

September 2008

WILDLIFE REFUGES

Changes in Funding, Staffing, and Other Factors Create Concerns about Future Sustainability





Highlights of [GAO-08-797](#), a report to congressional requesters

Why GAO Did This Study

The National Wildlife Refuge System, which is administered by the Fish and Wildlife Service in the Department of the Interior, comprises 585 refuges on more than 96 million acres of land and water that preserve habitat for waterfowl and other migratory birds, threatened and endangered species, and other wildlife. Refuges also provide wildlife-related activities such as hunting and fishing to nearly 40 million visitors every year.

GAO was asked to (1) describe changing factors that the refuge system experienced from fiscal years 2002 through 2007, including funding and staffing changes, and (2) examine how habitat management and visitor services changed during this period. We surveyed all refuges; visited 19 refuges in 4 regions; and interviewed refuge, regional, and national officials.

In commenting on a draft of this report, the Department of the Interior made technical comments that we have incorporated as appropriate.

GAO is not making recommendations in this report.

To view the full product, including the scope and methodology, click on [GAO-08-797](#). For more information, contact Robin Nazzaro at (202) 512-3841 or nazzaror@gao.gov.

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What GAO Found

Between fiscal years 2002 and 2007, the refuge system experienced funding and staffing level fluctuations, the introduction of several new policy initiatives, and the increased influence of external factors such as extreme weather that threaten wildlife habitat and visitor infrastructure. Although core funding—measured as obligations for refuge operations, maintenance, and fire management—increased each year, inflation-adjusted core funding peaked in fiscal year 2003 at about \$391 million—6.8 percent above fiscal year 2002 funding. Inflation-adjusted core funding ended the period 2.3 percent below peak levels, but 4.3 percent above fiscal year 2002 levels by fiscal year 2007. Core refuge staffing levels peaked in fiscal year 2004 at 3,610 full-time equivalents—10.0 percent above the fiscal year 2002 level—and then declined more slowly than funding levels. By fiscal year 2007, staffing levels fell to 4.0 percent below peak levels, but 5.5 percent above fiscal year 2002 levels. Through fiscal year 2007, the number of permanent employees utilized by the refuge system declined to 7.5 percent below peak levels. During this period, refuge system officials initiated new policies that: (1) reduced staff positions and reallocated funds and staff among refuges to better align staff levels with funding; (2) required refuge staff to focus on a legislative mandate to complete refuge conservation plans by 2012; (3) shifted to constructing a larger number of smaller visitor structures, such as informational kiosks, and fewer large visitor centers to spread visitor service funds across more refuges; (4) increased the number of full-time law enforcement officers and their associated training and experience requirements; and (5) resulted in additional administrative work. During this period, external factors that complicate refuge staffs' ability to protect and restore habitat quality also increased, including severe storms and development around refuges.

Our survey showed that the quality of habitat management and visitor service programs varied across refuges during our study period. Habitat conditions for key types of species improved about two times more often than they worsened, but between 7 percent and 20 percent of habitats were of poor quality in 2007. Certain habitat problems increased at more than half of refuges during this period, and managers reported that they increased the time spent on certain habitat management activities, such as addressing invasive plants, despite declining staffing levels. However, several managers we interviewed told us that staff were working longer hours without extra pay to get work done, and managers expressed concern about their ability to sustain habitat conditions. While the quality of four key visitor service programs was reported to be stable or improving between fiscal years 2002 and 2007 at the vast majority of refuges, the other two key programs—environmental education and interpretation—were considered poor quality at one-third of refuges in 2007. Changes in the time spent on visitor services varied considerably across refuges, and managers noted that visitor services generally are cut before habitat management activities when resources are limited. Managers are concerned about their ability to provide high-quality visitor services in the future given staffing and funding constraints.

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Abbreviations

FHWA	Federal Highway Administration
FTE	full-time equivalent
FWS	U.S. Fish and Wildlife Service
GDP	gross domestic product
Improvement Act	National Wildlife Refuge System Improvement Act of 1997
Interior	Department of the Interior
MMS	Maintenance Management System
NWR	National Wildlife Refuge
NWRS	National Wildlife Refuge System
RONs	Refuge Operating Needs System
SAMMS	Service Asset and Maintenance Management System
WMA	Wildlife Management Area
WMD	Wetland Management District

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United States Government Accountability Office
Washington, DC 20548

September 22, 2008

The Honorable Nick J. Rahall, II
Chairman
Committee on Natural Resources
House of Representatives

The Honorable Madeleine Z. Bordallo
Chairwoman
Subcommittee on Fisheries, Wildlife, and Oceans
Committee on Natural Resources
House of Representatives

The Honorable Ron Kind
House of Representatives

The National Wildlife Refuge System, administered by the Department of the Interior's U.S. Fish and Wildlife Service (FWS), comprises about 585 refuges on more than 96 million acres of land and water that provide habitat for millions of waterfowl and other migratory birds, threatened and endangered species, and other plants and wildlife. Each year, nearly 40 million visitors take part in one or more of the refuge system's six wildlife-dependent visitor activities—hunting, fishing, wildlife observation, wildlife photography, environmental education, and environmental interpretation—and other recreational activities.

The refuge system spans all 50 states, American Samoa, Guam, Puerto Rico, the U.S. Virgin Islands, and other U.S. territories. FWS manages its dispersed refuges through its headquarters office in Washington D.C., eight regional offices, and hundreds of field offices located on or near refuge lands. Individual refuge offices may report directly to a regional office (these refuges are referred to as “stand-alone” refuges in this report), or may be grouped with other offices into a “complex” under the common management of a project leader. The 585 refuges have been organized into 126 complexes and 96 stand-alone refuges. Staff at refuges may include refuge managers, project leaders, wildlife biologists, law enforcement officers, park rangers, and administrative or maintenance staff, among others.

What is recognized as the first wildlife refuge was established in 1903 as a federal bird reservation to protect brown pelicans and other waterbirds. Over time, refuges have been added to the system for various specific purposes such as providing habitat for one or more specific endangered species, or for broader purposes such as providing habitat for waterfowl and other migratory birds in general. In 1997, the National Wildlife Refuge

System Improvement Act (Improvement Act) provided a unifying mission for all the units in the refuge system—to conserve, manage, and, where appropriate, restore fish, wildlife, and plant resources and their habitats for the benefit of present and future generations.¹ The act requires refuges to give priority to wildlife-dependent recreational uses that are deemed compatible with the purposes of the refuge in refuge planning and management. In addition, the act generally requires refuges to complete comprehensive conservation plans—long-range plans for managing, among other things, habitats and providing visitor services—by 2012.

You asked us to (1) describe changing factors that the refuge system experienced from fiscal years 2002 through 2007, including funding and staffing changes, and (2) examine how habitat management and visitor services changed during this period. To address these objectives, we surveyed 538 units within the refuge system—including stand-alone refuges and refuges within complexes—that we determined to be within the scope of our review and obtained an 81 percent response rate. Survey respondents were primarily refuge managers or project leaders (for the purposes of this report we refer to both of these groups as refuge managers). We also obtained and analyzed funding data, as measured by obligations, and staffing data, as measured by the number of full-time equivalents (FTE) and the number of permanent employees, from the Federal Financial System and the Federal Personnel Payroll System, and refuge planning and performance data from FWS's Refuge Annual Performance Planning System.² We visited headquarters, 4 regional offices, and 19 refuges, and conducted phone interviews with officials at the other 4 regional offices and about 50 additional refuges. We selected refuges in order to see a range in geographic location, visitation level, refuge prioritization, and type of management activities and challenges. We conducted our work from July 2007 to September 2008 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained

¹Pub. L. No. 105-57 (1997).

²For this report, we obtained data on obligations because these data represent a fairly complete picture of funding received in support of the refuge system. Available funds come from appropriations, grants, recreation fees, donations, and all other sources received during each fiscal year. We determined that the financial and personnel systems were sufficiently reliable for the purposes of this report; we used data only from the performance system for assisting in selection of refuges for site visits and determined it to be reliable for that purpose.

provides a reasonable basis for our findings and conclusions based on our audit objectives. More detailed descriptions of our scope and methodology and the statistical analysis of our survey data are presented in appendixes I and II, respectively.

Results in Brief

For fiscal years 2002 through 2007, funding and staffing levels for the refuge system fluctuated, several new refuge system policy initiatives were introduced, and the influence of external factors such as extreme weather and human development that affect refuge operations increased:

- *Funding.* Inflation-adjusted funding (in 2002 dollars) for refuge operations, maintenance, and fire management—considered “core” refuge activities by refuge officials—peaked in fiscal year 2003, for the celebration of the refuge system’s centennial, at about \$391 million—6.8 percent above fiscal year 2002 levels—and then declined to 2.3 percent below peak levels in fiscal year 2007; it ended 4.3 percent above fiscal year 2002 levels. In nominal dollars, core funding increased each year over the time period from about \$366 million in fiscal year 2002 to about \$468 million in fiscal year 2007. At the refuge level, inflation-adjusted core funding varied considerably during the time period, with about as many losing funding as gaining since fiscal year 2002. Specifically, core funding decreased at 96 of 222 complexes and stand-alone refuges and increased at 92, with funding remaining about the same at 34. The magnitude of the changes in core funding at the refuge level also were more pronounced than for the trend overall. For example, from fiscal year 2002 through fiscal year 2007, the Kootenai National Wildlife Refuge in Idaho lost 66 percent of its core funding. Overall, core funding for 39 complexes and stand-alone refuges decreased by more than 25 percent during this time period.
- *Staffing.* Staffing levels for core refuge activities (core staffing), measured in FTEs, peaked 1 year later than core inflation-adjusted funding and then declined more slowly. Specifically, core staffing peaked in fiscal year 2004 at 3,610 FTEs—10.0 percent above fiscal year 2002 levels—and then declined to 4.0 percent below peak levels by fiscal year 2007; staffing levels ended 5.5 percent above the fiscal year 2002 level. In addition to FTEs, refuge officials said that permanent positions are an important staffing measure because they represent a predictable workforce for managers to rely upon from one year to the next. Like FTEs, the number of permanent employees peaked in fiscal year 2004, then declined to 7.5 percent below 2004 levels by fiscal year 2007—a loss of 275 employees—and 1.7 percent below fiscal year 2002 levels. Though 38 complexes and stand-alone refuges gained staff since 2004, more than three times as many lost permanent employees.

