refuge complex's programs. Partnerships are vital to accomplishing the Service mission. By establishing and maintaining partnerships, refuge staff would foster communication among local communities, landowners, and other interested parties. The refuge staff would continue to seek new opportunities and strengthen existing relationships to help achieve mutually beneficial goals and objectives.

Strategies:

- Refuge staff would increase involvement in community and civic activities to strengthen relationships.
- Refuge staff would continue to strengthen relationships with existing partners such as Montana Fish, Wildlife, and Parks, Ducks Unlimited, The Nature Conservancy, and Sheridan County.
- Refuge staff would seek and develop volunteer opportunities with the local community.
- Refuge staff would promote new partnerships to support conservation, restoration, and awareness of the mixed-grass prairie and its wildlife.
- Refuge staff would participate in projects and events sponsored by local and regional partners and cooperators.
- Refuge staff would investigate developing a “friends” group for the refuge complex within 5 years after CCP approval.
- Refuge staff would promote the refuge's management practices, such as prescribed grazing and burning, among private landowners and would provide technical assistance.

Objective 2: Outreach

For the duration of the plan, annually reach at least 200 individuals through formal and informal events and activities. Focus outreach to increase awareness, appreciation, and understanding of natural resource conservation and management practices. Promote the significance of remaining native-prairie grasslands and wetlands among area landowners and the local and regional communities.

Rationale:

Outreach efforts help educate people about the refuge and its needs. The refuge staff would work to expand the public outreach program to local and regional communities and city, county, state, and federal officials. Outreach may include formal meetings and “tailgate” discussions with visitors or landowners, and well as news releases, organized programs, tours, and presentations.

Strategies:

- Regularly attend local wildlife and community meetings to provide information on refuge complex activities, management, and issues.

- Communicate with the community and local landowners about the importance of a stewardship ethic.
- Visit with congressional offices annually to keep them up-to-date on refuge complex activities, management, and issues.
- Annually visit with commissioners from the refuge complex's three counties (Daniels, Sheridan, and Roosevelt) to keep them up-to-date on refuge complex activities, management, and issues.
- Write monthly news articles for local newspapers, and deliver television and radio spots on request.
- Develop and maintain a refuge complex website.
- Foster a local volunteer program.
- Adhere to all federal laws associated with cultural resources.
- Consult with a Service archeologist on appropriate site mapping, data storage, site preservation, and protocols to follow regarding newly discovered sites.
- Consult with a Service archeologist on cultural resource research and study requests.
- Avoid areas of known cultural resources (and potentially sensitive areas when practical) during management actions such as fencing. While cultural resources information should not be readily available to the public, refuge staff and law enforcement officers should know the locations of sensitive resources so they can be managed and protected.
- Continue to coordinate cultural resource inventories on refuge complex construction and development sites.
- Avoid or conduct noninvasive (archival or oral history) investigations of cultural sites such as historic graves.
- Whenever possible, document interviews with local people and long-term refuge staff.
- Protect structures that are eligible for the National Register of Historic Places.
- Educate staff on cultural resource issues and the importance of National Historic Preservation Act compliance, because staff awareness is vital to preservation and protection of resources.

Cultural Resources Goal

Preserve and value the cultural resources and history of Medicine Lake NWR Complex to connect staff, visitors, and the community to the area's past.

Objective 1: Preserve Resources

For the duration of the plan, preserve and protect significant cultural resources within refuge complex lands.

Rationale:

Cultural resources include archaeological sites (prehistoric and historic and their associated documentation), buildings and structures, landscapes, objects, and historic documents. These assets form tangible links with the past. The refuge is responsible for protecting and managing these irreplaceable resources for future generations. The Service established a cultural resources management program to manage the rich collection of cultural resources under its jurisdiction. Some of the primary goals related to refuge management include: 1) identify, evaluate, and encourage preservation of cultural resources and 2) consult with a broad array of interested parties.

Strategies:

- Consult with a Service archeologist before any landscape management disturbance or activity that might affect structures older than 50 years or disturb the soil surface. These activities must go through a Section 106 review under the National Historic Preservation Act.

Research Goal

Conduct innovative natural resource management, using sound science and applied research to advance the refuge complex staff's understanding of natural resource function and management within the northern Great Plains.

Objective 1: Applied Research

During the 15 years following CCP approval, use applied and adaptive research that might influence management decisions and support the refuge's purpose. From this information, identify and create priorities for additional research to assist the refuge complex in achieving habitat objectives.

Rationale:

Habitat-based goals and objectives form the basis for establishing research and monitoring priorities for the refuge complex. Investigations must be

designed, funded, and carried out to address questions or information gaps. Research would be supported on a case-by-case basis, as long as it does not detract from the refuge purpose.

Partnerships are critical for achieving the research goal and objectives. Cooperative efforts, such as shared funding, lodging, vehicles, equipment, knowledge, and expertise, are needed to accomplish research projects.

Strategies:

- Focus wildlife population research on assessments of species-habitat relationships. Develop models that predict wildlife responses to habitat management or restoration.
- Design and conduct issue-driven research unlikely to be addressed reliably using long-term monitoring. Develop predictive models of habitat management and restoration.
- Promote refuge research and science priorities within the broader scientific community that focus on meeting information needs identified in habitat management goals and objectives.
- Determine whether restored habitat is meeting the requirements of migratory birds.
- Continue to support current research on crested wheatgrass and groundwater and surface wetlands impacts as a result of oil and gas development.

6.4 PERSONNEL

Medicine Lake NWR currently supports 9 full-time permanent employees and between 7 and 10 seasonal employees whose average tenure is 4 months per year. This equates to about 12 FTE employees. Additional permanent and career seasonal staff would be required to implement the strategies in the CCP and effectively monitor the flora and fauna to determine if the goals and objectives of the CCP are being met.

Table 15 compares the current staff levels with the proposed additional staff needed to fully implement the CCP. A staff assessment of the refuge approved 20 permanent FTEs to complete all necessary functions (Fiscal Year 2006). However, the proposed staffing levels are based on numerous existing vacancies and realistic funding projections for the next 15 years.

If all the proposed positions were funded, the refuge staff would be able to carry out all aspects of this

CCP, which would provide maximum benefits to refuge wildlife, facilities, and operations, and provide for increased public use. Projects that have adequate funding and staffing would receive priority status. Staffing and funding are requested for the 15-year period of the CCP.

6.5 FUNDING

Projects required to carry out the CCP are funded through two separate systems, as follows:

- The refuge operations needs system (RONS) is used to document requests to Congress for funding and staffing needed to carry out projects above the existing base budget.
- The Service asset maintenance management system (SAMMS) is used to document the equipment, buildings, and other existing properties that require repair or replacement

Lists of the RONS and SAMMS projects required to carry out this draft CCP (including maintaining structures and equipment at a safe and productive level for the 15 years of the CCP) are found in appendix I and J.

6.6 PARTNERSHIP OPPORTUNITIES

Opportunities exist near the Medicine Lake NWR complex to establish partnerships with sporting clubs, elementary and secondary schools, and community organizations. A strong partnership already exists between the Service and Montana Fish, Wildlife, and Parks.

At regional and state levels, partnerships might be established with various organizations. Some of these partnerships already exist (or exist at a different level), such as with Ducks Unlimited and The Nature Conservancy. Existing partnerships could be expanded, and new ones created with organizations such as the National Audubon Society, National Wild Turkey Federation, Montana Wildlife Federation, and wildlife societies, wilderness societies, and others.

6.7 MONITORING AND EVALUATION

Adaptive management is a flexible approach to long-term management of biotic resources. Adaptive management is directed over time by information such as the results of ongoing monitoring activities.

Table 15. Current and Proposed Staffing

<i>Current</i>	<i>Proposed Staffing*</i>
Project Leader (GS-13)	Project Leader (485) (GS-13)
Deputy Project Leader (GS-12)	Supervisory Refuge Operations Specialist (485) (GS-12)
Refuge Operations Specialist (485) (GS-7/9) VACANT	Refuge Operations Specialist (485) (GS-7/9) for WMD
NONE	Refuge Operations Specialist (485) (GS-5/7/9) for Refuge
Wildlife Biologist (GS-11)	Wildlife Biologist (486) (GS-11)
Biological Technician (GS-5/7) VACANT	Biological Technician (GS-5/7) WMD
NONE	Biological Technician (GS-5/7) Refuge
NONE	Resource Specialist (GS-9) Geographical Information Systems (GIS)
Administrative Officer (GS-7/9)	Administrative Officer (GS-9)
NONE	Office Secretary (GS-5)
VACANT	Park Ranger (025) (GS-9) Law Enforcement
NONE	Outdoor Recreation Planner (411) (GS-7/9)
Prescribed Fire Specialist (401) (GS-7/9)	Prescribed Fire Specialist (401) (GS-9)
VACANT	Fire Program Technician (404) (GS-5/7)
Maintenance Mechanic (WG-10)	Maintenance Mechanic (4749) (WG-10)
Maintenance Worker (WG-8)	Seasonal Maintenance Worker (4749) (WG-8)

** 20 permanent FTEs are approved under the region 6 organization chart. In addition to the FTEs identified above, the refuge would use seasonal and youth programs to fill staffing needs.*

Projects are carried out within a framework of scientifically driven experiments to test the predictions and assumptions outlined within a CCP (figure 20).

To apply adaptive management, specific survey, inventory, and monitoring protocols would be adopted for the Medicine Lake NWR Complex. The Habitat Management Plan would be used to provide the monitoring protocols. The habitat management strategies would be systematically evaluated to determine management effects on wildlife populations. This information would be used to refine approaches and determine how effectively the objectives are being met. Evaluations would include participation by Service personnel and other partners. If monitoring and evaluation indicate undesirable effects for target and nontarget species or communities, alteration to the management projects would be made. Subsequently, the CCP would be revised.

6.8 STEP-DOWN MANAGEMENT PLANS

Specific monitoring and evaluation activities would be described in step-down management plans. This CCP is intended to be a broad umbrella plan that outlines general concepts and objectives for habitat, wildlife, wilderness, public use, cultural resources, refuge operations, and partnerships. Step-down management plans provide greater detail for implementing specific actions authorized by the CCP. Table 16 presents plans that are anticipated to be needed for the refuge complex, their current status, and next revision date.

Table 16. Step-down Management Plans for Medicine Lake NWR Complex, Montana

<i>Plan</i>	<i>Date Completed or Revised</i>
Fire Management Plan	2001, next revision 2009
Annual Water Management Plan	2001
Safety Plan	1996
Cropland Management Plan	1995
Invasive Plant Control Plan	1995
Research Natural Area Management Plan	1994
Grassland Management Plan	1993
Hunting and Fishing Management Plan	1990
Wilderness Management Plan	1985
Visitor Services Management Plan	Within 5 years
Habitat Management Plan	Within 3 years

6.9 PLAN AMENDMENT AND REVISION

This CCP would be reviewed annually to determine the need for revision. A revision would occur if and when significant information becomes available, such as a change in ecological conditions. Revisions to the CCP and subsequent step-down management plans would be subject to public review and NEPA compliance. At a minimum, this plan would be evaluated every 5 years and revised after 15 years.

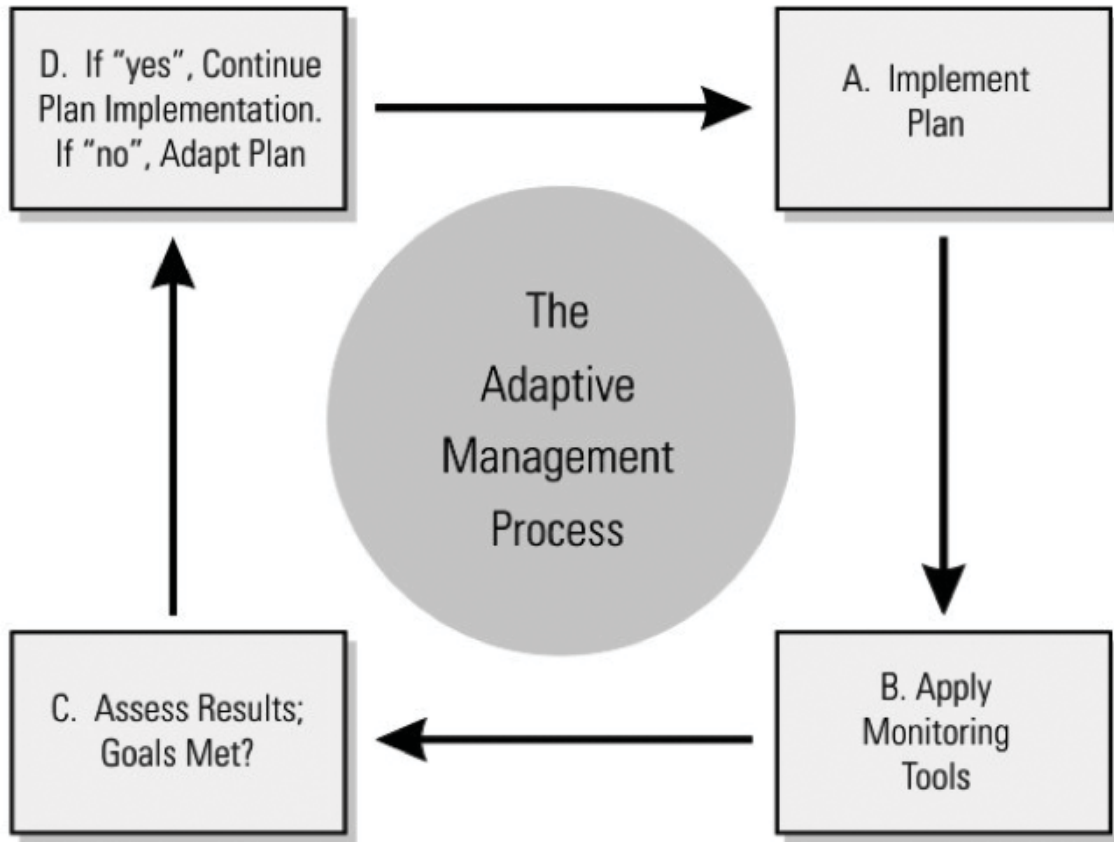


Figure 20. Adaptive management process.

Glossary of Terms

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

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).

animal unit month (AUM)—Measure of the quantity of livestock forage. Equivalent to the amount of forage needed to support a 1,000-pound animal (or one cow/calf pair) for one month.

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

ATV—All-terrain vehicle.

AUM—*See* animal unit month.s

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

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 comprising living organisms.

CCC—*See* Civilian Conservation Corps.

CCP—*See* comprehensive conservation plan.

CFR—*See* Code of Federal Regulations.

Civilian Conservation Corps (CCC)—Peacetime civilian “army” established by President Franklin D. Roosevelt to perform conservation activities from 1933–42. Activities included erosion control; firefighting; tree planting; habitat protection; stream improvement; and building of fire towers, roads, recreation facilities, and drainage systems.

