Comprehensive Conservation Plan

Cokeville Meadows National Wildlife Refuge

Wyoming

March 2014

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Wyoming

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Contents

APPENDIXES

FIGURES

FIGURES (CONTINUED)

TABLES

Summary

Tom Koerner / FWS

Mallards

This section summarizes the comprehensive conservation plan that we, the U.S. Fish and Wildlife Service, prepared for the Cokeville Meadows National Wildlife Refuge. The National Wildlife Refuge System Improvement Act of 1997 requires that we develop a comprehensive conservation plan for each unit of the National Wildlife Refuge System. This plan will guide management of the refuge over the next 15 years.

The Refuge

Located in southwestern Wyoming within Lincoln County and immediately south of the town of Cokeville, Cokeville Meadows National Wildlife Refuge now manages 9,259 acres of narrow, forested riparian corridors; robust, emergent wetland plants; wet meadow sedge and grass communities; and upland sagebrush or grassland communities.

The refuge borders Idaho and Utah and is in the Bear River watershed with the Bear River bisecting it. The refuge elevation is around 6,300 feet above mean sea level, and it is home to a variety of wildlife. Game species include ducks, geese, sandhill crane, elk, deer, pronghorn, moose and rabbits. Furbearers and predators include beaver, muskrat, coyote, red fox, skunk, and raccoon.

Vision Statement

Early in the planning process, our planning team developed a vision statement for the refuge. This

future-oriented statement will guide management of the refuge over the life of this comprehensive conservation plan.

For thousands of years, the sandhill cranes have returned each spring to dance on the Cokeville Meadows. Their thunderous majestic calls remind us of our obligation to manage wildlife for generations unborn.

Nestled on the upper reaches of the Bear River in southwest Wyoming, the wet meadows, sage steppe, and riparian habitats of Cokeville Meadows National Wildlife Refuge provide outstanding habitat for a myriad of migratory birds and resident wildlife species.

Spectacular views and clean air add to the visitor's enjoyment of compatible wildlife-oriented recreation. Refuge management and habitat restoration activities are complementary with historical land uses, creating opportunities for conservation partnerships with neighbors and friends.

Goals

The following goals reflect the vision for the refuge and will help us to support healthy ecosystems and to provide compatible recreational opportunities for the public.

Habitat and Wildlife Management Goals

We developed three goals for habitat and wildlife management at Cokeville Meadows Refuge

Wet Meadow Habitat and Wildlife Goal

Using the best scientific practices to manage and preserve critical wet meadow habitat, the refuge will provide quality feeding, loafing, and breeding opportunities for a variety of migratory birds and resident wildlife.

Upland Habitat and Wildlife Goal

Manage and, where appropriate, enhance the diversity and composition of grassland and shrub–steppe habitats within the range of historical condi-

Tom Koerner / FWS

A greater sage-grouse hen leads her brood from wetlands to a night roost in sagebrush.

tions for sagebrush-dependent species, upland nesting migratory birds, and other resident species.

Riparian and River Habitats and Wildlife Goal

Maintain and, where appropriate, restore the processes necessary to sustain the biological diversity and integrity of riparian vegetation and aquatic habitats for breeding birds, native fishes, reptiles and amphibians.

Wildland Fire Management Goal

Manage wildland fires using a full array of strategic options from suppression to manipulating a fire to achieve benefits. Prescribed fire, manual, and mechanical treatments will be used to: (1) reduce the threat to land and property through hazardous-fuel reduction treatments, and (2) meet the habitat goals and objectives identified in this CCP.

Visitor Services and Cultural Resources Goal

Provide appropriate public access to refuge lands where visitors can safely enjoy compatible, wildlife-dependent recreation, such as hunting, fishing, wildlife observation, photography, environmental education, and interpretation. The refuge will seek partnerships to help protect onsite cultural resources.

Partnerships Goal

Engage in mutually beneficial partnerships to promote wildlife and habitat conservation, and public enjoyment of wildlife resources in the upper Bear River watershed that are consistent with historic land uses, refuge purposes and goals.

Refuge Development and Operations Goal

Effectively utilize all available resources to develop, enhance, and support refuge facilities and operations for wildlife, habitat, and public use programs. We will pursue easements, habitat improvements, and other land protection opportunities with willing sellers and interested land owners within the approved refuge acquisition boundary and within the Bear River watershed.

Management Direction

We prepared this comprehensive conservation plan with cooperation from the Wyoming Game and Fish Department, the Lincoln County Planning Department, the Bureau of Land Management, and the town of Cokeville. The public and local agencies were also significantly involved. After reviewing a wide range of comments from these parties and our management needs, we developed and analyzed alternatives for managing Cokeville Meadows National Wildlife Refuge. From these we selected alternative D (landscape-level management) as our proposed action. It addresses many of the external and internal comments we received during scoping.

With our proposed action, we will manage lands within the greater landscape by using partnerships to enhance habitats both on and off the refuge. We will continue to acquire land and easements to round out and complete the acquisition boundary. We will manage and restore wet meadow and upland habitats to increase wildlife productivity and diversity. We will specifically apply agricultural practices to enhance refuge habitats for wildlife both on and off the refuge. We will increase visitor resources, access, and wildlife-dependent uses (hunting, fishing, wildlife observation, photography, environmental education, and interpretation) to encourage greater understanding and appreciation of the Bear River watershed; wet meadow, riparian, and stream habitats; and wildlife.

Abbreviations

Administration Act	National Wildlife Refuge System Administration Act of 1966
BLM	Bureau of Land Management
BQ Dam	Beckwith and Quin Dam
CCP	comprehensive conservation plan
CFR	Code of Federal Regulations
cfs	cubic feet per second
Cokeville Meadows Refuge	Cokeville Meadows National Wildlife Refuge
EA	environmental assessment
ESA	Endangered Species Act
EVS	education and visitor services
°F	degrees Fahrenheit
FMP	fire management plan
FWS	U.S. Fish and Wildlife Service
GIS	geographic information system
HGM	hydrogeomorphic method
Improvement Act	National Wildlife Refuge System Improvement Act of 1997
IPM	integrated pest management
NEPA	National Environmental Policy Act of 1969
NWR	national wildlife refuge
the refuge	Cokeville Meadows National Wildlife Refuge
Refuge System	National Wildlife Refuge System
Region 6	Mountain-Prairie Region 6 of the U.S. Fish and Wildlife Service
Service	U.S. Fish and Wildlife Service
U.S.	United States
U.S.C.	United States Code

USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
WGFD	Wyoming Game and Fish Department

A glossary of these and other terms follows chapter 4.

Chapter 1—Introduction

Tom Koerner / FWS

Marsh Wren

We, the U.S. Fish and Wildlife Service (Service), have developed this comprehensive conservation plan (CCP) to provide a foundation for the management and use of Cokeville Meadows National Wildlife Refuge (Cokeville Meadows Refuge or refuge) in Wyoming for at least the next 15 years.

This chapter introduces the CCP with descriptions of the steps in the CCP planning process; our involvement and that of the State of Wyoming, the tribes, the public, and others; and other plans that may be affected or supported by the future management of the refuge.

Cokeville Meadows Refuge is located in southwestern Wyoming within Lincoln County near where Idaho, Utah, and Wyoming meet (figure 1). It lies directly south of the town of Cokeville, and both were named for coal located in the vicinity. The refuge now consists of 9,259 acres within a 26,657-acre acquisition boundary and lies in the Bear River Basin, which has a drainage area of about 4.8 million acres and includes parts of Idaho, Utah, and Wyoming.

This CCP was developed in compliance with the National Wildlife Refuge System Improvement Act of 1997 (Improvement Act) and Part 602 (National Wildlife Refuge System Planning) of "The Fish and Wildlife Service Manual." The actions described herein meet the needs of the National Environmental Policy Act of 1969 (NEPA). It was prepared by a planning team made up of representatives from the Wyoming Game and Fish Department (WGFD), Cokeville Meadows Refuge staff, various Service programs, the town of Cokeville, the Lincoln County Planning Department, the Bureau of Land Management (BLM), and other cooperating agencies. The planning team also incorporated public input in compliance with NEPA (see section 1.6).

After reviewing a wide range of public comments, issues, and management needs, our planning team developed a range of alternatives to manage the refuge. After assessing the environmental consequences of implementing each of these, we chose alternative D (landscape-level management) as our proposed action, which addresses all substantive issues raised

while also showing how best to achieve the purposes of the refuge. The details of the proposed action can be found in "Chapter 4—Management Direction."

This CCP will serve as a working guide for programs and actions on the refuge over the next 15 years.

1.1 Purpose and Need for the Plan

This CCP provides long-term guidance for managing refuge programs and activities. It will help Cokeville Meadows Refuge fulfill its purposes and define how the refuge will support the mission of the National Wildlife Refuge System (Refuge System). See section 2.2 for more about the refuge's purposes and its enabling legislation. For information on other relevant legislation and policies, see appendix E.

The CCP is needed to:

- communicate to the public and other partners the refuge's efforts to carry out the mission of the Refuge System;
- provide a clear statement of direction for managing the refuge;
- provide neighbors, visitors, and government officials an understanding of our management actions on and around the refuge;
- assure that the refuge's management actions are consistent with the mandates of the Improvement Act;

Figure 1. Vicinity map of Cokeville Meadows National Wildlife Refuge, Wyoming, and its proximity to other national wildlife refuges (in green).

- assure that management of the refuge is consistent with Federal, State, and county plans;
- provide a basis for developing budget requests for the refuge's operation, maintenance, and capital improvement needs.

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

We are the principal Federal agency responsible for fish, wildlife, and plant conservation. The Refuge System is one of our major programs.

U.S. Fish and Wildlife Service

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

In the late 19th and early 20th centuries, America's fish and wildlife resources were declining at an alarming rate, largely because of unrestricted market hunting. Concerned citizens, scientists, and hunting and angling groups joined together and generated the political will for the Federal Government to enact its first significant conservation measures. These actions included the establishment of the Bureau of Fisheries in the 1870s and, in 1900, the passage of the first Federal wildlife law—the Lacey Act—which prohibited interstate transportation of wildlife taken in violation of State laws. Beginning in 1903, President Theodore Roosevelt established more than 50 wildlife refuges across the Nation.

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

Today, we administer the Refuge System, enforce Federal wildlife laws, manage migratory bird populations, restore nationally significant fisheries, conserve and restore vital wildlife habitat, protect and recover endangered species, and help other governments with conservation efforts. We also administer a Federal aid program that distributes hundreds of millions of dollars to the States for fish and wildlife restoration, boating access, hunter education, and related programs.

U.S. Fish and Wildlife Service Activities in Wyoming

Our activities in Wyoming contribute to the State's economy, ecosystems, and education programs. The following describe our presence and recent activities in the State:

- As of May 2013, we have 55 employees.
- More than 12,586 hours were donated by 675 volunteers to help complete projects on refuge lands.
- We manage 2 fish hatcheries totaling 121 acres and 6 coordination areas totaling 16,291 acres (FWS 2013b), 1 ecological services field office, and 1 management assistance office.
- We manage 7 national wildlife refuges totaling 86,427 acres (figure 2) (FWS 2013b).
- On average, more than 857,000 people visit our lands every year:
  - More than 2,000 of these engage in hunting.
  - More than 5,300 of these take part in fishing.
  - More than 583,700 of these take part in wildlife observation.

  - Nearly 1,000 (576 in onsite programs) students take part in environmental education programs.

- We provided $4.5 million to WGFD for sport fish restoration and $4.2 million for wildlife restoration and hunter education.

- We paid Wyoming counties $744,583 under the Refuge Revenue Sharing Act, and $362,318 of that went to schools and roads (FWS 2012).

- Between 1987 and 2011, our Partners for Fish and Wildlife Program helped private landowners to enhance or restore 5,427 acres of wetlands, 294 miles of riparian and instream habitats, and 282,568 acres of upland habitats (FWS 2013c).

National Wildlife Refuge System

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

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

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

Individual units of the Refuge System were established under a wide variety of statutes and executive orders. Before 1966, each refuge was managed to meet its individual establishment purpose, but there was no law requiring the refuges to be managed as a cohesive system of lands. Passage of the National Wildlife Refuge System Administration Act of 1966 (Administration Act) changed that and created the Refuge System. In 1997, Congress significantly amended the Administration Act with the Improvement Act, which is the organic legislation of, and has a clear mission statement for, the Refuge System.

The Improvement Act states that each unit of the Refuge System, including wetland management districts, must:

- fulfill the mission of the Refuge System;

- fulfill the individual purposes of each refuge and district;

- consider the needs of fish and wildlife first;

- develop a CCP and fully involve the public in its preparation;

- support the biological integrity, diversity, and environmental health of the Refuge System;

- allow refuge managers to decide on compatible public uses;

- recognize that wildlife-dependent recreation activities, including hunting, fishing, wildlife observation, photography, environmental education, and interpretation, are legitimate and priority public uses.

The following principles guide the vision for wildlife and habitat of each unit of the Refuge System:

- Wildlife comes first.

- Ecosystems, biodiversity, and wilderness are vital concepts in refuge and district management.

- Habitats must be healthy.

- Growth of refuges and wetland management districts must be strategic.

- The Refuge System serves as a model for habitat management with broad participation from others.

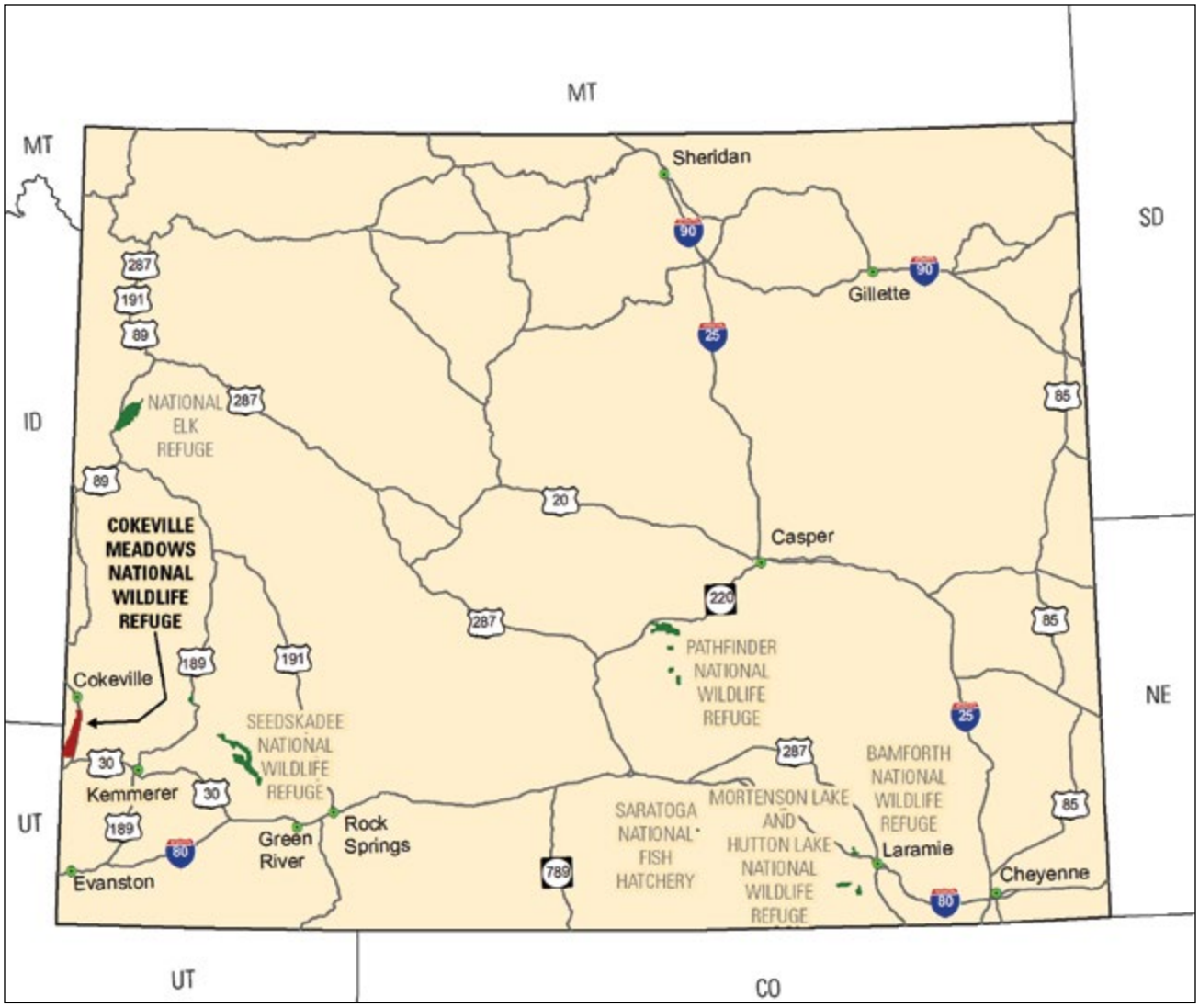


Figure 2. Location of Cokeville Meadows National Wildlife Refuge and other national wildlife refuges in Wyoming.

The following goals of the Refuge System (601 FW 1) help guide the development of CCPs and the administration, management, and growth of the Refuge System:

- Conserve a variety of fish, wildlife, and plants and their habitats, including species that are endangered or threatened with becoming endangered.
- Develop and support 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.
- 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.
- Provide and enhance opportunities to take part in compatible wildlife-dependent recreation (hunting, fishing, wildlife observation and photography, and environmental education and interpretation).
- Foster understanding and instill appreciation of the diversity and interconnectedness of fish, wildlife, and plants and their habitats.

Under the Improvement Act, we began to prepare CCPs for all national wildlife refuges and wetland management districts using public involvement.

1.3 National and Regional Mandates

Refuge System units are managed to achieve their designated purposes, as described in establishing legislation, Executive orders, or other establishing documents, and the mission and goals of the Refuge System. Key guidance for the Refuge System is found in the Administration Act, as amended, Title 50 of the Code of Federal Regulations (CFR), "The Fish and Wildlife Service Manual."

Descriptions of the laws and Executive Orders that may affect this CCP and the management of Cokeville Meadows Refuge can be found in appendix E. Policies on planning and the management of refuges are found in the "Refuge System Manual" and "The Fish and Wildlife Service Manual" as well as in various Director's orders, Regional Director's orders, and Service handbooks.

1.4 Refuge Contributions to Regional and National Plans

The Cokeville Meadows Refuge also contributes to the conservation efforts described below.

Conserving the Future

Conserving the Future: Wildlife Refuges and the Next Generation lays out 24 recommendations that 9 implementation teams are charged with fulfilling. The implementation of these recommendations are currently underway and can be followed online (FWS 2011).

Conserving the Future will deliver on three outcomes: articulate the important work and future of the Refuge System in a vision document, raise the awareness of conservation on refuges, and foster new leaders for us and the Refuge System as well as for the conservation community.

Bird Conservation

As interest in bird and habitat conservation has grown over the past few decades, partnership-based bird conservation initiatives have produced international, national, and regional conservation plans. "All-bird" conservation planning in North America has come from the North American Bird Conservation Initiative. Formed in 1999, it is a coalition of government agencies, private organizations, and bird initiatives in the United States that works to advance integrated bird conservation based on sound science and cost-effective management to help all birds in all habitats.

The conservation of all birds is being accomplished under four planning initiatives: the U.S. Shorebird Conservation Plan, the North American Landbird Conservation Plan by Partners in Flight, the North American Waterbird Conservation Plan, and the North American Waterfowl Management Plan.

U.S. Shorebird Conservation Plan

Partners from Federal and State agencies and nongovernment organizations from across the country pooled their resources and expertise to develop a conservation strategy for migratory shorebirds and the habitats on which they depend. The resulting document, completed in 2000, provides a scientific framework to find species, sites, and habitats that most urgently need conservation action.

The main goals of the plan are to make sure that adequate quantities and qualities of shorebird habitat are supported locally and to support or restore shorebird populations at the continental and hemispheric levels. Separate technical reports were developed for conservation assessment, comprehensive monitoring strategy, research needs, and education and outreach. These national assessments were used to step down goals and objectives into 11 regional conservation plans.

Although some outreach, education, research, monitoring, and habitat conservation programs are being carried out, the accomplishment of conservation objectives for all shorebird species will require a continued, coordinated effort among existing and new partners.

North American Landbird Conservation Plan by Partners in Flight

This plan, developed by Partners in Flight beginning in 1990, recognizes that the population levels of many migratory bird species are declining. The chal-

Tom Koerner / FWS

Rough-legged Hawk

lenge, according to the program, is to manage human population growth while supporting functional natural ecosystems.

Partners in Flight is a cooperative that includes partnerships among Federal, State, and local government agencies, philanthropic foundations, professional organizations, conservation groups, industries, the academic community, and private individuals. The goals for Partners In Flight (Rich et al, 2004) are:

- Define an active, scientifically based conservation design process that identifies and develops solutions to threats and risks to landbird populations.
- Create a coordinated network of conservation partners to carry out the objectives of landbird conservation plans at multiple scales.
- Secure the commitment and resources to support the vigorous implementation of landbird conservation objectives.

The main goal of Partners in Flight is to provide for the long-term health of landbirds on this continent. The first priority is to prevent the rarest species from going extinct. The second priority is to prevent uncommon species from descending into threatened status. The third priority is to "keep common birds common."

Partners in Flight named priority landbird species and habitat types and developed 52 bird conservation plans covering the continental United States. For planning purposes, they split North America into seven groups of birds by ecological area—avifaunal biomes—and 37 bird conservation regions (figure 3). The Cokeville Meadows Refuge lies within Bird Conservation Region 10, the Northern Rockies Region. This region includes the Northern Rocky Mountains and outlying ranges in both the United States and Canada and the intermontane Wyoming Basin and Fraser Basin.

More specifically, the refuge sits within the physiographic area known as the Wyoming Basin (figure 4). This area is primarily in Wyoming but also extends into northern Colorado, southern Montana, and small parts of northeast Utah and southeast Idaho. The area consists of broad intermountain basins interrupted by isolated hills and low mountains that merge to the south into a dissected plateau. The Wyoming Basin is primarily shrub–steppe habitat, dominated by sagebrush and shadscale and interspersed with areas of shortgrass prairie. Higher elevations have mountain shrub vegetation, and the highest areas have coniferous forest. Partners in Flight priority bird populations and habitats of the Wyoming Basin are listed in table 1.

Table 1. Priority bird populations by habitat at Cokeville Meadows National Wildlife Refuge, Wyoming.

Shrub–steppe	*Sagebrush grasslands*	*Wetlands*
greater sage-grouse	short-eared owl	American bittern
ferruginous hawk	Swainson's hawk	Wilson's phalarope
sage thrasher	mountain plover	white-faced ibis
sage sparrow		American avocet
Brewer's sparrow		American white pelican

Source: FWS 2013a.

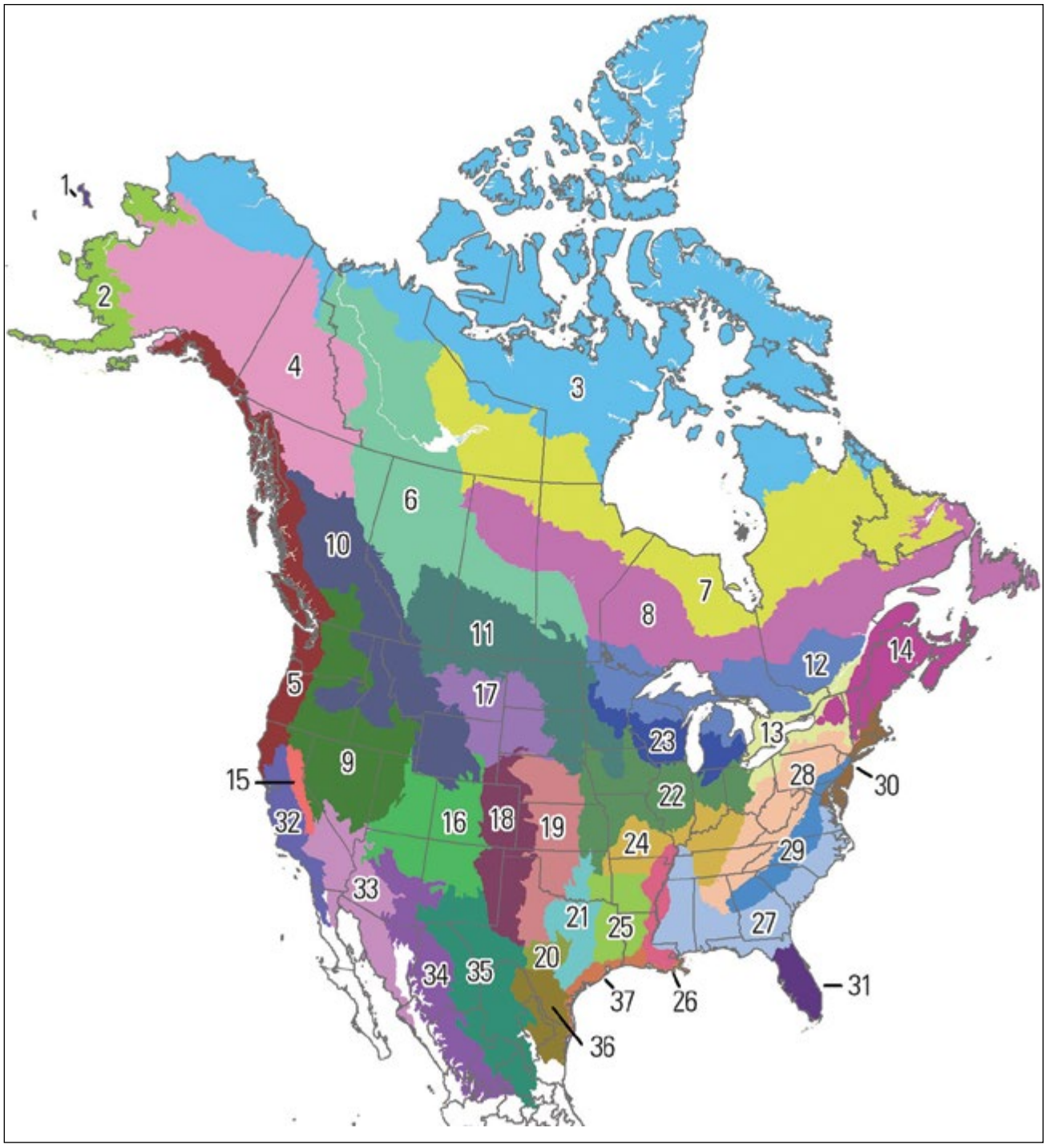


Figure 3. Map of the bird conservation regions of North America

North American Waterbird Conservation Plan

This plan is carried out by a partnership consisting of Federal, State, and Provincial wildlife agencies; individuals; and nonprofit conservation organizations covering 28 countries from Canada to Panama as well as islands and near-shore areas of the Atlantic and Pacific Oceans, the Gulf of Mexico, and the Caribbean Sea. It provides a contiguous framework for conserving and managing colonial-nesting waterbirds, including 209 species of seabirds, coastal waterbirds (gulls, terns, and pelicans), wadingbirds (herons and ibises), and marshbirds (certain grebes and bitterns).

Its overall goal is to make sure that the following are sustained or restored throughout the waterbirds' ranges in North America: (1) the distribution, diver-

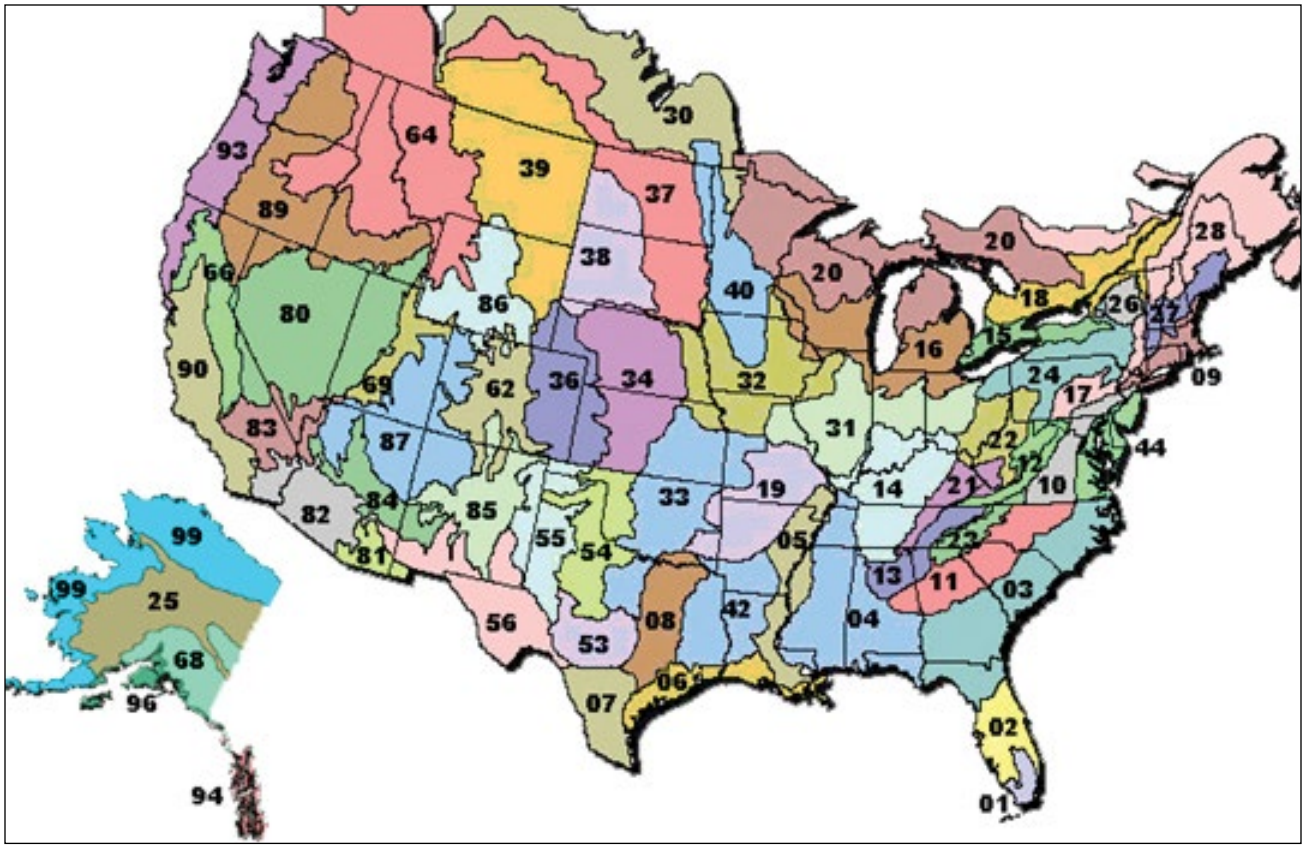


Figure 4. Map of physiographic areas of the United States, including area 86, the Wyoming Basin, which contains Cokeville Meadows National Wildlife Refuge, Wyoming.

sity, and abundance of waterbird populations; (2) habitats for breeding, migratory, and nonbreeding waterbirds; and (3) important sites for waterbirds.

Political considerations and ecological factors influenced the drafting of waterbird planning region boundaries. Sixteen planning regions are identified in the Western Hemisphere, and Cokeville Meadows Refuge is located within the Intermountain West Waterbird Conservation Region. This Region's dispersed high-mountain lakes; large, terminal, hypersaline lakes; marshes; playas; rivers; streams; riparian zones; and fresh and brackish wetlands host about 40 waterbird species, including many, or most, of the world's California gulls, eared grebes, white-faced ibises, and American white pelicans.

Eleven waterbirds are identified as species of high concern in this waterbird conservation region: yellow rail, Franklin's gull, black tern, eared grebe, western grebe, Clark's grebe, snowy egret, American white pelican, common loon, American bittern, and certain managed populations of the greater and lesser sandhill crane. Cokeville Meadows Refuge provides habitat for several of these species, including American bittern, black tern, western grebe, bittern, and sandhill crane.

The waterbirds that use this region are highly adaptable to constantly changing wetland conditions and depend on a region of wetlands to meet habitat and forage needs during the stages of their annual life cycle. The competing demands for water from agriculture, development, and recreation pose the greatest threats to regional waterbird populations. Contaminants such as mercury and dichlorodiphenyltrichloroethane (DDT) and its breakdown products also threaten the region's waterbirds. Because of the West's feast-or-famine water regime, this plan stresses conserving a network of quality wetland habitats with secure water sources to provide choices for waterbirds during drought and flood cycles (Kushlan et al. 2002).

North American Waterfowl Management Plan

Written in 1986, this plan envisioned a 15-year effort to achieve landscape conditions that could sustain waterfowl populations. Specific objectives are to increase and restore duck populations to the average levels of the 1970s—62 million breeding ducks and a fall flight of 100 million birds.

In the mid-1980s, waterfowl populations had plummeted to record lows. Duck nesting habitat was disappearing at a rate of 60 acres per hour. Recogniz-

ing the importance of waterfowl and wetlands to North Americans and the need for international cooperation to help in the recovery of a shared resource, the United States and Canadian Governments developed a strategy to restore waterfowl populations through habitat protection, restoration, and enhancement. Mexico joined the plan in 1994.

The plan is innovative because of its international scope and its implementation at the regional level. Its success depends on the strength of partnerships, called "joint ventures," involving Federal, State, Provincial, tribal, and local governments; businesses; conservation organizations; and individual citizens. Joint ventures are regional in scope and self-directed. They drive science-based conservation through diverse community participation and develop implementation measures for areas of concern contained in the plan.