-
- *Policy initiatives.* Several new refuge system policy initiatives were implemented during this period. First, recognizing that funding declines after 2003 were exacerbating an already high proportion of staff costs in refuge budgets, regional offices began to (1) reduce staff positions through attrition and by further consolidating some stand-alone refuges into complexes, and (2) categorize refuges into three tiers for the purpose of prioritizing funding and staffing allocations among refuges. These measures are primarily responsible for the decline in FTEs and permanent employees from fiscal year 2004 peak levels and the shifts in staffing among complexes and stand-alone refuges. Also, in fiscal year 2004, refuge system officials at headquarters recognized that the refuge system was not on pace to meet the Improvement Act mandate to complete conservation plans for each refuge by 2012. To help meet this deadline, refuge system officials created a completion schedule and required staff at refuges to turn their attention to completing the plans. While refuge officials believe that they can meet the deadline, current information shows that some plans are behind schedule. In addition, during fiscal years 2002 through 2007, to help spread visitor service funds across as many refuges as possible, refuge officials began placing a greater emphasis on constructing smaller visitor facility structures, such as informational kiosks and restrooms, at a larger number of refuges rather than constructing a smaller number of traditional visitor centers. Furthermore, refuge system management began an initiative to increase the number of full-time law enforcement officers and their associated training and experience requirements to improve safety and address other concerns. Finally, during this period, various refuge system, FWS, and Department of the Interior policies increased administrative work for nonadministrative refuge staff by requiring additional data entry into certain systems and responses to numerous data calls. Refuge system officials are beginning to implement changes to reduce some of these administrative burdens.
 - *External factors.* The influence of external factors—those outside the control of the refuge system that complicate refuges' abilities to protect and restore habitat quality, including extreme weather and development on adjacent lands—increased over this period. For example, our survey found that from fiscal years 2002 through 2007, the influence of development—such as the expansion of urban areas and the conversion of off-refuge land near refuges to agriculture or industrial use—increased around refuges and contributed to refuge habitat problems for almost one-half of the refuges. Such development can pollute refuge lands and waters and make it more difficult to maintain viable, interconnected habitat in and around a refuge's borders.

Survey responses and interviews with refuge managers indicated that the quality of habitat and visitor service programs, as well as the amount of time devoted to these activities, varied across refuges during our study period. Given recent funding and staffing changes, and other factors affecting refuges, managers are concerned about their ability to provide quality habitat and visitor service programs into the future:

- *Habitat management.* Twenty-eight percent to 40 percent of habitats on refuges for several types of key species, such as waterfowl and other migratory birds, improved between fiscal years 2002 and 2007, but conditions of 11 percent to 18 percent of refuge habitats worsened and 7 percent to 20 percent were in poor condition in 2007. Complicating habitat management is growing pressure from increasing habitat problems occurring on refuges and the influence of external factors. Our survey found that invasive plant species and habitat fragmentation were the leading problems, affecting 55 percent and 44 percent of refuges, respectively, and both were increasing on more than half of refuges. At the same time, managers reported increasing the time spent on habitat management at many refuges. Of note, we estimated that refuges where staff time increased were 3.0 times more likely than refuges where staff time decreased to report improved, rather than worsened, habitat for both waterfowl and other migratory birds. However, 93 percent of refuge managers also noted increases in administrative workload on nonadministrative staff from fiscal years 2002 through 2007; managers said that such tasks take away from the time staff can devote to habitat management, and some managers reported that staff are working longer hours without overtime pay to address habitat needs. Many refuge managers expressed concern about their long-term ability to maintain high-quality habitat in light of decreasing permanent staff levels at refuges between fiscal years 2002 and 2007 and increasing pressures on refuges and refuge staff.
- *Visitor services.* Our survey found that the quality of all six wildlife-dependent visitor services was stable or improving between fiscal years 2002 and 2007 at the vast majority of refuges. And while four of the six visitor services were of moderate or better quality in fiscal year 2007 at more than three-quarters of refuges, environmental education and environmental interpretation programs were of poor quality at about one-third of refuges. Some refuges reported that they expanded their visitor services infrastructure, for example, by adding informational kiosks and trails and tour routes, yet more than one-half of refuges reported no change. The change in the time spent by refuges on visitor services varied considerably throughout the system. Refuge managers we interviewed told us that visitor services generally are reduced first—before habitat

management activities—when a refuge faces budget constraints, and several told us that they have become more dependent on volunteers to staff their visitor centers or run their programs. Our survey and site visits found that refuge managers are very concerned about their ability to provide high-quality visitor services to the public given recent funding and staffing changes.

In commenting on a draft of this report, Interior made technical comments that we have incorporated as appropriate.

Background

The National Wildlife Refuge System (NWRS)—the only system of federal lands protected specifically for wildlife conservation—provides more than 96 million acres of habitat for over 700 species of birds, hundreds of threatened or endangered species, and a wide variety of other species. Each year, millions of birds stop to rest at refuges strategically located along their migration routes. In 1903, President Theodore Roosevelt established what is now recognized as the first refuge, the Pelican Island National Wildlife Refuge (NWR) in Florida. During the more than 100 years since, the refuge system has grown to include 548 wildlife refuges and 37 wetland management districts that address a variety of wildlife purposes.³ For example, the Merced NWR in California was established in 1951 with the broad purpose of serving as a sanctuary for migratory birds, while the Antioch Dunes NWR, also in California, was established to protect three specific endangered species—Lange’s metalmark butterfly, Contra Costa wallflower, and the Antioch Dunes evening primrose.

The refuge system employs more than 4,000 staff dispersed in its offices across the country. Individual refuges may report directly to a regional office, or may be grouped with other refuge units into a complex under the common management of a project leader.⁴ Complexes range in size from 2

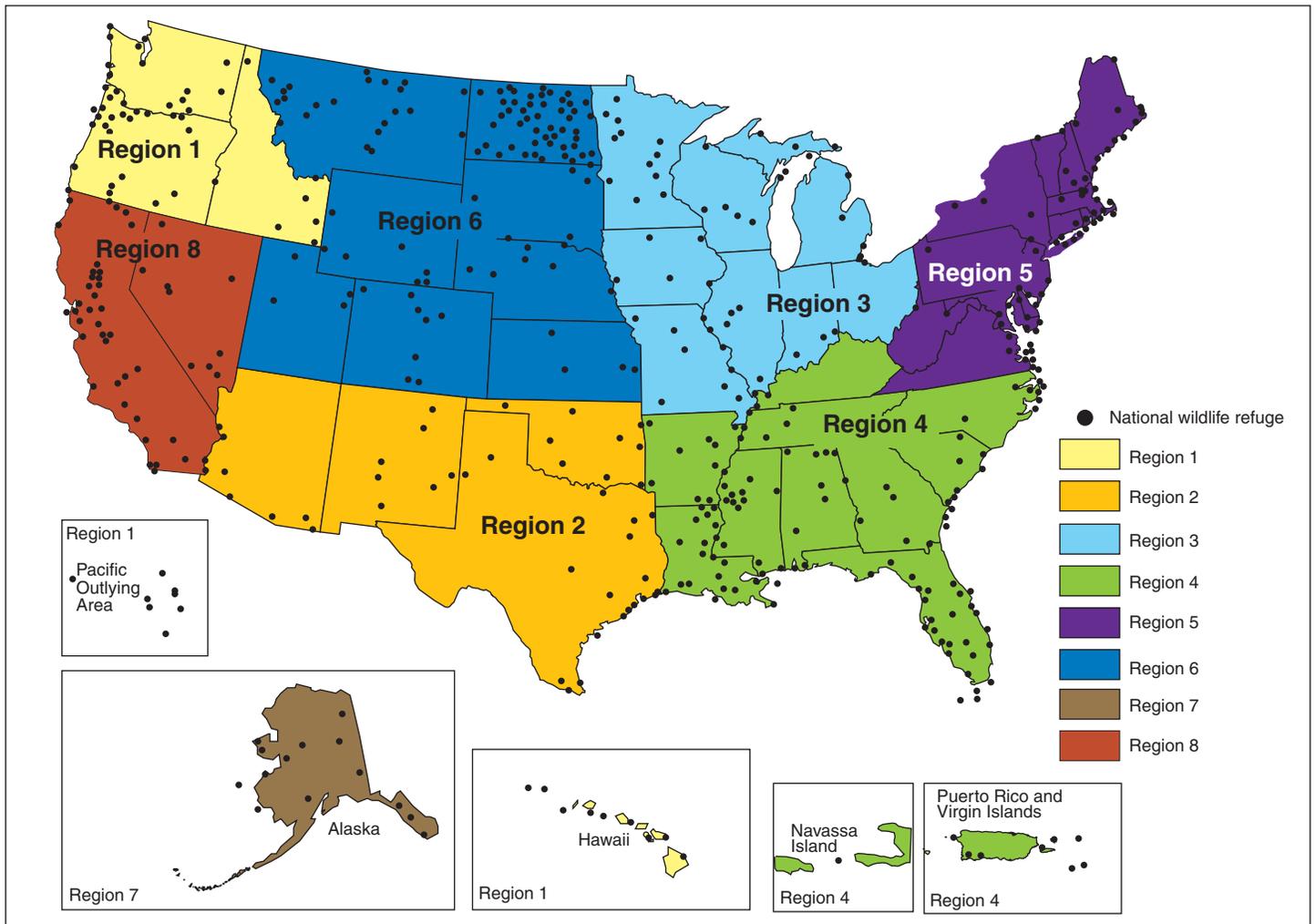
³For the purpose of this report, we refer to wildlife refuges and wetland management districts collectively as refuges. Wetland management districts administer small parcels of land called waterfowl production areas, which are scattered over many counties and preserve wetlands and grasslands that are critical to waterfowl and other wildlife. Wetland management districts consist primarily of easements that require landowners to manage their land in ways that are not contrary to the waterfowl conservation mission, and thus have more responsibility for easement enforcement and management than refuges. In addition, hunting tends to be the most prevalent visitor service on these lands, while wildlife observation is more prevalent on refuges.

