

GAO

Report to the Subcommittee on
Interior, Environment, and Related
Agencies, Committee on
Appropriations, House of
Representatives

September 2007

PRAIRIE POTHOLE REGION

At the Current Pace of
Acquisitions, the U.S.
Fish and Wildlife
Service Is Unlikely to
Achieve Its Habitat
Protection Goals for
Migratory Birds



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Highlights

Highlights of [GAO-07-1093](#), a report to the Subcommittee on Interior, Environment, and Related Agencies, Committee on Appropriations, House of Representatives

Why GAO Did This Study

The 64-million-acre Prairie Pothole Region in the north-central United States provides breeding grounds for over 60 percent of key migratory bird species in the United States. During much of the 20th century, the draining of wetlands and the conversion of prairie to cropland has reduced bird habitat. Under the Small Wetlands Acquisition Program, the Department of the Interior's U.S. Fish and Wildlife Service (the Service) aims to sustain remaining migratory bird populations by permanently protecting high-priority habitat. Some habitat is temporarily protected under the Department of Agriculture's Conservation Reserve Program.

In this context, GAO examined (1) the status of the Service's acquisition program in the region, (2) the Service's habitat protection goals for the region, and (3) challenges to achieving these goals. To answer these objectives, GAO examined Service land acquisition data and projected rates of habitat loss.

What GAO Recommends

GAO suggests that Congress consider several alternatives as it deliberates on resource levels for habitat protection in the region. In addition, GAO is recommending that the Service focus more on acquiring the least expensive high-priority habitat. The Department of the Interior did not provide comments in time for them to be included as part of this report.

www.gao.gov/cgi-bin/getrpt?GAO-07-1093.

To view the full product, including the scope and methodology, click on the link above. For more information, contact Robin M. Nazzaro at (202) 512-3841 or nazzaror@gao.gov.

PRAIRIE POTHOLE REGION

At the Current Pace of Acquisitions, the U.S. Fish and Wildlife Service Is Unlikely to Achieve Its Habitat Protection Goals for Migratory Birds

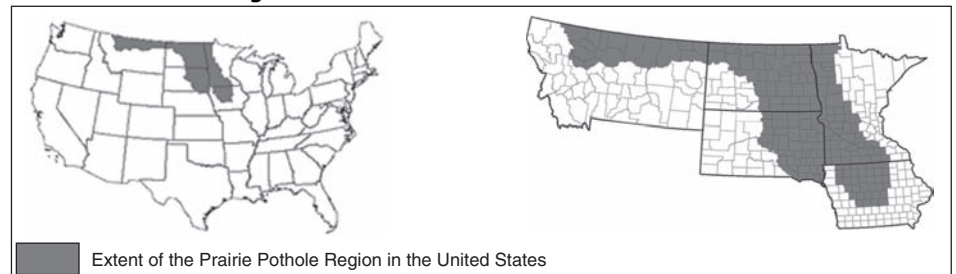
What GAO Found

Since the inception of the Small Wetlands Acquisition Program in the late 1950s, the Service has acquired and permanently protected about 3 million acres of wetlands and grasslands in the Prairie Pothole Region, primarily using Migratory Bird Conservation Funds. The Service has purchased outright almost 700,000 acres and acquired permanent conservation easements on more than 2.3 million acres that are privately owned.

To sustain bird populations in the region, the Service's goal is to acquire and permanently protect as much as possible of an additional 12 million acres of "high-priority" habitat—at-risk acreage capable of supporting a high number of breeding duck pairs per square mile. The goal acreage consists of 1.4 million acres of wetlands and 10.4 million acres of grasslands. According to the Service, achieving this goal is necessary to sustain the region's current population of 4.2 million breeding duck pairs and to ensure that enough habitat is maintained during wet years, when duck populations boom.

At the current pace of acquisitions, it could take the Service around 150 years and billions of dollars to acquire its 12 million goal acres. Some emerging market forces, however, suggest that the Service may have only several decades before most of its goal acreage is converted to agricultural uses. The pace of acquisitions could be increased marginally by using existing funds more efficiently or substantially by providing additional resources. The Service has purchased some expensive habitat in South Dakota. On the basis of GAO's analysis, the Service could have acquired about an additional 8,500 acres of high-priority habitat in South Dakota in fiscal year 2006, over and above the 16,169 acres that it did acquire, by more effectively targeting low-cost, high-priority habitat. However, with about \$17 million per year for land acquisitions in the Prairie Pothole Region, the Service's limited resources pose a substantial challenge. Another way to address this challenge is to explore additional resource alternatives, such as increasing the price of the federal Duck Stamp (these funds are placed in the Migratory Bird Conservation Fund), reauthorizing a wetlands loan, or providing additional funds from the Land and Water Conservation Fund. Each of these alternatives would require congressional action, such as H.R. 2735 and S. 272, which have been introduced in the 110th Congress.

The Prairie Pothole Region



Source: Prairie Pothole Joint Venture.

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United States Government Accountability Office
Washington, DC 20548

September 27, 2007

The Honorable Norman D. Dicks
Chairman
The Honorable Todd Tiahrt
Ranking Member
Subcommittee on Interior, Environment,
and Related Agencies
Committee on Appropriations
House of Representatives

Before European settlement, the 64-million-acre Prairie Pothole Region was one of the largest grassland-wetland ecosystems in the world. Even today, the remaining intact acreage, which is spread across parts of Iowa, Minnesota, Montana, North Dakota, and South Dakota, provides breeding grounds for more than 60 percent of key migratory bird species in the United States. Prairie wetlands, or “potholes,” are freshwater depressions and marshes that were created by glaciers thousands of years ago. Often seasonal and smaller than 1 acre, prairie wetlands provide critical habitat for almost 200 migratory bird species, including some—like the piping plover and whooping crane—that are threatened or endangered. Throughout the 20th century, the draining of wetlands and the conversion of native prairie to cropland dramatically reduced available breeding habitat for migratory birds. A 1988 report to Congress by the Secretary of the Interior found that only about 7 million of the original 20 million acres of prairie wetlands then remained. Losses due to agriculture have only increased in the 2 decades since then. Iowa, for example, has less than 1 percent of its original prairie wetlands left. Consequently, alarming declines in the populations of many migratory bird species occurred in the latter half of the 20th century across the United States and Canada—mallards declined from 8.7 million to 5.5 million, pintails declined from 6.3 million to 2.9 million, and blue-winged teal declined from 5.3 million to 3.8 million—reaching their lowest levels in the 1980s.

Under the Small Wetlands Acquisition Program, the Department of the Interior’s (Interior) U.S. Fish and Wildlife Service (the Service) aims to sustain remaining migratory bird populations over the long term by acquiring critical breeding habitat in perpetuity. To fulfill this aim, the Service protects habitat referred to as “waterfowl production areas”—95 percent of which are in the Prairie Pothole Region—through two mechanisms: fee-simple acquisitions (buying a piece of land) and

minimally restrictive easements (which allow farming or grazing once certain conservation measures are in place). Minimally restrictive easements cost the Service, and taxpayers, less than fee-simple acquisitions, since most land-use rights are retained by the landowner, and they allow the Service to stretch limited funds to acquire more priority habitat. The Small Wetlands Acquisition Program in the Prairie Pothole Region is administered by staff in the Service's region 3 and region 6. Region 3 covers the Minnesota and Iowa portions of the Prairie Pothole Region, while region 6 covers the Montana, North Dakota, and South Dakota portions of the Prairie Pothole Region.

During the early years of the program, the focus was on protecting wetlands through minimally restrictive wetland easements. In region 6, farmers grow crops on land that may have 100 wetlands per square mile. If such wetlands are drained, farmers can more easily work the fields with large equipment, and additional land becomes available for planting. Minimally restrictive wetland easements protect wetlands while allowing private landowners to retain ownership of their land and to continue farming. In exchange for a one-time, lump-sum payment, landowners agree not to drain, fill, or level wetlands on their property. Beyond acquiring wetland easements, since September 1989 the Service has also used the program to acquire easements on associated grassland acreage. These grassland easements increase the program's overall effectiveness by also protecting the grasslands surrounding already-protected prairie pothole wetlands from conversion to cropland or land with other agricultural uses. For example, grassland easements provide migratory birds with suitable nesting habitat and cover from predators, such as foxes and raccoons. Similar to wetland easements, grassland easements are minimally restrictive, in that they allow haying after the migratory bird nesting season.

In deciding which lands to acquire, the Service uses biological criteria and technologies, such as satellite imaging, to develop models that help focus its conservation efforts. These models predict the number and location of breeding duck pairs in reference to the location and abundance of wetlands and grasslands in the Prairie Pothole Region.¹ The Service uses these predictions to target acquisition areas that are currently capable of

¹While there are hundreds of migratory bird species in the region, duck species serve as the best "goal posts" for habitat protection. According to Service biologists, if habitat is conserved to protect duck species, then all other migratory bird species benefit.

supporting a high number of breeding duck pairs. Most of these areas are in the Service's region 6. In region 3, where more land has been converted to agriculture, the Service uses the models' predictions to target areas that, although largely used for agricultural purposes, have the highest potential to be restored to provide habitat for migratory birds, according to region 3 officials.

Despite the Service's concerted efforts, migratory bird populations in the Prairie Pothole Region currently face mounting threats. Although the Service protects only about 5 percent of acreage in the region, in the past it could rely on the likelihood that much of the unprotected, available migratory bird habitat was unthreatened because it was either unsuitable for agricultural production or temporarily protected by Department of Agriculture (Agriculture) conservation programs.² In addition, land prices then were relatively low, enabling the Service to acquire a fair amount of land each year with limited funds. In the past 10 years, however, land prices have risen from about \$70 per acre in some parts of the region to more than \$280 per acre. Moreover, with the advent of genetically modified crops and new cropping technologies, landowners can convert much native grassland that was previously unsuitable for agricultural uses to crops such as corn and soybeans, according to Service realty officials. In addition, although Agriculture's Conservation Reserve Program currently protects approximately 10 million acres of the region's grassland, contracts on about 3.5 million acres are set to expire by 2010. With the growing popularity of ethanol as a fuel and per-acre rental rates for corn exceeding \$60 in some areas, landowners receiving \$40 per acre in these areas under the Conservation Reserve Program have a substantial incentive to allow their conservation contracts to expire so that they can convert their land to agricultural production.

During the last century when migratory bird populations came under threat, Congress took several actions to increase migratory bird numbers and slow the trend of converting prairie wetlands to agricultural uses. The Migratory Bird Conservation Act of 1929—the first federal statute authorizing habitat acquisition—authorized the acquisition of land and

²The Food Security Act of 1985 created the Conservation Reserve Program, which provides annual rental payments and cost-share assistance to producers to help them safeguard environmentally sensitive land. Producers contractually agree to retire their land from agricultural purposes and keep it in approved conserving uses, generally for 10 to 15 years. See Pub. L. No. 99-198, title XII, subtitle D, §§ 1231-6, 99 Stat. 1354, 1509 (1985), as amended.

water to protect migratory birds.³ The migratory bird fund was established in 1934 by the Migratory Bird Hunting Stamp Act.⁴ The fund's three principal sources of revenue—the sale of federal Duck Stamps purchased by hunters, refuge visitors, birders, and other wetland conservationists; import duties on arms and ammunition; and 70 percent of certain refuge entrance fees—produce roughly \$44 million annually for land acquisitions, generally all of which is expended in the year it is made available. Congress amended this act in 1958 to create the Small Wetlands Acquisition Program, which authorized the Secretary of the Interior to acquire waterfowl production areas that provide necessary habitat for waterfowl and other migratory birds.⁵ Three years later, to prevent the serious loss of important wetlands and other waterfowl habitat, Congress passed the Wetlands Loan Act, which authorized appropriations of up to \$105 million to the Migratory Bird Conservation Fund as an advance against future Duck Stamp sales.⁶ In support of the legislation, Interior stated that time was “running out” in the race to preserve migratory birds because wetland drainage and the conversion of grasslands to cropland were reducing available natural habitat.⁷ In 1976, Congress raised the wetlands loan ceiling to \$200 million, and in 1986, Congress forgave the loan.⁸ Congress also has provided additional monies through other sources for land acquisitions in the region, such as grants under the North American Wetlands Conservation Act and funds from the Land and Water Conservation Fund. More recent legislative proposals in the 109th and 110th Congresses have proposed raising the price of the Duck Stamp and reauthorizing a new wetlands loan.⁹

³Act of Feb. 18, 1929, ch. 257, 45 Stat. 1222, as amended, codified at 16 U.S.C. § 715, et seq.

⁴Act of Mar. 16, 1934, ch. 71, 48 Stat. 451, as amended, codified at 16 U.S.C. § 718a, et seq.

⁵Pub. L. No. 85-585, 72 Stat. 487 (1958), codified at 16 U.S.C. § 718d(b)(3).

⁶Pub. L. No. 87-383, 75 Stat. 813 (1961), as amended, codified at 16 U.S.C. § 715k-3, et seq.

⁷Letter from Frank P. Briggs, Assistant Secretary of the Interior, to Representative Herbert C. Bonner, reprinted in S. Rep. No. 87-705 at 4 (1961).

