Chapter 2: Refuge Planning Context

In this chapter:

Introduction

This chapter provides a background for the comprehensive conservation planning process undertaken for each unit of the National Wildlife Refuge System (NWRS, Refuge System). The first tier of planning guidance comes from the overarching policy and legislation that governs all federal agencies as well as guidance that applies to the Refuge System as a whole. The second tier of planning guidance derives from refuge-specific factors and the local social and ecological context. A third tier of guidance is informed by the refuges' role as articulated by broader conservation initiatives and planning efforts—both internal and external to the Service. The fourth and final section of this chapter describes the details of the planning process as it has unfolded for these two refuges.

Refuge System Planning Guidance

This first section outlines the broad, overarching guidance that applies to all Refuge System units. It is created at the highest levels of the federal government and provides guidance for the refuge planning process. Included are the mission of the U.S. Fish and Wildlife Service (FWS, Service); the mission, goals, and guiding principles of the Refuge System; and a compendium of other relevant federal legislation.

The U.S. Fish and Wildlife Service

DeSoto and Boyer Chute Refuges are administered by the Service, the primary federal agency responsible for conserving, protecting, an enhancing the Nation's fish and wildlife populations and their habitats. The Service oversees the enforcement of federal wildlife laws, management and protection of migratory bird populations, restoration of fisheries, administration of the Endangered Species Act of 1973, restoration of wildlife habitat such as wetlands, collaboration with international conservation efforts, and the distribution of conservation funding to states, territories, and tribes. Through its conservation work, the Service also provides a healthy environment in which Americans can engage in outdoor activities. Additionally, as one of three land managing agencies in the Department of the Interior, the Service is responsible for the Nation's Refuge System.

FWS Mission

The mission of the 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.

The National Wildlife Refuge System

The Refuge System was founded in 1903 when President Theodore Roosevelt designated a three-acre island off the Florida coast, Pelican Island, as a sanctuary for colonial nesting birds. Today, the Refuge System has grown to a network of over 560 national wildlife refuges (NWR, refuge), 38 wetland management districts, and 49 coordination areas covering over 150 million acres of public lands and waters. Over 50 percent of these lands (over 76 million acres) are contained within Alaska's 16 refuges, with the remainder distributed throughout the other 49 states and U.S. territories. Since 2006, Marine National Monuments have been added to the Refuge System, bringing over 50 million additional acres in the Pacific Ocean under federal protection and conservation management.

The Refuge System is the world's largest collection of lands and waters specifically designated and managed for fish and wildlife. Overall, it provides habitat for more than 700 birds species, 220 mammal species, 250 reptile and amphibian species, 200 fish species, and more than 280 threatened or endangered plants and animals. As a result of international treaties for migratory bird conservation and related legislation such as the Migratory Bird Conservation Act of 1929, many refuges have been established to protect migratory waterfowl and their migration flyways that extend from nesting grounds in the north to wintering areas in the south. Refuges also play a vital role in preserving threatened and endangered species.

Refuges provide important recreation and education opportunities for visitors as well. When public uses are deemed appropriate and compatible with wildlife and habitat conservation, refuges are places where people can enjoy hunting, fishing, wildlife observation and photography, environmental education and interpretation, and other recreational activities. Many refuges offer visitor services such as visitor centers, wildlife trails, automobile tours, and environmental education programs. Nationwide, over 41 million people visit national wildlife refuges annually.

NWRS Mission

The mission of the Refuge System is ". . . to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans." (National Wildlife Refuge System Improvement Act of 1997 – Public Law 105-57).

NWRS Goals

Revised goals for the Refuge System were adopted on July 26, 2006 and were incorporated into Part 601 of Chapter 1 of the "U.S. Fish and Wildlife Service Manual." The goals are:

- Conserve a diversity of fish, wildlife, and plants and their habitats, including species that are endangered or threatened with becoming endangered;
- Develop and maintain a network of habitats for migratory birds, anadromous and interjurisdictional fish, and marine mammal populations that is strategically distributed and carefully managed to meet important life history needs of these species across their ranges;

- 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 participate in compatible wildlife-dependent recreation (hunting, fishing, wildlife observation and photography, and environmental education and interpretation); and
- Foster understanding and instill appreciation of the diversity and interconnectedness of fish, wildlife, and plants and their habitats.

NWRS Guiding Principles

The National Wildlife Refuge System Administration Act of 1966, as amended, states that each refuge shall be managed to fulfill both the mission of the Refuge System and the purposes for which the individual refuge was established. It also requires that any use of a refuge be a compatible use—a use that will not materially interfere with nor detract from, in the sound professional judgment of the refuge manager, fulfillment of the mission of the Refuge System or the purposes of the refuge. The 1997 amendments to the National Wildlife Refuge System Administration Act of 1966 identified a number of principles to guide management of the Refuge System. *Conserving the Future: Wildlife Refuges and the Next Generation* (2011), which presents the Service's new vision, revised and renewed the Service's commitment to the guiding principles, drawing on Aldo Leopold's land ethic and introducing a new principle for our commitment to scientific excellence. The revised guiding principles include the following:

- We are land stewards, guided by Aldo Leopold's teachings that land is a community of life and that love and respect for the land is an extension of ethics. We seek to reflect that land ethic in our stewardship and to instill it in others.
- Wild lands and the perpetuation of diverse and abundant wildlife are essential to the quality of the American life.
- We are public servants. We owe our employers, the American people, hard work, integrity, fairness, and a voice in the protection of their trust resources.
- Management, ranging from preservation to active manipulation of habitats and populations, is necessary to achieve Refuge System and Service missions.
- Wildlife-dependent uses involving hunting, fishing, wildlife observation, photography, interpretation and education, when compatible, are legitimate and appropriate uses of the Refuge System.
- Partnerships with those who want to help us meet our mission are welcome and indeed essential.
- Employees are our most valuable resource. They are respected and deserve an empowering, mentoring, and caring work environment.
- We respect the rights, beliefs, and opinions of our neighbors.
- We are a science-based organization. We subscribe to the highest standards of scientific integrity and reflect this commitment in the design, delivery and evaluation of all of our work.

To maintain the health of individual refuges and the Refuge System as a whole, managers must anticipate future conditions. Managers must endeavor to avoid adverse impacts and take positive actions to conserve and protect refuge resources. Effective management also depends on acknowledging resource relationships and acknowledging that refuges are important parts of larger ecosystems. Refuge managers work together with partners—including other refuges, federal and state agencies, tribal and other governments, non-governmental organizations and groups, academic institutions, the public, and others—to protect, conserve, enhance, or restore all native fish, wildlife, plants, and their habitats.

Legal and Policy Compliance

Although the National Wildlife Refuge System came into existence over 100 years ago, it was not until the National Wildlife Refuge System Improvement Act of 1997 (Improvement Act) that several important mandates were established making the administration and management of refuges more cohesive and unified. The Improvement Act directs the Secretary of the Interior to ensure that the mission of the Refuge System and purposes of the individual refuges are carried out. Fundamental to this effort is the preparation of a 15-year comprehensive conservation plan (CCP) covering each unit in the Refuge System. In addition, the Improvement Act mandates that consideration be given to the maintenance of biological integrity, diversity, and environmental health; regulated determination of compatible public uses; facilitation of wildlife-dependent recreation; protection of archaeological and cultural values, coordination and cooperation with state fish and wildlife agencies; and the development of plans in a process that ensures active public involvement.

In addition to the Improvement Act and a refuge's establishing and authorizing legislation, several federal laws, executive orders, and regulations govern the administration of each refuge. Key legislative policies that direct refuge management include the Endangered Species Act (1973), Clean Water Act (1977), Land and Water Conservation Fund (1965), and Migratory Bird Treaty Act (1918). Appendix D contains a partial list of the legal mandates that guided the preparation of this plan and those that pertain to refuge management activities.

Wilderness Review

Refuge planning policy mandates that wilderness reviews be conducted through the comprehensive conservation planning process (FWS 2000b). The wilderness review process consists of three phases: inventory, study, and recommendation. In the inventory phase Service-owned lands and waters within the refuge that are not currently designated wilderness are reviewed, and areas that meet the criteria for wilderness established by Congress are identified. The criteria are size, naturalness, opportunity for solitude or primitive recreation, and supplemental values. Areas that meet the criteria are called Wilderness Study Areas (WSAs). In the study phase a range of management alternatives for the WSAs are developed and evaluated to determine if they are suitable for recommendation for inclusion in the National Wilderness Preservation System. In the recommendation phase the suitable refuge lands are described in a Wilderness Study Report that moves from the director of the Service through the secretary of the Department of the Interior and the president to Congress.

No lands within DeSoto or Boyer Chute NWRs satisfy the criteria for wilderness established by Congress and described in Service policy (FWS 2008b). These refuges do not contain 5,000 contiguous acres of roadless, natural lands, nor do the refuges possess any units of sufficient

size to make their preservation practicable as wilderness. Refuge lands and waters have been substantially altered by humans, particularly through altered seasonal flow regimes and engineering of the Missouri River channel, highly modified floodplain hydrology and drainage, agricultural and residential development of the floodplain, and the construction of diffuse transportation infrastructure networks.

Refuge Management Guidance

In addition to the guidance that applies to all Refuge System units, refuge planning is also affected by policy and guidance specific to the individual management units under review. This section outlines the planning guidance pertaining to the refuges' establishment authorities, purposes, land acquisition history, and self-prescribed vision statement.

Brief History of Refuge Establishment and Land Acquisition

DeSoto National Wildlife Refuge

The refuge acquired its name from a historic bend on the Missouri River. The bend was originally named after the river town of DeSoto (incorporated in 1855), which provided a steamboat landing and ferry crossing, promoted a railroad west, and was once the county seat of Washington County, Nebraska. The town of DeSoto prospered in the late 1850s and early 1860s, then declined as residents moved on to the Colorado gold fields. The town was ultimately abandoned in the late 19th century when the Missouri River channel shifted leaving the townsite several miles west of the river, and a railroad crossing was established three miles north in Blair, Nebraska.

Plans were developed and proposed for a DeSoto-Bertrand Bend cutoff by the U.S. Army Corps of Engineers (USACE, Corps) early in the Missouri River channelization and dam-building era. The project was designed to improve navigation on the Missouri River but was stalled by local resistance until 1956 when the Service made a preliminary investigation and determined that the area had substantial potential benefits for wildlife. Coupled with a primary purpose of wildlife conservation the refuge proposal offered extensive recreational benefits, engendering additional local support, and appeared in the 1958 Congressional Record as the "DeSoto–Bertrand Bend National Wildlife Refuge and Recreation Area."

Migrating birds on DeSoto NWR; Randy Mays

DeSoto NWR was established in March of 1958 with the approval of the Migratory Bird Conservation Commission with the dual intention of providing for the needs of migratory birds and providing public recreation to local communities. According to realty records, the authorized land base owned in fee title by the Service is fully acquired at 7,823 acres in size, with 3,499 in Iowa and 4,324 in Nebraska. Over 7,000 of these acres were acquired through federal Duck Stamp funding. A portion of the refuge's land acquisition took place before the DeSoto–Bertrand Bend

was cut off from the main channel, and today the physical footprint of the refuge actually spans 8,365 acres. The additional 542-acre area discrepancy from the realty records is accounted for by the changes that took place in 1960 when the DeSoto–Bertrand Bend of the Missouri River was cut off and a new, shorter channel was dug by the Corps. The additional acreage includes the area from the top bank on the west side of the new channel to the foot of the levee on the east side of the channel. Nearly half of this area (286 acres) is the Missouri River channel itself, and the remainder is the levee and lands riverward of the levee. The new channel construction ultimately had the effect of decreasing the Missouri River channel acreage and increasing the acreage of land and water under the purview of the refuge. Land acquisition for the refuge occurred quickly between 1959 and 1962, with only a few small land transactions occurring subsequent to that period. A timeline of refuge land acquisition is included in table 2-1.

Table 2-1: Land Acquisition Summary by Fiscal Year, DeSoto NWR

Fiscal Year*	No. of Transactions		Yearly Acres Acquired		Leased Acres	Total Acres
	Iowa	Nebraska	Iowa	Nebraska		
1959	2	2	1,815.43	2,588.92	-	4,404.35
1960	-	1	-	1,640.97	3.61	6,048.93
1961	8	1	948.49	-16.38	-	6,981.04
1962	4	1	696.07	110.69	-	7,787.80
1963	2	-	3.02	-	-	7,790.82
1970	1	-	13.15	-	-	7,803.97
1972	1	-	21.00	-	-	7,824.97
1980	1	-	2.00	-	-	7,826.97

*The fiscal year pre-1976 ran from July 1–June 30. Beginning in 1976 the fiscal year has run from October 1–September 30.

Boyer Chute National Wildlife Refuge

The Boyer Bend area, where the refuge is now located, originally formed through the deposition and accumulation of sand and sediment from Iowa's Boyer River, named after an early settler who hunted and trapped in the area. Over time, the erosive forces of the Missouri River cut channels and chutes through these deposits.

Interest in the Boyer Chute, the feature that gives the refuge its name, began during the Flood Control Acts and the Missouri River channelization era—well before the refuge was established. In 1937 a revetment and shale dikes were constructed across the upstream end of Boyer Chute. This engineering forced water to remain within the main river channel. Subsequent sediment accumulated behind the upstream cutoff and the construction of an earth-fill road crossing the middle of the old chute channel prevented water from flowing into the chute in all but spring high water periods or during floods (USACE 1995).