Intermountain West Joint Venture

Established in June 1994, this joint venture and implements the plan in the Intermountain West (Intermountain West Joint Venture 2005). It conserves wetlands and associated habitats and is comprised of many partnerships among public and private organizations that share common interests in supporting and managing key ecosystems in the region. Lands under its jurisdiction stretch from the Sierra Nevada and Cascades in the west to just east of the Rocky Mountains and from the Mexican border in the south to the Canadian border in the north. This extensive geographic region encompasses portions of eleven western States and includes an enormous variety of avian habitat.

Intermountain West Regional Shorebird Plan

This plan covers six bird conservation regions in the Intermountain West and includes an array of habitats from saline sinks to alpine streams (Oring et al. 2010). The Cokeville Meadows Refuge offers important breeding habitat for several shorebird species and is of modest importance to many species of migratory birds.

Recovery Plans for Federally Listed, Threatened, or Endangered Species

No federally listed species have been documented at Cokeville Meadows Refuge. One candidate species, greater sage-grouse, does occur on the refuge. If, during the life of this CCP, listed species are discovered on the refuge or new species are listed, we will make sure that the refuge takes part in any approved recovery plans. We will also conduct an Intra-Service Section 7 Consultation on refuge management activities that might affect the listed or candidate species.

To make sure that the conservation of candidate species is adequately considered in this document, we conducted a biological evaluation of its actions per section 7 of the Endangered Species Act (ESA) (see appendix C).

State Wildlife Action Plan

Congress created the State Wildlife Grants Program and the Tribal Wildlife Grants Program in 2001. These provide States, territories, and tribes with Federal dollars to support conservation aimed at preventing wildlife from needing protection under the ESA. To take part in the State Wildlife Grants program, each State completed a State Wildlife Action Plan by October 1, 2005.

These plans define integrated approaches to the stewardship of all wildlife species, with added emphasis on species of concern and habitats at risk. The goal is to shift focus from single-species management and highly specialized individual efforts to a geographically based, landscape-oriented, fish and wildlife conservation effort. We approve State Wildlife Action Plans and Tribal Wildlife Grants Programs and administer these programs' monies.

We reviewed the WGFD State Wildlife Action Plan and used information in it during the development of this CCP. The State Wildlife Action Plan contains information from the Tribal Wildlife Grants Programs developed by the Wyoming Wind River Indian Reservation and the Confederated Tribes of the Goshute Reservation. Carrying out the habitat goals and objectives of this CCP will support those of the WGFD State Wildlife Action Plan.

Responding to Accelerating Climate Change

We believe that a rapid acceleration in climate change could affect the Nation's fish, wildlife, and plant resources in profound and unforeseen ways. While many species would continue to thrive, some may decline or go extinct. Others may survive in the wild only through direct and continued intervention.

In 2010, we drafted a strategic plan to address climate change for the next 50 years entitled "Rising to the Challenge—Strategic Plan for Responding to Accelerating Climate Change" (FWS 2010). The plan employs three key strategies: adaptation, mitigation,

and engagement. In addition, the plan acknowledges that no single organization or agency can address climate change without allying itself with others across the Nation and around the world (FWS 2010). This plan is an integral part of the U.S. Department of the Interior's strategy for addressing climate change as expressed in Secretarial Order 3289 (September 14, 2009).

We will use the following guiding principles from the plan (FWS 2010) in responding to climate change:

- Priorities setting—Continually evaluate priorities and approaches, make difficult choices, take calculated risks, and adapt to climate change.
- Partnership—Commit to a new spirit of coordination, collaboration, and interdependence with others.
- Best science—Reflect scientific excellence, professionalism, and integrity in all of our work.
- Landscape conservation—Emphasize the conservation of habitats within sustainable landscapes, applying our strategic habitat conservation framework.
- Technical capacity—Assemble and use state-of-the-art technical capacity to meet the climate change challenge.
- Global approach—Be a leader in national and international efforts to meet the climate change challenge.

Scientific observations and data suggest that the great northern geographic area in which Cokeville Meadows is located—as defined by Service and U.S. Geological Survey (USGS) experts, see section 1.5 below—may already be undergoing environmental and ecological changes because of climate change trends. Clear patterns in climate change could affect high-mountain ecotypes and lower-elevation, snow melt-dependent watersheds more acutely than they some other geographic areas.

To address the effects of possible climactic change, any proposed management strategies must continue to adapt to a dynamic environment. When considering possible climatic changes and resulting potential ecological changes, we look for effects on the following 12 focal species of the great northern

Tom Koerner / FWS

Coyote

geographic area: bull trout, pacific lamprey, salmon, steelhead, greater sage-grouse, Lewis's woodpecker, trumpeter swans, willow flycatcher, Columbia spotted frog, cutthroat trout subspecies, Arctic grayling, and wolverine.

1.5 Landscape-Scale Conservation

In the face of escalating challenges such as land use conversion, invasive species, water scarcity, and complex issues that could be amplified by possible climatic changes, we have broadened our vision from an ecosystem approach to conservation across a broader, landscape scale.

Figure 5. Basic strategic habitat conservation process.

Strategic Habitat Conservation

In the early 21st century, we undertook a cooperative effort with the USGS that culminated in a report by the National Ecological Assessment Team (USGS 2006). The report outlines a unifying adaptive resource management approach—integrating planning, design, delivery and evaluation— for conservation on a landscape scale. This is strategic habitat conservation—a structured, science-driven approach for making efficient, transparent decisions about where and how to expend our resources to conserve species, or groups of species, that are limited by the amount or quality of habitat (figure 5).

Since 2006, we have taken significant steps to turn this vision into reality. Our and USGS experts have defined a framework of 21 geographic areas using an aggregation of bird conservation regions. Cokeville Meadows Refuge lies in geographic area six—the great northern. This geographic area is unique in social values, natural resources, and managerial challenges.

The great northern geographic area six includes one of the largest surface areas of all the geographic areas in North America, spanning more than 447,000 square miles in the United States (57 percent) and Canada (43 percent). Ecologically, this area represents one of the most relatively intact and functional ecosystems in the United States with diverse groups of species and important conservation and restoration opportunities. Habitats support plant and animal species with cultural significance to multiple Native American tribes and of important societal and conservation value to the United States, Canada, and the world. Cultural traditions are tied closely to the land's natural resources, as are contemporary ways of life, such as ranching, logging, and recreational and subsistence hunting and fishing. The Nation's largest communities of free-roaming bison, elk, deer, and other ungulates; wolves; and bears as well as diverse salmon and trout populations are hallmarks of this geographic area

Landscape Conservation Cooperatives

Protecting natural and cultural resources is essential to sustaining our health and quality of life. Humans, along with fish and wildlife, rely on clean water and the benefits of healthy rivers, streams, wetlands, forests, grasslands, and coastal areas in order to thrive. Managing the landscapes that provide our natural and cultural resources has become more challenging. With the signing of Secretarial Order No. 3289, the Department of the Interior launched landscape conservation cooperatives to better integrate science and management to address climate change and other landscape-scale issues. By forming a network that is holistic, collaborative, adaptive, and grounded in science, landscape conservation cooperatives work to sustain our economy and our land, water, wildlife, and cultural resources (Department of the Interior 2010).

The continent's 22 landscape conservation cooperatives include resource managers and scientists who share a common need for scientific information and an interest in conservation. Each landscape con-

servation cooperative brings together Federal, State, and local governments along with tribes and first nations, nongovernmental organizations, universities, and interested public and private organizations. Our partners work collaboratively to identify best practices, connect efforts, identify science gaps, and avoid duplicating work through conservation planning and design.

Cokeville Meadows Refuge is in the Great Northern Landscape Conservation Cooperative, which covers the great northern geographic area six (figure 6).

The Vision of Landscape Conservation Cooperatives

Support landscapes that are capable of sustaining natural and cultural resources for current and future generations.

The Mission of Landscape Conservation Cooperatives

Landscape conservation cooperatives:

- develop and provide integrated science-based information about the implications of climate change and other stressors to sustain natural and cultural resources;
- develop shared, landscape-level, conservation objectives and strategies based on scientific understanding and the implications of current and future environmental stressors;
- facilitate the exchange of applied science when implementing conservation strategies and products that they and their partners develop;

Figure 6. Location of the Cokeville Meadows National Wildlife Refuge within geographic area six, the great northern, as administered by the Great Northern Landscape Conservation Cooperative.

- monitor and evaluate strategy effectiveness in meeting shared objectives;
- develop effective linkages among each other.

1.6 Planning Process

We prepared this CCP in compliance with the Improvement Act and Part 602 (National Wildlife Refuge System Planning) of "The Fish and Wildlife Service Manual." The actions described herein meet the needs of the Council on Environmental Quality regulations that carry out NEPA. The Refuge System's planning policy, issued in 2000, also offers guidance for refuge and wetland management district plans, including CCPs and stepdown management plans, to help them follow the Improvement Act. We adhered to the steps of the CCP and EA process that are outlined in this planning policy (figure 7).

We began the preplanning process in August 2009 by establishing a planning team made up primarily of staff from the refuge and the Mountain-Prairie Region 6 of the U.S. Fish and Wildlife Service (Region 6) division of refuge planning. Other teammembers included staff from other Service divisions, including education and visitor services (EVS), law enforcement, realty, geographic information system (GIS), water rights, fire, fisheries, and from WGFD and BLM staff. Later on, the town of Cokeville and Lincoln County, represented by the Lincoln County Planning Department, formally requested to join the planning team and were included through a memorandum of understanding between us and these local governments.

During preplanning, the team developed a mailing list, identified internal issues, and identified the unique qualities of the refuge (see section 2.5).

During planning, the team identified and reviewed current programs, compiled and analyzed relevant data, and reviewed establishing authorities to define the purposes of the refuge. We also prepared a hydrogeomorphic method (HGM) analysis report. The HGM report took almost 2 years to research and complete and resulted in many sound recommendations for the restoration and management of the refuge.

Afterwards, a notice of intent to prepare the draft CCP and environmental assessment (EA) was published in the "Federal Register" on October 30, 2009. Public scoping—the process of obtaining public input to inform the planning process—began soon after in

Figure 7. Process steps for comprehensive planning and associated environmental analysis.

November 2009 and included the mailing of invitation letters, the posting of flyers and press releases and the holding of public scoping meetings. The draft plan was printed and released for 45 days of public review in September 2013. We analyzed all of the comments we received during the public review and made appropriate changes to this CCP.

Table 2 lists the specific steps we took to prepare the Cokeville Meadows Refuge CCP.

Coordination with the Public

We compiled a mailing list of more than 83 names during the planning process. It includes private citizens; local, regional, and State government representatives and legislators; other Federal agencies; and interested organizations, as described in appendix D.

In November 2009, we held two public scoping meetings near Cokeville Meadows Refuge. The first was in Cokeville, Wyoming, and the second was in

Table 2. Planning process summary for Cokeville Meadows National Wildlife Refuge, Wyoming.

Date	*Event*	*Outcome or purpose*
August 13, 2009	Cokeville Meadows Refuge CCP meeting for public officials	Overview of the planning and public participation processes, identification of issues, answer questions from officials, and discussion of economic development
September 25, 2009	Initial meeting with the proposed planning team	CCP overview developed; planning team completed; purposes identified; initial issues and qualities list developed; development of mailing list started
November 16–18, 2009	Kickoff meeting, vision, and goals development.	Issues and qualities list updated; biological and mapping needs identified; public scoping planned
October 30, 2009	Public scoping planning	Scoping meeting schedules and formats completed
November 17, 2009	Public scoping meeting, Cokeville, WY	Public opportunity offered (to learn about the CCP and provide comments)
November 18, 2009	Public scoping meeting, Kemmerer, WY	Public opportunity offered (to learn about the CCP and provide comments)
April 20–21, 2010	Alternatives workshop	Vision statement and goals reviewed; alternatives developed.
February 23–25, 2011	Assessment of environmental impacts	Reviewed range of alternatives and decided on environmental consequences.
April 26–28, 2011	Non-biological objectives and strategies workshop	Objectives and strategies for the proposed action drafted
June 21–23, 2011	Biological objectives and strategies workshop	Objectives and strategies for the proposed action drafted
July–December, 2011	First draft CCP and EA preparation	First draft of the CCP and EA prepared
March–April 2012	Planning team review of the first draft CCP and EA	First draft of the CCP and EA reviewed and commented on by planning team
May 2012–May 2013	Internal Service review of and editing of the first draft CCP and EA	Draft CCP and EA reviewed and commented on by our regional office staff, planning team, and others
May 2013	Planning team review of the second draft CCP and EA	Second draft of the CCP and EA reviewed and commented on by planning team
June–August 2013	Preparation of public review draft CCP and EA	
September 2013	Draft CCP and EA distributed	Draft CCP and EA mailed out to the public and posted on the Division of Planning Web site
September 2013	Public comment meeting in Cokeville, Wyoming	Draft CCP and EA presented to the public; public comments collected
November 2013	Public comments collected and analyzed	Modification of Draft CCP to incorporate relevant and substantive public comments
December 2013	Briefed Assistant Regional Director of Refuge System	Summary of public comments reviewed and addressed by our Region 6 Assistant Regional Director of the Refuge System
February 2014	Briefed Regional Director	Summary of public comments reviewed and addressed by our Regional Director and Deputy Regional Director and CCP signed
March 2014	Production and distribution of final CCP. Begin implementation.	Final CCP sent to the printer and then distributed to the public. Staff begins implementing the CCP

Kemmerer, Wyoming. Fifty-two people attended the two meetings. They were primarily local citizens, including ranchers, sportsmen and women, other recreational users, and wildlife management professionals. Following a presentation about the refuge and an overview of the CCP and NEPA processes, we encouraged attendees to ask questions and offer comments. We recorded verbal comments and gave attendees a comment form by which to submit more thoughts or questions in writing.

In addition to verbal comments received during scoping meetings and others that we held with Congressional representatives and stakeholders, we received a total of 12 written letters during the initial scoping period ending December 31, 2009. We reviewed and considered all substantive comments and public input throughout the planning process.

State Coordination

In November 2009, our Region 6 Director mailed a letter to the director of WGFD inviting the agency to take part in our CCP planning process. As a result, six representatives from WGFD are part of the CCP planning team, which complements the excellent, ongoing working relationships we had already established with local WGFD biologists.

WGFD is charged with providing "an adequate and flexible system for the control, management, protection, and regulation of all Wyoming wildlife." WGFD supports 36 wildlife habitat management areas and 96 public access areas, encompassing 410,000 acres of managed lands for wildlife habitat and public recreation. These lands contain 121 miles of stream easements and about 21,014 surface acres of lakes and reservoirs for public access.

Tribal Coordination

In November 2009, our Region 6 Director mailed letters to 12 Native American tribal governments informing them about the CCP development process and inviting them to take part. Letters went to the Northern Arapaho, Crow Creek Sioux Tribe, Lower Brule Sioux, Fort Peck Assiniboine and Sioux Tribes, Cheyenne River Sioux, Oglala Sioux, Standing Rock Sioux, Santee Sioux, Rosebud Sioux, Northern Cheyenne, Eastern Shoshone, and Northwest Band of Shoshone Nation of Utah Tribe.

Although none of the tribal governments chose to take part in our planning process, they remain on the CCP mailing list and continue to receive CCP-related correspondence.

Results of Scoping

We used all the comments we collected during scoping and public comment meetings and from correspondence, including refuge management recommendations, to develop the list of issues that are addressed in this CCP in this chapter and in chapter 2. Our planning team also developed alternatives to address these issues and chose one alternative to be our proposed action.

The Draft Plan

We considered all input in developing the draft CCP and EA, including suggestions from the public, partners, and other groups, about changes to the refuge's current management. The planning process makes sure that issues with the greatest effects on the refuge are given priority or are resolved. After scoping and a detailed analysis of the results, we created four management alternatives that best addressed the issues that had been identified. We chose alternative D (landscape-level management) to be our proposed action. In September 2013, we published a notice of availability announcing that the draft CCP and EA was available for a 30-day public review period. In appendix D of this CCP we provide a summary of written comments that we gathered during the review period along with our responses.

The Final Plan

After reviewing public comments on the draft CCP and EA, our Region 6 Director selected alternative D as the preferred alternative. Subsequently, we produced this final CCP, which is based on the draft CCP but includes substantive changes. The biological evaluation for the final CCP determined that there would likely be no adverse effect on threatened or endangered species or on critical habitats as a result of the actions of the CCP (appendix C). The Regional Director approved the final CCP in February 2014 after finding that it would cause no significant impact to the human environment (appendix A).

Chapter 4 outlines the long-term guidance for management decisions that arose from the preferred alternative, sets forth objectives and strategies to accomplish refuge purposes and goals, and identifies our best estimate of future needs. The CCP details program levels that are sometimes substantially above current budget allocations yet serve to assist in our strategic planning.

Chapter 2—The Refuge

Tom Koerner / FWS

Badger

For many years, resource professionals and conservation agencies recognized the unique wetland habitat of the Upper Bear River floodplain near Cokeville, Wyoming, in Lincoln County and its value to migratory birds. In the late 1970s and early 1980s, we and WGFD reviewed the potential for protecting the area's habitat. In July 1987, we gained conditional support for a refuge proposal from WGFD.

This chapter discusses Cokeville Meadows Refuge's establishment, management history, purposes, and special values as well as its proposed vision, goals, and planning issues.

2.1 Establishment, Acquisition, and Management History

We prepared a land protection plan and accompanying environmental impact statement that resulted in a record of decision in 1992 that approved an acquisition boundary for a refuge. The record of decision also authorized us to buy a total of 26,657 acres within the boundary. This lead to the creation of Cokeville Meadows Refuge.

Establishment

Cokeville Meadows Refuge was established in 1993 with our first land acquisition.

Creation of the refuge was proposed to preserve and protect wetland-breeding and migration habitat for migratory and resident birds including trumpeter swan, redhead, white-faced ibis, long-billed curlew, sandhill crane, greater sage-grouse, and many other conservation-priority species (FWS 1990, 1992, 2002; Nicholoff 2003; WGFD 2005).

Acquisition History

The refuge has grown since 1993 (table 3) to consist of 9,259 acres of fee-title and conservation easement lands (6,466 acres in fee title, 1,689 acres in conservation easements, 320 acres of State-leased land, and 784 acres in Farmers Home Administration easements) (figure 8).

Future acquisitions of land for refuge purposes, by easement or fee title, will depend on our having the available funds to pay the appraised fair market value for land and on having willing sellers (figure 9).

Management History

Since 1993, we have managed the refuge primarily for waterfowl nesting and production. By controlling water with the existing ditches of an irrigation system that was developed by the farmers and ranchers of the valley, our refuge staff improved and enhanced wet meadow habitats along the Bear River. Since 2003, we have improved the irrigation system for wildlife management purposes by adding and replacing water control structures.

We primarily use grazing and haying as vegetation management tools on wet meadow and upland habitats. We also manipulate water levels using existing irrigation ditches, irrigate, mow, harrow, and disk to improve grassland and wetland habitats. Prescribed fire has not been used to manage habitats on the refuge since establishment, primarily because the refuge has not had sufficient staff to prepare the necessary plans and required NEPA documentation.

Except for a visitor contact station consisting of a kiosk and a parking lot, a short walking trail, and the refuge office, the refuge has not been open to public use. Approximately 3,200 visitors a year use these limited facilities for wildlife observation, photography, and interpretation. In December 2012, we issued a draft hunting plan and an associated EA for public comment with the intent to open portions of Cokeville Meadows Refuge to hunting in 2014.

2.2 Purposes

Every refuge has one or more purposes for which it was established. The purpose is the foundation on which to build all refuge programs—from biology and public use to maintenance and facilities. No

Table 3. Land acquisition history of Cokeville Meadows National Wildlife Refuge, Wyoming.

Date of acquisition	*Acres acquired*	*Acquisition authority*	*Means of acquisition*	*Percent of acquisition within the refuge boundary*
10/12/1993	203	Emergency Wetland Resources Act	Fee title – Land and Water Conservation Fund	0.76%
12/22/1993	625	Emergency Wetland Resources Act	Fee title– Land and Water Conservation Fund	2.34
03/05/1997	222	Emergency Wetland Resources Act	Fee title–Land and Water Conservation Fund	0.83
08/21/1997	263	Migratory Bird Conservation Act	Fee title–Migratory Bird Conservation Fund	0.99
06/02/1998	2,214	Migratory Bird Conservation Act	Fee title–Migratory Bird Conservation Fund	8.31
06/09/2000	2,264	Migratory Bird Conservation Act	Fee title–Migratory Bird Conservation Fund	8.49
04/15/2003	672	Fish and Wildlife Act	Fee title–Land and Water Conservation Fund	2.52
01/26/1995	1,689	Emergency Wetland Resources Act	Conservation easement–Land and Water Conservation Fund	6.34
Total percentage within the acquisition boundary acquired to date.				30.58

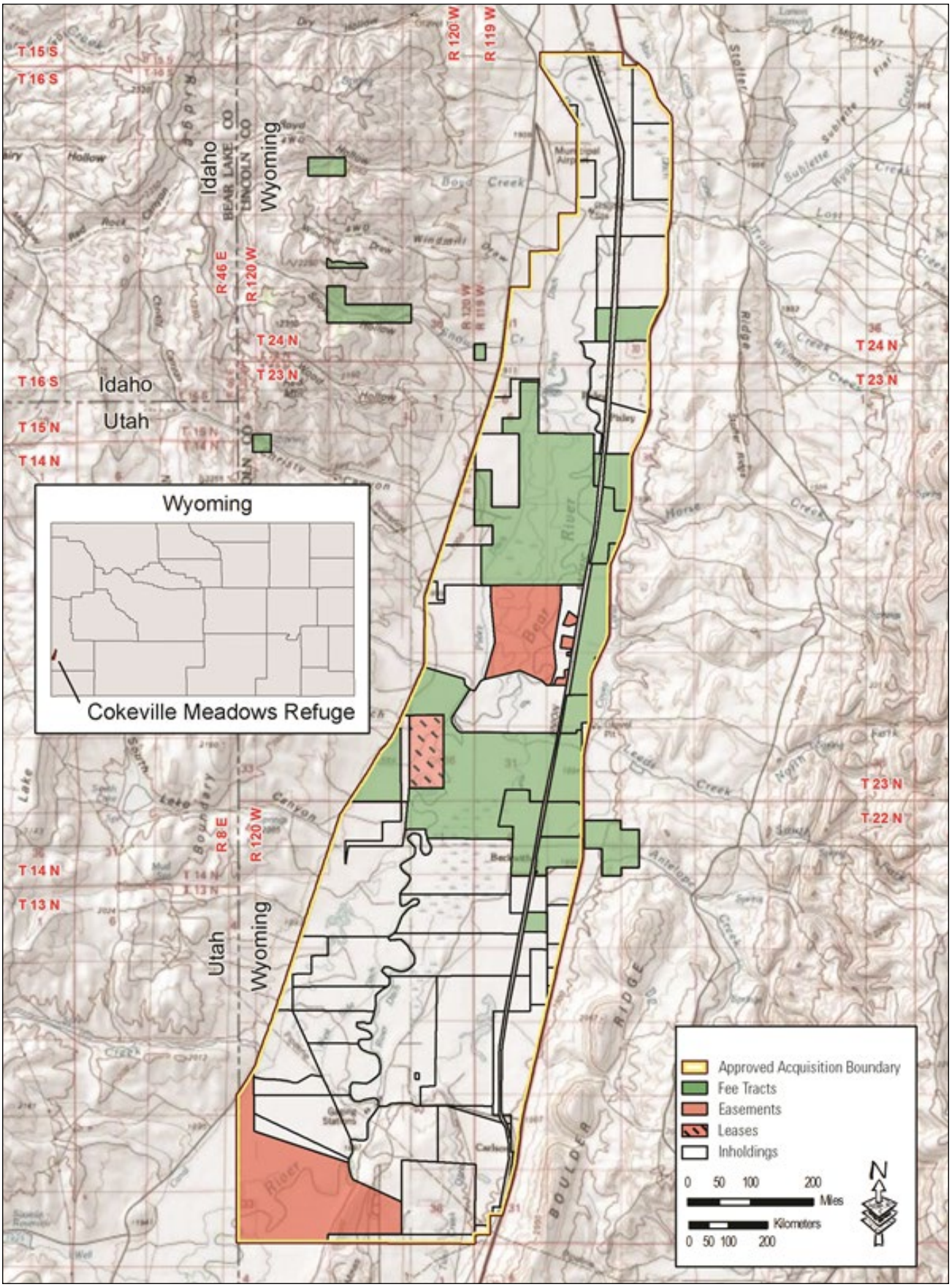


Figure 8. Base map of Cokeville Meadows National Wildlife Refuge, Wyoming.

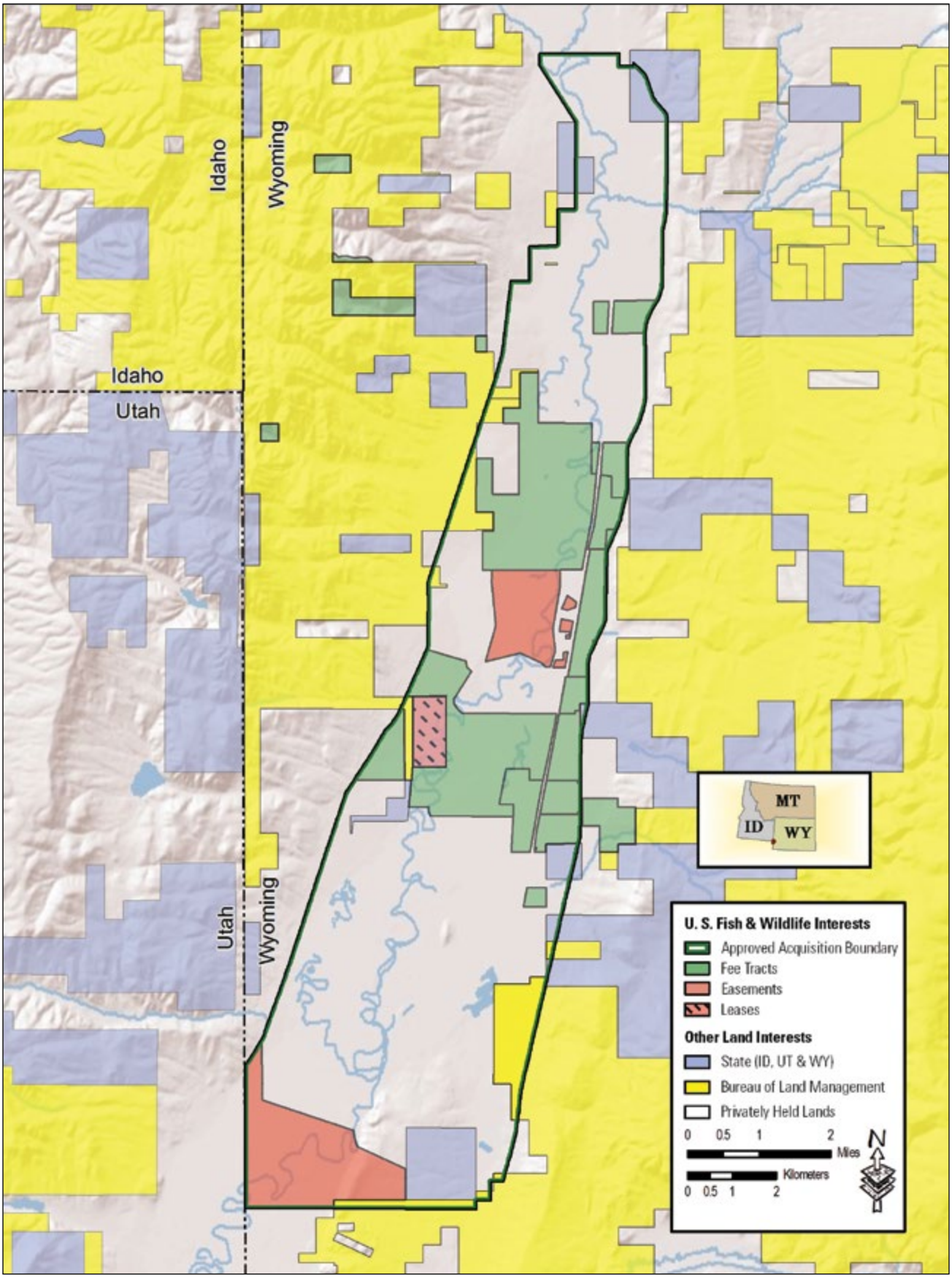


Figure 9. Ownership of lands near and within Cokeville Meadows National Wildlife Refuge, Wyoming.

action that we or the public undertake may conflict with these purposes.

Refuge purposes are found in the statutes, Executive orders, or other documents that authorize the refuge and the acquisition of any parcel of land within the refuge boundary. An individual refuge may contain lands that have been acquired under a variety of authorities, giving a refuge more than one purpose. The goals, objectives, and strategies identified in the CCP (see chapter 4) support the purposes for which the refuge was established.

The following laws specify the purposes for Cokeville Meadows Refuge:

- "For use as an inviolate sanctuary, or for any other management purpose, for migratory birds." (Migratory Bird Conservation Act, 16 U.S.C. § 715d)
- "The conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions." (Emergency Wetlands Resources Act of 1986, 16 U.S.C. § 3901(b))
- "For conservation purposes." (Consolidated Farm and Rural Development Act of 1961, 7 U.S.C. § 2002)

2.3 Vision

A vision is a concept, including desired conditions for the future, that describes the essence of what we are trying to accomplish at a refuge. The following vision for Cokeville Meadows Refuge is future-oriented and designed to be achieved throughout the life of the CCP and beyond:

For thousands of years, the sandhill cranes have returned each spring to dance on the Cokeville Meadows. Their thunderous majestic calls remind us of our obligation to manage wildlife for generations unborn.

Nestled on the upper reaches of the Bear River in southwest Wyoming, the wet meadows, sage steppe, and riparian habitats of Cokeville Meadows National Wildlife Refuge provide outstanding habitat for a myriad of migratory birds and resident wildlife species.

Spectacular views and clean air add to the visitor's enjoyment of compatible wildlife-oriented recreation. Refuge management and habitat restoration activities are complementary with historical land uses, creating opportunities for conservation partnerships with neighbors and friends.

2.4 Goals

A goal is a descriptive, broad statement of desired future conditions that conveys a purpose but does not define measurable units. Goals direct efforts toward achieving the vision and purposes of the refuge and outline approaches for managing refuge resources. We developed seven goals for the refuge based on the Improvement Act, the purposes of the refuge, and information obtained during planning.

FWS

Greater sage-grouse males have gathered at a lek looking to attract females.

Habitat and Wildlife Management Goals

Three goals were developed for habitat and wildlife management at Cokeville Meadows Refuge.

Wet Meadow Habitat and Wildlife Goal

Using the best scientific practices to manage and preserve critical wet meadow habitat, the refuge will provide quality feeding, loafing, and breeding opportunities for a diversity of migratory birds and resident wildlife.

Upland Habitat and Wildlife Goal

Manage and, where appropriate, enhance the diversity and composition of grassland and shrub–steppe habitats within the range of historical conditions for sagebrush-dependent species, upland nesting migratory birds, and other resident species.

Riparian and River Habitats and Wildlife Goal

Maintain and, where appropriate, restore the processes necessary to sustain the biological diversity and integrity of riparian vegetation and aquatic habitats for breeding birds, native fishes, reptiles and amphibians.

Wildland Fire Management Goal

Manage wildland fires using a full array of strategic options from suppression to manipulating a fire to achieve benefits. Prescribed fire, manual, and mechanical treatments will be used to: (1) reduce the threat to land and property through hazardous-fuel reduction treatments, and (2) meet the habitat goals and objectives identified in this CCP.

Visitor Services and Cultural Resources Goal

Provide appropriate public access to refuge lands where visitors can safely enjoy compatible, wildlife-dependent recreation, such as hunting, fishing, wildlife observation, photography, environmental education, and interpretation. The refuge will seek partnerships to help protect onsite cultural resources.

Partnerships Goal

Engage in mutually beneficial partnerships to promote wildlife and habitat conservation, and public enjoyment of wildlife resources in the upper Bear River watershed that are consistent with historic land uses, refuge purposes and goals.

Refuge Development and Operations Goal

Effectively utilize all available resources to develop, enhance, and support refuge facilities and operations for wildlife, habitat, and public use programs. We will pursue easements, habitat improvements, and other land protection opportunities with willing sellers and interested land owners within the approved refuge acquisition boundary and within the Bear River watershed.

2.5 Special Values

Early on, our planning team and the public identified the outstanding qualities of Cokeville Meadows Refuge. Refuge qualities are the characteristics and features that make it special, valuable for wildlife, and worthy of refuge status. It was important to name and describe the special values of the refuge to recognize the refuge's worth and to make sure that its special values are preserved, protected, and enhanced through the planning process.

Refuge qualities can be unique biological values or something as simple as "a quiet place to see a variety of birds and enjoy nature." The following summarizes the qualities that make Cokeville Meadows Refuge unique and valued:

- The refuge lies within an important part of the Pacific flyway and plays an important role as a nesting and foraging area for migratory birds.
- These are public lands where people can take part in wildlife-dependent recreational opportunities: hunting, fishing, wildlife observation, photography, environmental education, and interpretation.
- The refuge lies in the Upper Bear River watershed.

- The refuge is a greenbelt within southwest Wyoming's high desert.
- The refuge has potential for a broad range of partnerships that are integral to every aspect of refuge management.
- The refuge can serve as an outdoor classroom to provide environmental education opportunities for local communities.
- Nearby universities are resources for natural resource studies that can add to the body of scientific literature on a variety of environments within the Bear River watershed and the importance of national wildlife refuges in the western United States.