⁸Pub. L. No. 94-215, § 2(a), 90 Stat. 189 (1976) (increase in the loan ceiling); and Pub. L. No. 99-645, title I, § 101(b), 100 Stat. 3582, 3584 (1986) (loan forgiveness).

⁹H.R. 4315, 109th Cong. (2005) (would have increased the Duck Stamp price and reauthorized wetlands loan program); H.R. 2735, 110th Cong. (2007) (would increase Duck Stamp price); and S. 272, 110th Cong. (2007) (would reauthorize wetlands loan program).

In this context, we examined (1) the present status of the Service's Small Wetlands Acquisition Program in the Prairie Pothole Region, (2) the Service's habitat protection goals for the region, and (3) challenges to achieving these goals.

To examine the present status of the Service's Small Wetlands Acquisition Program, we analyzed Service fee-simple and easement acquisition data in the Prairie Pothole Region, dating from program inception in 1959. We also visited three Service realty acquisition offices in Minnesota, North Dakota, and South Dakota and reviewed fee and easement acquisition records. To examine the Service's habitat protection goals, we reviewed Service strategic planning documents for the Prairie Pothole Region. We visited the Service's Habitat and Population Evaluation Team offices in Minnesota and North Dakota to discuss how the Service developed spatial models to identify high-priority habitat. We also obtained the Service's breeding-duck density models and compared them with the location of recent Service acquisitions. To examine challenges the Service faces in achieving its habitat protection goals, we compared the Service's land acquisition rates with grassland conversion rates obtained from Agriculture. We also analyzed data on lands protected by Agriculture's Conservation Reserve Program. Using these sources, we developed a hypothetical model of the amount of time and money necessary for the Service to achieve its goals, as well as the amount of habitat that may be converted in future years. The projections are mathematical calculations that are based on certain assumptions. We cannot predict, however, the likelihood that any of these assumptions will continue into the future. We also developed another model to identify whether opportunities existed for the Service to use its resources more efficiently when acquiring grassland easements in South Dakota. In addition to the Service's easement acquisition data and habitat spatial models, in this second model we also used the Service's list of landowners willing to sell an easement to the Service and land prices associated with parcels in the Service's high-priority acquisition areas. We used this information to compare the grassland easements that the Service purchased in fiscal year 2006 in South Dakota with what it potentially could have purchased. In addition, we examined recent legislative and other proposals for providing additional resources to the Service for habitat protection in the Prairie Pothole Region. We assessed the reliability of the data provided by the Service by comparing these data with information published in the Service's annual lands report, reviewing fee and easement acquisition records, and observing easement violations and subsequent corrective actions required of landowners. On the basis of these and other steps, we determined that these data were sufficiently reliable for the purposes of this report. Appendixes I and II present a more

detailed description of our scope and methodology. Our work was conducted in accordance with generally accepted government auditing standards, including an assessment of internal controls, from September 2006 through August 2007.

Results in Brief

Since 1959, the Service has acquired and permanently protected about 3 million acres of wetland and grassland habitat in the Prairie Pothole Region under its Small Wetlands Acquisition Program, primarily through monies from the Migratory Bird Conservation Fund. Of the protected land, the Service has acquired about 6,200 tracts through fee-simple acquisitions covering almost 700,000 acres and over 28,000 perpetual easements covering more than 2.3 million acres of privately owned land. About 60 percent of the perpetual easements are wetland easements protecting more than 1.4 million acres of wetlands; the remaining 40 percent are grassland easements protecting about 900,000 acres of grasslands. To acquire habitat, the Service used fee simple for most of its Prairie Pothole Region acquisitions in the Service's region 3 and easements for most of its acquisitions in the Service's region 6. Over the past 48 years, the Service has acquired more than 95 percent of both the fee and easement tracts using monies from the Migratory Bird Conservation Fund. In the last 3 years, the Service has allocated, on average, \$16 million per year from this fund to Prairie Pothole acquisitions. Other funding sources include grants provided through the North American Wetlands Conservation Act (less than \$700,000 annually, on average) and the Land and Water Conservation Fund (less than \$200,000 annually over the last 2 years). Upon acquisition, the fee-simple acquisitions and the easements are managed by the Service's wetland management districts.

To sustain duck populations and to counter emerging threats, the Service aims to acquire as much existing high-priority migratory bird habitat in the Prairie Pothole Region as possible. To this end, its current acquisition goal is to permanently protect about 12 million additional wetland and grassland acres. The Service defines high-priority wetlands as temporary and seasonally flooded small wetlands, and others smaller than 1 acre, that are embedded in areas supporting more than 25 duck pairs per square mile. The Service defines high-priority grasslands as grasslands that are larger than 55 acres and accessible to more than 25 duck pairs per square mile. According to the Service, its habitat protection goals are to permanently protect an additional 1.4 million acres of high-priority wetlands and an additional 10.4 million acres of high-priority grasslands. On the basis of scientific models, the Service estimates that the 64-million-acre Prairie Pothole Region—both protected and unprotected lands—can

support an annual population of about 4.2 million breeding duck pairs. Approximately 1.1 million (27 percent) breeding pairs currently use wetland and grassland habitat protected by the Service. Reaching the Service's habitat acquisition goal of 12 million additional acres would enable the Service to permanently protect habitat capable of supporting an additional 1.5 million breeding duck pairs. (The Service does not consider wetlands and grasslands now providing habitat for the remaining 1.6 million duck pairs to be "at risk" because it believes these acres will not be converted to agricultural uses.) The recent development of the Service's sophisticated scientific models, which predict the density of duck pairs and the location of grasslands, were integral to developing these goals. According to Service biologists, these acreage targets must be met to sustain migratory bird populations and to ensure that enough habitat is maintained during wet years, when duck populations boom.

At the current pace of acquisitions, and assuming that the land would be available indefinitely, it could take the Service around 150 years and billions of dollars to acquire the 12 million acres of wetlands and grasslands it has identified as critical for sustaining migratory bird populations—on the basis of one hypothetical scenario we developed. The Service plans to continue to use both fee-simple and easement acquisitions toward achieving its goal. The land will not be available for acquisition indefinitely, however, and some emerging market forces that give landowners an incentive to convert grasslands to cropland suggest that substantial amounts of the Service's goal acreage may be converted to agricultural use in the future. For example, while Agriculture's Conservation Reserve Program now has 10 million grassland acres in the Prairie Pothole Region temporarily protected, contracts covering more than 2 million acres of high-priority habitat for the Service are due to expire by 2010. The longer that this acreage is temporarily protected under the Conservation Reserve Program, the longer the Service has to acquire permanent protection rights. If this grassland acreage is converted to agricultural use and the pace of conversion continues into the future, the Service might only have several decades in which to acquire its high-priority grasslands. If this scenario were to occur, over the next several decades the Service would acquire only about 3 million grassland acres—less than one-third of its grassland acreage goal. The Service's pace of acquisitions could be increased (1) *marginally*, if it used its existing funds more efficiently, or (2) *substantially*, if additional resources were provided toward this effort. For example, we found that since 2002, over 70 percent of the Service's grassland easement acquisitions in South Dakota has been in the highest-priority areas. On the basis of our efficiency modeling, however, the Service could have acquired an

additional 8,500 acres of high-priority habitat in South Dakota in fiscal year 2006—over and above the 16,169 acres it did acquire. Given the Service’s desire to spread funds throughout the region, and other factors, its land acquisitions cannot be expected to be 100 percent efficient in terms of the number of ducks protected per dollar expended. Nonetheless, our analysis showed that existing resources may be used more efficiently by targeting the lower-cost lands within high-priority habitat areas. Another way to increase the pace of acquisitions is to explore additional resource options, such as the following three options:

- *Increase the cost of the federal Duck Stamp.* The purchasing power of the revenue generated by the sale of the federal Duck Stamp, which has been fixed at \$15 per Duck Stamp since 1991, has been eroded by inflation and escalating land prices. H.R. 2735, introduced by the 110th Congress, would increase the price of the Duck Stamp to \$20 for hunting years 2008 through 2010 and to \$25 thereafter. Increasing the price of the Duck Stamp would generate new revenue; thus, it would not increase the federal deficit.
- *Reauthorize a new Wetlands Loan Act.* Since 1961, Congress has reauthorized the Wetlands Loan Act several times and appropriated \$200 million (\$870 million in 2007 dollars) to provide an advance of funds against future Duck Stamp sales. It has been nearly 20 years, however, since the last reauthorization. S. 272, introduced in the 110th Congress, would reauthorize a new wetlands loan in the amount of \$400 million as an advance against future Duck Stamp revenues. If the loan were repaid by future Duck Stamp revenues, this alternative would have little net effect on the federal deficit.
- *Provide additional resources from the Land and Water Conservation Fund.* This fund—which receives about \$900 million annually from a variety of sources, including oil and gas leases on the Outer Continental Shelf—is used only minimally in the Prairie Pothole Region. Over the last 2 years, the region has received less than \$200,000 annually from the fund, and since 1988, it has received about \$2.6 million. Through 2006, however, the fund had a balance of nearly \$15 billion. If any of the fund balance were to be spent without corresponding offsets, the federal deficit would increase.

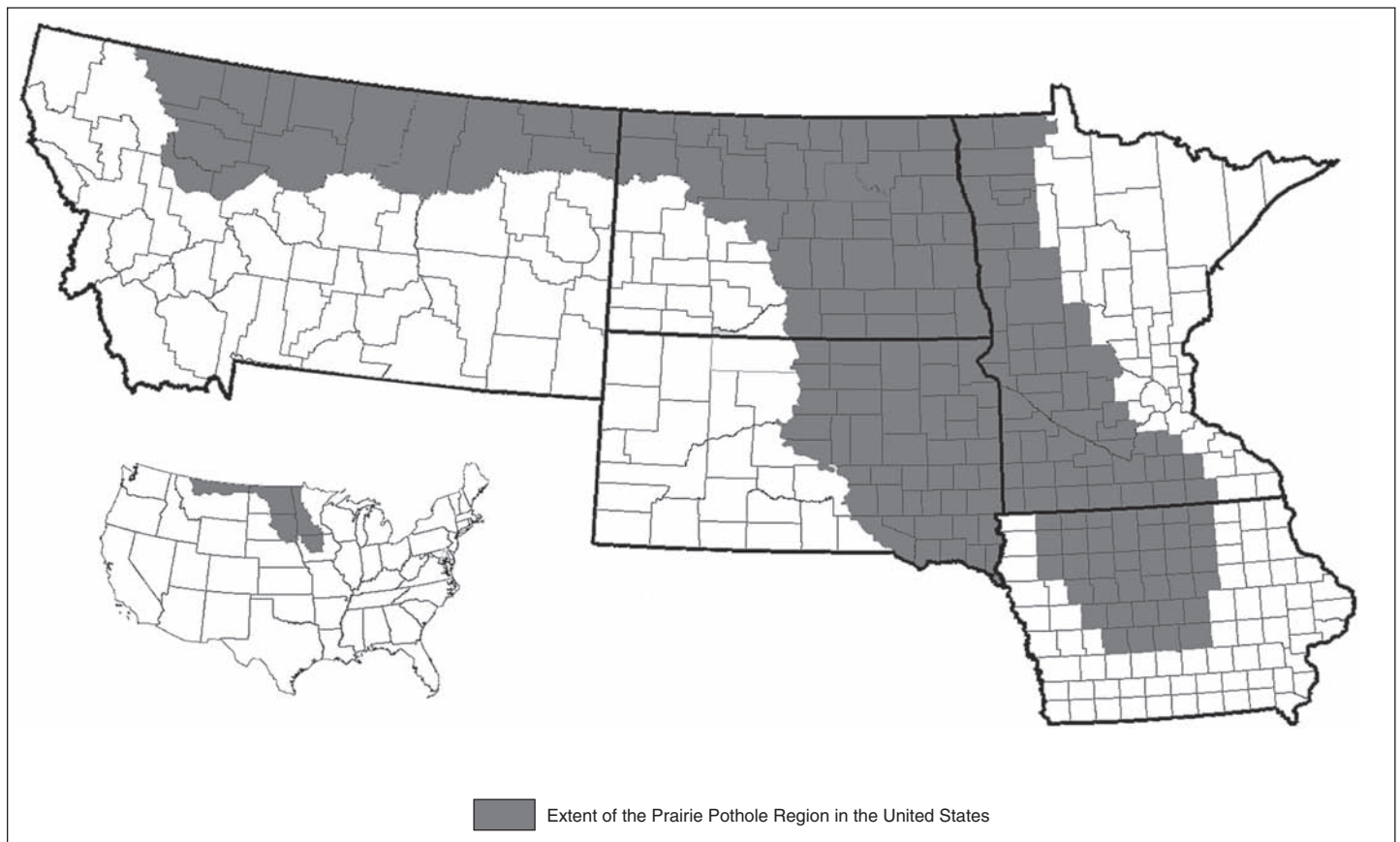
Each of these possible resource options would require congressional action. Also, these options are not mutually exclusive, and they could be used together in any combination. Moreover, these are just three of the resource options that could be considered; our intent was not to develop a comprehensive list of all such options.