The impetus for a national wildlife refuge at the Boyer Chute arose in the late 1980s during the Missouri River Corridor Study, a multiple-partner collaborative project that identified Boyer Bend and its chute as the highest priority conservation restoration site on the 137-mile stretch of river between Sioux City, Iowa, and Plattsmouth, Nebraska. The refuge was authorized in August of 1992, and in the same year the restoration of Boyer Chute was undertaken by the Corps. The restoration was completed in 1994—the same year the majority of the visitor services infrastructure was developed on the lands that would become the refuge. The initial refuge design was a part of the Papio–Missouri River Natural Resources District's (NRD) Missouri

River Corridor Project, and the land base included only the island formed by the restored Boyer Chute and a narrow strip of land immediately west of the chute (approximately 2,000 total acres) (FWS 1992). In August of 1995, the Service began managing the refuge under a Memorandum of Understanding with the Papio–Missouri River NRD who owned the land at the time. The refuge officially opened to the public over Labor Day weekend the following year (1996). In September of 1997, the NRD handed over fee title ownership of the original refuge land base, a 1,954-acre property, to the Service. This land transaction officially established the refuge. That same year a refuge boundary expansion began due to congressional appropriations under the Back to the River initiative, which enlarged the authorized acquisition boundary to 10,010 acres (FWS 1997). This initiative sought to increase fish and wildlife habitat and public recreation on the 65-mile stretch of the Missouri River between Herman and Bellevue, Nebraska.

Welcome to Boyer Chute NWR; USFWS

Approximately 4,040 acres (40 percent, all in Nebraska) of the proposed refuge boundary are currently owned and managed by the Service. The remaining 5,309 acres (53 percent, which *excludes* the 661 acres of Missouri River surface area) are privately owned with two exceptions: Boyer Bend Wildlife Management Area (WMA) held by the Iowa State Conservation Commission (81 acres) and a 444-acre agricultural tract owned by the Nebraska Board of Educational Lands and Funds (figure 2-1). The vast majority of non-refuge land in the authorized boundary is in agricultural production. When full acquisition from willing sellers is complete, the refuge will connect with DeSoto NWR through Wilson Island State Recreation Area to the north and with the Neale Woods to the south.

The current acquisition priorities for Boyer Chute NWR are depicted in figure 2-2. Phase One is west of the Missouri River and includes Boyer Island and the lands immediately southwest (52 percent acquired). Phase Two is also west of the Missouri River and includes the northwest areas of the acquisition boundary (13 percent acquired). Phase Three is all authorized lands on the east side of the Missouri River (0 percent acquired).

Figure 2-1: The Refuges and Adjacent Conservation Lands

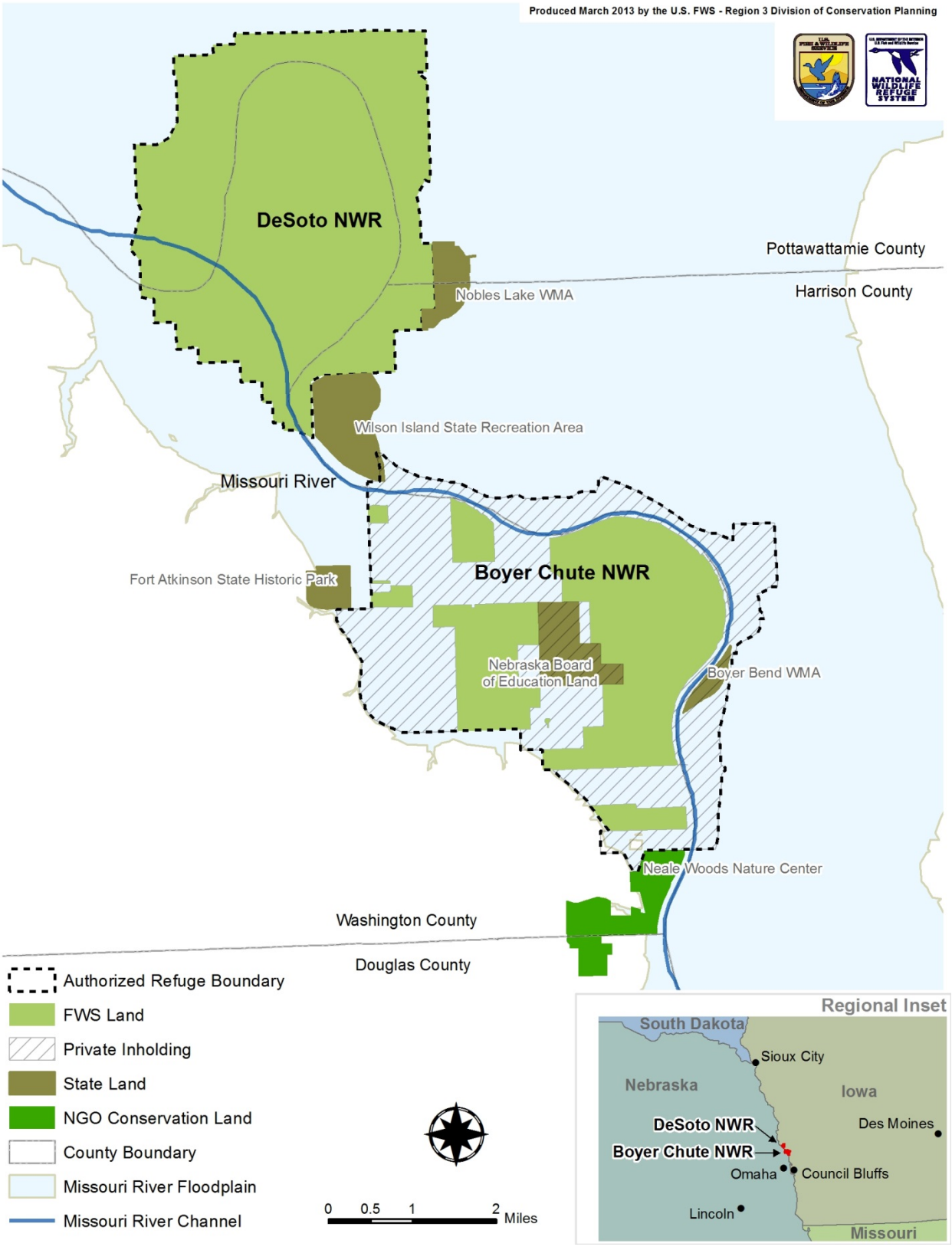
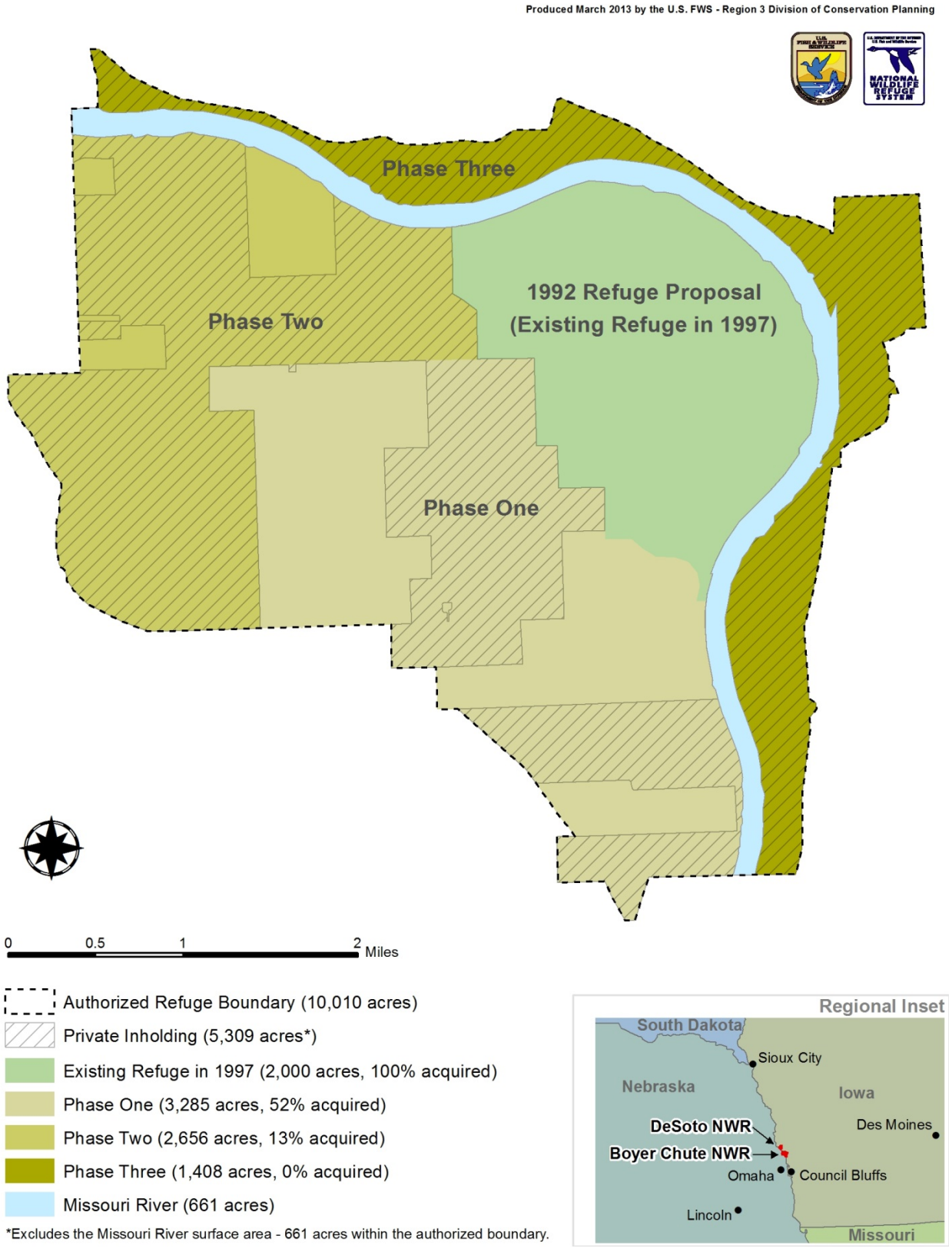


Figure 2-2: 1997 Land Acquisition Priorities, Boyer Chute NWR



Despite the 1992 refuge authorization and Service management which began in 1995, official Service land acquisition for (and formal establishment of) the refuge did not begin until 1997 when the NRD donated the 1,954-acre Boyer Island property. That same year Congress made an appropriation of two million dollars from the Land and Water Conservation Fund to expand the refuge, which funded a number of acquisitions in the years that followed. Priority was given to areas with potential for wetland restorations, including Nathan's Lake, Mud Lake, Horseshoe Lake, and the Mallard Wetlands. Much of the Nathan's Lake Complex (655 acres) was acquired and restored in collaboration with the NRD, and then transferred to the Service. The acquisition and restoration of Horseshoe Lake and Mallard Wetland properties (over 800 acres) were the result of the collaboration between the refuge, the Natural Resources Conservation Service's Wetland Reserve Program, and Ducks Unlimited. The total refuge acreage has remained stable since the end of 2005, with approximately 40 percent of the authorized refuge boundary acquired and managed by the Service. A timeline of refuge land acquisition is included in table 2-2.

Table 2-2: Land Acquisition Summary by Fiscal Year, Boyer Chute NWR

Fiscal Year*	No. of Transactions Made	Total Yearly Acres	Cumulative Refuge Acres
1997	1	1,953.85	1,953.85
1998	5	324.99	2,278.84
1999	3	505.31	2,784.15
2000	3	305.00	3,089.15
2001	6	170.12	3,259.27
2002	3	41.00	3,300.27
2003	2	28.94	3,329.21
2004	-	-	-
2005	5	710.56	4,039.77
2006	1	0.04	4,039.81
2007	-	-	-
2008	-	-	-
2009	1	(easement) 0.06	4,039.87
2010	-	-	-
2011	-	-	-

*The fiscal year has run from October 1–September 30 since 1976.

Boyer Chute NWR straddles two geographic regions of the Service, and management responsibilities have alternated over time from one region to the other. The refuge was first authorized in 1992 as a unit in the Rocky Mountain Region. When the Service finally began management of the refuge in 1995 under a Memorandum of Understanding with the land owner (Papio-Missouri River NRD), refuge operations and maintenance were delegated to DeSoto NWR in the Midwest Region of the Service. This arrangement lasted until July of 2001, during which time the refuge was "officially" established when, in 1997, the land was transferred to the Service. In July of 2001, Boyer Chute NWR switched hands and became an independent refuge fully supported and managed by the Rocky Mountain Region. Five years later in October 2006, full management and oversight of the refuge transferred back to DeSoto NWR because of the close proximity of the refuges, the added efficiencies of shared management, and because of their common ecology, habitats, wildlife management, and publics.

Refuge Purposes

National wildlife refuges are established under a variety of legislative acts and administrative orders and authorities. These orders and authorities include one or more specific purposes for which refuge lands are acquired. The purposes are of key importance in refuge planning and are the foundation for management decisions. The purposes of a refuge are specified in, or derived from the law, proclamation, executive order, agreement, public land order, donation document, or administrative memorandum establishing, authorizing, or expanding a refuge, refuge unit, or refuge subunit.