2.6 Planning Issues

We identified several key issues raised during internal and public scoping. After reviewing refuge laws and policy, we fine tuned those issues that were within the scope of this document. These are summarized below.

Substantive comments, those that can be addressed within our authority and management capabilities, were considered further in the formation of alternatives.

Habitat and Wildlife Management

Specific issues were identified for the unique habitats found at Cokeville Meadows refuge along with general issues that apply to the refuge as a whole.

Wet Meadow Habitat

The conservation of wet meadow habitat is one of the primary reasons Cokeville Meadows Refuge was established. Aside from some significant improvements to water control facilities, we manage water in these habitats much like the former private owners did. Prior economic uses of refuge wet meadows—hay production or grazing—did provide good habitat for migratory birds and other wildlife.

The recent HGM study conducted on Cokeville Meadows Refuge shows that our management continues to provide good habitat but that the natural hydrologic regime was altered by human-produced flood processes in the valley, which has lead to a change in the vegetation communities found in wet meadows. Non-native grasses now dominate many meadows and there has been a proportional decline in some native sedge–rush communities.

There are concerns about improving the monitoring and evaluation of water management effects on species composition and on the location and placement of water control structures in relation to historical sloughs and river channels. There are also concerns about enhancing water quality, wildlife habitat, and invasive species. Active management could be used to mimic natural processes. Tools the refuge could use include haying, grazing, and prescribed fire.

Upland Habitat

Subdivision encroachment and the conversion of upland habitats from native vegetation are issues that occur within the acquisition boundary and on adjacent lands.

The conversion of native habitat to cropland took place on some refuge-owned lands before acquisition. Returning these to native vegetation or continuing with farming activities is an important issue to consider. Maintaining water rights and offsetting crop predation by birds such as cranes and geese (FWS 1992) are also important topics, as are plant diversity in degraded or marginal upland habitats, grazing management, and restoring upland habitats to benefit sage-grouse, passerine birds, and nesting and brood-rearing by dabbling ducks.

Former croplands with extensive weed seed banks and varying water rights are a concern. Potential solutions to this problem include using cooperative farming agreements to establish weed control, to grow native vegetation, or to farm small grains. Rotating small grains from site to site may also help combat the depredation of private lands by migratory birds. During this rotational phase, we could work cooperatively with the permittee and Lincoln County Weed and Pest District to control invasive plants.

Riparian and River Habitats

The Bear River channel through Cokeville Meadows Refuge is deeply incised and has severely eroding banks in places. Riparian vegetation also lacks woody overstory plants. As a result, restoring the natural processes of the Bear River Valley, as identified in the HGM report, came up during scoping. To assess native fish populations—emphasizing Bonneville cutthroat trout, a species of concern found in the area—partnerships with WFGD, neighboring landowners and other irrigators, nongovernmental organizations, and others would be required. And fish mobility in the Bear River is a concern due to the Beckwith and Quin (BQ) and Pixley Dams.

Another issue is the need to manage riparian vegetation to optimize habitat for selected passerine and other migratory birds and to restore the diversity of plant species with a focus on native grasses, sedges, rushes, and woody species like willow and cottonwood. Restoring riparian habitats will require streambank stabilization projects that may include mechanized streambank reconstruction, fencing to exclude livestock from the riparian corridor, and the use of adaptive management to decide if haying or grazing would be needed to improve migratory bird habitat. Conducting a big game hunting program may reduce the effects of wintering native ungulates.

Haying, Grazing, and Prescribed Fire

Haying and rotational grazing of refuge habitats in the summer and fall of each year have helped to support wet meadow use by migratory birds. Some areas along the Bear River may have the potential to support woody riparian vegetation which would benefit neotropical migrant bird species along with other aquatic and terrestrial species. Woody riparian vegetation would also improve bank stability and erosion control. We will consider management options for establishing woody riparian vegetation.

On some sites, prescribed fire can be used to improve the control of invasive species, increase plant diversity, or set back succession to improve wildlife habitat. Prescribed fire would be a new tool in the habitat management toolbox, not a replacement of other treatment options.

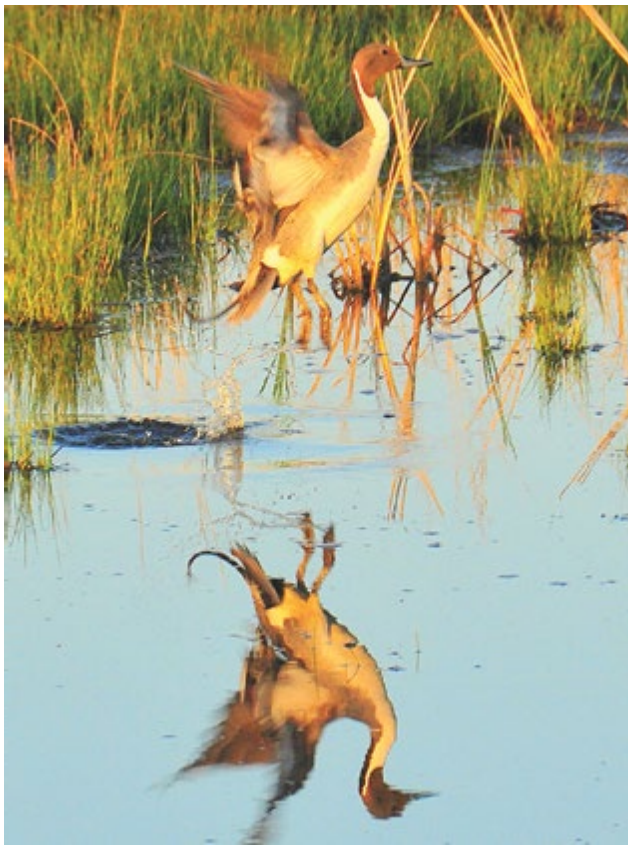
Invasive Species

Cokeville Meadows Refuge occupies part of an agricultural landscape and is intermixed with private farm and ranch lands. As such, concerns have been raised about both plant and animal invasive species.

The refuge would develop an Integrated Pest Management (IPM) plan that would define the proper use of chemical, biological, and mechanical treatment methods for the most effective control of invasive plants. The refuge will also collaborate with the State and other cooperating agencies to address invasive species.

The refuge will have to engage and work with the State and other cooperative agencies to address issues and concerns about aquatic invasive species, like zebra and quagga mussels, throughout the Bear River watershed.

Carp control and management would be conducted on the refuge to reduce sediment and other pollutants and improve water quality within the wet meadow habitats. Scoping revealed a desire by some to harvest carp from flooded wet meadow habitats in the spring. While removing carp from the meadows could improve water quality, recreational harvest is unlikely to be an effective control technique and would create unacceptable disturbance to nesting migratory birds. The public harvest of carp could be allowed in designated areas on the Bear River.



Tom Koerner / FWS

Pintail

Wildlife Disease, Crop Depredation, and Private Property Damage

Neighboring landowners want us to address the potential spread of wildlife diseases to their livestock and crop depredation on their lands. These concerns were raised before and during public scoping for the CCP.

The primary wildlife disease concern is brucella transmission when elk commingle with cattle. The refuge is working with WGFD to keep elk and cattle separate. In some extreme cases, elk are hazed from private and refuge lands. An elk hunting program may begin in 2014, and one of its goals is to disperse wintering elk from the refuge.

Depredation involves damage to small grain crops by waterfowl and other migratory birds and is a more difficult issue. However, in recent years, refuge permittees have planted a small grain crop on the refuge to help offset depredation on private land. If upland restoration takes place on the refuge and

small grain crops are used for 2–3 years per rotation, this will provide migrating flocks with a food source on the refuge, which may reduce their foraging on private fields. As the refuge acquires more in-holdings, we will continue to work with WGFD to address the depredation issue.

Wildland Fire Management

Native plant communities in the Bear River Basin evolved under a disturbance regime that included grazing animals, fire, and weather events. This periodic disturbance kept the ecosystem diverse and healthy while supporting significant biodiversity for thousands of years. Historically, natural fire and Native American ignitions played an important role in most ecosystems by removing fuel accumulations, decreasing the effects of insects and diseases, stimulating regeneration, cycling critical nutrients, and providing a variety of habitats for plant and animal species.

After European settlement, wildfires were suppressed. Today, most local fire departments and area farmers and ranchers still aggressively suppress wildfires. We have not used prescribed fire for habitat management or fuel reduction purposes on the refuge. It has been our policy to aggressively suppress wildfires because the refuge is too small and too close to farm and ranchsteads to use wildfire management as a tool. Thus, all unplanned ignitions will continue to be suppressed in accordance with Federal fire policy.

Before establishment, local farmers and ranchers periodically burned agricultural lands within the refuge boundary. This CCP does allow the use of prescribed fire for specific purposes, contingent on the right plans, funding, and on having the qualified staff to conduct such a program.

Visitor Services and Cultural Resources

Following are issues involving visitor services and cultural resources.

Public Access

In accordance with the Administration Act (see appendix E), all national wildlife refuges are closed to public use until they are formally open to the public. Accordingly, Cokeville Meadows Refuge has been closed to the public since it was established. The lack of opportunities for people to engage in wildlife-dependent recreation was perhaps the most consistent and widely held issue raised during public scoping.

Because access to the refuge is required for authorized public use, resolving such issues must be considered in the planning process. Vehicular access is allowed only by special use permit and public access to the Bear River has not been authorized due primarily to private land access issues and to safety issues involving railroad crossings. We will work to provide foot and vehicle access points on both the east and west sides of the refuge. Because of limited staff and finances, however, creating and supporting one refuge access point is a more realistic goal. Additional foot or vehicle access points may depend on added volunteers, partners, and money.

The Improvement Act identifies six priority public uses: hunting, fishing, wildlife observation, photography, environmental education, and interpretation. Congress deemed these to be appropriate on refuges and to be facilitated whenever they are compatible with refuge purposes and the Refuge System mission. In 2006 the refuge constructed a visitor contact station, an information kiosk, and a walking trail at the Netherly Slough along U.S. Highway 30. It became the only area of the refuge open to public access. Environmental education, interpretation, wildlife observation, and photography are compatible uses for this area. Elsewhere on the refuge,

We have not had the staff or money to conduct planning for opening hunting and fishing programs. Land acquisition at the refuge has been slow; for many years, the refuge did not have a sufficient land base to support some forms of recreation. In close consultation with WGFD, we prepared a draft hunting plan and associated EA to open Cokeville Meadows Refuge to the hunting of big game, small game, and migratory birds beginning in 2014. That plan was released for public review and comment in December 2012. If the NEPA analysis results in a finding of no significant impact, we will submit a rule for publication in the Federal Register that will open the refuge to hunting in the fall of 2014.

Members of the public also want to use the refuge for non-wildlife dependent recreation such as all-terrain vehicle, snowmobile, and horseback riding. These will be evaluated for appropriateness (603 FW 1) within the development of this CCP. However, the Refuge Recreation Act of 1962 (see appendix E) prohibits those forms of recreation that are not directly related to the primary purposes of the refuge until the Secretary of the Interior determines that (1) the recreational use will not interfere with primary purposes for which the areas were established; and (2) that funds are available for the development, opera-

tion, and maintenance of these permitted forms of recreation (Fischman 2003).

Visitor Safety

Seeing that the public has safe access to the refuge is a top priority for us. Access from U. S. Highway 30, which parallels the east side of the refuge, goes over an active railroad. Thus, existing crossings would need signals and cross arms. Coordinating this with the railroad company, funding, and the upkeep of safety equipment are major issues to consider.

Hunting

In close consultation with WGFD, we prepared a draft hunting plan and associated EA to open Cokeville Meadows Refuge to the hunting of big game, small game, and migratory birds. The plan was released for public review and comment in December 2012. If NEPA analysis results in a finding of no significant impact, we will submit a rule for publication in the Federal Register that will open the refuge to hunting in the fall of 2014.

The plan would allow licensed hunters to take jackrabbits, fox, skunk, and raccoon during open seasons for game species. Some members of the public also requested access to hunt a variety of species classified as predators by the State of Wyoming. Under State law, predators may be taken year-round without a license. The hunting of wolves and coyotes, however, would not be permitted under this plan.

The hunting program will provide wildlife-dependent recreation for the public, including families. The big game hunting program would also help us to discourage the commingling of wild ungulates and livestock by disturbing elk on the refuge during the hunting season.

Fishing

We will seek to open portions of the Bear River to fishing on the refuge and will work directly with WGFD to adopt State fishing regulations. It is anticipated that WGFD staff will help with enforcement and to guide the public on refuge lands. Where the potential exists and there is enough support, the refuge will engage partners to find sites and develop areas with better fishing opportunities.

Wildlife Observation, Photography, Environmental Education, and Interpretation

In response to scoping, we will seek to open portions of the refuge to wildlife observation and photography and work with partners to find ways to enhance visitor facilities for these activities. Our current visitor contact station, information kiosk, and walking trail at Netherly Slough will be maintained, and we will continue to provide limited staff-led environmental education and interpretation by request.

Public Information

As wildlife-dependent recreation expands, we will need to provide more information about it, including regulations. The refuge has not yet produced public information materials. Opening of the refuge to hunting would require us to provide brochures, leaflets, media announcements, and maps.

Cultural Resources

While there are no known National Register-eligible historic properties on refuge lands, we need to do more to inventory and manage our cultural resources. We will seek partners to help develop projects and programs to provide stewardship and interpretation for significant sites like historic trails.

Law Enforcement

As noted in scoping comments, hunting and other wildlife-dependent recreational uses will require adequate refuge law enforcement to insure public safety and a high level of compliance with regulations that protect wildlife and private property. We expect there to be sufficient Federal wildlife officers assigned to the Seedskadee National Wildlife Refuge Complex to provide law enforcement at the refuge.

Before 2010, the refuge did not have an assigned, commissioned Federal wildlife officer. Now there are two officers assigned to the Seedskadee National Wildlife Refuge Complex, and we will seek to keep at least two officers throughout the life of this CCP. We will also continue to cooperate with WGFD, the Lincoln County sheriff, and other law enforcement agencies to provide added law enforcement at the refuge.

Partnerships

"Working with others" is part of our mission statement and is needed to achieve the vision and goals for the refuge. We are unlikely to have the resources necessary to accomplish the actions proposed in this CCP unless we engage partners in our cause. Because of the varied land ownership pattern in the Bear River watershed, we will need to cooperate with several Federal, State and local agencies;

nongovernment organizations; and private landowners to address issues on a landscape scale.

Existing partnerships with cooperative farmers and ranchers and with WGFD have been instrumental in our management of the refuge, and we will expand these throughout the life of this CCP. Developing a refuge Friends group is also an important strategy. Friends groups are private, independent, and nonprofit organizations that link communities to national wildlife refuges. Friends organizations collaborate with refuges to conduct public events, teach communities about conservation, restore habitat, keep trails, coordinate volunteers, and more.

Refuge Development and Operations

Many issues surround the daily maintenance and long-term development of Cokeville Meadows Refuge. Because there are no plans to split Cokeville Meadows Refuge off from Seedskadee National Wildlife Refuge Complex as a stand-alone station, we expect it to be administered as part of the Seedskadee National Wildlife Refuge Complex throughout the life of the CCP and will continue to depend on the resources of the complex.

Staff, Equipment, and Facilities

We are responsible for managing more than 9,000 acres at the refuge, including fee-title lands and conservation easements, yet our staff consists of only one full-time employee, an assistant manager. Additional staff within the is available to conduct refuge operation activities at Cokeville Meadows Refuge, but more staff may be needed. We also have limited equipment, and some of it is in poor condition and needs replacement. However, Seedskadee National Wildlife Refuge has a good fleet of equipment that can be shared among stations.

We built a new, multi-purpose headquarters for the refuge in 2009. It has an office, shop, cold storage units, and an apartment. Other facilities, such as signs and fences, are in good-to-moderate condition and are maintained or replaced as needed. Water control structures and dikes are in good working condition and receive minor repairs as needed.

The most significant facility needing replacement is the Pixley Dam, which was built in 1903 and is near failure. The operation and maintenance of the Pixley Dam is hazardous. We will work with neighboring landowners, irrigation interests, and others to replace the dam to improve safety, water management, and fish passage.

Junk and Debris Removal

The lands we acquired for the refuge often came with junk, debris, and old infrastructure that we had to remove to restore wildlife habitats. Rocks, dilapidated fence posts, wire, culverts, and more were placed in piles on the refuge for later disposal. They are now a danger to people and have created a safe haven from which some animals depredate migratory bird nests. Our staff has properly disposed of some of the remaining junk and debris, but more remains.

Water Rights and Resources

Water is the lifeblood of the refuge. It is on a floodplain, and all wildlife and habitats on the refuge depend on an adequate quantity and quality of fresh water. The refuge will use and improve current facilities and infrastructure to enhance habitats and to manage its water in support of the Federal water rights that have been acquired for the public.

Using the refuge's HGM report, we will evaluate the placement of facilities and may move, remove, or upgrade them to improve hydrologic processes. We will seek partners to help us develop infrastructure projects. The refuge's water rights have been identified, and we are working to keep our surface and ground water rights in good standing with the Wyoming State Engineers Office. With help from our regional division of water resources, we will develop a water management stepdown plan that will quantify the refuge's water rights in relation to Wyoming water law, the Bear River Compact, and the water rights of neighboring landowners.

Land Protection

Little progress has been made in recent years to acquire more lands within the refuge acquisition boundary. This complex issue requires finding money and willing sellers. We will seek to buy more fee-title and conservation easement lands and their associated water rights throughout the life of the CCP.

We will also seek to acquire public lands within the refuge acquisition boundary. Beginning in 2004, attempts to withdraw public domain lands have been unsuccessful. We will continue to work with the BLM to achieve the withdrawal of the Federal mineral estate and approximately 500 surface acres of public lands now administered by BLM within the acquisition boundary. We will also work with the State of Wyoming to acquire State lands within the acquisition boundary through land exchanges.

Refuge Mineral Rights and Energy Development

We typically acquire land for the Refuge System subject to any outstanding mineral rights. Most refuges, including Cokeville Meadows Refuge, include lands where we own the surface estate but not the mineral estate. We also do not want, or have the authority, to prevent a mineral holder from exploiting their property. We may, however, require that the mineral estate owner or lessee comply with NEPA regulations before we issue them a special use permit for use of the refuge's surface estate for the exploration and extraction of minerals. NEPA protects the public's interest in the refuge and makes sure that mineral exploration and extraction is conducted in a way that reduces effects to habitat and wildlife.

The geography that lead pioneers and settlers to develop wagon trails through the Bear River Valley during our country's westward expansion now draws the attention of pipeline and transmission line planners who want to transport the rich energy resources from Wyoming to population centers in the west. Developing energy transmission corridors through the refuge may significantly affect resources. We will communicate with project proponents and other State and Federal agencies as these projects are considered, and, for projects affecting neighboring lands, we will work with all parties to reduce or mitigate the negative effects to refuge habitats and wildlife.

Refuge law and regulations do not apply to lands within the acquisition boundary that we have not yet acquired. Any new lands we accept will be subject to existing property rights, including rights-of-way (ROW). On lands where we have an existing real property interest, either in fee title or easement, we would need to issue a right-of-way before any new above- or below-ground transmission infrastructure could be built. The issuance of such rights-of-way would require more NEPA compliance that would be paid for by the proponent of the project and would be subject to a compatibility determination. Compatibility, a requirement of the Improvement Act, is difficult for such projects to meet.

Inventory, Monitoring, and Research

Cokeville Meadows Refuge has never received the staff or money necessary for a scientifically sound inventory and monitoring program. Although more resources may become available during the life of this CCP, partnerships with others are necessary to obtain the monitoring data necessary for us to adaptively manage refuge habitats. We will work with WGFD and other partners to inventory and monitor wildlife populations and habitat conditions both on and off the refuge. This includes monitoring water quality and salt loading in wet meadow habitats.

Monitoring programs are needed to assess water quality, including temperature, dissolved oxygen levels, and sedimentation load, and other baseline information to find issues in the watershed that may affect aquatic species.

Nuisance Animal and Predator Control

Managing nuisance animals like beavers and muskrats that affect private or refuge infrastructure will be handled on a case-by-case basis in cooperation with WGFD and neighboring landowners. Special use permits may be issued to control nuisance wildlife that damage water control structures, irrigation infrastructure, or other property. A stepdown trapping plan that includes more NEPA compliance will be developed in cooperation with WGFD to authorize permitted trapping for beaver, mink, muskrat, bobcat, coyote, red fox, badger, weasel, skunk and raccoon on refuge lands in conjunction with an existing WGFD trapping program along the Bear River.

We collected several comments and questions during scoping about how we will manage predators and furbearers on the refuge, such as when coyotes or wolves depredate livestock on private land from the sanctuary of refuge habitats. In accordance with our regional refuge policy on predator management on Refuge System lands, we will cooperate with, and provide access to, U.S. Department of Agriculture (USDA) Wildlife Services or State of Wyoming Predator Management staff for ground-based (shooting and trapping) predator management actions when evidence suggests that an individual predator or family group is depredating livestock. We will not, however, authorize prophylactic predator control or aerial gunning on refuge lands.

Volunteers Programs

Volunteers programs are a great way to introduce interested individuals and groups to the Refuge System and to involve them in the management of refuges. They provide a venue for people who want to help conserve natural resources with hands-on work. These programs are also enormously important to us because they help us to manage refuge resources, especially during times of fiscal uncertainty. Our staff would like to foster and support more volunteer groups at Cokeville Meadows Refuge for help in day-to-day operations.

Chapter 3—Refuge Resources and Description

Tom Koerner / FWS

Elk

This chapter describes the resources of Cokeville Meadows Refuge in Wyoming, which share many characteristics with the greater Bear River watershed.

3.1 Physical Environment

Cokeville Meadow Refuge is located in Lincoln County, Wyoming, near Utah and Idaho. It is just south of the town of Cokeville, and both are so named for nearby coal deposits. The refuge consists of 9,259 fee-title and conservation easement acres within the Bear River watershed, which has a drainage area of about 4.8 million acres in Wyoming, Utah, and Idaho.

Climate

The climate of the Cokeville Meadows region is semiarid, midcontinental (FWS 1992). Most precipitation that falls in the region is of Pacific origin; average annual precipitation is about 12 inches, with ranges from 9 to 18 inches annually. The area is dry most of the year. About 38 percent of precipitation occurs as rainfall from April to June. In winter, gusty winds can produce blizzards and drifting snow. The frost-free season is only 60–70 days.

Days are generally clear and sunny (about 250 days per year) and evaporation rates are high in the summer. Monthly average relative humidity ranges from 35 percent in July to about 75 percent in December. Mean monthly pan evaporation rates have a seasonal total of 31.3 inches, which is nearly three times that of annual precipitation. Temperatures are often below 0 °F in winter and can exceed 90 °F in midsummer. Annual mean temperature is 38 °F.

The combination of low precipitation, high evaporation, and high summer temperatures leads to scant free-standing surface water from summer through winter.

Climate Change

The Secretary of the Interior issued an order in January 2010 requiring U.S. Department of the Interior agencies with land management responsibilities to consider the effects of a potential climate change as part of their long-range planning endeavors. The

Department of Energy's report, "Carbon Sequestration Research and Development," concluded that ecosystem protection is important to carbon sequestration and may reduce, or prevent, the loss of carbon now stored in the terrestrial biosphere (U.S. Department of the Interior 2010).

Some members of the atmospheric sciences community believe that an increase in the average amount of carbon dioxide (CO2) could lead to the gradual rise in the world's surface temperature and commonly refer to this scenario as "climate change." In relation to comprehensive conservation planning for Refuge System units, carbon sequestration constitutes the primary climate-related effect to be considered in planning.

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

One habitat management activity in particular found in many wildlife refuges throughout our Nation—prescribed fire—releases carbon dioxide 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 biomass. This vegetation sequesters an approximately equal amount of carbon as was lost to the air (Dai et al. 2006).

Some other potential effects of a change in climatic conditions may need to be considered in the future, including:

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

Land Features

Cokeville Meadows Refuge is located in the Bear River Valley in southwestern Wyoming on a 20-mile stretch of the Bear River, which flows into the Great Salt Lake and is the largest river in the Western Hemisphere that flows into an inland sea. The headwaters of the Bear River are in the Uinta Mountains in northern Utah (Laabs et al. 2007). The river flows northward into southwestern Wyoming and passes near Evanston before looping back into Utah. As the river continues northward, it flows back into Wyoming just north of U.S. Highway 30 southwest of the town of Cokeville. The southern edge of the Cokeville Meadows Refuge acquisition boundary is near the site where the Bear River enters Wyoming. After leaving the northern Cokeville Meadows Refuge acquisition boundary, the river loops into Idaho and then descends southward into Utah, and flows generally south and westward near Logan, Utah, and eventually enters Bear River Migratory Bird Refuge and the Great Salt Lake west of Brigham City, Utah.

The longitudinal profile of the river is steep near its headwaters but flattens quickly as it reaches the Wyoming border near Evanston. At Cokeville Meadows Refuge, the river gradient is about 2 feet per mile. The uplands to the east of the Bear River Valley constitute the divide between the Great Salt Lake and the Green River and Colorado River watershed. The uplands to the west of the Bear River Valley form the divide between the circuitous drainage of the Bear River and the direct drainage into the Great Salt Lake.

The Bear River Valley reaches its greatest width (about 3 miles) just north of the south border of Wyoming. Then the valley narrows to less than one-quarter-mile wide at Myers Narrows, about nine miles south of Evanston, and then to less than 100 yards wide at the narrows, north of Evanston. The Bear River Valley widens again to about 2 miles at Cokeville Meadows Refuge and then narrows again just north of the town of Cokeville, Wyoming, where it is less than one-quarter-mile wide.

Southwestern Wyoming, west of the Green River Basin, is characterized by north-trending mountain ranges, ridges, and valleys that represent diverse geological formations (Veatch 1907). The area under Cokeville Meadows Refuge includes complex folded and eastward-thrust rocks of Paleozoic, Mesozoic, and early Tertiary ages overlain by slightly deformed later Tertiary and Quaternary sediments. The north–south belt of mountains and overthrust faults is known as the "Overthrust Belt" Geologic Province of western Wyoming, southeastern Idaho, and northeastern Utah (Blackstone 1977). The Overthrust Belt is part of an extensive area of folding and faulting

that runs north–south from Canada to Mexico, also known as the Cordilleran Fold Belt (Ver Ploeg and DeBruin 1982). Additional detailed information on the geology of the refuge vicinity can be found in other sources such as Lines and Glass (1975), Rubey et al. (1980), Bradley (1936), Laabs et al. (2009), Reheis et al. (2005), Reheis et al. (2009).

The contemporary geomorphologic surfaces at Cokeville Meadows Refuge (Reheis et al. 2005) are primarily one- to two-mile-wide Holocene alluvial deposits from the Bear River flanked by younger-age alluvial fans and low terraces. The alluvial fill exceeds 185 feet in thickness in some areas of the Bear River Valley near Cokeville Meadows (Robinove et al. 1963). Alluvial fan deposits, which extend about two-thirds up the Bear River Valley in the Cokeville Meadows region, reach a thickness of 75 feet. Natural levees occur next to larger perennial tributary streams, and some older, partly buried or scoured, natural levees exist next to former abandoned channels of the Bear River. Other important geomorphic surfaces include active alluvial fans on the west side of the valley, older Pleistocene terraces and glacial outwash on the southeast side of the valley, Pleistocene sediment deposits, the alluvium of side slopes and small intermittent streams, and older terraces and alluvial fans. Drainage within the area is through many streams and creeks that flow directly into the Bear River or by infiltration into alluvial fans and terrace deposits next to the river floodplain.

Elevations on Cokeville Meadows Refuge range from about 6,500 feet above mean sea level on the bluffs at the south end, to about 6,170 feet on the north end where the Bear River exits the refuge. Topographic heterogeneity on the refuge is related to historical Bear River channel and tributary channel migrations, minor within-floodplain channels, floodplain scouring, and alluvial deposition. Significant topographic features include the many abandoned channels of the Bear River, old alluvial and glacial terraces, and alluvial fans.

Subsurface Minerals within the Refuge Boundary

The subsurface minerals that can be found within the approved acquisition boundary of the refuge include coal, phosphate, potash, sodium, oil, and gas.

Soils

Soil mapping for the Cokeville Meadows region of Lincoln County, Wyoming, is incomplete, and contemporary, detailed soil maps for the refuge are not available. Soil maps from the Bear River Valley immediately upstream of Cokeville Meadows Refuge in Rich County, Utah, and a preliminary interim soil map prepared by USDA Natural Resources Conservation Service for the Bear River Valley in Lincoln County provide general descriptions of soil types and their distribution. Clearly, about 12 major soil types or groups are present on, or next to, Cokeville Meadows Refuge. The arrangement of soils on the refuge is complex and reflects the many channel migration events across this floodplain, introduction of mixed-erosion sediments from surrounding Quaternary and Tertiary terraces, and alluvial deposition of Bear River Valley parent materials.

Most soils on the refuge are shallow, with thin veneers of loam, silt, and clay overlying deeper sands and gravels, and can generally be categorized by three broad groups. The largest geomorphic soil group occupies floodplains and low terraces and is of the Calciaquoll-Cryaquoll-Riverwash Association. This group is characterized by nearly level to strongly sloping (from 0- to 15-percent slopes) soils that are generally deep, variable in texture, and derived from alluvium. Test borings and wells show that the greatest thickness of the alluvium, including thin veneers of silt loams and underlying alluvial sands and gravel, is about 150 feet thick (Robinove et al. 1963). Silts that overlay gravel typically are less than 6 feet below the surface. Wader loam is made up of most soils immediately next to the active Bear River channel, and Dogie Creek sandy loam occupies natural levees along the Bear River channel. Floodplain soils that overlie former meander belts of the Bear River include Bear Lake silt loam, and Berenicteon silt loam. Abandoned channels and other meander belt depressions in the Bear River floodplain have clay or silt-clay soils overlying sands and gravels of former river channel bottoms.

The second soil group at Cokeville Meadows Refuge occurs on alluvial fans and high terraces on the edges of the Bear River floodplain. These soils are found on nearly level to moderately steep slopes (from 0- to 30-percent slopes) and are generally well-drained gravelly and cobble silty and sandy loams such as Nevka loam, and Duckree gravelly loams. Alluvial fan deposits may reach a thickness of 75 feet.

The third group is present on the foothills of the Overthrust Belt and is of the Calciorthrid-Haploxeroll-Torriothent Association. Geologic overthrusting and the resulting mixed parent materials have produced variable soil textures and complex soil or landform relationships.

Water Resources

Described below are Cokeville Meadows Refuge's hydrology, water quality, and water rights.

Hydrology

Waterflow into the Bear River comes from regional precipitation, snowmelt, and ground water discharge. The Smith's Fork River and the Sublette, Twin, Spring, Brunner, Muddy, and Coral Creeks are major tributaries to the Bear River near Cokeville Meadows Refuge. Water in the Bear River is fresh, but shallow depressions and larger lakes in the system can be highly saline. The Bear River at Cokeville Meadows Refuge has little gradient, channel slope is approximately 1.5–2 feet per mile. The flat relief and low stream gradient have caused the Bear River to often alter its course across the floodplain, which has created many abandoned river channels and entrenched meanders. Most of the refuge acquisition boundary is within the 100-year floodplain (figures 10 and 11).

Historically, the Bear River had a strongly unimodal discharge, or river stage pattern, with peak discharges above 400 cubic feet per second (cfs) in June and relatively sustained low discharges near 100 cfs from August through February. Water from the Bear River begins to enter many off-channel oxbows and depressions at about 300 cfs, and much of the floodplain is inundated at discharges of greater than 1,000 cfs. Consequently, historical flow data suggest overbank and backwater flooding from the Bear River into the Cokeville Meadows floodplain ecosystem has typically occurred for only short time periods in late May through mid-June in most years. While of short duration, these seasonal floods recharge floodplain wetlands to their highest levels in spring. Thereafter wetlands gradually dry from evapotranspiration to low maintenance levels in the winter.

Besides the strong seasonal pattern of river discharge, stage data from the Bear River below Pixley Dam, near Cokeville, Wyoming, show a long-term pattern of peak discharges about every 12–15 years when the river exceeds 1,500 cfs. In contrast, intervening dry years did not have river discharges greater than 500 cfs. During the 60-year record below Pixley Dam, the Bear River exceeded 1,500 cfs for 9 years and was below 500 cfs for 15 years. This suggests that there is a highly dynamic flooding environment for floodplain wetlands in the Cokeville region. Years with extensive overbank flooding punctuate years with more regular, moderate flows and frequent dry years (Wyoming Water Development Commission 2001).

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Yellow-headed Blackbird

The central division of the Bear River in Wyoming, including Cokeville Meadows Refuge, has about 500,000 acre-feet of waterflow in wet years, about 190,000 acre-feet in average years and essentially no flow in extremely dry years. In average and wet years, available waterflow occurs during the nonirrigation season (August–March) on both the Smith's Fork and Bear River mainstem channels. The long-term, alternating wet–dry pattern of waterflow into the Bear River and the related, variable annual recharge of floodplain wetlands probably caused long-term, regularly fluctuating patterns of wetness and dryness in these wetlands at about 10- to 15-year intervals.