To help ensure that the Service acquires as much of its high-priority habitat as possible with its available funds, we are recommending that the Secretary of the Interior direct the Director of the U.S. Fish and Wildlife Service to fully integrate the Service's recently developed scientific models with consideration of land prices, with the goal of maximizing the acquisition of the least expensive high-priority habitat when deciding which lands to acquire in the Prairie Pothole Region, while balancing that goal with the continued need to acquire high-priority habitat throughout the region. Determining the appropriate level of overall resources that should be devoted to acquiring migratory bird habitat in the Prairie Pothole Region is a policy decision that rests with Congress and the President. The two legislative proposals that have been introduced in the 110th Congress would provide the Service with hundreds of millions of additional resources for land acquisitions in the region. However, several billion dollars will likely be needed for the Service to achieve its goal. We present the information in this report to Congress as it deliberates whether and to what extent additional resources should be provided to the Service to acquire high-priority habitat in the Prairie Pothole Region. We suggest that Congress consider this information as it debates H.R. 2735, regarding whether and to what extent to increase the price of the Duck Stamp; S. 272, regarding whether and to what extent to reauthorize a wetlands acquisition loan; and whether and to what extent additional funds may need to be provided to the Service from the Land and Water Conservation Fund. Although we requested comments from the Department of the Interior on our findings and recommendations, none were provided in time for them to be included as part of this report.

Background

Created by retreating glaciers about 12,000 years ago, the Prairie Pothole Region encompasses about 25 million wetland depressions of varying sizes across a 300,000-square-mile area, one-third of which covers parts of Iowa, Minnesota, Montana, North Dakota, and South Dakota (see fig. 1), with the rest covering three Canadian provinces. These potholes once were set in an expansive sweep of native prairie—shortgrass, mixed grass, and tallgrass.

Figure 1: U.S. Portion of the Prairie Pothole Region



Source: Prairie Pothole Joint Venture.

According to the Service, with an average of 83 wetlands per square mile, the Prairie Pothole Region contains the highest wetland density of any region in North America (see fig. 2). Of the over 800 migratory bird species in North America, more than 300 species rely on these wetlands—177 species for breeding and nesting habitat and another 130 species for feeding and resting during spring and fall migrations. This region is the

most productive breeding habitat for ducks (more than one-half of the continent's ducks breed in the region) and many other birds.

Figure 2: Prairie Potholes in Burke County, North Dakota (May 1999)

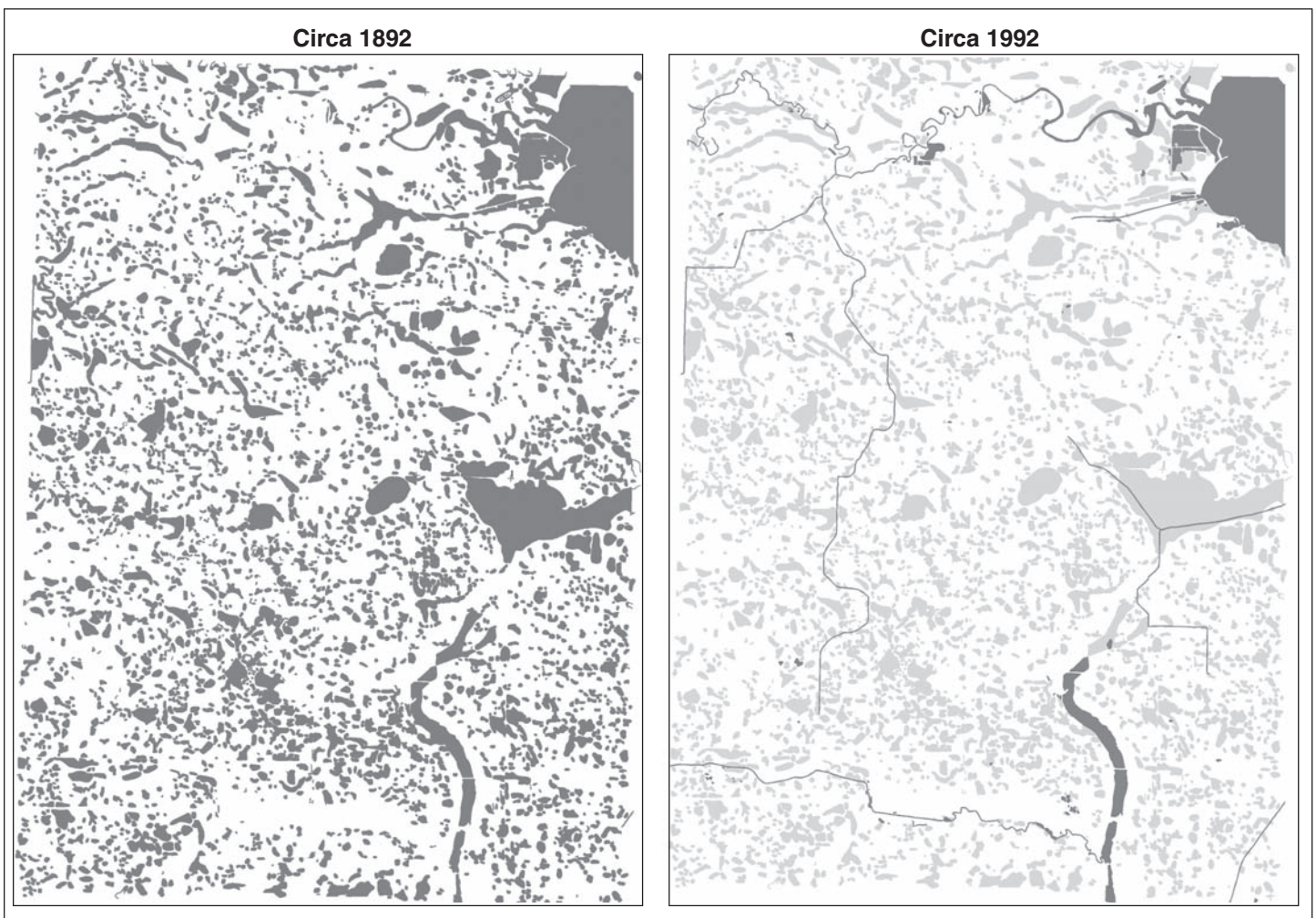


Source: Jim Ringelman, Ducks Unlimited.

Over the last century, most of the region has been converted to intensively cultivated cropland and heavily grazed or hayed grasslands. Today, farmers and ranchers produce an abundance of wheat, barley, hay, corn, soybeans, and cattle, which feed people in this nation and abroad. Consequently, many wetlands have been drained and native prairie grasses have been either plowed or extensively used. This loss of habitat has had dangerous repercussions for migratory birds—grassland birds, for example, have suffered steeper and more widespread declines over the

past 25 years than any other North American bird group, according to Service documents. Figure 3 shows the extent to which historical wetlands were drained in Jackson County, Minnesota, as agricultural production increased in the 1800s and 1900s.

Figure 3: Wetland Drainage in 50 Square Miles of Jackson County, Minnesota (1892 to 1992)



Source: U.S. Fish and Wildlife Service's Habitat and Population Evaluation Team.

Left: Wetland basins in 50-square-mile area of Jackson County, Minnesota, circa 1892.

Right: Wetland basins drained for agricultural and other purposes in the same 50-square-mile area of Jackson County, Minnesota, circa 1992.

The Service plays a key role in slowing and reversing the trend of habitat loss by protecting and restoring wetland and grassland habitat throughout the region. In 1987, after nearly 30 years of acquiring migratory bird habitat, largely on the basis of observing the migrations and breeding grounds of ducks, the Service formed the Habitat and Population Evaluation Team to provide biological and technical assistance by helping to identify where to devote habitat protection resources to maximize migratory bird benefits. On the basis of its biological research, the Habitat and Population Evaluation Team recently developed scientific models to identify high-priority grasslands and wetlands—those capable of supporting 25 or more breeding duck pairs per square mile—in the Prairie Pothole Region. These models use 20 years of annual waterfowl population surveys and habitat condition assessments to predict the distribution and abundance of breeding duck pairs. By overlaying spatial models with land cover data of grasslands and wetlands, the Service has determined which wetlands and grasslands have the highest potential—if protected—to sustain duck populations over the long term.

On the basis of these scientific models, Service biologists within wetland management district offices determine whether there are landowners with property in the high-priority zones who have expressed interest in having their property eased. Since the Service acquires easements only from willing sellers, landowners typically approach the Service to express interest in selling an easement, according to Service realty specialists. If the property appears to be within the high-priority zones, a Service biologist performs an on-site biological evaluation to verify that it is capable of supporting the desired number of breeding duck pairs, as identified by the scientific models. When funding becomes available, the realty specialists state that they begin acquiring easements from the list of willing sellers, generally starting from properties in the highest-priority zones. If the wetland acquisition office still has funding and there are no longer any landowners in the highest-priority acquisition areas that have expressed interest in having their property eased, the realty specialists state that they would acquire properties in lower-priority areas, since monies from the Migratory Bird Conservation Fund have to be spent by the end of the fiscal year.

After biological evaluations are performed, realty specialists undertake property inspections, title searches, and payment determinations. Prior to fiscal year 2004, when acquiring easements, Service realty specialists appraised a parcel of land, and, on the basis of the appraisal, they would pay a percentage (typically, 50 to 90 percent) to reflect that only some property rights were being attained by the Service. Beginning in fiscal year

2004, to save the costs associated with performing an appraisal, the Service developed an adjusted assessed land value formula. This formula uses county-assessed land values for a particular piece of property and applies a multiplier to reflect recent land sales in the vicinity. Service realty specialists then pay a percentage of the adjusted assessed land value. Once payments are made, both fee and easement properties, known as waterfowl production areas, are managed by the local wetland management district (there are more than 20 wetland management districts in the Prairie Pothole Region) and are part of the National Wildlife Refuge System. For easement acquisitions, officials with nearby wetland management districts have responsibility for enforcing the terms of the easement, which typically involve aerial surveillance twice each year to identify possible violations.

The Service's conservation efforts in the Prairie Pothole Region also reflect the agency's participation in international management plans, including the North American Waterfowl Management Plan. First signed in 1986, this management plan is a shared conservation strategy developed among the United States, Canada, and Mexico to restore migratory waterfowl populations of continental North America. This plan identified the Prairie Pothole Region as critical to the long-term viability of waterfowl habitat in North America and, in 1987, established the Prairie Pothole Joint Venture to protect this habitat. Spanning the entire region, this joint venture constitutes an informal partnership of landowners; private conservation organizations; federal, state, and local government agencies; land trusts; public utilities; hunting groups; academia; and businesses. The Service plays a major role in the joint venture by providing leadership for its activities and funding for scientific research and land acquisitions.

The Service's land acquisitions in the Prairie Pothole Region have been funded using Migratory Bird Conservation Funds, grants through the North American Wetlands Conservation Act, and Land and Water Conservation Funds. The Migratory Bird Conservation Fund has received about \$44 million annually in recent years, \$24 million of which has come through receipts from the sale of federal Duck Stamps, all of which is generally spent in the year it is made available. Monies from this fund are allocated throughout the National Wildlife Refuge System at the discretion of the Director of the U.S. Fish and Wildlife Service. In 1961, the Wetlands Loan Act required that the use of Migratory Bird Conservation Funds for

land acquisitions have the approval of the governor of the state or an appropriate agency of the state in which the land is located.¹⁰ The North American Wetlands Conservation Act, which provides matching grants to carry out wetlands conservation projects in the United States, Canada, and Mexico, was passed to support the activities of the North American Waterfowl Management Plan.¹¹ Grant programs help deliver funding to on-the-ground projects for the protection, restoration, or enhancement of an array of wetland habitats. Funding for these grants is authorized at about \$75 million for fiscal year 2007. Finally, monies from the Land and Water Conservation Fund have been used in the Prairie Pothole Region since 1988. This fund was created in the Treasury as a funding source to assist in preserving and developing outdoor recreation resources. It is funded with revenues from a variety of sources, including oil and gas leases on the Outer Continental Shelf. These revenue sources total about \$900 million annually. During the past decade, revenues from the Outer Continental Shelf oil and gas leases have accounted for almost 100 percent of the deposits. Since the fund's inception in 1965, it has accumulated about \$29 billion through fiscal year 2006. About one-half of that amount—\$14.3 billion—has been appropriated, leaving a balance of nearly \$15 billion.

¹⁰Pub. L. No. 87-383, § 3, 75 Stat. 813 (1961).

¹¹The North American Wetlands Conservation Act (16 U.S.C. § 4401, et seq.) was enacted to protect, enhance, restore, and manage an appropriate distribution and diversity of wetland ecosystems and habitats associated with wetland ecosystems and other fish and wildlife in North America and to sustain an abundance of waterfowl and other wetland associated migratory birds, consistent with the goals of the North American Waterfowl Management Plan. Under this program, each federal dollar expended is matched by at least \$1 (and as much as \$4) from private, state, or local sources. Across the Prairie Pothole Region, on average, \$2.6 nonfederal dollars are raised for every \$1 of federal money from this funding source, according to a report by the Prairie Pothole Joint Venture.

