Chapter 1 — Purpose and Need

The Rainwater Basin was once covered by native prairie and was largely isolated from streams and natural drainages. Heavy rains or snow melts would fill the numerous shallow depressions scattered throughout the region. Its geographic location in the mid portion of the central flyway made the Rainwater Basin an oasis of food and rest for millions of birds making their northward migration to their breeding grounds. Waterfowl, shorebirds, and grassland birds would dominate the skies, with raptors following the migration.

Today, the landscape is dramatically changed. The expansive grasslands and numerous wetlands have been replaced with fields of corn and soybeans. Roads traverse the landscape at 1-mile intervals, and small rural communities are scattered within a 10-mile radius of one another. Many of the wetlands have been filled or drained, reducing their numbers to only about 16 percent of their historic level.

The remaining wetlands play an increasingly important role in providing resting and feeding areas for the millions of birds that continue to use the central flyway each spring and fall. However, their function as wetlands has been diminished by sedimentation, nutrient runoff, and reduced water runoff within the watersheds. Waterfowl and shorebirds are forced to crowd into fewer areas and compete for the limited amount of natural food provided by the wetlands.

The proposed Rainwater Basin Expansion Project (Rainwater Basin Wetland Management District Expansion Project) would contribute to the conservation efforts described in such plans as the North American Waterfowl Management Plan, the United States Shorebird Conservation Plan, Partners in Flight, the North American Waterbird Conservation Plan, and the Nebraska Natural Legacy Plan.

Proposed Action

The Service (U.S. Fish and Wildlife Service) is proposing the Rainwater Basin Expansion Project to expand the number of acres in Nebraska's Rainwater Basin that it can own in fee title or hold in easements. Currently, the Service has been authorized to purchase 24,000 acres of wetland habitat within the Rainwater Basin region. To date, 22,023 acres have been acquired. An additional 4,505 acres have been gifted, primarily from other Federal agencies.

The Service proposes to strategically acquire an additional 9,177 acres in fee title and 5,000 acres in conservation easements (table 1). All purchases would be from voluntary sellers. These 14,177 acres represent 0.36 percent of the Rainwater Basin.

Fee-title acquisition would focus on lands that meet one of two criteria: wetland portions that adjoin properties already partially held in fee title by the Service and larger semipermanent wetlands located within a wetland complex of smaller seasonal wetlands. These properties would be managed as WPAs (Waterfowl Production Areas). Management practices would include prescribed burning, livestock grazing, limited haying, and periodic resting (USFWS 2007). The areas would be open to public recreation, including hunting, wildlife viewing, photography, and environmental interpretation and education.

Conservation easements would be purchased on privately owned property containing smaller wetlands. The easements would protect the wetlands from being drained or filled. Surrounding upland buffer areas under easement would be planted with native grasses and protected from commercial and residential development, although haying and grazing would be allowed.

Table 1. Wetland Acquisition Authority within the Rainwater Basin Wetland Management District

	*Current Authorization Acres**	*Proposed Additional Acres*	*Total Acres*
Fee	24,000	9,177	33,177
Wetland		6,500	
Upland		2,677	
Easement		5,000	5,000
Wetland		2,500	
Upland		2,500	
			38,177

** Current authorization does not distinguish between fee-title and easement acquisition.*

Project Area

The Rainwater Basin is located near the center of the Great Plains. It encompasses approximately 6,100 square miles, covering portions or all of 21 counties in south-central Nebraska (figure 1) (LaGrange 2005). At its widest, it is 160 miles across, extending from Gosper County to central Seward County. The northern edge parallels the central Platte River, and the southern edge lies about 10 miles north of the Kansas border.

The topography ranges from flat to gently rolling loess plains that historically supported a tallgrass and mixed-grass prairie ecosystem. The area is geologically new and has not developed a complete system of streams to drain surface water. The shallow depressions, formed predominately by wind scouring, are quickly filled with runoff following spring snow melts and heavy rains—thus the name Rainwater Basin. The size of the depressions or wetlands ranges from a few acres to more than 1,000 acres.

The climate is semiarid, with annual precipitation ranging from 21 to 28 inches (west to east). Annual evaporation for small bodies of water averages 46 inches; about 77 percent of that amount is lost from May through October. Most of the precipitation occurs in the spring and summer. Heavy rains fill the wetlands, but they dry out in a matter of a few weeks. Wind scouring of dry wetland basins has caused the finer silts and loam soils to be removed, while the heavier clays remain in the wetland bottoms. In some wetlands, the impervious clay layer that has formed extends as deep as 72 inches.

The region lies in the center of the central flyway. Migratory birds from the gulf coast states, Mexico, and areas further south funnel through the Rainwater Basin before spreading outward toward the Prairie Pothole Region and areas further north. The flight pattern of the migration resembles the shape of an hourglass, with the Rainwater Basin and the central Platte River being at the narrowest part (figure 2). Prominent wetland areas to the south include the Playa Lakes of Texas, New Mexico, Oklahoma, and Kansas. To the north is the Prairie Pothole Region. The prominence of the constriction emphasizes the importance of the Rainwater Basin as a resting and feeding stopover for millions of migratory birds.

The nearby Platte River complements the value of the Rainwater Basin. In years when drought or spring snowstorms make the wetlands unavailable, many of the birds move to the river.

The Rainwater Basin lies over the Ogallala aquifer, providing water for irrigated agriculture, primarily corn and soybeans. Waste grain provides food for migrating waterfowl and cranes.

Purpose of and Need for Proposed Action

Recognizing the importance of the Rainwater Basin as stopover and breeding habitat for millions of migratory birds, the Service began protecting wetlands with fee-title acquisition in 1962. NGPC (Nebraska Game and Parks Commission) took the same approach. All properties were purchased from voluntary sellers.

In most situations, it was the owners of the deeper, wetter portions of the individual wetland basins who were willing to sell. Many surrounding owners of the remaining portion of a wetland chose to retain ownership and farm their portion during drier years. This split ownership greatly reduced the effectiveness of the publicly owned portion of the wetland. This is because if a drained wetland has only a small portion in private ownership, the wetland cannot be effectively restored without purchasing the privately held portion. For example, a 200-acre drained wetland with 180 acres in public ownership and 20 acres in private ownership remains effectively drained until the last 20 acres are purchased. These generally small, privately owned tracts connected to publicly owned wetlands are referred to as "roundouts."

Now, nearly 50 years after the Service began protecting wetlands with fee-title acquisition, only 8.5 percent (18,067 acres) of the historic wetland acres are in public ownership. Public wetland areas (State and Federal) are represented by 90 distinct properties containing all or portions of 168 wetlands, or 1.5 percent of the 11,000 historic wetlands (USFWS, Grand Island GIS Shop, unpublished).

The partners of the Rainwater Basin Joint Venture (see related actions and activities) examined wetland acres in private ownership that may hamper the ability to manage wetlands owned by the Service or NGPC. The partners also examined the nutritional and energetic needs of all waterfowl while staging in the region. The total additional acres needing protection in the Rainwater Basin are based on this collaborative work.

Fee Title

Taking into consideration the factors described above, the Rainwater Basin Joint Venture projected that an additional 7,790 wetland acres need to be purchased in fee title by all partners. The Service would strive to acquire 6,500 wetland acres. The required upland buffer around these wetlands is estimated to be 2,677 acres. Ownership of properties purchased with the authorization of this proposal would be held by the Service as part of the National Wildlife Refuge System. The properties would be managed as WPAs.

Fee-title acquisition would focus on two types of wetland properties. The primary focus would be on

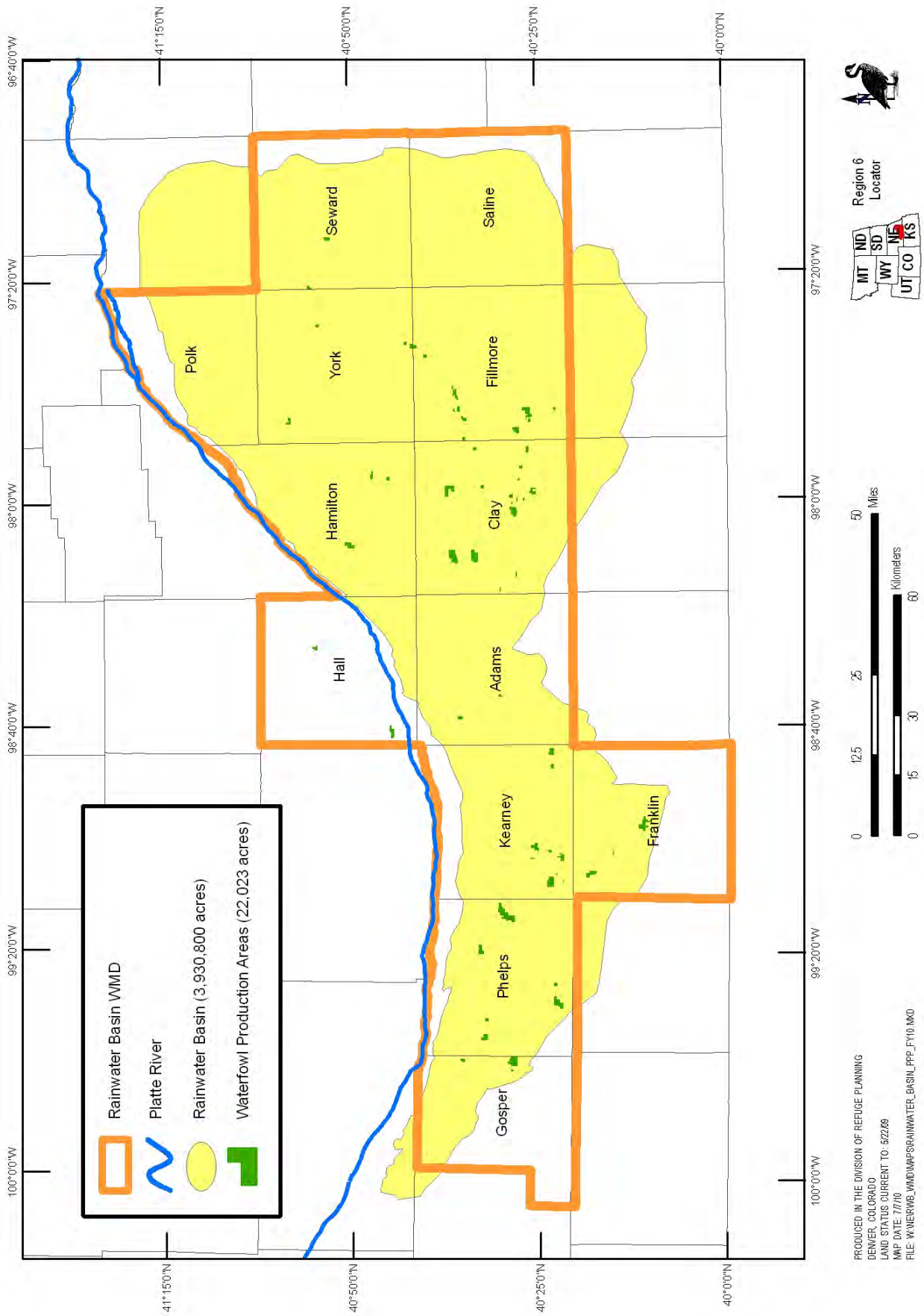

Figure 1. Rainwater Basin Wetland Management District.

Figure 2. Central Flyway's spring migration route.

portions of privately owned wetland roundouts that share a boundary with wetlands already owned by the Service. The secondary focus would be on large wetlands that can serve as a core wetland within a complex of smaller, privately owned wetlands.

Currently, 38 WPAs need additional acquisition to complete ownership of the properties' hydric or wetland soil. Adjoining roundout property, which represents a significant portion of the total wetland area, would need to be purchased in fee title to allow full management of the wetland. Adjoining wetland portions that represent a small portion of the wetland and do not significantly impact management on the Service's portion could be protected with conservation easements. Most properties that could serve as core wetlands within a wetland complex are currently drained and would be more difficult to purchase. Both of these acquisition approaches would have a positive effect on bird use within the local area.