By law refuges are to be managed to achieve their purposes, and unless otherwise indicated by the establishing document the following rules apply:

- Purposes dealing with the conservation, management, and restoration of fish, wildlife, and plants and their habitats take precedence over other management and administration purposes.
- When in conflict, the purpose of an individual refuge may supersede the Refuge System mission.
- Where a refuge has multiple purposes related to fish, wildlife, and plant conservation, the more specific purpose will take precedence in instances of conflict.
- When an additional unit is acquired under a different authority than that used to establish the original unit, the addition takes on the purpose(s) of the original unit, but the original unit does not take on the purpose(s) of the addition.

DeSoto NWR's establishing authorities and related purposes include:

> Migratory Bird Conservation Act of 1929
> ". . . for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." 16 U.S.C. 715d
>
> Refuge Recreation Act of 1962*
> ". . . suitable for—(1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species . . ." 16 U.S.C. 460k–460k-4
>
> *This purpose was applied post facto to DeSoto NWR, which was established in 1958.

Boyer Chute NWR's establishing authorities and related purposes** include:

> The Fish and Wildlife Act of 1956
> ". . . for the development, advancement, management, conservation, and protection of fish and wildlife resources . . ." 16 U.S.C. 742f(a)(4)
>
> ". . . for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude . . ." 16 U.S.C. 742f(b)(1)

**The Emergency Wetlands Resources Act of 1986 also appears in a number of important refuge documents. This act promotes, ". . . 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 . . ." (16 U.S.C. 3901(b), 100 Stat. 3583). Wetland habitats are a key component of the refuge's floodplain ecosystem, and a primary collaborative focus for the refuge and its partners. This legislation, however, is neither included in the authorities cited in the environmental assessments, nor the official documents that transferred land from the NRD to the Service. In addition, all land purchases by the Service have occurred under the authority of the Fish and Wildlife Act of 1956 using monies from the Land and Water Conservation Fund.

Refuge Vision Statement

The vision provides a simple statement of the desired future condition for a refuge. It provides a sense of direction and an ideal for what the refuge will become through effective management. The purposes of the refuge and the mission of the Refuge System provide the foundation for the vision and are enhanced by the unique characteristics of the refuge and local environment. The shared vision statement for DeSoto and Boyer Chute Refuges is:

> DeSoto and Boyer Chute National Wildlife Refuges are located in the migratory bird corridor of the Missouri River floodplain and provide essential habitat for resident, migratory, and endangered species. The Steamboat Bertrand Museum Collection, large concentrations of wetland-dependent birds, and inventive environmental education partnerships make these refuges special within the National Wildlife Refuge System. High quality floodplain forest, grassland, wetland, sandbar, and riverine habitats support diverse and productive populations of migratory waterfowl, shorebirds, and neotropical birds as well as rare threatened and endangered species including the pallid sturgeon, Piping Plover, and Least Tern. The refuges offer high quality interpretive and environmental education programs for the public that increase an appreciation for the impact of settlement along the Missouri River and the refuges' role in conserving and managing Missouri River floodplain habitat and wildlife. The refuges also provide abundant opportunities to participate in environmental interpretation, wildlife observation, hunting, fishing, and other wildlife-dependent recreation while at the refuges. U.S. Fish and Wildlife Service staff and partners work collaboratively to understand, restore, and conserve biological communities on the refuges in a dynamic and changing environment, and work to promote an enduring appreciation for the refuges, the Refuge System, and Service trust resources.

Relationship to Other Conservation Initiatives

DeSoto and Boyer Chute Refuges constitute a total potential contribution of 18,375 acres (of a total 2.3 billion acres of U.S. land) to the conservation landscape. By themselves, the two refuges will have little impact on the retention of open space, the persistence of wildlife species, and the maintenance of ecosystem services. However, refuge efforts combined with activities and partnerships across the larger conservation network have great potential to provide a measure of sustainability to the Nation's natural resources and provide the mechanism for the Service to meet its critical mission. The following sections identify a number of important conservation initiatives that overlap and complement the vision and goals outlined in this plan. Where possible, the refuges collaborate with these efforts and incorporate shared objectives.

Migratory Bird Conservation Initiatives

North American bird conservation efforts have evolved over the past few decades from predominantly localized efforts to landscape-scale initiatives with separate planning emphases on guilds of birds and a greater emphasis on collaborative management. There are over 700 species of birds in the United States, and DeSoto and Boyer Chute Refuges host over 250 of these species including a diversity of waterfowl, water birds, shorebirds, and landbirds. The refuges' position straddling the Central and Mississippi flyways (figure 2-3) makes them an important stopover as birds travel from their breeding grounds in the north to their wintering areas in the south.

North American Waterfowl Management Plan (1986)

Waterfowl (family *Anatidae*—including ducks, geese, and swans) are economically important for both hunting and wildlife observation activities, can be used as indicators of environmental health, and are an important part of wetland ecosystems. Habitat loss resulting from agriculture, urbanization, and industrial activities has caused their numbers to decline in recent decades.

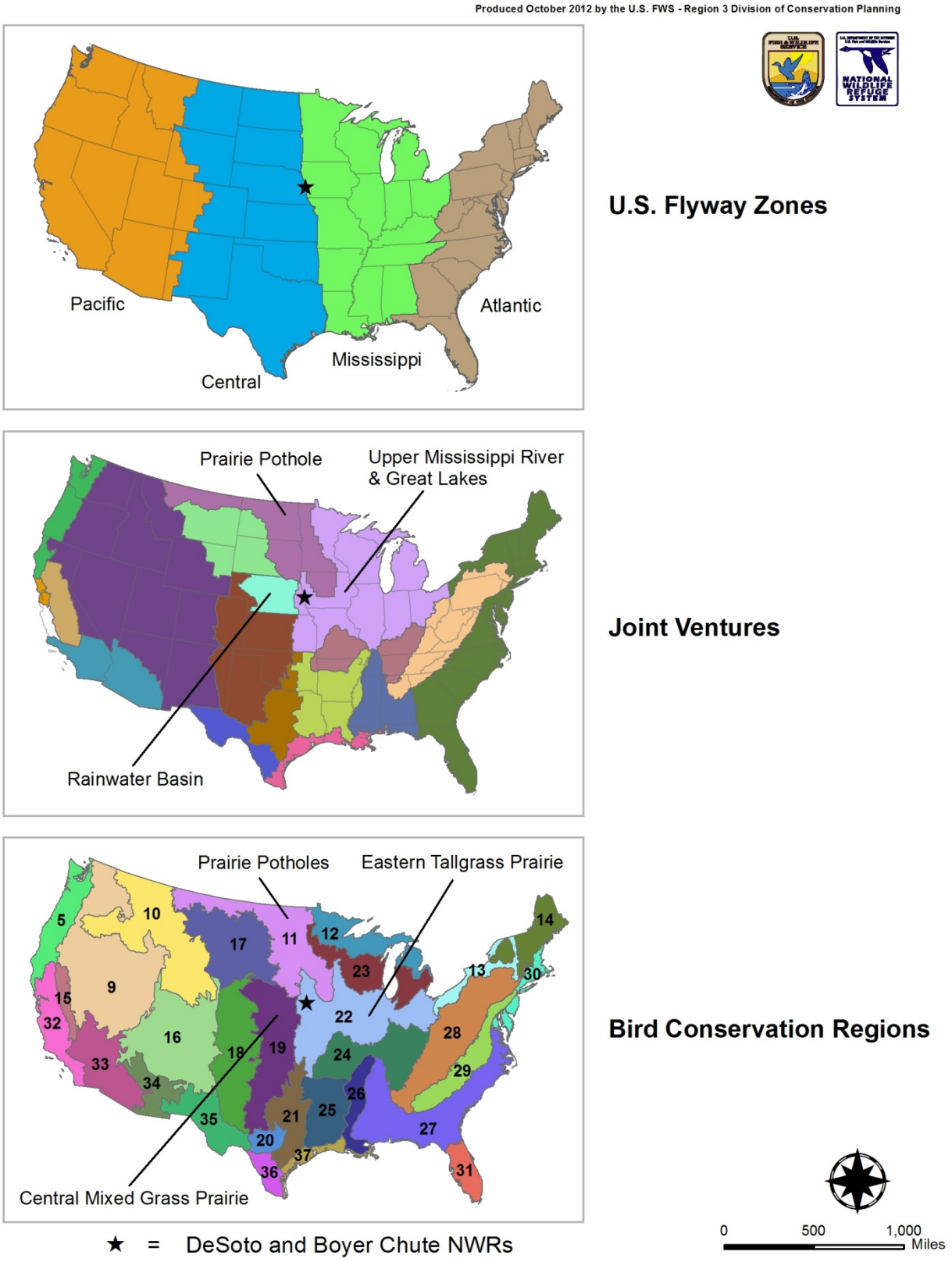
The 15-year North American Waterfowl Management Plan was originally drafted in 1986 but has had a number of subsequent updates. The plan sets up a framework for cooperative planning and coordinated management between the United States and Canada to increase waterfowl populations to acceptable and desired levels. Mexico also became a signatory in 1994. The plan describes appropriate waterfowl population goals, and also provides recommended actions for reaching the population levels. One major result of the plan was the establishment of joint ventures (JVs) between private and government organizations within geographic regions to coordinate waterfowl research and management activities. These joint ventures assist in integrating continental migratory bird priorities into regional, state, and local level conservation programs. Constituents include individuals, businesses, non-governmental organizations (NGOs), and local, state, and federal government representatives (FWS et al. 1986).

Wood Duck pair; USFWS (Dave Menke)

DeSoto and Boyer Chute Refuges lie within the Upper Mississippi River and Great Lakes Joint Venture (UMGL JV) region, yet they are also close to the Prairie Pothole Joint Venture (PP JV) to the north, and the Rainwater Basin Joint Venture (RWB JV) to the west (figure 2-3). Because the Missouri River Corridor is a distinct and well-travelled migratory pathway, DeSoto and Boyer Chute Refuges have some unique characteristics and roles that distinguish them from other sections of these JVs. This midcontinental location is an important feeding and resting area for migratory waterfowl in the fall, and to a lesser degree in the spring. Because many of the region's wetlands have been drained for agriculture, remaining wetlands and riparian areas like those provided by the refuges are essential to the seasonal migration of many migratory bird species.

The UMGL JV was formed in 1993, and at 240 million acres it is one of the largest and most diverse JVs. It has protected, restored, and enhanced over 522,000 acres of habitat. Habitat conservation strategy handbooks for each bird group—shorebirds, landbirds, water birds, and waterfowl —along with a comprehensive implementation plan, were released in 2007 to provide guidelines for the habitat types and quantities required to sustain target bird populations. These new plans use the latest geospatial analysis tools along with the most current scientific knowledge in their biological planning, regional landscape design, and strategies for projects, monitoring, research, communication, and outreach.

Figure 2-3: Bird Conservation Regions (1)



Established in 1987, the PP JV includes one-third of North America's Prairie Pothole Region. The portion contained within the United States is approximately 100,000 square miles. This landscape of depressional wetlands and grasslands combined with the Prairie Pothole Region in Canada constitute one of the largest and most productive concentrations of wetland habitat in the world. Birds native to the prairie pothole region include 18 species of waterfowl, 96 species of songbirds, 36 species of water birds, 17 species of raptors, and 5 species of upland game birds. Due to productive soils and abundant water, much of the Prairie Pothole region has been drained and used for agriculture or grazing. The JV works to counter this trend by saving or restoring high priority wetland areas and adjacent native prairie and grassland habitat throughout the region. Their 2005 Implementation Plan calls for the protection of 1.4 million additional wetland acres and 10.4 million acres of grassland (Ringelman 2005).