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.

colonial birds—generally birds that nest in the same place and at the same time; coloniality has been a successful evolutionary strategy for many bird species. Colonies take many forms and can vary in size from a few to millions.

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 are western wheatgrass, needle and thread, and green needlegrass.

coteau—A hilly upland including the divide between two valleys; a divide; the side of a valley.

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

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, historic records, and traditional cultural properties 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 that protects nesting birds from the view of predators, usually consisting of one to two species of wheatgrass, alfalfa, and sweetclover.

depredation—Destruction or consumption of eggs, broods, or individual wildlife due to a predatory animal; damage inflicted on agricultural crops or ornamental plants by wildlife.

DNC—*See* dense nesting cover.

drawdown—The act of manipulating water levels in an impoundment to allow for the natural drying-out cycle of a wetland.

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.

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 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 species—Plants or animals that occur naturally in a certain region and 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 finding of no significant impact (40 CFR 1508.9).

extinction—The complete disappearance of a species from the earth; no longer existing.

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

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.

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.

FTE—full-time equivalent; one or more job positions with tours of duty that, when combined, equate to one person employed for the standard government work year (261 days).

FWS—*See* U.S. Fish and Wildlife Service.

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.

GIS—*See* geographic information system.

GS—general schedule (pay rate schedule for certain federal positions).

habitat—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 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.

impoundment—A body of water created by collection and confinement within a series of levees or dikes, creating separate management units although not always independent of one another.

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.

involute sanctuary—A place of refuge or protection where animals and birds may not be hunted.

IPM—*See* integrated pest management.

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).

management alternative—*See* alternative.

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 which 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.

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, other than as a result of an introduction, historically occurred or currently occurs in that ecosystem.

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

nest success—The percentage of nests that successfully hatch one or more eggs of the total number of nests initiated in an area.

nongovernmental organization—Any group that 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 of a kind that is of foreign origin (new to or not widely prevalent in the U.S.) and can directly or indirectly injure crops, other useful plants, livestock, poultry, other interests of agriculture, including irrigation, navigation, fish and wildlife resources, or public health. According to the Federal Noxious Weed Act (PL 93-639), a noxious weed (such as 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.

NWR—national wildlife refuge.

objective—An objective is a 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).

overwater species—nesting species such as diving ducks and many colonial-nesting birds that build nests within dense stands of water-dependent plants, primarily cattail, or that build floating nests of vegetation that rest on the water.

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 2 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.

prairie pothole—A glacially derived depression wetland found in the northern Great Plains.

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 (dead carcasses).

refuge operations needs system (RONS)—A national database that contains the unfunded operational needs of each refuge. Projects included are those required to implement approved plans and meet goals, objectives, and legal mandates.

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.

resident species—A species inhabiting a given locality throughout the year; nonmigratory species.

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.

Sandhill blowouts—Found in the sandhills and sand prairie areas, these small active non-vegetated areas can move around (similar to a sand dune). Plants around the sand prairie are often associated with Indian rice grass and scurf pea.

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

sediment—Material deposited by water, wind, and glaciers.

Service—*See* U.S. Fish and Wildlife Service.

Service Asset Maintenance Management System (SAMMS)—A national database which contains the unfunded maintenance needs of each refuge; projects include those required to maintain existing equipment and buildings, correct safety deficiencies for the implementation of approved plans, and meet goals, objectives, and legal mandates.

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.

special status species—Plants or animals that have been identified through federal law, state law, or agency policy as requiring special protection of monitoring. Examples include federally listed endangered, threatened, proposed, or candidate species; state-listed endangered, threatened, candidate, or monitor species; Service’s species of management concern; species identified by the Partners in Flight program as being of extreme or moderately high conservation concern.

special use permit—A permit for special authorization from the refuge manager required for any refuge service, facility, privilege, or product of the soil provided at refuge expense and not usually available to the general public through authorizations in Title 50 CFR or other public regulations (Refuge Manual 5 RM 17.6).

species of concern—Those plant and animal species, while not falling under the definition of special status species, that are of management interest by virtue of being federal trust species such as migratory birds, important game species, or significant keystone species; species that have documented or apparent populations declines, small or restricted populations, or dependence on restricted or vulnerable habitats.

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).

submergent—A vascular or nonvascular hydrophyte, either rooted or nonrooted, that lies entirely beneath the water surface, except for flowering parts in some species.

tame grass—*See* dense nesting cover.

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.

TMDL—Total Maximum Daily Load; a calculation of the maximum amount of pollutant that a water body can receive and still meet water quality standards.

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.

vegetative litter—Residual or acculation of plant material over time. Without periodic disturbance such as fire and grazing, plant and root growth can stagnate.

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).

wading birds—Birds having long legs that enable them to wade in shallow water including 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.

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.

WMD—*See* wetland management district.

Appendix A

Key Legislation and Policies

This appendix briefly describes the guidance for the National Wildlife Refuge System and other policies and key legislation that guide the management of Medicine Lake National Wildlife Refuge Complex.

National Wildlife Refuge System

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

Goals

- Fulfill our statutory duty to achieve refuge purpose(s) and further the System mission.
- Conserve, restore where appropriate, and enhance all species of fish, wildlife, and plants that are endangered or threatened with becoming endangered.
- Perpetuate migratory bird, interjurisdictional fish, and marine mammal populations.
- Conserve a diversity of fish, wildlife, and plants.
- Conserve and restore, where appropriate, representative ecosystems of the United States, including the ecological processes characteristic of those ecosystems.
- 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 4 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 affect refuge management the most are listed below.

American Indian Religious Freedom Act (1978)—

Directs agencies to consult with native traditional religious leaders to determine appropriate policy changes necessary to protect and preserve Native American religious cultural rights and practices.

Americans with Disabilities Act (1992)—

Prohibits discrimination in public accommodations and services.

Antiquities Act (1906)—Authorizes the scientific investigation of antiquities on federal land and provides penalties for unauthorized removal of objects taken or collected without a permit.

Archaeological and Historic Preservation Act (1974)—Directs the preservation of historic and archaeological data in federal construction projects.

Archaeological Resources Protection Act (1979), as amended—Protects materials of archaeological interest from unauthorized removal or destruction and requires federal managers to develop plans and schedules to locate archaeological resources.

Architectural Barriers Act (1968)—Requires federally owned, leased, or funded buildings and facilities to be accessible to persons with disabilities.

Bald and Golden Eagle Protection Act (1940, amended 1962)—Provides for the protection of the bald eagle and the golden eagle by prohibiting the possession, sale, etc., of any part of a bald or golden eagle.

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. 7168 (1935)—Establishes Arrowwood Migratory Waterfowl Refuge “as a refuge and breeding ground for migratory birds and other wild life... to effectuate further the purposes of the Migratory Bird Conservation Act....”

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.

Wilderness Act (1964)— The Wilderness Act of 1964 (Public Law 88-577 [16 U.S. C.1131-1136])

defines wilderness as: “A wilderness, in contrast with those areas where man and his works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain.” An area of wilderness is further defined to mean in this Act an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man’s work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least 5,000 acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

Appendix B

List of Preparers, Consultation, and Coordination

This document is the result of the extensive, collaborative, and enthusiastic efforts by the seven members of the Laramie Plains refuges planning team below. Many others contributed insight and support.

Planning Team

<i>Team Member</i>	<i>Position</i>	<i>Work Unit</i>
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Dennis Nelson	Maintenance Specialist	Medicine Lake NWR Complex
Sharri Lunde	Administrative Officer	Medicine Lake NWR Complex
Tim Connolly	Private Lands Coordinator	Medicine Lake NWR Complex
Mark Ely	Geographic Information System (GIS) Specialist Chief of Comprehensive	USFWS, Region 6; Lakewood, CO
John Esperance	Conservation Planning and Land Protection Planning	USFWS, Region 6; Lakewood, CO
Elizabeth Madden	Refuge Wildlife Biologist	Medicine Lake NWR Complex
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Mimi Mather	Landscape Architect	Shapins Associates

Contributors

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

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Appendix C

Public Involvement

In 1998, the Service began the planning process for the Medicine Lake National Wildlife Refuge Complex (complex), and a notice of intent (NOI) was published in the Federal Register on August 6, 1998, with a public meeting held at the refuge headquarters on October 17, 1998. In 2001, the process stalled for several years while the service considered preliminary land acquisition proposal for the Comprehensive Conservation Plan (CCP). There were several staff changes at the refuge including a new project leader who came on duty in 2005.

In October 2006, the planning process was restarted, and a planning team consisting of Service personnel from the refuge complex, the Division of Refuge Planning, and Montana Fish, Wildlife, and Parks (MFWP) was formed.

In October 2006, the Service invited state and tribal representatives to participate in the planning process for the CCP for the Medicine Lake complex. A planning team comprising Service personnel from the complex and the regional office, and MFWP personnel (appendix B) was developed during the kickoff meeting in October 2006.

The planning team developed a new draft vision and goals, a planning schedule, and a public involvement plan. The team began an internal scoping process by identifying refuge qualities and issues over the course of several meetings and electronic correspondence.

Pre-scoping and scoping began in November 2006. A notice of intent (NOI) was published in the Federal Register on January 9, 2007, announcing the scoping process.

The planning team developed a mailing list of over 120 names that included private citizens, local, regional, and state government representatives, other federal agencies, and non-profit organizations. In November 2006, a planning update was mailed out to the public and posted on the planning website. The planning update provided a summary of the NWRS and the CCP process, along with an invitation to a public meeting, which was held at the Medicine Lake Fire Hall. The meeting was also announced in the local newspapers and flyers were posted at businesses throughout the region. Additionally, announcements were made by refuge staff at a variety of meetings and contact.

More than 20 people attended the meeting, despite minus-zero blustery weather. At the start of the meeting, the CCP planner provided an overview of the process and the project leader gave a brief presentation about the refuge and current

management issues during a presentation and question-and-answer period. The overall response was very positive. People who attended were invited to submit additional thoughts or questions orally or in writing and were all given a 2-page comment form to complete. There was additional coverage about the planning process in the local newspaper, and by the end of the response deadline of February 8, 2007, the team recorded over sixty comments.

Over the course of preplanning and scoping, the planning team collected information about the resources of the complex and the surrounding areas. This information is summarized in chapter 4, "Affected Environment."

Mailing List

The following mailing list was developed for this CCP:

Federal Agencies

U.S. Representative Denny Rehberg, Washington D.C.

U.S. Senator Max Baucus, Washington D.C.

U.S. Senator Jon Testor, Washington D.C.

Tribes

Tribal Chairman John Morales, Fort Peck Tribes

State Officials

Governor Brian Schweitzer, Helena, Montana

Representative Sam Kitzenberg, Glasgow, Montana

State Agencies

Montana Fish, Wildlife, and Parks

Local Counties and Towns

Daniels County Commissioners

Roosevelt County Commissioners

Sheridan County Commissioners

Wibaux County Commissioners

Tim Hutslar, Mayor of Medicine Lake, Montana

Ronald Aduet, Mayor of Scobey, Montana

John Dale Evans, Mayor of Wibaux, Montana
Matt Golik, Mayor of Wolf Point, Montana
Don Jensen, Mayor of Plentywood, Montana
Theresa Murray, Mayor of Poplar, Montana
Gordon Oelkers, Mayor of Culbertson, Montana
Terry Peterson, Mayor of Froid, Montana
James Weiler, Mayor of Westby, Montana
Connie Wittak, Mayor of Flaxville, Montana
Organizations, Businesses and Civic Groups
Medicine Lake Chamber of Commerce
Medicine Lake Commercial Club, Chris Ator
Poplar Chamber of Commerce
Sheridan County Chamber of Commerce
American Birding Association
Culbertson Chamber of Commerce
Daniels Chamber of Commerce & Agriculture
Daniels County Pheasants Forever
Ducks Unlimited

Missouri River Country
Montana Audubon Society
Montana Defenders of Wildlife
Montana Fisheries Society
Montana Native Plant Society
National Wildlife Federation
National Wildlife Refuge Association
Natural Heritage Program
Pheasants Forever
The Nature Conservancy
Sierra Club
Wilderness Society
Wilderness Watch
Wildlife Management Institute
Wildlife Society
Wolf Point Chamber of Commerce
USGS–Fort Collins Science Center, Ft. Collins, CO

Appendix D

Compatibility Determinations

Compatibility Determination for Recreational Fishing

Use: Recreational Fishing

Refuge Name: Medicine Lake National Wildlife Refuge (NWR) Complex

Establishing and Acquisition Authorities:

- Migratory Bird Conservation Act of 1929
- Executive Order 7148, dated August 19, 1935

Refuge Purposes:

- “As a refuge and breeding ground for migratory birds and other wildlife.” (Executive Order 7148, dated August 19, 1935)
- “For use as an inviolate sanctuary, or for any other management purpose, for migratory birds.” (16 U.S.C. § 715d [Migratory Bird Conservation Act])
- “Protect and preserve the wilderness character of areas within the National Wilderness Preservation System...in a way that will leave them unimpaired for future use and enjoyment as wilderness.” (Public Law 88-577 [Wilderness Act])

National Wildlife Refuge System

Mission:

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.

Description of Use:

The use would be a continuation of the historic activity of recreational (noncommercial) fishing. Public use areas, such as parking areas, fishing areas, boat ramps, interpretive panels and signs,

information kiosks, and other structures will need to be maintained to facilitate this program. Areas on the refuge complex that are seasonally sensitive to migratory birds will remain closed to public entry and use. Public visitation at Medicine Lake NWR averages 16,000 visits annually; of these, 1,400 visits are for fishing. Only selected areas of the refuge complex will be open to fishing and will be posted accordingly. Special refuge regulations governing fishing will be available in refuge brochures. Current refuge fishing brochures are attached.

Fishing on Medicine Lake NWR Complex is allowed from November 15 to September 15 each year and from sunrise to sunset daily. Medicine Lake has 8 public fishing access areas, and each is posted with Public Fishing Area signs. Anglers are required to follow Montana state law and refuge regulations. Bank fishing at designated sites is allowed whenever there is open water. Boat fishing is allowed on Medicine Lake from a period beginning at ice-out through September 15. Ice fishing is allowed when the ice is thick enough and safe to support anglers. There are two primitive boat ramps to support the summer motorless-boat fishing program. The entire north shore of the lake is available for fishing. Several areas are available for walk-in access for ice fishing. All motorized vehicles and power ice augers are prohibited within the high-water line of Medicine Lake west of Montana State Highway #16. The use of ice fishing shelters will be allowed in accordance with state law and special refuge regulations. Fishing derbies may be allowed by issuing special use permits (SUP) and special conditions.

Availability of Resources:

The refuge complex has adequate administrative and management staff to maintain its fishing program. Implementing improvements or expanding fishing opportunities will be described in step-down management plans and addressed through future funding requests.