Conservation Easements

The Joint Venture determined that an additional 9,239 acres of wetlands need to be protected by perpetual easements (Andy Bishop, coordinator, Rainwater Basin Joint Venture, Nebraska; personal communication; May 12, 2010). The Service would strive to acquire 2,500 wetland acres and 2,500 upland buffer acres through conservation easements.

Easements purchased by the Service would be grassland-wetland easements that would require the upland to be in permanent grassland. The easement would restrict commercial and residential development, but would allow the landowner to use the property for haying, grazing, and recreation. Allowing access to the property will remain a landowner's right.

The Rainwater Basin Wetland Management District has administered 31 conservation easements within the region since before 2009. Eight of these easements are within the Rainwater Basin, but only one has significant wetland habitat for migratory birds. Since 2009, the Service has acquired five additional grassland-wetland conservation easements within the Rainwater Basin. Those easements, acquired under the current land acquisition authority, follow the same guidelines proposed in this document.

The NRCS (Natural Resources Conservation Service) is expected to be the dominant partner with the Service in obtaining perpetual easements under its WRP (Wetlands Reserve Program). In 2010, the WRP launched a pilot project that allows landowners to sell a WRP easement, with the buyer retaining the right to graze the property with only minimal restrictions. The reason for allowing grazing is that it helps to keep wetlands in an early successional, seed-producing state, making it more valuable to migrating birds.

Waterfowl Nutritional Needs

The Rainwater Basin is internationally recognized for its importance as a migration stopover. Birds in migration have additional nutrient demands, not only for the actual migration but to reach a body condition needed for egg production (Devries et al. 2008).

Historically, the Rainwater Basin has provided migrating birds with natural foods from thousands of shallow wetlands. It is impossible to estimate how much food these wetlands provided for waterfowl hundreds of years ago, but recent research into the nutrient value of common native wetland plants documents their high value.

The Rainwater Basin Joint Venture has used data on energetic needs and the number of bird-use days in the Rainwater Basin to estimate that migratory waterfowl need a total of 15.6 billion Kcal (kilocalories) during their stay in the region, consisting of both natural and agricultural sources (Rainwater Basin Joint Venture, unpublished report, 2010).

The conversion of wetlands and grassland to cropland has caused migrating waterfowl to feed heavily on waste grain (top chart in figure 3). Although waste grain meets the caloric requirements of waterfowl, it does not provide the amino acids and minerals required in their diet.

One of the goals of the Rainwater Basin Joint Venture is to increase the amount of available energy for waterfowl from natural, nonagricultural foods to 4.4 billion Kcal, or 28 percent of their diet (Rainwater Basin Joint Venture, unpublished report). A 2004 GIS (geographic information system) assessment of available wetland habitat and food indicated that, given their current number and condition, the region's

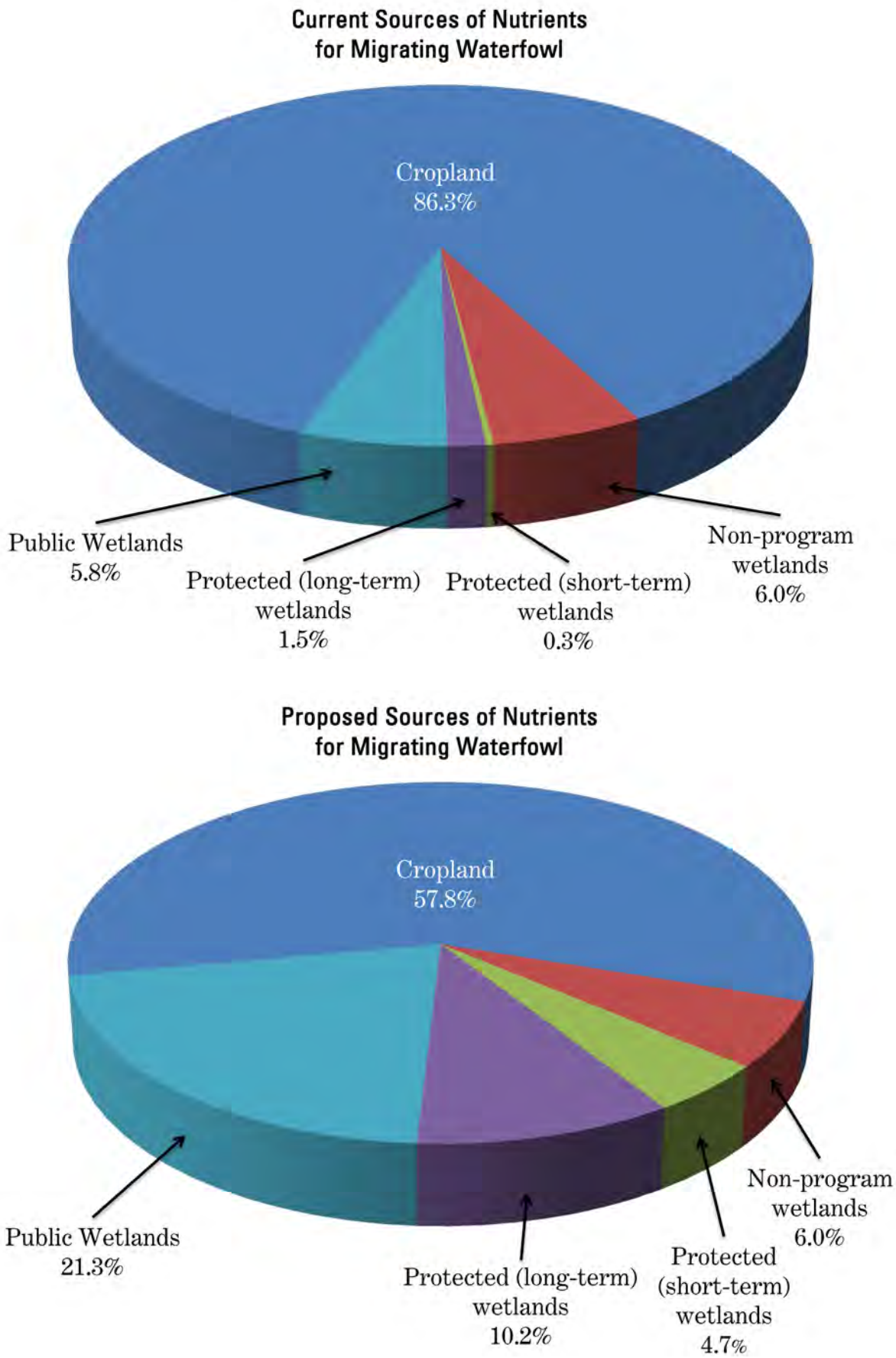

Figure 3. Sources of nutrients for migrating waterfowl.

wetlands are capable of only providing 13.6 percent of the birds' dietary needs (USFWS, Grand Island GIS Shop, unpublished).

In addition to loss of wetlands, remaining wetlands with altered hydrology or no management for wildlife are more prone to developing dense stands of late-successional plants such as reed canary grass, cattail, and bulrush. Research suggests that wetlands dominated by late-successional plants can provide only about one-tenth of the kilocalories (0.025 million Kcal/acre) of wetlands in an early-successional stage (USDA, NRCS 2008).

The proposed action would contribute to meeting the nutritional needs of migratory birds determined by the Rainwater Basin Joint Venture. Better vegetation management at existing wetlands and an increase in the number of wetlands providing natural foods are required. The bottom chart in figure 3 shows where future wetland foods will come from. Acquisition and management of additional wetlands would increase the projected contribution from public wetlands from 5.8 to 21.3 percent. This action would provide the greatest amount of increased nutrition with the fewest number of acres.

Easement purchases and associated management would need to be increased to provide 10.2 percent of needed calories. Short-term wetlands are those that have less than 99-year easements or land use contracts. These wetlands would be expected to provide almost 5 percent of needed calories. Privately owned wetlands that have no protection would be expected to continue to provide 6 percent of the wetland foods.

Decisions to Be Made

The Service's planning team (see appendix B) will complete an analysis of the alternatives. Based on the analysis documented in this environmental assessment, the Service's Regional Director of Region 6, with the concurrence of the Director of the U.S. Fish and Wildlife Service, may make two decisions:

- Determine whether the Service should expand the acquisition authority for the Rainwater Basin Wetland Management District; and,
- If yes, determine whether the selected alternative would have a significant impact on the quality of the human environment. The National Environmental Policy Act of 1969 requires this decision. If the quality of the human environment would not be significantly affected, a finding of no significant impact will be signed and made available to the public. If the alternative would have a significant impact or impacts, completion of an environmental impact statement would be required in order to address those impacts.

Issues Identified and Selected for Analysis

Two public scoping meetings were held in Clay Center and Holdrege, Nebraska, in January 2011. Public comments were taken at these scoping meetings to identify issues to be analyzed for the proposed action. Approximately 33 landowners, citizens, and elected representatives attended the meetings. Additionally, 16 letters providing comments and identifying issues and concerns were received.

The Service's field staff contacted local government officials, other public agencies, and conservation groups that have expressed an interest in and a desire to provide a sustainable future for wetlands in the Rainwater Basin region. Approximately 170 fact sheets were mailed out, and project information was also made available at the Rainwater Basin Wetland Management District and regional planning Web sites.

Many of the comments related to the biological needs of waterfowl and socioeconomic issues. Comment topics are summarized below.

Biological Issues

- Concern about past and future loss of wetlands within the Rainwater Basin.
- Concern about providing adequate habitat for spring migration.
- Concern about the value of the region for migrating birds and the need to protect declining species.
- Concern that farm programs and increased interest in biofuels may cause loss of the remaining unprotected wetlands.
- Concern that the energetics model used to determine the number of acquisition acres is not a valid or accurate model.
- Concern that wetlands in public ownership are not being managed for the benefit of all wildlife, including pheasants.

Socioeconomic Issues

- Concern that land protection discourages or negatively affects economic activity in the area.
- Concern about the loss of taxes paid to the county, placing a greater tax burden on local taxpayers.
- Concern about acquisition driving up land prices.
- Concern that conversion of farmland to public ownership will decrease the human population and support for schools, roads, and other services.
- Concern that local government should be given more authority to approve or disapprove land acquisitions and to determine the use of public property.

- Concern that funding should be made available to compensate landowners for their privately owned wetlands.
- Concern that the Service should work with landowners to enhance wetlands on private property.

Issues not selected for detailed analysis

At one of the scoping meetings, the accuracy of the energetics models was called into question. No detailed analysis of this issue was performed for this environmental assessment. This model clearly assumes that the data used to estimate the energetic needs of waterfowl within Rainwater Basin came from a large amount of research not specific to this area. For example, the energetic value (Kcal) of a particular wetland plant studied in another part of the country is assumed to have an energetic value similar to that of the same plant species within the Rainwater Basin. The validity of this assumption is currently unknown and would require site-specific research. The energetic value given to plants in the Rainwater Basin, however, represents the best information available. Information from the energetic model has helped the Service better understand the importance of the Rainwater Basin for migratory waterfowl, not just as a resting area but also as a source of amino acids and minerals.

The issue of land management on WPAs is addressed only in general terms in this document. Land management actions depend on a large number of variables, including existing vegetative conditions, site-specific objectives, past management actions, seasonal weather conditions, and other planned management actions. In addition, the Wetland Management District in 2007 developed a Comprehensive Conservation Plan (USFWS 2007) for Service lands within the Rainwater Basin that outlined and analyzed land management actions.

A common concern expressed by the public pertains to wetland grazing and pheasant habitat. The Rainwater Basin Wetland Management District commonly receives comments that the Service does not do as much as it could to increase pheasant populations. Although pheasants are recognized as part of the diversity provided by WPAs, the pheasant is a State-managed species and not a Service responsibility. The purpose of the Wetland Management District, as described in the Migratory Bird Hunting and Conservation Stamp Act, is to manage migratory birds.

National Wildlife Refuge System and Authorities

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

Lands acquired under the proposed action would be administered as part of the Refuge System in accordance with the National Wildlife Refuge System Administration Act of 1966 and other relevant legislation, executive orders, regulations, and policies.