⁴According to officials in Region 3, that region does not group refuges together in the same manner as complexes formed by other regions. However, for the purpose of this report, we collectively refer to groups of refuges combined together for management purposes as complexes.

to 19 refuges, and one of the refuges in each complex usually serves as the complex headquarters.⁵ Complexing has reorganized the 585 refuges into 126 complexes and 96 stand-alone refuges. Officials in headquarters serve as advisors to regional refuge chiefs and to refuge managers. Figure 1 shows the location of the 585 refuges comprising the NWRS.

⁵Two complexes include only one refuge but are considered complexes because they have two units that they manage. Specifically, the Big Island NWR in Hawaii includes the Hakalau Forest NWR as well as the Kona Forest NWR, which is considered a unit of Hakalau Forest NWR. The Aransas/Matagorda Island National Wildlife Refuge Complex in Texas is the other example.

Figure 1: Map of the National Wildlife Refuge System



Source: Fish and Wildlife Service.

Until the passage of the National Wildlife Refuge System Improvement Act of 1997, the refuge system was the only major federal public lands network without a basic statute providing a mission for the system, policy direction, and management standards for all of its units. The Improvement Act gave the refuge system a unifying mission—to administer a national network of lands and waters for the conservation, management, and, where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans. The legislation also called for FWS to plan and direct the continued growth of the system in a manner designed

to accomplish this mission. In addition, the Improvement Act required that the biological integrity, diversity, and environmental health of the refuge system be preserved. The act generally requires refuges to complete comprehensive conservation plans—long-range plans for managing, among other things, habitats and providing visitor services—by 2012. An important component to the act was that it recognized six wildlife-dependent recreational uses of the refuge system—hunting, fishing, wildlife observation, wildlife photography, environmental education, and environmental interpretation—as appropriate uses that are consistent with the mission of the refuge system, when they are determined to be compatible with the purposes of individual refuges. While hunting and fishing have always been popular uses on refuges, wildlife observation is the most prevalent activity on refuges today, and attracted over 23 million visitors in 2006.

For the most part, refuges generally perform similar activities that are compatible with the mission of protecting wildlife and habitat and providing visitor services:

- *Habitat management.* Refuges manage their lands to provide adequate habitat for the species they were established to conserve and to maintain biological diversity and integrity. Management activities may include (1) performing habitat management work such as maintaining water levels in water impoundments and ponds and treating invasive species; (2) performing fire management activities including conducting prescribed burns; (3) restoring habitat to make it more useful for wildlife purposes; (4) monitoring species and habitat through surveys and other studies; (5) managing volunteers doing habitat- or wildlife-related work; and (6) coordinating habitat management efforts with outside entities, such as private land owners, state agencies, and other groups.
- *Visitor services.* Nearly 40 million people visit refuges each year, and the vast majority of refuges provide visitors with the opportunity to participate in one or more of the six wildlife-dependent recreational uses outlined in the Improvement Act. To support these activities, refuges install roads, trails, docks, and boat ramps, and develop interpretive and educational exhibits, among other things.

Refuges also perform work that supports both habitat management and visitor services:

- *Maintenance.* The refuge system maintains more than \$18 billion in real property, including more than 41,000 facilities such as buildings, visitor infrastructure, and roads; more than 4,000 vehicles; and almost 4,000

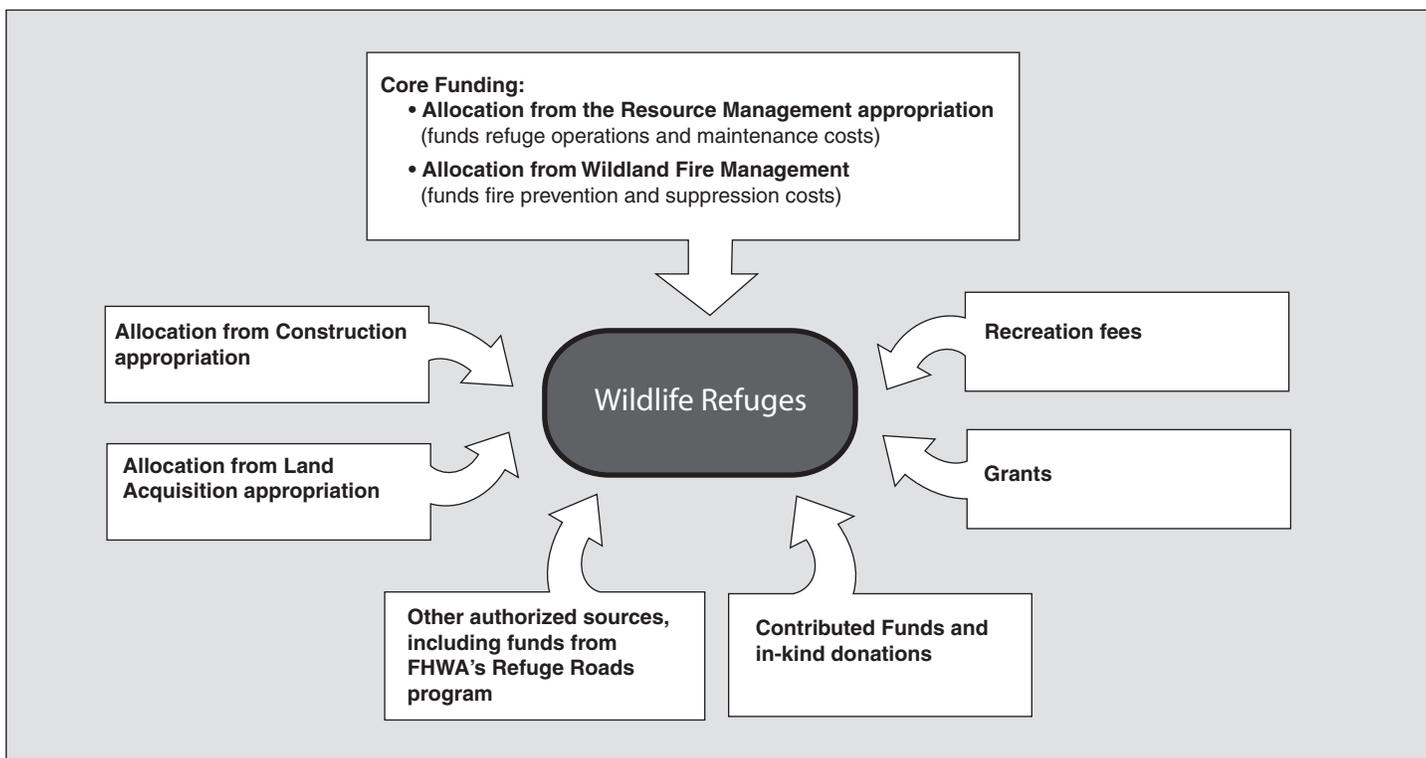
pieces of heavy equipment. Refuge staff perform preventative maintenance on their refuges' real property to achieve specific performance targets that are tied to the refuge system's mission, such as restoring wetlands, monitoring wildlife, and providing recreation opportunities. The refuge system currently has a deferred maintenance backlog, which is described in appendix III. Appendix IV discusses the Refuge Operational Needs System, which maintains information on refuge operational requirements such as staff, equipment, and planned projects.

- *Law enforcement.* The refuge system employs law enforcement officers who are tasked with protecting refuges' natural resources, infrastructure, and the visiting public. Officers also enforce conservation agreements with private landowners.
- *Conservation planning.* Refuges are required to complete comprehensive conservation plans that outline priorities for wildlife and habitat as well as visitor services.
- *Wildfire suppression.* The refuge system supports wildfire suppression needed on refuge lands as well as other federal lands.

The refuge system receives most of its funding for core refuge operations and maintenance activities from FWS's annual resource management appropriation; funds for fire management to restore and improve habitat as well as wildfire suppression come via a separate appropriation. Funding from several other sources supports other types of refuge system activities. For example, the refuge system receives annual allocations from FWS's construction appropriation to construct, improve, acquire, or remove buildings and other facilities, and from FWS's land acquisition appropriation to acquire interests in lands, including easements that provide important fish and wildlife habitat. Refuges also may apply for grants from federal, state, and local governments and nonprofit organizations, among others, to supplement their funding. The Department of Transportation's Federal Highway Administration (FHWA), through its Public Lands Highway-Refuge Roads Program, provides funds to maintain and improve public roads that provide access to or within a refuge. In addition, the refuge system has a permanent appropriation authorizing refuges to use recreation fees they collect and to accept donations, voluntary services, and in-kind contributions from private conservation groups, such as land or equipment donations. The refuge system receives additional funding through other FWS programs, such as Endangered Species or Fisheries and Habitat Conservation. Like the refuge system, these programs also receive allocations from the resource management appropriation and may, in turn, obligate a portion of this funding to

support projects occurring on refuge lands. Figure 2 shows the principal sources of funding for the refuge system.

Figure 2: Principal Funding Sources for Wildlife Refuges



Source: GAO.

While most refuges carry out the same type of activities, key characteristics of refuges such as acreage, visitation levels, and the type of ecosystems they contain—and consequently the challenges they face—can vary. Sixteen refuges in Alaska account for approximately 85 percent—more than 76 million acres—of the refuge system’s total acreage, and these refuges generally operate somewhat differently than others. The Arctic NWR in northeastern Alaska, for example, contains 8 million acres of wilderness that is relatively undisturbed; as such, activities focus primarily on research, monitoring, and education. In contrast, the Tualatin River NWR—located 15 miles from Portland, Oregon—faces the challenge of protecting natural resources amid rapidly increasing visitation levels. Refuges along the southwest border of the United States, meanwhile, face unique law enforcement challenges as they support the Department of Homeland Security’s border control efforts.