Ground water in the refuge area is present in the Bear River Valley alluvium, alluvial fan deposits, and in older, underlying geologic formations. The alluvial aquifer underlying the refuge is bounded laterally and vertically by relatively impermeable shale (Glover 1990). This shale layer effectively prevents ground water movement between the alluvial aquifer and other, deeper formations. The potentiometric surface of the alluvial aquifer, a hypothetical surface representing the level to which ground water would rise if not trapped in a confined aquifer, shows that water enters the aquifer as underflow from the Bear River at the upstream part of refuge and then this water discharges downstream into the Bear River (Berry 1955). A second source of water recharge into

the alluvium is leakage from tributary streams. Generally, ground water levels in the alluvium mirror seasonal precipitation and Bear River discharge patterns.

Alluvial fan deposits also yield large quantities of water where they overlie the alluvium, but the amount of ground water gradually decreases away from the Bear River as the saturated thickness decreases (Berry 1955). The recharge for alluvial fans is derived mainly from infiltrations of surface runoff. Several older geologic formations that underlie the area, including Madison limestone, the Amsden Formation, Tensleep sandstone, the Bear River Formation, and the Wasatch Formation, also provide moderate quantities of ground water to wells. Water from these formations is generally under artesian head and often moves to the land surface as low elevations dip from their outcrop areas. Up to 100 gallons of water per minute occur in artesian wells derived from the Madison limestone and Tensleep sandstone outcrops.

Transpiration, primarily from willows, persistent emergent wetland plants, and wet meadow grasses and sedges or rushes that obtain water directly from the water table, is a significant type of ground water discharge during the summer (Glover 1990). The amount of water that discharges as transpiration depends on the consumptive needs of various plant species and the depth to water. Transpiration is higher when the water table is high and at the land surface (such as in wetter years) and decreases as depth to water increases.

Ground water from the northern part of the Bear River Valley, including the Cokeville Meadows area, is of a calcium bicarbonate type, but constituents vary by geological source (Robinove et al. 1963). Total mineral content of alluvial ground water is 285–510 parts per million dissolved solids. Ground water seepage from the Smith's Fork River influences local ground water quality and clearly reduces local sodium and chloride levels. Generally, wells tapping alluvium up gradient and away from return flow into the Bear River have water that is lower in dissolved solids and with lower sodium and chloride content than sites close to the river channel. Terrace deposits and alluvial fans contain magnesium-calcium bicarbonate-type ground water with moderate amounts of sulfate. Deeper artesian ground water contains mixed-type water, predominantly sodium-calcium sulfate and bicarbonate types.

Water Quality

Surface water quality in the Bear River and floodplain wetlands varies because of human activities and natural processes and is affected by the water's source and drainage. The area is underlain by Precambrian metamorphic rocks on the north slopes of the Uinta Mountains of northeastern Utah and underlain by Tertiary formations and lined by Tertiary and Cretaceous rocks in Wyoming. Seasonal fluctuations in the discharge of the Bear River are accompanied by relatively minor changes in the total mineral content of the water; the effects of high flows in spring include mainly the dilution of major constituents.

Bear River water generally has a progressive increase in mineral content as it approaches the Beckwith and Quin Dam (BQ Dam) and then decreases in mineral content as it flows downstream from the BQ Dam to Cokeville, Wyoming. Part of this latter decrease in mineral content is due to dilution by lower-mineral water entering the Bear River from the Smith's Fork River (Robinove et al. 1963). In the central watershed, water quality is changed by excess suspended sediments, high levels of nutrients, and high water temperatures along some reaches (Bear River Watershed Information System 2007). Nutrient and sediment loads of the Bear River progressively decrease through the central region until the river reaches the confluence with Smith's Fork (Bear River Watershed Information System 2007). Inflow from Smith's Fork has especially high nutrient and sediment loads during the summer.

The upper part of the Smith's Fork has relatively good water quality. However, as this tributary travels through lower-gradient land, water quality

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White-faced Ibis

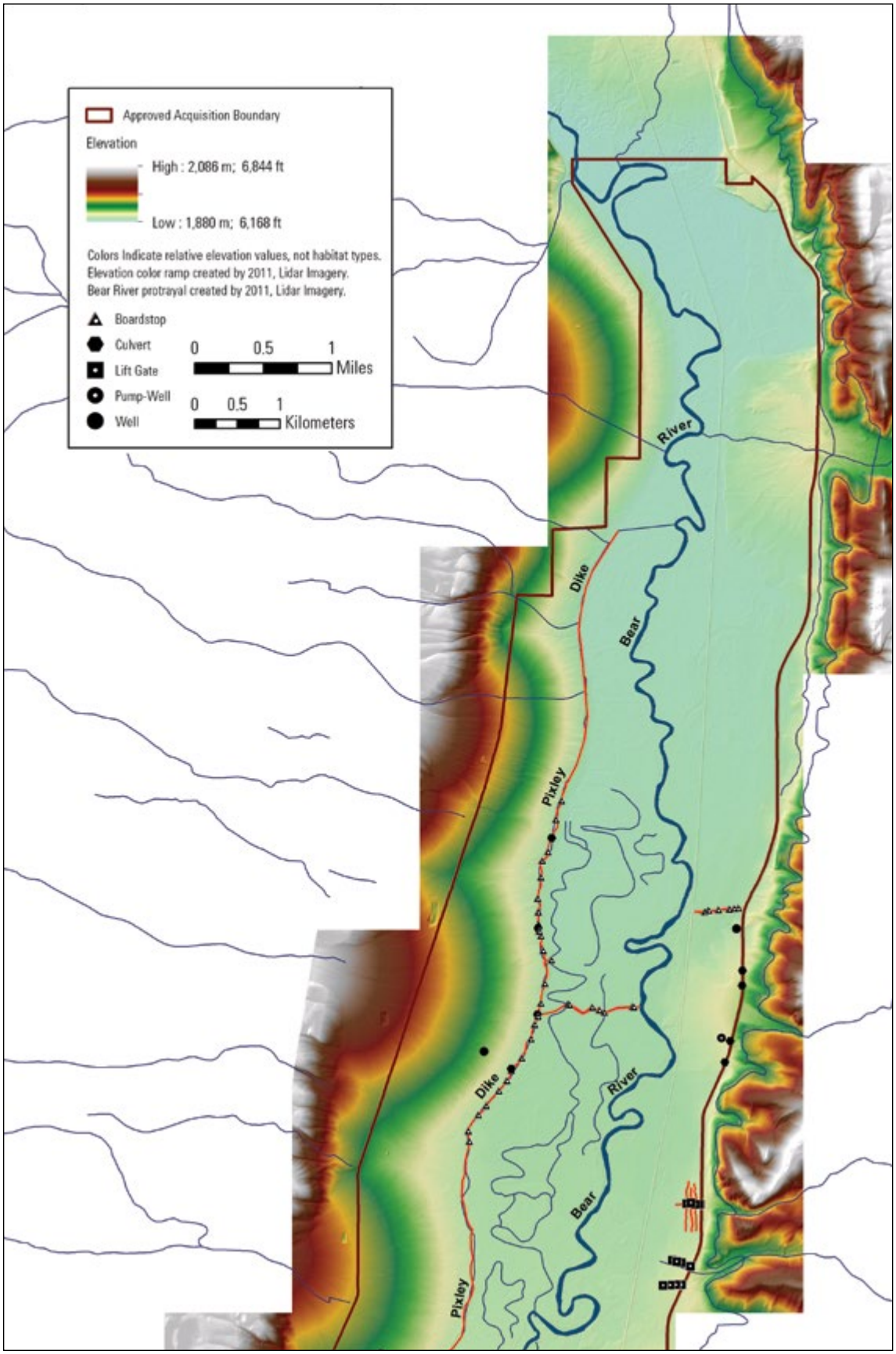


Figure 10. Light detection and ranging-generated (LIDAR) topography—with hydrology and water control structures—of the Cokeville Meadows National Wildlife Refuge, Wyoming (North).

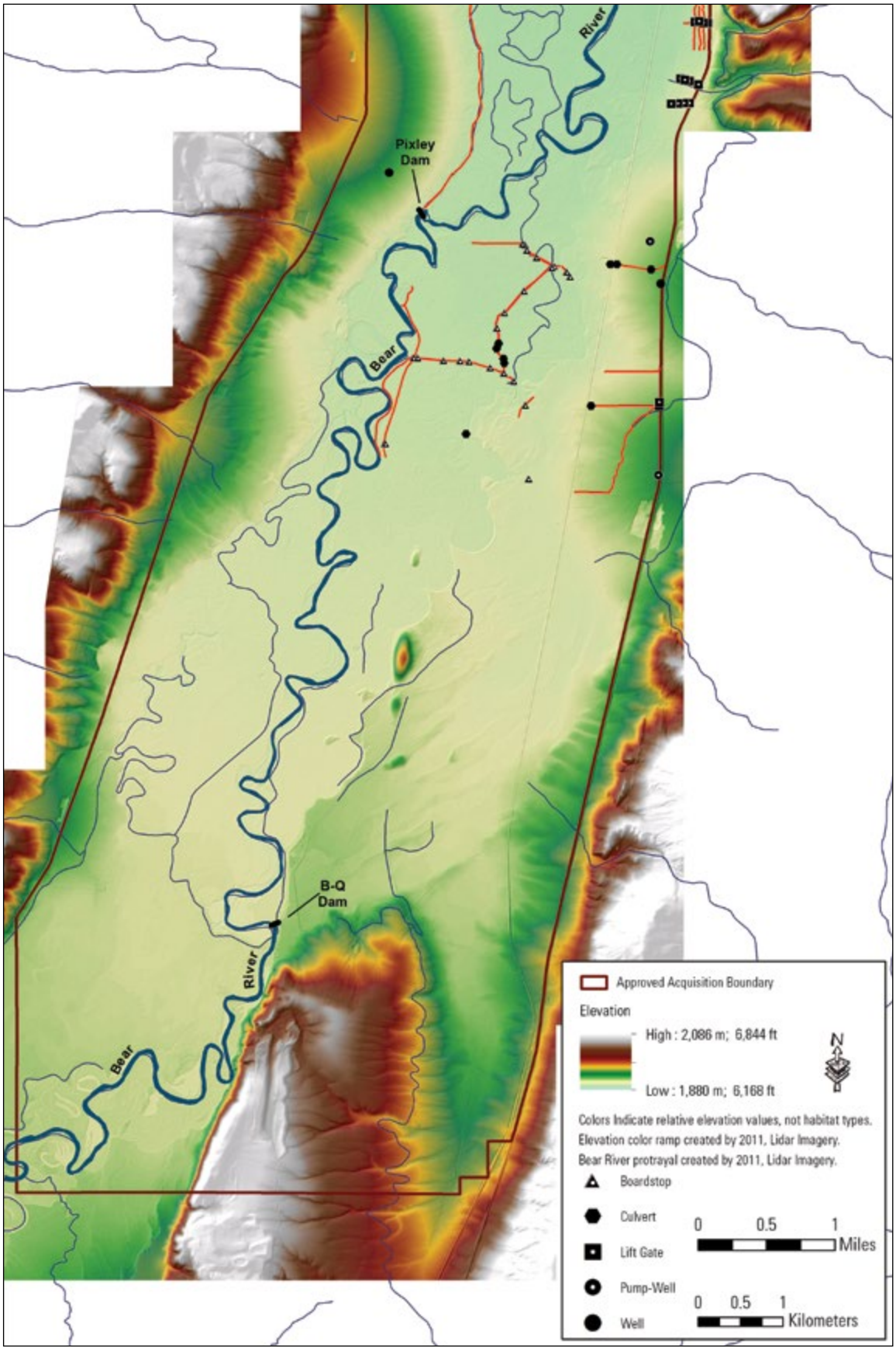


Figure 11. Light detection and ranging-generated (LIDAR) topography—with hydrology and water control structures—of the Cokeville Meadows National Wildlife Refuge, Wyoming (South).

decreases due to a variety of sources. At the confluence of Smith's Fork with the Bear River, water quality is changed by sediments. Bank erosion is the main identified contributor. WFGD established the Smith's Fork Steering Committee in 2004 to attempt to reduce high-sediment loads, increase bank stability, and improve wildlife habitat through best management practices, changing grazing practices, and controlling seasonal burns.

Agrichemicals pose another water quality issue. Elevated levels of phosphorus and nitrogen degrade water quality, but this issue occurs primarily downstream of the refuge and is beyond the scope of this CCP. Now, sediments are the greatest concern on the refuge and for adjacent upstream and downstream reaches of the Bear River. Sediment loads increase because of construction, grazing, and natural instream erosion. Irrigation return flows to the Bear River may also contribute to water quality issues, including nitrogen concentrations from animal wastes. Streambank stabilization and keeping livestock at controlled watering points may address the larger issues (Krueger 1994; Winward 1994).

Water Rights

The Bear River Commission was formed by compact in 1958 to allocate water use throughout the watershed. Major uses include agriculture, irrigation, power generation, recreation, and municipal and industrial needs. The Bear River's average annual inflow to the Great Salt Lake is nearly 1.2 million acre feet, and, with this plentiful water supply, the Bear River Basin is one of the few areas remaining in the State of Utah with a substantial amount of developable water. Water rights for the Bear River are fully allocated, but not fully developed (table 4).

Air Quality

Air quality problems in Wyoming are usually related to urban areas in mountain valleys or to river valleys that are sensitive to temperature inversions. Particulate matter and carbon monoxide have the greatest adverse affects on Wyoming's air quality. Particulate matter is a measure of tiny liquid or solid

Table 4. Water rights summary for Cokeville Meadows National Wildlife Refuge, Wyoming.

Permit number, proof number	*Priority date*	*Volume rate, cubic feet per second*	*Volume, gallons per minute*	*Use*	*Irrigation acres*	*Source*
Permit #12453 Proof 16322	6/1/1914	1.22		Irrigation	80	Ellen Reservoir
Permit #195333 Beckwith No. 1 Enl. and Replacement	12/22/2010		2000	Irrigation	290.67	Ground water (Pending 2,000 gallons per minute)
Permit #195332 Thornock Bros No. 1 Replacement Well	12/22/2010		2000	Irrigation	284.16	Ground water (Pending 2,000 gallons per minute)
U.W. 42138 Cornia No. 3 Well	4/8/1977		1300	Irrigation	347.76	Ground water
Permit 9120 Proof 23297 (44A)	6/9/1909	4.97		Domestic, Irrigation	348	Smith's Fork Irrigation District
Permit 9120 Proof 20756 (15, a)	6/9/1909	0.29		Irrigation	39.76	Smith's Fork Irrigation District
Permit 9120 Proof 15155 (15, A)	6/9/1909	0.69		Irrigation, Stock	48.6	Smith's Fork Irrigation District
U.W. 15162 Corina No. 2 Well	8/14/1972		25	Domestic or Stock		Ground water
Permit 295E Proof 9993 (41, a)	5/31/1897	7.34		Domestic, Stock		Smith's Fork Irrigation District
Permit 9120 Proof 23411	6/9/1909	2.2		Irrigation, Domestic	514.66	Smith's Fork Irrigation District

Table 4. Water rights summary for Cokeville Meadows National Wildlife Refuge, Wyoming.

Permit number, proof number	*Priority date*	*Volume rate, cubic feet per second*	*Volume, gallons per minute*	*Use*	*Irrigation acres*	*Source*
Proof 4451E Tanner Supply Ditch Enl.	4/18/1925	0.38		Irrigation	27.1	Antelope Creek
U.W. 74218 Buckly No. 4 Enl. Well	11/9/1984		450	Irrigation*		Ground water (450 gallons per minute Supplemental Supply to lands under U.W. 60699)
U.W. 59625 Buckly No. 3 Well	7/1/1982		25	Domestic, Stock		Ground water
U.W. 60689 Buckly No. 4 Well	2/8/1982		1000	Irrigation*	158.62	Ground water (Supplemental supply under 9120 and 4451E 1000GPM)
Permit 9120 Proof 23297 (Etcheverry Sheep CO)	6/9/1909	0.4		Irrigation, Domestic	27.55	Smith's Fork Irrigation District
Permit 9120 Proof 23412 (20A, 30)	6/9/1909	0.93		Irrigation*	65.21	Smith's Fork Irrigation District (36.67 Acres irrigated by supplemental supply through Pixley)
Permit 9120 Proof 15155 (20a, 30)	6/9/1909		0.75	Irrigation, Stock	52.6	Smith's Fork Irrigation District
Permit 9120 Proof 20756 (20A, 30)	6/9/1909	1.14		Irrigation	80.45	Smith's Fork Irrigation District
Territorial Permit Proof 8617 (19, a-c)	5/31/1878	1.6		Irrigation	787	Bear River
Territorial Permit Proof 8619	12/31/1879	2.29		Irrigation	160	Bear River (Service has part of total permit)
Territorial Permit 8621 (19, a-c)	12/31/1880	0.43		Irrigation	30	Bear River (Service has part of total permit)
Territorial Permit 8634 (19, a-c)	12/31/1881	2.37		Irrigation	166	Bear River (Service has part of total permit)
U.W. 57459 Thornock No. 3 Well	4/14/1981		1200	Irrigation, Stock	212.6	Ground water
U.W. 73966 Thornock No. 3 Enl. Well	6/9/1982		200	Irrigation	158.62	Ground water
Permit 3264 Proof 8722	6/12/1901	1.14		Irrigation	80	Bear River
Territorial Permit Proof 8883	12/31/1881	0.28		Irrigation	20	North Lake Spring Creek

Table 4. Water rights summary for Cokeville Meadows National Wildlife Refuge, Wyoming.

Permit number, proof number	*Priority date*	*Volume rate, cubic feet per second*	*Volume, gallons per minute*	*Use*	*Irrigation acres*	*Source*
Permit 9120 Proof 16241	6/9/1909	5.49		Irrigation	384	Smith's Fork Irrigation District
Permit 9120 Proof 23412	6/9/1909	0.08		Irrigation*	5.98	Smith's Fork Irrigation District (Supplemental supply under Terr through Pixley Ditch)
Territorial Permit Proof 8918	12/18/1908	Not quantified		Stock*, Domestic*, Irrigation*		Tributary of Bear River (supplemental supply for BQ Dam East Use: S, D, I)
Territorial Permit Proof #8617	5/31/1878	0.68		Irrigation	48	Bear River (Plus Sucker Springs)
Territorial Permit Proof #8634 (44A)	12/31/1881	0.29		Irrigation	20	Bear River
U.W. 41237 Bartek No. 1 Well	7/20/1977		718	Irrigation	352	Ground water
Permit 9120 Proof #23297 (20A, 30)	6/9/1909	0.01		Irrigation*	6.91	Smith's Fork Irrigation District (Supplemental supply under Leeds Ditch 1888 Priority and 1301 Enl.
Permit 9120 Proof #20756 (44A)	6/9/1909	3.38		Irrigation, Domestic	236	Smith's Fork Irrigation District
Permit 1761E Proof 8782	8/3/1907	0.08		Irrigation	6	Bear River
Territorial Permit Proof #8621 (Etcheverry Sheep CO)	12/31/1880	2.35		Irrigation	165	Bear River
Territorial Permit Proof #8634 (Etcheverry Sheep CO)	12/31/1881	0.58		Irrigation	41	Bear River
Territorial Permit Proof #8622	12/31/1880	11		Irrigation	766	Bear River
U.W. 308 Etch No. 1 Well	7/24/1959		1440	Irrigation	154.25	Ground water
Permit 295E Proof 9993 (Etcheverry Sheep CO)	5/31/1887	0.37		Stock, Domestic		Smith's Fork Irrigation District
Permit 2066E Proof #14118	3/8/1909	0.4		Irrigation	28	Pine Creek
Permit 9120 Proof #23410	6/9/1909	0.01		Irrigation, Domestic	0.75	Smith's Fork Irrigation District

Table 4. Water rights summary for Cokeville Meadows National Wildlife Refuge, Wyoming.

Permit number, proof number	*Priority date*	*Volume rate, cubic feet per second*	*Volume, gallons per minute*	*Use*	*Irrigation acres*	*Source*
Permit 2065E Proof #14114	3/6/1909	0.4		Irrigation	28	Smith's Fork Irrigation District

**Title 41-3-113 Wyoming Statute for Supplemental Supply Water Rights: A supplemental supply water right is defined as a permit or certificate of appropriation for the diversion, from a stream, of water from a new source of supply for application to lands for which an appropriation of water from a primary source already exists. Such supplemental supply permits or certificates of appropriation may be allowed by the State engineer or the State board of control under such regulations or conditions as he or it may prescribe. The use and administration of presently existing rights for supplemental supply appropriations or rights for supplemental supply appropriations hereafter acquired shall hereafter be made upon the express condition that the total amount of water to be diverted at any one (1) time both under a primary appropriation of water and a supplemental supply appropriation shall not be in excess of one (1) cubic foot of water per second of time for each seventy (70) acre tract so irrigated, except that when the right to divert water under the provisions of W.S. 41–4–317 through 41–4–324, is permitted the total amount of surplus water to be diverted at any one (1) time both under a primary appropriation of water and a supplemental supply appropriation shall not be in excess of one (1) cubic foot of water per second for each seventy (70) acre tract so irrigated. Nothing herein shall be construed to apply to water stored under a reservoir permit. (Wyoming Legislative Services Office. [No date]).*

particles in the air that may be breathed into the lungs. In the area of the refuge, carbon from automobiles, including all-terrain vehicles and snowmobiles, and diesel engines; soot from slash burning, forest fires, fireplaces, and wood stoves; and dust associated with windblown sand and dirt from roadways and fields may all contribute to particulate matter. The major sources of particulate matter are dust from vehicles traveling on unpaved roads and forest fire smoke.

The refuge is in a designated Class I air quality area as defined under the Clean Air Act of 1977. Air quality here is considered good, with no nearby manufacturing sites or major air pollution sources. Throughout the year, occasional widespread regional smoke from large-scale forest fires located to the west and annual agricultural burning that occurs in Idaho reduce visibility at the refuge. The small particles and aerosols resulting from these fires are carried long distances in the air and cause haze.

Tom Koerner / FWS

Sandhill Cranes

3.2 Biological Resources

The wide range of altitudes in the Bear River watershed allows for diverse habitats. Grasslands and shrublands dominate the flats and lowlands, while pinion–juniper woodlands and pine forests are found on higher slopes. Big sagebrush is common on much of the landscape, although other shrubs, such as rabbitbrush, saltbush, and greasewood, may dominate some areas. Lower elevations are mostly private land, with most of the pasturelands in the wide valleys used for agriculture and grazing. Bear River water is used extensively to irrigate alfalfa, pastureland, and small grain crops.

The Bear River provides important wildlife corridors for species migration in the western United States. The small, pristine mountain streams in the forested headwaters are ideal breeding habitat for the Bonneville cutthroat trout and leatherside chub, important native species. Many species, such as elk, black bear, pika, and marmots use these high-elevation forests and snow-covered mountain slopes.

In the course of its 500-mile journey, the Bear River passes through three national wildlife refuges: Cokeville Meadows Refuge, Bear Lake Refuge, and Bear River Migratory Bird Refuge. The primary routes of migratory birds following the Pacific and central flyways combine in the Bear River watershed. The refuges and adjacent areas provide essential habitat for many species of waterfowl and wading, shore, and upland birds that migrate through on their way to and from Canadian and Alaskan interior and coastal wetlands.

More than 200 bird species have been documented within the watershed, half are closely associated with wetlands. Many marsh and shorebirds, including white-faced ibis, snowy egret, long-billed curlew, black tern, great blue heron, American bittern, black-crowned night-heron, trumpeter swan, and sandhill crane, along with upland birds, such as the greater sage-grouse and Columbian sharp-tailed grouse, can be found throughout the watershed.

Besides bird species, several mammals are dependent on the blocks of intact habitat and the key migration linkages between these areas. Elk, mule deer, moose, and pronghorn depend on key wintering areas and migration corridors throughout the watershed.

This section describes the specific wet meadows, uplands, riparian and river habitats (figure 12) and wildlife found on the refuge.

Wet Meadow Habitat

Wet meadows include a variety of wetlands, which are defined as lands where soil is saturated by water at least periodically or is covered by water (Cowardin et al. 1979). The degree of saturation determines the types of plants and animals that live in the soil or on the surface. Furthermore, wetlands can be considered to be transitional areas between aquatic habitats and dry upland habitats.

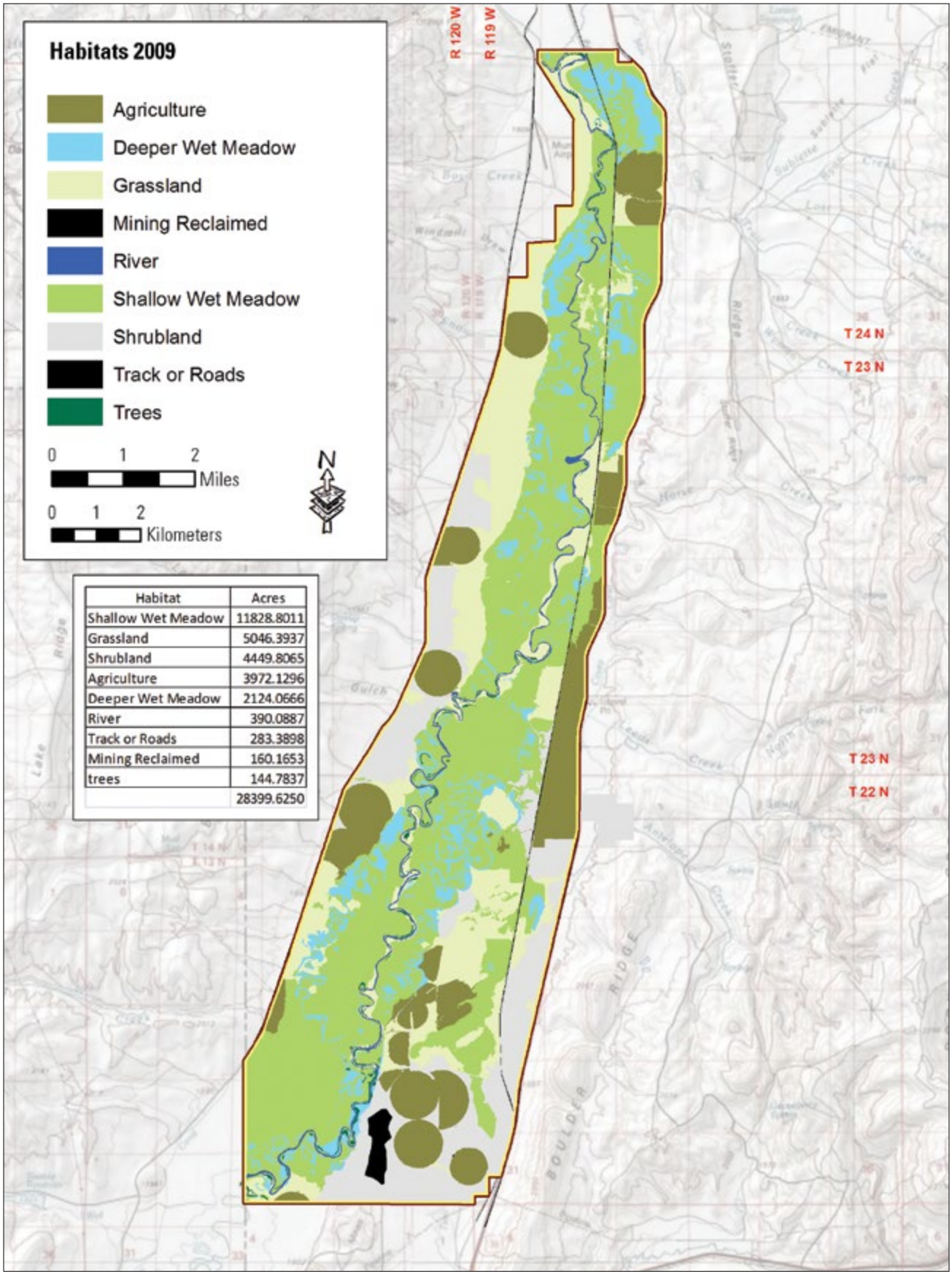
Several types of wetlands occur on Cokeville Meadows Refuge: (1) saline meadow; (2) wet meadow, consisting of native or tame grasses; (3) tall emergent wetland; and (4) open water, including managed impoundments that have shallow standing water for most of the growing season, small stock ponds, and irrigation canals.

Saline Meadow

Because of the geologic origins of some soils, salts tend to percolate to their surfaces when they are saturated with water. Only salt-tolerant plants may survive in saturated saline or alkali soils. Saline meadows are dominated by salt grass, greasewood, alkali sacaton, alkali cordgrass, and other salt-tolerant species.

Tom Koerner / FWS

Many of the wetlands on Cokeville Meadows Refuge flood seasonally. Local snowmelt initially fills the wetlands followed by snow at higher elevations that melts and eventually raises the Bear River.



Habitat	Acres
Shallow Wet Meadow	11828.8011
Grassland	5046.3937
Shrubland	4449.8065
Agriculture	3972.1296
Deeper Wet Meadow	2124.0666
River	390.0887
Track or Roads	283.3898
Mining Reclaimed	160.1653
trees	144.7837
	28399.6250

Figure 12. Existing habitats within the approved acquisition boundary of the Cokeville Meadows National Wildlife Refuge, Wyoming.

Tom Koerner / FWS

As snow on nearby mountains melts, the Bear River rises and water diverts into many of the refuge's wetlands.

Wet Meadow

Wet meadows may have shallow standing water of less than 6 inches dominated by meadow foxtail (Garrison grass is a cultivar), wire rush, and sedges.

Tall Emergent Wetland

Tall emergent wetlands occur during the primary growing season from late spring through summer and always have shallow standing water of less than 12 inches dominated by hardstem bulrush and cattails.

Open Water

Open water plant communities include rooted, submerged aquatic plants such as pondweed and floating plants such as duckweed.

Typically, wetlands support hydrophytes (water-loving plants) and hydric soils and hold water for most of the growing season (Cowardin et al. 1979). In predominantly arid southwestern Wyoming, water is a limiting factor for many species, and is highly attractive for most species. For many plant and animals, the availability of unbound water is essential. Below are listed the obligate emergent wetland and wet meadow bird species.

Obligate emergent wetland bird species:

- trumpeter swan
- Canada goose
- redhead
- greater sandhill crane
- white-faced ibis
- Forster's tern
- black tern
- common yellowthroat (warbler)

Obligate wet meadow bird species:

- American bittern
- sora (rail)

White-tailed deer, elk, striped skunks, deer mice, meadow voles, muskrats, northern leopard frogs, and wandering garter snakes are among the more common nonbird wildlife species found on the refuge's wet meadow and wetland habitats.

Results of the refuge's HGM study show that human-caused changes in the local hydrology have altered the nature of wet meadow habitats on the refuge (Heitmeyer et al. 2012). Since refuge establishment, we have continued to flood wet meadows every year in a way similar to that used by the pioneer farmers and ranchers who developed the valley's irrigation system in the early 20th century. Thus, the natural pulses of flooding and drying and drought cycles have been removed from the wet meadows for over 100 years. Our irrigation practices and those of earlier landowners resulted in extended hydroperiods. The meadows are flooded longer and deeper than they were under natural conditions.

While the economic use of these lands for haying and grazing has resulted in excellent habitat for a variety of migratory birds and other wildlife, it has

also caused potentially negative changes, including the loss of native vegetation types and habitat diversity. Much of the meadows are covered with a near monoculture of creeping meadow foxtail (*Alopecurus arundinaceus*). As a result, native sedge, rush, and bulrush communities have declined.

Upland Habitat

Sagebrush-dominated habitats form one of the largest ecosystems in North America (Gleason and Cronquist 1964; Trimble 1999). In North America, sagebrush or shrub–steppe habitats are bounded on the west by the Sierra Nevada and the Cascade Range and on the east by the Rocky Mountains and the Colorado Plateau. These habitats run as far north as the Okanagan Valley, British Columbia, and south to almost the Grand Canyon and the Colorado River. These habitats are dominant in Utah, Nevada, western Colorado, southwestern Wyoming, southern Idaho, eastern California, Oregon, and Washington.

Three major characteristics generally describe shrub–steppe habitats: (1) the great expanse in area occupied contiguously by a single plant or structural type; (2) the sharpness of the boundary, or ecotone, between adjacent habitat types; and (3) the occurrence of a single dominant species, like sagebrush, or, alternatively, the occurrence of few codominant species (Gleason and Cronquist 1964; Trimble 1999).

In western States, shrub–steppe has been seriously degraded or completely removed through agricultural conversion, overgrazing by domestic livestock, invasion by exotic plants, expansion of pinion–juniper (*Pinus* spp.–*Juniperus* spp.), uncharacteristic wildfires, and habitat fragmentation. In fact, the changes that occurred since Euro-Americans arrived in the early 1800s were so rapid that little is known about the original landscape.

Wildlife associated with shrub–steppe habitats may also be characterized by a limited number of species (Paige and Ritter 1999; Nicholoff 2003), and some of these are experiencing population declines. The sagebrush-obligate greater sage-grouse is of significant conservation concern throughout its range. The species is a candidate for listing under the ESA, and efforts to restore shrub–steppe habitat and grouse numbers are now the focus of multiple Federal and State agencies throughout western States and Provinces. Other obligate birds of shrub–steppe habitats, including many long-distance migrants, (Rich et al. 2005) have also shown significant population declines in recent years, including the sage thrasher, Brewer's sparrow, and sage sparrow.

Other species are considered shrub–steppe obligates part of the time, as they are found in habitats such as grasslands. Many of these species are also declining in population, including the short-eared owl and the vesper sparrow. Even the widely distributed Western meadowlark has shown declines in recent years. Below are listed the obligate and semiobligate

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Water can be deep and semipermanent flooding prevalent in old river channels and depressions. This allows submerged aquatic vegetation such as bladderwort to thrive.