Conservation of additional wildlife habitat in the Rainwater Basin region would also continue to be consistent with the following laws, policies, and management plans:

- Migratory Bird Treaty Act (1918)
- Migratory Bird Hunting and Conservation Stamp Act (1934)
- U.S. Fish and Wildlife Act (1956)
- Land and Water Conservation Fund Act (1965)
- Endangered Species Act (1973)
- North American Waterfowl Management Plan (1994)
- National Wildlife Refuge System Biological Integrity, Diversity, and Environmental Health (2001)
- Migratory Non-Game Birds of Management Concern in the U.S. (2002)

Related Actions and Activities

The Service is working with other public and private entities to maintain wildlife habitat within the Rainwater Basin region. Many organizations in Nebraska have recognized the ecological significance of the region and the need to promote conservation in concert with production agriculture. Wetland acquisition and restoration has been done by the NGPC, NRCS, Ducks Unlimited, and The Nature Conservancy. Local Natural Resource Districts have worked closely with conservation partners to maintain a balance between wetland habitats and agriculture.

In 2007, the Wetland Management District developed a CCP (Comprehensive Conservation Plan) (USFWS 2007) for Service lands within the Rainwater Basin. The document identifies land management activities planned by the Service through 2022. The need for additional land acquisition was identified as important in the draft CCP sent out for public comment and the subsequent final document.

Rainwater Basin Joint Venture

The Rainwater Basin was identified as a habitat of major concern by the North American Waterfowl Management Plan, establishing it as a focus area for a joint venture (Canadian Wildlife Service and U.S.

Fish and Wildlife Service 1986). Partners involved in the formation of the joint venture included the Service, the NGPC, Ducks Unlimited, the NRCS, Little Blue Natural Resource District, and the National Audubon Society. Its current partners include many of the same organizations plus other Natural Resource Districts, The Nature Conservancy, and private landowners.

The Rainwater Basin Joint Venture is currently in the process of rewriting its Implementation Plan (Gersib et al. 1992). The newer version is expected to identify a need to acquire an additional 20,000 acres (about 60 percent of which would be perpetual easements). One proposed strategy is developing working landscapes, which involves the purchase and restoration of wetlands and grasslands, with the property being resold to the private sector once a conservation easement has been established. The easement would allow livestock grazing and dryland haying, but no farming. Public access would also remain with the landowner. This approach would protect wetlands, restore grasslands, and provide agricultural income to the landowners.

Ducks Unlimited

Ducks Unlimited has long recognized the Rainwater Basin as a focus area for wetland conservation efforts. Its goal is to secure a base of wetland complexes to restore the region's function for waterfowl. In 2002, it began acquiring the Verona Complex in the central portion of the Rainwater Basin. Much of the property, including both the wetland and the surrounding upland, has required restoration. Ducks Unlimited's Rainwater Basin initiative uses multiple approaches, consisting of land acquisition, wetland restoration, wetland management, and affecting public policy. The land acquisition portion involves the purchase of land containing existing or restorable wetland habitat. Once Ducks Unlimited has restored the wetlands, the property may be sold to a public agency or to a private buyer with a conservation easement in place. The proceeds from the sale are then used to repeat the process.

Nebraska Game and Parks Commission

NGPC continues to work toward acquisition, restoration, and management of Rainwater Basin wetlands. Currently, it owns approximately 6,700 wetland acres. Its philosophy of acquisition, restoration, and management of its lands mirrors that of the Service. NGPC also faces the problems of split ownership and is working toward acquiring roundouts to improve the functionality of its wetlands.

NGPC developed the Nebraska Legacy Plan (Schneider et al. 2005), which is Nebraska's "Comprehensive Wildlife Conservation Strategy"; such plans are required by Congress for all States. The plan was developed by a partnership team made up of 20 Federal and State agencies, nongovernmental organizations, and the Ponca Tribe of Nebraska. This document has become the guiding document for conservation groups throughout the State.

The plan identifies the Rainwater Basin as a biologically unique landscape. Key concerns identified for this region include the spread of invasive species, conversion of natural habitats, alteration of grazing and burning regimes, and drainage and sedimentation of existing wetlands.

Natural Resources Conservation Service

The NRCS is one of the major partners in wetland conservation in the region. Most of its recent work has been associated with the national Wetlands Reserve Program, a voluntary program to restore wetlands. The program has three options for landowners: permanent conservation easements, 30-year conservation easements, or a simple cost-share restoration agreement. Lands enrolled in a conservation easement have both the wetland and the surrounding upland restored. Within the Rainwater Basin, Wetlands Reserve Program contracts scattered across the Rainwater Basin Wetland Management District have restored and protected approximately 7,077 acres (Randy Epperson, program manager, Natural Resource Conservation Service, Nebraska; personal communication; 2011).

Recently, the NRCS granted a variance to the Wetlands Reserve Program within Nebraska. The variance would allow sellers of conservation easements to retain grazing rights. The basis of the variance is that grazing is a critical, natural process in sustaining shallow, playa wetlands.

In addition, because of the intense agriculture and wetland drainage within the Rainwater Basin, the Nebraska office of NRCS in 2010 approved an application that requested a variance to allow center pivot irrigation equipment to traverse portions of wetlands and uplands protected under the Wetlands Reserve Program. However, numerous wetlands remain drained and without conservation protection because farmers need to run one or more pivot wheels across a wetland which is generally not allowed under the Wetland Reserve Program.

The Farm Service Agency, with technical assistance from the NRCS, administers the CRP (Conservation Reserve Program) which emphasizes support for working livestock-grazing operations, enhancement of plant and animal biodiversity, and protection of grassland under threat of conversion to other uses for a limited duration (10–15 years). Participants voluntarily limit future development and cropping uses of the land. At the same time, participants retain the right to conduct common livestock-grazing practices and operations related to the production of forage and seeding, subject to certain restrictions during nesting seasons of bird species that are in significant decline or are protected under Federal or State law.

Nebraska Environmental Trust

By a vote of the people, the Nebraska Environmental Trust was established in 1992 to use 44.5 percent of the State's lottery proceeds for the purpose of conserving, enhancing, and restoring natural physical and biological environments across the State. During its 19-year existence, millions of dollars have been provided toward conservation of wetlands within the Rainwater Basin region. The projects funded by the trust have included fee and easement acquisition, restoration, research, monitoring, and public outreach projects.

Tri-Basin Natural Resource District

Tri-Basin Natural Resource District, located in the western portion of the Rainwater Basin, currently owns and manages a large wetland and two conservation easements that protect privately owned wetlands. In addition, an imposed moratorium on groundwater development has prompted the district to begin exploring ways to reduce groundwater use and to increase groundwater recharge. One such program would be water banking, in which water allocation in one area would be transferred to another area. This type of program leads the way to having drained wetlands restored as marginal farm lands are taken out of irrigation. Other Natural Resource Districts within the Rainwater Basin are also looking at ways to better manage groundwater use for agriculture.

Habitat Protection and the Acquisition Process

Wetland habitat protection would occur through the purchase of fee-title and conservation easements. It is the long-established policy of the Service to acquire minimum interest in land from willing sellers to achieve habitat acquisition goals.

The acquisition authorities for the proposed expansion are the Migratory Bird Hunting and Conservation Stamp Act of 1934, also known as the Duck Stamp Act (16 USC 718-718h; 48 Stat. 51, as amended) and the Land and Water Conservation Fund Act of 1965 (P.L. 88-578, Title 16). The Migratory Bird Hunting and Conservation Stamp Act money used to acquire property is received from Duck Stamp revenue. The Land and Water Conservation Fund is derived primarily from oil and gas leases on the Outer Continental Shelf, motorboat fuel tax revenues, and sale of surplus Federal property.

There could be additional funds to acquire lands, waters, or interest therein for fish and wildlife conservation purposes through congressional appropriations, donations from nonprofit organizations, and other sources.

The basic considerations in acquiring interest in property are the biological significance of a wetland, the feasibility of restoring wetland habitat, and landowner interest in the program. Fee-title acquisition would focus on two areas: wetland portions that adjoin properties in fee title by the Service, and larger semipermanent wetlands located within a wetland complex of smaller seasonal wetlands. These properties, once acquired, would be managed as WPAs.

Conservation easements would be purchased in perpetuity on privately owned property containing smaller wetlands located in cropland and grassland. The easements would protect the wetlands from being drained or filled. Surrounding upland buffer areas under easement would be planted and remain in grass. All other property rights, including grazing, haying, and public access would remain with the landowner.

Purchases would occur with willing sellers only and would be subject to available funding.

USFWS

A waterfowl production area in late spring

Chapter 2 — Alternatives, Including the Proposed Action

This chapter describes the two alternatives identified for this project that were developed according to National Environmental Policy Act (NEPA) § 102(2)(E) requirements to "study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources." In addition, alternatives that were eliminated from detailed study are briefly discussed, including the reasons they were not further examined. The following alternatives were analyzed:

- no-action alternative
- proposed action, giving the Service the authority to expand its acquisition authority from its current level of 24,000 acres to 38,177 acres

The alternatives consider the effects of expanding land acquisition within the Wetland Management District boundary identified in this environmental assessment.

Alternative A (No Action)

Under alternative A, wetland acquisition would continue until the Service has reached its current authorization of 24,000 acres. After the authorization level is reached, any additional acres that would come under Service ownership within the Rainwater Basin would come from donations or gifts from landowners, conservation organizations, and other government agencies. Wetland habitat management and restoration would continue on lands owned by the Service to help meet the needs of migratory birds. Refuge revenue-sharing payments would continue to be made to counties with Service lands.

Under this alternative, many of the privately owned wetlands vulnerable to drainage or other destruction may be lost. The burden to protect wetlands without compensation would lie more heavily on private landowners with a majority of marginal cropland not being restored.

Alternative B (Proposed Action)

Under alternative B, the Service would increase its land acquisition goal from 24,000 acres to 38,177 acres within the Rainwater Basin Wetland Management District. All lands would be acquired from willing sellers, with acquisition occurring over as many years as necessary to reach the new goal.

The Service would seek to purchase an additional 9,177 acres in fee title and 5,000 acres in conservation easements over the existing goal. Lands targeted for acquisition would be according to a prioritization system established by the Rainwater Basin Joint Venture. This system was developed by biologists from different agencies and organizations to identify and ensure protection of those wetlands that best meet the biological needs of migratory waterfowl and shorebirds.

Within the rating system, fee-title acquisition will meet one of two criteria: privately owned portions of wetlands adjoining existing WPAs and large wetlands that are part of a complex of numerous small wetlands. Conservation easements purchased from willing sellers would focus on small wetlands that are part of a large complex of wetlands.

Lands purchased in fee title would be managed as WPAs and be open to public use.

Conservation easements purchased from willing sellers would prohibit destruction of wetland habitat. In addition, the surrounding upland included in the easement would be required to be maintained as grassland. The landowner would retain access, grazing, and haying rights. Easements would be managed by the Watershed Management District. Monitoring would include periodic reviews of land status through correspondence and meetings with landowners or land managers to ensure that the stipulations of the conservation easement are being met. Photographs would be taken at the time the easements are established to document baseline conditions.

Refuge revenue sharing would be paid to counties for Service lands in fee-title ownership. Taxes on lands containing a conservation easement would continue to be paid by the landowner.

Alternatives Considered but Not Studied

There was no further analysis conducted for the following two alternatives for the reasons described below.

Wetland Protection and Enhancement through Partnerships

One alternative considered was developing a program similar to CRP that would pay landowners for protecting their wetlands from being altered or destroyed for a period of 10 years. The contract would be available for renewal every 10 years. This alternative would not ensure the protection of wetlands for the long term. Like CRP lands, wetlands would become vulnerable to drainage when crop prices make it profitable to convert such wetlands to cropland. Furthermore, the Service has an active Partners for Fish and Wildlife Program in the area, which can be used if acquisition is not an option for a landowner.