The Service Has Acquired and Permanently Protected about 3 Million Acres of Migratory Bird Habitat in the Prairie Pothole Region Since 1959

Since 1959, the Service has acquired and permanently protected about 3 million acres of wetland and grassland habitat in the Prairie Pothole Region. The majority of this acreage, about 80 percent, is protected through perpetual easements placed on private lands. In areas of the region that require additional efforts to restore lands to a condition capable of supporting migratory birds, the Service uses fee-simple acquisitions instead of easements. In acquiring land for migratory bird habitat, the Service uses monies primarily from the Migratory Bird Conservation Fund—expending about \$325 million since 1959—although other sources of funds contribute, particularly in areas where state law limits the use of the Migratory Bird Conservation Fund. Upon acquisition, the fee-simple acquisitions and the easements are managed by the Service’s wetland management districts. We reported in November 1991 that the Service enforced the terms of Prairie Pothole Region conservation easements effectively by keeping accurate and current documentation on eased lands and performing annual aerial surveillance of the wetlands under easement, followed by on-the-ground inspection of suspected violations.¹² Our assessment of the Service’s enforcement policies and procedures at the three offices we visited for this review showed that the Service continues to provide an appropriate level of easement monitoring and enforcement.

Approximately 3 Million Acres Have Been Protected to Date

Under the Small Wetlands Acquisition Program, the Service has acquired and permanently protected about 3 million acres of wetland and grassland habitat in the Prairie Pothole Region. In protecting this habitat, over the past 48 years the Service has acquired approximately:

- 6,199 fee-simple parcels, covering almost 700,000 acres;
- 2,756 grassland easements, covering slightly more than 900,000 acres; and
- 25,582 wetland easements, covering about 1.4 million acres.

To acquire and protect habitat, the Service’s region 6 acquires most land using wetland and grassland easements, whereas the Service’s region 3 acquires most land using fee-simple acquisitions. In the Service’s region 6,

¹²GAO, *Wetlands Preservation: Easements Are Protecting Prairie Potholes, but Some Improvements Are Possible*, [GAO/RCED-92-27](#) (Washington, D.C.: Nov. 7, 1991).

easements provide a cost-effective method of protecting habitat while keeping land in private ownership. According to Service officials in this region, outreach to private landowners is essential for habitat protection because over 70 percent of habitat in the region is privately owned. Farmers in this area grow crops on land that may have 100 wetlands per square mile. If such wetlands were drained, farmers could more easily work the fields with large equipment, and additional land would become available for planting. Minimally restrictive wetland easements protect wetlands while allowing private landowners to retain ownership of their land and to continue farming. In exchange for a one-time, lump-sum payment, landowners agree not to drain, fill, or level wetlands on their property. Because the Service does not acquire all of the land-use rights associated with a property, easements are less expensive than fee-simple acquisitions. For example, in region 6, the Service typically pays between 25 and 90 percent of a property's estimated market value to place grassland or wetland easements, thus enabling the Service to protect more acreage than if it were to acquire these lands in fee simple, which would require it to pay market value. In recent years, the Service has used easements to acquire nearly 98 percent of its protected acreage in region 6.

In contrast, the Service's region 3 relies more heavily on fee-simple acquisitions—about two-thirds of the 30,000 acres acquired since fiscal year 2000 has been through fee-simple. Although more costly than easements, to undertake restoration actions and ensure permanent protection of the land, the Service emphasizes fee-simple acquisitions. Service biologists and realty officials told us that because most of the land in region 3 has been converted to cropland or other uses, the Service often needs to acquire all of the land-use rights to be able to restore the land so it can support migratory birds. Specifically, for wetlands, the Service must often “plug” drainage ditches leading away from historical wetland basins. These “plugs” typically cost about \$500 each. For grasslands, the Service must kill plants currently growing, such as crops or invasive species, and replace them with a mix of native grasses. Such efforts can easily cost up to \$100 per acre, according to a Service biologist. Table 1 shows the amount of wetland and grassland acreage acquired using fee-simple and easement acquisitions in Service region 3 and region 6 since the Small Wetlands Acquisition Program began.

Table 1: Land Acquisitions in the Prairie Pothole Region under the Small Wetlands Acquisition Program (Fiscal Years 1959-2006)

Service region and state	Easement acquisitions		Fee-simple acquisitions (acres) ^a	Total acres
	Grasslands (acres)	Wetlands (acres)		
Region 3				
Iowa	6	632	22,531	23,169
Minnesota	10,812	62,968	189,417	263,198
Subtotal	10,817	63,600	211,948	286,366
Region 6				
Montana	44,334	25,328	31,197	100,859
North Dakota	207,285	845,651	246,447	1,299,382
South Dakota	643,660	511,919	158,194	1,313,773
Subtotal	895,279	1,382,898	435,837	2,714,013
Total	906,096	1,446,498	647,786	3,000,380

Source: GAO analysis of U.S. Fish and Wildlife Service data.

Note: Some numbers do not add up because of rounding.

^aFor fee-simple acquisitions, Service data do not distinguish between grassland and wetland acquisitions.

Funding Has Come Primarily from the Migratory Bird Conservation Fund, Although Other Sources Contribute

Funding for Prairie Pothole Region land acquisitions under the Service’s Small Wetlands Acquisition Program has come primarily from the Migratory Bird Conservation Fund. Since the acquisition program began in 1959, the Service has spent nearly \$340 million (unadjusted dollars) to acquire land in the region—over 95 percent of which, or about \$325 million, has come from the Migratory Bird Conservation Fund. Of this amount, the Service has spent about \$130 million in region 3 and about \$209 million in region 6. The distribution of these funds within the Prairie Pothole Region has changed significantly over time, however, because of actions taken by North Dakota. From 1959 through 1977, North Dakota received the lion’s share of the Service’s Migratory Bird Conservation Fund expenditures in the Prairie Pothole Region—the Service spent \$35.5 million in the state (53 percent), compared with \$66.5 million for the entire region—primarily because wetlands in the state are capable of supporting a large number of breeding duck pairs. Because of a dispute with the Service in 1977, however, North Dakota enacted legislation temporarily prohibiting the governor from allowing the Service to acquire

any land or interests in land for migratory bird purposes.¹³ The state also passed a law limiting the duration of any future easements for waterfowl production areas acquired by the federal government to 50 years, and limiting the duration of most other easements to 99 years.¹⁴ As a result, the Service's use of Migratory Bird Conservation Fund monies fell, and from 1978 through 2006, the Service spent only \$20 million of the \$260 million expended in the Prairie Pothole Region in North Dakota.¹⁵

The Service has also used other sources of funding for land acquisition in the Prairie Pothole Region under the Small Wetlands Acquisition Program: the North American Wetlands Conservation Act grants and monies from the Land and Water Conservation Fund. From the passage of the North American Wetlands Conservation Act in 1989 through fiscal year 2006, the Service has expended slightly more than \$10 million in the Prairie Pothole Region using grants from this source. Of this amount, nearly \$7 million has been spent in North Dakota to acquire grassland easements on 95,000 acres. According to a Service official, monies from this source have been focused on land acquisitions in North Dakota, in part, to make up for the limitations on using Migratory Bird Conservation Funds in the state. Furthermore, the Service has spent about \$2.6 million to acquire 70 properties, covering about 13,000 acres, in the Prairie Pothole Region using Land and Water Conservation Funds since 1988, when monies were first appropriated from this fund to the region. According to Service realty officials, the Service has not acquired many properties using monies from this fund, in part because of the competitiveness of the annual appropriation process. Since 1992, for example, the Service has acquired only 11 properties, totaling about 7,000 acres, using monies from the Land and Water Conservation Fund.

¹³N.D. Cent. Code § 20.1-02-18.3. The prohibition expired in 1985, but North Dakota governors have not approved land acquisitions since 1985.

¹⁴N.D. Cent. Code § 47-05-02.1.

¹⁵Under the terms of the 1961 Wetlands Loan Act, the Service's use of Migratory Bird Conservation Funds for land acquisitions requires the consent of the governor of the state or an appropriate agency of the state in which the land is located. Previous governors had authorized the Service to acquire up to 1.2 million wetland acres. In 1983, the U.S. Supreme Court decided that the North Dakota legislature could not revoke previous governors' consent decisions (*North Dakota v. United States*, 460 U.S. 300 (1983)). As a result, the Service was able to use monies from the Migratory Bird Conservation Fund to acquire some acreage that had been approved by previous North Dakota governors. As of November 2006, the Service had acquired about 850,000 acres of the 1.2 million acres authorized prior to 1977.

In addition to these funding sources, the Service has partnered with Ducks Unlimited in North Dakota to protect migratory bird habitat by accepting funding for easements.¹⁶ According to Ducks Unlimited, they have provided funding for the Service to purchase about 72,000 acres of easements from landowners in North Dakota. Once easements are purchased using Ducks Unlimited's funds, the Service takes ownership of the easements. Because North Dakota law generally limits maximum easement terms to 99 years, Ducks Unlimited cannot acquire perpetual easements. Service officials, relying on a 1991 Interior Regional Solicitor's Opinion, however, said that the Service is not bound by state law regarding easement terms, even if state law prevents the Service from purchasing easements using Migratory Bird Conservation Fund monies. Therefore, according to a Service official, when the Service receives a monetary donation from Ducks Unlimited to purchase easements, the eased land is protected in perpetuity. Ducks Unlimited has also donated funds for the Service to acquire about 6,400 acres in South Dakota, but it has not donated funds for any easements to the Service in region 3.

While the Service has sought a variety of funding sources to help it acquire habitat in the Prairie Pothole Region, land prices in the region have increased dramatically since the Small Wetlands Acquisition Program began. Total annual funding, however, has generally not kept pace, thus decreasing the purchasing power of the Service's habitat acquisition resources. For example, in 1966, the Service acquired easements that cost, on average, about \$13 per acre in region 6 and about \$22 per acre in region 3. The Service's fee acquisitions in 1966 averaged about \$55 an acre in region 6 and just under \$100 per acre in region 3. By comparison, in 2006, easement acquisitions averaged about \$283 per acre and nearly \$1,100 per acre in region 6 and region 3, respectively, and fee-simple acquisitions averaged more than \$685 per acre and \$3,100 per acre in region 6 and region 3, respectively. Combined average dollar-per-acre prices for both easements and fee-simple acquisitions in the Prairie Pothole Region have increased more than 2,000 percent over the last 40 years. During this period, funding for the Small Wetlands Acquisition Program in the region increased about 410 percent.

Acquired Lands Have Been Managed Effectively

The Service has effectively managed the lands it has acquired in the Prairie Pothole Region under the Small Wetlands Acquisition Program. Upon acquisition, the Service's wetland management districts manage the fee-

¹⁶Ducks Unlimited is a wetland and waterfowl conservation organization.

simple and easement tracts and enforce easement terms. In November 1991, we reported that the Service had been successful in helping to preserve wetlands in the Prairie Pothole Region, primarily because of effective easement enforcement.¹⁷ We found that the Service keeps documentation on the wetlands and grasslands to be protected and has performed annual aerial surveillance of the wetlands and grasslands under easements, followed by on-the-ground inspections of suspected violations. In our review of the Service's current enforcement policies and procedures in the three offices we visited, we found that the Service's ongoing monitoring and enforcement efforts continue to provide reasonable assurance that landowners are complying with the terms of their wetland and grassland easements. For example, according to the Service's refuge annual performance plan, in fiscal year 2005 the Service inspected over 31,000 conservation easements in region 3 and region 6 and detected about 900 violations (a 97 percent compliance rate).¹⁸ Of the easement violations, the Service resolved about 460 violations by working with the landowners to correct the problems and brought another 4 easement violations into compliance through legal actions.¹⁹ Service officials told us that it is a continual process to work with landowners to achieve resolution for all easement violations. In region 6, National Wildlife Refuge officials told us that since program inception, they have had fewer than 20 cases brought to court challenging the Small Wetlands Acquisition Program's easement provisions, and the Service has never lost a case. To help ensure consistent easement administration throughout the Prairie Pothole Region, region 3 and region 6 consolidated their easement guidance in 2005.²⁰

¹⁷[GAO/RCED-92-27](#).

¹⁸These 31,000 easements include Service easements in the Prairie Pothole Region that are not part of the Small Wetlands Acquisition Program as well easements outside of the Prairie Pothole Region. The Service's 28,339 Small Wetlands Acquisition Program grassland and wetland easements, however, constitute the vast majority of conservation easements (over 95 percent) in the Service's region 3 and region 6.

¹⁹The 430 remaining possible violations were resolved the following year, according to Refuge officials.

²⁰Department of the Interior, *Fish and Wildlife Service Great Lakes Region (3) and Mountain-Prairie Region (6) Administrative and Enforcement Procedures for FWS Easements (Wetland, Grassland, Habitat, Tallgrass, and FmHA) within the Prairie Pothole States* (Twin Cities, MN, and Denver, CO: Oct. 1, 2005).