Annual funding is needed for seasonal workforce salary and for supplies to maintain fishing facilities (including mowing, painting, and repairing facilities, litter pickup, restroom cleaning supplies, periodic pumping costs of vaulted toilets). Funding is needed for law enforcement staff salaries, fuel costs, repairs and maintenance of patrol vehicles, and associated costs to support the law enforcement program. Funding is needed for a maintenance worker

salary and equipment to maintain fishing areas and facilities. Routine law enforcement patrols occur year-round. Medicine Lake NWR complex has 1 collateral duty law enforcement officer and receives assistance from local Montana Fish, Wildlife, and Parks officers.

Anticipated Impacts of the Use:

The proposed action recommends an annual review of the fishing program. This evaluation will determine what effect diverting funding and staff will have on the ability of the refuge complex to implement habitat management. Limited staff and funding will be directed first toward habitat management. Lack of funding and personnel may result in decreased opportunities and facilities.

Temporary disturbance of wildlife may occur in the vicinity of fishing activity. Fishing will temporarily decrease the fish population until natural reproduction or stocking replenishes the population. Frequency of use is directly dependent upon fish populations and their feeding activity. When fish populations are high and active, public use will increase. Historically, Medicine Lake experiences a winter kill on average once in 10 years, and the fishery needs time to recover. The vast majority of fishing visits are from local fishermen from the very small (population 250) and rural community of Medicine Lake. No long-term negative impacts to the refuge or its resources are anticipated.

Public Review and Comment:

Public review and comment will be solicited through public posting of notices at each refuge, notices in local newspapers, and CCP public meetings.

Determination:

Recreational public fishing is compatible.

Stipulations Necessary to Ensure Compatibility:

Current regulations are included in the attached Medicine Lake NWR Complex fishing brochures. Anglers also are required to follow Montana state law.

Justification:

Recreational fishing is a historic wildlife dependent use at Medicine Lake NWR and is one of the priority public uses as specified in the Refuge Improvement Act of 1997. Infrastructure is already in place to facilitate this activity. Current staffing levels and funding resources are adequate. Special refuge regulations are in place to minimize negative impacts to refuge habitat and wildlife.

Signature:

Jerry Rodriguez Date
 Project Leader, Medicine Lake NWR

Review:

Lloyd Jones Date
 Regional Compatibility Coordinator

Concurrence:

Dean Rundle Date
 Refuge Supervisor, CO, WY, MT, UT

Approval:

Rick Coleman Date
 ARD – Refuges/Partners for Fish and Wildlife

Mandatory 15-Year Re-evaluation Date: _____

Compatibility Determination for Recreational Hunting

Use: Recreational Hunting

Refuge Name: Medicine Lake National Wildlife Refuge (NWR) Complex

Establishing and Acquisition Authorities:

- Migratory Bird Conservation Act of 1929
- Executive Order 7148, dated August 19, 1935

Refuge Purposes:

- “As a refuge and breeding ground for migratory birds and other wildlife.” (Executive Order 7148, dated August 19, 1935)
- “For use as an inviolate sanctuary, or for any other management purpose, for migratory birds.” (16 U.S.C. 715d [Migratory Bird Conservation Act])
- “Protect and preserve the wilderness character of areas within the National Wilderness Preservation System...in a way that will leave them unimpaired for future use and enjoyment as wilderness.” (Public Law 88-577 [Wilderness Act])

National Wildlife Refuge System

Mission:

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.

Description of Proposed Use:

The Medicine Lake NWR complex is open to recreational public hunting in accordance with State of Montana seasons and regulations established for each area. There are an estimated 7,200 hunter visits on refuge complex lands each year which is about 45% of the annual visitation on the refuge (annual visitation is about 16,000). Most of the hunter visits are for ring-necked pheasants. The refuge staff observes a small number of waterfowl hunters each year. The number of hunter visits for deer are estimate at fewer than 50. Animals that are currently hunted or may be hunted include:

white-tailed deer
pronghorn antelope
waterfowl (ducks and geese)
mourning dove
sharp-tailed grouse
ring-necked pheasant
Hungarian partridge
coyote
red fox
white-tailed jackrabbit

Specific areas are open to hunting during early seasons. Other areas on the refuges, with exception of administrative areas, may open later in the season. Specific regulations are attached and are available to the public at information kiosks and administrative areas.

Hunting is a designated priority public use established for the Refuge System. The harvest of these species will be compensatory mortality, with minimal impact to the overall health of their populations.

Availability of Resources:

Currently, sufficient resources are available to continue the existing recreational hunting programs. Implementing improvements or expanding hunting opportunities will be described in step-down management plans and addressed through future funding requests.

Anticipated Impacts of the Use:

Temporary disturbance will exist to wildlife in the vicinity of the activity. Animals surplus to populations will be removed by hunting. A temporary decrease in populations of wildlife might help ensure that carrying capacity (especially for big-game species) is not exceeded. Closed areas will provide some sanctuary for game and nongame species, minimize conflicts between hunters and other visitors, and provide a safety zone around communities and administrative areas.

Public Review and Comment:

Public review and comment will be solicited through public posting of notices at the refuge, notices in local newspapers, and public meetings held during the CCP process.

Determination:

Recreational public hunting is compatible.

Stipulations Necessary to Ensure Compatibility:

Current stipulations are included in attached brochures specific for each refuge.

Justification:

Recreational public hunting is a historic wildlife dependent use of the refuge complex, and is designated as one of the priority public uses as specified in the Refuge Improvement Act of 1997. Infrastructure is already in place to support hunting programs, and current staffing levels and funding are adequate. Special regulations are in place to minimize negative impacts to the refuges and associated wildlife. Montana state law further controls hunter activities. Hunting is a legitimate wildlife management tool that can be used to control wildlife populations. Hunting harvests a small percentage of the renewable resources, which is in accordance with wildlife management objectives and principals.

Signature:

Jerry Rodriguez Date
Project Leader, Medicine Lake NWR

Review:

Lloyd Jones Date
Regional Compatibility Coordinator

Concurrence:

Dean Rundle Date
Refuge Supervisor, CO, WY, MT, UT

Approval:

Rick Coleman Date
ARD – Refuges/Partners for Fish and Wildlife

Mandatory 15-Year Re-evaluation Date: _____

Compatibility Determination for Public Use

Use: Public use for wildlife observation, photography, environmental education and interpretation.

Refuge Names: Medicine Lake National Wildlife Refuge (NWR) Complex

Establishing and Acquisition Authorities:

- Migratory Bird Conservation Act of 1929
- Executive Order 7148, dated August 19, 1935

Refuge Purposes:

- “As a refuge and breeding ground for migratory birds and other wildlife.” (Executive Order 7148)
- For use as an inviolate sanctuary, or for any other management purpose, for migratory birds and other wildlife.” § 715d [Migratory Bird Conservation Act])
- “Protect and preserve the wilderness character of areas within the National Wilderness Preservation System...in a way that will leave them unimpaired for future use and enjoyment as wilderness.” (Public Law 88-577 [Wilderness Act])

National Wildlife Refuge System

Mission:

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.

Description of Use:

The use would be a public use, for wildlife observation, photography, environmental education and interpretation. Medicine Lake NWR complex is currently open to public use in accordance with special refuge regulations. There were an estimated 16,000 public visits during 2006 for these activities. The refuge complex is open from dawn to dusk, and entry into closed areas is allowed through a special use permit and special conditions that are evaluated on a case-by-case basis.

These activities may take place on foot, bicycle, automobile, nonmotorized boat, canoe, horse, cross-county skis and snowshoes. Refuge staff will assist in activities when available. Organized groups, such as schools, scouts, and 4-H organizations, may have instructors or leaders who will use refuge habitat and facilities to conduct compatible programs. Ages of participants range from preschool to college and beyond.

Current activities:

- auto-tour route – 1
- hiking trail – 1
- boat/canoe use – Medicine Lake
- observation blind – 1 (seasonal)
- observation tower - 1
- environmental education area – 1 and annual events
- interpretive/information kiosk - 4
- visitor contact station in office building

Availability of Resources:

Sufficient resources are available to continue the existing public use programs.

The CCP preferred alternative recommends expanding interpretation and environmental education, and maintaining wildlife observation programs and facilities. The interpretation and environmental education programs would emphasize the principles of natural plant and animal communities and ecological processes and restoration.

Implementing improvements or expanding public use opportunities will be addressed in future step-down management plans and through future funding requests. Program expansion will require increased funding for operations and maintenance. When funding is not adequate to operate and maintain programs, they will be reduced in scope or discontinued. Information kiosks, interpretive signs, and other infrastructure are in place for the present level of public use activities.

Anticipated Impacts of the Use:

No detrimental impacts are anticipated with the public use programs. Temporary disturbance will exist to wildlife in the vicinity of the activity. Closed areas will provide sanctuary for wildlife.

Public Review and Comment:

Public review and comment will be solicited through public posting of notices at each refuge, notices in local newspapers, and CCP public meetings.

Determination:

Public Use – wildlife observation, photography, environmental education and interpretation are compatible.

Stipulations Necessary to Ensure Compatibility:

Current stipulations are included in an attached brochure.

Justification:

Public use for wildlife observation, photography, environmental education and interpretation is a historic wildlife dependent use of the refuge complex. These activities are designated as priority public uses as specified in the Refuge Improvement Act of 1997. Infrastructure is already in place to support public use programs, and current staffing levels and funding are adequate. Special regulations are in place to minimize negative impacts to the refuges and associated wildlife.

Signature:

Jerry Rodriguez Date
Project Leader, Medicine Lake NWR

Review:

Lloyd Jones Date
Regional Compatibility Coordinator

Concurrence:

Dean Rundle Date
Refuge Supervisor, CO, WY, MT, UT

Approval:

Rick Coleman Date
ARD – Refuges/Partners for Fish and Wildlife

Mandatory 15-Year Re-evaluation Date: _____

Appendix E

Divestiture Consideration for Lamesteer National Wildlife Refuge

During the CCP process, Lamesteer National Wildlife Refuge was identified as a candidate for divestiture from the National Wildlife Refuge System (NWRS). The refuge was analyzed by the planning team, regional office, and the refuge manager to determine whether it warranted continued status as a national wildlife refuge. On the basis of the analysis, the Service decided to propose divestiture of Lamesteer NWR from the Refuge System.

This document uses the region 6 divestiture model to document why Lamesteer NWR was recommended for divestiture. The divestiture model represents a set of criteria for measuring the value of a refuge. Designed as a pre-planning tool, the model allows planners and refuge managers to determine whether a refuge or easement refuge should be considered for divestiture. If the model indicates that a refuge should be considered for divestiture, the process and consequences of divestiture will be studied further during the CCP process. In the case of Lamesteer NWR, the model proved that the refuge is a candidate for divestiture.

The Divestiture Model – Criteria and Rules

The region 6 divestiture model was developed during a 2-day workshop held December 14-15, 2004, at the regional office in Denver. The purpose of the workshop was to standardize policy in region 6 for identifying which refuges to consider for divestiture. The model is still being tested and has not been finalized. The model consists of a set of 8 questions that must be addressed when considering a refuge for divestiture. The questions were prioritized as primary and secondary criteria for evaluation.

Primary Criteria

1. Does the refuge achieve 1 or more of the goals?

Answer: NO.

Explanation: Look beyond the purpose to see if the refuge is meeting Refuge System goals. Refuge purpose is forever, but it could become obsolete over time (such as the recovery of threatened and endangered species). An obsolete purpose does not automatically mean the Service should get rid of the refuge

The National Wildlife Refuge System Mission and Goals and Refuge Purposes policy, announced on June 20, 2006, lists 5 goals for the Refuge System:

A. Conserve a diversity of fish, wildlife, and plants and their habitats, including species that are endangered or threatened with becoming endangered.

B. Develop and maintain a network of habitats for migratory birds, anadromous and interjurisdictional fish, and marine mammal populations that is strategically distributed and carefully managed to meet important life history needs of these species across their ranges.

C. Conserve those ecosystems, plant communities, wetlands of national or international significance, and landscapes and seascapes that are unique, rare, declining, or underrepresented in existing protection efforts.

D. Provide and enhance opportunities to participate in compatible wildlife-dependent recreation (hunting, fishing, wildlife observation and photography, and environmental education and interpretation).

E. Foster understanding and instill appreciation of the diversity and interconnectedness of fish, wildlife, and plants and their habitats.

Lamesteer NWR does not meet the goals of the NWRS or only marginally meets the first goal because:

It is a reservoir in the middle of dry landscape enhanced by dam. It provides little migratory bird habitat – mostly for shorebirds and other very abundant or common species (chapter 4).

It is a water source, but any body of water would provide a resting stop and water source for birds and there are other livestock ponds and water sources within a reasonable distance (figure 19).

Lamesteer is ringed by cattails and is heavily silted in. It probably has more value now as a shallow wetland, and with continued siltation, its value will decrease. There is little biological data but the value of WPAs in terms of habitat and species diversity is far greater.

Conservation implies action, and the Service has no authority to do anything other than impound habitat. Hunting is allowed by landowner permission. There are no other opportunities to provide wildlife-dependent recreation or to foster an understanding or appreciation of the diversity and interconnectedness of fish, wildlife, and plants and their habitats.

A Service refuge sign exists on the road, but once visitors and refuge staff turn off the main road the refuge is difficult to find. Refuge staff asks permission of the landowner to go out on the land.

2. Does the refuge meet its purpose (fulfill the refuge's intent and statutory purpose)?

Explanation: Try to understand the intent of decision makers at the time the refuge was established.

Answer: NO

Lamesteer NWR is not a true sanctuary refuge; hunting is allowed now with landowner permission.

Since the Service does not control the uplands they are not a breeding ground. The uplands are cropland or heavily grazed with CRP on the south side, southwest corner produces crops. There is no authority or ability to control the quality of upland habitat breeding grounds. There are at least 125 breeding species in this region, far fewer out at Lamesteer; on estimate, 10 species breed there.

3. Does the refuge provide substantial support for migratory bird species, important sheltering habitat for threatened and endangered species, or support for species identified in authorizing legislation?

Explanation: The planning team must define "substantial." Refuge context is the key consideration. Substantial is relative to species, location, region, and other considerations.

Example: Flocks of migratory birds (thousands) would be considered substantial.

Answer: NO

4a. Does the refuge have biological integrity; if it does not, is it feasible to restore the biological integrity of the converted or degraded habitat?

NO, only through acquisition, and the Service would use limited resources to purchase easements in higher priority areas.

Explanation: The presence of native habitat is not enough to meet Refuge System standards; the Service is not trying to save every remnant species. Identify what has changed from presettlement habitat conditions. Consider the contribution to regional biodiversity. more silted in with cattails now than on previously farmed crop lands, argues against biological restoration.

4b. Does the Service have or can it reasonably acquire the right to restore the habitat?

Answer: NO. Biological integrity. It does not have

native habitat, and does not contribute to regional biodiversity.

Degraded. Native vegetation exists, but the value has been reduced due to the introduction of non natives and the loss of ecological functions.

* To answer Yes on biological integrity the answer must be Yes on both 4a and 4b.