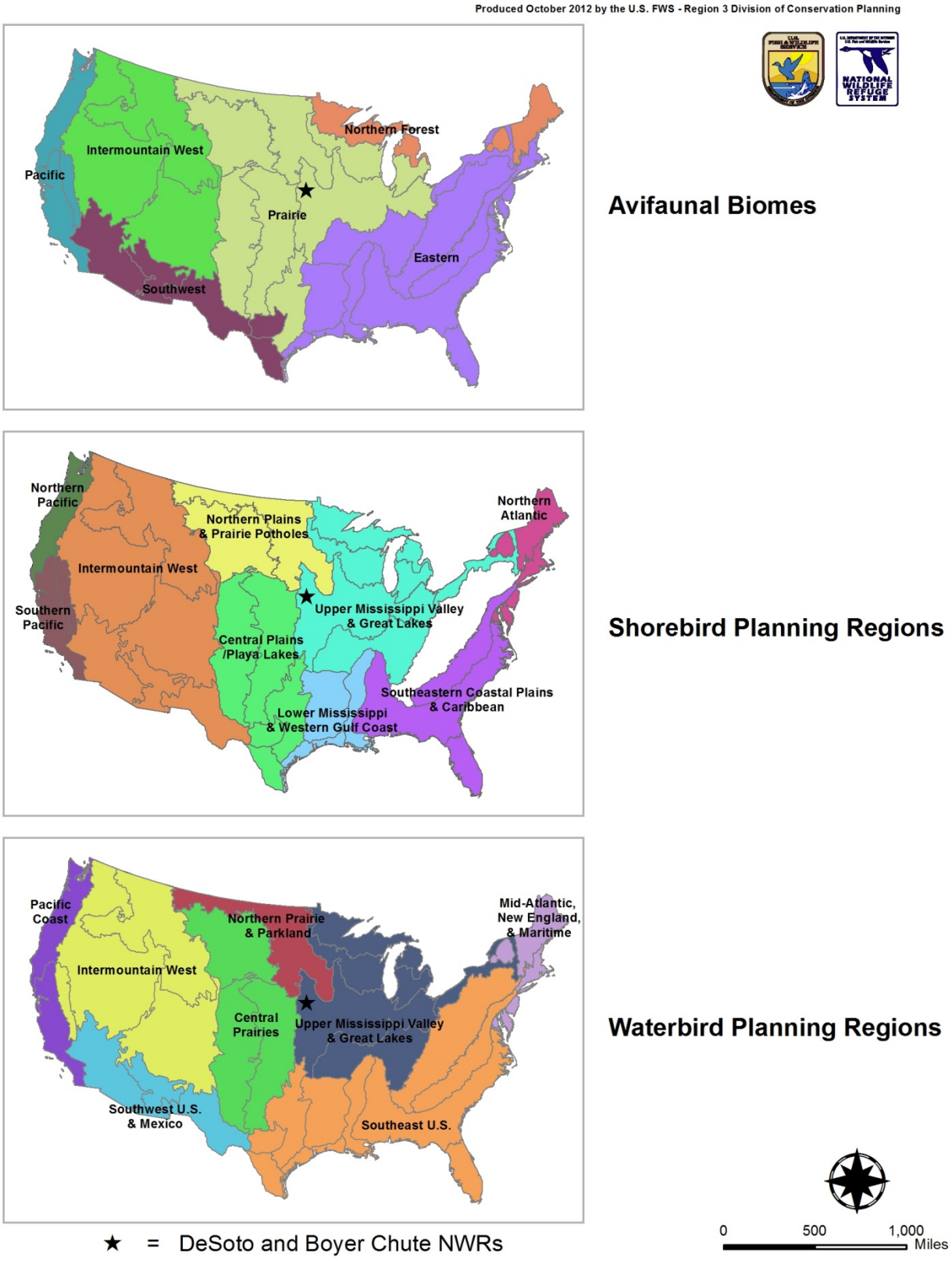
The RWB JV was formed in 1992 and spans 17 counties in south-central Nebraska. The basin is the narrowest point (approximately 150 miles wide) in the central flyway migration route between the Gulf Coast of Texas and Mexico and breeding grounds in the north. Each February and March millions of waterfowl rest, feed, and form pairs in this area. In addition, the wetlands are used in the spring by hundreds of thousands of migratory shorebirds. As an area with rich and productive land, many of the wetlands in this region have been converted to agricultural uses over the past century leaving less than 10 percent of the original wetland habitat—much of which is modified, degraded, and fragmented. Current wetland estimates in the basin tally 21,000 acres. The goal of the JV is to permanently protect 37,000 acres of wetlands with 25,000 acres of associated upland habitat to meet the needs of waterfowl and other migratory birds (RWB JV 2011).

North American Landbird Conservation Plan (Partners in Flight 2004)

In contrast to the other three bird plans discussed here, the target species of the North American Landbird Plan focuses on birds that inhabit predominantly terrestrial habitats. Approximately 448 landbirds breed in the United States and Canada.

Landbirds contribute to the economy in a number of ways. First and foremost they provide ecosystem services such as pollination, seed dispersal, and the consumption of insect pests. They also provide recreation opportunities such as wildlife observation and photography. The loss, modification, degradation, and fragmentation of habitat constitutes the primary threat for landbirds, including neotropical migrants, short-distance migrants, and largely resident species. The North American Landbird Conservation Plan identifies 192 species of continental importance. Approximately half (100) of these species are on a "watch list" because of a threatened/endangered population status. The remaining 92, as well as 66 species from the watch list, are considered "stewardship species" because they characterize and typify biogeographic regions or avifaunal biomes of North America (figure 2-4). These regions are based on Bird Conservation Regions (BCRs) devised by the North American Bird Conservation Initiative, but have been merged into larger units (figure 2-3) (Rich et al. 2004).

Figure 2-4: Bird Conservation Regions (2)



DeSoto and Boyer Chute Refuges lie at the center of the Prairie Avifaunal Biome, in the heart of North America's native grasslands. Unfortunately, over 99 percent of the original tallgrass prairie has been lost to agriculture and urban development, many of the wetlands have been drained, and fire—the primary disturbance mechanism for successional grassland habitat—has largely been eliminated from this ecosystem. Restored prairies and wetlands like those found on the refuges are important steps toward the recovery of declining species that once flourished throughout the central plains. This avifaunal biome still provides the wintering habitat for many Arctic species of landbirds, and breeding areas for nearly 40 percent of the species on the watch list. The watch list was created to identify landbird species with multiple reasons for conservation concern across their entire range.

U.S. Shorebird Conservation Plan (2001)

The U.S. Shorebird Conservation Plan was drafted by a partnership of national, state, private, and academic organizations committed to shorebird conservation across the United States. The designation "shorebird" is applied to those birds commonly known as sandpipers, plovers, oystercatchers, avocets, and stilts. Of the 214 shorebird species worldwide, 50 regularly breed or occur in the United States. The challenges of shorebird conservation stem from their great migration distances (crossing multiple jurisdictions), low reproduction rates, concentrated use of dispersed migration stopovers, a general loss of habitat across the landscape, and a lack of shorebird population data. This plan groups the BCRs to create 11 shorebird planning regions. Within each, a regional working group sets conservation goals, identifies critical habitats, assesses research needs, and recommends strategies for outreach and education. Founded on collaboration and cooperation between partners, the goal of the plan is to stabilize populations of shorebird species by protecting adequate quantities of wetland, shoreline, and grassland habitat to meet their breeding, wintering, and migrating needs (Brown et al. 2001).

DeSoto and Boyer Chute Refuges lie within the Upper Mississippi Valley and Great Lakes (UMVGL) shorebird planning region but are very close to the boundary with the Central Plains and Playa Lakes (CPPL) region to the west and the Northern Plains and Prairie Potholes region (NPPPR) to the north (figure 2-4). The latter two shorebird planning regions together encompass the entire central flyway migratory corridor. Shorebird habitat is an important component of floodplain habitat management on the refuges, with special consideration for federally listed Piping Plovers and Least Terns as potential visitors to the refuges.

The UMVGL region contains five BCRs and 32 shorebird species, nine of which are of high conservation priority: Greater Yellowlegs, Whimbrel, Buff-breasted Sandpiper, Short-billed Dowitcher, Marbled Godwit, Wilson's Phalarope, Upland Sandpiper, American Woodcock, and the Piping Plover. This region is noted for its climatic variability, and its primary habitat threats result from agriculture, river manipulation, and urban development. Objectives for meeting shorebird needs in this region include the protection of 9.6 million acres of ephemeral and permanent wetlands with associated upland habitats.

The CPPL region contains 5 BCRs, and hosts 40 species of migrating shorebirds—13 of which breed in the region, including the federally endangered Piping Plover. Shorebirds of primary conservation concern in the region include the Piping Plover, Mountain Plover, Snowy Plover, American Golden-Plover, Long-billed Curlew, Upland Sandpiper, and Buff-breasted Sandpiper. The overwhelming majority (>85 percent) of land in the region is in private ownership. Conservation challenges include a lack of adequate shorebird monitoring, the availability of water and water rights issues, and habitat loss as a result of expanding agriculture and urbanization.

The NPPPR region encompasses two BCRs, contains 13 breeding species of shorebird, and is characterized by widespread prairie grasslands and millions of depressional wetlands.

North American Waterbird Conservation Plan (2002)

The North American Waterbird Conservation Plan was created through the voluntary, collaborative efforts of many individuals and organizations interested in the future of seabirds and other colonial nesting birds (i.e., herons, loons, pelicans, gulls, albatrosses, petrels, auks, and rails). In response to threats like habitat loss, invasive and exotic species introductions, pollution, industrial activity, and site disturbance, the activities proposed by the plan range from continent-wide monitoring to local conservation actions that promote the distribution, diversity, and abundance of water birds. The plan covers 210 species, including seabirds, coastal water birds, wading birds, and marshbirds. Of the freshwater habitat requirements noted in the plan, DeSoto and Boyer Chute Refuges provide those associated with stream corridors and wetlands. These habitats provide for the nesting, feeding, roosting, and resting needs of water bird species. Through inventory and monitoring this plan is able to help identify the most threatened birds and the most critical habitats (Kushlan et al. 2002).

The refuges are positioned at the intersection of three water bird planning regions. They fall within the UMVGL water bird planning region but are close to the Central Prairies (CP) region to the west and the Northern Prairie and Parkland (NPP) region to the north (figure 2-4).

The UMVGL water bird region contains approximately 40 species of water birds, among them are priority species of terns, herons, bitterns, rails, and loons. Also, superabundant species are present such as Double-crested Cormorants and Ring-billed Gulls. The large river systems of this region, which include the Mississippi and Missouri Rivers, provide much of the important water bird habitat. Freshwater habitats at DeSoto and Boyer Chute Refuges that are used by water birds include wetlands, shorelines, rivers, and small islands. Development, river dredging and diking, and agricultural drainage are listed among the top threats to water bird habitat in this region.

The CP water bird region also prioritizes habitats found at DeSoto and Boyer Chute Refuges, namely native grasslands punctuated by depressional or river-associated wetlands. These areas host large breeding populations of Interior Least Terns, Black Terns, Eared Grebes, Black-crowned Night -Herons, American Bitterns, and Virginia Rails. They also provide important stopover areas for midcontinental Sandhill and Whooping Cranes.

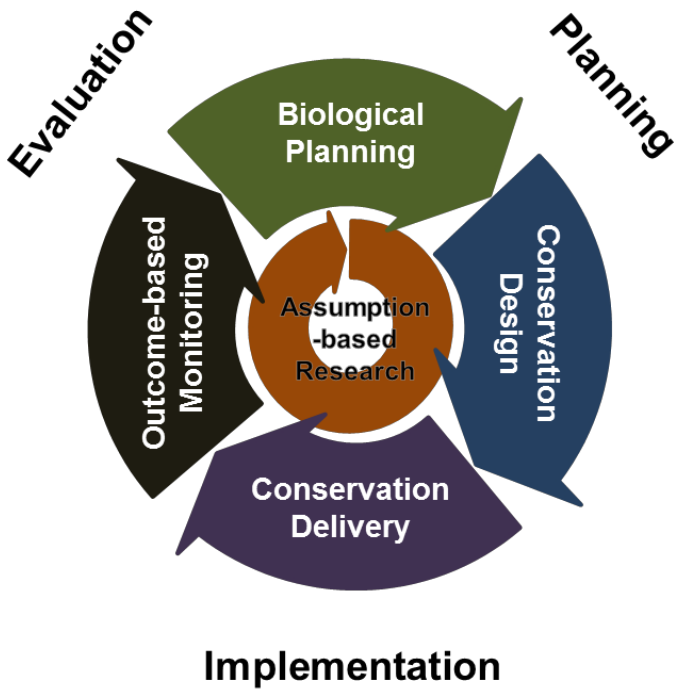
The NPP region's mixed grass prairies and numerous small wetlands provide some of the most important waterfowl production areas in North America. Twenty-four colonial, and fifteen non-colonial water bird species breed here. Efforts are being made to prevent the loss or deterioration of the pothole wetlands, and the impacts of climate change on these sensitive habitats are being closely monitored.

Strategic Habitat Conservation

Recognizing numerous advancements made in the fields of conservation, ecology, adaptive management, and technology, a panel of policy and technology experts from the Service, U. S. Geologic Survey, and the National Conservation Training Center formed the National Ecological Assessment Team (NEAT) in June of 2004. The goals of this team were to discuss and make

recommendations to the Service on its approach to conservation of 'trust resources' with efficiency, prioritization, and transparency as key drivers. The outcome of these meetings was the Strategic Habitat Conservation (SHC) framework, which is an iterative cycle of: (1) biological planning, (2) conservation design, (3) conservation delivery, and (4) monitoring (figure 2-5).

Figure 2-5: The Strategic Habitat Conservation Framework



The principles of SHC are not new to Service programs and projects, but the NEAT report formally establishes SHC as the new business model and operating platform for the Service in light of the 21st century's changing conservation landscape. Trends in the new millennium addressed by SHC include a focus on conservation science that is increasingly collaborative and interdisciplinary, spans multiple jurisdictions, uses a range of scales, and intertwines ecology with socioeconomic considerations. In addition, the face of the conservation workforce is changing, expectations from the public are increasing, and the complexity of environmental issues is intensifying. Whereas the previous era sought balance in the conservation and utilization of natural resources, the upcoming era has forced a recognition of limits to our environmental systems and the challenge of sustaining resources despite increasing pressures from threats such as urban development, energy production, water use, and climate change (FWS 2008c).

SHC emphasizes a landscape-scale consideration of resources and the importance of understanding and integrating the goals of collaborative partners as key ways to effectively achieve conservation objectives. This will require management support for work that not only spans program areas within the Service but support that extends beyond the Service to the interests and programs of the Service's conservation partners. The Service has taken steps to implement the SHC framework, including setting measurable, outcome-based objectives to guide visible progress towards conservation goals, using spatially-explicit models to provide the

means for systematic identification of conservation targets, and increasing the integration of science into planning and management decisions (FWS 2006 and 2008d).

The work outlined in this CCP for DeSoto and Boyer Chute Refuges adheres to the SHC framework by conducting a thorough review of science relevant to management of the refuges, feeding the information and issues identified during scoping directly into near- and long-term goals and objectives, and defining strategies to guide conservation delivery through the 15-year life of the CCP and beyond.