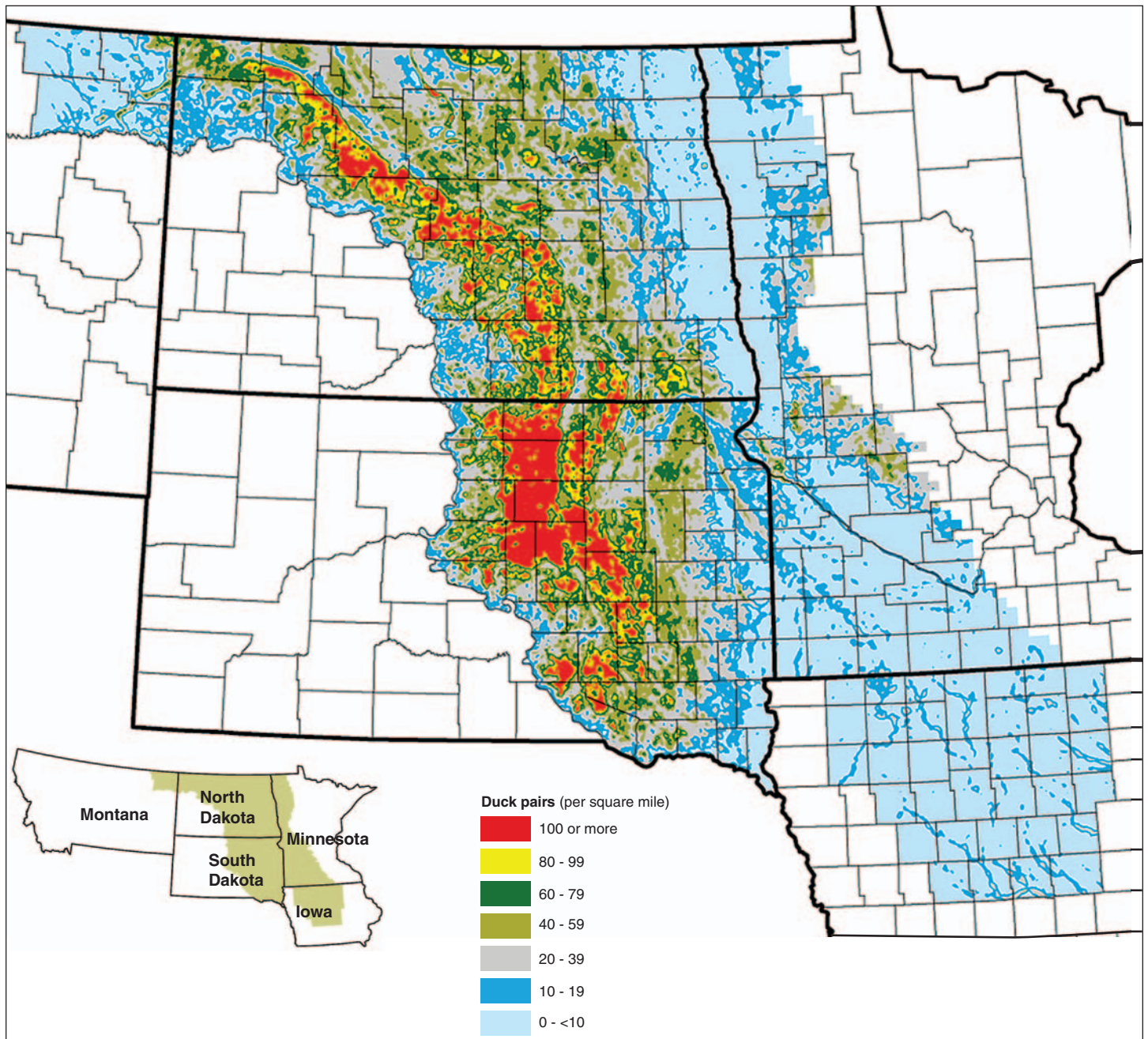
The Service Aims to Permanently Protect as Much as Possible of the 12 Million Acres It Has Identified as High-Priority Habitat

To sustain current migratory bird populations over the long term, the Service aims to protect as much as possible of the 12 million acres of high-priority habitat it has identified in the region. According to Service biologists, wetlands and grasslands are the two major components to habitat protection that influence migratory bird populations. Wetlands attract breeding ducks and provide habitat for ducklings, whereas grasslands provide nesting “cover” required for nesting success and hen survival.

Over the past 20 years, the Service has compiled data that have recently enabled its biologists to develop scientific models—using spatial data and geographic information systems technology—that identify wetlands and grasslands capable of providing habitat for a large number of migratory birds. Established in 1987, the Service’s Habitat and Population Evaluation Team coordinates the annual waterfowl breeding population and production survey. This survey provides a means of assessing contributions of waterfowl production areas in the Prairie Pothole Region to continental waterfowl populations. It is conducted by Service or state department of natural resource personnel on hundreds of 4-square-mile sample plots in the 5 Prairie Pothole states. In each 4-square-mile plot, waterfowl and other wetland birds are counted on selected wetlands, allowing Service biologists to estimate annual waterfowl abundance. Over the last 20 years, in fact, Service employees have conducted over 30,000 visits to wetlands and observed more than 260,000 breeding duck pairs.

Through analyzing 4-square-mile survey data over time, the Service developed “breeding pair accessibility maps” that display predictions of the number of duck pairs that could potentially nest in the grassland portions of every 40-acre block of the Prairie Pothole Region. These predictions take into account the location and density of wetlands, along with the maximum travel distances of hens from wetlands to their nest sites. Because nesting success is based on the proportion of grasslands within a 2-mile radius of wetlands, the breeding pair accessibility maps allow the Service to identify priority sites for the protection or restoration of grassland habitats, along with the proximity to wetlands, which have the highest potential for ducks’ nesting success. Figure 4 shows the Service’s prediction of the distribution and abundance of breeding duck pairs on the basis of historical 4-square-mile survey data and the accessibility to wetland and grassland cover.

Figure 4: Predicted Duck Pair Densities in the Prairie Pothole Region (Excluding Most of Montana)



Source: U.S. Fish and Wildlife Service.

The Service's 4-square-mile survey data show that the wetlands in the Prairie Pothole Region can support an annual population of about 4.2 million breeding duck pairs.²¹ To sustain this bird population in the future, the Service has determined that it needs to protect approximately 12 million acres of additional high-priority habitat in the region—an additional 1.4 million acres of high-priority wetlands and an additional 10.4 million acres of high-priority grasslands.²² The Service defines high-priority wetlands as temporary and seasonally flooded wetlands, and other wetlands less than 1 acre in size, that are embedded in cropland in areas that support over 25 duck pairs per square mile. The Service defines high-priority grasslands as those grasslands that are greater than 55 acres and accessible to over 25 duck pairs per square mile. Service biologists told us that the small, shallow wetlands embedded within croplands are most at risk of being drained. They also stated that 55 acres is generally the minimum size the Service would consider for a grassland easement because grassland migratory birds require larger tracts of intact grasslands for nesting cover.

Of the approximately 4.2 million breeding duck pairs in the region, approximately 1.1 million ducks (27 percent) currently use wetlands protected by the Service. Achieving the Service's habitat protection goal for wetlands would enable it to permanently protect habitat capable of supporting an additional 1.5 million breeding duck pairs. The Service considers the remaining wetlands that currently provide habitat capable of supporting 1.6 million duck pairs to be at lower risk of loss to agricultural uses. Achieving the habitat protection goal for grasslands supports the wetland goal because grasslands are needed to provide adequate nesting cover. In fact, Service biologists estimate that a 10 percent decline in the high-priority grassland acreage would result in an annual reduction of 250,000 ducks in the fall migration. In addition, according to Service biologists, because duck populations are cyclical, reaching these goals would enable the Service to protect enough habitat to accommodate increased populations during future boom cycles.

In addition to habitat protection goals, the Service also aims to restore some wetlands and grasslands in the Prairie Pothole Region. The Service's

²¹This estimate is for mallards, pintails, blue-winged teals, gadwalls, and shovelers.

²²Of this acreage, the Service's goals are to acquire 200,000 acres of wetlands and 400,000 acres of grasslands in fee, and 1.2 million acres of wetlands and 10.2 million acres of grasslands using easements.

restoration goals are over and above its 12-million-acre habitat protection goal. The purpose of restoring wetlands and grasslands is to offset some of the long-term habitat losses that have occurred in the region, even as the Service strives to protect existing habitat through fee-simple and easement acquisitions. A Service official stated that restoration work is generally less time-critical because the habitat has already been degraded, and, theoretically, it could be restored to some productive habitat level at any time, assuming the habitat has not been irreparably harmed. In contrast, the Service's habitat protection work is time-critical because the Service is trying to protect this acreage before it is converted to other uses. Habitat protection is more cost-effective than habitat restoration because of the extra expense associated with restoring the habitat after it has been degraded.

The Service aims to restore an additional 682,000 wetland acres and an additional 393,000 grassland acres. The Service estimates that the wetland acres target will provide habitat capable of supporting an additional 492,000 duck pairs. The Service developed its restoration goals in collaboration with conservation and land-use agencies in the region. The Service's restoration goals in the region will also contribute to meeting the restoration goals of some of its partners. For instance, Minnesota recently released a long-range duck plan with a goal to restore and protect 600,000 acres of wetlands and 1.4 million acres of grasslands. Service officials state that they are working in conjunction with their partners in Minnesota to help attain the state's goal as well as the Service's overall restoration goals. Service biologists and realty officials acknowledge that restoration can be costly, and they said that they will reevaluate their restoration goals periodically and make changes as appropriate.

At the Current Pace of Acquisitions, the Service Is Unlikely to Achieve Its Habitat Protection Goals; but Options Exist to Increase the Pace of Acquisitions

At the current pace of acquisitions, it could take the Service around 150 years and billions of dollars to acquire the 12 million acres of wetlands and grasslands that it has identified as necessary for sustaining migratory bird populations. Because of emerging market forces and projected habitat loss rates in the region, however, the Service may realistically have about 50 years to acquire wetlands and grasslands, on the basis of one hypothetical scenario we developed. If acquisition levels remain constant and habitat loss projections hold true, during the next 5 decades, the Service would acquire only about one-third of the grassland goal before the remaining acreage is converted to cropland. However, options exist that could increase the pace of acquisitions. Specifically, the pace of acquisitions could be increased (1) *marginally*, if the Service used its

existing funds more efficiently, or (2) *substantially*, if additional resources were provided.

At Current Pace, Acquisitions May Take Around 150 Years, but the Service May Have Less Than 50 Years Because of Possible Habitat Loss

Since fiscal year 2004,²³ the Service has acquired, on average, 79,000 wetland and grassland acres per year through easements and fee-simple acquisitions, spending about \$17 million each year.²⁴ If this pace continues in the future, it would take the Service around 150 years and \$2.6 billion (2007 dollars) to acquire its goal acreage if none of this land were converted to other uses.²⁵ Emerging market forces, however, are creating a scenario in which the Service may have less time in which to acquire its goal acreage. For example, Agriculture's Economic Research Service reported in 2006 that rising demand and prices for corn and other commodities used to produce ethanol and other renewable fuels increasingly entice landowners who do not produce crops to convert their land to cropland. Furthermore, in March 2007, the Congressional Research Service reported that corn prices—the prices received by producers—increased from \$2.50 per bushel in September 2006 to \$4.16 per bushel in January 2007, primarily because of growing demand for ethanol, a corn-based renewable fuel. This demand contributed to an increase in 2007 crop acreage, and the demand is expected to continue. In June 2007, Agriculture reported that corn growers planted 92.9 million acres of corn in 2007, a 19 percent increase over 2006 and the highest acreage since 1944. Furthermore, in February 2007, Agriculture forecasted that ethanol production is expected to expand sharply through 2009 and 2010 in response to strong profit incentives. In addition, hardier seed varieties, such as drought-tolerant corn and herbicide-resistant soybeans, as well as new farming techniques, such as no-till cultivation, allow many landowners to convert grasslands to cropland. These technological developments make it easier to produce crops in areas that historically were considered marginally suitable or generally unsuitable for crop production. Figure 5 shows recent conversion of native grasslands to

²³Beginning in fiscal year 2004, the Service changed its formula for calculating wetland and grassland easement payments.

²⁴The 79,000 acre annual average includes average donations of nearly 27,000 acres per year.

²⁵This dollar and acreage estimate is one of many potential scenarios that may occur in the future. It is a hypothetical scenario that is based on mathematical calculations, including assumptions that habitat acquisition will continue at recent levels and funding for habitat acquisition will keep pace with increases in land prices. We cannot forecast the likelihood that any of these assumptions will continue into the future.

cropland in Sanborn County, South Dakota—acreage that is part of the Service’s targeted acreage for habitat protection.

Figure 5: Conversion of Native Grasslands to Cropland in a High-Priority Habitat Area of Sanborn County, South Dakota (circa 2007)



Source: U.S. Fish and Wildlife Service.