County Zoning

In a traditional approach used by counties and municipalities, the local government would use zoning as a means of designating what type of development could occur in an area. Nebraska law grants cities and counties the authority to regulate land use, and engaging in planning and zoning activities is therefore optional. However, zoning may be subject to frequent changes and would not ensure the long-term protection of wetlands.

Chapter 3 — Affected Environment

Physical Environment

Climate

The region's climate is semiarid, with annual precipitation ranging from 21 to 28 inches (west to east). Annual evaporation for small bodies of water averages 46 inches; about 77 percent of that amount is lost from May through October. Most of the precipitation occurs in the springtime and during summer thunderstorms. Heavy rains fill the wetlands, but quickly dry in a matter of a few weeks. Wind scouring of wetland bottoms has removed the finer silts and loam soils, while the heavier silt clays remain in the wetland bottoms. In some wetlands, the impervious clay layer that has formed extends as deep as 72 inches.

Climate change

Current climate change projections for the Great Plains are for warmer temperatures and increased precipitation. The increase in precipitation is expected to be quite variable across the Great Plains and will be less than that needed to offset the increase in temperatures. The result will likely be warmer, drought-like conditions. Intense precipitation events are projected to increase, causing more runoff, pollution, and soil erosion problems. Droughts and floods are expected to occur more frequently. The problems caused by climate change will be further compounded by invasive species that will be able to adapt quickly to fluctuating extreme water conditions.

Adaptation, mitigation, and engagement

The Service's strategic response to climate change involves three core strategies: adaptation, mitigation, and engagement (USFWS 2009). Through adaptation, the impacts of climate change on wildlife can be reduced by conserving habitats expected to be resilient. The Rainwater Basin Expansion Project would provide an anticipatory, rather than a reactive, response. As preserving migratory corridors becomes increasingly important, the Rainwater Basin will continue to provide a stopover area for shorebirds and waterfowl within the central flyway.

Waterfowl use of the area may increase significantly because most of its precipitation occurs in late winter and early spring and because of the greater intensity of precipitation events. Another factor that may play a significant role in bird use will be the anticipated decline in precipitation and wetlands in other portions of the country.

Carbon sequestration forms one of the key elements of mitigation. The Rainwater Basin Expansion Project would have a mitigating effect on climate change by capturing carbon. Wetlands that are currently drained and being farmed at the time of purchase would be restored to wetland habitat. Surrounding upland buffer areas would be restored to native warm-season grasses and forbs. Prairie vegetation stores carbon in its deep fibrous roots, with approximately 80 percent of the plant biomass located below ground. Since the land would no longer be farmed, a large amount of carbon is expected to be sequestered.

Engagement involves cooperation, communication, and partnerships to address the conservation challenges presented by climate change (USFWS 2009). The Rainwater Basin Expansion Project would serve as a model for engagement by working with farmers and landowners; nongovernmental organizations such as The Nature Conservancy, Ducks Unlimited, and Pheasants Forever; State and local agencies such as the NGPC and local Natural Resource Districts; and Federal agencies, including the NRCS.

Geologic resources

The Rainwater Basin lies in the flat to gently rolling, mixed-grass, loess plains of south-central Nebraska. This area is geologically new and has not developed a complete system of streams to drain surface water. It is from this characteristic that the area received its name: Rainwater Basin.

Wind-deposited Peorian Loess occurs extensively across the basin and has been stable for about 10,000 years (Keech and Dreezen 1959). Upland soils that formed in wind-deposited material include Crete, Hastings, Holdrege, Hord, and Uly (Kuzila 1984). The soils are suitable for farming, with about 80 percent of the land being planted with crops. The shallow, flat depressions formed predominately by wind scouring are often referred to as playa wetlands because of their formation process and ephemeral (water levels lasting for a brief time) nature. Radiocarbon dating indicates the wetlands were created near the end of the Ice Age, 20,000 to 25,000 years ago. Some depressions may have been enlarged and new ones created as recently as 3,000 years ago (Farrar 1996).

Over thousands of years, minute clay particles accumulated in the bottoms of the depressions, allowing water to pond above the soil surface. The impervious clay layers are 6 to 72 inches thick. The wetland soils are predominantly Butler, Fillmore, Scott, and Massie (Kuzila and Lewis 1993, Kuzila 1994).

HABITAT

History of Land Development

In contrast to the thick clay in the depressions, the upland soils are very productive silts and loams used for agriculture. At the end of the 1800s, the rich soil was being cultivated, and by the 1910s, larger wetlands were being converted to cropland. In the 1950s, irrigation canals and large-volume wells expanded gravity-flow irrigation, causing smaller wetlands to be filled and their watersheds to be reshaped.

Water concentration pits were constructed to collect irrigation runoff at the lowest parts of the fields in areas that would normally be wetlands. The pits were an effective way to both drain a wetland and gain excavated material to fill the remaining portion of the wetland. The use of concentration pits was extensive. The Service identified 11,859 concentration pits totaling 7,506 acres within the Rainwater Basin in 2004 (USFWS, Grand Island GIS Shop, unpublished). Their water storage capacity is estimated to be about two-thirds of the region's historic wetland storage capacity.

A 1984 (Schildman and Hurt 1984) wetland survey estimated that approximately 4,000 wetlands existed that totaled over 100,000 acres. More recent soil surveys, however, estimate that the original number of wetlands was much higher and covered about twice that number of acres.

In the early 1970s, the loss of wetlands further increased with the development of center pivot irrigation technology. Pasture ground containing wetlands was broken up, drained, and combined with other cropland to form large (160-acre) fields that would support center pivots. The 2004 assessment estimated that only 16 percent (1,693) of the historic wetlands retained some wetland function. Those wetlands total about 38,500 acres.

Many of the former wetlands were intentionally leveled or have been filled with culturally accelerated sediment. Nearly all the remaining wetlands have been affected by surrounding land use. Most of the effect has been the reduction of the watershed's ability to provide enough water to allow the wetlands to function naturally. As more upland has been converted to cropland, sedimentation caused by runoff has increased. In the last 40 years, the use of chemicals and fertilizers in crop production has brought pesticides and high levels of nutrients into the wetlands.

Wetlands in larger watersheds used to retain water on a semipermanent basis. Now with reshaping of the landscape, creation of roads and ditches, sedimentation, and cultivation practices, even unaltered wetlands cannot function properly and most of them are becoming more ephemeral.

The loss of pastureland not only affected water quality from runoff, it effectively reduced livestock available for grazing remaining wetlands. Wetlands that once supported livestock grazing and remained open for waterfowl became choked with cattail and bulrush.

Past Wetland Protection and Land Use within Watersheds

Challenges related to wetlands go beyond what is actually happening within each wetland. Many of the problems are associated with surrounding land uses. Those uses include intense cultivation, land leveling, large livestock confinement areas, and lack of grazing livestock.

Cultivation of upland areas increases soil erosion and sedimentation of wetlands, a process that has been going on in some areas for more than 150 years. Runoff and erosion also transport pesticides and nutrients to the wetlands. In some larger watersheds, seasonal heavy rains are known to occur with enough intensity that residual cornstalks are transported to ditches and waterways. Restoration work on these wetlands often includes sediment removal, especially near the fluvial area of waterways.

Land leveling, as discussed earlier, began with the conversion from dryland farming to gravity flow irrigation. Effective gravity-flow irrigation requires a uniform, gentle slope across the field to allow water released on the upper end of the field to flow gently down toward the lower end. Any wetland or depression in the middle of the field that pooled water was filled. The common practice was to dig large water concentration pits to collect any water that reached the lower end of the field. Soil material removed from the pit was used to fill the remaining portion of the wetland to allow more area to be farmed. The result of this practice was that only the larger wetlands that could not be economically filled or drained remained as wetlands.

The ability of many of the remaining wetlands to function deteriorated. Sedimentation reduced water depth, loss of portions of the watershed's runoff shifted wetlands toward more seasonal water retention, aquatic vegetation increased, and, with the absence of grazing livestock, the wetlands became more choked with monotypic stands of cattail, bulrush, and reed canarygrass.

The availability of corn for feed and profitability encouraged large livestock confinement facilities. Many were built on poorer, steeper land—often in close proximity to a wetland. Although State regulations

control most of the contaminant concerns, large runoff events and violations sometimes place these contaminants in wetlands.

Wetland drainage and conversion is the main threat to the Rainwater Basin wetlands. Over the past decade, wetland loss from drainage and filling has been extensive. Wetland drainage was widespread even before efforts were made to determine the number of wetlands that existed in the region.

Estimates of the number of historical wetlands are based primarily on soils maps, which show the extent of hydric soils on the landscape. That estimate is 11,000 historical wetlands totaling 204,000 acres (USFWS, Grand Island GIS Shop, unpublished). GIS analysis and high-resolution aerial photography allow for an accurate measure of wetland acres. Current estimates are that 38,500 acres of wetlands remain. The number of functional wetlands has declined to 1,693 (2004 data, USFWS, Grand Island GIS Shop, unpublished). This is about 16 percent of the historical number.

Each year, the slow degradation of wetlands continues. Shallow depressions that are being farmed are slowly filling with sediment from the adjacent upland. Years of farming and pesticide application have adversely affected native vegetation and invertebrates. Farming practices such as no-till farming reduce the amount of soil erosion, but may also reduce the amount of water runoff reaching the depression.

Most of the larger wetlands have been fully or partially drained. Those that have retained some functionality are slowly being subjected to the same forces as the smaller depressions: sedimentation, agricultural chemical runoff, and decreased surface water running into the wetland. Years of no farming or grazing encourages invasion by reed canarygrass, cattail, bulrush, and trees. In general, lack of grazing, burning, and disturbance greatly reduces the value of the wetland for migratory birds. Wetlands that retain a higher level of functionality still capture enough of the watershed's runoff to provide aquatic vegetation, invertebrates, and water for migrating birds, but these remaining wetlands are being subjected to the same adverse effects as the more disturbed wetlands.

An additional threat to some of the wetlands is nutrient and waste runoff from large livestock confinement areas. Animal waste in feedlots is hauled to surrounding fields. Although State regulations are in place to control runoff, heavy rain events can cause rapid runoff carrying waste and chemicals that reach wetlands. Since the wetlands are within a closed drainage, the nutrients and pollutants are not flushed out but accumulate within the wetlands.

There are many factors driving the continued conversion of wetlands within the Rainwater Basin. The assumption is that the wetlands that were easy and economically feasible to drain have already been drained and converted. Each year, however, additional wetlands are lost. Some of the common causes for the continuing loss of wetlands are changes in Farm Bill regulations, commodity prices, increased crop insurance subsidies, and new irrigation and farming technologies. Commodity prices and crop insurance serve as a safety net for farming the more risky lands. New irrigation technologies allow for chemigation, control of water delivery, and easier access across wet areas and steeper slopes. No-till farming allows for more economical farming in more arid areas than were possible in years past. In recent years, impending moratoriums on groundwater development have stimulated developers and producers to convert more land to cropland.

Property taxes, low livestock prices, and low production rates from dryland farming cause landowners to continually look for ways to make every acre financially productive, reducing the incentive to keep a privately owned wetland.

The conversion of wetlands and grassland has also caused birds to concentrate into fewer areas, increasing the risk of disease outbreaks and competition for natural foods. Waste grain has replaced much of the natural foods in waterfowl diets. Although corn meets the caloric requirements, it is deficient in many of the nutrients found in natural foods (Baldassare and Bolen 1994, Krapu et al. 2004).

Current Protection Status

Service acquisition has focused on purchase and protection of the larger wetlands. Over the decades, as the smaller surrounding wetlands have been lost, the wetlands purchased by the Service have become isolated. In some portions of the Rainwater Basin, acquisition needs to focus on protecting the smaller wetlands that make up a complex, while other portions need a larger core wetland to be restored to create a complex. Figure 4 shows the change in spatial distribution of wetlands throughout the region (USFWS, Grand Island GIS Shop, unpublished).