There is limited communication with the landowner; the primary landowner lives in another state (see Question 6 below).

5. Does it contribute to landscape conservation, provide a stepping stone for migratory birds, or serve as a unique habitat patch important to the conservation of a trust species?

Answer: NO.

Lamesteer NWR is not the only water source in the area (figure 19).

It does not contribute to landscape conservation and is not important for trust species.

If Lamesteer NWR did not exist, migratory birds would not be impacted. Yellowstone River and other stock ponds in the vicinity provide for migrating birds, although Lamesteer NWR could be one of the larger ponds.

Within a 25-mile radius, there are 127 lakes or ponds; within a 50-mile radius, there are 425. The average size 9 acres.

Secondary Criteria

6. Politics/Community – Is there such significant community interest in and support for the refuge that divesture would result in unacceptable long-term public relations?

Answer: NO.

The landowner of Section 15, T12N, R60E is elderly and lives in another state and rents out the property. He is not interested in selling the property to the service, and will be giving the property to an heir who wants it. He would like to see the easement stay on the property if the Service fixes the dam. If the Service will not repair the dam, the owner would like the easement back.

The landowner of the south half of Section 14 farms and runs cattle on the property and leases some of Section 15 from the first landowner. The reservoir is shallower now and has more cattail in it than it did historically. The previous landowner would pump water from the reservoir to irrigate a nearby alfalfa field. He does not have strong feelings about keeping

or removing the easement. The reservoir does not benefit him, and there is adequate livestock water with or without the dam.

There have been no comments from county commissioners on the planning process. The Town of Wibaux inquired about the planning process, but offered no comments.

7. Jurisdiction – Does the Service have or can it acquire the jurisdiction to meet the Refuge’s purpose, and Refuge System mission and goals, and also prevent incompatible uses?

Answer: NO.

8. Other Land Manager – Could some other party achieve most or all of the purposes of the refuge without the Service having to incur costs?

(ask this question only if the answer to questions 1 and 2 are No.)

Answer: NO.

Additional Considerations

Cost/Liability – Cost will never be a primary or secondary factor for divesting a refuge; cost (in itself) should not be a criterion for divesting land.

The dam was inspected recently and likely will need repair in the near future. This would be a huge cost and liability to the Service for minimal benefit in return.

If cost is a consideration for divestiture, it is because some other factor is driving the decision.

Liability is an addition to a decision to either keep or divest a refuge, but it is not a primary or secondary decision-making criterion.

Rules – The following 5 rules organize the responses to the criteria questions and determine whether to consider a refuge for divestiture.

***Rule 1: IF the refuge cannot meet 1 or more Refuge System goals, THEN it should be considered for divestiture.**

**this is the rule that applies to Lamesteer Refuge System.*

Rule 2: IF the answers to questions 1 through 4 are as follows:

Yes – Meets a Refuge System goal, but only the education goal

No – Does not meet the refuge purpose

No – Does not substantially support trust species

No – Does not possess biological integrity

THEN the refuge should be considered for divestiture.

Rule 3: IF the answers to questions 1 through 5 are as follows:

Yes – Meets a Refuge System goal, but only the education goal

Yes - Purpose

No – Trust species

No – Biological integrity

No – Connectivity

THEN the refuge should be considered for divestiture.

Rule 4: IF the answers to questions 1 through 6 are as follows:

1. Yes – Goal

2. Maybe – Purpose

3. No – Trust species

4. Yes – Biological integrity

5. No – Connectivity

6. Yes – Jurisdiction

THEN keep the refuge (positive rule).

Rule 5: IF the answers to questions 1 through 3 are as follows,

Yes – Goal

Yes – Purpose

Yes – Trust species

THEN keep the refuge (positive rule).

Justification

Lamesteer NWR did not meet 1 or more of the Refuge System goals, and therefore should be considered for divestiture. It does not meet or minimally meets the refuge purpose. It does not substantially support trust species, and does not possess biological integrity. It should be considered for divestiture.

Appendix F

Fire Management Program

The Service has administrative responsibility including fire management for the Medicine Lake NWR Complex (complex), which covers approximately 43,450 acres in northeast Montana.

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 ignitions by Native American people 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 grazing are excluded from prairie landscapes, a build-up of thatch and the invasion of woody vegetation results increases fuel loadings. This increase in fuel loads creates the potential for severe, hard-to-control wild land fires which threatens firefighters and public safety, as well as federal and private facilities.

However, when fire is used properly it can

- reduce hazardous fuels build-up in both wildland-urban interface (WUI) and non-WUI areas;
- improve wildlife habitats by reducing the density of vegetation and/or changing plant species composition;
- sustain and 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 wildlife and livestock forage.

Wildland Fire Management Policy and Guidance

In 2001, the Secretaries of the Interior and Agriculture approved an update of the 1995 “Federal Fire Policy.” 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. It also directs agencies to use the appropriate management response for all wildland fire regardless of the ignition source.

This policy provides 9 guiding principles that are fundamental to the success of the fire management program.

- Firefighter and public safety is the first priority in every fire management activity.
- The role of wildland fires as an ecological process and natural change agent will be incorporated into the planning process.
- Fire management plans (FMPs), programs, and activities support land and resource management plans and their implementation.
- Sound risk management is a foundation for all fire management activities.
- Fire management programs and activities are economically viable, on the basis of values to be protected, costs, and land and resource management objectives.
- FMPs and activities are based on the best available science.
- FMPs and activities incorporate public health and environmental quality considerations.
- Federal, state, tribal, local, interagency, and international coordination and cooperation are essential.
- 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 management plans (for example, the CCP). The FMP is a step-down plan derived from the land-use plans and habitat plans, with more detail on fire suppression, fire use, and fire management activities.

Management Direction

The Medicine Lake NWR Complex will protect life, property, and other resources from wildland fire by safely suppressing all wildfires. Prescribed fire and manual and mechanical fuel treatments will

be used in an ecosystem context to protect federal and private property, and for habitat management purposes. Fuel reduction activities will be applied in collaboration with federal, state, private, and nongovernmental organizations partners.

Fuel treatments would be applied depending on the priorities 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 the Region 6 Refuges' Regional Priorities (Fiscal Year 2007 - 2011). For WUI treatments, areas with community wildfire protection plans (CWPPs) and communities at risk (CAR) will be the primary focus. The two communities at risk located near the refuges that were identified in the Federal Register (August 17, 2001) were Froid, and Medicine Lake. The development of CWPPs is an ongoing process. The CWPP for the City of Medicine Lake is being developed, and the CWPP for the City of Froid will be completed in the near future.

All aspects of the fire management program will be conducted in a manner consistent with applicable laws, policies, and regulations. The Medicine Lake NWR Complex will maintain an FMP to accomplish the fire management goals that follow (see Fire Management Goals). 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 National Wildlife Refuge System Wildland Fire Management Program Strategic Plan are consistent with Department of Interior (DOI) and U.S Forest Service policies, National Fire Plan direction, the President's Healthy Forest Initiative, the 10-Year Comprehensive Strategy and Implementation Plan, National Wildfire Coordinating Group (NWCG) Guidelines, initiatives of the Wildland Fire Leadership Council, and Interagency Standards for Fire and Aviation Operations.

The Region 6 NWRS Priorities FY07 - 11 are consistent with the refuge's vision statement: "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 the complex 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 reduce unnatural fuel loads and attempt to return to a natural burn cycle of 3 to 7 years. This will require treating between 2,000 and 5,000 acres annually over a 5-year average. This fire management cycle will keep fuel loads at safer levels and enhance plant vigor and health over time.

Strategies

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

All management actions will use prescribed fire, manual and/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 outlined in the FMP for the refuge. Prescribed fire burn plans will be developed for specific sites, following the Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide (2006) template.

Prescribed fire temporarily reduces air quality by diminishing visibility and releasing components through combustion. The refuges will meet the Clean Air Act emission standards by adhering to the Montana/Idaho Smoke Management Program 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 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 administration station or at other refuges within

the district, and will be shared among all units. Fire management activities will be conducted in a coordinated and collaborative manner with federal and nonfederal partners.

Upon approval of this CCP, a new FMP will be developed for the complex. The FMP may be done as:

- 1) a FMP that covers each refuge and wetland management district;
- 2) a FMP that covers the refuges within this CCP;
- 3) a FMP that covers the fire management district;
or
- 4) an interagency FMP.

Appendix G

Draft Land Protection Plan

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Land Protection Plan

This Land Protection Plan (LPP) provides a general description of the operations and management of the proposed additions to the Medicine Lake National Wildlife Refuge (NWR), as outlined in the Preferred Alternative of the Comprehensive Conservation Plan (CCP). The U.S. Fish and Wildlife Service has developed this LPP during the planning process to provide local landowners, government agencies, and the public a general understanding of the anticipated management approaches for the proposed fee title and conservation easement acquisition. The purpose of the LPP is to present an overview of the Service's proposed management approach to wildlife and associated habitats, public uses, interagency coordination, public outreach, and other issues related to operations.

Introduction and Project Description

The Medicine Lake NWR has developed a CCP to provide the refuge manager a 15-year management plan to conserve fish, wildlife, and plant resources and their related habitats, while providing opportunities for compatible wildlife-dependent recreational uses. As part of the CCP, the refuge staff evaluated the future habitat protection needs of the refuge. The refuge's land-acquisition project proposal is part of a conservation strategy to protect highly productive wildlife habitat, including both wetlands and uplands, through fee title or easement purchase of approximately 1,780 acres of land adjoining and surrounding the refuge. This LPP addresses the refuge's habitat protection needs for the next 15 years.

The refuge was established by Executive Order in 1935 "as a breeding ground for migratory birds and other wildlife." The 31,660-acre refuge consists of two noncontiguous areas: the 28,396-acre Main Unit which contains the 8,200-acre Medicine Lake, as well as 17 smaller water units and adjacent grasslands, and the 3,264-acre Homestead Unit which includes 1,280 acres of wetlands in 5 water units and the rest in grassland habitat. The refuge contains an 11,330-acre wilderness area that was established in 1976 and includes Medicine Lake with its natural islands, and the 2,300-acre Sandhills Unit, which has habitat found in only one other location in Montana.

The boundary of the project area comprises "roundouts" of 11 parcels ranging in size from 37 acres to 612 acres. The Service intends to purchase 1,780 acres of private land from willing landowners within the new approved boundary. The Service intends to purchase acreage, in fee title or conservation easements, of important wetlands and grasslands habitats to expand existing protected conservation lands within the project area.

The purposes of the Medicine Lake NWR project area are:

- To protect habitat integrity by preventing fragmentation
- To preserve landscape integrity to maintain, sustain, and enhance the historic plant, animal, and insect biodiversity of native prairie habitats
- To minimize invasive plant infestations caused by soil disturbance
- To a lesser extent to improve management and maintenance of the refuge boundary

Major Wildlife Values

The proposed project area provides breeding and migration habitat for a diverse array of bird species. The refuge bird list includes 272 species, of which 125 are documented breeders. The Medicine Lake NWR is considered one of approximately 500 Globally Important Bird Areas by the American Bird Conservancy (Chipley 2001). The wetlands of the project area are extremely valuable habitat for waterfowl, shorebirds, and other wetland dependent wildlife. Native prairie and Conservation Reserve Program (CRP) grasslands in the project area provide large tracts of crucial breeding habitat for a host of grassland birds that are exhibiting dramatic continental declines.

Seventeen species that breed in the project area are on the Partners in Flight and the National Audubon Society's national watch lists (Muehtler 1998, Pashley et al. 2000): piping plover, yellow rail, long-billed curlew, marbled godwit, willet, Wilson's phalarope, Franklin's gull, short-eared owl, Sprague's pipit sparrows, Brewer's, clay-colored, Baird's, and Nelson's sharp-tailed lark bunting, chestnut-collared and McCown's longspurs, and bobolink. All of these are upland prairie nesters, with the exception of piping plover, Franklin's gull, and yellow rail, which nest in wetland habitats. Twenty-seven species that occur in the complex are nongame migratory bird species of management concern (USFWS: the 1995 List), and 20 of those breed within the project area.

The importance of this area to breeding and migrating waterfowl has long been recognized and was the primary reason for the purchase of the refuge in 1935. Most common nesting ducks are mallard, gadwall, northern pintail, northern shoveler, blue-winged teal, and lesser scaup, with a total of 14 species breeding locally. Although the density and diversity of nesting waterfowl is

outstanding, more remarkable are the high nest-success and recruitment rates in the area — among the highest recorded in the Prairie Pothole Region. Unlike more intensively-farmed areas of the Prairie Pothole Region, this area retains extensive, contiguous tracts of publicly and privately owned grasslands, and has a coyote-based predator community (rather than red foxes, raccoons, and striped skunks). Nest success consequently is relatively high, varying between 25 to 70 percent (Mayfield). For example, recorded nest success on Refuge grasslands during 1975-1999 averaged 30 to 40 percent (range 12 to 78 percent). Recruitment rates for mallards (0.97) and likely other dabblers, are the highest of any refuge lands in the Prairie Pothole Region (USFWS 1996), and make it an important “source” breeding area. Up to 40,000 ducks have been produced annually on the refuge alone. The numerous large wetlands of the project area provide important migration habitat for hundreds of thousands of waterfowl and waterbirds in spring and fall, including endangered whooping cranes and threatened bald eagles.

The large pelican nesting colony on Medicine Lake has existed since at least 1939. With more than 10,000 nesting pelicans, it is one of the largest colonies in the United States. These pelicans range throughout the complex during the breeding season, foraging in area wetlands. Other abundant birds that nest in colonies include eared grebe; black, Forster’s and common terns; Franklin’s gull; great blue heron; and black-crowned night heron.

The refuge is central to the breeding ranges of the passerine birds (or, songbirds) endemic to the northern Great Plains, many of which are experiencing alarming population declines (Sauer et al. 1997). From 1995 to 1999, the most abundant breeding passerines in the refuge grasslands were grasshopper sparrow, Baird’s sparrow, chestnut-collared longspur, and Savannah sparrow. Western meadowlark, clay-colored and Le Conte’s sparrows, lark bunting’s, and bobolink were also common. All of these species are showing continental declines, mostly due to loss of native grassland habitats. Many are also ‘area sensitive,’ meaning they disappear from an area once grasslands are fragmented below a minimum size. These species still occur in high numbers in northeast Montana primarily because of the relatively intact nature and size of remaining prairie areas.

Concentrations of migrating shorebirds are found throughout the complex, especially in drier years, when low water levels leave large areas of exposed shoreline. Several upland-nesting shorebirds are also common breeders in grassland habitats: marbled godwit, willet, upland sandpiper, and Wilson’s phalarope. A large proportion of the threatened Great Plains populations of piping plovers breed on alkali lakes in northeast Montana. This population was listed as threatened in 1985. As many as 34

pairs have nested on the refuge during low water years. Plovers nesting in northeast Montana have the highest breeding recruitment of the Great Plains population, largely due to the relatively intact wetland and prairie complexes found in the area (Murphy et al. 2000).