These emerging market forces, in combination with the provisions of Agriculture’s Conservation Reserve Program, could result in higher habitat loss rates. According to Agriculture, whereas more than 50,000 acres of grasslands were converted to cropland in the Service’s high-priority acquisition area in 2006, this figure may increase to more than 135,000 acres per year. This program provides annual rental payments to landowners who take cropland out of production, typically resulting in return of the land to grasslands. According to Agriculture, in recent years—primarily due to the demand for ethanol—rental payments for crop

production have increased in some areas to be substantially more than rental payments under the Conservation Reserve Program, thereby giving landowners a substantial incentive to let contracts expire and convert to agricultural uses. In 2007, contracts on nearly 1.8 million acres of grasslands are due to expire, and, by 2010, an additional 1.7 million acres are set to expire (see table 2). Of these 3.5 million acres, nearly 60 percent (2 million acres) is high-priority goal acreage for the Service. Moreover, according to the Congressional Research Service, about 17 percent of the acreage protected under the Conservation Reserve Program will not be reenrolled or otherwise extended.²⁶ If this reenrollment level holds true for the Prairie Pothole Region, more than 135,000 goal acres could be lost to agricultural production each year, on average, through 2010.

Table 2: Expiration Dates for Conservation Reserve Program Contracts in the Prairie Pothole Region

Years	Grasslands covered by expiring contracts (acres)
2007 – 2010	3,485,070.9
2011 – 2015	3,878,594.5
2016 – 2020	1,790,369.7
2021 – 2025	439,647.6
Total	9,593,682.7

Source: GAO analysis of Department of Agriculture data.

Note: Some current Conservation Reserve Program acreage is subject to easements that are in effect for up to 30 years.

If these factors increase the level of grassland habitat loss, according to the scenario we developed, the Service would have about 50 years to acquire high-priority grassland habitat, at which point only about 3 million acres—or less than one-third of its goal grassland acreage—would be

²⁶ According to the Congressional Research Service, for example, in the Conservation Reserve Program, 23.2 million acres of the 27.8 million acres currently enrolled nationwide can be reenrolled or otherwise extended, thus giving a reenrollment rate of 83.5 percent.

protected, while the remainder would be converted.²⁷ The main factor controlling the time frame the Service has to acquire its high-priority goal acreage is the provisions of the Conservation Reserve Program. The longer that this acreage is temporarily protected in the program, the longer the Service has to try to permanently protect that acreage. Matching data from the Service and Agriculture, it appears that nearly 5 million acres of the Service's 10.4 million grassland goal acreage is currently temporarily protected under the Conservation Reserve Program.

Options Exist That Would Enable the Service to Acquire Desired Habitat More Quickly

The pace of acquisitions could be increased if the Service used its existing funds more efficiently or if more resources were provided toward this effort. The first step in acquiring desired habitat more quickly is for the Service to remain vigilant in ensuring that existing resources are being spent in the most cost-effective manner possible. In particular, the Service has developed scientific models to target high-priority wetlands and grasslands, but it has not linked this information with land values to ensure that it always acquires the highest-priority available land at the lowest available cost. Another step in acquiring desired habitat more quickly would be to explore additional resource options. For example, increasing the cost of the federal Duck Stamp or reauthorizing a new Wetlands Loan Act could provide additional resources with little or no increase in the federal deficit. Alternatively, additional resources could be made available from the Land and Water Conservation Fund. However, absent corresponding offsets, this approach would increase the federal deficit. Each of these options would require congressional action.

²⁷The habitat acquisition trend is based on projecting the average habitat acquisition levels for the past 3 years. We selected this period because we believe the most recent years are the best representation of current market trends. Using other years to calculate the average values would lead to different projections. The habitat loss projection assumes that all landowners who are not eligible to reenroll their grasslands in the Conservation Reserve Program will convert their grasslands to agricultural uses. The projection also assumes that all landowners who can reenroll in this program will choose to, despite higher payments associated with converting their lands. In addition, the projection does not include grassland conversions that were not, at some point, temporarily protected by the Conservation Reserve Program. This hypothetical scenario is one of several scenarios that we developed to identify the challenges the Service faces in achieving its habitat protection goals.

Opportunities May Exist for the Service to Spend Existing Funds More Efficiently

According to an optimization analysis we performed on 450 grassland easements that the Service acquired in 2002 through 2006 in South Dakota (region 6), we found that some opportunities may exist for the Service to spend its existing funds more efficiently. Overall, the Service has done a good job of acquiring high-priority habitat, but some cost-efficiencies can still be gained. On the one hand, we found that from January 1, 2002, through September 30, 2006, more than 70 percent of the Service's grassland easements in South Dakota was acquired in the highest-priority zones—those accessible to 60 or more duck pairs per square mile. On the other hand, we also found that the price the Service paid for these high-priority easements varied widely (see fig. 6). Furthermore, in some cases, the Service spent substantially more per acre to acquire easements in lower-priority zones (blue areas in fig. 6) than it spent on easements in higher-priority zones (red areas in fig. 6). For example, in 2005 and 2006, the Service paid, on average, three times as much money per acre to acquire some easements in lower-priority zones than it paid to acquire some easements in higher-priority zones.

Figure 6: Matrix of Cost in Relation to Habitat Value of Grassland Easements Acquired (Number, Acreage, Average Cost per Acre, and Total Spent) in South Dakota (Fiscal Years 2002–2006)

Cost per acre	Habitat priority zone (maximum number of duck pairs per square mile with access to grassland easements)			
	Low (<20)	Medium low (20–39)	Medium high (40–59)	High (60 or more)
Greatly below average	None	11 easements 2,524 acres \$115 per acre \$282,975	13 easements 2,894 acres \$120 per acre \$344,375	88 easements 32,798 acres \$102 per acre \$3,348,745
Somewhat below average	3 easements 946 acres \$149 per acre \$137,610	9 easements 4,031 acres \$184 per acre \$842,600	22 easements 3,911 acres \$160 per acre \$652,545	79 easements 21,818 acres \$181 per acre \$3,743,215
Somewhat above average	2 easements 404 acres \$272 per acre \$109,050	10 easements 1,633 acres \$292 per acre \$539,845	11 easements 1,911 acres \$359 per acre \$707,765	76 easements 24,276 acres \$276 per acre \$6,730,924
Greatly above average	2 easements 144 acres \$600 per acre \$87,975	22 easements 4,172 acres \$558 per acre \$2,213,200	28 easements 3,753 acres \$662 per acre \$2,294,180	60 easements 13,168 acres \$506 per acre \$6,227,710

Source: GAO analysis of U.S. Fish and Wildlife Service data.

Note: Data in the analysis represent grassland easements acquired from January 1, 2002, through September 30, 2006. To account for rising land values, the dollar thresholds for the categories in the left column were calculated separately for each of these 5 years. In each cell of this figure, the cost per acre represents the average per-acre price for the acquired easements in that cell; this amount may, therefore, not match the result of dividing the total spent by the total acreage in that cell. Easements in the upper right-hand cells (red) provide significantly more habitat value per dollar than the easements in the lower left-hand cells (blue). See appendix II for more details on how this analysis was performed.

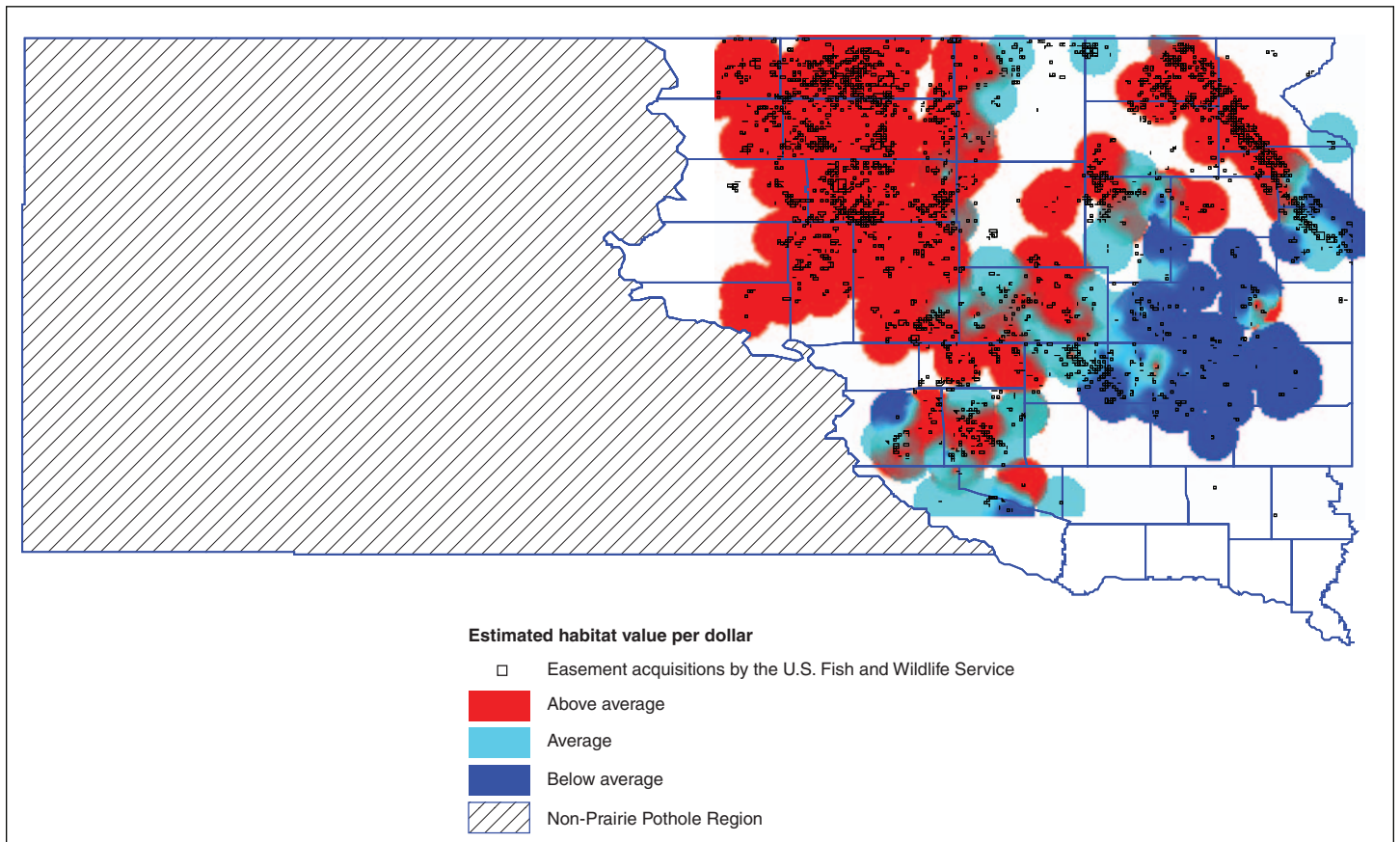
Given this wide variation in habitat value per dollar for easement acquisitions, we conducted an analysis to determine whether the Service could have allocated its dollars more effectively and found that it could have acquired more of the highest-priority habitat without spending more money (see app. II). Our analysis indicated that an important opportunity for gains in efficiency would be for the Service to target the lowest-cost easements in the highest-priority zones. If in fiscal year 2006, the Service had thus targeted its acquisitions, we estimated that it could have acquired at no additional expense, from landowners waiting to sell, about 5,000 acres of the highest-priority habitat in addition to the 16,169 acres it did

acquire in South Dakota. Had the Service acquired the 5,000 acres, it could have also acquired further acreage at no additional cost by forgoing easement acquisitions in the highest-cost but lower-priority zones (blue areas in fig. 7) and by using available funds to acquire additional low-cost, higher-priority lands. In particular, had the Service chosen not to acquire 8 high-cost, lower-priority easements in fiscal year 2006, we estimated that it could have acquired an additional 3,500 acres of higher-priority land, rather than the 1,398 acres of lower-priority land. Taken together, we estimated that these 2 efficiency gains would have allowed the Service to acquire about 8,500 more acres of the highest-priority land in South Dakota than it acquired—without additional expenditures.²⁸

In addition, our analysis also showed that the Service has had more success in acquiring lower-cost grassland easements in high-priority zones in certain parts of the state than in others. Specifically, from January 1, 2002, through September 30, 2006, the Service was generally able to acquire grassland easements of higher habitat value per dollar (red areas in fig. 6) in the northwestern portion of South Dakota's Prairie Pothole Region. Likewise, most of the grassland easements of lower habitat value per dollar were located in the southeastern portion of South Dakota's Prairie Pothole Region. These easements were located in lower-priority zones; acquired for an above-average per-acre price; or both (blue areas in fig. 6). This geographic pattern, illustrated in figure 7, suggests that the Service might be able to overlay estimated land prices and habitat priority when targeting lands for acquisition.

²⁸Our analysis accounted for many of the real-world constraints that the Service faces in conducting its work, such as the need to make timely decisions, the need for willing sellers, and funding source restrictions. The analysis, however, is subject to several limitations and, therefore, is meant to be an illustrative, rather than a definitive, assessment of the potential for efficiency gains. See appendix II for details on our methodology.