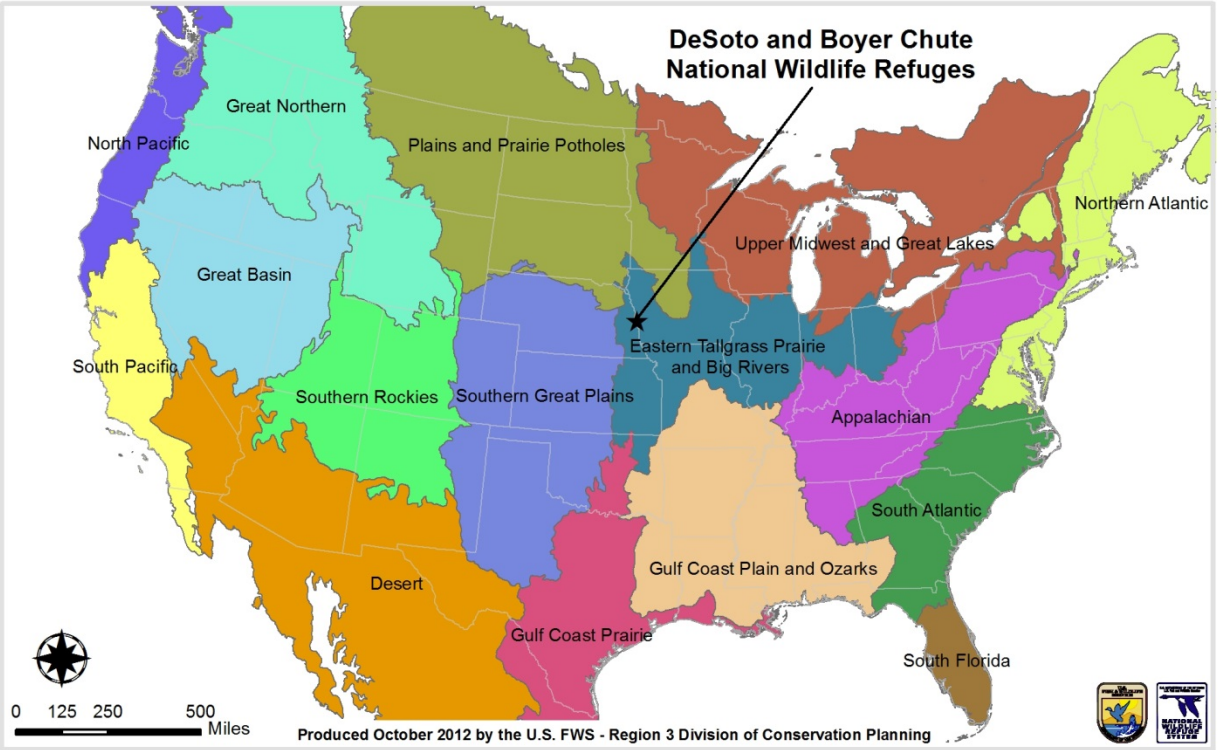
Eastern Tallgrass Prairie and Big Rivers Landscape Conservation Cooperative

In 2009, with SHC as the guiding philosophy, the Service established a national geographic framework, or a continental platform on which to establish landscape-level conservation partnerships and implement conservation actions in the 21st century (FWS 2009b). The framework establishes boundaries for 22 geographic areas, each to serve as a base for the establishment of a Landscape Conservation Cooperative (LCC). LCCs will provide a spatial context and an organizational structure for facilitating conservation planning, shared science, information exchange, and decision support in response to broad-scale, complex, and dynamic issues such as climate change.

Eastern Tallgrass Prairie LCC; USFWS

DeSoto and Boyer Chute Refuges are located within the Eastern Tallgrass Prairie and Big Rivers (ETPBR) LCC (figure 2-6). The ETPBR LCC stretches across the agricultural belt of America from Ohio to Kansas, and the vast majority of the land is held in private ownership. Agriculture drives the regional economy, habitat conditions are driven by agricultural practices, and both will be impacted by climate change. In particular, changes in the frequency and magnitude of flood events and drought cycles have the great potential to affect the wildlife and habitat at the refuges. Along with human uses such as navigation and irrigation, the big rivers (Mississippi, Missouri, Illinois, Wisconsin, Ohio, and Wabash) of this LCC provide commercial and recreational fisheries and important migratory bird habitat.

Figure 2-6: Landscape Conservation Cooperatives



Climate Change Planning

Climate change is an important part of the conservation dialogue and has been formally recognized by the Service as one of the leading conservation challenges of the 21st century.

U.S. Fish and Wildlife Service

In its strategic plan, "Rising to the Urgent Challenge: Strategic Plan for Responding to Accelerating Climate Change," the Service calls for bold and strategic action to address climate change through three broad, overarching strategies: adaptation, mitigation, and engagement (FWS 2010b). Despite considerable uncertainty regarding the magnitude, extent, and timing of changes, the Service vision includes measures to ". . . sustain diverse, distributed, and abundant populations of fish and wildlife through conservation of healthy habitats in a network of interconnected, ecologically functioning landscapes" (pg. 5). The plan also describes six principles deemed essential to achieving this vision: priority setting, partnership, best science, landscape conservation, technical capacity, and global approach. Climate change is a key consideration in the discussions and decision making for the future management proposed at DeSoto and Boyer Chute Refuges. Climate change is likely to have major impacts on larger river systems like the Missouri River through altered flow cycles, groundwater recharge within the watershed, water availability, land cover change, habitat availability, effects to infrastructure, and so forth.

"Conserving the Future: Wildlife Refuges and the Next Generation" (FWS 2011c) is the encapsulation of the Refuge System's bold, new vision. This vision acknowledges the broad social, political, and economic changes that have taken place since the agency last set

comprehensive goals in 1999. The document articulates 24 recommendations to guide the future of the Refuge System; recommendation number two directly addresses climate change:

> "Develop a climate change implementation plan for the National Wildlife Refuge System that dovetails with other conservation partners' climate change action plans and specifically provides guidance for conducting vulnerability assessments of climate change impacts to refuge habitats and species as well as direction for innovation in the reduction of emissions and improved energy efficiency on federal lands (FWS 2011c)."

Iowa

The report, Climate Change Impacts on Iowa, was released in January of 2011 by the Iowa Climate Change Impacts Committee (ICCIC). The report highlights the effects of climate change on Iowa's economy, health, and natural and agricultural systems. Iowans are already experiencing higher temperatures, higher humidity levels, and increased precipitation frequency and intensity—particularly in eastern Iowa. The committee summarized their findings with six key recommendations to policymakers, of which number three addresses wildlife conservation:

> "Increase investments in state programs that enhance wildlife habitat and management and restore public and private lands. Changes in climate will have a direct impact on both game and non-game species."

In addition, recommendation two encourages the protection of Iowa's soil and water resources, on which the state's economy depends.

The changes to wildlife and habitats in Iowa are described by the 2011 ICCIC report as including changes in interactions among species, timing of life cycles, northward shifts in species ranges, major shifts in the steady state of some natural systems, and unknown impacts to game species of fish, bird, and mammal. With specific regard to floodplain areas such as those found at DeSoto and Boyer Chute Refuges, the report states, ". . . the higher rainfall portions of the pothole region in Iowa and eastern Minnesota may take on greater importance for protecting duck populations (Johnson et al. 2010)"; and

> "Given the potential for greater streamflows due to increased rainfall, it also makes sense to give rivers more room to flood. Game fish and other animals can survive these floods if we give them room. Greater wetland capacity and wider stream corridors will also reduce downstream flooding and sedimentation, while improving fish and wildlife habitat in normal years."

Groups of species in Iowa most vulnerable to climate change include (ICCIC 2011):

- Species restricted to cold microclimates such as fens, cold air slopes, and cold-water streams.
- Rare, threatened, or endangered species.
- Specialists that rely on one species of pollinator or host for their survival.
- Declining species, including grassland nesting birds and neotropical migrant birds in general.
- Species that need large blocks of undisturbed forest or prairie.

- Turtles that rely on incubation temperature to determine the sex of the offspring; the sex ratio of their offspring (and thus future reproductive potential) are disturbed by rising temperatures.
- Turtles and amphibians vulnerable to mid-summer flooding (e.g., wood turtle).

Greenhouse gas emissions are also a great concern for Iowans, as indicated in the Iowa Climate change Advisory Council's 2008 "Final Report." The report describes scenarios and sets goals for the reduction of greenhouse gasses through the year 2050. A number of policy options are provided to legislators to meet these goals (ICCAC 2008).

Nebraska

The State of Nebraska does not currently have a climate change action plan. A section of the Nebraska State Wildlife Action Plan (Schneider et al. 2005) calls for "species and ecosystem adaptation to climate change" and for at-risk species to be evaluated for vulnerability to climate change. Strategies for adapting to climate change include reducing non-climate stressors (i.e., invasive species, pests, pathogens, pollution, and habitat loss, degradation, and fragmentation); maintaining ecological processes and functions (i.e., disturbance, hydrology); conserving a network of conservation areas; restoring habitat connectivity; increasing climate change knowledge (i.e., vulnerability assessments, monitoring, experiments, and modeling); and managing adaptively.

State Wildlife Action Plans

Congress charged each state in the Nation with producing a comprehensive wildlife conservation strategy to help conserve wildlife and natural areas and ensure their persistence for future generations. The resulting State Wildlife Action Plans (SWAP) assess the current condition of the state's wildlife and habitats, identify and prioritize issues and challenges, and lay out actions for long-term conservation of wildlife resources. They include recommendations for the conservation of lands and waters, invasive species management, data gathering and monitoring, collaboration, environmental education, and other relevant natural resource considerations. States must have a SWAP to receive federal funding from the Wildlife Conservation and Restoration Program and the State Wildlife Grants Program.

Iowa

The Iowa Department of Natural Resources (DNR) developed the Iowa Wildlife Action Plan (IWAP) with a 25-year vision for addressing concerns regarding 999 of Iowa's birds, mammals, fish, amphibians, reptiles, mussels, land snails, dragonflies, and damselflies. Of the species considered, 147 are game species, and 297 are considered species of greatest conservation need (SGCN). Nearly one-third of all Iowa species are in need of conservation effort to prevent eventual candidacy for threatened or endangered status. Fish and birds have the greatest total number of species listed as SGCN, but aquatic and semi-aquatic wildlife have the highest percentages of their total number of species listed. Riverine habitats have the greatest number of SGCN among aquatic habitats, and woodlands have the most among the terrestrial habitats (table 2-3) (Zohrer 2006).

Table 2-3: Iowa's Species of Greatest Conservation Concern (Zohrer 2006)

Wildlife Group	Total Species Considered	SGCN	Percent of Total
Breeding Birds	206	67	33
Migratory Birds	199	18	9
Mammals	82	18	22
Fish	153	67	44
Amphibians and Reptiles	71	31	44
Mussels	55	29	53
Land Snails	8	8	100
Butterflies	119	30	25
Dragonflies and Damselflies	106	28	26
TOTALS	**999**	**296**	**30**

Iowa covers approximately 56,239 square miles (35,992,960 acres). Ninety-four percent of Iowa was converted to farmland by 1990, leaving less than 30,000 acres of native prairies (0.1 percent), 422,000 acres of wetlands (5 percent), and 2,800,000 acres of forests (43 percent). Surface water is only 1 percent of the Iowa land surface. Iowa also has one of the highest proportions of privately-owned land in the Nation. Only about 600,000 acres of wildlife habitat (1.7 percent of the land area of the state) is permanently protected by public ownership, and an additional 57,000 acres permanently protected by conservation easements. One goal of the IWAP is to double Iowa's permanently protected wildlife habitat to 4 percent of the state land area (Zohrer 2006).

Iowa portions of DeSoto and Boyer Chute Refuges are located in the Missouri Alluvial Plain region of the state, an area buffering the lower two-thirds of the western boundary of the state and comprising 2 percent of the state's total land. This area is among the landforms of the state with the smallest proportion of wildlife habitat. Currently, 84 percent of the Missouri Alluvial Plain region is either cropped or developed (Zohrer 2006). The priority habitat classes for this region are wet forest and river oxbow channels—both relevant to management on the refuges.

Nebraska

In 2005 Nebraska developed its comprehensive wildlife conservation strategy: "The Nebraska Natural Legacy Project." This document describes the state's wildlife and habitat and lays out a strategic plan for species protection.

Due to rich and productive soils, Nebraska lands have been developed predominantly for agricultural uses. Today less than 2 percent of the original tallgrass prairie habitat in the state remains and just over 1 million acres (35 percent) of the state's wetlands persist. Nebraska once had nearly 24,000 miles of rivers and streams, most of which have now been modified through flow reductions and channelization. In addition, 97 percent of the state's land is privately owned, with only 3 percent owned and managed by federal or state agencies. Land use changes have had widespread consequences on state wildlife and associated habitats. In the strategy document six key stressors to ecological systems are identified: (1) altered fire regime, (2) altered grazing regime, (3) altered hydrologic regime, (4) introduction of invasive species and pathogens, (5) fragmentation, and (6) pollution (Schneider et al. 2005).