At least 38 species of mammals and 16 species of amphibians and reptiles are also found in the complex. Smooth green snake and western hognose snake, common to the refuge and sandhills, are considered species of concern by the Montana Natural Heritage Program.

Threats to and Status of the Resources

The greatest threat to these lands are agricultural conversions from grasslands to cropland, conversions from grassland to groundwater-irrigated cropland, drainages of wetlands and conversions to cropland, and development of residential homes and ranchettes. As an example, during the period from 1982 to 1997, more than 1.2 million acres of native prairie was converted to agricultural production in Montana (Johnson 2000).

The Service believes that the proposed protection of habitat supports wildlife values by protecting large tracts of private lands from residential and commercial development that would undermine these values and fragment habitats.

The Service is also concern with the fragmentation of habitats in other areas of Montana. This habitat loss is due primarily to the conversion of lands, once significant to wildlife, to summer homes and associated human-uses. In a landscape largely intact, habitat fragmentation poses a substantial threat to the continued viability of wildlife populations. Given the current strong market for scenic western properties, Montana prairie lands will be vulnerable to sale and subdivision for residential and commercial development.

Residential and commercial development, as well as fragmentation, can present a substantial threat to aquatic ecosystems. Housing developments can bring problems such as sewage-derived nutrient additions to streams and lakes, wetland drainage, water diversion, invasive or noxious weeds, and the introduction of nonnative fishes into aquatic ecosystems.

Proposed Action

The Service intends to purchase or receive donated conservation easements on approximately 1,780 acres from willing landowners within the approved boundary. The primary objective of this proposal is to maintain biological diversity and related wildlife values, and conserve the relatively naturally functioning systems and processes of the refuge.

Funding for the purchase of fee title lands will come from the Migratory Bird Conservation Fund or the Land and Water Conservation Fund. The Nature Conservancy, Ducks Unlimited, and other conservation groups could be interested in this area and may become a partner. Other partnership components, such as habitat management activities, will continue to be funded through the Partners for Wildlife Program, private sources, and other state and federal resource agencies.

The primary objective of this refuge will continue to be to promote the conservation and recovery of migratory birds and endangered species, and to maintain the unique biological diversity of the area. The proposed refuge addition will continue to protect and maintain the integrity of the complex of grassland and wetland habitats and the diversity complement of fish, wildlife, and plants.

The refuge acquisition program would rely on voluntary participation from landowners. If the land is purchased in fee title, the property would become part of the Medicine Lake NWR and would be managed according to the establishing purpose of the refuge. If the Service accepts a donation or purchases conservation easements, subdividing and developing for residential, commercial, or industrial purposes would not be permitted. Altering the natural topography, converting native grassland to cropland, and draining wetlands drainage or establishing game farms also would be prohibited. All land would remain in private ownership, and property tax and weed control would remain the responsibility of the landowner. Control of public access to the land also would remain under the control of the landowner.

A portion of the proposed expansion would be managed by the Northeast Montana Wetland Management District (WMD), which is administered by Medicine Lake NWR. If acreage is purchased for conservation easements, the project area will be checked by WMD staff to ensure compliance with the terms of the easement. The Service's role is to monitor the purchased easements to ensure that landowners comply with the easement agreement so that the property does not undergo subdivision, development for home sites, or conversion of native rangeland to cropland. The Service believes current ranching practices, such as grazing, are compatible with the purpose of the refuge.

Protection Alternatives

An alternative that was considered but not selected was a conservation strategy to protect highly productive wildlife habitat, including wetlands and uplands, through the purchase of approximately 8,400 acres of lands adjoining and surrounding the refuge.

The project was viewed as an opportunity to unite the refuge into one unit while protecting from development a riverine floodplain and native mixed-grass prairie. This alternative would have enhanced wildlife habitat, protected existing senior water rights; and adjusted administrative boundaries for ease of management.

After a more detailed biological review, the Service decided that the threat within the riparian flood zone, from agricultural conversion or development was not great enough to warrant the protection and status of the National Wildlife Refuge System.

Priority Areas

The Service has created 3 priority zones for acquiring fee title or conservation easements on private lands that will provide the largest benefit to wildlife (see figure 1). Providing connectivity and wildlife habitat linkages to existing protected lands is a key element used to delineate priority areas within a project area. Connectivity of habitats also helps ensure that wide-ranging species, such as migratory birds, receive sufficient habitat to meet their life cycle requirements.

The project area has been split into 3 priority zones for acquiring conservation easements using the following criteria:

- * connectivity to other lands
- * biological significance to migratory birds

Priority 1 Lands: This includes the area on the northeast side of the refuge. Priority zone 1 lies within the highly productive Prairie Pothole Region and has relief typical of the glacial drift prairie relatively gentle rolling plains with occasional shallow depressions. This is an area of high wetland density, and resulting prairie wetland complexes contain a high diversity of wetland types and sizes.

Priority 2 Lands: Priority zone 2 also has protective wetlands and remnant native grassland species. Vegetation is primarily the wheatgrass-needlegrass association of the mixed-grass prairie (Coupland 1950), but plant associations are diverse and fluctuate greatly in time and space with annual moisture, slope, aspect, and soil type. Subirrigated, wet meadow areas are dominated by prairie cordgrass, switch grass, western wheatgrass, rushes and sedges, and abundant tall forbs.

Priority 3 Lands – Priority zone 3 is influenced by Big Muddy Creek, a meandering, narrow less than 20 to 30 feet wide), meandering perennial prairie stream, the largest in the area. This floodplain consists primarily of soils formed in deposits from glacial outwash and alluvial deposits that are moderately to poorly drained, and are saline or salt affected in many locations. Numerous wetlands

were formed from shallow depressions, oxbow cutoffs, and a high water table from underground aquifers.

Acquisition Alternatives

The Service proposes to acquire fee title and conservation easements principally by using the Migratory Bird Conservation Fund and funds appropriated under the Land and Water Conservation Act, which is derived from royalties paid for offshore oil and gas leasing. Such funds are intended for land and water conservation projects. The funds are not derived from general taxes.

The Migratory Bird Conservation Fund has been used within the refuge project area to protect waterfowl and other wildlife habitat on private land through the Small Wetlands Acquisition Program.

Management activities associated with easements may be funded through other sources, such as The Nature Conservancy, Ducks Unlimited, North American Wetland Conservation Act grants, Partners for Fish and Wildlife, and other private and public partners.

Coordination

The Medicine Lake NWR proposed acquisition program has been discussed with landowners; conservation organizations; federal, state and county governments; and other interested groups and individuals. The proposal and associated CCP and EA address the protection of native habitats, primarily through acquisition of fee title and conservation easements, by the Service under the direction of the National Wildlife Refuge System.

A public open house held in Medicine Lake, Montana on November 29, 2006, to take comments and identify issues to be analyzed for the proposed project. Landowners, citizens, and elected representatives attended the meetings. In addition, Service field staffs have contacted local government officials, other public agencies, sporting clubs, and conservation groups.

Socio-cultural Considerations

This area also hosts state, federal, and private conservation lands. The 2.1 million-acre Fort Peck Indian Reservation forms the west boundary of the refuge on the west side of Big Muddy Creek. The State of Montana owns 286,204 acres of State School Land within the 3 county area. The Nature Conservancy owns about 700 acres and, by perpetual easement, protects several hundred additional acres about 25 miles north. The U. S. Department of Agriculture administers approximately 465,000 acres of CRP contracts in the area.

The economy of the Medicine Lake area is primarily agrarian and cattle ranches dominate the private lands within the project area. Land parcels are relatively large, which helps maintain this intact landscape. The human population is sparse and towns are widely scattered. Private lands are also used for hunting. A seasonal influx of tourists is attracted to the area for open space opportunities to bird watch, camp, canoe, fish, and hunt.

Summary of Proposed Action

Table 1 shows the acreage of habitat protection priority zone lands (zones 1, 2, and 3) identified for acquisition of fee title or conservation easements.

Table 1. Priority zone acreage for fee title or conservation easement acquisitions for Medicine Lake NWR.

Description	Total Area (acres)
Priority Zone 1	1,092
Priority Zone 2	477
Priority Zone 3	215
Total	1,784

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Appendix H

List of Plant and Wildlife Species

This appendix contains the common and scientific names of plant associations, amphibians, reptiles, fish, birds, and mammals of the Medicine Lake National Wildlife Refuge Complex. Plant associations of Sheridan County are as described by Heidel et al. 2000.

Plant Associations

Plant associations listed below are for woodland, shrubland, herbaceous, and other types.

Woodland Types

Green ash	<i>Fraxinus pennsylvanica</i>
Common chokecherry	<i>Prunus virginiana</i>
Quaking aspen	<i>Populus tremuloides</i>
Common snowberry	<i>Symphoricarpos albus</i>

Shrubland Types

Silver sagebrush	<i>Artemisia cana</i>
Western wheatgrass	<i>Pascopyrum smithii</i>
Silverberry shrubland	<i>Elaeagnus commutata</i>
Few-flowered wild buckwheat	<i>Eriogonum pauciflorum</i>
Broom snakeweed	<i>Gutierrezia sarothrae</i>
Common chokecherry	<i>Prunus virginiana</i>
Black greasewood	<i>Sarcobatus vermiculatus</i>
Western wheatgrass	<i>Pascopyrum smithii</i>
Buffaloberry	<i>Shepherdia argentea</i>
Western snowberry	<i>Symphoricarpos occidentalis</i>

Herbaceous Types

Prairie sandreed	<i>Calamovilfa longifolia</i>
Needle and Thread	<i>Stipa comata</i>
Wheat sedge	<i>Carex atherodes</i>
Woolly sedge	<i>Carex lanuginosa</i>
Clustered field sedge	<i>Carex praegracilis</i>

Saltgrass	<i>Distichlis spicata</i>
Common spikerush	<i>Eleocharis palustris</i>
Few-flowered spikerush	<i>Eleocharis quinqueflora</i>
Thickspike wheatgrass	<i>Elymus lanceolatus</i>
Prairie junegrass	<i>Koeleria macrantha</i>
Thick-spike wheatgrass	<i>Elymus lanceolatus</i>
Needle and thread	<i>Stipa comata</i>
Foxtail barley	<i>Hordeum jubatum</i>
Indian ricegrass	<i>Oryzopsis hymenoides</i>
Lemon scurfpea	<i>Psoraleidium lanceolatum</i>
Switchgrass	<i>Panicum virgatum</i>
Mat muhly	<i>Muhlenbergia richardsonis</i>
Little bluestem	<i>Schizachyrium scoparium</i>
Western wheatgrass	<i>Pascopyrum smithii</i>
Saltgrass	<i>Distichlis spicata</i>
Blue grama	<i>Bouteloua gracilis</i>
Green needlegrass	<i>Nassella viridula</i>
Water smartweed	<i>Polygonum amphibium</i>
Sago pondweed	<i>Potamogeton pectinatus</i>
Common water-milfoil	<i>Myriophyllum spicatum</i>
Nuttall's alkaligrass	<i>Puccinellia nuttalliana</i>
Ditch grass Great Plains	<i>Ruppia maritima Great Plains</i>
Red glasswort	<i>Salicornia rubra</i>
Plains muhly	<i>Muhlenbergia cuspidata</i>
Hardstem bulrush	<i>Scirpus acutus</i>
Alkali bulrush	<i>Scirpus maritimus</i>
Threesquare bulrush	<i>Scirpus pungens</i>
Sprangletop	<i>Scolochloa festucacea</i>
Prairie Whitetop	<i>Scolochloa festucacea</i>
Prairie cordgrass	<i>Spartina pectinata</i>

Western porcupine grass	<i>Stipa curtisetata</i>
Common arrow-grass	<i>Triglochin maritimum</i>
Common cattail western	<i>Typha latifolia western</i>

Undescribed Types

Slimstem reedgrass	<i>Calamagrostis stricta</i>
Water sedge	<i>Carex aquatilis</i>
Fireberry hawthorn	<i>Crataegus chrysocarpa</i>
Shrubby cinquefoil	<i>Pentaphylloides floribunda</i>
Western porcupine grass	<i>Stipa curtisetata</i>
Thickspike wheatgrass	<i>Elymus lanceolatus</i>
Slender wheatgrass	<i>Elymus trachycaulus</i>
Alkali cordgrass	<i>Spartina gracilis</i>
Creeping juniper	<i>Juniperus horizontalis</i>
Thickspike wheatgrass	<i>Elymus lanceolatus</i>
Prairie cordgrass	<i>Spartina pectinata</i>
Black greasewood	<i>Sarcobatus vermiculatus</i>
Nuttall's alkaligrass	<i>Puccinellia nuttalliana</i>
Nevada bulrush	<i>Scirpus nevadensis</i>
Plains Muhly	<i>Muhlenbergia cuspidata</i>

Amphibians and Reptiles

Salamanders

Tiger salamander	<i>Ambistoma tigrinum</i>
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Frogs and Toads

Western chorus frog	<i>Pseudacris triseriata</i>
Northern leopard frog	<i>Rana pipiens</i>
Wood frog	<i>Rana sylvatica</i> (possible, but undocumented)
Woodhouse's toad	<i>Bufo woodhousei</i>
Canadian toad	<i>Bufo hemiophrys</i>
Great Plains toad	<i>Bufo cognatus</i>
Plains spadefoot	<i>Scaphiopus bombifrons</i>

Turtles

Painted turtle	<i>Chrysemys picta</i>
Snapping turtle	<i>Chelydra serpentina</i>

Snakes

Racer	<i>Coluber constrictor</i>
Western terrestrial gartersnake	<i>Thamnophis elegans</i>
Plains garter snake	<i>Thamnophis radix</i>
Smooth green snake	<i>Ophiodrys vernalis</i>
Northern redbelly snake	<i>Storeria occipitomaculata</i>
Western hognose snake	<i>Heterodon nasicus</i>
Bullsnake	<i>Pituophis catenifer</i>

Fishes

The following fishes occur in Big Muddy Basin, Montana (Brown 1971; Holton and Johnson 1996).