Refuge Funding and Staffing Levels Fluctuated, New Policies Were Introduced, and the Influence of Various External Factors Affecting Refuges Increased from Fiscal Years 2002 through 2007

From fiscal years 2002 through 2007, the refuge system experienced fluctuations in funding and staffing levels, the introduction of several new refuge system policy initiatives, and increases in the influence of external factors such as extreme weather and development that affect refuge operations. Inflation-adjusted funding for core refuge system activities—measured as obligations for refuge operations, maintenance, and fire management—increased by 6.8 percent from fiscal year 2002 to fiscal year 2003 for the celebration of the refuge system’s centennial, then declined quickly to 4.7 percent below peak levels by fiscal year 2005, before increasing again to 2.3 percent below peak levels in fiscal year 2007, when adjusted for inflation (in 2002 dollars); it ended the period 4.3 percent above fiscal year 2002 levels.⁶ In nominal dollars, core funding increased each year over the time period from about \$366 million in fiscal year 2002 to about \$468 million in fiscal year 2007. Core refuge system staffing levels peaked in fiscal year 2004 after increasing 10.0 percent, and then declined more slowly than funding to 4.0 percent below this level by the end of fiscal year 2007; they ended the period 5.5 percent above fiscal year 2002 levels. During the same period, several refuge system policy initiatives were implemented to reduce staff levels and reprioritize funding among refuges, ensure the completion of required conservation plans, shift focus toward constructing a greater number of smaller visitor facilities, and increase the number of full-time law enforcement officers and associated training; other initiatives increased the administrative workload on refuges. Refuges also experienced an increase in the influence of various external factors that may complicate managers’ abilities to protect habitat and provide visitor services, such as extreme weather events and development on adjacent lands.

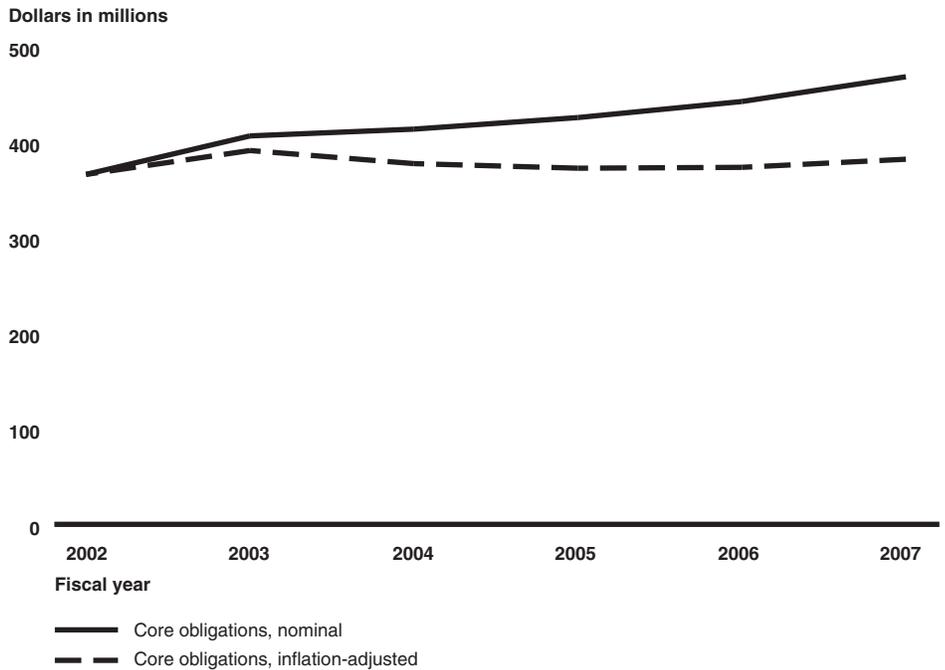
⁶We adjusted nominal dollars using the Gross Domestic Product (GDP) Price Index for Government Consumption Expenditures and Gross Investment (federal nondefense sector), with 2002 as the base year. This price index assigns greater weight to changes in federal workers’ compensation than does the more general GDP (Chained) Price Index.

Inflation-Adjusted Core Refuge Funding Peaked in Fiscal Year 2003 Then Decreased, but Ended the Period above Fiscal Year 2002 Levels

Obligations for core refuge activities—operations, maintenance, and fire management—peaked in fiscal year 2003, then decreased and remained below peak levels through fiscal year 2007, when adjusted for inflation (in 2002 dollars), but above fiscal year 2002 levels.⁷ As shown in figure 3, total nominal obligations for core refuge system activities increased each year from about \$366 million in fiscal year 2002 to about \$468 million in fiscal year 2007—an average annual increase of 5.1 percent or about \$18.5 million. However, when adjusted for inflation, total core obligations peaked in fiscal year 2003 at about \$391 million for the wildlife refuge centennial—an increase of 6.8 percent over fiscal year 2002. Core inflation-adjusted obligations then quickly fell back to 4.7 percent below peak levels by fiscal year 2005. By fiscal year 2007, inflation-adjusted core obligations rebounded somewhat to about \$382 million—still 2.3 percent below peak levels, but 4.3 percent above fiscal year 2002 levels. While the refuge system did receive an increase in the allocation from the resource management appropriation for fiscal year 2008, we did not include it in our analysis because the fiscal year was not yet complete.

⁷For this report, we obtained data on obligations because these data represent a fairly complete picture of funding received in support of the refuge system. Available funds come from appropriations, grants, recreation fees, donations, and all other sources received during each fiscal year.

Figure 3: Refuge System Core Obligations, Nominal and Inflation-Adjusted Dollars (in 2002 Dollars), Fiscal Years 2002 through 2007



Source: GAO analysis of Fish and Wildlife Service data.

Note: We used obligations as a measure of the funding for the refuge system.

At the refuge level, the trends in inflation-adjusted core refuge obligations at the 222 complexes and stand-alone refuges varied considerably during our study period.⁸ Specifically, from fiscal year 2002 through fiscal year 2007, core inflation-adjusted obligations decreased for 96 complexes and stand-alone refuges, increased for 92, and stayed about the same for 34.⁹ The magnitude of the changes in core funding at the refuge level also were more pronounced than for the trend overall. For example, the refuge with the largest percentage inflation-adjusted decrease in funding was the Kootenai NWR in Idaho, where obligations fell from \$957,506 in fiscal year

⁸Obligations data are only available for stand-alone refuges and complexes, not for refuges that are a part of complexes.

⁹We defined funding increasing or decreasing by 5 percent or less over the time period as staying about the same. Four refuges, Neches River NWR, North Dakota Wildlife Management Area, Rocky Flats NWR, and Rocky Mountain Front Conservation Area, incurred no obligations during the fiscal year 2002 to 2007 time period.

2002 to \$324,283 in fiscal year 2007, a decrease of 66 percent. The refuge experiencing the largest inflation-adjusted dollar decrease was the Mid-Columbia NWR Complex in Washington state, where obligations fell from about \$9.4 million in fiscal year 2002 to about \$5.2 million in fiscal year 2007, a decrease of about \$4.1 million.¹⁰ Moreover, from fiscal year 2002 through fiscal year 2007, core funding for 39 complexes and stand-alone refuges decreased by more than 25 percent. On the other hand, the refuge receiving the largest percentage increase in inflation-adjusted funding was the Caddo Lake NWR in Texas. Its obligations increased by 156 percent, from \$95,255 in fiscal year 2002 to \$244,094 in fiscal year 2007, largely reflecting an increase in operations at this refuge since it was established in October 2000. The refuge experiencing the largest dollar increase in inflation-adjusted funding was the Okefenokee NWR in Georgia, where obligations for core refuge activities increased from about \$7.4 million in fiscal year 2002 to about \$15.8 million in fiscal year 2007—an increase of about \$8.4 million.¹¹ However, almost 90 percent of this increase consisted of fire management funding provided largely to respond to the wildfires the refuge faced in April 2007. Appendix V presents obligations for core refuge activities for all 222 complexes and stand-alone refuges in both nominal and inflation-adjusted dollars for each of fiscal years 2002 through 2007.

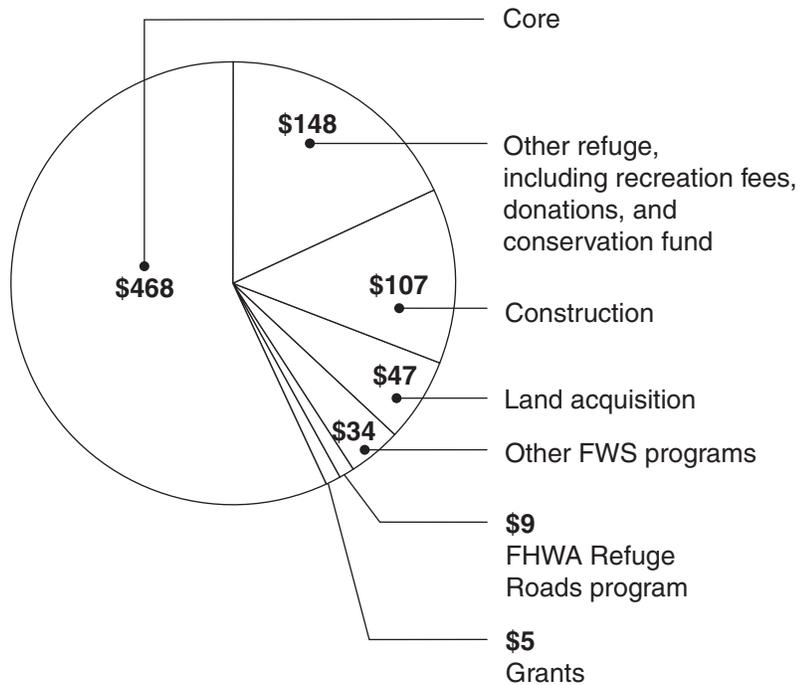
Total obligations, in nominal dollars, for the refuge system were about \$816 million in fiscal year 2007. As illustrated in figure 4, core obligations comprised about 57 percent of this total, or about \$468 million. Obligations of allocations from Interior’s construction and land acquisition appropriations added approximately 19 percent, or about \$154 million. Additional obligations of funds received through recreation fees, donations, conservation funds, and all other sources, contributed approximately 18 percent, or about \$148 million. Other funds were obligated from grants and allocations from the FHWA and from other FWS programs.

¹⁰The decrease equals about \$4.1 million due to rounding.

¹¹Okefenokee NWR is the name the refuge system uses for the complex consisting of the Banks Lake NWR and Okefenokee NWR.