It is estimated that 30,000 animal species are found in Nebraska. Species of conservation concern were identified and divided into two tiers. The 80 species in Tier I are globally or nationally at-risk, whereas the 532 species in Tier II are at-risk in Nebraska but are secure in other parts of their range. The plan sets a conservation goal of at least 10 populations of each Nebraska endemic, restricted-range, or state listed species (Tier I). Tier II species identified as having a limited range in a larger geographic region, being widespread, existing commonly elsewhere but only peripherally in Nebraska, or as having Nebraska population as disjunct from the primary geographic range had goals of seven, four, one, and one populations in Nebraska respectively (Schneider et al. 2005).

Next, state habitats were classified. Terrestrial communities are categorized into 69 types and aquatic systems into seven types. The report acknowledges that a more refined classification scheme for aquatic habitats is needed and that nearly half of the Tier I at-risk species are dependent on wetland or riverine habitats (Schneider et al. 2005).

Habitats for at-risk species were then reviewed by designating 40 "biologically unique landscapes" across the state. These landscapes were selected for their potential to protect the greatest biodiversity and occur across a mixture of public and private ownership. If protected, these 40 landscapes have the potential to meet or exceed the SWAP's population goals for 44 Tier I species (55 percent), partially meet the population goals for 24 additional Tier I species (35 percent), and will not meet the population goals for the remaining 17 species (24 percent). A second review was the conducted to see if the existing network of federal and state conservation lands sufficiently protects the Tier I at-risk species. The study found that these lands meet or exceed the plan's population goals for 18 Tier I species (23 percent), partially meets the population goals for 22 of the Tier I species (27 percent), and does not meet the population goals for 40 species (50 percent) (Schneider et al. 2005).

Nebraska portions of DeSoto and Boyer Chute Refuges reside in the SWAP's Tallgrass Prairie Ecoregion, which constitutes the eastern quarter of the state. The refuges are also located in one of the priority biologically unique landscapes identified in the report simply as the Missouri River Landscape. There are 11 state listed species in the Missouri River Corridor, six of which are federally listed. Nineteen Tier I at-risk species are documented in this landscape (see Threatened and Endangered Species section and Species Lists in appendix B) including five birds, five fish, one reptile, one mammal, six mollusks, and one plant (Schneider et al. 2005).

Region 3 Fish and Wildlife Conservation Priorities

Although every species and habitat are important, there is a subset that requires immediate attention for their conservation, protection, and/or recovery. At the federal level, conservation priorities are directed first toward migratory birds, interjurisdictional fish, and those species that are nationally threatened or endangered with extinction.

In accordance with the Government Performance and Results Act the Service must direct ample resources towards its most important functions and responsibilities. In 1997 a group of employees and wildlife specialists in the Midwest Region (Region 3) of the Service met to create a Fish and Wildlife Resource Conservation Priorities list. The report, published in January of 2002, identifies 243 species in the region as resource conservation priorities, along with habitat indicators, obstacles, strategies, and desired outcomes (FWS 2002). The report emphasizes the use of species as conservation targets over habitats for three primary reasons:

- Species are the primary element of biological diversity; they are irreplaceable if extirpated.
- Identifying species implies maintaining specific habitats in a way that meets the life cycle needs of the target species.
- By assessing multiple species within a single landscape, locations can be identified where elements overlap and the most essential habitats occur.

The list of Region 3 species of conservation concern with ranges that overlap with DeSoto and Boyer Chute Refuges includes the massasauga rattlesnake, pallid sturgeon, shovelnose sturgeon, paddlefish, plains minnow, western silvery minnow, blue sucker, logperch, flathead chub, ottoe skipper, and western prairie fringed orchid. Regional conservation priorities for birds from the 2002 publication were updated in 2008 (FWS 2008a). Based on the updated list, the bird species of conservation concern whose ranges overlap with the refuges now includes the following 22 species: Swainson's Hawk, Bald Eagle, Least Bittern, Dickcissel, Black-billed Cuckoo, Henslow's Sparrow, Nelson's Sparrow, Chestnut-collared Longspur, Smith's Longspur, Peregrine Falcon, Rusty Blackbird, Loggerhead Shrike, Black Tern, Cerulean Warbler, Red-headed Woodpecker, Pied-billed Grebe, Upland Sandpiper, Hudsonian Godwit, Solitary Sandpiper, Short-eared Owl, Wood Thrush, and Bell's Vireo.

Double-crested Cormorants, bighead carp, and grass carp are also listed but are considered nuisance species.

Conservation Lands in the Vicinity of the Refuges

Much of the land conservation in the United States occurs on lands owned and managed by federal and state agencies in trust for the American public. Nationally, the states of the central plains have the lowest percentages of publicly-owned land. Nebraska ranks 41st of 50 states for federal ownership at 1.10 percent, and 44th for state ownership at 0.50 percent (National Wilderness Institute [NWI] 1995). Similarly in Iowa, 0.29 percent is federally owned (47th lowest of the 50 states), and 0.74 percent is state owned (41st of 50) (NWI 1995). A number of conservation land-holdings in the region surrounding the refuges are owned and managed by county and city governments as well as private organizations (figure 2-7).

All of the authorized land within DeSoto NWR's boundary has been acquired by the Service, and of the authorized 10,010-acre boundary for Boyer Chute NWR, 4,040 acres are owned and managed by the Service. As noted in figure 2-1, also within the authorized boundary for Boyer Chute NWR is a 440-acre tract owned by the Nebraska Board of Educational Lands and leased for agricultural use, as well as a 77-acre tract on the east side of the Missouri River held by the Iowa DNR as Boyer Bend Wildlife Management Area (WMA). Boyer Bend WMA is open to deer hunting and can only be publicly accessed by boat.

Two WMAs managed by the Iowa DNR share a common boundary with DeSoto NWR. To the east is Nobles Lake WMA, a 236-acre property that is half wetland and half upland with an access road and boat launch. To the west is Rand Bar WMA, 65 acres of bottomland forest only accessible by its frontage on the Missouri River.

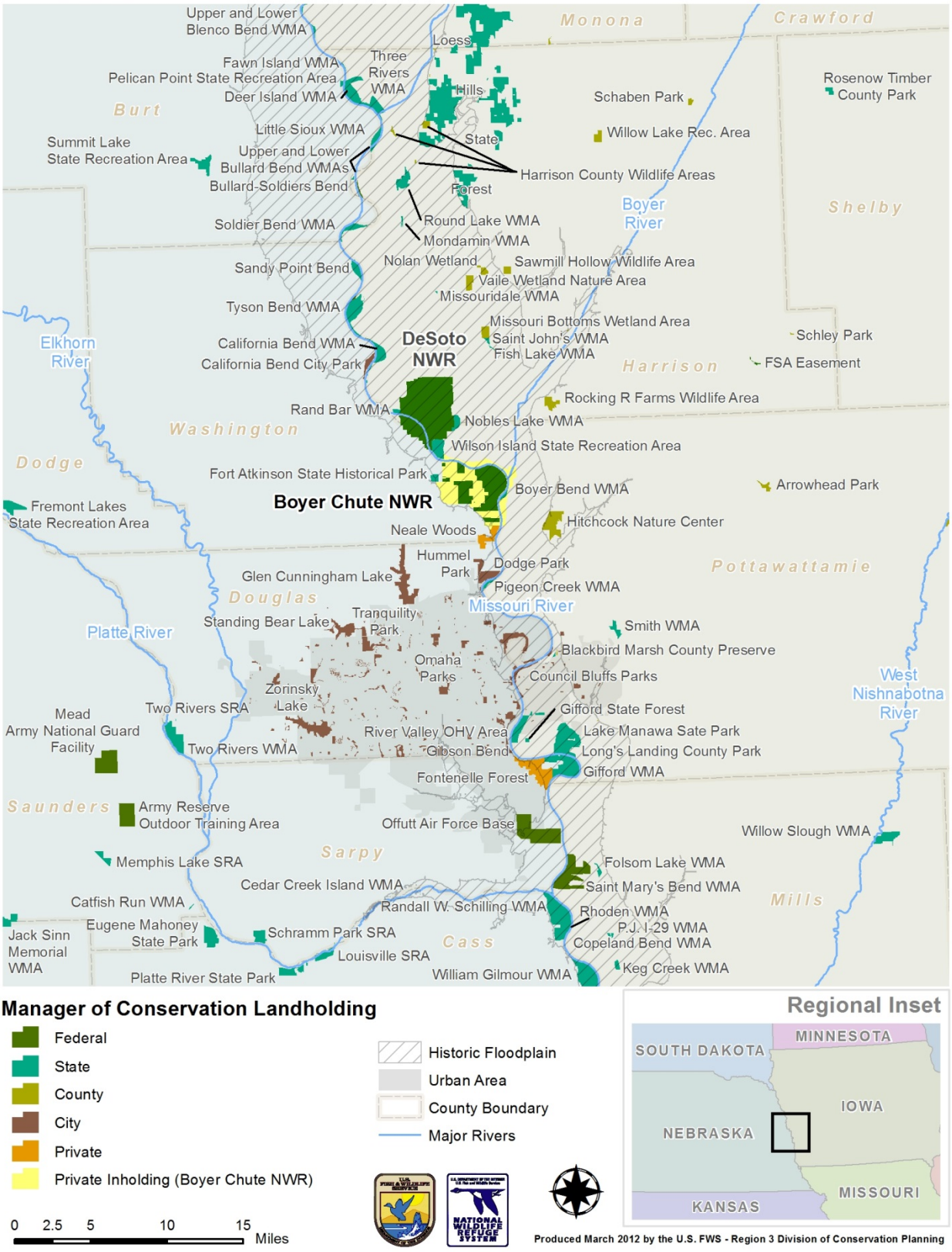
Directly between DeSoto and Boyer Chute Refuges is the 423-acre Iowa DNR property, Wilson Island State Recreation Area. It is dominated by dense cottonwood forest, and camping, hunting, fishing, and mushroom gathering are all popular activities.

Fort Atkinson adjacent to the refuge; USFWS

As for conservation areas adjacent to Boyer Chute NWR, on the western edge of the refuge is the Fort Atkinson State Historical Park. This 157-acre park is the site of one of the first American forts built west of the Missouri River. Even before construction and use of the fort (1820–1827), this location was a common meeting place for Native American tribes, fur traders, and soldiers. Managed by the Nebraska Game and Parks Commission, the park showcases a historic military fort and the site known as "Council Bluff" where the Lewis and Clark Expedition first met with local Native Americans. On the southern border of Boyer Chute NWR's authorized boundary is the Neal Woods Nature Preserve. This 554-acre property is privately owned and managed by the Fontenelle Nature Association and offers 9 miles of hiking trails through forests and prairies, environmental education programming, and a nature center.

An examination of the broader region surrounding the refuges reveals a number of additional conservation lands owned and managed by a diversity of conservation entities (figure 2-7). As figure 2-7 indicates, several conservation areas are located directly along the banks of the Missouri River. The vast majority are state WMAs, but there are a few private conservation lands, as well as a number of city parks in Omaha, Nebraska; Council Bluffs, Iowa; and Blair, Nebraska. Farther from the Missouri River there are a handful of small county conservation lands in Iowa. The largest of these is the 1,003-acre Hitchcock Nature Preserve—considered one of the best places to observe fall raptor migrations in the region. Twenty-five miles north of the refuge in Iowa are the four units of the 11,266-acre Loess Hills State Forest. The state forest is administered by the Iowa DNR's Bureau of Forestry. Activities include hiking, backpacking, picnicking, camping, and hunting. It features an observation platform with panoramic views of the Loess Hills landscape. Three larger military installations are located to the south and southwest of the refuge. Although natural resource conservation is not the primary purpose for these lands, they often have divisions and programs that address wildlife and habitat conservation.

Figure 2-7: Conservation Lands in the Area of the Refuges



The Refuge Planning Process

This section provides an overview of the refuge planning process as it relates to DeSoto and Boyer Chute Refuges by defining the purpose of a CCP, describing the planning process undertaken for these refuges, identifying and clarifying the major management issues considered during the planning process, explaining how this CCP relates to subsequent site-specific planning efforts, and presenting the options for revising plans.

Purpose of a Comprehensive Conservation Plan

This CCP describes the management direction and desired future conditions for DeSoto and Boyer Chute Refuges over the next 15 years. The plan provides guidance and rationale for management actions and will be used by the refuge manager and staff as a reference document when developing work plans and making management decisions. Through the development of goals, objectives, and strategies, this CCP describes how the refuges contribute to the overall mission of the Refuge System, fulfill the purposes designated for each refuge, and use the best available science for adaptive management.

This plan enhances the management of DeSoto and Boyer Chute Refuges by:

- Providing a clear statement of desired conditions and management direction for the refuges.
- Maintaining continuity in management of the refuges over time.
- Integrating activities at the refuges with conservation activities that occur in the surrounding region.
- Ensuring that management of the refuges is consistent with all applicable laws, policies, and plans.
- Providing neighbors, visitors, and the general public with an understanding of the Service's management actions on and around the refuges.
- Facilitating public involvement in management decisions for the refuges by providing a process for effective coordination, interaction, and cooperation with affected parties, including federal agencies, state conservation organizations, adjacent landowners, and interested members of the public.
- Demonstrating support for management decisions and their rationales using the best available science, sound professional judgment, and public involvement.
- Ensuring that management and planning at the refuges considers the preservation of historic properties.
- Providing a sound basis for budget requests to meet operational, maintenance, and capital improvement needs on the refuges.