Hiodontidae

Goldeye	<i>Hiodon alosoides</i>
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Cyprinidae

Brassy minnow	<i>Hybognathus hankinsoni</i>
Common carp	<i>Cyprinus carpio</i>
Emerald shiner	<i>Notropis atherinoides</i>
Fathead minnow	<i>Pimephales promelas</i>
Flathead chub	<i>Hybopsis gracilis</i>
Lake chub	<i>Couesius plumbeus</i>
Longnose dace	<i>Rhynchichthys cataractae</i>
Northern redbelly dace	<i>Phoxinus eos</i>
Northern redbelly dace x finescale dace	<i>Phoxinus eos x P. neogaeus</i>
Pearl dace	<i>Margariscus margarita</i>
Plains minnow	<i>Hybognathus placitus</i>
Western silvery minnow	<i>Hybognathus argyritis</i>

Catostomidae

Longnose sucker	<i>Catostomus catostomus</i>
River carpsucker	<i>Carpoides carpio</i>
White sucker	<i>Catostomus commersoni</i>

Ictaluridae

Black bullhead	<i>Ictalurus melas</i>
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Esocidae

Northern pike	<i>Esox lucius</i>
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Gadidae

Burbot	<i>Lota lota</i>
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Gasterosteidae

Brook stickleback	<i>Culaea inconstans</i>
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Centrarchidae

black crappie	<i>Pomoxis nigromaculatus</i>
white crappie	<i>Pomoxis annularis</i>

Percidae

Iowa darter	<i>Etheostoma exile</i>
sauger	<i>Stizostedion canadense</i>
walleye	<i>Stizostedion vitreum</i>
yellow perch	<i>Perca flavescens</i>

Butterflies**Pieridae (Whites and Sulphurs)**

checkered white	<i>Pontia protodice</i>
western white	<i>Pontia occidentalis</i>
cabbage white	<i>Pieris rapae</i>
Olympia marble	<i>Euchloe olympia</i>
clouded sulphur	<i>Colias philodice</i>
orange sulphur	<i>Colias eurytheme</i>

Lycaenidae (Coppers) (Hairstreaks) (Blues)

gray copper	<i>Lycaena dione</i>
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purplish copper	<i>Lycaena helloides</i>
great copper	<i>Lycaena xanthoides</i>
spring azure	<i>Celastrina lucia</i>
silvery blue	<i>Glaucopsyche lygdamus</i>
Melissa blue	<i>Lycaeides melissa</i>
greenish blue	<i>Plebejus saepiolus</i>

Nymphalidae (Fritillaries) (Checkerspots) (Crescents) (Satyrs)

variegated fritillary	<i>Euptoieta claudia</i>
callippe fritillary (Nevada fritillary)	<i>Speyeria callippe</i> (Speyeria nevadensis)
Gorgone Checkerspot	<i>Chlosyne gorgone</i>
pearl crescent	<i>Phyciodes tharos</i>
northern crescent	<i>Phyciodes cocyta</i>
painted lady	<i>Vanessa curdii</i>
red admiral	<i>Vanessa atalanta</i>
eyed brown	<i>Satyrodes eurydice</i>
inornate ringlet	<i>Cenonympha inornata</i>
common wood nymph	<i>Cercyonis pegala</i>
Uhler's arctic	<i>Oeneis uhleri</i>
monarch	<i>Danaus plexippus</i>

Hesperiidae (Skippers)

Northern cloudywing	<i>Thorybes pylades</i>
Common checkered skipper	<i>Pyrgus communis</i>
Common sootywing	<i>Pholisora catullus</i>
Garita skipperling	<i>Oarisma garita</i>
European skipper	<i>Thymelicus lineola</i>
Common branded skipper	<i>Hesperia colorado</i>
Peck's skipper	<i>Polites peckius</i>
Tawney-edged skipper	<i>Polites themistocles</i>
Delaware skipper	<i>Anatrytone logan</i>

Birds

The 273 bird species recorded at Medicine Lake NWR include the following:

- * 5 introduced species
- * 1 extinct species
- * 2 extirpated species
- * 125 breeding species
- * 2 federally endangered species
- * 2 federally threatened species

The order of this list of resident, migratory, and nesting birds at Medicine Lake NWR follows. "The American Ornithologists' Union check-list of North American Birds," (7th ed. 1998; 42nd supplement 2000).

* indicates a documented breeding record

indicates a migratory nongame bird species of management concern in the United States (USFWS 1995)

Loons

common loon# *Gavia immer*

Grebes

pied-billed grebe* *Podilymbus podiceps*
 horned grebe* *Podiceps auritus*
 red-necked grebe *Podiceps grisegena*
 black-necked grebe* *Podiceps nigricollis*
 Western grebe* *Aechmophorus occidentalis*
 Clark's grebe* *Aechmophorus clarkii*

Pelicans

American white pelican* *Pelecanus erythrorhynchos*

Cormorants

double-crested cormorant* *Phalacrocorax auritus*

Bitterns, Herons, and Egrets

American bittern*# *Botaurus lentiginosus*
 great blue heron* *Ardea herodias*

great egret *Ardea alba*
 snowy egret *Egretta thula*
 black-crowned night-heron* *Nycticorax nycticorax*

Ibises and Spoonbills

white-faced ibis*# *Plegadis chihi*

New World Vultures

turkey vulture *Cathartes aura*

Swans, Geese, and Ducks

white-fronted goose *Anser albifrons*
 snow goose *Chen caerulescens*
 Ross's goose *Chen rossii*
 Canada goose* *Branta canadensis*
 trumpeter swan# *Cygnus buccinator*
 tundra swan *Cygnus columbianus*
 wood duck *Aix sponsa*
 gadwall* *Anas strepera*
 American wigeon* *Anas americana*
 American black duck *Anas rubripes*
 mallard* *Anas platyrhynchos*
 blue-winged teal* *Anas discors*
 cinnamon teal* *Anas cyanoptera*
 northern shoveler* *Anas clypeata*
 northern pintail* *Anas acuta*
 green-winged teal* *Anas crecca*
 canvasback* *Aythya valisineria*
 redhead* *Aythya americana*
 ring-necked duck* *Aythya collaris*
 greater scaup *Aythya marila*
 lesser scaup* *Aythya affinis*
 white-winged scoter *Melanitta fusca*
 long-tailed duck *Clangula hyemalis*
 bufflehead* *Bucephala albeola*
 common goldeneye *Bucephala clangula*

Barrow's goldeneye	<i>Bucephala islandica</i>
hooded merganser	<i>Lophodytes cucullatus</i>
common merganser	<i>Mergus merganser</i>
red-breasted merganser	<i>Mergus serrator</i>
ruddy duck*	<i>Oxyura jamaicensis</i>

Osprey, Kites, Hawks, and Eagles

osprey	<i>Pandion haliaetus</i>
bald eagle	<i>Haliaeetus leucocephalus</i> (threatened)
northern harrier*#	<i>Circus cyaneus</i>
sharp-shinned hawk	<i>Accipiter striatus</i>
Cooper's hawk	<i>Accipiter cooperii</i>
northern goshawk#	<i>Accipiter gentilis</i>
broad-winged hawk	<i>Buteo platypterus</i>
Swainson's hawk*	<i>Buteo swainsoni</i>
red-tailed hawk*	<i>Buteo jamaicensis</i>
ferruginous hawk*#	<i>Buteo regalis</i>
rough-legged hawk	<i>Buteo lagopus</i>
golden eagle*	<i>Aquila chrysaetos</i>

Falcons and Caracaras

American kestrel*	<i>Falco sparverius</i>
merlin	<i>Falco columbarius</i>
gyrfalcon	<i>Falco rusticolus</i>
peregrine falcon#	<i>Falco peregrinus</i>
prairie falcon*	<i>Falco mexicanus</i>

Gallinaceous Birds

gray partridge*	<i>Perdix perdix</i> (introduced)
ring-necked pheasant*	<i>Phasianus colchicus</i> (introduced)
sage grouse	<i>Centrocercus urophasianus</i>
sharp-tailed grouse*	<i>Tympanuchus phasianellus</i>
greater prairie-chicken	<i>Tympanuchus cupido</i> (extirpated)

Rails

yellow rail*#	<i>Coturnicops noveboracensis</i>
Virginia rail*	<i>Rallus limicola</i>
sora*	<i>Porzana carolina</i>
American coot*	<i>Fulica americana</i>

Cranes

sandhill crane	<i>Grus canadensis</i>
whooping crane	<i>Grus Americana</i> (endangered)

Plovers

black-bellied plover	<i>Pluvialis squatarola</i>
American golden- plover	<i>Pluvialis dominica</i>
semipalmated plover	<i>Charadrius semipalmatus</i>
piping plover*	<i>Charadrius melodus</i> (threatened)
killdeer*	<i>Charadrius vociferus</i>

Stilts and Avocets

black-necked stilt	<i>Himantopus mexicanus</i>
American avocet*	<i>Recurvirostra americana</i>

Sandpipers and Phalaropes

greater yellowlegs	<i>Tringa melanoleuca</i>
lesser yellowlegs	<i>Tringa flavipes</i>
solitary sandpiper	<i>Tringa solitaria</i>
spotted sandpiper*	<i>Actitis macularia</i>
willet*	<i>Catoptrophorus</i> <i>semipalmatus</i>
upland sandpiper*#	<i>Bartramia longicauda</i>
eskimo curlew	<i>Numenius borealis</i> (extirpated)
whimbrel	<i>Numenius phaeopus</i>
long-billed curlew*#	<i>Numenius americanus</i>
hudsonian godwit	<i>Limosa haemastica</i>
marbled godwit*	<i>Limosa fedoa</i>
ruddy turnstone	<i>Arenaria interpres</i>

red knot	<i>Calidris canutus</i>
sanderling	<i>Calidris alba</i>
semipalmated sandpiper	<i>Calidris pusilla</i>
western sandpiper	<i>Calidris mauri</i>
least sandpiper	<i>Calidris minutilla</i>
white-rumped sandpiper	<i>Calidris fuscicollis</i>
Baird's sandpiper	<i>Calidris bairdii</i>
pectoral sandpiper	<i>Calidris melanotos</i>
dunlin	<i>Calidris alpina</i>
stilt sandpiper	<i>Calidris himantopus</i>
ruff	<i>Philomachus pugnax</i>
short-billed dowitcher	<i>Limnodromus griseus</i>
long-billed dowitcher	<i>Limnodromus scolopaceus</i>
common snipe*	<i>Gallinago gallinago</i>
Wilson's phalarope*	<i>Phalaropus tricolor</i>
red-necked phalarope	<i>Phalaropus lobatus</i>

Skuas, Jaegers, Gulls, and Terns

Franklin's gull*	<i>Larus pipixcan</i>
Bonaparte's gull	<i>Larus philadelphia</i>
ring-billed gull*	<i>Larus delawarensis</i>
California gull*	<i>Larus californicus</i>
Thayer's gull	<i>Larus thayeri</i>
glaucous gull	<i>Larus hyperboreus</i>
Caspian tern*	<i>Sterna caspia</i>
common tern*	<i>Sterna hirundo</i>
Forster's tern*	<i>Sterna forsteri</i>
least tern# (endangered)	<i>Sterna antillarum</i>
black tern*#	<i>Chlidonias niger</i>

Pigeons and Doves

rock dove [also: common pigeon]*	<i>Columba livia</i> (introduced)
mourning dove*	<i>Zenaida macroura</i>
passenger pigeon	<i>Ectopistes migratorius</i> (extinct)

Cuckoos and Anis

black-billed cuckoo*	<i>Coccyzus erythrophthalmus</i>
yellow-billed cuckoo	<i>Coccyzus americanus</i>

Typical Owls

eastern screech-owl	<i>Otus asio</i>
great horned owl*	<i>Bubo virginianus</i>
snowy owl	<i>Nyctea scandiaca</i>
northern hawk owl	<i>Surnia ulula</i>
burrowing owl*#	<i>Athene cunicularia</i>
long-eared owl*	<i>Asio otus</i>
short-eared owl*#	<i>Asio flammeus</i>

Nightjars

common nighthawk*	<i>Chordeiles minor</i>
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Swifts

chimney swift	<i>Chaetura pelagica</i>
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Hummingbirds

ruby-throated hummingbird	<i>Archilochus colubris</i>
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Kingfishers

belted kingfisher*	<i>Ceryle alcyon</i>
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Woodpeckers

red-headed woodpecker#	<i>Melanerpes erythrocephalus</i>
yellow-bellied sapsucker	<i>Sphyrapicus varius</i>
downy woodpecker	<i>Picoides pubescens</i>
hairy woodpecker	<i>Picoides villosus</i>
northern flicker*	<i>Colaptes auratus</i>

Tyrant Flycatchers

western wood pewee	<i>Contopus sordidulus</i>
eastern wood pewee	<i>Contopus virens</i>
yellow-bellied flycatcher	<i>Empidonax flaviventris</i>
alder flycatcher	<i>Empidonax alnorum</i>

willow flycatcher	<i>Empidonax traillii</i>
least flycatcher*	<i>Empidonax minimus</i>
eastern phoebe	<i>Sayornis phoebe</i>
Say's phoebe*	<i>Sayornis saya</i>
great crested flycatcher	<i>Myiarchus crinitus</i>
western kingbird*	<i>Tyrannus verticalis</i>
eastern kingbird*	<i>Tyrannus tyrannus</i>

Shrikes

loggerhead shrike*#	<i>Lanius ludovicianus</i>
northern [also: great grey] shrike	<i>Lanius excubitor</i>

Vireos

plumbeous vireo	<i>Vireo plumbeus</i>
blue-headed vireo	<i>Vireo solitarius</i>
warbling vireo	<i>Vireo gilvus</i>
Philadelphia vireo	<i>Vireo philadelphicus</i>
red-eyed vireo	<i>Vireo olivaceus</i>

Crows, Jays, and Magpies

blue jay	<i>Cyanocitta cristata</i>
black-billed magpie*	<i>Pica hudsonia</i>
American crow*	<i>Corvus brachyrhynchos</i>
common raven	<i>Corvus corax</i>

Larks

horned lark*	<i>Eremophila alpestris</i>
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Swallows

purple martin	<i>Progne subis</i>
tree swallow*	<i>Tachycineta bicolor</i>
northern rough- winged swallow*	<i>Stelgidopteryx serripennis</i>
bank swallow*	<i>Riparia riparia</i>
cliff swallow*	<i>Petrochelidon pyrrhonota</i>

barn swallow*	<i>Hirundo rustica</i>
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Titmice and Chickadees

black-capped chickadee*	<i>Poecile atricapilla</i>
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Nuthatches

red-breasted nuthatch	<i>Sitta canadensis</i>
white-breasted nuthatch	<i>Sitta carolinensis</i>

Creepers

brown creeper	<i>Certhia americana</i>
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Wrens

house wren*	<i>Troglodytes aedon</i>
sedge wren*#	<i>Cistothorus platensis</i>
marsh wren*	<i>Cistothorus palustris</i>

Kinglets

golden-crowned kinglet	<i>Regulus satrapa</i>
ruby-crowned kinglet	<i>Regulus calendula</i>

Thrushes

eastern bluebird*	<i>Sialia sialis</i>
western bluebird	<i>Sialia mexicana</i>
mountain bluebird*	<i>Sialia currucoides</i>
Townsend's solitaire	<i>Myadestes townsendi</i>
veery*#	<i>Catharus fuscescens</i>
gray-cheeked thrush	<i>Catharus minimus</i>
Swainson's thrush	<i>Catharus ustulatus</i>
hermit thrush	<i>Catharus guttatus</i>
American robin*	<i>Turdus migratorius</i>

Mimic Thrushes

gray catbird*	<i>Dumetella carolinensis</i>
brown thrasher*	<i>Toxostoma rufum</i>