Figure 4: Total Obligations for the Refuge System in Nominal Dollars, Fiscal Year 2007

Dollars in millions



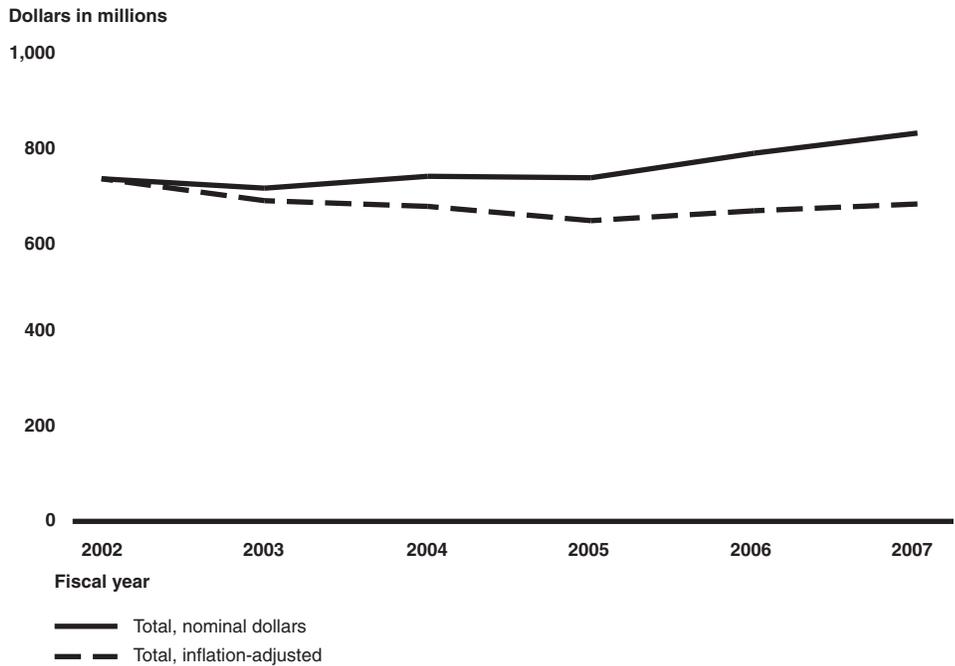
Total: \$816 million

Source: GAO analysis of Fish and Wildlife Service data.

Notes: We used obligations as a measure of the funding for the refuge system. Obligations sum to \$818 million due to rounding.

In contrast to the trend in core funding, total inflation-adjusted funding for the refuge system as a whole did not peak in fiscal year 2003, but instead steadily decreased from fiscal year 2002 levels until fiscal year 2005 and rebounded somewhat thereafter (see fig. 5). Even after rebounding somewhat in fiscal year 2005, however, inflation-adjusted total funding decreased to about \$666 million in fiscal year 2007—an average annual decrease of 1.6 percent (about \$11.2 million) or 7.5 percent below fiscal year 2002 levels. The main driver in the generally decreasing trend in total funding is a sharp drop in funding for land acquisition, which fell from about \$101 million in fiscal year 2002 to about \$38 million in fiscal year 2007. In nominal dollars, total obligations increased from about \$720 million in fiscal year 2002 to about \$816 million in fiscal year 2007—an average annual increase of 2.5 percent or about \$18.3 million.

Figure 5: Total Obligations for the Refuge System, Nominal and Inflation-Adjusted Dollars (in 2002 Dollars), Fiscal Years 2002 through 2007



Source: GAO analysis of Fish and Wildlife Service data.

Note: We used obligations as a measure of the funding for the refuge system.

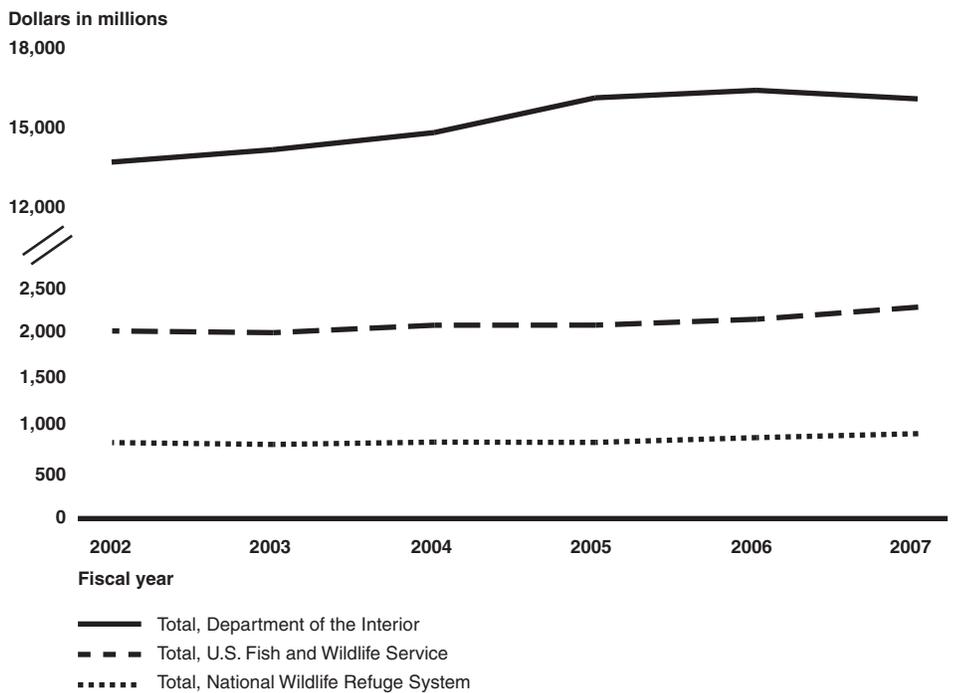
Beyond receiving financial resources, refuges also receive in-kind donations from nonprofit groups, for-profit companies, and other organizations. From our survey, we obtained information on donations received by 246 individual refuges—67 percent of refuges responding to our survey. These donations typically consisted of equipment and other supplies that refuges used to help manage habitat or deliver visitor services, though larger donations included land and construction of visitor centers. Donations at most of the refuges totaled \$500,000 or less over the entire 6-year time frame; however, several refuges reported that they received more than \$1 million over this period.¹² For example, a refuge in Washington state estimated that it received in-kind donations totaling about \$20 million, consisting primarily of land donations from nonprofit organizations, bridge work, and habitat restoration projects. Another refuge in Michigan estimated that it received about \$5 million worth of in-

¹²We did not ask survey respondents to estimate the dollar value of volunteer time.

kind donations, including land donations from local industries, as well as shoreline restoration, fence removal, and tree removal projects performed by these industries.

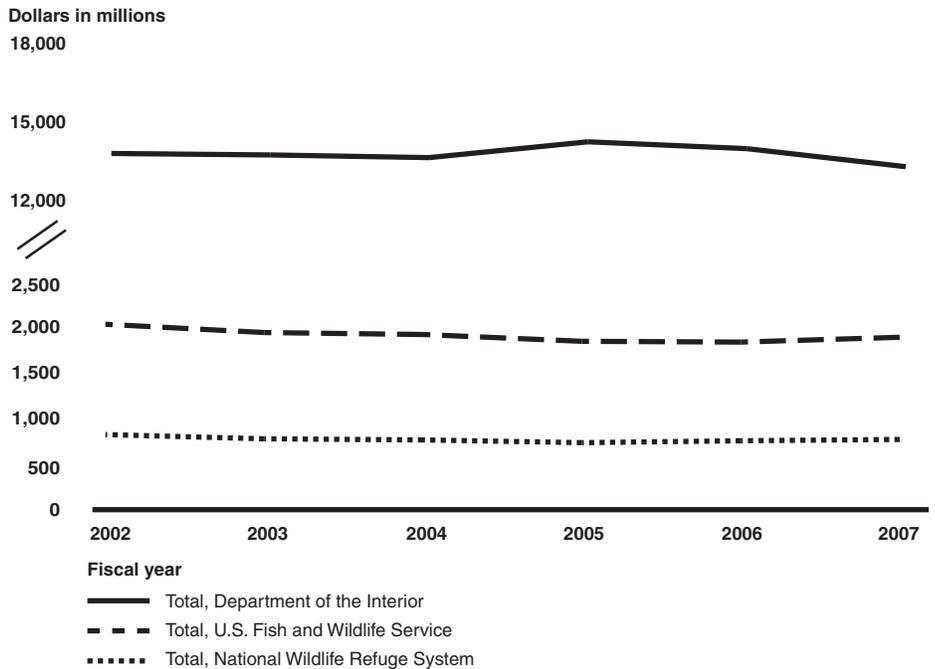
The declining trends in refuge system funding were comparable to general declines in obligations for FWS and Interior overall, although Interior fared somewhat better. FWS fared about the same as the refuge system ending in fiscal year 2007 at 7.5 percent below fiscal year 2002 levels, when adjusted for inflation. Interior overall fared somewhat better over the same period, declining 3.9 percent when adjusted for inflation. Figures 6 and 7 show the trends in nominal and inflation-adjusted obligations, respectively, made by the refuge system, FWS, and Interior from fiscal years 2002 through 2007.

Figure 6: Total Obligations for the Department of the Interior, Fish and Wildlife Service, and National Wildlife Refuge System, Nominal Dollars, Fiscal Years 2002 through 2007



Source: GAO analysis of Interior data.

Figure 7: Total Obligations for the Department of the Interior, Fish and Wildlife Service, and National Wildlife Refuge System, Inflation-Adjusted Dollars (in 2002 Dollars), Fiscal Years 2002 through 2007



Source: GAO analysis of Interior data.

Staffing Levels Increased through Fiscal Year 2004, Then Declined More Slowly Than Funding and Ended the Period Below Peak Levels

Staffing levels, as measured by FTEs the refuge system actually used, peaked later and declined more slowly than funding for both core refuge activities (core staffing) and all refuge activities (total staffing).¹³ FTEs for core staffing, which includes operations, maintenance, and fire management, increased from 3,283 in fiscal year 2002 to a peak of 3,610 in fiscal year 2004—an increase of 10.0 percent. Core staffing then fell back to 3,464 FTEs by fiscal year 2007—still 5.5 percent higher than the fiscal year 2002 level, but 4.0 percent below peak staffing levels. While operations and maintenance FTEs increased 3.6 percent overall during our study period, they ended the period down 6.9 percent from their 2004

¹³ Actual FTEs, representing staff time charged to specific activities at complexes and standalone refuges, are reported in the Federal Financial System. They differ from budgeted FTEs, which generally represent the operations and maintenance staffing ceiling for the refuge system in a given fiscal year and are reported in the annual FWS budget justifications.

peak. Fire management FTEs, on the other hand, increased 14.3 percent over fiscal year 2002 levels.¹⁴ Table 1 shows FTE trends for core refuge system activities from fiscal years 2002 through 2007.