The 2001 DeSoto CCP

Current management of DeSoto National Wildlife Refuge is guided by a comprehensive conservation plan that was begun in July 1999 and received final approval in January 2001 (FWS 2001). A revision of the 2001 CCP was prompted by the catastrophic flooding in 2011

and by a desire to more efficiently integrate management of DeSoto and Boyer Chute Refuges. The 2001 DeSoto NWR CCP contained 25 goals, 43 objectives, and 212 strategies and called for an addition of 7.75 full-time equivalent positions. Habitat was to shift slowly away from agriculture to a diversity of natural cover types that would better support wildlife (table 2-4).

Table 2-4: Future Land Cover Projected by the DeSoto 2001 CCP

Habitat	Acres in 2001	Approximate acres projected for 2015
Woodlands	3,345	3,700
Grasslands	1,642	2,780
DeSoto Lake	788	788
Croplands	1,989	475
Wetlands	101	115
Sandbar/Beach	40	40
TOTAL	**7,905**	**7,898**

Highlights from the goals, objectives, and strategies of the 2001 CCP include the following:

- Increased and enhanced habitats friendly to migratory waterfowl to increase use days
- Reduction of the midcontinental Snow Goose population
- Increased cottonwood recruitment
- Studies of potential management options for DeSoto Lake
- Maintenance of the DeSoto Lake sport fishery
- Increased land conservation adjacent to the refuge
- Increased off-refuge wetland restoration
- Reduction of invasive species
- Control of the resident deer herd
- Upgraded facilities at the Steamboat Bertrand Discovery Site
- Encouragement of wildlife observation and photography
- A robust environmental education program in local schools
- Maintenance of the Steamboat Bertrand Museum Collection
- Additional law enforcement and higher safety standards
- More visitation, volunteerism, partnerships, and collaborative research
- High quality interpretation of the FWS mission, the Lower Missouri River ecosystem, the Steamboat Bertrand Museum Collection, and the Lewis and Clark history in the area

Overview of the Planning Process

Developing a CCP takes multiple years and involves a great deal of refuge staff effort and regional office support. For organizational simplicity, the planning process is divided into five

stages: (1) preplanning, (2) scoping, (3) alternative development, (4) draft preparation and review, and (5) final document preparation and approval.

The Comprehensive Conservation Plan (CCP) for DeSoto and Boyer Chute National Wildlife Refuges was also developed with contributions and assistance from many state and federal partners, NGOs, universities, and citizens (see appendices H and I). The active participation of stakeholders was vital to understanding the full range of perspectives and values associated the refuges, and the contributions of these entities was invaluable in determining the future direction of the refuges' management.

Preplanning

Preplanning occurs before the formal planning period begins. During preplanning, policy is reviewed, the core planning team is established, a planning record is created, interest groups are identified, and an initial planning timeline is drafted. Studies, reports, surveys, research and monitoring activities, previous planning efforts, historical documents, and other background information and data resources are also gathered and reviewed during this period.

The planning process began independently for Boyer Chute NWR during the summer of 2010, and planning progressed until the following summer at which time priorities shifted to the 2011 Missouri River flood response. In September of 2011, it was decided to start the planning process over from the beginning—this time combining the planning effort for DeSoto and Boyer Chute Refuges. By default the initial Boyer Chute NWR CCP planning period became an extended preplanning stage for the new combined EA and CCP.

This CCP planning effort for DeSoto NWR constitutes the first CCP revision effort undertaken by the Midwest Region of the Service. The 2001 DeSoto NWR CCP and any associated monitoring or implementation tracking of the original CCP can therefore also be considered a form of preplanning for this revised CCP.

Scoping of Planning Issues

The official planning period begins with the scoping process—a thorough assessment of thoughts, ideas, concerns, challenges, opportunities, and other issues associated with the refuges. The scoping process begins by soliciting input from the refuges' staff, then stakeholders and the public, and finally leadership within the Service.

The first step, a CCP kick-off meeting, was held at DeSoto NWR at the end of November 2011. Refuge and regional planning staff met to discuss the refuges' vision statement and goals, brainstorm issues, and review the planning process.

The next step is for the planning team to engage stakeholders including federal and state agencies, tribal governments, local communities, non-government organizations, academic institutions, neighbors, and others interested in the future of the refuges in identifying the issues and opportunities they see confronting the refuges. Although input, feedback, and comments are encouraged throughout the entire planning process, the official public scoping period is the best time for stakeholders to engage in the planning process.

For DeSoto and Boyer Chute Refuges, the formal comment period began on January 23, 2012 and ended on February 24, 2012. As a part of this comment period two open houses were held to provide the public a forum to discuss ideas with refuge staff and regional planners. The first

open house was held at DeSoto NWR's Visitor Center on February 15 and the second at the Fort Calhoun City Hall Library on February 16. Nearly forty people signed in during the open houses, and a total of eleven written comments were submitted to refuge staff during the public scoping period.

The final stage of scoping took place at the Service's Midwest regional office, where leaders from the Refuge System, Migratory Birds, Ecological Services, Fisheries, and other Midwest Region programs further discussed and refined the list of issues that would be addressed in the CCP. This internal scoping meeting was held on March 29, 2012.

The issues discussed during the scoping phase and described in the Planning Issues section below helped bring important topics to the attention of the plan's authors and were used to inform the writing of the management alternatives in the environmental assessment (EA) document—including the preferred alternative that forms the basis of this CCP.

Alternatives Development

Developing management alternatives as a part of the refuge planning process is derived from the National Environmental Policy Act of 1969 (NEPA). This act requires federal agencies to consider the impacts of proposed actions and to develop a reasonable range of alternatives to those actions.

An initial set of management alternatives was developed during the Refuge Review Workshop held May 1–2, 2012. The resulting set of draft alternatives was further refined through a series of meetings, calls, and follow-up activities. An Alternatives Workshop was held the last week of November 2012, which served to define and clarify the details of management under each of the alternatives, review and revise draft objectives, and discuss the environmental effects associated with each alternative. At this point the proposed action (Alternative D) was selected by refuges staff and was further developed as the basis for the Draft CCP.

Preparation and Review of Environmental Assessment and Draft Plan

The CCP is published in two phases: draft and final, in accordance with NEPA. The EA and Draft CCP document presents the full range of alternatives considered for future management of the refuges, and the environmental effects associated with each alternative. The EA and Draft CCP document also identifies the preferred alternative selected by refuges staff as the desired basis for the Final CCP and further describes the goals, objectives, and strategies associated with the proposed management direction.

A complete preliminary version of the EA/Draft CCP was completed on May 28, 2013. It was then reviewed and revised by refuge and regional office staff in June and July, a time period that culminated with an internal review meeting at the Midwest Regional Office on August 1, 2013. The EA/Draft CCP was then released for review by the public for a period of 30 days. Public review and comment began on September 20, 2013 with the publication of a Notice of Availability in the *Federal Register*, a news release made through local media outlets, a postcard announcement sent to the CCP mailing list, the distribution of an e-mail announcement, the delivery of paper copies of the full document to local libraries, and by making an electronic copy available on the Service's website. Due to a federal government shutdown from October 1–16, 2013, the public review period was extended an additional three weeks until November 8, 2013, and the open houses were rescheduled to November 5 (Fort Calhoun) and November 7 (DeSoto NWR). Thirteen people attended the open houses, and a

total of eleven comments were submitted to the refuges during public review. The comments included topics ranging across refuge habitats and wildlife, management tools (such as prescribed fire and chemical use), public access and uses, land conservation and floodplain protection, and the planning process. Additional information from the public review and comment period is provided in the Response to Comments (appendix K).

Preparation and Review of the Final Plan

A thorough review of the Draft CCP document and proposed management direction was undertaken, and where appropriate comments received by the Service on the EA/Draft CCP were incorporated into the final version of the CCP. As with the Draft CCP, the availability of the Final CCP was announced with a notice in the *Federal Register* and through local media outlets, a final postcard and/or e-mail announcement was sent to the project mailing list, full copies of the document were sent to local libraries, and an electronic copy was made available on the Service's website.

The Final CCP document is the basis for management of the refuges for 15 years. It guides the development of more detailed, resource-specific step-down management plans, and underpins the annual budgeting process through Service-wide allocation databases. Most importantly, it lays out the general approach to managing habitat, wildlife, and visitor services at DeSoto and Boyer Chute Refuges, directing day-to-day actions and decision making.

Implementation

Implementation begins immediately following approval of the CCP and public notification of the decision. Funding and staff time will be allocated to implement of the CCP as appropriations, budgets, and other resources allow.

Step-Down Management Plans

The CCP provides general direction for refuge management over short- and long-term timeframes. It also begins to describe specific objectives and strategies for the refuges. Step-down management plans build on the framework provided by the CCP and develop management concepts in greater detail. This process provides refuge managers and staff the opportunity to identify specific implementation actions that will be carried out to meet the requirements of the CCP. It is common for refuges to revise or develop step-down management plans following the completion of the CCP. A number of step-down management plans may be undertaken depending on the resources of a refuge and management needs. Current Service direction recommends the development of at least three step-down management plans during the 15 years covered by a CCP, including the Habitat Management Plan, Inventory and Monitoring Plan, and Visitor Services Plan.

Plan Review, Amendment, and Revision

While CCPs are designed to provide guidance for refuge management over a 15-year period, planning policy also indicates that plans should be reviewed regularly. Service policy calls for an annual review of CCPs and modification when notable events or new information determine that change is necessary in order to achieve the refuge purposes, vision, and goals. Specifically, the policy calls for revision, ". . . when significant new information becomes available, ecological conditions change, major refuge expansion occurs, or when we identify the

need to do so during plan review" (602 FW 3(8)b). This policy offers an opportunity for adaptive management and may result in CCP amendments or minor, major, or complete revisions.

CCP amendments consist of changes to the plan that do not alter the original intent of any part of the plan and do not typically require additional NEPA compliance. Examples of amendments include changes in the priority or timing of strategies, or the creation of step-down management plans that support the original CCP objectives. Minor plan revisions cover small content changes that meet the criteria for a categorical exclusion under NEPA in accordance with 550 FW3.3C. Examples of minor revisions include changes to strategies or an objective's numerical target value. Major or complete plan revisions include changes to content in the goals and objectives of the original CCP and require the same procedures and processes used to develop the original CCP including an environmental assessment or environmental impact statement with alternatives, environmental effects, and public review.

In the case of DeSoto NWR, catastrophic flooding in 2011 caused dramatic changes in refuge habitats and visitor services, as well as combining management with Boyer Chute NWR, prompted a complete CCP revision after 10 years instead of the full 15-year planning cycle.

Planning Issues

A planning issue is any matter that requires a management decision such as an initiative, opportunity, resource management problem, threat to the resources of the unit, conflict in uses, public concern, or the presence of an undesirable resource condition. Issues arise from both within and outside of the Service. The scoping by refuge and regional Service staff, scoping among partner agencies, and public scoping identified a number of planning issues, which have been organized under the following headings: Habitat Management, DeSoto Lake, Land Acquisition, Wildlife, Refuge Administration, Visitor Services and Public Use, Infrastructure, and Outreach, Support, and Partnerships.

Habitat Management

Issue Question

What is the best way to manage habitats on the refuges to maximize benefits to wildlife and support conservation in the greater Missouri River ecosystem?

Background (Why is it an issue? What are the consequences of not addressing the issue?)

The Missouri River once flowed across an expansive floodplain landscape, experienced seasonal changes in flow punctuated by surge events and periods of drought, sustained large-scale erosion and deposition, and was a constantly evolving mosaic of habitats and successional cover types. These processes and the resulting landforms were and remain important to wildlife associated with the Missouri River system, such as migratory birds and riverine fishes. Managing refuge lands in the Missouri River floodplain for habitat conditions that reflect historic assemblages and maintain diverse native wildlife populations is challenging, because the system and its driving landscape processes are dramatically different today than they were in the past. Considerable changes have occurred to the system over the past century due to main stem dams, channelization, and development of the floodplain, including:

- Altered seasonal and annual flow regimes
- Decreased erosion, deposition, and sediment loads
- Highly altered surface and subsurface hydrology
- Reduced disturbance frequencies, such as floods and fire
- Diminished habitat succession cycles
- Decreased acres of terrestrial and aquatic habitat (loss of 354,000 acres of floodplain habitat and 72 miles of river channel)
- Greater habitat fragmentation
- Reduced habitat heterogeneity
- Reduced habitat quality
- Invasive species impacts on plant and animal communities
- Increased wildlife disturbance
- Changing climatic conditions

Today, the Missouri River floodplain ecosystem is highly engineered and controlled. The landscape is now fairly stable and predictable for multiple years with occasional, (typically minor) flood events. The refuges must work within these constraints to provide habitats that continue to benefit diverse and abundant endemic and migratory wildlife populations. The consequences of not conserving and managing the refuges and other conservation lands in the Missouri River Valley to promote healthy floodplain habitats analogous to historic conditions are the continued loss and degradation of these unique big river system habitats and a gradual reduction in the diversity of species that comprise them.

Associated Planning Priorities

- Maximize adaptive capacity of management and refuge compatibility with flood cycles
- Optimize the quantity and distribution of wetlands, grasslands, and forests for wildlife
- Support the conservation of rare and declining riverine, shallow water, and sandbar habitats
- Address the concerns associated with farming on refuges
- Identify and meet critical biotic and abiotic monitoring needs
- Reduce invasive plant species
- Contribute to biological goals within the broader Missouri River landscape
- Maximize anticipation of, and management response to, climate change stresses

DeSoto Lake

Issue Question

What is the best way to manage DeSoto Lake to maximize benefits to wildlife and people?