Figure 7: Estimated Habitat Value per Dollar for Grassland Easement Acquisitions in South Dakota (Fiscal Years 2002–2006)



Source: GAO analysis of U.S. Fish and Wildlife Service data.

Note: Data in the analysis represent grassland easements acquired from January 1, 2002, through September 30, 2006. The three shadings on the map—illustrating above-average, average, and below-average habitat value per dollar—correspond to the three shaded categories in figure 6. This map is an illustrative of the overall spatial pattern in habitat value per dollar, rather than a precise prediction of the habitat value per dollar of any given parcel. See appendix II for details on the methodology used to conduct this analysis.

According to Service realty officials in North Dakota, South Dakota, and Minnesota, while they generally target the highest-priority land, they are not always able to acquire the lowest-priced of the highest-priority land for the following reasons:

- *Landowner willingness.* Service data show that willing sellers are more numerous in areas of relatively expensive land than in areas of less expensive land. For example, in 3 relatively expensive South Dakota counties (\$450 to \$550 per acre for grassland easements), about

150 landowners have expressed interest in selling a grassland easement to the Service. By contrast, in 5 relatively inexpensive South Dakota counties (less than \$200 per acre for grassland easements), only 40 landowners have expressed interest.

- *Timing.* Service officials stated that they must act quickly once a landowner expresses interest in selling a property because the window of opportunity may be very narrow. For instance, a landowner may need cash to pay off a loan that is about to be due, or heirs to a property may need to sell the property as part of the probate process. Service realty officials told us that opportunities to acquire certain parcels of grasslands may come only once in a generation.
- *Funding source restrictions.* Service realty officials also told us that their land acquisition decisions are affected by restrictions on how they spend monies from the Migratory Bird Conservation Fund. For example, the law authorizes the U.S. Postal Service to charge full price for Duck Stamps only if the Service has spent all Migratory Bird Conservation Fund monies made available the previous fiscal year.²⁹ As a result, the Service may pursue a lower-priority acquisition because it is more expedient, rather than a high-priority acquisition that may not be completed by the end of the fiscal year. In contrast, funds from the Land and Water Conservation Fund are generally available until expended, meaning they can be carried over from fiscal year to fiscal year. Moreover, the Service cannot spend monies from the Migratory Bird Conservation Fund in North Dakota for grassland easements because the Service does not have approval from the governor, as required, to purchase easements under the Migratory Bird Conservation Act in that state.³⁰

Service officials also told us that as they learn more about the ecological value of different geographic areas, they will incorporate this knowledge into land acquisition decisions, which may require focusing on more costly parcels. Paying a higher price for grasslands at a high risk of being converted, for example, may be more effective than paying less money for

²⁹Pub. L. No. 95-552, 92 Stat. 1450 (1982).

³⁰A 1991 Interior Solicitor's opinion states that although North Dakota law restricts the use of Migratory Bird Conservation Fund monies for grassland easements, the Service can still acquire grassland easements using Land and Water Conservation Fund monies. The Solicitor's opinion states that Congress imposes no conditions on the Secretary of the Interior to obtain state consent for such acquisitions.

Options for Providing
Additional Resources for
Habitat Acquisitions

parcels that are unlikely to be degraded. Given these factors, and the Service's desire to spread funds throughout a region, the Service's land acquisitions in this region will never be 100 percent efficient in terms of the number of ducks protected per dollar expended. Still, we found little coordination or planning among acquisition offices in region 6 to maximize the cost-effectiveness of their limited acquisition funding. Service officials told us that they may coordinate within an acquisition office to acquire the highest-priority land, but acquisition offices rarely coordinate among themselves to ensure that the Service is acquiring land as cost-effectively as possible. Some questions also arose during our review about the Service's distribution of land acquisition funds between region 3 and region 6 and about the allocation of funds within region 3 for fee-simple acquisitions versus easement acquisitions.

Another step in acquiring desired habitat more quickly would be to explore additional resource options, such as increasing the cost of the federal Duck Stamp, reauthorizing a new Wetlands Loan Act, or making available additional resources from the Land and Water Conservation Fund. First, the federal Duck Stamp's price, which has increased seven times since 1934, has been fixed at \$15 since 1991—the longest lapse between price increases. Adjusting for inflation, the Duck Stamp would need to be raised to \$21 to have the same purchasing power as it did in 1991. Accounting for the increase in land prices in the Prairie Pothole Region, the price of the Duck Stamp would need to be raised to nearly \$42. In the 109th Congress, H.R. 4315 proposed an increase in the price of the Duck Stamp to \$25 through hunting years 2014 and to \$35 thereafter. More recently, H.R. 2735, in the 110th Congress, would increase the price of the Duck Stamp to \$20 for hunting years 2008 through 2010 and to \$25 thereafter.³¹ A \$10 increase in the price of the Duck Stamp, assuming that sales of these stamps remained unchanged, would boost nationwide Migratory Bird Conservation Fund revenues from about \$24 million per year to about \$39 million per year. This increase would give the Service an additional \$15 million each year, which it could use to acquire high-priority habitat in the Prairie Pothole Region. Increasing the price of the Duck Stamp would generate new revenue; thus, it would not increase the federal deficit. Second, since 1961, Congress has reauthorized the Wetlands Loan Act several times and appropriated \$200 million (\$870 million in 2007

³¹H.R. 2735 would require the amount received for each stamp sold in excess of \$15 to be used for the costs of national wildlife refuge operations. However, legislation could be enacted without this restriction if Congress wanted to allow the agency to devote additional funds to land acquisitions.

dollars) to provide an advance of funds against future Duck Stamp sales. It has been nearly 20 years, however, since the last reauthorization. Two recent proposals, H.R. 4315 and S. 272, proposed a \$400 million loan as an advance against future Duck Stamp revenues. If the loan were repaid by future Duck Stamp revenues, this alternative would have little net effect on the federal deficit. Third, the Land and Water Conservation Fund, which receives about \$900 million annually from a variety of sources, is used only minimally in the Prairie Pothole Region. Over the last 2 years, less than \$200,000 has been appropriated to the region annually, and since 1988, about \$2.6 million has been appropriated. Through 2006, however, the Land and Water Conservation Fund had a balance of nearly \$15 billion. Were any of the balance to be spent without corresponding offsets, the federal deficit would increase.

Increasing the cost of the federal Duck Stamp, reauthorizing the new Wetlands Loan Act, or making available additional resources from the Land and Water Conservation Fund are just three of the possible options. Also, these three options are not mutually exclusive and they could be used together in any combination. Moreover, this list of options is not comprehensive. For example, in addition to increasing the price of the federal Duck Stamp, H.R. 2735, which was introduced on June 14, 2007, included two other provisions designed to increase funding for the National Wildlife Refuge System in general: (1) establish a special postage stamp and (2) designate an income tax overpayment check-off to donate money to the proposed National Wildlife Refuge System Trust Fund.

Conclusions

Because of intense agricultural development throughout the 20th century, most of the Prairie Pothole Region's original wetlands have been drained and the grasslands plowed, contributing to steep declines in many migratory bird species. Over the past 48 years, the Service's land acquisitions under the Small Wetlands Acquisition Program in the region have been successful at stemming, and in some areas, reversing, the pace of wetland drainage and grassland conversion of the 1950s and 1960s, and these efforts have helped to increase duck populations from the alarmingly low levels of the 1980s. To date, the Service's efforts have been propped up by several complementary factors: relatively low land prices, Agriculture conservation programs, and prime habitat that was unsuitable for agricultural production. Taken together, the Service's acquisition of a small percentage of available lands proved sufficient to sustain migratory bird population levels.

The pressure to convert grasslands to cropland, however, is now much greater than it was in the past. Recent market forces do not bode well for the Service's continuing efforts to secure habitat in the Prairie Pothole Region and suggest that the Service has a small window of time in which to conserve high-priority migratory bird habitat. Technological advances in genetically modified seed varieties, such as drought-tolerant corn and herbicide-resistant soybeans, now allow farmers to crop areas once considered unsuitable for farming. Moreover, corn commodity prices over the past 5 years have more than doubled, in large part because of the growing demand for ethanol, a corn-based renewable fuel. These factors have pushed land prices in the Prairie Pothole Region dramatically higher over the past few years and have made Agriculture conservation programs less appealing to farmers.

For the Service to permanently protect as much as possible of the remaining 12 million wetland and grassland acres identified as critical to sustaining migratory bird populations in the region, it is now urgent for the Service to ensure that it gains maximum ecological benefit from its acquisitions. While the Service has developed sophisticated scientific models to target high-priority wetlands and grasslands, it has not linked this information with land prices. As a result, the Service could potentially achieve some modest efficiency gains if it were to more effectively target lower-cost high-priority habitat. While any efficiency gains would allow the Service to protect the maximum number of migratory birds at the least amount of cost before all of the existing habitat is converted to other uses, it would not fix the fundamental underlying resource challenge. With an average of about \$17 million available per year for land acquisitions in the region, it will take the Service well over a century to acquire its 12 million goal acres and will cost billions of dollars. If current trends continue, the Service will fall well short of its goal. Significantly increasing the pace of acquisitions would require additional resources. Two options that have been introduced in Congress to provide additional resources include increasing the price of the Duck Stamp and reauthorizing a new wetlands acquisition loan. Another alternative, providing additional funds from the Land and Water Conservation Fund, would also increase the pace of acquisitions in the Prairie Pothole Region.

Matters for Congressional Consideration

Determining the resource level that is appropriate to devote to acquiring migratory bird habitat in the Prairie Pothole Region is a policy decision that rests with Congress and the President. How much time the Service has to protect this high-priority habitat will largely depend on how much of the land stays temporarily protected by Agriculture conservation programs. The two legislative proposals that have been introduced in the 110th Congress would provide the Service with hundreds of millions of additional resources for land acquisitions in the region. However, several billion dollars will likely be needed for the Service to achieve its goal. We present this information to Congress as it deliberates whether and to what extent additional resources should be provided to the Service to acquire high-priority habitat in the Prairie Pothole Region. We suggest that Congress consider this information as it debates H.R. 2735, regarding whether and to what extent the price of the Duck Stamp should be increased; S. 272, regarding whether and to what extent to reauthorize a wetlands acquisition loan; and whether and to what extent additional funds may need to be provided from the Land and Water Conservation Fund.

Recommendation for Executive Action

To help ensure that the Service acquires as much high-priority habitat as possible with its available funds, we recommend that the Secretary of the Interior direct the Director of the U.S. Fish and Wildlife Service to fully integrate the Service's recently developed scientific models with consideration of land prices, with the goal of maximizing the acquisition of the least expensive high-priority habitat when deciding which lands to acquire in the Prairie Pothole Region, while balancing that goal with the continued need to acquire high-priority habitat throughout the region.

Agency Comments

We provided the Department of the Interior with a draft of this report for review and comment. However, no comments were provided in time for them to be included as part of this report.

We are also sending copies of this report to interested congressional committees, the Secretary of the Interior, the Director of the U.S. Fish and Wildlife Service, and other interested parties. We also will make copies available to others upon request. In addition, the report will be available at no charge on the GAO Web site at <http://www.gao.gov>.

If you or your staff have any questions about this report, please contact me at (202) 512-3841 or nazzaror@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made major contributions to this report are listed in appendix III.

Robin M. Nazzaro

Robin M. Nazzaro
Director, Natural Resources and Environment

Appendix I: Scope and Methodology

To determine the present status of the Department of the Interior's (Interior) U.S. Fish and Wildlife Service's (the Service) Small Wetlands Acquisition Program in the Prairie Pothole Region, we examined fee-simple and easement acquisition data for counties of Iowa, Minnesota, Montana, North Dakota, and South Dakota that are within the boundaries of the Prairie Pothole Region, as identified by the North American Waterfowl Management Plan. Because the Small Wetlands Acquisition Program began in 1959, we examined acquisitions from 1959 through 2006. For fee-simple and easement acquisitions, we also identified the funding source used to purchase each parcel. We obtained acquisition data and associated funding data from the Service's Lands Record System. To verify the reliability of these data, we compared summary data with information published in the Service's annual lands report. We also visited three Service acquisition offices in Minnesota, North Dakota, and South Dakota and reviewed fee-simple and easement acquisition records. During these visits, we also observed easement violations, including wetlands that were filled, and witnessed the corrective actions required of landowners by the Service. Of note, we did not examine fee-simple and easement acquisitions within the Prairie Pothole Region outside of the Small Wetlands Acquisition Program, such as Dakota Tall Grass easements or fee-simple acquisitions for parcels of land within the approved acquisition boundaries of National Wildlife Refuges. Furthermore, we did not examine fee-simple or easement properties that the Service has acquired from the Farm Service Agency.