Tom Koerner / FWS

Emergents such as Baltic rush, native sedges, and creeping foxtail grow in large, seasonally flooded wetlands during the summer.

grassland and shrub–steppe nesting bird species occurring at Cokeville Meadows Refuge.

Obligate grassland community bird species:

- short-eared owl
- mountain plover
- horned lark
- western meadowlark

Obligate sagebrush–steppe (Sagebrush-dominated) community bird species:

- greater sage-grouse
- sage thrasher
- Brewer's sparrow
- sage sparrow

Semiobligate sagebrush–steppe (Sagebrush-dominated) community bird species:

- ferruginous hawk
- golden eagle
- prairie falcon
- mourning dove
- western burrowing owl
- common nighthawk
- Brewer's blackbird

Pronghorn, mule deer, western jumping mice, Wyoming ground squirrels, black-tailed jackrabbit, desert cottontails, coyotes, northern sagebrush lizards, and Great Basin gopher snakes are among the more common nonbird wildlife species found on the refuge's uplands habitat

Riparian and River Habitats

Riparian habitats compose less than 1 percent of the total area of the Wyoming Basin, and are important to regional biological diversity. Riparian zones can vary considerably in size and plant composition because of the many combinations that can be created between water resources and the physical characteristics of a site, such as gradient, aspect, topography, soil types, water quality, timing and period of water availability, elevation, and plant community.

Riparian Corridors

Several characteristics set the Bear River riparian corridor apart from its surrounding shrub–steppe habitat: (1) a well-defined moist-soil or wet habitat-type boundary, typically linear and parallel with the river; (2) a small size relative to the overall valley; (3) greater productivity in terms of biomass, both plant and wildlife; and (4) greater biodiversity. Riparian habitats are essential for many native wildlife species, especially migratory birds (Nicholoff 2003) and are generally less resistant to human disturbances than other habitat types and sensitive to channel incision (Germanoski and Miller 2004).

Listed below are the obligate riparian corridor bird species found at Cokeville Meadows Refuge.

Obligate riparian corridor bird species:

- western wood peewee
- yellow warbler
- common yellowthroat
- willow flycatcher
- song sparrow

Semiobligate riparian corridor bird species:

- yellow-billed cuckoo
- MacGillivray's warbler
- black-billed cuckoo

Raccoons, red foxes, moose, long-tailed weasels, North American porcupines, American beavers, Valley garter snakes, and tiger salamanders are among the more common nonbird wildlife species found on the refuge's riparian habitat.

Wetland Conditions

Wetland acreages in Wyoming have declined in recent years because of agricultural conversion and urbanization (figure 13). Agricultural diversions, initially developed to remove soil salts and increase hay meadow production, have enhanced some wetlands along the central Bear River Basin. The Bear River wetlands are among the most productive and diverse bird habitats in Wyoming (USGS 1996).

However, since the establishment of Cokeville Meadows Refuge in 1993, subtle changes in land use have occurred. There has been a shift from gravity flow flood irrigation to mechanical pump-driven sprinklers, which has dropped the water table in the Bear River floodplain (Heitmeyer et al. 2012). A lack of proactive wildlife management actions has affected vegetation types, and conveyance systems deteriorated, which affected wildlife use of the area. The initial refuge focal species, particularly Canada geese, redhead, canvasback, white-faced ibis, American bittern, and terns now range farther and nest in more favorable habitats. Field studies are ongoing, but preliminary results show that American bittern and cinnamon teal numbers have increased substantially since 1993. Nesting pairs of Canada goose, redhead, white-faced ibis, and terns have declined on the refuge, but they nest on adjacent lands and into Utah.

The Thomas Fork and Smith's Fork, tributaries to the Bear River, and the Bear River reach between them provide ideal habitat for the Bonneville cutthroat trout (Behnke 1992, Baxter and Stone 1995). The most genetically pure strain of Bonneville cutthroat trout within its ranges is found here. The Bear River links these tributary populations, resulting in what is likely the last connected large-river habitat available to Bonneville cutthroat trout. Habitat loss, migration barriers, and proposed reservoir development on Smith's Fork threaten the native Bonneville cutthroat populations in the central watershed of the Bear River Basin.

Trout Unlimited is involved in supporting and restoring migration corridors for the fish in Thomas Fork and Smith's Fork, and WGFD completed fishery habitat improvements on the headwaters of Thomas Fork as part of the Bonneville Cutthroat Trout Conservation Strategy (Bear Lake Regional Commission 2000, Trout Unlimited 2005). Besides Bonneville cutthroat trout, several native nongame fish of conservation concern also inhabit the Bear River and its tributaries. These include bluehead sucker, western silvery minnow, and the finescale dace.

There are a large number of carp in the river. When water is diverted into the wet meadows, carp make their way there. Carp can swim in the meadows where there is as little as 3 to 4 inches of water. Carp affect native species of fish and are not desirable on the refuge; however, there are not any well-known ways to control this population. Some members of the public expressed interest in harvesting carp with archery equipment. Our refuge staff will address this request as a potential recreational opportunity in a future fishing plan.

Haying, Grazing, and Prescribed Fire

Haying and rotational grazing of refuge habitats is conducted in the summer and fall every year. Past management techniques have degraded some habitat types, particularly woody riparian communities.

Prescribed fire has not yet been used on the refuge. If allowed, it would be a new tool in the habitat management toolbox and not a replacement for other treatment options.

Threatened and Endangered Species

No federally listed threatened or endangered species are known to occur at Cokeville Meadows Refuge. However, one listed plant may occur in the area and several candidate species occur, or may occur, that warrant our attention.

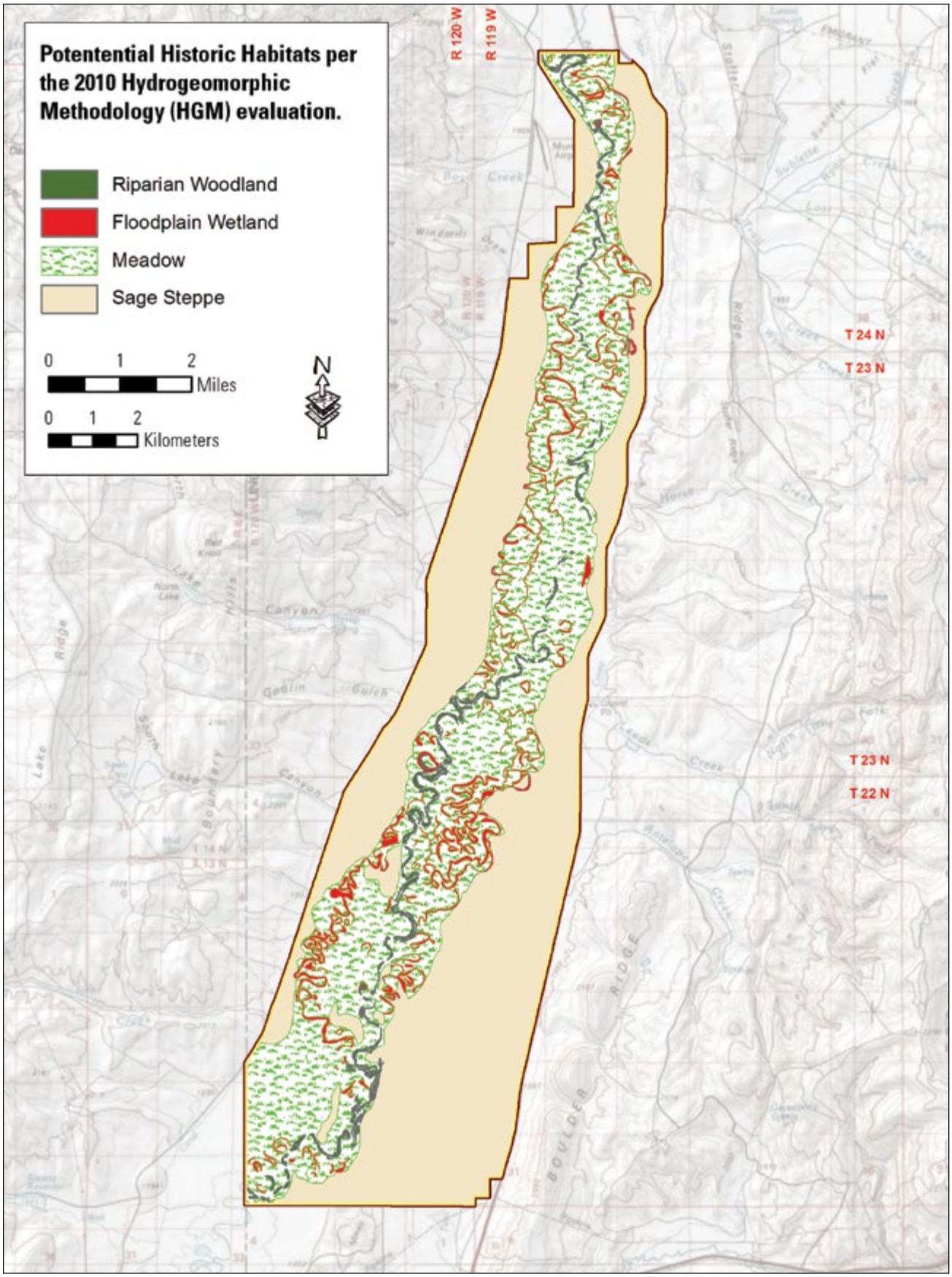

Figure 13. Potential historical habitats per the 2010 hydrogeomorphic method evaluation of the Cokeville Meadows National Wildlife Refuge, Wyoming.

Ute Ladies'-tresses Orchid

Ute ladies'-tresses orchid is federally listed as a threatened species under the ESA.

Cokeville Meadows Refuge lies within the range of the Ute ladies'-tresses orchid. This is a perennial orchid, 8- to 20-inches tall, with white or ivory flowers clustered into a spike arrangement at the top of the stem. This orchid normally blooms from late July through August. However, it may bloom in early July or still be in flower as late as early October, depending on climatic conditions. It is endemic to moist soils near wetland meadows, springs, lakes, and perennial streams where it colonizes early successional point bars or sandy edges. The elevation range of known occurrences is 4,200 to 7,000 feet, although no known populations in Wyoming occur above 5,500 feet. Soils in which this orchid has been found typically range from fine silt or sand to gravels and cobbles, as well as highly organic and peaty soil types. It is not found in heavy or tight clay soils or in extremely saline or alkaline soils. Ute ladies'-tresses typically occurs in small, scattered groups found primarily in areas where vegetation is relatively open.

Because this orchid species appears to take 5 to 10 years to reach reproductive maturity, reproductively mature plants do not flower every year, and the refuge has not been specifically surveyed for its presence, it is unknown if this species exists within the boundary of the refuge

Yellow-billed Cuckoo

Yellow-billed cuckoo is a candidate for Federal listing. The distinct population segment of the yellow-billed cuckoo west of the Continental Divide is a candidate for listing under the ESA (66 FR 143, 25 July 2001). In Wyoming, the yellow-billed cuckoo is dependent on large areas of woody, riparian vegetation that combine a dense shrubby understory for nesting and a cottonwood overstory for foraging. Destruction, degradation, and fragmentation of wooded, riparian habitats are continuing threats to yellow-billed cuckoos in Wyoming. Additionally, project actions to control outbreaks of caterpillars, cicadas, or grasshoppers and the general use of insecticides in, or next to, riparian areas may negatively affect yellow-billed cuckoos. Surveys to find the presence of yellow-billed cuckoos are difficult because of the secretive nature of the species and the variability in the timing of nesting. None have been sighted or documented on the refuge.

Greater Sage-grouse

Greater sage-grouse is a candidate for Federal listing. They are dependent on sagebrush habitats year-round. Habitat loss and degradation, as well as the loss of population connectivity, have been identified as important factors contributing to the decline of greater sage-grouse populations across its range.

This species has been documented in upland sites next to the refuge's boundary, and there are historical records of this species using lands within the refuge's acquisition boundary.

Wyoming has adopted a "Greater Sage-grouse Core Area Protection" strategy to enhance conservation of the greater sage-grouse (State of Wyoming 2011). The recommendations of the State Sage-grouse Implementation Team and State of Wyoming's Core Area Protection strategy attempt to limit new development and harmful activities in areas with substantial sage-grouse populations. The northernmost portion of the Cokeville Meadows Refuge lies approximately 1 and a half miles due west of a designated sage-grouse core area.

Gray Wolf

Gray wolf is a species of concern in Wyoming and is federally listed under the ESA in other states. In Wyoming, gray wolves are no longer included on the Federal List of Endangered and Threatened Wildlife (50 CFR 17.11) and are no longer listed as a nonessential experimental population under the ESA (77 FR 55530; September 10, 2012). The gray wolf in Wyoming is now managed by the State under the Wyoming Gray Wolf Management plan. This management plan strives to support a gray wolf population in Wyoming of at least 150 individual wolves and 15 breeding pairs (at least 100 individuals and 10 breeding pairs outside of Yellowstone National Park and the Wind River Indian Reservation).

Section 4(g)(1) of the ESA requires us to monitor for at least 5 years, in cooperation with the States, the status of all recovered species that have subsequently been removed from the Federal List of Endangered and Threatened Wildlife. The primary goal of this monitoring is to make sure that the status of the recovered species does not deteriorate. If an unanticipated decline were detected, measures would be taken to avoid the need to relist the species as threatened or endangered.

Gray wolves follow the seasonal movements of big game and may occur in large ungulate migration, wintering, or birthing areas. While some project activities can affect gray wolves directly, changes to big game populations or herd movements can also affect their distribution, abundance, and survival.

Pygmy Rabbit

Pygmy rabbit is a species of concern. It is the smallest member of the rabbit family, and it occurs in

portions of many western states, including southwestern Wyoming. Pygmy rabbits are sagebrush-obligate species that are primarily found in areas with deep soils that support dense big sagebrush communities, often where other species of sagebrush and forbs also occur. The conversion of sagebrush grasslands, habitat fragmentation, fire, invasive plants, and overgrazing are considered potential threats to pygmy rabbits.

Planning measures that keep large tracts of suitable habitat and corridors to adjacent habitat will aid in the conservation of this species. In January 2008, our agency's division of ecological services started a status review to find out whether or not this species warrants listing under the ESA.

Mountain Plover

Mountain plover is a species of concern. It is a migratory, terrestrial shorebird averaging 8 inches (21 centimeters) in body length. Mountain plovers are light brown above and white below, but lack the contrasting band characteristic of other plovers. They feed on invertebrates, primarily beetles, crickets, and ants. These plovers arrive at their breeding grounds in the western Great Plains and Rocky Mountain States in the spring. Southbound migration is prolonged, starting in late June and continuing through October.

Suitable habitat for nesting mountain plovers includes grasslands, mixed-grassland areas and short-grass prairie, shrub–steppe, plains, alkali flats, agricultural lands, cultivated lands, sod farms, and prairie dog towns.

White-tailed Prairie Dog

The white-tailed prairie dog is approximately 13- to 15-inches long and weighs 1 to 3 pounds. It is a small, stout rodent within the squirrel family. White-tailed prairie dogs have a short, white-tipped tail, large eyes, a blackish-brown cheek patch above and below each eye, and a tan-brown pelt. They typically inhabit moderately sloped grasslands, desert grasslands, and shrublands at altitudes ranging from 5,500 to 9,800 feet. While this rodent occurs over much of its historical range, colonies are more widely dispersed and population sizes have declined. This species inhabits areas across western and central Wyoming, northwest Colorado, northeastern Utah, and a small area in south-central Montana. Wyoming holds most of its range.

Prairie dogs serve as the primary prey species for the black-footed ferret and several raptors, including the golden eagle and ferruginous hawk. Prairie dog colonies and burrows also provide shelter or nest sites for species like the mountain plover and the burrowing owl. In May 2008, we started a status review to find out whether this species warrants listing under the ESA.

Species of Concern

Besides species that are federally listed for protection under the ESA, there are others that are of special concern because of the threats they face and because they may fit one of the following categories:

- They are now or have recently been under review to find out whether they may warrant listing under the ESA in the future.
- They were recently delisted and there is still need for some protection to ensure the species' continued recovery.
- They are protected under Federal laws and warrant more attention.
- They are species that are considered likely to become candidates or proposed for listing in the near future and for which we have entered into conservation agreements.

Effective planning now can help the long-term conservation of these species and remove threats that may contribute to the future need for listing under the ESA.

The WGFD's wildlife action plan entitled "A Comprehensive Wildlife Conservation Strategy for Wyoming" provides a long-range conservation plan to conserve Wyoming's "Species of Greatest Conservation Need". The following are Species of Greatest Conservation Need for the area of Cokeville Meadows Refuge:

- Bonneville cutthroat trout
- bluehead sucker
- leatherside chub
- mountain sucker

All of these species are identified as endemic aquatic species of the Bear River watershed in Wyoming. Among the threats they face are changes in the quantity and quality of the river waters in which they dwell because of pollution and increased sedimentation and temperatures; diseases like whirling disease; stream channel modifications such as dredging, impoundments, channelization, erosion, tree and shade removal; competition from aggressive, nonnative species; and hybridization with nonnative species, which makes them less resilient.

Invasive Species

Invasive plants found on the refuge include creeping meadow foxtail. Noxious weeds from the Wyoming State Noxious Weed List found at Cokeville Meadows Refuge include perennial pepperweed and Canada thistle. The only known aquatic invasive species of concern currently found on the refuge is carp. Other aquatic invasive species of concern, such as zebra and quagga mussels, have not been found on the refuge.

Wildlife Disease, Crop Depredation, and Private Property Damage

The greatest wildlife disease concern on the refuge is the potential for brucella transmission to cattle when they commingle with elk. Diseases such as botulism and West Nile are also informally monitored, but do not have a history of prevalence, at the refuge.

Depredation concerns include damage to small grain crops by waterfowl and other migratory birds. In recent years, we have worked with permittees to plant a small grain crop on the refuge to help offset depredation and damage on nearby private lands.

3.3 Visitor Services, Human History, and Cultural Resources

This section details the various services provided to visitors at Cokeville Meadows Refuge and describes its human history and cultural resources.

Public Access

Since establishment, Cokeville Meadows Refuge has been closed to public access. In 2006, the refuge constructed a visitor contact station, an information kiosk, and a walking trail at the Netherly Slough along U.S. Highway 30 for public use. Environmental education, interpretation, wildlife observation, and photography are compatible uses that are allowed at this site on the refuge. No other public uses are authorized without a special use permit.

Private land issues affect access, which is allowed by vehicle only with a special use permit and which is not allowed via river boat.

Pressure has grown to allow greater public use. But a lack of funding has meant there was not enough staff to manage public use activities. As a result, the refuge has remained closed.

Visitor Safety

The refuge acquisition boundary is bisected from north to south by the Union Pacific Railroad. Several tracts owned by the refuge are within this area. Thus, access to portions of the refuge requires crossing the railroad track, which poses a danger.

Concerns about visitor safety have been few because public access is limited to a small number of special use permit holders.

River Boating

River boating is not allowed on the Bear River within the refuge acquisition boundary because: (1) riverflows can be reduced substantially at any of the dams and diversions, (2) inadequate access points for boat launching combined with low flows make it an unattractive recreational activity, and (3) it is not one of the six priority wildlife-dependent public uses of the Refuge System.

Hunting

We completed a hunting plan and EA in January 2012 to open designated portions of the refuge to big game, upland game, and migratory bird hunting. The hunt plan package was submitted to our headquarters, and we anticipate the refuge will be open to hunting for the first time in the fall of 2014.

Shed Antler Collecting

The collecting of shed antlers is not one of the six priority wildlife-dependent recreational activities of the Refuge System. It is considered an economic activity, and all economic activities that take place on national wildlife refuges must pass an appropriateness test to be allowed and then must be found not only compatible with a refuge's purposes but a contributor to their achievement and that of the mission

of the Refuge System. We have conducted an appropriateness test (appendix H) for shed antler hunting and found it to be inappropriate at the refuge.

The State of Wyoming has adopted shed antler collection regulations that prohibit the hunting or collection of shed antlers between January 1 and April 30. This regulation allows shed antler hunting to start at the beginning of the migratory bird nesting season. Since Cokeville Meadows Refuge was established for the protection of migratory birds and their habitats, allowing antler collectors on the refuge to conduct this activity would pose unwanted disturbance to the migratory birds. By the time most elk and deer have shed their antlers, they have moved off the refuge to the east and onto BLM lands. There is more opportunity on those lands to collect antlers than on the refuge. Thus, shed antler collecting is not an appropriate use of Cokeville Meadows Refuge, and it is not compatible with the refuge's purposes or with the Refuge System mission.

Fishing

Cokeville Meadows Refuge is not open to the public for recreational fishing, though that may change. A stepdown fishing plan will be prepared to open portions of the Bear River to fishing opportunities in accordance with WGFD fishing regulations. The fishing plan must undergo public review and comment and then be submitted to the Federal Register and be published as a final rule.

Upon approval of a fishing plan, we anticipate that WGFD staff will help to enforce activities and guide the public on refuge lands. Where the potential exists and when there is enough support, the refuge will engage partners to find sites and to develop adequate public access for sportfishing.

Trapping

Cokeville Meadows Refuge has not been open for recreational or commercial trapping, but will be open to limited recreational trapping. Limited furbearer trapping may be authorized by special permit in accordance with State regulations. Furbearers and predator species available for regulated take by trapping include beaver, mink, muskrat, bobcat, red fox, badger, weasel, skunk and raccoon.

Wildlife Observation and Photography

Wildlife observation and photography are only allowed at the public use facilities located at the Netherly Slough, though we may seek to open more of the refuge to these uses. We will also work with partners to find areas where facilities and opportunities can be enhanced to improve these activities.

Environmental Education and Interpretation

Environmental education and guided interpretation are provided by refuge staff, volunteers, or partners on request and when resources allow. Staff-lead programs are limited. We plan to add self-guided interpretive opportunities such as brochures and walking trails.

Public Information

Public information is available at the refuge office and at the Seedskadee National Wildlife Refuge Complex headquarters and Web site, by way of the Cokeville Meadows Refuge link. The refuge does not currently have a general information brochure. We would like to expand the public information program at Cokeville Meadows Refuge to include the development of brochures and leaflets.

Human History and Cultural Resources

This section describes the human history and cultural resources found at Cokeville Meadows Refuge.

Prehistoric Era

Current archaeological evidence shows that the earliest human inhabitants of the area, referred to as paleo-Indians, migrated to the region near the close of the last ice age approximately 12,000 years ago. These people had a highly mobile lifestyle that depended on the hunting of large animals, including mammoths and huge, now-extinct bison species. The hallmarks of most paleo-Indian sites are the beautiful, but deadly, spear points that are recovered from

animal kill and butchering sites, small temporary camps, or isolated occurrences.

There was a gradual, but definite, shift in the pattern of human use of the region beginning about 8,500 years ago that continued until approximately 1,800 years ago. The changes during this period, referred to as the Archaic Period, were the result of a combination of a growing population, technological innovation, and regional influences. Regional climatic changes also had a strong influence.

It is clear that the environmental conditions of early portions of the Archaic Period were affected by an Altithermal Climatic Period, characterized by a hotter, dryer climate that negatively affected human populations (James Enterprises, Incorporated 2003). The Altithermal was supplanted by the cool and wet Neoglacial Climatic Period during later portions of the Archaic Period (Johnson and Pastor 2003). As these environmental changes affected floral and faunal communities, cultures adjusted settlement and subsistence strategies accordingly (James Enterprises, Incorporated 2003).

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The Historic Era of the Cokeville Meadows Refuge featured a great western expansion as pioneers took to one of many trails in the area, like the Oregon Trail.

The Archaic Period is better represented in the archaeological record than the preceding Paleo-Indian Period with a greater variety of tools and the evidence of a larger variety of plant and animal use found on many of the sites from that time. Houses built in shallow depressions (pit houses), generally smaller spear points, ground stone that reflects food processing, a wide variety of animal remains, a diverse tool assemblage, and multiple fire features are all often found on Archaic Period sites.

The Late Prehistoric Period began approximately 1,800 years ago and ended 250–300 years ago when European influences began to alter Native American cultures. The development of the bow and arrow, advancements in ceramic production, influences from neighboring regions, and a variety of features are hallmarks of sites dating to this period. Although population increases during this time are reflected in the increased number of sites, people continued to move about the landscape in small groups between periods of more sedentary lifestyles.

Between Anno Domini 1700 and 1750, the beginning of the Protohistoric Period, Europeans and their material culture began to have a significant influence on the native populations. By the early 1700s, horses were introduced to the region, and, over the next several decades, trade and settlement increased at a steady and sometimes accelerated rate. The Shoshone were the dominant Late Prehistoric Period and Protohistoric Period Native Americans in the region. Other Native American tribes, including the Crow, Ute, Comanche, Salish, Arapahoe, Cheyenne, Sioux, and the Gros Ventre, also inhabited, or passed through, southwestern Wyoming (Backer et al. 2001, Thompson and Pastor 1995). By the beginning of the Historic Era, the Eastern Shoshone Tribe and the closely allied Northern Shoshone-Bannock Tribe inhabited the area, at which time it was less frequently used by the Ute, Arapahoe and Cheyenne tribes.

Historic Era

The Historic Era of the Cokeville Meadows Refuge region began in the early 1800s and continued through World War II. Some of the first people of European decent in the region were the diverse and independent early trappers and explorers often referred to as mountain men. The height of mountain men activity in southwestern Wyoming encompasses the years from about 1810 to 1840 and was closely aligned with the rise and fall of the beaver skin trade networks. Several of their rendezvous—large gather-

ings of Mountain Men and Native Americans for beaver skin trade and exchange of various other goods—were held in the area, and many of the transportation routes used in later decades were explored and charted during this time.

Many transportation corridors crossed through the Cokeville Meadows Refuge area. Four major trail systems, the Oregon trail, the Mormon trail, the Overland trail, and the Emigrant trail, carried hundreds of thousands of people as they traveled west seeking new homes or fortunes. Each trail consisted of a system of primary routes and many cutoffs and side routes that often overlapped with other trails in the area. Beginning in the early to mid-1830s and continuing until 1869, these trails brought people, goods, and mail to much of the Rocky Mountain West. The completion of the transcontinental railroad in 1869 provided a quicker and easier way to travel west, and traffic along trails quickly slowed to a trickle.

The construction of the Lincoln Highway, starting in 1913, running just south of the refuge, allowed automobile traffic through the area.

The historical military presence in the refuge area was closely associated with the early trails and the need to move goods across the frontier. Fort Bridger, located approximately 40 miles to the south-southeast of the refuge, was a vital trading and military post from the early 1840s to 1890 and served as a resupply point for many of the wagon trains as they continued west. Confrontations with Native Americans occurred during the early years and increased as settlers poured into the region. The Fort Laramie Treaties of 1851 and 1868 were attempts to quell the increasing conflicts but yielded limited results. By the 1860s, the hostilities worsened, and many battles and skirmishes ensued. By 1890, the tribes had been moved off their lands and relocated to reservations.

The Homestead Acts of 1862 and 1909, along with many other acts that encouraged settlement and industry, started a boom and bust cycle that, to some extent, continues to the present. Industries, including charcoal production, coal mining, railroad tie manufacture, and oil exploration, in addition to cattle and sheep ranching, spurred the fast establishment of many settlements and small towns, many, of which, faded as quickly as they appeared.

Cokeville, Wyoming, is situated at the confluence of the Bear River and Smith's Fork valleys. Between 1812 and 1828, these valleys were the domain of Native Americans, fur trappers, and traders; during the 1830s and 1840s they became a well-traveled pathway of emigrant trains traveling to Oregon and California. Known as "Smith's Fork on the Bear River" to fur trappers and pioneers, Cokeville acquired its permanent name after the discovery of nearby coal deposits that produced coke, an intense burning, and virtually smokeless product.

The Mormon Church sent the first permanent settlers to the area in 1874 to found a community. Sylvanus Collett and Robert Gee arrived with their families at the Smith's Fork River, soon to be followed by the John Bourne family. The men trapped, hunted, and traded hides, furs, and extra meat for supplies in Evanston, Wyoming, about 70 miles south. The trip to Evanston was arduous; winter journeys were sometimes made on the frozen Bear River. The launching of the Oregon Short Line in 1881 made travel easier. The railroad stimulated trade, changing the center of the main settlement to the vicinity of the tracks.

Before 1906, Cokeville consisted of two saloons, a hotel, a general store, and boarding houses. In the next nine years it incorporated and added a state bank, a newspaper, a water system, and electric lighting. In 1922, Cokeville made national headlines when Ethel Stoner became mayor and two other women won seats on the town council. They ran on a law enforcement ticket, though, once in office, they found that the local police were disinclined to enforce Prohibition laws that were then in force.

After U.S. Highway 30 was commissioned through the town in 1926, then surfaced with oil in 1935, Cokeville found itself on a major cross-country route. The highway continues to play an important role in the town's economy (BLM 2004).

Identified Cultural Resources of the Refuge

Although many cultural resource sites have been recorded near Cokeville, Wyoming, few have actually been documented on the Cokeville Meadows Refuge. This lack of information reflects the relatively low potential for resources on most of the refuge because of its extensive wetlands and the lack of cultural resource surveys. Four resources, all historic, have been recorded; and their eligibility for the National Register of Historic Places has been decided:

- Depot or Thornock Property (site 48LN3936). Consensus: not eligible as of June 10, 2002.
- Etcheverry Property or Bear River Ranch (site 48LN4119). Consensus: not eligible as of October 25, 2004.
- Antelope Property (site 48LN4120). Field not eligible as of June 15, 2004.

- Beckwith and Quin Canal (site 48LN2711). Consensus: not eligible as of June 1, 2009.

Based on the USGS topographic map, several unrecorded ditches, water control structures, transportation-related features, and ranch structures are located on the refuge. Prehistoric sites, if present, are likely located in the upland areas of the refuge.

We will seek to develop a program that will find and interpret significant cultural resources in the area such as historic trails. Portions of the Oregon-California Trail System exist within the refuge acquisition boundary, but we do not now own them.

Law Enforcement

Law enforcement on the refuge is provided by a full-time Federal wildlife officer and a dual-function Federal wildlife officer, both stationed at Seedskadee National Wildlife Refuge. We seek and support cooperative law enforcement help from WGFD and the Lincoln County Sheriff's Department.

3.4 Partnerships

Cokeville Meadows Refuge actively expands its many partnerships. We see that partnerships, both on and off the refuge, are important ways to accomplish wildlife-dependent goals. These include coordination with WGFD to conduct wildlife disease control, surveys and monitoring, and habitat improvement projects both on and off the refuge. We also engage in partnerships with local, State, and Federal agencies, nongovernment organizations, local landowners, cooperators, and private corporations.

Our Partners for Fish and Wildlife Program is active in the refuge area providing technical help and cost-share projects to help landowners improve wildlife habitat on private land. When possible, our refuge staff work closely with the Partners biologist on projects that can help wildlife on both private and refuge lands.

The refuge does not now have, but would like to develop, a Friends group.

Landscape Conservation

We coordinate with Bear River Watershed Conservation Area partners to enhance and preserve wildlife habitat connectivity, and we would like to strengthen these efforts. However, because the refuge is not staffed, we are often limited to conservation activities within the refuge boundary.

3.5 Socioeconomic Environment

Cokeville Meadows Refuge is located in Lincoln County in the southwest corner of Wyoming. The county serves as a good starting point for evaluating the socioeconomic environment of the refuge.

Current Land Types and Uses

Lincoln County lies in the region known as the Upper Bear River area, where the land cover is made up primarily of grasslands and shrublands. It is estimated that about 75 percent of the land in this region is used for grazing (Utah Water Research Laboratory 2011). As of 2006, about 63 percent of the land in the Upper Bear River area counties was in Federal ownership, mostly under the BLM and USDA Forest Service. About 24 percent of the land is privately owned, 4 percent is owned by the States of Utah or Wyoming, and 7 percent is owned by Native American tribes (Conservation Biology Institute 2006).

County Population

Since the year 2000, Wyoming's population has increased by approximately 14 percent (U.S. Census Bureau 2010). Lincoln County has grown by 24 percent since 2000 with an estimated total population of 17,961 persons in 2012 (U.S. Census Bureau 2013). From 2000 to 2010, Lincoln was the fastest growing Wyoming county in the Bear River watershed. It is estimated that approximately 200 new homes are being built within Lincoln County each year (Royster and Gearino, 2006). While the total population and population density of this county is relatively sparse (table 5), the population of this area of the country is expected to continue growing apace with the Cache Valley area of Wyoming (U.S. Census Bureau 2010).

Todd Gallion / FWS

A meeting of the planning team.

Table 5. Population, income, education, unemployment, and poverty rate statistics for Lincoln County, Wyoming.

Residents (2010)[2]	18,106
Persons per Square Mile[4]	4.4
Percentage Population change since 2000[4]	+24
Median household income (2009)[4]	$59,160
Percentage of the population with a bachelor's degree or higher[3]	17
Percentage unemployed in 2008[1]	3.6
Percentage unemployed in 2011	6.6
Percentage of individuals below poverty (2009)[4]	8

Source: [1](Bureau of Labor Statistics 2008), 2(Bureau of Labor Statistics 2011a), 3(Bureau of Labor Statistics 2011b), 4(U.S. Census Bureau 2009).

Ethnicity and Education

In 2010, only 2 percent of Lincoln County's population identified themselves as Hispanic or Latino, while the rest of the population in the county identified themselves as white (U.S. Census Bureau 2010). The rate of individuals possessing degrees in higher education in this county is 23 percent.