Starlings

European starling* *Sturnus vulgaris*
(introduced)

Wagtails and Pipits

American pipit *Anthus rubescens*

Sprague's pipit*# *Anthus spragueii*

Waxwings

bohemian waxwing *Bombycilla garrulus*

cedar waxwing* *Bombycilla cedrorum*

Wood Warblers

Tennessee warbler *Vermivora peregrina*

orange-crowned
warbler *Vermivora celata*

Nashville warbler *Vermivora ruficapilla*

yellow warbler* *Dendroica petechia*

chestnut-sided
warbler *Dendroica pensylvanica*

magnolia warbler *Dendroica magnolia*

Cape May warbler *Dendroica tigrina*

black-throated blue
warbler *Dendroica caerulescens*

yellow-rumped
warbler *Dendroica coronata*

black-throated green
warbler *Dendroica virens*

Townsend's warbler *Dendroica townsendi*

Blackburnian warbler *Dendroica fusca*

pine warbler *Dendroica pinus*

prairie warbler *Dendroica discolor*

palm warbler *Dendroica palmarum*

bay-breasted warbler *Dendroica castanea*

blackpoll warbler *Dendroica striata*

black-and-white
warbler *Mniotilta varia*

American redstart* *Setophaga ruticilla*

ovenbird *Seiurus aurocapillus*

northern waterthrush *Seiurus noveboracensis*

Kentucky warbler *Oporornis formosus*

Connecticut warbler *Oporornis agilis*

mourning warbler *Oporornis philadelphia*

MacGillivray's warbler *Oporornis tolmiei*

common yellowthroat* *Geothlypis trichas*

Wilson's warbler *Wilsonia pusilla*

Canada warbler *Wilsonia canadensis*

yellow-breasted chat* *Icteria virens*

Tanagers

scarlet tanager *Piranga olivacea*

Sparrows and Towhees

spotted towhee* *Pipilo maculatus*

American tree sparrow *Spizella arborea*

chipping sparrow* *Spizella passerina*

clay-colored sparrow* *Spizella. Pallida*

Brewer's sparrow*# *Spizella breweri*

field sparrow* *Spizella pusilla*

vesper sparrow* *Pooecetes gramineus*

lark sparrow* *Chondestes grammacus*

lark bunting*# *Calamospiza melanocorys*

Savannah sparrow* *Passerculus sandwichensis*

grasshopper
sparrow*# *Ammodramus
savannarum*

Baird's sparrow*# *Ammodramus bairdii*

Le Conte's sparrow* *Ammodramus leconteii*

Nelson's sharp-tailed
sparrow* *Ammodramus nelsoni*

fox sparrow *Passerelia iliaca*

song sparrow* *Melospiza melodia*

Lincoln's sparrow *Melospiza lincolni*

white-throated
sparrow *Zonotrichia albicollis*

Harris' sparrow *Zonotrichia querula*

white-crowned sparrow	<i>Zonotrichia leucophrys</i>
dark-eyed junco	<i>Junco hyemalis</i>
McCown's longspur*#	<i>Calcarius mccownii</i>
Lapland longspur	<i>Calcarius lapponicus</i>
chestnut-collared longspur*#	<i>Calcarius ornatus</i>
snow bunting	<i>Plectrophenax nivalis</i>

Cardinals, Grosbeaks, and Allies

rose-breasted grosbeak	<i>Pheucticus ludovicianus</i>
black-headed grosbeak	<i>Pheucticus melanocephalus</i>
lazuli bunting*	<i>Passerina amoena</i>
dickcissel#	<i>Spiza americana</i>

Blackbirds and Orioles

bobolink*	<i>Dolichonyx oryzivorus</i>
red-winged blackbird*	<i>Agelaius phoeniceus</i>
western meadowlark*	<i>Sturnella neglecta</i>
yellow-headed blackbird*	<i>Xanthocephalus xanthocephalus</i>
rusty blackbird	<i>Euphagus carolinus</i>
Brewer's blackbird*	<i>Euphagus cyanocephalus</i>
common grackle*	<i>Quiscalus quiscula</i>
brown-headed cowbird*	<i>Molothrus ater</i>
orchard oriole*	<i>Icterus spurius</i>
Baltimore oriole*	<i>Icterus galbula</i>
Bullock's oriole	<i>Icterus bullockii</i>

Finches

pine grosbeak	<i>Pinicola enucleator</i>
purple finch	<i>Carpodacus purpureus</i>
house finch*	<i>Carpodacus mexicanus</i>
common redpoll	<i>Carduelis flammea</i>
hoary redpoll	<i>Carduelis. hornemanni</i>
pine siskin	<i>Carduelis pinus</i>
American goldfinch*	<i>Carduelis tristis</i>

Old World sparrows

house sparrow*	<i>Passer domesticus</i> (introduced)
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Mammals

The following list of mammals have ranges within the area of Medicine Lake Complex.

* indicates documented occurrence (refuge data, Thompson 1982)

indicates documented (trapped or seen) by E.A. Preble at Johnson Lake (1910)

Insectivores

Shrews

Arctic shrew*	<i>Sorex arcticus</i>
Baird's shrew	<i>Sorex bairdii</i>
Cinereus (masked) shrew*	<i>Sorex cinereus</i>
pygmy shrew*	<i>Sorex hoyi</i>
Merriam's shrew	<i>Sorex merriami</i>
northern short-tailed shrew	<i>Blarina brevicauda</i>

Bats

long-eared bat	<i>Myotis evotis</i>
Keen's bat *	<i>Myotis. keenii</i>
little brown bat *	<i>Myotis lucifugus</i>
northern long-eared bat	<i>Myotis septentrionalis</i>
small-footed bat	<i>Myotis subulatus</i>
western red bat	<i>Lasiurus blossevillei</i>
eastern red bat	<i>Lasiurus borealis</i>
hoary bat	<i>Lasiurus cinereus</i>
silver-haired bat	<i>Lasionycteris noctivagans</i>
big brown bat	<i>Eptesicus fuscus</i>

Hares and Rabbits

mountain cottontail*	<i>Sylvilagus nuttalli</i>
snowshoe hare*	<i>Lepus americanus</i>
white-tailed jackrabbit*#	<i>Lepus townsendii</i>

Squirrels

least chipmunk	<i>Tamias minimus</i>
woodchuck	<i>Marmota monax</i>
Franklin's ground squirrel	<i>Spermophilus franklinii</i>
Richardson's ground squirrel*#	<i>Spermophilus richardsonii</i>
thirteen-lined ground squirrel*#	<i>Spermophilus tridecemlineatus</i>
black-tailed prairiedog	<i>Cynomys ludovicianus</i>

Pocket Gophers

northern pocket gopher*#	<i>Thomomys talpoides</i>
plains pocket gopher	<i>Geomys bursarius</i>

Heteromyids

olive-backed pocket mouse*#	<i>Perognathus fasciatus</i>
plains pocket mouse	<i>Perognathus flavescens</i>
Ord's kangaroo rat	<i>Dipodomys ordii</i>

Beavers

American beaver*	<i>Castor canadensis</i>
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Mice, Rats, and Voles

western harvest mouse	<i>Reithrodontomys megalotis</i>
plains harvest mouse	<i>Reithrodontomys montanus</i>
white-footed mouse	<i>Peromyscus leucopus</i>
deer mouse*#	<i>Peromyscus maniculatus</i>
northern grasshopper mouse *#	<i>Onychomys leucogaster</i>
bushy-tailed woodrat	<i>Neotoma cinerea</i>
Norway rat*	<i>Rattus norvegicus</i>
house mouse*	<i>Mus musculus</i>
southern red-backed vole	<i>Clethrionomys gapperi</i>
prairie vole*	<i>Microtus ochrogaster</i>
meadow vole*#	<i>Microtus pennsylvanicus</i>

sagebrush vole* <i>Lemmiscus curtatus</i>	
common muskrat*#	<i>Ondatra zibethicus</i>

Jumping Mice

meadow jumping mouse*	<i>Zapus hudsonius</i>
western jumping mouse	<i>Zapus princeps</i>

New World Porcupines

common [also: North American] porcupine*	<i>Erethizon dorsatum</i>
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Carnivores

Canids

coyote*#	<i>Canis latrans</i>
gray wolf*#	<i>Canis lupus</i> (extirpated)
swift fox*#	<i>Vulpes velox</i> (extirpated)
red fox*	<i>Vulpes vulpes</i>

Bears

American black bear*	<i>Ursus americanus</i>
grizzly (brown) bear*	<i>Ursus arctos</i> (extirpated)

Procyonids

common raccoon*	<i>Procyon lotor</i>
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Mustelids

long-tailed weasel*#	<i>Mustela frenata</i>
black-footed ferret	<i>Mustela nigripes</i>
least weasel*	<i>Mustela nivalis</i>
american mink*	<i>Mustela vison</i>
wolverine*	<i>Gulo gulo</i>
American badger*#	<i>Taxidea taxus</i>
northern river otter	<i>Lontra canadensis</i>

Mephitids

striped skunk*#	<i>Mephitis mephitis</i>
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Felids

feral (or domestic) cat* *Felis catus* (introduced)

bobcat* *Lynx rufus*

Cervids

wapiti (elk)*
(introduced) *Cervus elaphus*

mule or black-tailed
deer* *Odocoileus hemionus*

white-tailed deer* *Odocoileus virginianus*

moose* *Alces alces*

caribou* *Rangifer tarandus*

Pronghorn

pronghorn*# *Antilocapra americana*

Bovids

American bison* *Bos bison* (extirpated)

domestic cow* *Bos taurus*

Appendix I

Refuge Operating Needs System (RONS)

Tier 1 Projects					
<i>Project #</i>	<i>Station</i>	<i>Project Title</i>	<i>Cost Estimate (Thousands) First Year Need</i>	<i>Personnel FTE</i>	<i>Recurring Annual Need (Thousands)</i>
00004	MDLNWR	Protect visitors, natural, and cultural resources, and facilities (Refuge Officer)	\$65	1.0	\$75
00002	MDLNWR	Initiate and Expand GIS, GPS and ADP Capabilities within the Complex (GIS/GPS/ADP specialist)	\$65	1.0	\$89
97025	MDLNWR	Monitor Wildlife Response to Upland Management (Refuge Operations Specialist)	\$65	1.0	\$89
00003	MDLNWR	Manage Visitor Programs, Environmental Education, Outreach, Friends Group (Outdoor Recreation Planner)	\$65	1.0	\$89
98004	MDLNWR	Exotic Tree Control (Maintenance Worker)	\$37.5	.5	\$32
98008	MDLNWR	Cover Map Refuge Complex Vegetation	\$204		\$15
98001	MDLNWR	Refuge Water Budget Model (Refuge Operations Specialist)	\$65	1.0	\$75
97020	MDLNWR	Conduct Wildlife and Habitat Monitoring	\$121		\$10
97022	MDLNWR	Install predator exclusion fences	\$77		\$5
99001	MDLNWR	Aerial Photo Coverage of Refuge Complex Administered Lands	\$88		\$2
Tier 2 Projects					
<i>Project #</i>	<i>Station</i>	<i>Project Title</i>	<i>First Year Need (Thousands)</i>	<i>Recurring Annual Need (Thousands)</i>	
06010	MDLNWR	Restore Mixed-grass Prairie Uplands in Eastern Montana	\$300	\$0	
99003	MDLNWR	Expand Water Management Capabilities	\$459	\$15	
00006	MDLNWR	Improve Visitor Services & Administrative Functions within Refuge Complex-Receptionist	\$65	\$63	
99004	MDLNWR	Enhance Wildlife Habitat within the Complex	\$95	\$4	

Tier 2 Projects, cont.				
<i>Project #</i>	<i>Station</i>	<i>Project Title</i>	<i>First Year Need (Thousands)</i>	<i>Recurring Annual Need (Thousands)</i>
97007	MDLNWR	Increase Monitoring of Wildlife Populations by Bird Banding	\$80	\$25
97008	MDLNWR	Carp Control	\$45	\$7
97010	MDLNWR	Enhance Public Perception of the Service	\$207	\$17
97011	MDLNWR	Expand Management Capabilities with Bunkhouse Rehabilitation	\$96	\$25
97012	MDLNWR	Enhance Visitor Contact Areas Refuge Headquarters	\$112	\$25
97021	MDLNWR	White Pelican Monitoring/Study-Wildlife Biologist	\$65	\$89
97024	MDLNWR	Wildlife Habitat Enhancement on Refuge and Adjoining Private Land	\$65	\$53
97023	MDLNWR	Homestead Mechanical Water Management	\$222	\$10
98012	MDLNWR	Cultural Resource Survey	\$255	\$10
98013	MDLNWR	Moist Soil Mapping and Air Quality	\$34	\$25
98014	MDLNWR	Air Quality Monitoring Invertebrates	\$33	\$5
98011	MDLNWR	Air Quality Literature Survey	\$60	\$37
98010	MDLNWR	Air Quality Monitoring	\$49	\$10
98009	MDLNWR	Air Quality- Fine Particle Sampling	\$132	\$30
98007	MDLNWR	Visual Air Quality	\$121	\$30
98005	MDLNWR	Air Quality- Scene Monitoring	\$89	\$30
00014	MDLNWR	Provide Opportunities for Wildlife Observation and Photography within the Complex	\$112	\$8
98002	MDLNWR	Implement a Fisheries Management Program	\$110	\$12
00015	MDLNWR	Complete Grounds Work of Headquarters Complex	\$178	\$30
97009	MDLNWR	Enhance Disease Monitoring within the Complex to Reduce Resource Losses	\$62	\$10
00016	MDLNWR	Address the Problem of Lack of House within the Refuge Complex	\$220	\$17
97028	MDLNWR	Upland Habitat Enhancement	\$93	\$10
00017	MDLNWR	Investigate Predatory Impacts of gull Colonies on Nesting Migratory Birds	\$75	\$25
99006	MDLNWR	Design and Print New Complex Leaflets to Service Standards	\$65	\$6
99007	MDLNWR	Fire Management Program Building	\$209	\$7
99008	MDLNWR	Develop Refuge Complex Video and Slide Presentation	\$108	\$15
00010	MDLNWR	Enhance Water Management Capabilities	\$397	\$12
00012	MDLNWR	Enhance Refuge Complex Volunteer Program	\$60	\$10
00013	MDLNWR	Survey Burrowing Owl Populations within the Complex	\$141	\$26

Appendix J

Service Asset Maintenance Management System (SAMMS)