Background (Why is it an issue? What are the consequences of not addressing the issue?)

DeSoto Lake is a prominent and important feature of DeSoto NWR, and its management carries implications for habitat, wildlife, recreation, and partnerships. The channelization and armoring of the lower third of the Missouri River during the middle of the twentieth century eliminated 72 miles of the river habitat, including the oxbow cut off in 1960 to create DeSoto Lake. Subsequent drainage of Missouri River floodplain for agriculture and other developed uses has further reduced the acres of open water, wetland, and a range of aquatic habitats—negatively impacting to a number of species.

The full range of possible management options for DeSoto Lake has not yet been thoroughly explored. For example, it may be possible to change management of the drainage ditches that enter the lake, or reestablish some form of connection between the lake and the Missouri River. Changes to lake management have the potential to increase and/or improve aquatic habitat for wildlife. The fishery is also an important consideration of lake management. The degree of connectivity between the Missouri River and DeSoto Lake, and the manipulation of lake-associated wetland habitats will have impacts on the recreational fishery. For example, management could maintain an isolated, stocked, open water sport fishery, or move toward a more connected, river-influenced fishery.

Future management of the lake must carefully weigh these factors, along with any resulting management responsibilities. The potential consequences of not exploring the ways to improve the management of DeSoto Lake include the continued degradation of lake conditions, water quality, and aquatic habitat—providing sub-optimal benefits to wildlife, offering less to visitors in the form of fishing and other recreation activities, and requiring excessive management resources.

Associated Planning Priorities

- Maximize the quality of habitat for fish and other aquatic species
- Investigate and clarify the options for connectivity between DeSoto Lake and the Missouri River channel
- Investigate and clarify management options regarding the drainage ditches that enter the lake
- Improve water quality in DeSoto Lake
- Maintain a healthy fishery for anglers
- Minimize resources required for lake management
- Strengthen partnerships associated with lake management
- Minimize impact to refuge neighbors

Land Conservation

Issue Question

What Service footprint will best accomplish the refuges' land and water conservation goals and best supplement Missouri River ecosystem conservation?

Background (Why is it an issue? What are the consequences of not addressing the issue?)

As mentioned in the habitat management issue statement, the quantity and quality of habitat in the Missouri River ecosystem has been greatly reduced and degraded from that which existed in the past. National wildlife refuges on the Lower Missouri River (DeSoto, Boyer Chute, Squaw Creek, and Big Muddy NWRs) play an important role in providing the habitat required to sustain wildlife populations in the Missouri River ecosystem. The refuges' overarching goal is to leverage their resources to make the greatest possible contribution to wildlife, habitat, and people. Identifying and safeguarding lands and waters that provide essential natural resource and conservation values is a key component of this goal. Two aspects of this goal relevant to DeSoto and Boyer Chute Refuges include: (1) fully acquiring the Refuge System priority lands currently authorized by Congress at Boyer Chute NWR, and (2) identifying ways to increase conservation in the ecosystem through a diversity of public and private efforts.

First of all, the lands and waters encompassing the authorized boundary of Boyer Chute NWR have been considered a high conservation priority for over 20 years, but land acquisition has been stymied by a lack of funding and willing sellers. It remains a long-term priority to acquire and restore the 5,309 acres (53 percent) of Boyer Chute NWR's authorized boundary that are still privately-owned and used for agriculture (this total excludes the 661 acres of Missouri River surface area). The refuge's existing collection of scattered, isolated parcels make habitat management less efficient, diminish benefits to wildlife, and make law enforcement more difficult.

Secondly, the Service is currently engaged with a number of partner agencies and organizations vested in Missouri River conservation. Opportunities exist for additional collaborative conservation between the Service and its partners in the broader Missouri River basin.

National wildlife refuges have an important role in the regional green infrastructure. They not only protect wildlife and habitat but help sustain essential ecosystem services for people. Within the larger regional context, the planning process can help the refuges review the best configuration of protected lands for wildlife, the conservation priority associated with existing habitats, the best way to consolidate fragmented landholdings, the most appropriate land protection strategies, and the strategic implementation of land conservation activities.

The consequences of inaction are fragmented landholdings that make it difficult to meet refuge wildlife and habitat objectives as well as broader conservation goals in the Missouri River ecosystem.

Associated Planning Priorities

- Acquire priority inholdings at Boyer Chute NWR

- Evaluate ways to improve conservation capacity for units of the Refuge System associated with the Missouri River ecosystem
- Support partners and the public in local and regional land and water conservation efforts

Wildlife

Issue Question

How can the refuges have the greatest beneficial impact on wildlife in the Missouri River ecosystem?

Background (Why is it an issue? What are the consequences of not addressing the issue?)

The quantity and quality of wildlife habitats in the Missouri River ecosystem have decreased greatly in the past century, and as a result, a number of species populations associated with the ecosystem have declined. The overarching mission of biological conservation in the Refuge System is to maintain the diversity of species and habitats; however, the resources available to accomplish this mission are limited. It is a challenging responsibility for the refuges to set priorities among species of conservation concern and respond with appropriate management applications. Invasive species also impact refuge wildlife management decisions. Local conservation efforts are enhanced by an understanding of fish and wildlife conservation priorities at a broader, ecosystem scale, which can then be stepped down to individual refuges.

Wildlife management; Randy Mays

Another important step in providing direction for refuge wildlife management is having appropriate biological inventories and monitoring activities, which help managers understand and adapt management. Unfortunately, the resources required for these activities are not always available. In addition, the science that informs wildlife management decisions evolves over time, with new and improved insights discovered for achieving conservation successes. Keeping up with the changing state of science can be challenging, especially with the added uncertainty associated with climate change.

If wildlife objectives are not set to effectively meet wildlife needs in the ecosystem, the result will be the continued decline and eventual loss of certain species as well as the loss of relevance and value for DeSoto NWR, Boyer Chute NWR, and other conservation lands in the Missouri River ecosystem.

Associated Planning Priorities

- Maximize support for species of conservation concern
- Maximize the refuges' contribution to population objectives for target species
- Maximize benefits to migratory bird species (a refuge purpose for DeSoto NWR)
- Reduce invasive plant and animal species
- Maximize anticipation of, and management response to, climate change stresses on wildlife in the Missouri River ecosystem

Refuge Administration

Issue Question

In what ways can the administration of the refuges be improved?

Background (Why is it an issue? What are the consequences of not addressing the issue?)

DeSoto and Boyer Chute Refuges were created independently, and their biological and visitor services management programs developed separately. Over time independent management led to a natural degree of redundancy or overlap as both refuges sought to meet infrastructure, equipment, staff, and program needs. In 2006 when full management of Boyer Chute NWR was passed to DeSoto NWR few immediate changes were made, but in response to the damage caused by severe flooding in 2011 efforts have been taken to integrate and streamline resources shared by the two refuges.

In addition to management redundancies, the agency budget is also an important consideration for administration. Service budgets are in a constant state of flux due to an annual allocation system and regular political turnover. The current decreasing trend in Service-wide allocations has further reinforced the need to increase management efficiencies. Not reviewing and streamlining administration of the refuges would be wasteful of refuge and Service resources, reduce funds available to other refuge programs, place an unnecessarily burden on the workload of refuges staff, and make understanding of, and compliance with, refuge management more difficult for visitors and the public.

Associated Planning Priorities

- Increase management efficiencies
- Increase management consistency between the refuges
- Consider changes in visitor fees to balance management needs and visitor satisfaction
- Optimize hours of operation to balance management constraints with visitor satisfaction
- Address law enforcement needs

Visitor Services and Public Use

Issue Question

How can the refuges direct resources to provide the best visitor services possible while adhering to capability standards for such uses (given wildlife as the Service's first and highest priority)?

Background (Why is it an issue? What are the consequences of not addressing the issue?)

Service staff, local and state governments, conservation partners, and the public have long recognized the need for additional recreation opportunities along the Missouri River. There is a great demand for outdoor recreation opportunities from local towns and cities along the Missouri River, including the nearly 850,000 people in the Greater Omaha–Council Bluffs Metropolitan Area. The degree to which the refuges can help meet this need is influenced by a number of constraints.

First and foremost, maintaining infrastructure in a floodplain setting is risky, challenging, and oftentimes expensive. Secondly, the refuges have limited funds, time, and staff to meet the public demand. And finally, the FWS mission clearly establishes a priority for the conservation, protection, and enhancement of fish, wildlife, plants, and their habitats on national wildlife refuges over all other uses.

Because the refuges are on the fringe of a major metropolitan area, open space in the surrounding landscape will likely decrease in the future. Public lands will likely experience increased use, encounter demands for new and different types of uses, greet more diverse publics, and experience changes in the age structure and other demographics of visitors. Understanding and adapting to these trends are important for the refuges as management seeks to balance natural resource conservation with future visitor use.

The NWRS Mission demands that recreation be carefully balanced with wildlife and habitat priorities. Flooding in 2011 forced a review and evaluation of the existing visitor services infrastructure at the refuges. A number of socioeconomic factors are being considered as refuge staff assess current and future public access, public use, visitor services, infrastructure, and environmental interpretation. The decision making will hinge on four key factors: (1) the management direction of the biological program, (2) the design for joint management of DeSoto and Boyer Chute Refuges, (3) personnel resources available for programming, law enforcement, and maintenance, and (4) Service policies regarding the appropriateness and compatibility of public uses.

To offer appropriate visitor services opportunities on the refuges, staff must continually review, evaluate, and make improvements to the visitor services program. Effective adaptive management will allow the refuges to make the greatest contribution to public health and wellness, avoid unacceptable impacts to refuge habitats and wildlife, reduce safety concerns, minimize the management burden on refuge staff, and ultimately retain relevancy, advocacy, and public support.

Associated Planning Priorities

- Continue curatorship of the Steamboat Bertrand Museum Collection and integrated interpretation of the Discovery Site
- Maximize public access to refuge lands and waters within the constraints established for wildlife conservation
- Optimize consumptive uses (hunting, fishing, and gathering) on the refuges to avoid overharvest
- Promote the highest quality environmental education and interpretation programs
- Maximize safety
- Support appropriate use of refuge management resources (time, money, personnel)

Infrastructure

Issue Question

What is the best configuration of refuge infrastructure for both administration and visitor use?

Background (Why is it an issue? What are the consequences of not addressing the issue?)

Four main factors have contributed to the need to review and evaluate refuge infrastructure in the planning process: (1) shared management of the refuges, (2) a history of high infrastructure development on the refuges, (3) flood constraints, and (4) budgetary constraints.

As described in the issue "Refuge Administration," the two refuges came into being independently, and a large amount of public infrastructure was initially developed on each refuge to meet the anticipated recreation demands of local communities and the Omaha–Council Bluffs Metro Area.

In addition to considerations born of the new shared management, flooding and budgets have also led refuge management to reevaluate infrastructure on the refuges. Broad-scale flooding in 2011 damaged (and in some cases completely destroyed) infrastructure, requiring immediate and long-term decisions about what to reconstruct, what to remove, and the general constraints of building on a floodplain—even one as highly regulated as the Missouri River.

In addition, management continually seeks better ways to utilize the financial and staff resources at a field station. Changes are made when infrastructure is deemed inadequate, excessive, expensive, and/or maintenance-prone. The general consequence of not evaluating refuge infrastructure during planning is an unnecessary drain on refuge time, money, and personnel resources.

Associated Planning Priorities

- Ensure quality maintenance of infrastructure
- Maximize flood compatibility

- Where appropriate, provide flood resistance instead of flood compatibility
- Where possible, reduce excess infrastructure to increase efficiencies and reduce overhead

Outreach, Support, and Partnerships

Issue Question

How can the refuges bolster their relationships with partners, visitors, and other constituents?

Background (Why is it an issue? What are the consequences of not addressing the issue?)

Refuges do not exist in a void. They are public lands that require: (1) public and private support to accomplish conservation goals, (2) interaction with constituents to remain relevant, and (3) advocacy to persist. First of all, healthy relationship networks create a multiplier effect by leveraging the resources and efforts of multiple sources toward achieving conservation successes. Because the Service cannot accomplish its conservation goals alone, conservation values must be shared by partners, local communities, refuge neighbors, visitors, and the public. Secondly, the general public understanding varies greatly regarding the mission and purposes of national wildlife refuges, how they differ from other public lands, and how refuges can benefit the natural, social, and economic health of local communities. The need for outreach and education about the Refuge System is ongoing and essential to the FWS mission. Similarly, refuges must remain engaged with the communities and public they serve to understand their expectations as demographics and cultural values change over time.

A similar lack of public understanding exists regarding the ecological functions of big river systems like the Missouri. Conservation values such as flood relief and water table replenishment are generally less understood than economic uses such as agricultural production and industrial use. There is a long-standing need to improve public understanding of the floodplain's value to both natural and human systems.

The consequences of not building and maintaining strong relationships and support include a reduced capacity to achieve our mission; a reduced public appreciation of the unique wildlife, habitats, and ecosystems conserved by refuges; limited public advocacy or support; and ultimately the deterioration in the value of land conservation.

Associated Planning Priorities

- Increase public understanding of, and appreciation for, the refuges and the Refuge System
- Increase public appreciation and understanding of the Missouri River ecosystem
- Increase support for the refuges
- Increase interaction with Omaha–Council Bluffs and local communities
- Increase engagement in partnerships on the Missouri River
- Strengthen relationships with refuge neighbors