Economy, Employment, Income, Recreation and Industries

Wyoming's poverty rate in 2009 stood at 10.2 percent. By contrast, Lincoln County had a poverty rate in 2009 lower than the statewide average (8 percent) and a median household income level ($59,160), which is higher than the statewide average (U.S. Census Bureau 2010).

Forestry, fishing, hunting, agriculture, and mining accounted for roughly 19 percent of total jobs in Lincoln County (U.S. Census Bureau 2011). Employment in timber is a small fraction of total employment and has decreased since 1999 (U.S. Department of Commerce 2010).

Following the national trend, wildlife viewing has become increasingly popular, while hunting and fishing have decreased or remained stable in popularity in and around Lincoln County. Statewide, for residents 16 years of age and older, 84 percent of individuals surveyed watched wildlife, 39 percent fished, and 19 percent hunted in Wyoming. (FWS 2008).

3.6 Operations

Operations at the refuge were limited from 1992 until 2002. A small budget was allocated in 2002, and a dedicated assistant manager was hired in 2004 but has since left the refuge. Other staff or resources to support refuge operations and maintenance have come from the headquarters at Seedskadee National Wildlife Refuge Complex. In 2008 funding was provided for a new building at the refuge and for the demolition of existing, dilapidated structures. The new building was completed in December 2009.

The following is a description of what constructed items exist on the refuge today and what is needed for the refuge to develop and operate. Topics include staff, equipment, facilities, railroad facilities, junk and debris, refuge mineral rights and energy development, and volunteers programs.

Funding and Staff

Cokeville Meadows Refuge is not currently staffed. Since 1993, our staff headquartered at the Seedskadee National Wildlife Refuge Complex in Sweetwater County, Wyoming, has managed Cokeville Meadows Refuge. The Seedskadee National Wildlife Refuge Complex staff of five full-time equivalent positions and two to three seasonal employees are

responsible for management activities at Seedskadee National Wildlife Refuge as well for Cokeville Meadows Refuge. The two refuges total 36,489 acres. Staff from Seedskadee National Wildlife Refuge Complex travel approximately 83 miles to work at the refuge.

In addition, Refuge System administrative staff support the Seedskadee National Wildlife Refuge Complex as part of a business team concept. Remotely stationed in Utah, Wyoming, Montana, and Colorado, they provide assistance with contracting, budget tracking, travel, and payroll.

Table 6 illustrates staff needs at Seedskadee National Wildlife Refuge Complex.

Equipment

The refuge has limited equipment to conduct refuge and maintenance operations. Some of the equipment is in poor condition and needs replacement. However, Seedskadee National Wildlife Refuge has a good fleet of equipment, and the two refuges share these resources.

Facilities

One multipurpose building on the refuge houses an office, a maintenance shop, cold storage, and a two-bedroom apartment. Other facilities include many dikes and water control structures, stock fences, gates, two-track service roads, the Pixley Dam (of which we own about half), multiple wells and pumps, a center pivot irrigation system, and four old buildings that are in need of demolition and removal.

There are two diversion dams on the Bear River within the refuge's acquisition boundary. Upstream, the BQ Dam provides water to several thousand acres of wet meadow and wetland habitats on both sides of the river via the BQ East and BQ West canals. The Pixley Dam is located in the center of the refuge boundary and provides irrigation water to several thousand more acres of wet meadow and wetland habitats along the Bear River via the Pixley East and Pixley West canals. Both dams are in bad condition, and the Pixley Dam needs to be replaced.

Public use facilities on the refuge include a parking lot, information kiosk, and short nature trail located near Netherly Slough, along Highway 30, on the east side of the refuge.

Table 6. Staff needs at Seedskadee National Wildlife Refuge Complex, Wyoming..

Official title	*Working title*	*Series, grade*	*Full-time equivalent position*	*Assignment*	*Stationed at*
Permanent staff					
Wildlife refuge manager	Complex manager	GS–0485–13	1	Seedskadee Refuge Complex	Seedskadee Refuge
Wildlife refuge manager	Deputy project leader	GS-0485-11	1	Cokeville Meadows Refuge	Cokeville Meadows Refuge
Wildlife refuge specialist	Wildlife refuge specialist	GS-0485-09	1	Seedskadee Refuge Complex	Seedskadee Refuge
Wildlife biologist	Wildlife biologist	GS–0485–09/11	1	Seedskadee Refuge	Seedskadee Refuge
Engineering equipment operator	Maintenance worker	WG–5716–10	1	Seedskadee Refuge	Seedskadee Refuge
Maintenance worker	Maintenance worker	WG–4749–08	1	Seedskadee Refuge	Seedskadee Refuge
Biological science technician	Biological science technician	GS-0404-07	1	Seedskadee Refuge Complex	Cokeville Meadows Refuge
Federal wildlife officer	Federal wildlife officer	GL–1801–09	1	Seedskadee Refuge Complex	Seedskadee Refuge
Temporary, term, and seasonal staff (as money allows)					
Biological science tech (temp)	Biological science tech (Temp)	GS–0404–05	0.5	Seedskadee Refuge Complex	Seedskadee Refuge
Biological science tech (temp)	Biological science tech (Temp)	GS–0404–03	0.5	Cokeville Meadows Refuge	Cokeville Meadows Refuge

Railroad Facilities

The Union Pacific Railroad bisects the Cokeville Meadows Refuge acquisition boundary from north to south and has facilities in the area.

Junk and Debris

Junk piles and unwanted property on the refuge pose risks to human safety and health.

Land Protection

The refuge is working with partners and local governments to prevent development by attempting to acquire lands in fee title or through conservation easements to reduce the threat of urban encroachment and habitat conversion.

Private lands outside the refuge acquisition boundary are being developed and turned into housing projects or converted and further developed via center pivot irrigation systems. It is anticipated that, in the short term, some private land within the acquisition boundary will also start to be developed.

Refuge Mineral Rights and Energy Development

We do not own the mineral estate of the lands we hold in fee title at Cokeville Meadows Refuge. In the past, oil and gas were extracted from lands surrounding the refuge boundary. Some mineral development is taking place within the approved acquisition boundary and some is taking place outside, and adjacent to, the acquisition boundary. Mineral development poses threats to refuge lands and habitat within the Bear River watershed both on and off the refuge. To protect wildlife habitats from the undue effects of human activities, we seek the withdrawal of subsurface Federal mineral rights from lands within the refuge boundary that are now administered by the BLM. Where appropriate, we will attempt to secure the subsurface mineral estate of lands purchased in fee title when the opportunity arises and work to reduce or mitigate changes brought on by such development.

Where we are successful in securing subsurface mineral rights, wildlife and the habitats on which they depend will be protected for the enjoyment of future generations. Where we are unable to secure subsurface mineral rights, wildlife and their habitats may be subjected to the temporary and permanent adverse effects of mineral development and transportation.

Pipeline and transmission line corridors have not been designated within the refuge boundary. We will evaluate requests for rights-of-way and surface disturbance on a case-by-case basis.

Inventory, Monitoring, and Research

Cokeville Meadows Refuge has never received the staff or money necessary for a scientifically sound inventory and monitoring program.

Nuisance Species and Predators

Nuisance species, whether terrestrial or aquatic, may include animals and invasive plants that could occur in some of the refuge's habitats and which threaten either the variety or abundance of native species; the stability of the ecosystem; the infrastructure of the refuge; and the commercial, agricultural, aquacultural or recreational activities that are dependent on the refuge's habitats. An animal or plant that is considered a nuisance species in a refuge because of the effects that its population size or behavioral patterns have on the refuge's habitats or infrastructure may not be considered a nuisance species on another refuge. Examples of species that at times have been considered a nuisance at Cokeville Meadows Refuge are muskrat and beaver.

The refuge also lies within the historical range of some species considered predators, such as the gray wolf, coyote, red fox, weasel, and others. Predators are an integral part of, and carry out important functions in, a healthy ecosystem. Sometimes predators that make use of refuge habitats may pose a danger to humans or cause damage to private livestock or property near the refuge. Under certain circumstances we allow these animals to be captured or lethally controlled on refuge lands (appendix I).

Volunteers Programs

The refuge operates a small volunteers program.

Chapter 4—Management Direction

Tom Koerner / FWS

Leopard Frog

This CCP will serve as the primary management document for Cokeville Meadows Refuge until it is formally revised. We will carry out the actions identified herein with help from existing and new partner agencies, organizations, and the public. There are no assurances that projects identified in this CCP will be fully, or even partially, financed. However, within every planning effort there are opportunities to examine current funds and other available resources, to choose implementation strategies, and to prioritize projects for improved effectiveness.

It is important to note that we place the highest priority on two groups of species—together known as trust species—and hold special responsibility in managing and conserving them. The first group contains those that are State or federally listed as endangered or threatened. The second group contains those listed as migratory birds, and a long list of these can be found in the Migratory Bird Treaty Act. For the most part, migratory birds include all bird species that occur in the U.S. with the exception of nonnative birds like European starling, English sparrow, and Eurasian collared dove and nonmigratory birds like sage-grouse. Objectives in this chapter are written with trust species in mind.

According to Section 3, Subsection 7, of Service Director's Order 172, "Responsibilities of Federal Agencies to Protect Migratory Birds," many Service programs are actively involved in bird conservation activities. Our objective for migratory bird management and conservation is to reduce the potential adverse effects of migratory bird take, with the goal of ending take, while implementing our mission. All Service programs strive to take an ecosystem approach to the protection and restoration of species and their associated habitats. As migratory birds is one of our trust resources, all programs must emphasize an interdisciplinary, collaborative approach to

migratory bird conservation in cooperation with other Service programs, in addition to other governments, State and Federal agencies, and non-Federal partners. However, we recognize that direct or indirect actions taken by our employees in the execution of their duties and activities as authorized by Congress may result in the take of migratory birds. In many instances, short-term negative impacts on migratory birds are balanced by long-term benefits. We will incorporate ecosystem integrity, reduction of invasive species, and long-term adaptive management in migratory bird management, using the best available scientific information (FWS 2004).

4.1 Management Focus

We will manage the refuge to improve resources and refuge operations and increase wildlife and habitat productivity within, and outside of, the refuge boundary. We will focus on managing lands within a greater landscape footprint by using partnerships to enhance habitats throughout the Bear River watershed in Wyoming. We recognize that great wildlife habitat exists outside of the refuge in private ownership or managed by other government agencies, and we would broaden our scope to work with partners throughout the Wyoming portion of the Bear River watershed where opportunities exist to improve and conserve wildlife habitat. We also want to reach out to private landowners to help them improve habitat for wildlife while they run their farms and ranches as they see fit.

We will continue to acquire land and easements to round out the acquisition boundary. We will restore and manage wet meadow and upland habitats to increase wildlife productivity and diversity. We will specifically gear agricultural practices to enhance refuge habitats for wildlife both on and off refuge lands. We will emphasize developing visitor resources such as access and opportunities for wildlife-dependent uses like hunting, fishing, wildlife observation, photography, interpretation, and environmental education to encourage a greater understanding and appreciation of the Bear River watershed; wet meadow, riparian, and stream habitats; and wildlife.

We propose that greater attention be given to Cokeville Meadows Refuge by the staff of the Seedskadee National Wildlife Refuge Complex so that we may conduct site-specific research; strengthen and support current partnerships and build new ones; develop specific, biologically based, and goal-oriented stepdown management plans; and guide future management decisions for the refuge.

4.2 Summary of the CCP

The issues discussed in this CCP were derived from the input of local citizens and communities, cooperating agencies, conservation organizations, and refuge staff. We developed four unique management alternatives to address the issues, concerns, and opportunities expressed during the scoping process (chapter 1). Once we assessed the environmental consequences of the implementation of each of the four alternatives, we identified alternative D as the proposed action after deciding that it would accomplish the following:

- best achieve the purposes, vision, and goals of the refuge
- help fulfill the Refuge System mission
- maintain and, where appropriate, restore the ecological integrity of the refuge and the Refuge System
- address identified significant issues and mandates
- be consistent with the principles of sound fish and wildlife management

We developed objectives in support of the goals identified in chapter 2 to carry out the proposed action. Strategies to achieve those objectives; rationales supporting the goals, objectives, and strategies; and the assumptions used in developing the CCP are described in this chapter. A description of refuge resources that will be affected by the proposed action may be found in chapter 3.

The Administration Act (appendix E) requires the Secretary of the Interior to make sure that public uses are compatible with refuge purposes before they are permitted. The CCP process requires a compatibility determination for all existing and proposed uses. Compatibility determinations for the refuge (appendix B) include cooperative farming, hunting, fishing, trapping, wildlife observation and photography, environmental education and interpretation, prescribed haying and grazing, and research.

4.3 Overview of Goals and Objectives

This section discusses objectives, and strategies that serve as the steps needed to achieve the goals of this CCP:

- 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 shows what is to be achieved, the extent of the achievement, who is responsible, and when and where the objective should be achieved.
- The rationale for each objective provides context, such as background information, assumptions, and technical details.
- The strategies describe the actions needed to achieve the objectives.

We base many goals and objectives on habitats rather than on wildlife because wildlife often respond to factors beyond the control of local refuge management. Managing migratory birds is a good example. And our management practices, such as fire, grazing, haying, tree planting, and water level manipulation, usually help wildlife communities by way of improved habitat conditions rather than by helping them directly. Habitat-based objectives emphasize the checking of important vegetation structure over time, which can be done by the staff we have. Checking wildlife population responses to changes in habitats, however, would require more staff. In lieu of checking wildlife directly, site-specific inventories, applied research, and literature reviews offer reasonable predictions of wildlife responses to habitat management.

Habitat and Wildlife Management Goals

This section discusses objectives and strategies for habitat and wildlife management.

Wet Meadow Habitat and Wildlife Goal

Using the best scientific practices to manage and preserve critical wet meadow habitat, the refuge will provide quality feeding, loafing, and breeding opportunities for a diversity of migratory birds and resident wildlife.

Indicator Species. American bittern, redhead, northern pintail, white-faced ibis.

Aim. Restore and expand bulrush sites where appropriate throughout the refuge; keep a variety of seasonal to semi-permanent flooding regimes to encourage the nesting and feeding of indicator species.

Table 7 shows the vegetation needs of indicator or focal species in the wet meadow habitat.

Wet Meadow Habitat Objective 1

Continue to keep at least 10 percent bulrush-dominant wet meadows and wetlands, and increase the bulrush part in selected wet meadow and wetland sites by 20 percent over the course of the CCP. Make sure that wet meadow habitat is moderately dominated by native graminoids (sedges, rushes and grasses).

Wet Meadow Habitat Objective 1—Specific Strategies

- Determine white-faced ibis nesting status and trends on refuge lands.
- Collaborate with other agencies, nongovernment organizations and volunteers to conduct forage and foraging habitat baseline and availability on refuge lands.
- Use GIS to map important foraging habitat on refuge lands.
- Find sites on refuge lands that are conducive to establishing bulrush patches adequate for waterbird nesting.
- Work to establish bulrush patches suitable for white-faced ibis nesting.

Wet Meadow Habitat Objective 2

Keep a variety of constant and stable water levels and reduce human disturbances to nesting areas during the breeding season (mid-April through July 10) in wet meadows and wetlands.

Wet Meadow Habitat Objective 2 —Specific Strategy

- Reduce human disturbances in nesting colonies during the breeding season through proper area and seasonal closures; the careful placement of public parking lots, roads, and trails; and continued coordination with cooperators.

Wet Meadow Habitat Objective 3

Within 5 years, make sure that at least 10 acres of contiguous wet meadow habitat scattered throughout the refuge are dominated by water depths of between 6 to 36 inches and emergent vegetation that creates a

Table 7. Indicator species in wet meadows habitat by needs at Cokeville Meadows National Wildlife Refuge, Wyoming. .

Indicator species	*Vegetation species diversity needs*	*Vegetation structure or cover needs*	*Food preference or source*	*Habitat and Water regime needs*
American bittern	Bulrushes, cattails, reeds, sedges, dense wet meadow grasslands	Tall (3–4.5 feet), dense emergent vegetation, prefers wetlands greater than 7 acres	Frogs and other amphibians, small fish, aquatic insects and invertebrates, small mammals occasional reptiles	Water >= 10 centimeters (4 inches), nests above water 4–24 inches deep
Redhead	Rushes, cattails, dense stands of emergent vegetation for nesting	Nests on emergent vegetation on shallow water attached to surrounding vegetation and built with rushes, reeds, and cattails; may sometimes nest on the ground on the edge of wetlands	Aquatic vegetation, insect larvae, snails, mollusks, small crustaceans, seeds, buds and tubers of submergent aquatic plants	Shallow water for nesting but deep for feeding (commonly 3–10 feet) and brood-rearing, near larger water bodies
Northern pintail	Grasslands, cultivated fields, sandy flats, lake marsh pond	Nest concealed in grass stubble Nests further from wetlands and sparser vegetation Vegetation height less than 12 inches 40 percent open water for brood habitat	Snails, shrimp, midges, earthworms, grains, bulrush seeds, pond weeds, spikerush, widgeon grass, smartweeds Diet 90 percent vegetation: seeds, aquatic vegetation, sedges, grain, minnows, aquatic invertebrates, tadpoles, insects	Uses a variety of wetlands from seasonal to semipermanent Breeding sites are typically small, shallow wetlands, with emergent vegetation and low vegetation cover in surrounding uplands
White-faced ibis	Nests in bulrushes and cattails (either floating or attached to aquatic vegetation); forages in flooded meadows and agricultural fields	Tall, dense emergent vegetation for nesting and shallow water areas for foraging*	Aquatic and moist soil invertebrates, especially earthworms and larval insects, leeches, snails, crayfish, small fish, frogs, midges, occasional aquatic vegetation	Strong preference for >74 acres, relatively level (<5-percent slope) fields with standing water 8 inches or less water depth

Source: *Andrea Orabona, WGFD nongamebird biologist, personal communication.

mosaic of relatively short (less than 1 foot) to moderately tall (1–2 feet) cover conducive for brood rearing and foraging habitat.

Strategies Common to All Wet Meadow Habitat Objectives

- Use a combination of prescribed fire, prescriptive livestock grazing, and mechanical or chemical treatments to determine the best method for invasive plant species control and the restoration of native wet meadow vegetation.
- Collaborate with WGFD, the Rocky Mountain Bird Observatory, and other entities to conduct necessary monitoring and wildlife data-gathering activities in support of these objectives.
- Collaborate with the Lincoln County Weed and Pest District, permittees, and other stakeholders to control invasive plant species.
- Conduct a vegetation inventory and monitoring program to assess if target species' habitat needs are being met.

Todd Gallion / FWS

Cub scouts looking for wildlife on the refuge.

- Review all water-management structures for improvements or repairs that would enhance management capabilities, assess and adjust water control structures and management plans to achieve habitat objectives.
- Determine baseline waterfowl, waterbird, and shorebird nesting status in wet meadow habitats.
- Sample vegetation zones (wet meadow, shallow and deep marsh, open water) to measure the percentage cover of different species and to complete a vegetation species inventory for each zone.
- Work with partners to conduct aquatic vegetation and invertebrate abundance and biomass surveys on the refuge to assess current wet meadow health and productivity.
- Estimate the percentage of emergent vegetation cover either visually or by GIS area determination using aerial photography.
- Find out if prescriptive wet meadow livestock grazing and haying are achieving habitat objectives through increased and improved oversight, monitoring, and research, and determine the distribution, abundance, and nesting success of wet meadow species.
- Conduct water quality sampling to determine amounts of salinity and total dissolved solids.
- Issue special use permits exceeding 5 years but for no more than 10 years at the manager's discretion and when it is found to be appropriate to meet the goal and objectives of wet meadows habitat. This permit is intended to offset the substantial financial costs associated with carrying out long-term restoration projects that a cooperator would accept to improve refuge habitats.

Wet Meadow Habitat Objectives Rationale

Healthy wet meadows on the refuge are essential because they provide habitat for a large variety of wetland-dependent species, which need to have a variety of vegetative heights and water depths, with some areas of vegetation that are dense and others that provide open areas for loafing and foraging. The American bittern, for example, is totally dependent

on wetland habitats and prefers large wetlands (at least 7 acres) with tall, dense, emergent vegetation such as cattails, rushes, and reeds inhabiting marshes with open water in the center, gradual slopes, a band of emergent vegetation around the periphery, and idle grassland in the adjacent uplands. Water quality conducive to the prey base is essential for these species.

To keep these habitats healthy and productive, we would use a combination of water management, prescribed fire, prescriptive livestock grazing, and mechanical or chemical treatments to provide a variety of wet meadow habitats for the greatest number and variety of species possible. Using all management techniques and the best science available, we would find methods to control invasive plant species and restore native wet meadow vegetation.

Upland Habitat and Wildlife Goal

Manage and, where appropriate, enhance the diversity and composition of grassland and shrub–steppe habitats within the range of historical conditions for sagebrush-dependent species, upland nesting migratory birds, and other resident species.

Indicator Species. Sage sparrow and short-eared owl.

Aim. Keep sagebrush in Wyoming in large continuous stands made up of a mosaic of open (5 percent) to moderate (25 percent) shrub cover and a variety of ages and heights.

Upland Habitat Objective 1

Within 4 years and for the duration of this plan, reestablish native grassland vegetative cover made up of an understory of western wheatgrass, thickspike wheatgrass, bluebunch wheatgrass, basin wildrye, Indian rice grass, and other native grasses and native forb species to help upland-nesting and brood-rearing species such as dabbler, horned lark, vesper sparrow, Savannah sparrow, western meadowlark, long-billed curlew, short-eared owl, and northern harrier.

Upland Habitat Objective 2 (existing native habitat)

Within 7 years of plan approval, and for the duration of this plan, manage shrub–steppe grasslands to improve vegetation conditions to meet a sagebrush canopy cover of at least 5 percent and no more than 30 percent with heights greater than 20 inches and a clumped or patchy low grass or forb understory made up of mostly bunchgrasses and native forb species.

Upland Habitat Objectives 1 and 2 Strategies

- Use prescriptive livestock grazing to make sure that both early and late-successional stages help short-eared owls and other wildlife species.
- Begin the vegetation monitoring of shrub–steppe and grassland habitats to make sure that there is adequate sagebrush, native bunchgrass, and forb cover to support target species.
- Support partnerships to make sure that there is adequate monitoring of greater sage-grouse.
- Collaborate with WGFD, the Rocky Mountain Bird Observatory, and other entities to conduct necessary monitoring and wildlife data-gathering activities.
- Evaluate interior fences for their condition and effectiveness in managing the prescriptive livestock grazing program.
- Collaborate with the Lincoln County Weed and Pest District, permittees, and other stakeholders to control invasive plant species.
- Conduct experiments using a combination of prescribed fire, prescriptive livestock grazing, and mechanical or chemical treatments to find the best method for invasive species control and the restoration of native grasses.
- Find and rank future areas for restoring to native species.
- Examine potential revegetation choices based on the surrounding native plant communities.
- Issue special use permits exceeding 5 years, but for no more than 10 years, at the manager's discretion and when found to be appropriate to meet the goal and objectives for upland habitats. This long-term permit is intended to offset the substantial financial costs associated with carrying out long-term restoration projects that a cooperator would accept to improve refuge habitats.

Upland Habitat Objectives Rationale

It is important that upland habitats be restored for the health of wildlife species that depend on them. Some of the upland habitats on the refuge were converted to agricultural crops before our ownership and need work to be restored to their native conditions. Doing this restoration would provide a key habitat type that is missing for many species.

To keep these habitats healthy and productive, we would use a combination of water management, prescribed fire, prescriptive livestock grazing, and mechanical or chemical treatments to provide a variety of healthy and productive upland habitats for the greatest number and variety of species possible. Using all management techniques and the best science available, we will find methods for controlling invasive plant species and restoring native upland vegetation. After restoration, a range assessment will be conducted to figure out stocking rates for livestock. This will help make sure that grazing used as a management tool will not negatively affect newly restored habitats.

Riparian and River Habitats and Wildlife Goal

Maintain and, where appropriate, restore the processes necessary to sustain the biological diversity and integrity of riparian vegetation and aquatic habitats for breeding birds, native fishes, reptiles and amphibians.

Indicator Species. yellow warbler, common yellowthroat, northern leopard frog.

Aim. Restore and expand riparian woodlands and wooded marshes, where appropriate throughout the refuge, to provide the adequate variety and structure of plant species needed to encourage the nesting of indicator species and to attract and support adequate food sources.

Table 8 shows the vegetation needs of the indicator and focal species of riparian and river habitats.

Table 8. Indicator species in riparian and river habitats by needs at Cokeville Meadows National Wildlife Refuge, Wyoming.

Indicator species	*Vegetation species diversity needs*	*Vegetation structure or cover needs*	*Food preference or source*	*Habitat and Water regime needs*
Yellow warbler	Nests in wet deciduous thickets, dominated by willows, alder, dogwood	Riparian woodlands, wooded marshes; riparian shrubs (nest placement at 1–14 feet) below 8,000 feet. Midstory and canopy. Will eject cowbird eggs or build another layer over them	Insects and other arthropods; caterpillars, moths, beetles, aphids; some occasional berries	Riparian-obligate
Common yellowthroat	Willow and marshes below 8,000 feet.	Nest placement at 0–3 feet; Dense, riparian shrubs near water. Uses understory. Third most commonly cowbird-parasitized bird	Insects such as grasshoppers, spiders, beetles, butterflies, dragonflies, and a few seeds	Riparian-obligate
Northern leopard frog	Sedges, cattails and tallgrasses.	Breed and lay eggs in stock ponds, semipermanent ponds, margins of larger lakes and beaver ponds, or in the backwaters out of the main flow of the stream; Forage among sedges, cattails and tallgrasses. Winter in ponds, buried in mud; shallow ponds for breeding and deep pools to hibernate	Invertebrates such as beetles, flies, ants, worms, and snails. But adult frogs sometimes consume voles, small birds, snakes, small fish, and other amphibians	Riverine and wet meadow wetlands, up to 9,000 in elevation; Swampy cattail marshes on plains and in beaver ponds in montane zones Breeding season: mid-march through July

Riparian Habitat Objective 1

Support, protect, and enhance existing shrub (greater than or equal to 40 percent canopy cover) and tree habitat to allow it to expand into dense patches with a variety of native herbaceous, shrub, and tree species (various native sedges, willows, alder, dogwood, cottonwood); age classes; and structural heights to provide the cover needed for neotropical migratory bird nest concealment and for streambank stabilization and shading.

Riparian Habitat Objective 1—Specific Strategy

- Survey, name and map (using GIS) all herbaceous, shrub, and tree species found along the refuge's riparian corridor; define native species' potential; and figure out the degree of invasive plant infestation.

Riparian Habitat Objective 2

Restore at least 25 acres of dense (greater than or equal to 40 percent canopy cover) willow in patches greater than or equal to 0.5 acre in size and greater than or equal to 60 feet wide on either side of the river to connect existing willow patches for yellow warbler, common yellowthroat, and other neotropical migratory birds that nest here and for increased streambank stabilization and stream shading.

Riparian Habitat Objective 2—Specific Strategies

- Cordon off segments of the riparian corridor with electric and wildlife-friendly fencing during the establishment of woody species.
- Using adaptive management, find and apply effective methods, including planting native vegetation, to restore the riparian corridor composition of the Bear River watershed.
- Manage livestock grazing to make sure that riparian habitat is allowed to establish and that willows are not removed or that canopy is not reduced.

River Habitat Objective 1 (find and improve river habitat types)

Within 7 years, develop partnerships to help find , monitor, and improve various river habitat types, such as pools, riffles, runs, glides, in greater than or equal to 1 mile of the Bear River within the boundary of the refuge.

River Habitat Objective 1—Specific Strategy

- Develop and support all necessary partnerships, such as with Trout Unlimited, WGFD, and the Lincoln County Conservation District, to find and map river habitat types and where sources of dissolved solids and other sediments enter the Bear River within and beyond the refuge boundary.

River Habitat Objective 2

Work with partners to find and remove barriers to improved habitat connectivity for all native riverine species in the Bear River within and beyond the refuge boundary.

River Habitat Objective 2—Specific Strategies

- Replace the Pixley Dam with a fish passage-friendly structure designed to allow the movement of native fishes from one side of the dam to the other.
- Replace or update irrigation diversion structures and culverts that create barriers and entrapment issues for fish species.

Bernardo Garza / FWS

A panorama of Cokeville Meadows Refuge looking west.

- Work with the Partners for Fish and Wildlife program to find private landowners who are interested in projects to improve riparian and riverine habitats on their lands.
- Work with cooperators of the BQ Dam to help resolve riverine species passage issues.
- Strategies Common to All Riparian and River Habitats Objectives
- Use a combination of prescribed fire, prescriptive livestock grazing, and mechanical or chemical treatments to find the best method to control invasive plant species control and restore native riparian vegetation.
- Collaborate with WGFD, the Rocky Mountain Bird Observatory, and other entities to conduct the necessary research, inventory, and monitoring of terrestrial and aquatic wildlife populations.
- Collaborate with the Lincoln County Weed and Pest District, permittees, and other stakeholders to control invasive plant species.
- Collaborate with WGFD to monitor and control aquatic invasive species.
- Conduct a vegetation inventory and monitoring program to see if target species' habitat needs are being met.
- Review all water management structures for improvements or repairs that would enhance management capabilities, and assess and adjust water control structures and management plans to achieve habitat objectives.
- Determine baseline waterfowl, waterbird, shorebird, and neotropical migratory bird species nesting status in the riparian corridor and aquatic species' life history habitat needs in the riverine corridor within the refuge.
- Sample riparian and riverine corridor vegetation zones to measure the percentage cover of different species.
- Sample physical characteristics of riverine habitats within the refuge boundary.
- Work with partners to conduct aquatic and riparian vegetation and invertebrate abundance and biomass surveys on the refuge to assess current river and riparian health and productivity.
- Figure out if prescriptive livestock grazing is achieving habitat objectives by using increased and improved oversight, monitoring, and research, and determine the distribution, abundance, and nesting success of riparian corridor species.
- Sample water quality for salinity and total dissolved solids.

Riparian and River Habitats Objectives Rationale

Sections of the Bear River on the refuge had willows removed before we acquired them, probably in an effort to increase hay yields. These open stretches of river have:

- less bank stability, resulting in the potential for increased sedimentation;
- decreased shade over the stream, resulting in increased water temperatures for trout;

Bernardo Garza / FWS

A panorama of Cokeville Meadows Refuge looking east.

- sparse woody vegetation for use by songbirds or other wildlife.

Given the growth characteristics of willows, their lack of expansion here leads us to believe that there is substantial herbivory by species other than livestock or that hydrology has been significantly altered by upstream diversions. With this in mind, we will fence willow plantings. Haying and grazing practices in the riparian zone will be modified to encourage willow establishment, and hydrological needs will be considered. Monitoring will be needed to document our efforts and to note any significant changes to existing willow communities.

We also recognize that there are issues with instream habitat for fish and other aquatic species including:

- sediments in the water from upstream agricultural and irrigation practices;
- instream diversions (BQ and Pixley Dams) that cause river downcutting below them and reduce species diversity because they lack fish passage;
- lack of instream structure to provide quality fish habitat, such as riffles, runs, glides, and shading from overhanging riparian vegetation on the riverbanks.

Willow plantings and changes to haying and grazing practices in the riparian zone would help to improve some of the riverine issues identified, but more work would be required to create necessary structures in the river to promote better habitat conditions for aquatic species such as fish, mollusks, and amphibians.

Invasive Species

The following objectives propose abatement and control measures for several species.

Mosquito Abatement and Control Objective

Within 3 years, meet with State and county officials to share with them our nationwide policy and to begin coordinating efforts to make sure that mosquito abatement on the refuge complies with Federal and State regulations.

Mosquito Abatement and Control Objective Strategies

- Develop a mosquito monitoring, abatement, and control plan in coordination with State and county officials.
- Set up all necessary points of contact to make sure that there are sufficient meetings and that there is adequate coordination with State and county officials.

Grasshopper Abatement and Control Objective

Within 3 years, meet with State and county officials to share with them our nationwide policy and to begin coordinating efforts to make sure that grasshopper and cricket control on the refuge complies with Federal and State regulations.

Grasshopper Abatement and Control Objective Strategies

- Develop a grasshopper and cricket monitoring, abatement, and control plan in coordination with State and county officials.
- Set up all necessary points of contact to make sure that there are sufficient meetings and that there is adequate coordination with State and county officials.

Mosquito and Grasshopper Abatement and Control Objectives Rationale

Developing a plan with the help of local community, county and State officials that describes monitoring protocols and establishes thresholds for treatment in the event that there are threats to human health and safety would provide a better understanding of the refuge and how it deals with infestations and disease issues. It should also provide an advanced directive on how to deal with such issues.

Integrated Pest Management Objective

Within 7 years, our staff would develop and have a final IPM plan in place to deal with fast-spreading diseases among animals and pest-carried disease issues.

Integrated Pest Management Objective Strategies

- Work with Region 6's IPM coordinator to develop the IPM plan for the refuge.
- Work with Region 6's contracting division to find ways to contract out the writing of an IPM plan.
- Hire a term employee to develop and write an IPM plan.

Integrated Pest Management Objective Rationale

We not only have to apply our own regulations, but we need a plan that has undergone the NEPA process to help us deal with all pest species in an agile and proactive way. The plan must provide thresholds and acceptable alternatives for treatments.

Wildlife Diseases, Crop Depredation, and Private Property Damage

The following objectives propose actions to control wildlife diseases, crop depredation, and private property damage.

Wildlife Diseases Objective

Carry out management activities and establish partnerships that help to prevent disease transmission from wildlife to livestock on and off refuge lands.