From 2000 to 2008, aerial surveys were conducted every spring by the station biologist to document the amount of migratory bird habitat available. A total of 17,984 acres of public wetlands were surveyed. Of that total, the average amount of suitable habitat (described as any habitat containing water) was 5,582 acres. This means that an average of 32 percent of the public wetland acres were suitable migration habitat. Some of those wetlands were supplemented with groundwater pumped by the Rainwater Basin Wetland Management District and the NGPC.

Groundwater

Most of the groundwater in the Rainwater Basin area has little or no influence on maintaining wetland water levels. The majority of the groundwater is located more than 50 feet underground and in some areas the groundwater is more than 400 feet deep. One area east of the Tri-County canal has groundwater levels that

are less than 50 feet deep due to artificial groundwater mounds that have developed near the surface (Ekstein and Hygnstrom 1996).

The development of center pivot irrigation in the last third of a century has placed a great demand on the groundwater underlying Rainwater Basin. Irrigation, compounded by extensive drought, has caused the State legislature to pass legislation to help control groundwater declines. Only the extreme western edge of the Rainwater Basin Wetland Management District lies within an over-appropriated Natural Resource District. Some of the Natural Resource Districts located within the Rainwater Basin, however, have placed a moratorium on new wells and are requiring stricter monitoring of pumping.

There is some groundwater recharge below Rainwater Basin wetlands. Percolation occurs as macropore flow through desiccation cracks that form during dry conditions (Wilson 2010). However, soil percolation decreases as clays expand and fill the desiccation cracks (Wood 2000, Wilson 2010). Research from playa lakes in Texas and New Mexico showed similar recharge characteristics (Wood 2000).

Artificially pumping groundwater into the wetlands has made a dramatic difference in amount of habitat on WPAs. The average suitable habitat for WPA wetlands not pumped was 22 percent of the total wetland acres. For WPA wetlands pumped, the average suitable habitat was 39 percent of the total wetland acres.

Biological Environment

Wildlife

Rainwater Basin serves as a critical resting and feeding stopover area for millions of waterfowl during spring migration. It is estimated that waterfowl using the area each spring include 7.5 million ducks and 2.1 million geese. Gersib et al. (1989) documented that 50 percent of the mid-continent mallards and 30 percent of the continental northern pintails migrate through during spring migration. Nearly 90 percent of the mid-continent population of greater white-fronted geese has been documented to use this region during their spring migration.

A total of 329 species of birds have been observed within the Rainwater Basin, including 41 species of shorebirds and 35 species of waterfowl. Between 200,000 and 300,000 shorebirds migrate through in the spring. Common grassland species include northern harrier, northern bobwhite, ring-necked pheasant, greater prairie-chicken, dickcissel, western meadowlark, bobolink, field sparrow, and grasshopper sparrow.

Spring migration usually starts with a buildup of Canada geese on the Platte River until the Rainwater Basin wetlands begin to thaw. Snow geese, greater white-fronted geese, and mallards begin to peak by mid- to late February. In early March, northern pintail numbers peak, followed by Ross's geese and green-winged teal. The remaining divers and puddle ducks usually peak during mid- to late March.

Most shorebirds pass through between April 15 and May 15. According to Jorgensen (2004), the most common spring shorebird migrants include black-bellied plover, American golden-plover, semipalmated plover, greater yellowlegs, lesser yellowlegs, willet, upland sandpiper, Hudsonian godwit, dunlin, white-rumped sandpiper, Baird's sandpiper, semipalmated sandpiper, least sandpiper, stilt sandpiper, short-billed dowitcher, long-billed dowitcher, buff-breasted sandpiper, Wilson's snipe, and Wilson's phalarope. Rainwater Basin has the largest known concentration of buff-breasted sandpipers during spring migration (Jorgensen 2007). Common late-summer migrants are greater and lesser yellowlegs, solitary sandpiper, upland sandpiper, pectoral sandpiper, semipalmated sandpiper, least sandpiper, stilt sandpiper, long-billed dowitcher, and Wilson's snipe.

Rainwater Basin is identified as a landscape of hemispheric importance by the Western Hemisphere Shorebird Reserve Network. It also lies within the Geographic Framework of Bird Conservation Region #19.

Peregrine falcons frequent wetlands during peak shorebird migration periods. Prairie falcons, on the other hand, are most numerous in late winter when horned larks and meadowlarks are common. Merlin are primarily winter visitors and spring migrants (Johnsgard 1997). Bald eagles are most common during peak waterfowl migration. Burrowing owls nest on isolated prairie dog towns. Cinnamon teal are rare, but are occasionally seen in the basin. Harris's sparrows can be seen on the eastern wetlands that have brushy growth or plum thickets.

Threatened and Endangered Species

Three species listed under the Federal Endangered Species Act and the Nebraska Nongame and Endangered Species Conservation Act use the Rainwater Basin wetlands during migration: the State and Federally endangered whooping crane and least tern, and the State and Federally threatened piping plover.

Forty-two percent of confirmed whooping crane observations in Nebraska have been at Rainwater Basin wetlands (Richert 1999). Most of these sightings occur during the first two weeks of April or from late October through mid-November. Piping plovers are rarely seen on Rainwater Basin wetlands due to their size and the number of other shorebirds that would be using mudflat habitats in late April through mid-May (Johnsgard 1997). Least terns have even been documented at some basins, although their occurrence in the Rainwater Basin is rare.

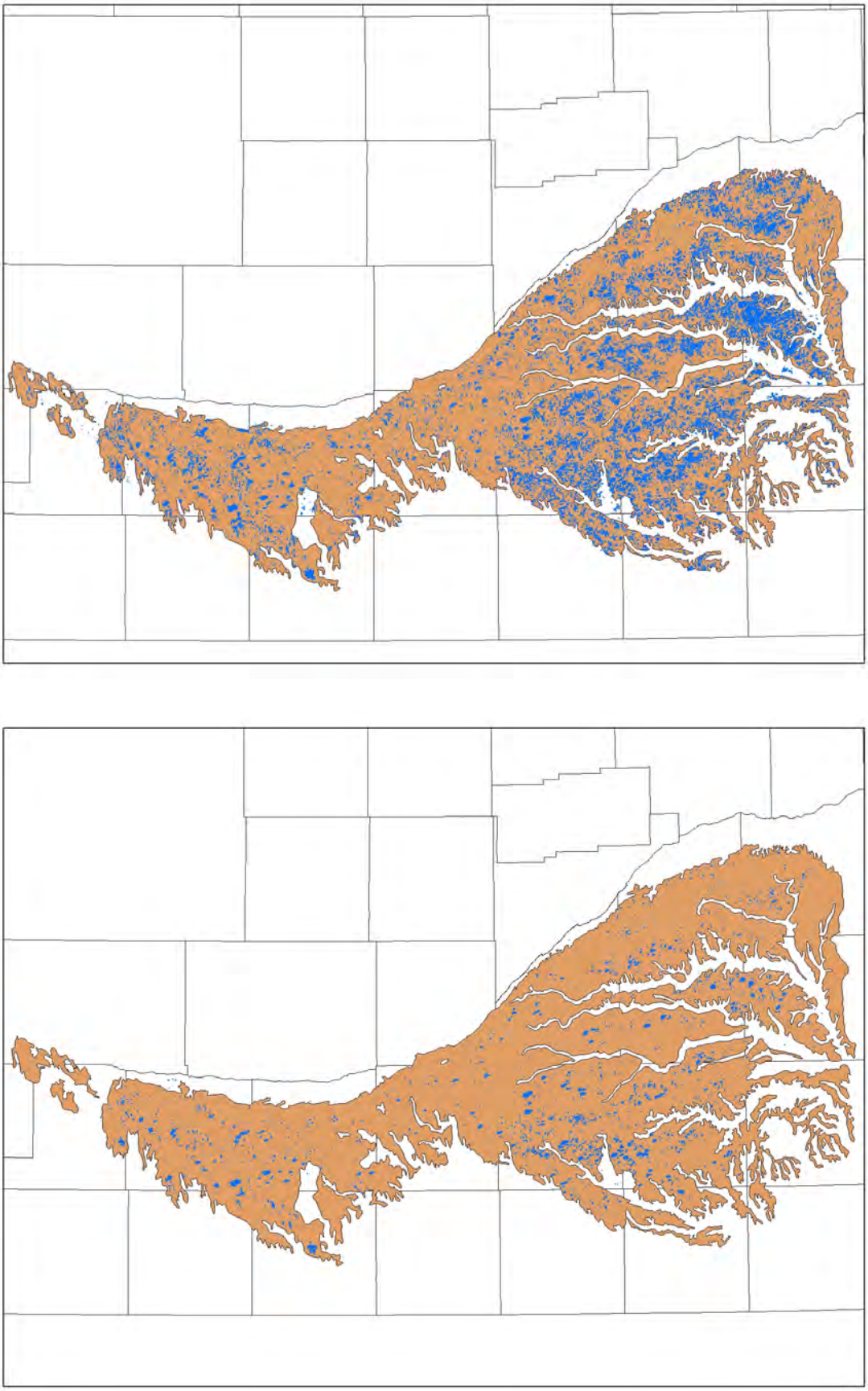

Figure 4. Historic (top) and current (bottom) wetland distribution and abundance (blue area) within the Rainwater Basin.

Other species that are proposed or are candidates for listing under the State and Federal Endangered Species Acts or are species of concern that use the Rainwater Basin include northern harrier, Swainson's hawk, ferruginous hawk, long-billed curlew, black tern, short-eared owl, and Sprague's pipit.

Mammals

Large mammals common to the region are those associated with grasslands of the Great Plains. They include white-tailed deer, coyote, raccoon, striped skunk, eastern cottontail, American badger, and Virginia opossum. Mule deer have occasionally been seen in the western portion. Muskrat and mink occur during wetter years but their populations have dropped dramatically with changes in land use and wetlands. Isolated prairie dog towns are scattered throughout the region, with most of them smaller than 40 acres and located on public lands. Common small mammals include thirteen-lined ground squirrel, northern and plains pocket gopher, Ord's kangaroo rat, meadow jumping mouse, meadow vole, northern grasshopper mouse, and white-footed mouse. Less common mammals are red fox, black-tailed jackrabbit, woodchuck, Franklin's ground squirrel, and eastern fox squirrel.

Reptiles and Amphibians

Semipermanent wetlands provide habitat for painted and snapping turtles. Ornate box turtles may be found in grassland areas. Western garter snakes, bull snakes, and eastern yellowbelly racers are fairly common. Western hog-nosed snakes are less common and prefer dry sandy prairies. Smooth green snake and redbelly snake are rare in the region. The lesser earless lizard may occur in open sandy soil with sparse vegetation, while the six-lined racerunner can be found in both lowland and upland sites.

Amphibians that occur in the Rainwater Basin include plains spadefoot toad, Woodhouse's toad, Great Plains toad, Blanchard's cricket frog, boreal chorus frog, bullfrog, gray treefrog, plains leopard frog, and tiger salamander.

Fisheries Due to the hydrologic nature of the wetlands within the Rainwater Basin, there currently are no viable fisheries. Two native Missouri River basin cyprinids, the shoal chub and plains minnow, are of concern but have no legal protected status in Nebraska. Catfishes, sunfishes, darters, catastomids, and other minnows are part of the fish communities in this region that are also of concern and of interest to the National Fish Habitat Action Plan partnerships.

Cultural Resources

Archaeological and Native dwelling remains representing 12,000 years of human occupation have been found in the Rainwater Basin. Although there have been few formal investigations done in the area, evidence from the earliest paleo-Indian occupation through the rural and agricultural development of the early 20th century has been located in a variety of geographical settings. Although these sites exhibit a wide range of artifacts and features, definite trends in site types and changes through time are apparent.

Current archaeological evidence indicates that the earliest humans, called paleo-Indians, migrated to the region near the close of the Ice Age approximately 12,000 years ago. These people had a highly mobile lifestyle that depended on the hunting of big game, including mammoths and a species of huge, now-extinct bison. The hallmark of most paleo-Indian sites are the beautiful but deadly spear points that are generally recovered from animal kill and butchering sites and small temporary camps. Three late paleo-Indian sites in Frontier County, just to the west of the Rainwater Basin, date from 10,000 to 8,000 years ago and have provided the best evidence of actual living areas. Another well-known paleo-Indian site, the Meserve site, dating to approximately 9,400 years ago, is located in Hall County within the Rainwater Basin.