Table 1: Core Refuge System FTEs, Fiscal Years 2002 through 2007

	2002	2003	2004	2005	2006	2007
Refuge system operations and maintenance FTEs	2,702	2,882	3,005	2,960	2,885	2,798
Refuge system fire management FTEs	582	610	605	595	660	665
Total refuge system core FTEs	3,283	3,493	3,610	3,556	3,545	3,464

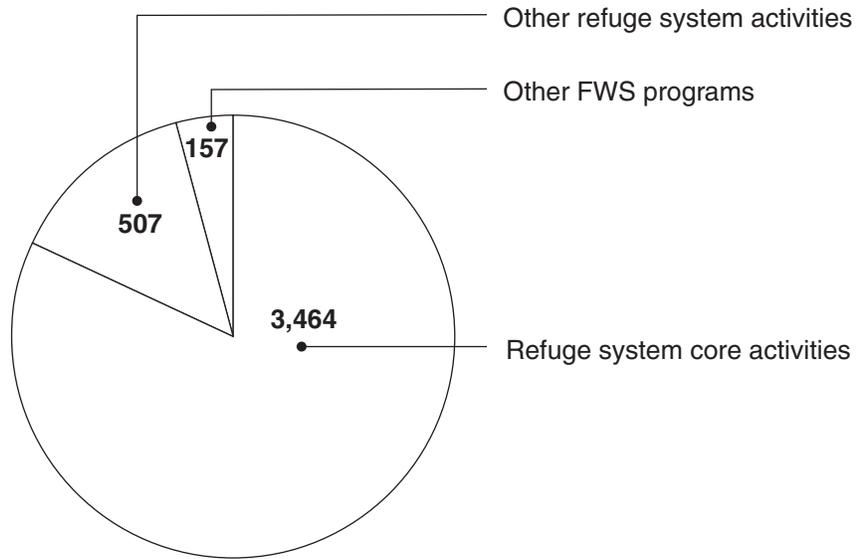
Source: GAO analysis of Fish and Wildlife Service data.

Note: Some columns do not sum due to rounding.

In contrast with funding, FTEs for noncore activities account for a relatively small portion of the total FTEs that support the refuge system. In fiscal year 2007, for example, 664 noncore FTEs supported the refuge system—about 16 percent of total FTEs—as illustrated in figure 8. Slightly more than 500 of these FTEs were allocated to the refuge system to manage construction projects, land acquisitions, grants, and donations, and to collect fees, among other refuge activities. FWS employees assigned to other agency programs accounted for about 157 of the 664 noncore FTEs for activities in support of the refuge system. For example, biologists from FWS’s Ecological Services program often monitor various species at refuges, supplementing the refuges’ habitat management activities while also furthering Ecological Services’ mission to conserve and restore threatened and endangered species.

¹⁴About 38 percent of the increase in fire management activities over the study period was due to an increase in emergency wildfire suppression, prevention of further degradation, and rehabilitation of burned areas.

Figure 8: Sources of Total FTEs that Supported the Refuge System, Fiscal Year 2007



Total: 4,128 FTEs

Source: GAO analysis of Fish and Wildlife Service data.

Similar to the trend in core FTEs, total FTEs used in support of the refuge system overall also peaked in fiscal year 2004 and then decreased through the remainder of the period. As table 2 illustrates, total FTEs increased 5.8 percent from fiscal year 2002 through fiscal year 2004, then declined through 2007, to close the period 0.9 percent higher than the fiscal year 2002 level. This amounted to a 4.7 percent drop from the peak staffing levels of fiscal year 2004.

Table 2: Total FTEs That Supported the Refuge System, Fiscal Years 2002 through 2007

	2002	2003	2004	2005	2006	2007
Refuge system FTEs	3,933	4,101	4,178	4,139	4,108	3,971
FTEs from other FWS programs	158	160	152	136	141	157
Total FTEs (including other FWS programs)	4,091	4,261	4,330	4,275	4,249	4,128

Source: GAO analysis of Fish and Wildlife Service data.

In addition to FTEs, the number of employees on board in refuge system positions also declined after peaking in fiscal year 2004.¹⁵ Through fiscal year 2007, nearly 375 employees were lost from the refuge system’s peak staffing levels, a reduction of 8.4 percent over this period (see table 3). About three-quarters of this loss came through a reduction in permanent employees. Refuge managers and regional and headquarters officials told us that the number of filled, permanent positions at refuges is a key measure of the effective strength of the workforce available to conduct core refuge activities because they represent employees on board indefinitely.¹⁶ Thus, the loss of 275 permanent employees (7.5 percent) since fiscal year 2004—generally through the elimination of vacant positions created by retirements and resignations—has reduced the number of staff available to conduct needed work. For the overall study period, total employees declined 4.0 percent below fiscal year 2002 levels and permanent employees declined 1.7 percent.

Table 3: Permanent and Total Refuge System Employees, Fiscal Years 2002 through 2007

	2002	2003	2004	2005	2006	2007
Permanent employees	3,446	3,592	3,663	3,624	3,512	3,388
Total employees	4,247	4,398	4,449	4,344	4,211	4,076

Source: GAO analysis of Fish and Wildlife Service data.

Note: The counts in the table are the number of employees as of July 1 for each fiscal year, which refuge system officials reported would represent the summer work season—and thus the annual staffing peak—at most refuges.

The overall fluctuation in staffing levels and the reductions since fiscal year 2004 in particular have affected many refuges. During the first 2 years of our study period, from fiscal year 2002 through 2004, 114 complexes and stand-alone refuges increased their permanent staff by more than 5 percent, while only 49 lost more than 5 percent and 55 stayed about the

¹⁵The employee counts discussed in this section are based upon the number of employees as of July 1 for each fiscal year, which refuge system officials reported would represent the summer work season—and thus the annual staffing peak—at most refuges.

¹⁶A position is occupied by one employee, either permanent or temporary, and working a full-time, part-time, or seasonal schedule. Conversely, a single FTE could encompass the hours worked by multiple employees. For example, four employees hired to work for 3 months during the summer would be the equivalent of 12 months of work, or one FTE, for the year. The same would be true for two employees who each worked 20 hours per week for an entire year. Thus an increase or decrease in the number of refuge system employees would likely result in a smaller related increase or decrease in total FTEs.

same.¹⁷ However, over the final 3 years, the situation was reversed: from fiscal year 2004 through 2007, the number of complexes and stand-alone refuges that lost more than 5 percent of their permanent staff more than doubled to 122, while only 38 gained at least 5 percent and 58 stayed about the same.

Several Policy Initiatives Were Implemented from Fiscal Years 2002 through 2007

The refuge system implemented several policy initiatives from fiscal years 2002 through 2007, including efforts to achieve more sustainable staffing levels, ensure the completion of conservation plans, construct a greater number of small visitor facilities, and modify the refuge system's law enforcement function. In addition, various refuge system, FWS, and Interior policies increased administrative work for nonadministrative refuge staff during this period.

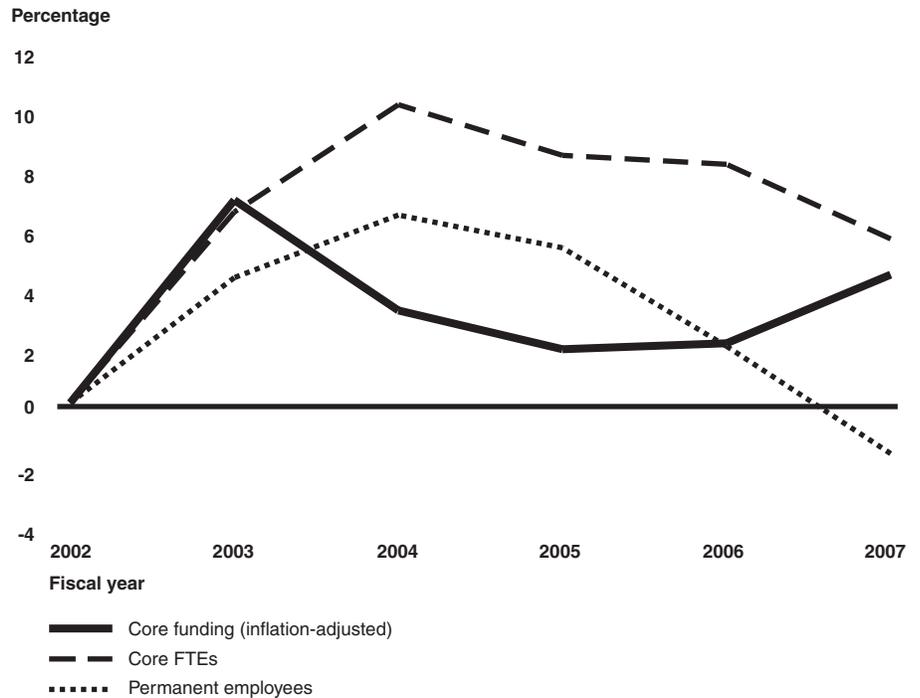
Workforce Management Planning

Because core staffing levels peaked later and declined more gradually than the system's core inflation-adjusted funding, as shown in figure 9, rising salary and benefit costs for these staff began to account for an increasing share of refuge budgets after fiscal year 2003.¹⁸ In many cases, there was an existing imbalance in refuge budgets that meant that personnel costs already were putting pressure on refuges' ability to operate. Generally, this reduced refuges' management capability—that is, the percentage of a refuge's budget available to pay for other operational costs that support its daily work, such as utilities, fuel, supplies, and seasonal labor. Although circumstances varied by refuge, some refuges' management capability shrank to less than 5 percent of their total budget—a nearly unsustainable operational scenario, according to some refuge managers and regional and headquarters officials we interviewed.