Wildlife Diseases Objective Strategies

- Develop a comprehensive wildlife disease contingency plan.
- Develop and carry out a hunt plant that reduces the commingling of elk and livestock.
- Work with partners to institute a forage reserve and grazing management plan to make sure that there is wide distribution and adequate dispersal of wild large ungulates throughout the Bear River watershed to end their commingling with domestic livestock.
- Coordinate with WGFD and other agencies to conduct hazing operations when necessary to prevent the commingling of wild large ungulates and domestic livestock.
- Coordinate with WGFD to increase game sampling operations in the area.

Wildlife Diseases Objective Rationale

Developing plans to reduce or mitigate the potential transmission of wildlife diseases to domestic livestock or humans is an important part of wildlife management and part of our being a good neighbor. While the potential for disease transmission is low, having plans in place would allow us to apply measures to address a problem in order to save lives and reduce financial hardships.

Crop Depredation Objective

Use small grain crops or other vegetative cover in designated areas of the refuge to help adjacent landowners to reduce damage to their crops from wildlife depredation.

Crop Depredation Objective Strategies

- Rotate crops through areas designated for the establishment of native vegetation to exhaust weed seed banks before planting native vegetation.
- Find two to three small areas on the refuge where small grain crops can be grown.
- Find ways to offset crop damage through permitting for other agricultural uses on the refuge.
- Define a rotational scheme for different vegetative covers in designated areas of the refuge.

Private Property Damage Objective

Make sure that our management activities and our compatible public use activities on the refuge help abate damage to private property next to the refuge.

Private Property Damage Objective Strategies

- Coordinate hunting seasons with WGFD.
- Hold annual meetings with WGFD and local landowners to discuss damage issues and to develop solutions to abate damage.
- Find ways to offset private property damage through permitting for other agricultural uses on the refuge.

Crop Depredation and Private Property Damage Objectives Rationale

Cokeville Meadows Refuge will be in a restoration phase for several years on areas identified to be reseeded to native vegetation. We will have grain crops in advance of native seeding to reduce weed seed buildup in those fields being restored. This would provide a grain crop on the refuge for wildlife and reduce damage on private lands.

After restoration activities are completed, and in cooperation with WGFD, we will find areas on the

refuge that could be used to plant small grains to reduce crop damage on private land.

Wildland Fire Management Goal

Manage wildland fires using a full array of strategic options from suppression to manipulating a fire to achieve benefits. Prescribed fire, manual, and mechanical treatments will be used to: (1) reduce the threat to land and property through hazardous fuel reduction treatments, and (2) meet the habitat goals and objectives identified in this CCP.

Wildland Fire Management Objective 1

Manage wildfires according to our and Federal wildland fire policies.

Wildland Fire Management Objective 1 Rationale

Current (2009) Federal wildland fire policy allows wildfires to be managed for multiple objectives. A wildfire can be managed for suppression in one area and managed to achieve benefits in another. As conditions change, these objectives can change.

Before European settlement, wildfires had the ability to burn vast areas. Today, there is still potential to have large fires (greater than 300 acres), but this has been reduced mostly because of wildfire suppression. While the potential for large fires has decreased, there is still a high probability that wildfires on Cokeville Meadows Refuge will damage neighboring property. Therefore, most wildfires that occur on the refuge will be suppressed.

Region 6 has identified fire management zones. Under this approach, the level of fire management staff would be determined by established modeling systems based on workload. Data used to figure out the workload is based on historical wildfire suppression activities as well as on historical and planned fuel treatments.

Realizing that fire management staff and equipment may be placed anywhere within a fire management zone, using our refuge staff as well as other Federal and non-Federal partners to aid in wildfire suppression is a priority. We will attempt to keep and encourage more fire qualifications for our refuge staff. In addition, local agreements between Federal and non-Federal partners will be kept or added.

Wildland Fire Management Objective 2

Within 1 year of plan approval, complete and submit for Region 6 review and approval a revised fire management plan (FMP) that reflects the goals and objectives identified in this CCP. Within 3 years, begin carrying out a prescribed fire program at the refuge.

Tom Koerner / FWS

Mallard Ducklings

Tom Koerner / FWS

Mallard Drake

Wildland Fire Management Objective 2 Rationale

Our policy requires that every refuge that has burnable vegetation must have an FMP. The FMP is a stepdown plan from the CCP that guides the fire management program. One will be instituted to meet national, Region 6, and refuge goals and objectives. An approved FMP allows our refuge manager to consider a wide range of suppression alternatives and to conduct prescribed fires.

The FMP is intended to be dynamic and reflect current policies and situations and is periodically reviewed or revised. Required updates or revisions will follow our national and Region 6 policies and guidance.

Wildland Fire Management Objective 3

Increase the use of prescribed fire to 1,000–1,500 acres per year. This includes maintenance-style burning such as in irrigation ditches and around water control structures.

Wildland Fire Management Objective 3 Rationale

Fire supports and restores nearly all the habitats located within the refuge. The frequency and magnitude of prescribed fires can have a profound effect on a habitat's successional state and the transition from one habitat type to another. After European settlement, wildfires were suppressed, which disrupted the natural disturbance cycle. Prescribed fire is an effective tool for restoring native plant communities, recycling nutrients, reducing or eliminating nonendemic vegetation, increasing the growth and production of native plants, reducing woody encroachment, and reducing the risk of catastrophic wildfire. The Improvement Act states that we must make sure that "biological diversity," "biological integrity," and "environmental health" is maintained and, by definition, these include, "…the natural biological processes that shape genomes, organisms, and communities…" such as fire.

Past fire history for the refuge is not well known. Since the refuge was established, no prescribed fires have occurred. Local residents have periodically burned lands now within the refuge acquisition boundary.

Wildland Fire Management Objective 4

Within 3 years, develop a comprehensive prescribed burn plan that identifies priority areas within the refuge for treatment and establishes burns on a rotational basis.

Wildland Fire Management Objective 4 Rationale

Per our policy, a prescribed burn plan is required before conducting prescribed fire. Because staff is limited, priorities need to be established to find which areas are most suitable for prescribed fire application.

Wildland Fire Management Objective 5

Increase the number of partners and interagency prescribed fires.

Wildland Fire Management Objective 5 Rationale

We have limited fire staff within our Region 6 fire management zone and limited staff at Seedskadee National Wildlife Refuge Complex. Help from partners is needed to fully carry out a prescribed fire program at Cokeville Meadows Refuge. We will pursue partnerships with other Federal agencies like the BLM and non-Federal cooperators to carry out prescribed fire on the refuge.

Wildland Fire Management Objective 6

Carry out and monitor prescribed fire, chemical, or mechanical treatments to reduce hazardous fuels throughout the refuge. Over the next 5 years, if funding allows, treat 20 percent of our lands that are close to places where values are at risk.

Wildland Fire Management Objective 6 Rationale

Hazardous fuel treatments are conducted to reduce the threat of catastrophic wildfire to values at risk. Values at risk may include sensitive habitats or species, cultural resources, Federal and private infrastructure and facilities, and nearby local communities. Our fire management and refuge staffs will collaborate with affected parties in developing Community Wildfire Protection Plans (CWPP) and hazardous fuels reduction treatments and in adding or removing communities that are at risk or that are of interest.

Wildland Fire Management Objective 7

Use Burned Area Emergency Response or Burned Area Rehabilitation funding as needed following wildfires.

Wildland Fire Management Objective 7 Rationale

Wildfires can cause damage to natural and cultural resources or improvements. Burned Area Emergency Response treatments are intended to protect public safety and stabilize and prevent further degradation to natural and cultural resources. These treatments are considered emergencies and are done within 1 year of wildfire containment. Burned Area Rehabilitation treatments are nonemergency efforts done within 3 years of wildfire containment to improve fire-damaged lands that are unlikely to recover to management-approved conditions or to repair or replace minor facilities that are damaged by wildfire. The use of Burned Area Emergency Response or Burned Area Rehabilitation funding will follow our national and Region 6 policies and guidance.

It is anticipated that Burned Area Rehabilitation has the potential to be used most within the refuge. Burned Area Rehabilitation funding can be used to repair or replace fences damaged because of wildfire as well as to treat burned areas to prevent the spread of invasive plants.

Strategies Common to All Wildland Fire Management Objectives

- Safely suppress all wildfires within the refuge boundary.
- Maintain fire qualifications for all capable Seedskadee National Wildlife Refuge Complex staff.
- Update the FMP as needed to accommodate this plan.
- Make the treatment of refuge lands near the wildland–urban interface a high priority for the reduction of hazardous fuels.
- Develop and support all necessary partnerships with State, county and local agencies and authorities to make sure that wildland fire suppression efforts are successful.

Visitor Services and Cultural Resources Goal

Provide appropriate public access to refuge lands where visitors can safely enjoy compatible, wildlife-dependent recreation, such as hunting, fishing, wildlife observation, photography, environmental education, and interpretation. The refuge will seek partnerships to help protect onsite cultural resources.

Public Access Objective 1

Within 7 years, develop a safe auto tour route and open it to the public.

Public Access Objective 1 Strategies

- Work with Union Pacific Railroad to develop a safe auto tour route within the refuge.
- Work with Wyoming Travel and Tourism Board to secure money to develop an auto tour route and facilities.
- Contact the Federal highway coordinator to get Federal access over the railroad.
- Develop projects through Region 6's EVS.
- Develop projects for Federal highways money on the identified auto tour route.
- Include Federal highways and refuge roads funds as potential sources to pay for roads, not just to pay for potential projects.

Public Access Objective 2

Within 3 years, develop a safe access point into the Etcheverry tract or another site on the western side of the refuge.

Public Access Objective 3

Within 3 years, develop a safe access point into the Thornock tract or another site on the eastern side of the refuge.

Public Access Objective 4

Within 3 years, develop a new walking trail that includes interpretive panels and a photography blind to improve access to Netherly Slough.

Public Access Objective 5

Find and study sites on the refuge where potential access points could be developed to provide the public with access to compatible, wildlife-dependent activities (figure 9).

Public Access Objectives 2 through 5 Strategies

- Use refuge resources and money to develop refuge access points.
- Apply for EVS money.
- Develop projects through EVS.
- Work with WGFD to obtain money for these projects.
- Use challenge cost share.
- Work with Region 6's GIS coordinator.

Public Access Objectives Rationale

Access to wildlife-dependent recreational activities is needed to fulfill the purposes of Cokeville Meadows Refuge, our mission, and the vision and goals of this CCP. Local residents have been seeking access to the refuge for many years to conduct these consumptive and nonconsumptive wildlife-dependent activities.

Visitor Safety Objective 1

Within 2 years, establish the means to increase the safety of our refuge staff and visitors who cross over the railroad tracks to access refuge lands.

Visitor Safety Objective Strategy

- Work with Region 6's department of transportation coordinator to find ways to finance safe railroad crossings onto refuge lands.

Visitor Safety Objective Rationale

Public safety and railroad crossings have to be addressed with the help of Union Pacific Railroad because the railroad bisects the refuge acquisition boundary and refuge fee-title lands.

River Boating Objective 1

Within 2 years, find proper launching and take-out sites along the Bear River within the refuge to allow the public to enjoy nonmotorized recreational boating opportunities necessary for hunting, fishing, wildlife observation, photography, and environmental education.

River Boating Objective 2

Within 2 years of plan approval, find safety portages, obstacles, and disturbance areas along the Bear River to create a map that shows safe boating recreational opportunities for the public.

River Boating Objectives Strategies

- Work with Region 6's GIS coordinator to develop the necessary GIS layers for a correct map.
- Work with Region 6's EVS to develop a brochure and map with information on river boating.
- Develop or improve all necessary roads to launch and take out sites.
- Coordinate with the State and the BLM to obtain gravel from developed pits necessary to create or improve access roads and launch sites.

River Boating Objectives Rationale

Nonmotorized boats provide a unique opportunity for visitors to experience and learn about the refuge by ways other than from a vehicle. Keeping these nonmotorized would provide excellent conditions for angling, wildlife viewing, photography, and other compatible, wildlife-dependent recreational uses.

Hunting Objective 1

Carry out the refuge hunt plan, once it is approved, before the 2014 Wyoming hunting season.

Hunting Objective 2

Develop a hunt map before the 2014 Wyoming hunting season to guide refuge users to designated hunting areas and access points and to inform of refuge hunting regulations and hunting opportunities for people of all abilities (see figure 14).

Hunting Objective 3

Upon hunt plan approval, work with WGFD to establish hunts that are consistent with WGFD commission regulations and that support population management objectives.

Hunting Objectives Strategies

- Develop media contacts and outreach materials to inform the hunting community of hunting opportunities.
- Allow hunters access to portions of the refuge that would provide reasonable challenges and opportunities for taking species that have harvest objectives and create minimal conflict with other priority wildlife-dependent recreational uses or with refuge operations.
- Produce and distribute a factsheet with a map that designates areas open and closed to hunting along with all pertinent rules, regulations, and restrictions so hunters can make informed decisions.
- Provide information in collaboration with WGFD about opportunities on surrounding lands to allow hunters to plan for a quality experience.
- Erect signs to designate closed and restricted areas to reduce the chance of noncompliance and conflicts with nonhunters.
- Provide adequate law enforcement staff in collaboration with WGFD during peak hunting periods.
- Erect interpretive displays at designated parking areas and at the contact station that describe ways to hunt ethically and to explain hunting rules, regulations, and restrictions.
- Use seasonal road and access closures to make sure that there is a quality hunt, to protect refuge habitats from erosion, and to reduce the overlapping of other public uses like rifle hunting and birdwatching.

Hunting Objectives Rationale

We recognize hunting as a traditional outdoor pastime that is deeply rooted in America's heritage. As long as resources can support it, hunting is considered a legitimate and proper public use on national wildlife refuges. Hunting can foster an understanding and instill appreciation of native wildlife and plants and generate support for their restoration and conservation as well as to generate support for the refuge, the Refuge System, and the Service.

The refuge is part of a larger system of lands. Given that many native wildlife species migrate on and off the refuge, such as waterfowl, elk, deer, and pronghorn, our refuge hunting program affects more than just refuge lands. The key to success is a strong working relationship with sportsmen and women and with the State and incorporating our hunting goals and objectives into a hunting stepdown management

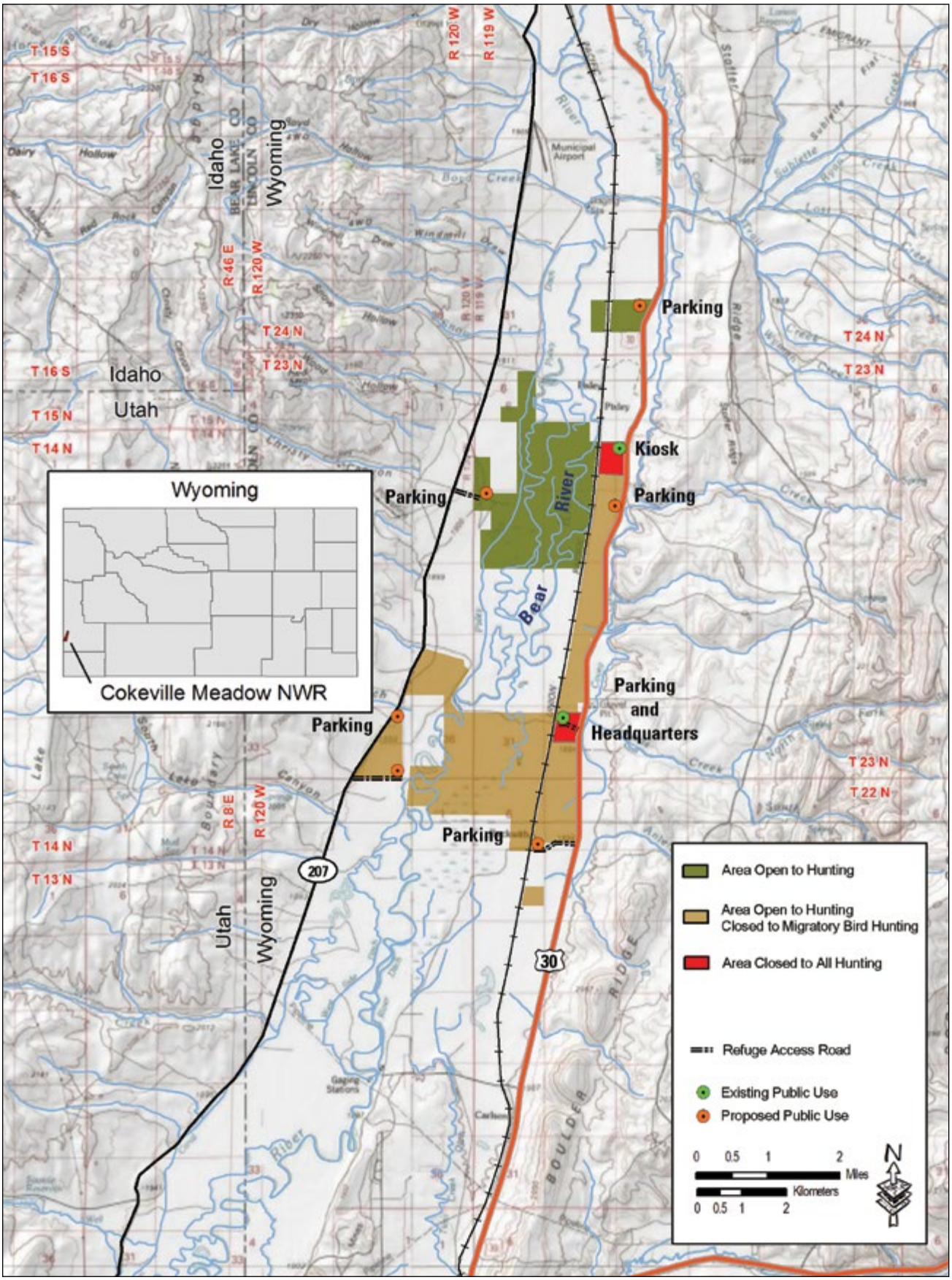

Figure 14. Proposed public uses at Cokeville Meadows National Wildlife Refuge, Wyoming.

Tom Koerner / FWS

Pronghorn

plan. We will work with the State to promote sound hunting practices as a wildlife management tool.

Fishing Objective 1

Within 10 years, determine the feasibility of restoring native sport fisheries.

Fishing Objective 2

Develop a public use area where one fishing event per year could be held for youth and where other wildlife-dependent public uses could also be served.

Fishing Objective 3

Develop an area that provides access for safe fishing opportunities to people of all abilities.

Fishing Objective 4

Work with WGFD to obtain access to fishing areas through private lands next to the refuge in conjunction with the refuge fishing program.

Fishing Objectives Strategies

- Gather baseline resource data, review literature, and develop and carry out restoration plans, in collaboration with USDA Natural Resources Conservation Service, Trout Unlimited, WGFD, and USGS.
- Develop a map with access points and areas that are accessible to fishing.
- Develop a volunteer base to help with a youth fishing program and event.
- Work with EVS to plan, develop, and finance the public use area and a youth fishing program.
- Collaborate with local outdoor groups (sportsmen and women) to promote and sponsor a youth fishing program.
- Work with youth programs, such as Girl Scouts and Boy Scouts, and with schools to encourage a broad spectrum of participation in fishing events.

- Develop a fishing brochure that details fishing access points and rules and regulations, and sign open and closed areas.

Fishing Objectives Rationale

We recognize fishing as a traditional outdoor pastime that is deeply rooted in America's heritage. As long as resources can support it, fishing is considered a legitimate and proper public use. Fishing can foster and understanding and instill appreciation of native fish, wildlife, and plants and generate support for their restoration and conservation as well as to generate support for the refuge, the Refuge System, and the Service.

Trapping Objective 1

Carry out a management-directed trapping program that would be administered by refuge staff.

Trapping Objective 1 Strategy

- Administer a trapping program on the refuge by issuing special use permits to qualified trappers who will serve to:
  - observe mammal populations;
  - remove portions of the annual surplus of furbearing mammals;
  - reduce mammals that cause damage to infrastructure and are responsible for localized predation or depredation issues.

Trapping Objective 1 Rationale

Trapping is done in accordance with the needs of the Refuge Recreation Act, the Administration Act, and NEPA. Authorized by 50 CFR, part 31.16, we administer recreational trapping and recognize it as a traditional outdoor pastime that is deeply rooted in America's heritage. As long as resources can support it, trapping is considered a legitimate and proper public use on national wildlife refuges. Trapping can foster an understanding and instill appreciation of native wildlife and plants and generate support for their restoration and conservation as well as to generate support for the refuge, the Refuge System, and the Service.

Permit trappers are essential because they provide cost-effective information for assessing populations of various furbearing mammals. They also find furbearing mammals, like muskrats, that damage refuge infrastructure. Trappers who continue to remove mammals that predate ground-nesting birds late in the winter or early spring may help reduce their adverse effects.

Trapping Objective 2

Allow recreational trapping for economic benefits on refuge lands.

Trapping Objective 2 Strategies

- Allow trapping on refuge lands within the framework of State seasons and regulations as prescribed by law.
- Watch and enforce trapping access and use regulations for compatibility with other refuge objectives.

Trapping Objective 2 Rationale

As refuge acreage allows, we would offer limited, refuge-permitted, WGFD-coordinated trapping for beaver, mink, muskrat, bobcat, red fox, badger, weasel, skunk, and raccoon. How we would address nuisance animals, predators like wolves and coyotes, and furbearers will be described in a stepdown management plan to this CCP. For compatibility reasons, the use of motorized vehicles will be restricted to designated roads.

Wildlife Observation and Photography Objective 1

Within 5 years, provide opportunities with minimal disturbance to wildlife and habitat and develop designated viewing sites (one auto tour route and two accessible wildlife-viewing areas) to promote an appreciation of natural and cultural resources.

Wildlife Observation and Photography Objective 2

Within 5 years, develop at least two photography blinds.

Wildlife Observation and Photography Objectives Strategies

- Work with EVS to plan, design, and find the best locations to build viewing sites and blinds.

- Evaluate which public access points can serve multiple functions.

- Work with local sportsmen and sportswomen organizations and volunteer groups to construct and support local viewing areas or blinds.

Wildlife Observation and Photography Objectives Rationale

Wildlife observation and photography are two of the six priority wildlife-dependent recreational public uses as defined in the Improvement Act. They should be allowed if found compatible and if the refuge has the resources to support them.

Promoting wildlife observation and the photography of plants and animals and their habitats can foster an understanding of, and an appreciation for, America's natural resources and the role of the Refuge System in managing and protecting these resources. The refuge is part of an intermontane ecosystem that typically has been used for farming and ranching. It offers a unique opportunity to view plants and animals in a natural setting.

Engaging in wildlife viewing or photography on foot would generally be allowed unless our staff designates specific areas or periods closed to the public . This would be the case during hunting seasons when visitor safety would be an issue. Developing an auto tour route and areas to interpret to visitors are also important ways to reach out to the public and to educate visitors about national wildlife refuges. Through such, they would get a feel for what refuges do and how they run. Additionally they would provide modes of access to enhance opportunities for wildlife viewing and photography.

Environmental Education and Interpretation Objective 1

Within 5 years, evaluate refuge lands for the possible development of environmental education and interpretation sites.

Environmental Education and Interpretation Objective 1 Strategies

- Work with Region 6's EVS, WGFD, Lincoln County officials, and the Wyoming Department of Transportation to find areas of potential development along Highway 30 and Lincoln County Road 207.

- Work with Region 6's EVS to design and develop environmental education and interpretation signage as well as to obtain money for their development and placement.

Environmental Education and Interpretation Objective 2

Within 5 years, work with EVS and develop a visitor services plan that covers all wildlife-dependent compatible uses.

Environmental Education and Interpretation Objective 2 Strategy

- Work with EVS to develop a visitor services plan.

Environmental Education and Interpretation Objectives 1 and 2 Rationale

We plan to develop opportunities to interpret wildlife resources, the Refuge System, and the Bear River watershed. Through these, visitors should be well informed of refuge resources and their roles within the larger landscape. Any environmental education and interpretive facilities would complement the habitats of the refuge and surrounding landscapes while better orienting and educating visitors.

A visitor services plan should be developed to find areas for public uses and to guide our staff on how to develop these areas.

Environmental Education and Interpretation Objective 3

Work with the Wyoming Department of Transportation to develop at least two highway pullouts on State Highway 30 along the east side of the refuge boundary to allow the driving public an opportunity to engage in wildlife observation and interpretation.

Environmental Education and Interpretation Objective 3 Strategies

- Work and develop a relationship with the Wyoming Department of Transportation to plan and establish pullouts.

- Involve other partners to engage the Wyoming Department of Transportation on pullout development.

- Establish a needs list of what the Wyoming Department of Transportation can provide and what we can provide to make pullouts happen.

Environmental Education and Interpretation Objective 3 Rationale

There is a substantial amount of traffic on State Highway 30 traveling to and from the Jackson Hole and Yellowstone areas in the spring, summer, and fall. Cokeville Meadows Refuge receives many of those visitors, and pullouts would provide good opportunities to reach out to these people (see figure 9).

Public Information Objective 1

Within 2 years, develop and begin disseminating a refuge brochure that contains information on the refuge's background, a refuge map, access points, and available wildlife-dependent recreational opportunities.

Public Information Objective 2

Within 2 years, update the refuge's Web site to include pertinent, up-to-date information, such as hunting and fishing guidance and maps, species lists, and access points.

Public Information Objectives Strategies

- Work with Region 6's EVS staff to develop the refuge brochure.

- Collaborate with local, county and State groups and agencies to disseminate the brochure as far and wide as possible.

- Update the refuge Web site and include electronic versions of refuge maps and the refuge brochure.

- Coordinate with local communities and chambers of commerce to alert them on the status of refuge programs and the brochure.

- Post printed and Web site press releases, at least monthly, on what is happening on the refuge.

Public Information Objectives Rationale

It is important that information about the refuge be developed and disseminated to the public, especially to help protect refuge resources. The information should be in place to inform and direct the public so refuge regulations can be understood, wildlife disturbance can be avoided, and the public can learn about the refuge and what the Refuge System provides to wildlife and refuge visitors.

Cultural Resources Objective

Protect documented cultural and historic resources to preserve them for all Americans and to comply with applicable laws.

Cultural Resources Objective Strategies

- Work with Region 6's archaeologist to develop and perform a formal review of documented resources every 5 years for protection, evaluation of condition, and preservation.

- Survey for cultural resources before development and restoration activities begin.

- Submit potential prescribed fire treatments and management activities for clearance, such as Section 106 clearance, before they begin.

- Use the most up-to-date techniques for surveys, documentation, preservation, restoration, and research through coordination with Region 6's archaeologists, the Wyoming State Historical Preservation Office, and local scholars and experts.

- Provide one half-time law enforcement officer to protect cultural resources.

Cultural Resources Objective Rationale

Our policy and certain laws direct Federal land managers to protect cultural resources found on Federal lands. It is important that they are identified and that adequate protection is provided to keep them intact for future generations.

Law Enforcement Objective

Provide adequate law enforcement coverage to make sure that wildlife-dependent recreational opportunities and other refuge programs and man-

agement activities are conducted in accordance with State and Federal laws and regulations to protect human safety and wildlife resources.

Law Enforcement Objective Strategies

- Collaborate and coordinate with the State of Wyoming and other Federal and State agencies to conduct patrol activities on refuge lands.
- Coordinate all law enforcement efforts and programs with our zone officer at Bear River Migratory Bird Refuge.

Law Enforcement Objective Rationale

Law enforcement on refuges is an essential part of protecting public safety and infrastructure and enforcing refuge laws and regulations. Collaborating with other agencies is an important way to broaden cooperation and to help each other with wildlife law enforcement.

Partnerships Goal

Engage in mutually beneficial partnerships to promote wildlife and habitat conservation, and public enjoyment of wildlife resources in the upper Bear River watershed that are consistent with historic land uses, refuge purposes and goals.

Partnerships Objective

Work with local, State, and Federal agencies, as well as with private organizations and individuals, to achieve refuge goals and objectives and to help these groups with management activities that promote habitat health and wildlife productivity across the Bear River watershed.

Partnerships Objective Strategies

- Coordinate with State agencies and private conservation organizations on projects that directly help wildlife and their habitats.
- Seek partnerships with private landowners in the Cokeville Valley to improve wildlife habitat along the Bear River.
- Work with WGFD and private landowners to increase fishing access on the Bear River.
- Set priorities for our money and support for projects (land protection, staff, and equipment) that accomplish refuge objectives and that use partner contributions.
- Work with WGFD to manage public lands that are near each other more efficiently through the coordinated exchange of staff, cooperators, equipment, and facilities.
- Pursue partnerships to develop a field bird guide that is specific to the refuge.
- Develop, coordinate, and support working relationships with State and local law enforcement authorities and fire departments to protect refuge properties and trust species.
- Develop, coordinate, and support working relationships with cooperating agencies and other partners who conduct prescribed burns.
- Through the Partners for Fish and Wildlife Program and other partners, develop, coor-

Tom Koerner / FWS

Indian Ricegrass.

Tom Koerner / FWS

Great Blue Heron

dinate, and support working relationships with those who deliver private lands projects.

Partnerships Objective Rationale

A major objective of this CCP is to establish partnerships with landowners, volunteers, private organizations, and county, State, and Federal natural resource agencies. In particular, landowners would be informed of opportunities to take part in habitat protection programs, such as conservation easements, for which they would be compensated. Opportunities exist to enhance, or to establish new, partnerships with nonprofit organizations, sporting clubs, community organizations, and educational institutes. Strong partnerships already exist with The Nature Conservancy, WGFD, the Lincoln County Weed and Pest District, and Partners for Fish and Wildlife.

Working across entire landscapes with multiple partners to protect and enhance wildlife habitat on large tracts of land is more effective than having individual groups working alone within their organizational boundaries. Partnerships bring about better understanding and coordination between different groups and illustrate what various partners can and cannot do to improve habitat. Partnerships also improve the odds for garnering and leveraging money for important projects that may help all the groups involved.

Refuge Development and Operations Goal

Effectively utilize all available resources to develop, enhance, and support refuge facilities and operations for wildlife, habitat, and public use programs. We will pursue easements, habitat improvements, and other land protection opportunities with willing sellers and interested land owners within the approved refuge acquisition boundary and within the Bear River watershed.

This section discusses our goals, objectives, and strategies for refuge development and operations. Projects required to carry out the CCP are financed through two separate systems, as follows:

- The Refuge Operations Needs System is used to document requests to Congress for money and staff needed to carry out projects above the existing base budget.
- The Service Asset Maintenance Management System is used to document the equipment, buildings, and other existing properties that require repair or replacement.

Staff

The Seedskadee National Wildlife Refuge Complex has six full-time employees. All of them have duties at Seedskadee National Wildlife Refuge and at Cokeville Meadows Refuge, but all are stationed at Seedskadee National Wildlife Refuge. Table 6 in chapter 3 lists these positions along with one new, full-time equivalent position assigned to Cokeville Meadows Refuge that is needed to carry out this CCP.

Staff Objective

Seek to hire at least one new, full-time equivalent position at Wage Grade-7 or Wage Grade-8 to function as maintenance staff for Cokeville Meadows Refuge to support public use and refuge facilities.

Staff Objective Strategies

- Refer to the 2008 staff model for the refuge.
- Look at split or joint positions with other agencies.

Staff Objective Rationale

The addition of this position is instrumental in supporting wetland impoundments, carrying out new habitat projects, giving proper care and maintenance to all refuge facilities and equipment, and to help with public access.

Equipment Objective

Within 5 years, replace all decrepit equipment and obtain all necessary equipment to carry out day-to-day activities to reduce dependence on the equipment at Seedskadee National Wildlife Refuge.

Equipment Objective Strategies

- Replace pickup truck and tractor.
- Obtain tractor with mowing attachment and front-end bucket (at least 50 horsepower).
- Replace backhoe.

Equipment Objective Rationale

Cokeville Meadows Refuge relies on Seedskadee National Wildlife Refuge to provide equipment and fleet support for operations. The refuge needs support to conduct its day-to-day activities that require maintenance equipment. The refuge has some equipment, but needs more tools to complete priority habitat and maintenance projects.

Facilities Objective 1

Replace the Pixley Dam with a more efficient irrigation management structure that includes fish passage and river connectivity and is large enough to allow for single-lane access.

Facilities Objective 1 Strategies

- Obtain full ownership of the Pixley Dam.
- Add the Pixley Dam to refuge property inventory for replacement in the Service Asset Maintenance Management System.
- Obtain all necessary Wyoming State Historic Preservation Office and Region 6's archaeologist approvals.
- Work with regional engineering and water resources to develop a new plan and design.

Mike Artmann / FWS

The Pixley Dam is in need of replacement.

- Work with our fisheries program and WGFD, the State Engineers Office, and other partners in the design and placement of a new structure.

Facilities Objective 1 Rationale

Pixley Dam is now jointly owned by a private owner and us. The dam was built in 1903, is in poor condition and near failure, and poses major safety hazards to anyone who works on it or uses it as a river crossing. The dam is an in-river structure that does not allow fish to pass upstream or downstream and has, over the years, created a situation where the biodiversity of species above the dam is low.

Facilities Objective 2

Work with other interests on the BQ Dam to make sure that this structure continues to serve the irrigation needs of refuge and private habitats.

Facilities Objective 2 Strategies

- Meet on an as-needed basis with other BQ Dam interests and coordinate all maintenance and repair activities.
- Use permittees to help with necessary repairs.
- Find grant opportunities for repairs and maintenance.

Facilities Objective 2 Rationale

The BQ Dam is an old, in-river structure that is used to divert water from the Bear River to irrigate wet meadow habitats in the Cokeville Valley. This structure requires annual maintenance to keep it functioning properly and safely. It does not allow fish to pass upstream or downstream and has, over the years, created a situation where the biodiversity of species below the dam is low.