There was a gradual but definite shift in the pattern of human use of the area beginning about 8,000 years ago. The changes were due to a combination of climatic fluctuations and an increasing population, coupled with tremendous social change and technological innovation. This stage is referred to as the Archaic stage and lasted until about 1,500 years ago. Although the Archaic stage is better represented in the archaeological record than the preceding paleo-Indian stage, interpretation of the remains is difficult. Evidence of a greater diversity of tools and increased use of native plants is found on many sites, but the remains also suggest a more localized and less mobile population.

By 2,000 years ago, the populations of the area became increasingly influenced by the woodland cultures to the east. This period, referred to as the Plains Woodland period (2,000 to 1,000 years ago), brought great changes and innovation, including the advent of pottery, the bow and arrow, and semipermanent dwellings. Small villages began to be established, and evidence of early agriculture has been found along some of the waterways.

Evidence of an increasingly sedentary population from approximately 1,000 years ago until approximately 400 years ago is found at many of the sites. This adaptation is referred to as the Central Plains village tradition and amplifies many of the trends began during the Plains Woodland period. Small villages of earthen structures with associated agricultural fields became more common. The increased use of pottery in conjunction with the construction of food storage

pits reflect a population that was spending increasing amounts of time in one location.

Early postcontact occupation of the area (400 to 100 years ago) included the Pawnee with the Arikara, Arapaho, Cheyenne, Lakota, Oto, and Kansas peoples. Their settlements tended to be large villages with extensive agricultural fields and were often located along the major waterways. Bison hunting, fishing, and Euro-American trade were also primary components of the economy. Beginning in the early 1700s, explorers began to make incursions into the area and by the mid-1800s, there was a regular stream of emigrants passing through on their way west. Many of these travelers chose to stay and settle in the area referred to today as the Rainwater Basin.

Socioeconomic Environment

Landownership

The project area includes all or portions of 13 counties: Adams, Clay, Fillmore, Franklin, Gosper, Hall, Hamilton, Kearney, Phelps, Polk, Saline, Seward, and York. The total population of these counties is almost 182,000 people, or roughly 10 percent of Nebraska's population (U.S. Census Bureau 2010). Numerous small communities of less than 1,000 people exist throughout the area. The five largest commercial hubs are Grand Island, Hastings, York, Holdrege, and Minden. The city of Kearney lies outside the Rainwater Basin immediately north of Kearney County.

The population trend within the Rainwater Basin follows the trends seen throughout the State. From 1980 to 2002, the number of farms in the Rainwater Basin region dropped from 4,585 to 3,280, representing a 28.5 percent decline, with the farms becoming larger (Nebraska Agricultural Statistics Service 2003). Between 2002 and 2007, the number of farms within the 13 Rainwater Basin Wetland Management District counties dropped by 6.3 percent, and the average farm size increased by 195 acres (USDA 2007).

During the years 2000 to 2010, the collective population of the counties in the Rainwater Basin increased by 1.0 percent (U.S. Census Bureau, 2010). The increase, however, was not uniform. Counties without a large commercial hub (9 of the 13 counties) showed significant declines. Fillmore and Franklin Counties each experienced about an 11 and 10 percent decline, respectively. Hall County, containing the city of Grand Island, showed nearly all of the gain (figure 5).

The well-being and stability of the small communities have depended on the farming economy, primarily irrigated corn and soybeans. As land becomes more concentrated in larger farm operations, fewer families remain in small communities to support businesses, schools, and churches. The trend is for people to move to larger nearby commercial hubs.

Approximately 1.6 percent of Nebraska is in either State or Federal ownership (U.S. Census Bureau, 1991). Only Iowa and Kansas have less government

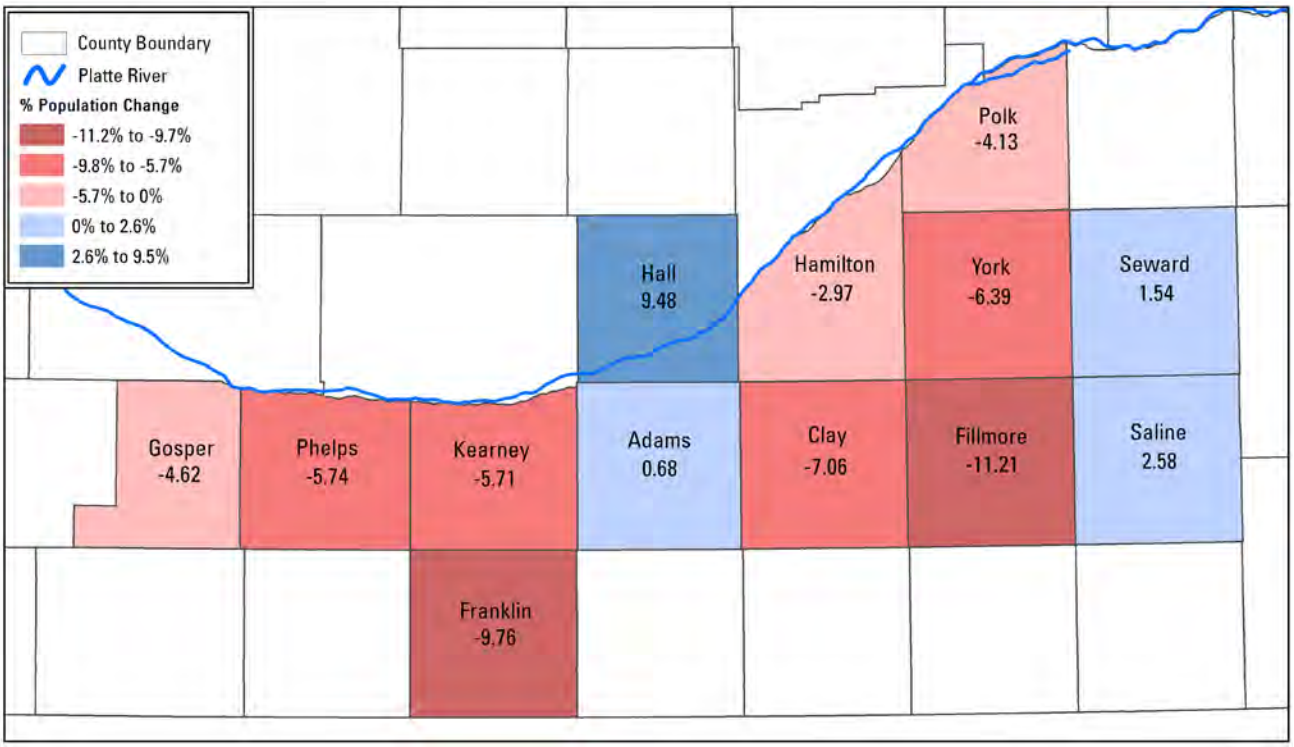

Figure 5. Change in county population size in the Rainwater Basin from the 2000 to 2010 census.

ownership by percentage. Within the Rainwater Basin, agriculture (79.9 percent cropland and 10.5 pasture or CRP) is the dominant land use (USFWS, Grand Island GIS Shop, unpublished). Roads or communities make up 5.4 percent of the land area. Fish and Wildlife Service lands within the region total 23,855 acres, representing about 0.6 percent of the region. Clay County, with the U.S. Department of Agriculture's 35,000-acre Roman L. Hruska Meat Animal Research Center, has a higher percentage of Federal ownership than the other Rainwater Basin counties. Located west of Clay Center, Nebraska, the research center is the largest federally owned property in the project area. Nonfarmed wetlands represent 1 percent of the land use. See the Habitat section in Chapter 3 for additional information about agricultural development.

Property tax

Property tax is assessed on each property owner within each county. The amount is derived from the value of each parcel of land, based on the reasonable highest and most probable use. The assessed value of agricultural land is no more than 75 percent of market value (NEDOR 2011).

The inflation in land value in recent years has caused taxes on agricultural land to go up disproportionately compared with nonagricultural property, such as homes within communities. For counties with low populations and few commercial properties, agricultural lands may represent well over half of the county's total assessed value. As costs in low-population counties continue to go up, populations go down, and because no new industries are being created, agricultural land claims a higher percentage of the county's total assessed value, placing more of the burden of financing the county on the shoulders of farmers.

Public use and wildlife-dependent recreational activities

For much of the past century, access to private property was relatively easy to obtain. Most of Nebraska's population was somehow connected to the land, either by family or by acquaintances. Hunting was seen as recreation that provided little opportunity for revenue to the landowner, and access was freely granted as a neighborly gesture. In the past few decades, this trend has changed. Urban populations are no longer closely connected to the land, and access to private land is more commonly being denied or allowed only on a fee basis.

The result is that the public is relying more on public lands for wildlife-dependent recreation. Within Rainwater Basin, 32 Wildlife Management Areas are managed by the NGPC, and the Service manages 59 WPAs. A total of 31,823 acres is available for public use (USFWS, Grand Island GIS Shop). Pheasant hunting is the most common recreational activity, followed by waterfowl hunting and birdwatching. It is estimated that 81,880 use-days are spent annually on waterfowl and upland bird hunting on State and Federal properties in the Rainwater Basin (Mark Vrtiska, biologist, NGPC; personal communication; May 12, 2010).

Chapter 4 — Environmental Consequences

This chapter assesses the environmental impacts expected to occur from the implementation of alternatives A and B, as described in Chapter 2.

Effects on the Biological Environment

This section describes the effects on wildlife habitat and water and soil resources of carrying out alternatives A and B.

WILDLIFE HABITAT—ALTERNATIVE A (NO ACTION)

Under alternative A, land acquisition by the Service would continue until the original authorization level of 24,000 acres is reached. At that time, future wetland acquisition would depend on other conservation agencies and nongovernmental organizations. Since the existing authorization limits only the purchase of property, the Service would continue to accept gifts from other entities. For example, the Service could enter into an agreement with a donor to accept ownership of a piece of property to be managed as part of the National Refuge System.

Most of the Rainwater Basin wetlands have been determined to be nonjurisdictional wetlands under the Clean Water Act as it is currently being administered. The U.S. Department of Agriculture's Swampbuster Act does not prohibit alteration of wetlands, but it withholds Federal farm program benefits from any person who plants a commodity crop in a wetland that has been converted. Changes in agricultural economics would continue to influence the existence of privately owned wetlands. Over a period of time, total wetland acres and quality are expected to decline under alternative A. Migratory waterfowl use the numerous shallow, temporary wetlands for feeding and resting, but prefer the larger nearby wetlands for roosting. As the presence of temporary wetlands declines, the value of larger wetlands located in a wetland complex would decline due to fewer food resources.

Wetlands with split ownership between the Service and private landowners would likely remain unrestored because complete restoration would be less likely due to conflicting land uses. These wetlands could also be under-managed, because in many cases the portion of wetlands in private ownership would remain idle and become dominated by late-successional wetland plants that provide little to no benefit to migratory waterfowl. The Service would continue to work with neighboring landowners to manage these areas for waterfowl. Participation level, however, would be expected to remain low.

Waterfowl nutritional needs derived from natural wetland foods would remain unmet. As little as 14 percent of the waterfowl diet, as estimated by the Rainwater Basin Joint Venture, would come from wetlands under this alternative. The remainder would continue to come from waste grain, which does not provide needed amino acids and minerals. Over time, as more wetlands are lost, the percentage of natural foods in waterfowl diets would be expected to decline even further.

Because any decline in roosting areas would cause bird populations to become more concentrated on the remaining wetlands, the potential for a major avian disease outbreak would remain high and would be expected to increase over time. Groundwater pumping would be expected to play a more critical role in keeping birds dispersed throughout the region.