¹⁷“About the same” refers to those complexes and stand-alone refuges that neither gained nor lost more than 5 percent of their staff. Subtotals do not sum to 222, the total number of complexes and stand-alone refuges, because four offices were not staffed with at least one permanent employee during any of the 6 fiscal years in our study period.

¹⁸During our study period, the refuge system had to pay for mandatory federal pay increases as well as increasing employee benefits costs. For more information on rising salary and benefits costs for federal employees, see GAO, *National Park Service: Major Operations Funding Trends and How Selected Park Units Responded to Those Trends for Fiscal Years 2001 through 2005*, [GAO-06-431](#) (Washington, D.C.: Mar. 31, 2006).

Figure 9: Comparison of Cumulative Percentage Change in the Refuge System's Core Funding, Core FTEs, and Permanent Employees, Fiscal Years 2002 through 2007



Source: GAO analysis of Fish and Wildlife Service data.

To attain a more sustainable balance between staffing costs and management capability, in fiscal year 2006, each regional office was directed to develop a workforce management plan. According to FWS guidance for these plans and interviews with senior refuge officials, regions were instructed to focus on doing “fewer things better,” that is, to allocate limited resources in such a way as to showcase selected refuges, rather than to allocate them across all refuges such that the level of habitat management and visitor services would be equally degraded. Although workforce plans differed by region, they generally proposed to

-
- increase management capability to a minimum of 25 percent of refuges' operating budgets by reducing the share devoted to salaries and benefits to 75 percent or less;¹⁹
 - reduce staff costs by (1) abolishing staff positions that became vacant through retirements and resignations, and (2) further consolidating refuges into complexes to eliminate redundant positions and reduce administrative costs;
 - categorize all refuges into one of three tiers—called focus refuges, targeted reduction refuges, or unstaffed satellite refuges—to prioritize them for funding and staffing increases or decreases; and
 - realign some vacated positions by moving them from lower- to higher-tiered refuges.

Although refuge system management did not intend for regions' workforce plans to conform to a rigid national standard, program headquarters did provide criteria for regions to use when placing refuges into the following tiers:

- **Focus refuges**, where FWS would strive to maintain or enhance field operations, would be selected because of the significance of their natural resources, important opportunities for wildlife-dependent recreation, or other "highly significant" values.
- **Targeted reduction refuges**, where reductions in operations would occur, also would be selected on the basis of natural resources, recreation, and other values, but would be considered a lower priority than focus refuges.
- **Unstaffed satellite refuges** had no specific criteria, but would include both refuges that have never been staffed and those that were to be destaffed due to budget constraints. Refuge system documents, as well as our interviews and site visits, showed these refuges to be often smaller, more remote, and less complex to manage than those in the upper two tiers.

¹⁹The original target ratio for most regions was 20 percent management capability to 80 percent salaries and benefits, but the management capability target was subsequently raised. Refuges in Alaska, Hawaii, and the Pacific Islands targeted a higher proportion of management capability due to their greater operational costs, especially for fuel and other essential supplies.

According to refuge system officials, the process for determining staff reductions, realignments, and refuge tiers varied considerably across regions, and refuge managers disagreed over the appropriateness of the methods some regions used. For example, Region 7 (Alaska) designated all of its refuges as focus refuges, while all other regions placed their refuges into each of the three tiers. Of the 275 refuge managers who answered a survey question on this issue, 41 percent responded that the criteria for categorizing refuges into tiers were appropriate to distinguish among the competing priorities in their respective regions, another 37 percent responded that they were not appropriate, and the remainder said they had no basis to judge. While most of the respondents who disagreed with their region's criteria were from lower-tiered refuges, 25 percent of those who responded this way managed at least one highest-priority, or focus, refuge. Refuge managers acknowledged that additional management capability was necessary for continued operations, and understood that workforce planning decisions that affected funding and staffing levels were inherently difficult. Still, according to a senior regional office official, refuge tiering added to the emotional strain of an already stressed workforce, establishing a "have" versus "have not" mentality that many staff took personally.

Implementation of workforce plans shifted funds and staff from lower-priority refuges to higher-priority refuges or from the regional office to the field, and reduced the total number of positions located at refuges. In all, about 375 refuge and regional office positions were either abolished—through elimination of vacant positions—or moved, with managerial, biological, and maintenance positions among those most frequently targeted for reduction or realignment. These changes were responsible for most of the 275 permanent employees who were lost after fiscal year 2004. By design, lower-tiered refuges absorbed a heavier share of these staff cuts and realignments. According to refuge system officials, the \$36 million increase in the fiscal year 2008 allocation for the refuge system from the resource management appropriation was being used in part to restore some of these lost positions and funding at targeted reduction refuges. Further, regional officials reported that management capability across each region had reached the desired margin of at least 25 percent of refuges' operational budgets. However, given that the fiscal year was not complete before the end of our review, we did not obtain additional data on FTE or position changes at refuges.

Conservation Planning

From fiscal years 2002 through 2007, refuge system officials implemented steps intended to ensure that comprehensive conservation plans mandated by the Improvement Act are completed on time. In early fiscal year 2004, refuge officials realized that they were not on track to complete the 554

Visitor Service Facility
Construction

conservation plans required by 2012—the due date mandated by the act.²⁰ At that time, refuge officials assessed needs and goals with regard to completing the plans, and provided recommendations to encourage timely completion as well as a monitoring and evaluation strategy. At the end of fiscal year 2005, however, refuge officials noted that the completion of these plans was still behind schedule—only 19 percent of the plans were complete even though more than half of the 15-year time frame had elapsed. To help ensure that the plans would be completed on time, refuge system officials required, among other things, refuge managers to identify work that could be set aside to focus on completing conservation plans. They also required regions to develop completion dates and milestones for completing the plans and to use a central database for tracking milestones. To date, about half of the 554 plans have been completed and about one-third are underway. Refuge officials said that they believe that they can meet the deadlines; however, some plans are still behind schedule.

In 2003, in response to discussions with Congress about how best to fulfill the requirement to provide the six wildlife-dependent activities described in the Improvement Act, the refuge system began an initiative to place greater emphasis on constructing small visitor facility structures, such as observation decks, informational kiosks, and restrooms, instead of larger visitor centers. These small structures are less expensive than visitor centers—which in 2007 were estimated to cost an average of \$5.7 million each—and can be completed more quickly. Thus, a larger number of refuges can receive visitor facility funds, enabling refuge system investments to benefit a larger number of visitors. For fiscal years 2003 through 2007, the refuge system directed about \$28 million toward these projects. Nevertheless, large visitor centers continue to be funded, and the refuge system was appropriated more than \$51 million for visitor center construction from fiscal years 2002 through 2007. Figure 10 shows examples of visitor facility infrastructure.

²⁰The Improvement Act excluded some refuges from the requirement to have comprehensive conservation plans completed by 2012.

Figure 10: Visitor Facilities at National Wildlife Refuges



Visitor center – Tualatin NWR



Interpretive kiosk – Great Bay NWR



Outdoor restroom – Great Bay NWR

Source: GAO.

Law Enforcement Modifications

In July 2002, in response to safety concerns, the Secretary of the Interior directed the refuge system to begin an initiative to modify its law enforcement program by, among other things, increasing the training requirements for officers, reducing the system's reliance on dual-function officers—staff with other primary duties who perform law enforcement duties part time—and creating an officer deployment model. Specifically, the refuge system increased the training requirements for law enforcement officers from 18 weeks to about 30 weeks from 2002 through 2007, with the vast majority of that increase coming from a new field training evaluation program. Refuge system officials also required some senior-

level staff, and all dual-function officers who were performing law enforcement functions less than 25 percent of their time, to cease performing their law enforcement duties beginning in 2003. As a result, the refuge system reduced the number of dual-function officers from 495 to 164 and hired 76 full-time officers who serve a single refuge. FWS also created a “zone officer” position to serve multiple refuges and has hired 45 of these officers.

In 2005, the International Association of Chiefs of Police released a law enforcement deployment model it developed with the refuge system to identify the level of law enforcement personnel needed to provide adequate protection of refuge resources and the public, and where those officers should be deployed. The model recommended a total of 845 law enforcement FTEs for the refuge system—about 600 FTEs more than the refuge system currently has on board.²¹ Given the refuge system’s current funding situation and the chances of the system attaining such a level, senior refuge officials have identified 450 positions as the minimum number they believe necessary to provide adequate protection. Refuge officials are hoping they can approach that minimum number by hiring an additional 200 officers in the near term.

New Administrative Work

During our study period, refuge managers told us that they began feeling the burden of a myriad of new administrative work, especially work that applies to nonadministrative staff, resulting from refuge system, FWS, and Interior policies. Ninety-three percent of refuge managers who responded to our survey said administrative duties for nonadministrative staff have increased since 2002; less than 2 percent of refuge managers reported a decrease in this workload. For example, refuge managers expressed concerns that the number of national reporting requirements and extent of mandatory training classes, among other administrative tasks, were burdensome. Furthermore, the refuge system created a new maintenance database that required much more data entry than the previous system. In addition, managers indicated that they have been receiving an increasing number of data calls over the years.

In 2003, refuge managers began an effort to address increasing administrative requirements and more than 300 refuge managers participated in discussions about the problem. Several managers formed an ad hoc committee in 2003 to address the issue and several officials from headquarters and regional offices joined the effort in 2004. Together, they

²¹In calculating the number of law enforcement FTEs currently on board, all dual-function officers were counted as .25 FTE.

drafted a white paper that provided several recommendations to reduce the burden. A headquarters team took the effort over and, in October 2007, released a report detailing their findings and 17 recommendations for reducing some requirements, such as reviewing national reporting requirements and eliminating those deemed unnecessary, as well as making Web-based training optional. According to refuge officials at headquarters, FWS is beginning to implement these 17 recommendations.

The Influence of Various External Factors That Complicate Refuges' Abilities to Manage Habitats and Provide Services Increased from Fiscal Years 2002 through 2007

A variety of factors that were generally outside the control of refuge system management became more influential between fiscal years 2002 and 2007. Some of these factors were natural occurrences, such as extreme weather, while others were due to the intensification of human activities, such as development. These factors added to refuge workload, complicating managers' abilities to protect habitat quality and provide visitor services.