To examine the Service's habitat protection goals for the region, we obtained and reviewed region-specific Service planning documents—in particular, the 2005 Prairie Pothole Joint Venture Implementation Plan. This plan describes the results of annual waterfowl breeding population and production surveys since 1987 and describes how these data have been used by the Service to create “breeding pair accessibility maps.” These maps enable the Service to predict the abundance and distribution of breeding duck pairs throughout the Prairie Pothole Region and is integral for realty officials in targeting lands for acquisition. We also visited the Service's two Habitat and Population Evaluation Team offices in Bismarck, North Dakota, and Fergus Falls, Minnesota, and interviewed Service biologists on the rationale and methods they used in developing the spatial models that identify these predicted high-priority areas for acquisition. We visited locations in the Service's high-priority acquisition areas, such as McPherson County, South Dakota, and observed a high number of duck pairs in numerous wetlands. We also visited locations in the Service's low-priority acquisition areas and observed very few duck pairs. Finally, we examined the Service's restoration goals and how these

goals buttress the Service's habitat protection goals. To do this, we interviewed Service biologists and realty officials in region 3—specifically, Fergus Falls. In this region, the Service undertakes more restoration work than it does in region 6. We visited wetlands that had been restored by the Service by “plugging” drainage ditches. We also obtained information from Service officials on the cost of restoring wetlands and grasslands.

To examine challenges that the Service faces in achieving its habitat protection goals, we compared the Service's recent fee-simple and easement acquisition rates with projected habitat loss rates in the Service's high-priority acquisition areas. We analyzed data on lands temporarily protected by the Department of Agriculture's (Agriculture) Conservation Reserve Program to estimate habitat loss. From these data, we identified the number of acres currently protected under this program in the Prairie Pothole Region that would potentially be unprotected—and therefore be able to be converted to cropland—as contracts expire over the next 5 years. We also obtained from the Congressional Research Service information on the likely Conservation Reserve Program reenrollment rates for fiscal years through 2010. On the basis of these data, we estimated the amount of time the Service has to acquire habitat in the Prairie Pothole Region, as well as the amount of habitat that may be converted to agricultural uses in the future if projected grassland conversion rates hold true. In addition, we identified recent funding levels for the Service's habitat protection activities in the Prairie Pothole Region. We used this information, along with Service data on the amount of wetland and grassland goal acres for acquisition, to estimate the costs (in unadjusted dollars) of acquiring the Service's goal acreage. Our estimates are mathematical calculations that are based on the aforementioned assumptions. We cannot forecast the likelihood that any of these assumptions will continue into the future, nor can we estimate the uncertainty associated with our estimate.

Because resources are a challenge for the Service as it continues to acquire habitat for migratory birds, we examined whether opportunities exist for the Service to use its resources more efficiently. We have included our methodology for this analysis in appendix II. We also identified the possibility of exploring additional resources for the Service. To do this, we examined legislative proposals in the 109th and 110th Congresses that include provisions such as increasing the price of the federal Duck Stamp and reauthorizing a new wetlands loan. The list of options that we identified is not meant to be comprehensive.

On the basis of steps that we have previously described, we determined that Agriculture and Service data were sufficiently reliable for the purposes of this report. Our work was conducted in accordance with generally accepted government auditing standards, including an assessment of internal controls, from September 2006 through August 2007.

Appendix II: Detailed Methodology for GAO's Optimization and Spatial Analyses

To determine the proportion of grassland easements that the Department of the Interior's U.S. Fish and Wildlife Service (the Service) acquired in the highest-priority habitat zones, we used computer mapping software to analyze grassland easements that the Service recently acquired. We first translated a digital map of the Service's habitat priority zones into MapInfo Geographic Information System software. These habitat priority zones correspond to the maximum number of breeding duck pairs per square mile that can access a given parcel of land, according to the Service's biological models. The map distinguishes 7 habitat priority zones: fewer than 10 duck pairs per square mile, 10 to 19 duck pairs per square mile, 20 to 39 duck pairs per square mile, 40 to 59 duck pairs per square mile, 60 to 79 duck pairs per square mile, 80 to 99 duck pairs per square mile, and 100 or more duck pairs per square mile. On this map, we plotted the boundaries of grassland easements that the Service acquired in South Dakota between January 1, 2002, and September 30, 2006. Of the 488 grassland easements that the Service paid to acquire during this period, we obtained digital property boundaries for 450 easements (92 percent). We used MapInfo software to identify the habitat priority zone in which each of these easements is located. For easements spanning more than 1 priority zone, we calculated the proportion of the easement located in each zone, multiplied this proportion by the midrange number of duck pairs per square mile with access to that zone, and arrived at a weighted average number of duck pairs per square mile.¹ After making this computation, we classified each property into 1 of 4 priority zones: fewer than 20 duck pairs per square mile, 20 to 39 duck pairs per square mile, 40 to 59 duck pairs per square mile, and 60 or more duck pairs per square mile. This is the same method of categorization that the Service uses to classify the habitat value of properties on its waiting list of willing sellers, which is described below.

To estimate the habitat value per dollar that the Service obtained for these easements, we combined these data on habitat priority zones with data on easement purchase amounts. For each easement, we calculated the cost per acre that the Service paid to acquire the property. For each year, we

¹For example, if 25 percent of a property was located in a zone that supports 20 to 39 duck pairs per square mile, and the remaining 75 percent of the property was located in a zone that supports 40 to 59 duck pairs per square mile, we estimated that the property, on average, was located in an area that supports 45 duck pairs per square mile ($0.25 * 30 + 0.75 * 50 = 45$). We therefore classified such a property as supporting 40 to 59 duck pairs per square mile. For areas that support 100 or more duck pairs per square mile, we assumed the midpoint to be 110 duck pairs per square mile.

classified the easements into quartiles according to their cost per acre. In 2006, for example, properties in the first quartile cost less than \$207 per acre, properties in the second quartile cost between \$207 and \$324, properties in the third quartile cost between \$324 and \$539, and properties in the fourth quartile cost \$539 or more per acre. By combining the 4 cost-per-acre quartiles with the 4 habitat priority zones, we obtained a matrix of 16 possible habitat value-per-dollar categories (see fig. 8). Within this matrix, a property purchased for a low cost per acre and located in a high-priority zone could be considered to have a higher habitat value per dollar than a property purchased for a high cost per acre and located in a low-priority zone. We used this matrix as a basis for classifying properties into the following three broad categories in terms of their habitat value per dollar: (1) above-average habitat value per dollar, which corresponds to properties in the upper right-hand corner of the matrix; (2) average habitat value per dollar, which corresponds to properties in the four diagonal cells of the matrix; and (3) below-average habitat value per dollar, which corresponds to properties in the lower left-hand corner of the matrix. Properties with above-average habitat value per dollar generally are accessible to more duck pairs per dollar spent than properties with below-average habitat value per dollar.

Figure 8: Methodology for Habitat Value per Dollar Matrix

Cost-per-acre quartile	Maximum number of duck pairs per square mile with access to grassland easements			
	Low (<20)	Medium low (20–39)	Medium high (40–59)	High (60 or more)
1st	Average habitat value per dollar	Above-average habitat value per dollar	Above-average habitat value per dollar	Above-average habitat value per dollar
2nd	Below-average habitat value per dollar	Average habitat value per dollar	Above-average habitat value per dollar	Above-average habitat value per dollar
3rd	Below-average habitat value per dollar	Below-average habitat value per dollar	Average habitat value per dollar	Above-average habitat value per dollar
4th	Below-average habitat value per dollar	Below-average habitat value per dollar	Below-average habitat value per dollar	Average habitat value per dollar

Source: GAO analysis of U.S. Fish and Wildlife Service data.

When aggregating these data over the 5-year period to present the amounts for the average cost per acre and the total amount spent in figure 6 in the main body of the report, we did not adjust the dollar values from different years for inflation or land value appreciation.

To determine whether opportunities might exist for the Service to acquire grassland easements more efficiently—that is, whether the Service could conserve more acreage without spending more money—we conducted an optimization analysis. Our analysis was performed using data for South Dakota grassland easements limited to fiscal year 2006 because (1) easement acquisitions in South Dakota are not subject to any funding source constraints, (2) there is a large amount of high-priority acreage for acquisition, and (3) data for 2006 reflect recent land values and are the most current data available. The analysis is meant to illustrate the gains in efficiency that may be possible if the Service were to consider land prices, in addition to habitat value, when acquiring grassland easements. The results cannot be projected to other periods or to other states in the Prairie Pothole Region. To conduct this analysis, we compared properties that the Service actually acquired with properties on its waiting list of willing sellers and hypothetically “purchased” the lowest-cost properties in the highest-priority zones. Starting with the first quarter of the fiscal year,

we identified all properties that the Service acquired and all properties that it placed on the waiting list during that quarter. We considered only properties in the highest-priority zone—those that are accessible to 60 or more duck pairs per square mile—because these properties have the potential to provide the highest habitat value per dollar. We sorted the properties by cost per acre, from least expensive to most expensive, and began “purchasing” properties until we reached the expenditure limit for that quarter. We performed the same analysis for the remaining three quarters. Properties not selected during a given quarter became candidates for selection in the subsequent quarter. At the end of the fourth quarter, any remaining funds were used to “purchase” additional easements.

We conducted the analysis for two hypothetical acquisition scenarios corresponding to two expenditure limits. In the first scenario, we set the expenditure limit equal to the total amount that the Service spent to acquire easements in the highest-priority zones—\$5,420,349 for South Dakota in fiscal year 2006. This scenario assumed that the Service would attain greater efficiency by simply targeting properties in the highest-priority zone with the lowest cost per acre. In the second scenario, the expenditure limit included all of the funds available in the first scenario, plus all of the funds the Service spent to acquire easements with below-average habitat value per dollar. Together, these funds totaled \$6,597,549 for South Dakota in fiscal year 2006. This scenario assumed that the Service would forgo acquiring properties with below-average habitat value per dollar in exchange for properties with above-average habitat value per dollar. In each scenario, we divided the total expenditure limit by four to obtain the expenditure limit for each quarter.

The results of this analysis are subject to some uncertainties. Since the properties on the waiting list were not acquired by the Service during the period of our review, we cannot be certain that the landowners would have accepted an offer from the Service to purchase a grassland easement. For example, in 2006, 73 percent of landowners accepted the Service's offers. To account for this uncertainty, we scaled down the purchase price and the acreage of each property on the waiting list by a factor of 0.75. This approach provides the same estimated value of acreage that could be acquired if we had replicated the analysis multiple times, each time simulating whether a given landowner would accept the Service's offer. However, because we did not replicate our analysis multiple times, we were not able to calculate the margin of error associated with our estimates.

Our analysis is subject to further uncertainty because it is based on the habitat values predicted by the Service's biological models, rather than the habitat value determined by on-the-ground biological assessments. On-site assessments account for some site characteristics—such as the quality of grasslands and soil capability—that are not included in the Service's biological models of habitat value. Although these site characteristics may influence selection decisions, we were unable to account for them in our analysis. If the Service's biological models systematically predict differ habitat values than those predicted by on-the-ground biological assessments, our analysis can either overstate or understate the potential for efficiency gains. If the Service's models, however, tend to accurately predict habitat value, on average, the estimates from our analysis would be accurate, on average.

Finally, our analysis is based on 1 year of data and does not account for the extent to which conditions could change over time. For example, our analysis does not estimate the remaining acreage of high habitat value-per-dollar land in the Prairie Pothole Region. If there are few remaining acres of such land, the potential efficiency gains over time may be limited. If there continues to be a wide variation in habitat value per dollar over an extended period, however, the potential efficiency gains may be substantial. Because our analysis focused only on 1 year, we were not able to determine which of these scenarios would be more likely.

To determine whether properties with above-average habitat value per dollar tend to be clustered in certain areas, we performed a spatial analysis. On a map of the South Dakota portion of the Prairie Pothole Region, we plotted the location of each grassland easement that the Service acquired between January 1, 2002, and September 30, 2006. Using the classification system that we have previously described, we labeled each property as having either above-average, average, or below-average habitat value per dollar. We used a mapping technique known as Inverse Distance Weighting to interpolate the values of parcels of land located near grassland easements that the Service has already acquired. With the Inverse Distance Weighting technique, the computer divides the map into a grid of equally sized square cells. For each of these cells, the computer searches for all of the Service's grassland easement properties located within a specified search radius. It then computes the average habitat value per dollar for the properties within the search radius, giving greater weight to nearby properties and lesser weight to more distant properties. Finally, it uses this average as its estimate of the habitat value per dollar for each cell and plots these estimates on the map. Using this technique, we divided the map into a grid of quarter-mile squares and developed

several maps, each of which specified a different search radius and assigned a different weight to nearby properties versus distant properties. We visually inspected these maps for obvious patterns in the location of habitat value per dollar. The maps gave different estimates of the habitat value per dollar for specific parcels of land. Furthermore, the properties were not selected at random, but rather represent the properties that the Service had recently acquired. Therefore, the map is not reliable for inferring the habitat value per dollar of any given parcel. However, the maps do illustrate a similar spatial pattern—that above-average habitat value-per-dollar properties were generally located in the northwest portion of our study area and below-average habitat value-per-dollar properties were generally located in the southeast portion of the study area. The map that we present in figure 7 is intended to be an illustrative example of the spatial pattern of habitat value per dollar, rather than providing estimates of the precise habitat value per dollar of each parcel.

Appendix III: GAO Contact and Staff Acknowledgments

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Staff Acknowledgments

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