<i>Station</i>	<i>Project Title</i>	<i>Cost Estimate (thousands)</i>	<i>SAMMS Work Order #</i>
	DEFERRED MAINTENANCE		
MDLNWR	Replace deteriorating windows	est. needed	2006518618
MDLNWR	Rehab quarters by replacing septic system R608 DMFP	\$21,000	2006553681
MDLNWR	Rehab Basement and Attic R6XX, DM	\$47,000	93106879
MDLNWR	Replace 1934 bunkhouse R612 DMFP	\$521,000	93106883
MDLNWR	Replace lawn shed R6 DMRP	\$10,000	02120719
MDLNWR	Replace Storage Building R6XX, DM	\$39,000	95106895
MDLNWR	Replace worn dam #1 R6 DMRP	\$1,039,000	97109869
MDLNWR	Replace 3 48" metal screwgates on Dam #1 R609 DMFP	\$235,000	2006553684
MDLNWR	Rehab Canal Banks R6XX, DM	\$495,000	90106876
MDLNWR	Rehab Sayer Bay water control structure R612 DMFP	\$41,000	94106886
MDLNWR	Rehabilitate Canals R6XX, DM	\$30,000	2007721033
MDLNWR	Rehabilitate Canals R6XX, DM	\$200,000	90106874
MDLNWR	Rehab Dam as per Dam Report R6 DMRH	est. needed	2006521048
MDLNWR	Rehabilitate deteriorating dike R6 DMRH	est. needed	2006518572
MDLNWR	Replace Water Control R6XX, DM	\$45,000	90106877
MDLNWR	Replace non functional WCS R6 DMRP	\$33,000	2006518522
MDLNWR	Replace deteriorating WCS R6 DMRP	\$33,000	2006518525
MDLNWR	Rehabilitate Gaffney Canal R6 DMRH	est. needed	2006518316
MDLNWR	Rehabilitate canal R6 DMRH	est. needed	2006518547
MDLNWR	Rehabilitate dike due to severe damage R6 DMRH	est. needed	2006518310
MDLNWR	Rehabilitate Dam R610 DMFP	\$385,000	96106898
MDLNWR	Repair Tower deficiencies	\$27,000	2006512540
MDLNWR	Replace Distribution Lines R6XX, DM	\$93,000	94106888
MDLNWR	Rehab Road R6XX, DM	\$385,000	99106920
MDLNWR	Rehab Boundary Fences R6XX, DM	\$93,000	95106893
MDLNWR	Replace Boundary Fence R6XX, DM	\$39,000	95106892
MDLNWR	Rehab Fence R6XX, DM	\$84,000	90106873
MDLNWR	Replace 10 miles fence R609 DMFP	\$50,000	95106894
MDLNWR	Replace Signs and Posts R6XX, DM	\$38,000	90106923
MDLNWR	Remove Piles from Ditch R6XX, DM	\$63,000	93106881
MDLNWR	Repair Homestead outlet R608 DMFP	\$61,000	94106887
MDLNWR	Rehabilitate Canal slopes	est. needed	2006517754
MDLNWR	Rehabilitate spillway to prevent flooding	est. needed	2006517772
MDLNWR	Rehabilitate Breaser Dam R611 DMFP	\$348,000	93106880
MDLNWR	Rehabilitate Breaser WCS R611 DMFP	\$62,000	2006516738
MDLNWR	Replace Fence R6XX, DM	\$71,000	97106899
MDLNWR	Repair Boundary Fence R6XX, DM	\$73,000	93106885
MDLNWR	Rehabilitate Dike due to leaks at the base	\$235,000	2006517773
MDLNWR	Repair Fence R6XX, DM	\$27,000	99106903
MDLNWR	Repair Fence R6XX, DM	\$26,000	96106897
MDLNWR	Replace Sewage Lines R6XX, DM	\$329,000	95106890
MDLNWR	Repair Predator Fence R6XX, DM	\$28,000	99106904
MDLNWR	Repair Homestead Dam	\$235,000	2006521033

<i>Station</i>	<i>Project Title</i>	<i>Cost Estimate (thousands)</i>	<i>SAMMS Work Order #</i>
	DEFERRED MAINTENANCE, cont.		
MDLNWR	Rehabilitate dike by removing trees	\$235,000	2006518301
MDLNWR	Replace Culverts R6XX, DM	\$32,000	95106891
MDLNWR	Replace Cattle Guards R6XX, DM	\$45,000	2006554796
MDLNWR	Rehab Trail R6XX, DM	\$58,000	01117719
MDLNWR	Repair Lamesteer dam R612 DMFP	\$655,000	90109868
MDLNWR	Repair Lamesteer WCS	\$235,000	2006519022
MDLNWR	Replace 5 miles of fence R611 DMFP	\$34,000	91106905
MDLNWR	Replace Boundary Fence R6XX, DM	\$155,000	93106906
MDLNWR	Replace deteriorating windows	est. needed	2006518618
MDLNWR	Rehab quarters by replacing septic system R608 DMFP	\$21,000	2006553681
MDLNWR	Rehab Basement and Attic R6XX, DM	\$47,000	93106879
MDLNWR	Replace 1934 bunkhouse R612 DMFP	\$521,000	93106883
MDLNWR	Replace lawn shed R6 DMRP	\$10,000	02120719
MDLNWR	Replace Storage Building R6XX, DM	\$39,000	95106895
MDLNWR	Replace worn dam #1 R6 DMRP	\$1,039,000	97109869
MDLNWR	Replace 3 48" metal screwgates on Dam #1 R609 DMFP	\$235,000	2006553684
MDLNWR	Rehab Canal Banks R6XX, DM	\$495,000	90106876
MDLNWR	Rehab Sayer Bay water control structure R612 DMFP	\$41,000	94106886
MDLNWR	Rehabilitate Canals R6XX, DM	\$30,000	2007721033
MDLNWR	Rehabilitate Canals R6XX, DM	\$200,000	90106874
MDLNWR	Rehab Dam as per Dam Report R6 DMRH	est. needed	2006521048
MDLNWR	Rehabilitate deteriorating dike R6 DMRH	est. needed	2006518572
MDLNWR	Replace Water Control R6XX, DM	\$45,000	90106877
MDLNWR	Replace non functional WCS R6 DMRP	\$33,000	2006518522
MDLNWR	Replace deteriorating WCS R6 DMRP	\$33,000	2006518525
MDLNWR	Rehabilitate Gaffney Canal R6 DMRH	est. needed	2006518316
MDLNWR	Rehabilitate canal R6 DMRH	est. needed	2006518547
MDLNWR	Rehabilitate dike due to severe damage R6 DMRH	est. needed	2006518310
MDLNWR	Rehabilitate Dam R610 DMFP	\$385,000	96106898
	EQUIPMENT		
MDLNWR	Replace 1979 Ford Tractor/Backhoe R607 HVYEQ	\$111,000.00	01117506
MDLNWR	Replace tractor mounted rotary mower R6XX, EQ	\$46,000.00	00106933
MDLNWR	Replace 1988 John Deere 2955 Tractor R6XX, EQ	\$87,000.00	01117484
MDLNWR	Replace 1997 Kawasaki Mule in 2007 R6XX, EQ	\$54,000.00	01116952
MDLNWR	Replace 1998 Kawasaki Mule ATV in 2008 R6XX, EQ	\$54,000.00	01116955
MDLNWR	Replace 1998 Arctic Cat ATV R6XX, EQ	\$48,000.00	01116960
MDLNWR	Replace 1998 Arctic Cat 4x4 ATV R6XX, EQ	\$48,000.00	01116961
MDLNWR	Replace 1988 Case Off-set Disc R6XX, EQ	\$63,000.00	01117043
MDLNWR	Replace 1986 Lilliston Grass Drill R6XX, EQ	\$57,000.00	01117045
MDLNWR	Replace 1986 Lilliston Grass Drill #2 R6XX, EQ	\$57,000.00	01117048
MDLNWR	Replace 1998 Truax Native Grass Drill R6XX, EQ	\$59,000.00	01117054
MDLNWR	Replace 1995 John Deere Lawn Tractor R6XX, EQ	\$46,000.00	01117313
MDLNWR	Replace 1994 Skidsteer Loader R6XX, EQ	\$88,000.00	01117317
MDLNWR	Replace 1994 John Deere Tractor R6XX, EQ	\$46,000.00	01117318
MDLNWR	Replace 1998 Alamo Flail Mower R6XX, EQ	\$62,000.00	01117319
MDLNWR	Replace 1993 Military Gorman Rupp 4" Diesel R6XX, EQ	\$57,000.00	01117328
MDLNWR	Replace 1992 Pacific Wildland Firefighting R6XX, EQ	\$52,000.00	01117331
MDLNWR	Replace 1997 Wajax-Pacific Firefighting R6XX, EQ	\$57,000.00	01117333
MDLNWR	Replace 1998 Buffalo earth scraper R6XX, EQ	\$57,000.00	01117342

<i>Station</i>	<i>Project Title</i>	<i>Cost Estimate</i> <i>(thousands)</i>	<i>SAMMS</i> <i>Work Order #</i>
	EQUIPMENT, cont.		
MDLNWR	Replace 1998 Snowmobile in 2008 R6XX, EQ	\$48,000.00	01117344
MDLNWR	Replace 1998 Arctic Cat Snowmobile in 2008 R6XX, EQ	\$48,000.00	01117346
MDLNWR	Replace 1996 High Pressure Sprayer R6XX, EQ	\$54,000.00	01117354
MDLNWR	Replace 1998 4630 4x4 Fencing Tractor R6XX, EQ	\$89,000.00	01117521
MDLNWR	Replace 1988 Wisconsin equipment trailer R6XX EQ	\$67,000.00	01117529
MDLNWR	Replace 1998 Tree Planter for Bobcat R6XX, EQ	\$54,000.00	01117534
MDLNWR	Replace 1994 Chevrolet S-350 4x4 flatbed R6XX, EQ	\$72,000.00	01117665
MDLNWR	Replace 1981 IHC 4x4 Firetruck R6XX, EQ	\$157,000.00	01117673
MDLNWR	Replace 1995 Ford 3/4 ton Service Truck R6XX, EQ	\$69,000.00	01117677
MDLNWR	Replace 1995 Dodge Dakota 4x4 pickup R6XX, EQ	\$67,000.00	01117680
MDLNWR	Replace 2000 Ford 4x4 Pickup R6XX, EQ	\$67,000.00	01117683
MDLNWR	Replace 1998 Ford 4x4 truck R6XX, EQ	\$67,000.00	01117685
MDLNWR	Replace 1998 Ford 4x4 Pickup R6XX, EQ	\$67,000.00	01117686
MDLNWR	Replace 2001 Chevy Tahoe 4x4 Utility Truck R6XX, EQ	\$72,000.00	01117687
MDLNWR	Replace 2001 Chevrolet Suburban 4x4 R6XX, EQ	\$78,000.00	01117689
MDLNWR	Replace 2001 Ford 550 Diesel Firetruck R6XX, EQ	\$78,000.00	01117691
MDLNWR	Replace trailered post pounder R6XX, EQ	\$48,000.00	01118360
MDLNWR	Replace duel axle trailer R6XX, EQ	\$78,000.00	02118686
MDLNWR	Replace Trimble GPS Unit, Model 33302-51 R6XX, EQ	\$57,000.00	02121382
MDLNWR	Replace 2001 John Deere Rotary Mower R6XX, EQ	\$52,000.00	02121384
MDLNWR	Replace Backup Generator R6XX, EQ	\$60,000.00	02121387
MDLNWR	Replace 2002 Arctic Cat ATV R6XX, EQ	\$48,000.00	02121391
MDLNWR	Replace 2002 Arctic Cat ATV in 2012 R6XX, EQ	\$48,000.00	02121395
MDLNWR	Replace 2001 Panther airboat R6XX, EQ	\$78,000.00	02121687
MDLNWR	Replace 2001 Mohawk Vehicle Lift R6XX, EQ	\$62,000.00	02121689
MDLNWR	Replace 2002 Ford Crewcab flatbed R6XX, EQ	\$72,000.00	02121691
MDLNWR	Replace 2002 Chevrolet S-10 Pickup R6XX, EQ	\$59,000.00	02121692
MDLNWR	Replace 2002 pumper unit in 2012 R6XX, EQ	\$57,000.00	02121693
MDLNWR	Replace 2002 Polaris 6x6 ATV R6XX, EQ	\$48,000.00	02121694
MDLNWR	Replace 2002 Arctic Cat ATV in 2012 R6XX, EQ	\$48,000.00	03127069
MDLNWR	Replace 2002 Travel Trailer in 2014 R6XX, EQ	\$50,000.00	03127070
MDLNWR	Replace 2001Travel Trailer in 2012 R6XX, EQ	\$51,000.00	03127095
MDLNWR	Replace 2003 Dodge Pickup in 2013 R6XX, EQ	\$64,000.00	03127096
MDLNWR	Replace 2003 Chevrolet 4x4 Pickup R6XX, EQ	\$65,000.00	03127097
MDLNWR	Replace 2003 Dodge Caravan in 2013 R6XX, EQ	\$70,000.00	03127099
MDLNWR	Replace 2003 Dodge Pickup in 2015 R6XX, EQ	\$64,000.00	03127100
MDLNWR	Replace 2003 Toolcat Utiltiy Loader R6XX, EQ	\$74,000.00	04133255
MDLNWR	Replace a trailered avian incinerator R6XX, EQ	\$57,000.00	04133256
MDLNWR	Replace 1979 Ford Tractor/Backhoe R607 HVYEQ	\$111,000.00	01117506
MDLNWR	Replace tractor mounted rotary mower R6XX, EQ	\$46,000.00	00106933
MDLNWR	Replace 1988 John Deere 2955 Tractor R6XX, EQ	\$87,000.00	01117484
MDLNWR	Replace 1997 Kawasaki Mule in 2007 R6XX, EQ	\$54,000.00	01116952
MDLNWR	Replace 1998 Kawasaki Mule ATV in 2008 R6XX, EQ	\$54,000.00	01116955
MDLNWR	Replace 1998 Arctic Cat ATV R6XX, EQ	\$48,000.00	01116960
MDLNWR	Replace 1998 Arctic Cat 4x4 ATV R6XX, EQ	\$48,000.00	01116961
MDLNWR	Replace 1988 Case Off-set Disc R6XX, EQ	\$63,000.00	01117043
MDLNWR	Replace 1986 Lilliston Grass Drill R6XX, EQ	\$57,000.00	01117045
MDLNWR	Replace 1986 Lilliston Grass Drill #2 R6XX, EQ	\$57,000.00	01117048

<i>Station</i>	<i>Project Title</i>	<i>Cost Estimate (thousands)</i>	<i>SAMMS Work Order #</i>
	CONSTRUCTION		
MDLNWR	Construct a water control structure that will allow water from Big Muddy Creek to flow into Johnson Lake WPA. Majority of cur	\$115,000	98123537
MDLNWR	Construct boardwalks and wildlife blinds R6 VFE-11	\$150,000	00123535
MDLNWR	Construct an Office/Environmental Education Center where Montana Highway #16 bisects the refuge. Design and install interpret	\$1,535,000	97109870
	REFUGE ROADS		
MDLNWR	R6 Medicine Lake NWR RTE 900, DMRH	\$176,664	2006521040
MDLNWR	Medicine Lake NWR RTE 105, DMRH	\$382,536	2006516793

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