WILDLIFE HABITAT—ALTERNATIVE B (PROPOSED ACTION)

Under alternative B, the expansion of land acquisition across the Rainwater Basin would ensure that critical wetlands are protected in perpetuity. It would allow the Service greater flexibility to consider fee-title or easement acquisition as potential land management strategies. GIS modeling would help to identify wetlands with key biological characteristics that are best suited for fee-title and easement acquisition. This approach would help to ensure that funding is directed to where it can provide the most benefit to priority species.

Purchase of roundout properties would in many ways multiply the benefits of the wetlands beyond what they currently provide in split ownership. It would be easier to use management strategies such as grazing, prescribed burning, restoration, and water management. The Service would continue to partner with neighboring landowners to enhance privately owned wetlands for the benefit of migratory birds.

Natural foods from wetlands would increase, bringing the Rainwater Basin Joint Venture closer to its

goal of having 28.2 percent of waterfowl energetic needs being met by natural foods rather than waste grain. Birds would be expected to leave the Rainwater Basin region in better body condition, which would in turn mean better production on their northern nesting grounds.

The potential for a major avian disease outbreak would be reduced as more wetlands would be better managed for waterfowl migrations. Pumping and other forms of water management would remain as management options.

Acquisition and protection of wetlands within the Rainwater Basin will indirectly provide improved water quality to the headwaters of several streams (e.g., Big Blue and Little Blue) that provide fish habitat.

Water and Soil Resources—Alternative A (No Action)

Under alternative A, water quality and quantity would decline and sedimentation would increase over time. It is expected that future wetland loss would increase agricultural and sediment runoff. Runoff flowing out of watersheds would increase, thereby increasing erosion and nutrient loading. The ability of altered wetlands to contribute to groundwater recharge would also decline.

Water and Soil Resources—Alternative B (Proposed Action)

Under alternative B, wetlands that are protected in perpetuity would exist for the long term, providing many of the benefits attributed to wetlands, including entrapment of agricultural fertilizers, chemicals, and sediment. Wetland plants would help convert fertilizers and other farm chemicals into nonpolluting forms. The preserved wetlands would continue to provide groundwater recharge to a currently declining groundwater table.

Effects on the Socioeconomic Environment

The socioeconomic impact of land acquisition within the Rainwater Basin counties is hard to measure with a high degree of certainty. What is known is that there would be reduction in agricultural production and tax revenue associated with Federal acquisition. What is poorly determined or immeasurable are the environmental and social benefits provided by wetlands, especially those located in close proximity to each other or near a community. Economists often refer to these benefits as nonexcludable (available to all) goods that have a value to the public that exceeds its value to the landowner. For Rainwater Basin wetlands, this value extends beyond the local residents to a much larger area. For example, the birds that use the Rainwater Basin during spring migration are of international value for birdwatching and hunting.

Some local residents perceive themselves as having to unfairly shoulder the burden of maintaining these wetlands for the benefit of others. Their concerns are expressed in the belief that Service acquisition of wetlands contributes to declining county populations, increasing land prices and taxes.

Population Decline

A review of population changes within counties located in the Rainwater Basin between 2000 and 2010 shows that the greatest decline has been in counties with low (<10,000) populations (U.S. Census Bureau 2010).

Fillmore County, which does not have a large commercial hub, showed the greatest reduction in population (11 percent), declining by 744 people from 2000 to 2010. In contrast, those counties with a larger commercial hub showed an increase in population. Hall County, which includes the community of Grand Island, showed over a 9 percent increase during the same period, increasing by 5,073 people. This trend in population shift among counties was common throughout the State, where counties with small populations and small commercial hubs showed a decrease while counties with larger populations and larger commercial hubs showed an increase.

Even though some residents are concerned that Federal acquisition may lead to a decrease in population, there does not appear to be a correlation between the two. Clay County, for example, showed a population decline of over 7 percent between 2000 and 2010. During that period of time, only 32.5 acres were acquired by the Service. A comparison of Clay County with a nearby county of similar population without Federal lands would help determine if Service ownership may be a contributing factor. A comparable county would be Antelope County. It does not have a large commercial hub or Federal lands, and it showed a decline of 11 percent. Other Nebraska counties that met the same criteria as Antelope County showed similar trends.

Rising Land Prices

Regarding the concern that Service acquisition drives up land prices, a 2010 UNL (University of Nebraska, Lincoln) survey reported that agricultural land values in the Rainwater Basin region increased an average of 2.6 percent annually between 2005 and 2010 (Johnson et al. 2010). During those same five years, only 513 acres were acquired in fee title by the Service. In 2009, 74 percent of agricultural lands sold in the Rainwater Basin region were purchased by active farmers, 21 percent were purchased by nonfarming Nebraska residents, and 5 percent were purchased by nonfarming out-of-state buyers.

UNL's survey asked 150 land-market observers to rank the importance of 16 factors in determining land prices. The top three factors were purchasing for farm expansion, a limited amount of land offered for sale, and the financial health of current owners. Property tax levels were ranked 15th out of 16.

In 2009, 68 percent of land purchases in the Rainwater Basin area were cash purchases and 27 percent involved a mortgage; 5 percent of ownership changes involved other types of transactions (e.g., gift, inheritance, etc.). During the last decade, the average rate of return on assets of agricultural land in the Rainwater Basin region dropped from 5.5 to 4.9 percent.

Increasing property taxes

Tax increases are a very contentious issue across the State, including in the Rainwater Basin. While land brought into Federal ownership is no longer on the tax roll, it does not result in an increase in personal property taxes paid to the counties.

For counties with low populations and no commercial hub, agricultural lands represent well over half of the county's total assessed value (Johnson et al. 2006). When county costs continue to go up, populations go down, and no new industries are being created, agricultural land claims a higher percentage of the county's total assessed value, shifting the burden of financing the county to the shoulders of farmers. A contrast that demonstrates this concept is that 57 percent of the total assessed value in Clay County is agricultural land, but it is only 22 percent in adjoining Adams County.

The Refuge Revenue Sharing Act provides for payments to counties by the Service in lieu of taxes. Revenues for these payments are derived from the sale of products from refuges, including animals, timber, and minerals, or from leases and other privileges. The revenue is deposited in a special Treasury account to be dispersed to counties containing refuge properties. Payment is calculated three different ways, with the amount due being the highest of the three methods. The three methods are: 0.75 percent of the appraised property value, 25 percent of the net receipts produced on the property, or $0.75 per acre. If the funds in the special Treasury account fall short of 100 percent payment, each county receives payment at a lower percentage. In 2009, Refuge revenue–sharing payment to Rainwater Basin counties averaged only 32.3 percent ($90,983) of full payment.

Social benefits

Although Service lands do not provide the same property tax revenue to the counties that the land would generate in private ownership, there are goods and services produced by these lands that benefit the general public. Some benefit the local community directly in terms of flood control, groundwater recharge, increased water quality, and sediment or nutrient entrapment. Recreation, aesthetics, and health and production of wildlife may serve the local community as well as a much larger society. Other benefits include reduced need for water and sewer services and increased law enforcement in the local area, thereby reducing costs to local communities.

There is no way to assign dollar values to these public benefits. The social and environmental benefits provided by the wetlands have very little economic value to an individual buyer; the assessed value reflects the land's value for agricultural production. In addition, each wetland provides a specific level of benefits depending on its unique characteristics, location in the watershed, and proximity to larger communities. For example, WPAs located in the more populated eastern portion of the Rainwater Basin receive a much higher use than those in the western portion.

Studies exist, however, that suggest some of the value wetlands provide to the public. In 1978, the Little Blue Natural Resources District hired an engineering firm to provide a cost-benefit analysis of a watershed plan in Clay County. The analysis reported that a 650-acre impoundment would have an estimated annual benefit value of $97.37 per acre. This value was based on only three benefits: $52.75 per acre for groundwater recharge, $41.14 per acre for flood control, and $3.46 per acre for recreation. The $97.37 in 1978 is equivalent to approximately $320 in today's economy. The estimate did not include the value of other services provided, such as capturing and transforming agricultural runoff or sustaining migratory bird populations.

A limited amount of agricultural benefit is provided by WPAs. In 2009, approximately 12,600 animal-unit months of grazing were provided. An additional 1,150 acres were hayed.

Publicly owned wetlands within the Rainwater Basin are an important factor in bringing hunters and birdwatchers to the region. The 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation reports that the average hunter in Nebraska spends about $25 per day on trip expenses (food, lodging, and fuel). For birdwatchers, that number is $31.50 per day. The Service estimates that there are approximately 80,000 visitor-days within basin WPAs each year. Using the $25 per visitor-day figure, that number of visitor-days brings $2 million of commerce to the region. NGPC estimates that upland game and waterfowl hunting provides $2,374,520 of economic activity to the Rainwater Basin (Mark Vrtiska, biologist, NGPC; personal communication; 2011).

These figures demonstrate that the value of benefits provided by WPAs is significant.

LANDOWNERSHIP AND LAND USE—ALTERNATIVE A (NO ACTION)

Under alternative A, many of the wetlands targeted for acquisition under this proposal would remain in private ownership and on the county tax rolls. An unknown number of them would be converted to cropland during drier conditions, but there could be significant variations in production across wet and dry years.

LANDOWNERSHIP AND LAND USE—ALTERNATIVE B (PROPOSED ACTION)

Under alternative B, 14,177 additional acres of land (0.36 percent of the Rainwater Basin region) would be permanently protected. The adjoining upland and drained portions of wetlands would be converted from cropland back to grassland and wetlands. Agricultural income from the 5,000 acres of easements would be derived from livestock grazing and haying.

The 9,177 acres purchased in fee title would be taken off the county tax rolls with the counties receiving Refuge revenue-sharing funds to help compensate for the loss of tax money.

Lands with a conservation easement would remain on the tax rolls, and the taxes would be paid by the landowner. Land use on these properties would be limited to the terms of the easement, which would allow haying, grazing, and control of public access.

PUBLIC USE—ALTERNATIVE A (NO ACTION)

Under alternative A, public use would remain relatively unchanged. Public access to wetlands targeted for acquisition under this proposal would be limited, with the property owner deciding the level of access. Public pressure on those wetlands currently in public ownership would increase, potentially affecting wildlife use of wetland areas.

PUBLIC USE—ALTERNATIVE B (PROPOSED ACTION)

Under alternative B, additional fee-title properties would be open to public recreation, including hunting, birdwatching, and environmental education. An increase in direct and indirect revenue from recreation would increase. Public pressure on and wildlife disturbance to individual wetlands would lessen as more areas would be available for use.

Properties with conservation easements would remain in private ownership. Access to the property would be at the discretion of the landowner since the easement would not include public use.

VALUE OF THE RAINWATER BASIN ECOSYSTEM—ALTERNATIVE A (NO ACTION)

Under alternative A, the level of wetland protection would remain relatively unchanged. Wetlands with split ownership between the Service and private landowners would continue to have limited benefits, especially for waterfowl. Over time the number of wetlands regionwide would be expected to continue to decline both in numbers and functionality.

VALUE OF THE RAINWATER BASIN ECOSYSTEM—ALTERNATIVE B (PROPOSED ACTION)

Alternative B would not completely restore the Rainwater Basin ecosystem, but it would help to reduce the threat of further losses. Nearly 90 percent of the region's wetlands would remain lost. Wetlands that are permanently protected would help ensure that the region continues to play a critical role in the migration of millions of ducks, geese, shorebirds, and other birds. The wetland values of the acquired areas would continue to provide better water quality, quality of life, and wildlife habitat for many generations.

Unavoidable Adverse Impacts

Any adverse effects that may be unavoidable while carrying out alternatives A and B are described below.

ALTERNATIVE A (NO ACTION)

Under alternative A, the adverse impact of habitat degradation and fragmentation would be expected to be more widespread and prevalent.

ALTERNATIVE B (PROPOSED ACTION)

Under alternative B, the expansion of land acquisition would cause a direct decline in taxes paid to counties.

Irreversible and Irretrievable Commitments of Resources

Any commitments of resources that may be irreversible or irretrievable as a result of carrying out alternatives A and B are described as follows.

ALTERNATIVE A (NO ACTION)

Under alternative A, there would be no additional commitment of resources by the Service if no action is taken. Wetlands altered to cropland, especially irrigated cropland, are irretrievable and contribute to the overall loss of migration habitat.