Facilities Objective 3

Support irrigation infrastructure to provide adequate and proper irrigation of refuge habitats.

Facilities Objective 3 Strategies

- Use our staff and equipment to support irrigation infrastructure.
- Work with partners to support infrastructure and facilities on the refuge and on private properties to support the proper function of irrigation systems.

Facilities Objective 3 Rationale

Proper irrigation and facilities maintenance throughout the Cokeville Valley greatly enhance wildlife habitat conditions.

Facilities Objective 4

Support wildlife-friendly boundary fencing and evaluate interior fences for removal.

Facilities Objective 4 Strategies

- Use permittees to repair or remove refuge fences, as necessary, to support wildlife management objectives.
- Replace fencing with deferred maintenance money.

Facilities Objective 4 Rationale

Refuge fences are required to properly manage and protect refuge lands from trespass. Fences help to separate uses such as grazing and haying. Evaluating interior fences for removal is an ongoing process.

Railroad Facilities Objective 1

Within 2 years, work with Union Pacific Railroad officials to define roles and responsibilities relating to railroad right-of-way maintenance and other issues that affect refuge operations.

Railroad Facilities Objective Strategy

- Contact Union Pacific Railroad officials to work through right-of-way issues about crossing over railroad tracks for refuge and public uses.

Railroad Facilities Objective Rationale

Railroad right-of-way issues, including fires, noxious weeds, accidents, contaminants, and wildlife effects, have to be addressed by working with the Union Pacific Railroad because the railroad bisects the refuge acquisition boundary and refuge fee-title lands.

Mike Artmann / FWS

Rip rap, used to reduce bank erosion, made its way onto the refuge before acquisition by the Service. A substantial amount of junk and debris has been removed by our partners and by refuge staff.

Junk and Debris Removal Objective

Within 5 years, find and remove all junk and debris piles from lands managed by the refuge.

Junk and Debris Removal Objective Strategies

- Find and map areas where junk and debris are located.
- Work with partners and cooperators to find safe and proper ways to remove and dispose of all the junk and debris piles on refuge lands.
- Hire seasonal employees to help clear debris piles.
- Work with partners and cooperators to find ways to keep junk and debris materials from being dumped on refuge lands.

Junk and Debris Removal Objective Rationale

Junk and debris piles on refuge lands are a health hazard to humans and wildlife and are eyesores. Small mammals, especially animals that depredate on migratory bird nests, often burrow under or dwell inside them. It is important that the staff and its partners find ways to promptly and properly dispose of all debris and junk piles to protect humans and wildlife and to restore a pristine look.

Water Rights and Resources Objective

Within 3 years, conduct an evaluation and develop a plan to define the refuge's water rights and how they should be used for habitat management.

Water Rights and Resources Objective Strategies

- Work with the division of water resources to develop a comprehensive refuge water rights evaluation.
- Name unneeded water rights for abandonment such as unused domestic water wells.
- Find money to allow us to drop unneeded abandoned wells.
- Work with the State Engineer's Office to define all refuge water rights and proper uses.

Water Rights and Resources Objective Rationale

We have water rights important for habitat management on the refuge that need to be identified, understood, and used to show that we are properly managing them.

Land Protection Objective

Incorporate all ways to protect habitat and wildlife values, as well as to preserve and enhance habitat connectivity.

Land Protection Objective Strategies

- Acquire lands in fee title from willing sellers within the refuge boundary.
- Use conservation or access easements throughout the Bear River watershed in Wyoming.
- Work with partners to find money to help us acquire easements.

Land Protection Objective Rationale

We feel that urban sprawl and development pose major threats to wildlife habitat in the Cokeville Valley. Steps need to be taken to protect habitat conditions and connectivity through fee-title acquisition and conservation easements and by working with partners to improve and protect key habitats within the Bear River watershed.

Refuge Mineral Rights and Energy Development Objective

Find ways to protect refuge habitats and the wildlife and plants that depend on them from onsite and offsite mineral and energy development and transportation activities.

Refuge Mineral Rights and Energy Development Objective Strategies

- Work with the BLM and other agencies and partners to secure mineral rights on refuge lands as opportunities arise.
- Work with partners to identify existing and future mineral and energy development and transportation activities that could adversely affect refuge habitats and resources and find ways to avoid or reduce effects.

Refuge Mineral Rights and Energy Development Objective Rationale

Mineral rights associated with refuge lands should be sought and bought whenever possible to protect refuge resources. Mineral and energy development and transportation in and around the approved acquisition boundary have the potential to adversely affect habitats and the plants and wildlife that depend on them. We will continue to work with partners and adjacent landowners to find ways to protect refuge resources while respecting private property.

Monitoring

Adaptive management is a flexible approach to the long-term management of biotic resources. Adaptive management is directed, over time, by the results of ongoing monitoring activities and other information. More specifically, adaptive management is a process by which projects are carried out within a framework of scientifically driven experiments to test the predictions and assumptions outlined by a CCP (figure 15).

To apply adaptive management, specific survey, inventory, and monitoring protocols would be adopted for Cokeville Meadows Refuge. The habitat management strategies would be systematically evaluated to identify management effects on wildlife populations. This information would be used to refine approaches and to figure out how effectively the objectives are being accomplished. If monitoring and evaluation show undesirable effects for target and nontarget species or communities, management projects would be altered accordingly and the CCP would be revised. Specific monitoring and evaluation activities would be described in a stepdown management plan (table 9).

Monitoring Objective 1

Within 5 years, define refuge monitoring needs with the help of Region 6's inventory and monitoring team and our partners.

Monitoring Objective 1 Strategies

- Define and rank habitat management research needs.

- Promote refuge research needs within the scientific community.
- Encourage research that focuses on the refuge's habitat management goals.

Monitoring Objective 2

Within 7–10 years, develop a monitoring plan.

Monitoring Objective 2 Strategy

- Work with Region 6's inventory and monitoring team to develop a comprehensive monitoring plan for Cokeville Meadows Refuge.

Monitoring Objectives Rationale

We recognize that the refuge has substantial inventory, monitoring, and research needs, but we lack the resources to harvest data. Thus, we need to find creative ways to encourage data gathering and scientific studies by outside parties. We first need to find and categorize the most substantial data gaps.

Research Objective 1

Where possible, allow third-party research to help us make sound, management-based decisions and to use the collected data.

Research Objective 2

Have outside groups perform refuge-specific research that would help us manage refuge habitats and resources or would fill in information and data gaps.

Research Objectives Strategies

- Conduct animal species inventories.
- Conduct vegetation inventories.
- Conduct soils data and inventories.
- Create breeding bird and nesting data baselines.

Research Objectives Rationale

The refuge needs baseline data for habitat and wildlife. Our staff would collaborate with universities and other entities to collect baseline data on refuge resources and obtain a better understanding of the effects of our management activities.

Nuisance Animal and Predator Control Objective

Allow the take of any nuisance species within the refuge boundary to reduce conflicts with our neighbors.

Nuisance Animal and Predator Control Objective Strategies

- Develop a nuisance animal management plan that identifies potential species and treatment choices.
- Work with WGFD and other agencies and partners to develop thresholds and management actions when problems are identified.

Nuisance Animal and Predator Control Objective Rationale

Our landscape-level plan can only be carried out by working cooperatively with our neighbors both on and off the refuge. Thus, our staff needs to make sure that animals that cross boundaries and become problems or a nuisances to the refuge and its neighbors are dealt with properly.

Volunteers Programs Objective 1

Within 1 year, create a list of tasks that a volunteers group could undertake to help the refuge and its habitats.

Volunteers Programs Objective 1 Strategies

- Name refuge needs and create a list of activities that volunteers could undertake.
- Seek input from our staff and partners on needs and possibilities.

Volunteers Programs Objective 2

Within 5 years, create at least one volunteers group to help our staff with priority volunteer projects that would be identified in objective 1.

Volunteers Programs Objective 2 Strategies

- Develop and put out press releases in surrounding communities.
- Contact the regional volunteer program coordinator.
- Contact local universities.
- Work with local governments to promote a volunteer program.

Volunteers Programs Objectives Rationale

Volunteers have taken a more important role in refuge operations as budgets tighten and staff become scarce. It is important for our staff to select which refuge activities can be delegated to volunteers.

4.4 Monitoring and Evaluation

We believe that the uncertainty surrounding habitat management can be dealt with most efficiently within the paradigm of adaptive resource management (see figure 15) (Holling 1978, Kendall 2001, Lancia et al. 1996, Walters and Holling 1990). This approach provides a framework within which we can make objective decisions and reduce the uncertainty surrounding those decisions. The key components of an adaptive resource management plan follow:

- clearly defined management goals and objectives
- a set of management actions with associated uncertainty as to their outcome
- predictions of various alternative responses to management strategies
- monitoring or assessing select natural resource conditions of interest, largely directed by objectives
- communicating and using new information to direct future decisionmaking

The adaptive management framework facilitates an iterative process, whereby our understanding of the effectiveness of strategies and the response and conditions of natural resources on the refuge is improved over time. Reducing the uncertainty of habitat management via adaptive resource manage-

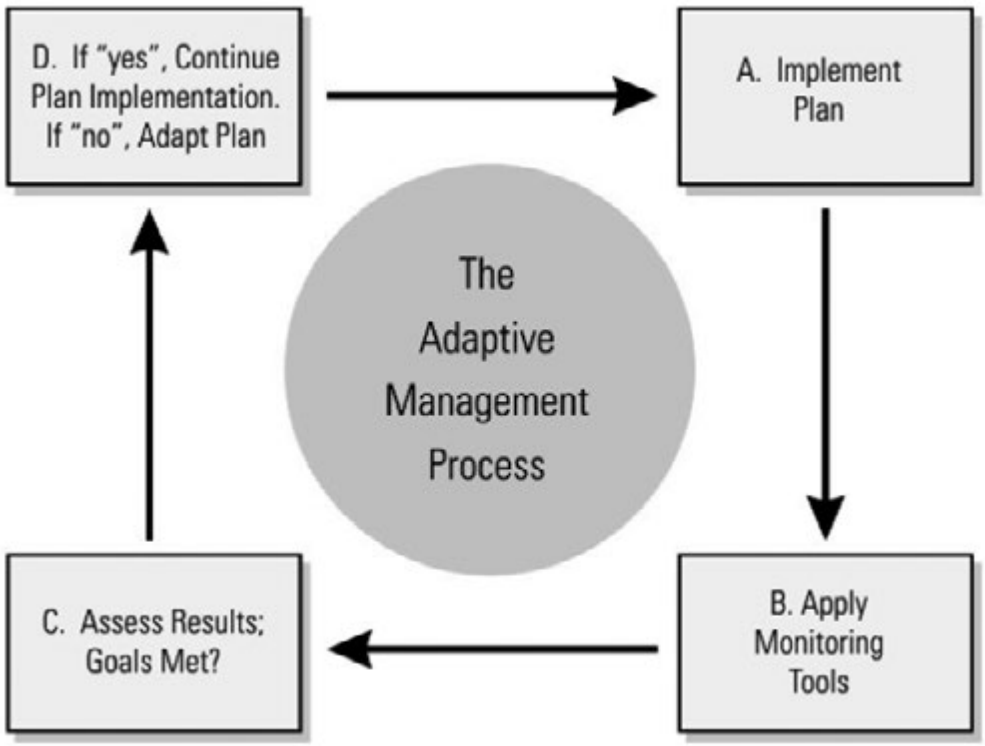

Figure 15. The adaptive resource management process.

ment helps in the continual development of long-term habitat management plans.

4.5 Plan Amendment and Revision

This CCP will be reviewed annually to find out if there is a need for plan revision. A revision would occur if and when significant information becomes available. This CCP will also be supported by detailed stepdown management plans to address the completion of specific strategies to support Cokeville Meadows Refuge goals and objectives. Revisions to the CCP and the stepdown management plans would be subject to public review and NEPA compliance. At a minimum, the CCP will be evaluated every 5 years and revised after 15 years.

Table 9 shows the timeline for stepdown management plans for Cokeville Meadows Refuge.

Table 9. Stepdown management plans for Cokeville Meadows National Wildlife Refuge, Wyoming.

Plan	*New or completed plan, approved year*	*Revised plan, completion year*
Habitat management	—	2019
Fire management	2002	2014
Disease contingency	2006	2016
Wilderness management	1986	2012
Refuge safety	2002	2010
Visitor services	1986	2019
Wildlife inventory and monitoring	—	2020
Spill prevention control and countermeasures	2006	2012
Hunting plan	2014	—
Trapping plan	—	2017
Fishing plan	—	2017
Predator and nuisance animal management plan	—	2017
Water and drought management plan	—	2017
Integrated pest management plan	—	2017

Tom Koerner / FWS

"Snow angels" made by magpies.

Glossary

abiotic—Pertaining to nonliving things.

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

adaptive management—Rigorous application of management, research, and monitoring to gain information and experience necessary to assess and change management activities; a process that uses feedback from research, monitoring, and evaluation of management actions to support or change objectives and strategies at all planning levels; a process in which policy decisions are carried out within a framework of scientifically driven experiments to test predictions and assumptions inherent in a management plan. Analysis of results helps managers figure out whether current management should continue as is or whether it should be modified to achieve desired conditions.

Administration Act—See National Wildlife Refuge System Administration Act of 1966.

alternatives—Different sets of objectives and strategies or means of achieving refuge purposes and goals, helping fulfill the Refuge System mission and resolving issues.

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

anadromous—Migrating from saltwater to spawn in fresh water, as some salmon species do.

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

baseline—Set of essential observations, data, or information used for comparison or a control.

Beckwith and Quin Dam—An instream water control structure located within the Cokeville Meadows Refuge boundary.

biological control—Reduction in numbers or elimination of unwanted species by the introduction of natural predators, parasites, or diseases.

biological diversity, also biodiversity—Variety of life and its processes, including the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur ("U.S. Fish and Wildlife Service Manual" 052 FW 1.12B). The National Wildlife Refuge System's focus is on endemic species, biotic communities, and ecological processes.

biological integrity—Composition, structure, and function at the genetic, organism, and community levels consistent with natural conditions and the biological processes that shape genomes, organ¬isms, and communities.

biomass—Total amount of living material, plants and animals, above and below the ground in a particular habitat or area.

biota—Animals and plants of a given region.

biotic—Pertaining to life or living organisms.

BLM—See Bureau of Land Management.

BQ Dam—See Beckwith and Quin Dam.

breeding habitat—Habitat used by migratory birds or other animals during the breeding season.

buffer zone or buffer strip—Protective land borders around essential habitats or water bodies that reduce runoff and nonpoint source pollution loading; areas created or sustained to lessen the negative effects of land development on animals and plants and their habitats.

Bureau of Land Management—A Federal agency under the executive branch of government.

canopy—Layer of foliage, generally the uppermost layer, in a vegetative stand; midlevel or understory vegetation in multilayered stands. Canopy closure (also canopy cover) is an estimate of the amount of overhead vegetative cover.

CCP—See comprehensive conservation plan.

CFR—See Code of Federal Regulations.

cfs—An abbreviation for cubic feet per second, a measurement of water flow.

climax—Community that has reached a steady state under a particular set of environmental conditions; a relatively stable plant community; the final stage in ecological succession.

Code of Federal Regulations (CFR)—Codification of the general and permanent rules published in the "Federal Register" by the Executive departments and agencies of the Federal Government. Volumes of the CFR are updated once each calendar year.

community—Area or locality in which a group of people resides and shares the same government.

compatible use—Wildlife-dependent recreational use or any other use of a refuge that, in the sound professional judgment of the director of the U.S. Fish and Wildlife Service, will not materially interfere with or detract from the fulfillment of the mission of the Refuge System or the purposes of the refuge ("Draft U.S. Fish and Wildlife Service Manual" 603 FW 3.6). A compatibility determination

supports the choice of compatible uses and identified stipulations or limits necessary to make sure that there is 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 U.S. Fish and Wildlife Service Manual" 602 FW 1.5).

concern—See issue.

conservation—Management of natural resources to prevent loss or waste. Management actions may include preservation, restoration, and enhancement.

cooperative agreement—Legal instrument used when the principal purpose of the transaction is the transfer of money, property, services or anything of value to a recipient to accomplish a public purpose authorized by Federal statute and substantial involvement between the Service and the recipient is anticipated.

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

cultural resources—Remains of sites, structures, or objects used by people in the past.

cultural resource inventory—Professionally conducted study designed to locate and evaluate evidence of cultural resources present within a defined area. Inventories may involve various levels including background literature search (class I), sample inventory of project site distribution and density over a larger area (class II), or comprehensive field examination to name all exposed physical manifestation of cultural resources (class III).

database—Collection of data arranged for ease and speed of analysis and retrieval, usually computerized.

deciduous—Pertaining to any plant organ or group of organs that is shed annually; perennial plants that are leafless for some time during the year.

defoliation—Removing of vegetative parts; to strip vegetation of leaves; removal can be caused by weather, mechanical, animals, and fire.

demography—Quantitative analysis of population structure and trend.

disturbance—Significant alteration of habitat structure or composition. May be natural (for example, fire) or human-caused events (for example, timber harvest).

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

EA—See environmental assessment.

easement—Agreement by which a landowner gives up or sells one of the rights on his or her property.

ecosystem—Dynamic and interrelating complex of plant and animal communities and their associated nonliving environment; a biological community, 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.

education and visitor services—A division of the U.S. Fish and Wildlife Service.

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

Endangered Species Act (1973), as amended—A law that required all Federal agencies to carry out programs for the conservation of threatened and endangered species.

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

endangered species, State—Plant or animal species in danger of becoming extinct or extirpated in a particular State within the near future if factors contributing to its decline continue. Populations of these species are at critically low levels or their habitats have been degraded or depleted to a significant degree.

endemic species—Plants or animals that occur naturally in a certain region and whose distribution is relatively limited to a particular locality.

environmental assessment (EA)—Concise public document, prepared in compliance with the National Environmental Policy Act of 1969, that briefly discusses the purpose and need for an action and alternatives to such action, and provides sufficient evidence and analysis of changes to figure out whether to prepare an environmental impact statement or finding of no significant impact (40 CFR 1508.9).

environmental education—Education aimed at producing a citizenry that is knowledgeable about the biophysical environment and its associated problems, aware of how to help solve these problems, and motivated to work toward their solution.

environmental health—Natural composition, structure, and functioning of the physical, chemical, and other abiotic elements, and the abiotic processes that shape the physical environment.

ESA—See Endangered Species Act (1973), as amended.

EVS—See education and visitor services.

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

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

°F—See Fahrenheit.

Fahrenheit—A measurement of temperature.

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

Federal land—Public land owned by the Federal Government, including lands such as national forests, national parks, and national wildlife refuges.

federally listed species—Species listed under the Federal Endangered Species Act of 1973, as amended, either as endangered, threatened, or species at risk (formerly candidate species).

fee title—Acquisition of most or all the rights to a tract of land.

fire regime—Description of the frequency, severity, and extent of fire that typically occurs in an area or vegetative type.

fire management plan (FMP)— A plan that identifies and integrates all wildland fire management and related activities within the context of approved land or resource management plans. It defines a program to manage wildland fires (wildfire and prescribed fire).

flora—All the plant species of an area.

FMP— See "fire management plan."

forb—A broad-leaved, herbaceous plant; a seed-producing annual, biennial, or perennial plant that does not develop persistent woody tissue but dies down at the end of the growing season.

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

GIS—See geographic information system.

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

GPS—Global Positioning System.

guild—A group of species that use a common resource base in a similar fashion within an ecological community. It can be generally defined (for example, grassland birds) or specifically defined (for example, seed-eating small mammals).

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

habitat conservation—Protection of animal or plant habitat to make sure that the use of that habitat by the animal or plant is not altered or reduced.

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

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

herbivore—Animal feeding on plants.

herbivory—The eating of plants, especially ones that are still living.

HGM—See hydrogeomorphic method.

hydrogeomorphic method—An interdisciplinary science that focuses on the interaction and linkage of hydrologic processes with landforms or earth materials and the interaction of geomorphic processes with surface and subsurface water in temporal and spatial dimensions.

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

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

integrated pest management—Methods of managing undesirable species such as invasive plants; education, prevention, physical or mechanical methods of control, biological control, responsible chemical use, and cultural methods.

introduced species—A nonnative plant or animal species that is intentionally or accidentally released into an ecosystem where it was not adapted before.

introduction—Intentional or unintentional escape, release, dissemination, or placement of a species into an ecosystem because of human activity.

invasive plant, also noxious weed—Species that is non¬native to the ecosystem under consideration and whose introduction causes, or is likely to cause, economic or environmental harm or harm to human health.

inviolate sanctuary—Place of refuge or protection where animals and birds may not be hunted.

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 U.S. Fish and Wildlife Service Manual" 602 FW 1.5).

lek—A physical area where males of a certain animal species gather to show their prowess and compete for females before or during the mating season.

local agencies—Municipal governments, regional planning commissions, or conservation groups.

management alternatives—See alternatives.

management plan—Plan that guides future land management practices on a tract of land. See cooperative agreement.

mean sea level—The sea level halfway between average levels of high and low water.

mechanical control—Reduction in numbers or elimination of unwanted species through the use of mechanical equipment such as mowers and clippers.

mesic—Characterized by, relating to, or requiring a moderate amount of moisture; having a moderate rainfall.

microhabitat—Habitat features at a fine scale; often identifies a unique set of local habitat features.

migration—Regular extensive, seasonal movements of birds between their breeding regions and their wintering regions; to pass usually periodically from one region or climate to another for feeding or breeding.

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

migratory gamebird—Bird species, regulated under the Migratory Bird Treaty Act and State laws (legally hunted, including ducks, geese, woodcock, and rails).

mission—Succinct statement of purpose or reason for being.

monitoring—Process of collecting information to track changes of selected parameters over time.

monotypic—Having only one type or representative.

moraine—Mass of earth and rock debris carried by an advancing glacier and left at its front and side edges as it retreats.

National Environmental Policy Act of 1969—Required all agencies including the Service to examine the environmental effects of their actions, incorporate environmental information, and use public participation in the planning and implementation of all actions. Required Federal agencies to integrate this act with other planning needs and prepare proper documents to facilitate better environmental decisionmaking (40 CFR 1500).

national wildlife refuge—Designated area of land, water, or an interest in land or water within the Refuge System, but does not include coordination areas; a complete listing of all units of the Refuge System is in the current "Annual Report of Lands Under Control of the U.S. Fish and Wild¬life Service."

National Wildlife 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 Administration Act of 1966—Defined the National Wildlife Refuge System and authorized the Secretary of the Interior to allow any use of a refuge, provided such use is compatible with the major purposes for which the refuge was established.

Native species—Species that, other than as a result of an introduction, historically occurred or now occur in that ecosystem.

neotropical migrant, also neotropical migratory bird—Bird species that breeds north of the United States–Mexico border and winters primarily south of this border.

NEPA—See the National Environmental Policy Act of 1969.

nest success—Percentage of nests that successfully hatch one or more eggs of the total number of nests started in an area.

nongovernment organization—Any group that does not include Federal, State, tribal, county, city, town, local, or other government entities.

North American Waterfowl Management Plan—North American Waterfowl Management Plan, signed in 1986, recognizes that the recovery and perpetuation of waterfowl populations depends on restoring wetlands and associated ecosystems throughout the United States and Canada. It established cooperative international efforts and joint ventures made up of individuals; corporations; conservation organizations; and local, State, provincial, and Federal agencies drawn together by common conservation objectives. The Souris River Basin refuges are included in the "Prairie Pothole Joint Venture."

notice of intent—Notice that an environmental impact statement will be prepared and considered (40 CFR 1508.22); published in the "Federal Register."

noxious weed, also invasive plant—Any living stage (including seeds and reproductive parts) of a parasitic or other plant of a kind that is of foreign origin (new to or not widely prevalent in the United States) and can directly or indirectly injure crops, other useful plants, livestock, poultry, other interests of agriculture, including irrigation, navigation, fish and wildlife resources, or public health. According to the Federal Noxious Weed Act (PL 93-639), a noxious weed (invasive plant) is one that causes disease or has adverse effects on humans or the human environment and, therefore, is detrimental to the agriculture and commerce of the United States and to public health.

NWR—See national wildlife refuge.

objective—Concise statement of what is to be achieved, when and where it is to be achieved, and who is responsible for the work. Objectives are derived from goals and provide the basis for determining management strategies. Objectives should be reachable, time-specific, and measurable.

partnership—Contract or agreement entered into by two or more individuals, groups of individuals, organizations, or agencies in which each agrees to furnish a part of the capital or some in-kind service, such as labor, for a mutually beneficial enterprise.

patch—Area distinct from that around it; an area distinguished from its surroundings by environmental conditions.

perennial—Lasting or active through the year or through many years; a plant species that has a lifespan of more than 2 years.

phenology—The relationship between plant or animal development and climatic conditions.

planning team—Team that prepares the comprehensive conservation plan. Planning teams are interdisciplinary in membership and function. A team generally consists of a planning team leader; refuge manager and staff biologist; staff specialists or other representatives of Service programs, ecosystems or regional offices; and State partnering wildlife agencies as proper.

planning team leader—Typically a professional planner or natural resource specialist knowledgeable of the needs of National Environmental Policy Act and who has planning experience. The planning team leader manages the refuge planning process and ensures compliance with applicable regulatory and policy needs.

planning unit—Single refuge, an ecologically or administratively related refuge complex, or distinct unit of a refuge. The planning unit also may include lands now outside refuge boundaries.

plant association—Classification of plant communities based on the similarity in dominants of all layers of vascular species in a climax community.

plant community—Assemblage of plant species unique in its composition; occurs in particular locations under particular influences; a reflection or integration of the environmental influences on the site such as soil, temperature, elevation, solar radiation, slope, aspect, and rainfall; denotes a general kind of climax plant community (ponderosa pine or bunchgrass).

potentiometric surface—A hypothetical surface representing the level to which ground water would rise if not trapped in a confined aquifer.

predation—Mode of life in which food is primarily obtained by the killing or consuming of animals.

prescribed fire—A wildland fire originating from a planned ignition to meet specific objectives identified in a written, approved, prescribed fire plan for which NEPA requirements (where applicable) have been met before ignition.

priority public use—See wildlife-dependent recreational use.

pristine—Typical of original conditions.

private land—Land that is owned by a private individual, a group of individuals, or a nongovernment organization.

private landowner—Any individual, group of individuals, or nongovernment organization that owns land.

private organization—Any nongovernment organization.

proposed action—Alternative proposed to best achieve the purpose, vision, and goals of a refuge (contributes to the Refuge System mission, addresses the significant issues, and is consistent with principles of sound fish and wildlife management).

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 shown an interest in Service issues and those who do or do not realize that Service decisions may affect them.

public involvement—Process that offers affected and interested individuals and organizations an opportunity to become informed about, and to express their opinions on, Service actions and policies. In the process, these views are studied thoroughly and thoughtful consideration of public views is given in shaping decisions for refuge management.

public involvement plan—Broad long-term guidance for involving the public in the comprehensive planning process.

public land—Land that is owned by the local, State, or Federal government.

purpose of the refuge—Purpose specified in or derived from the law, proclamation, Executive order, agreement, public land order, donation document, or administrative memorandum establishing authorization or expanding a refuge, refuge unit, or refuge subunit ("Draft U.S. Fish and Wildlife Service Manual" 602 FW 1.5).

refuge lands—Lands in which the Service holds full interest in fee title, or partial interest such as limited-interest refuges.

refuge purpose—See purpose of the refuge.

Refuge System—See National Wildlife Refuge System.

Region 6—Mountain-Prairie Region of the U.S. Fish and Wildlife Service, which administers Service programs in Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Wyoming, and Utah.

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

restoration—Artificial manipulation of a habitat to restore it to something close to its natural state. Involves taking a degraded grassland and reestablishing habitat for native plants and animals. Restoration usually involves the planting of native grasses and forbs, and may include shrub removal and prescribed fire.

riparian area or riparian zone—Area or habitat that is transitional from terrestrial to aquatic ecosystems including streams, lakes, wet areas, and adjacent plant communities and their associated soils that have free water at or near the surface; an area whose parts are directly or indirectly attributed to the influence of water; of or relating to a river; specifically applied to ecology, "riparian" describes the land immediately adjoining and directly influenced by streams. For example, riparian vegetation includes all plant life growing on the land adjoining a stream and directly influenced by the stream.

runoff—Water from rain, melted snow, or agricultural or landscape irrigation that flows over the land surface into a waterbody.

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

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

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

shorebird—Any of a suborder of birds such as a plover or a snipe that frequent the seashore or mudflat areas.

sound professional judgment—Finding, determination, or decision that is consistent with principles of sound fish and wildlife management and ad¬ministration, available science and resources, and adherence to the needs of the National Wildlife Refuge System Administration Act of 1966 and other applicable laws.

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

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

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

species of concern—Those plant and animal species, while not falling under the definition of special status species, that are of management interest by virtue of being Federal trust species such as migratory birds, important game species, or significant keystone species; species that have documented or clear populations declines, small or restricted populations, or dependence on restricted or vulnerable habitats. Species that: (1) are documented or have clear population declines; (2) are small or restricted populations; or (3) depend on restricted or vulnerable habitats.

stand—Any homogenous area of vegetation with more or less uniform soils, landform, and vegetation. Typically used to refer to forested areas.

stepdown management plan—Plan that provides the details necessary to carry out management strategies identified in the comprehensive conservation plan ("Draft U.S. Fish and Wildlife Service Manual" 602 FW 1.5).

strategy—Specific action, tool, or technique or combination of actions, tools, and techniques used to meet unit objectives ("Draft U.S. Fish and Wildlife Service Manual" 602 FW 1.5).

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

succession—Orderly progression of an area through time from one vegetative community to another in the absence of disturbance. For example, an area may proceed from grass–forb through aspen forest to mixed-conifer forest.

surficial—Relating to or occurring on the surface.

temporarily flooded—Surface water is present for brief periods during the growing season.

trust resource—Resource that, through law or administrative act, is held in trust for the people by the government. A Federal trust resource is one for which trust responsibility is given in part to the Federal Government through Federal legislation or administrative act. Generally, Federal trust resources are those considered to be of national or international importance no matter where they occur, such as endangered species and species such as migratory birds and fish that regularly move across State lines. Besides species,

trust resources include cultural resources protected through Federal historic preservation laws, nationally important and threatened habitats, notably wetlands, navigable waters, and public lands such as State parks and national wildlife refuges.

trust species—See trust resource.

understory—Any vegetation whose canopy (foliage) is below, or closer to the ground than canopies of other plants.

upland—Dry ground; other than wetlands.

USDA—See U.S. Department of Agriculture.

U.S. Department of Agriculture—A Federal agency under the executive branch of government.

U.S. Fish and Wildlife Service—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 made up of more than 530 national wildlife refuges and thousands of waterfowl production areas. It also runs 65 national fish hatcheries and 78 ecological service field stations, the agency enforces Federal wildlife laws, manages migratory bird populations, restores national significant fisheries, conserves and restores wildlife habitat such as wetlands, administers the Endangered Species Act, and helps foreign governments with their conservation efforts. It also oversees the Federal aid program that distributes millions of dollars in excise taxes on fishing and hunting equipment to State wildlife agencies.

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

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

U.S. Geological Survey—Federal agency whose mission is to provide reliable scientific information to describe and understand the earth; reduce loss of life and property from natural disasters; manage water, biological, energy, and mineral resources; and enhance and protect our quality of life.

USGS—See U.S. Geological Survey.

vision statement—Concise statement of what the planning unit should be, or what the Service hopes to do, based primarily on the Refuge System mission, specific refuge purposes, and other mandates. In addition, the vision statement is tied to the maintenance and restoration of biological integrity, diversity, and environmental health of each refuge and the Refuge System.

visual obstruction—Pertaining to the density of a plant community; the height of vegetation that blocks the view of predators and conspecifics to a nest.

visual obstruction reading (VOR)—Measurement of the density of a plant community; the height of vegetation that blocks the view of predators to a nest.

VOR—See visual obstruction reading.

wadingbirds—Birds having long legs that enable them to wade in shallow water. Includes egrets, great blue herons, black-crowned night-herons, and bitterns.

Wage Grade—Pay rate schedule for certain Federal positions.

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

watershed—Geographic area within which water drains into a particular river, stream or body of water. A watershed includes both the land and the body of water into which the land drains.

wetland—Land transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water.

WGFD—See Wyoming Game and Fish Department.

wildfire—Unplanned ignition of a wildland fire (such as a fire caused by lightning, volcanoes, unauthorized and accidental human-caused fires) and escaped prescribed fires.

wildland fire—A general term describing any nonstructure fire that occurs in the wildland. There are two types of wildland fire—wildfire and prescribed fire.

wildlife-dependent recreational use—Use of a refuge involving hunting, fishing, wildlife observation and photography, or environmental education and interpretation. These are the six priority public uses of the Refuge System as established in the National Wildlife Refuge System Administration Act of 1966, as amended. Wildlife-dependent recreational uses, other than the six priority public uses, are those that depend on the presence of wildlife.

wildlife management—Practice of manipulating wildlife populations either directly through regulating the numbers, ages, and sex ratios harvested, or in¬directly by providing favorable habitat conditions and alleviating limiting factors.

woodland—Open stands of trees with crowns not usually touching, generally forming from 25 to 60 percent cover.

Wyoming Game and Fish Department—A government department of the State of Wyoming.

xerophytic—Pertaining to a plant that needs little water (adapted to growing in dry habitat).

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