ALTERNATIVE B (PROPOSED ACTION)

Under alternative B, there would be an irretrievable and irreversible annual commitment of funds to protect and manage these lands. The potential for the property to be used for crop production would be gone.

Short-Term Use versus Long-Term Productivity

This section describes the effects of short-term use versus long-term productivity of alternatives A and B.

Alternative A (No Action)

Under alternative A, landowners would be able to convert wetlands to cropland, which would boost agricultural production but would also have a long-term negative effect on migratory bird habitat.

Alternative B (Proposed Action)

Under alternative B, land acquisition would perpetually preserve wetlands and adjoining grasslands. The loss of direct tax revenue to the affected counties would have a long-term impact.

Cumulative Impacts

Cumulative impacts are defined by NEPA as the impacts on the environment that result from the incremental impact of the action when added to the other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions (40 CFR § 1508.7)

Past Actions

Past land acquisition by the Service or the NGPC has included 31,823 acres of wetland and grassland. The Wetland Reserve Program administered by NRCS has added 7,077 acres in conservation easements. The total of these acres represents approximately 1.0 percent of the Rainwater Basin. These lands are managed primarily for the social benefits wetlands provide, particularly for wetland and grassland birds.

Present Actions

The Service's proposed action to expand land acquisition authority to 38,177 acres would add an additional 14,177 acres to the National Refuge System, 5,000 of which would be conservation easements. Land acquisition by NGPC is limited and is driven by available funds and willing sellers. The Wetland Reserve Program continues to be an active program. The Wetland Reserve Program areas, however, are not open for public use. Ducks Unlimited is actively seeking willing sellers and is obtaining both fee-title and easement properties. Its acquisitions are directed toward purchasing property, restoring the wetland and upland, protecting it with a conservation easement, and then selling the property. Present actions by conservation groups support the goals of the Service and the Rainwater Basin Joint Venture.

Reasonably Foreseeable Future Actions

Reasonably foreseeable actions are actions and activities that are independent of the proposed expansion addressed in this document. They are anticipated to occur regardless of which alternative is selected. Increased production of ethanol and demand for corn and soybeans are expected to encourage increased acreage of, and production from, farmland. A significant portion of that increased acreage can be expected to come from wetland conversion. Future wetland conservation will be done primarily by the U.S. Department of Agriculture and nongovernmental conservation organizations.

Wind energy development is currently being considered for the region. The potential for this development is uncertain at this time.

Development—Alternative A (No Action)

Much of the development within the Rainwater Basin has been and would continue to be related to agriculture. Since 90 percent of the historic wetlands have already been converted or lost, the number of wetlands that would be affected by additional development in the future would be small, but the development would significantly affect the wetlands that remain. For example, over 2,300 acres of grassland were converted to cropland in just four counties within the Rainwater Basin in 2009. The long-term, cumulative effect would likely result in the continuation, and possible acceleration, of the decline in waterfowl, shorebird, and other migratory bird populations.

Development—Alternative B (Proposed Action)

The proposed action would restore and protect an additional 14,177 acres of wetland and grassland areas for the benefit of the public and wildlife.

Conservation Efforts—Alternative A (No Action)

Under alternative A, current Service programs such as Partners for Fish and Wildlife would continue within the Rainwater Basin region. The Service would continue to work cooperatively with landowners to voluntarily improve habitat on private land through various conservation means such as prescribed fire, range management systems, or native plantings. Those landowners wishing to sell off unproductive wetland acres would have fewer options for selling.

Conservation Efforts—Alternative B (Proposed Action)

Alternative B would allow for the protection of an additional 14,177 acres of wetland and grassland

habitats. These acres would be added to the 23,855 acres currently owned and managed by the Service. The action would have a long-term positive impact on wildlife habitat, significantly add to the management capability for existing wetlands, and help the Service meet the goals in the North American Waterfowl Plan.

Chapter 5 — Coordination and Environmental Review

Agency Coordination

The Service has discussed the proposal to expand land acquisition in the Rainwater Basin with landowners; conservation organizations; other Federal agencies; tribal, State, and county governments; and other interested groups and individuals.

The Service held two public meetings, in Holdrege and Clay Center, Nebraska in January 2011 to provide information and discuss the proposal with landowners and other interested citizens. Information on the proposal has been made available to county commissioners in each of the 13 counties included in the project area.

At the Federal level, information was provided to the Congressional delegation, as well as to representatives from the U.S. Department of Agriculture (NRCS). At the State level, information was provided to Governor Heineman's staff and Nebraska's State senators. Information was also provided to tribes within the State.

Nongovernmental conservation groups are vital to the success of the proposed project. Service staff has coordinated with partner organizations such as The Nature Conservancy, Natural Resource Districts, and Ducks Unlimited.

Contaminants and Hazardous Materials

Surveys for contaminants would be conducted before any land interests are acquired. Fieldwork for the preacquisition surveys would be conducted on a tract-by-tract basis. Any suspected problems or contaminants requiring additional surveys would be referred to a contaminants specialist located in the Service's Ecological Services office in Grand Island, Nebraska.

National Environmental Policy Act

As a Federal agency, the Service must comply with provisions of NEPA. An environmental assessment is required under the act to evaluate reasonable alternatives that will meet stated objectives and to assess the possible impacts to the human environment. The environmental assessment serves as the basis for determining whether implementation of the proposed action would constitute a major Federal action significantly affecting the quality of the human environment and the need for an environmental impact statement.

The analysis for, and development of, this environmental assessment facilitated the involvement of government agencies and the public in the decision-making process.

Strategic Habitat Conservation and Landscape Conservation Cooperatives

SHC (strategic habitat conservation) is a means of applying adaptive management across large landscapes. Landscape conservation cooperatives will facilitate strategic habitat conservation (USFWS 2008).

Strategic Habitat Conservation

The Rainwater Basin expansion proposal would apply the strategic habitat conservation framework outlined in the National Ecological Assessment Team report (National Ecological Assessment Team 2006). SHC involves an ongoing cycle of biological planning, conservation design, conservation delivery, outcome-based monitoring, and assumption-based research (figure 6). It is the process by which the Service continues to develop and apply science focused on improving the ability to apply conservation delivery actions that result in landscapes capable of supporting populations of priority species at desired levels. Additionally, SHC provides the framework by which the Service develops and applies science to inform and continually improve conservation delivery by addressing landscape-level population-limiting factors in an adaptive manner.

The Service's Region 6 Refuges Program has established a GIS office in Grand Island that works closely with the Rainwater Basin Joint Venture and the Rainwater Basin Wetland Management District to provide support for the biological planning, conservation design, conservation delivery, and monitoring/

Figure 6. The elements of strategic habitat conservation

research elements of SHC necessary to implement the proposed action. This environmental assessment addresses the four key SHC elements: planning, design, delivery, and monitoring and research.

Biological planning

Priority resources were described in earlier chapters of this document. Biological planning requires the identification of priority species, development of population objectives, and identification of landscape-level limiting factors that keep the populations of priority species below desired levels. Initial biological planning was done using dabbling ducks and a subset of goose populations as focal species. This approach was based on the assumption that protection and management of wetlands in a manner that meets the biological needs of the focal species will also adequately meet the needs of other wetland species.

Conceptual and quantitative models have been developed to identify specific wetlands and wetland complexes. Priority species would continually be defined and updated throughout the implementation of the proposed action, and additional landscape models would be developed for priority species. Biological planning will continue into the future, engaging partners in the population objectives and developing biological models that will be directly linked to conservation delivery actions.

Conservation design

Land acquisition is most effectively completed using biologically driven, spatially explicit models. During the past decade, the Service, in cooperation with the Rainwater Basin Joint Venture, has used GIS to extensively map the Rainwater Basin region. Modeling has identified and ranked each hydric soils area, including both drained and existing wetlands. Key spatial and biological characteristics of each area were scored to determine which wetlands are cost effective to acquire and restore. The analysis considered the impacts of geographic features such as the proximity of other wetlands, roads, and power lines to individual wetlands. Color-coded maps reflect an individual wetland's priority for fee-title acquisition, easement, and other types of conservation programs.

The information obtained from the model was also used in conjunction with the management history of existing WPAs to identify where roundout acquisition is most needed.

Conservation delivery

The Rainwater Basin Wetland Management District has worked with neighboring landowners, conservation organizations, and government agencies for almost five decades to preserve and enhance wetlands throughout the region. Beginning in the early 1990s, Partners for Fish and Wildlife biologists have worked with the same partners to bring conservation programs to wetland owners regardless of their proximity to existing Service properties. Application of the SHC framework will build on existing partnerships and support the development of new partnerships for delivering conservation throughout the ecoregion.

It is recognized that the past practice of opportunistic acquisition will not result in the best use of conservation dollars. The function of some wetlands can best be used or enhanced by short-term conservation programs. Computer modeling of waterfowl energetic needs and wetland priority mapping allows for greater flexibility, increased responsiveness, and improved efficiency in meeting Service and partner conservation delivery needs.

Conservation design will continue to involve the development of spatially explicit decision support tools for targeting conservation delivery actions. Research and monitoring will help update the modeling parameters used to develop conservation priorities.

Monitoring and research

The success of the proposed action would depend on its ability to adapt to new and better information gathered through research and monitoring. Currently, monitoring and research are being done on a variety of subjects to provide for better decision making in the future. At the end of each growing season, wetlands are examined to assess the response of plant communities and seed production to different management actions. This information is being used to develop a strategic decision-making matrix to guide future management. Bird use associated with wetland juxtaposition is being analyzed to confirm if our

current understanding of wetland complexes aligns with what occurs in the field. A study of the relationship between groundwater recharge and wetland characteristics was recently completed. Research related to grazing intensity and its impact on the control of reed canarygrass is beginning its final year. Information from these studies and future work on landscape ecology will be incorporated into the SHC process to further refine biological planning.

Landscape conservation cooperatives

The Service will use LCCs (Landscape Conservation Cooperatives) as a means of implementing strategic habitat conservation. LCCs will be formal scientific and management partnerships between the Service, the U.S. Geological Survey, other Federal agencies, States, tribes, nongovernmental organizations, universities, and others to increase the capacity for applied conservation science in support of fish and wildlife management in specific landscapes (Secretarial Order Number 3289). The tools developed by the LCCs will allow Service offices, and our many partners, to implement on-the-ground actions in the most effective locations to meet conservation goals.

The Rainwater Basin Expansion Project is part of the Great Plains LCC, which was recently developed. The project meets the criteria of the LCC initiative: cooperation among private landowners and other agencies (Federal, State, local, and nongovernmental organizations). In addition to fostering partnerships, the LCCs provide science support to managers.

The Secretary of the Interior recently outlined the importance of LCCs as a response to climate change (USFWS 2009). LCCs reach across broad landscapes, involve many partners, and function at a scale necessary to address wildlife adaptation in response to climate change. The Rainwater Basin Expansion Project would contribute to the wetland protection projects of Ducks Unlimited, NGPC, Natural Resource Districts, and the U.S. Department of Agriculture.

These cooperatives will continue to grow as a means of delivering strategic habitat conservation. The Service and the U.S. Geological Survey have signed a memorandum of understanding to strengthen the science–management relationship in landscape-level conservation. This further commitment to strategic habitat conservation improves the basis for the type of landscape conservation being proposed.

Distribution and Availability

Copies of this environmental assessment were sent to Federal and State legislative delegations, tribes, agencies, landowners, private groups, and other interested individuals.

Additional copies of the document are available from the following offices and Web sites:

U.S. Fish and Wildlife Service
Rainwater Basin Wetland Management District
P.O. Box 8
Funk, Nebraska 68940
308/263 3000
http://rainwater.fws.gov

U.S. Fish and Wildlife Service
Region 6, Division of Refuge Planning
Branch of Land Protection Planning
P.O. Box 25486–DFC
Denver, Colorado 80225
303/236 4345
303/236 4792 fax
http://mountain-prairie.fws.gov/planning/lpp.htm