One commonly cited external factor was extreme weather events such as droughts, floods, and severe winds. Survey results show that the contribution of extreme weather events to habitat problems increased at 52 percent of refuges; only 2 percent reported a decline. Storm damage also increased at many more refuges than it decreased: in particular, hurricanes Ivan, Katrina, and Rita in 2004 and 2005 damaged large parts of refuges in the southeastern United States. Eighteen refuges in three states were temporarily closed to the public as a result of these storms; a 19th refuge—Louisiana's Sabine NWR—remains closed to public use. According to FWS, storm damage to the refuge system in 2005 alone exceeded \$300 million.

Development pressures caused by the expansion of urban areas and problems associated with the conversion of off-refuge land to agriculture or industrial use also increased during this period. Refuge managers reported that human settlement infrastructure such as roads, housing, and airports increasingly contributed to refuge habitat problems between 2002 and 2007—around 46 percent of refuges. These development pressures can contribute pollution to refuge lands and waters and make it more difficult to maintain viable, interconnected habitat in and around a refuge's borders. Moreover, increasing development around refuges can be accompanied by an increase in the demand for recreational uses of nearby refuges, including some uses—such as recreational boating or rock-climbing—that may be incompatible with a refuge's established purpose. In addition, the influence of off-refuge agricultural and industrial activities increased for many more refuges than it decreased. Because refuges do not exist in isolation, they must be managed in concert with adjacent lands to maintain healthy habitats, a reality that requires managers to allocate

time to spend away from their refuges to develop working relationships with adjacent and upstream landowners.

Other external factors affecting the refuge system include inadequate water rights and rights-of-way, such as public roads that divide refuge lands; the impacts associated with these factors worsened at more refuges than they improved, though they were stable for almost half of all respondents. Additionally, almost a quarter of the responses to our survey identified impacts associated with climate change as one of the biggest threats to habitat condition throughout the system. Managers reported that they already are seeing effects that they attribute to climate change, including drying of wetlands and wildfires of increased frequency and intensity. In addition to the obvious effects on habitat condition, these disturbances can affect wildlife-dependent visitor services, such as hunting or photography, to the extent that they change waterfowl migration patterns or the ranges of land- and water-based wildlife that historically are native to a given refuge.²²

Several Changes in Habitat Management and Visitor Services Occurred at Refuges from Fiscal Years 2002 through 2007, Raising Managers' Concerns About Future Sustainability

From fiscal years 2002 through 2007, several changes occurred in refuges' habitat management and visitor services, creating concerns about the refuges' abilities to maintain high-quality habitat and visitor services in the future. While 28 percent to 40 percent of habitats on refuges for several types of key species improved between fiscal years 2002 and 2007, conditions at some refuges worsened and 7 percent to 20 percent of habitats were in poor condition in 2007. Refuge habitats are facing growing pressure from increasing habitat problems and external factors, and although most refuges increased time spent on habitat management activities, there is increasing concern from managers that staffing and funding constraints will inhibit the ability of refuges to maintain quality habitat in the future in light of increasing habitat problems and resource constraints. The quality of visitor services improved on one-fifth to nearly one-half of refuges between fiscal years 2002 and 2007, but environmental education and interpretation programs were of poor quality at about one-third of refuges in 2007. While some refuges have been able to increase the time spent on visitor services, refuge managers are concerned about their

²²For more information about the effects of climate change on federal lands, see GAO, *Climate Change: Agencies Should Develop Guidance for Addressing the Effects on Federal Land and Water Resources*, [GAO-07-863](#) (Washington, D.C.: Aug. 7, 2007). According to senior officials, the refuge system participates in a climate change workgroup within Interior, and refuges will include a discussion of potential climate change impacts in future comprehensive conservation plans.

ability to provide high-quality visitor services to the public given recent funding and staffing changes.

While Habitats on Refuges for Key Types of Species Improved More Often Than They Worsened between Fiscal Years 2002 and 2007, Others Are in Poor Condition and Many Refuge Managers Are Concerned about Maintaining Habitat Conditions

While 28 percent to 40 percent of habitats on refuges for several types of key species improved between fiscal years 2002 and 2007, conditions of 11 percent to 18 percent of refuge habitats worsened and 7 percent to 20 percent of habitats were in poor condition in 2007. Habitat problems and external factors are increasing at refuges, and most refuges increased the time spent on habitat management activities. However, managers are concerned that staffing and funding constraints will inhibit the refuges' ability to maintain quality habitat in the future.

Between Fiscal Years 2002 and 2007, Habitat Conditions on Refuges for Key Types of Species Improved More Often Than they Worsened, Although Some Refuges Have Poor Quality Habitat

Refuge managers reported that habitats for five key types of species we surveyed refuges about improved between 2002 and 2007 about two times as often as they worsened (see table 4).

Table 4: Change in Habitat Quality by Species Type, Fiscal Years 2002 through 2007

Species type	Percent of refuge habitats where quality improved	Percent of refuge habitats where quality stayed the same	Percent of refuge habitats where quality worsened
Waterfowl	36	47	18
Other migratory birds	40	44	17
Threatened and endangered species	28	52	11
Candidate threatened and endangered species	33	47	14
State species of concern	29	54	13

Source: GAO.

Notes: Refuge managers identified habitat quality for specific threatened and endangered species, candidate species, and state species of concern occurring on their refuges that are aggregated into these general "types of species" categories. Not all species occurred on every refuge. See app. I for a discussion of our methodology. Some rows may not sum to 100 due to rounding and survey responses such as "no basis to judge."

Tualatin River NWR outside of Portland, Oregon, for example, saw a marked improvement in wetland habitat, according to the refuge manager, as the refuge has begun to address an invasive weed infestation over the past year. The refuge has been addressing two primary invasive plants—knotgrass and cocklebur—that had infested approximately one-third of the refuge’s 600 wetland acres since 2003, overtaking the native wetland plants that thousands of birds rely on for food during migration. Through herbicide application, mowing and discing, and water level manipulation, the refuge was able to cut infestations in half over the last year, bringing the habitat back up to sufficient quality for use by the migrating birds.²³ We observed the results of some of these activities to remove knotgrass (see fig. 11).

Figure 11: Results of Activities to Remove Knotgrass at Tualatin River National Wildlife Refuge



Source: GAO.

Refuge managers also reported that 11 percent to 18 percent of habitats on refuges for key species have worsened since 2002. Camas NWR in Idaho, for example, has faced a drought for the last several years. According to the refuge manager, the lack of water has negatively impacted a riparian zone of cottonwoods and willows that migrating birds, such as yellow warblers, use during migration. In addition, many of the trees in the

²³Discing is a type of soil tillage involving a series of disc-shaped plows.

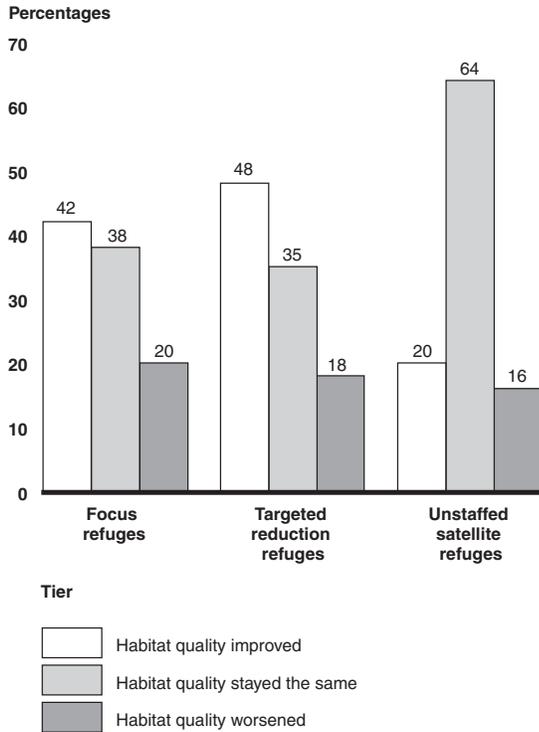
riparian area are close to 100 years old and are dying. Currently, the refuge is working on a plan to restore the vegetation, relying in part on wells for irrigation, but expects it will take decades to restore.

As might be expected, we found differences in changes in the quality of habitat for waterfowl and other migratory birds between focus and targeted reduction refuges when compared to unstaffed refuges (see figs. 12 and 13). Specifically, we found that managers at focus and targeted reduction refuges were significantly more likely to report that habitat quality for waterfowl improved between 2002 and 2007 than at unstaffed satellite refuges.²⁴ For example, between fiscal years 2002 and 2007, more than twice as many focus refuges experienced improved waterfowl habitat (42 percent) as experienced worsened waterfowl habitat (20 percent). At unstaffed satellite refuges, by contrast, habitat for waterfowl worsened almost as frequently as it improved, with 20 percent of refuges experiencing improved quality and 16 percent experiencing worsened quality. We found a similar situation for other migratory birds. We also found that these relationships generally remain strong in statistical models that simultaneously account for the effects of the change in staff time and the change in external factors, such as extreme weather and agricultural activity, which can contribute to habitat problems. For example, based on these models, we estimate that focus refuges were 3.4 times more likely than unstaffed satellite refuges to experience improved rather than worsened habitat quality for other migratory birds and that targeted reduction refuges were 3.9 times more likely.²⁵

²⁴Our survey results also show that refuge managers are far more likely to rate habitats on unstaffed satellite refuges as low priority than habitats on focus or targeted reduction refuges. This is consistent with what managers told us about the criteria for placing refuges into tiers. For example, unstaffed refuges generally are smaller and more remote, and have less complex and less important habitat, than the higher tiered refuges. In spite of this, our statistical models show that unstaffed satellite refuges are more likely to experience worsened habitat even after accounting for habitat priority. See app. II for details.

²⁵After accounting for changes in staff time and external factors, our model for waterfowl habitat did not find that focus refuges were significantly more likely than unstaffed satellite refuges to report that habitat improved, rather than worsened, although the difference between targeted reduction and unstaffed satellite refuges remained statistically significant. See app. II for details on our analysis.

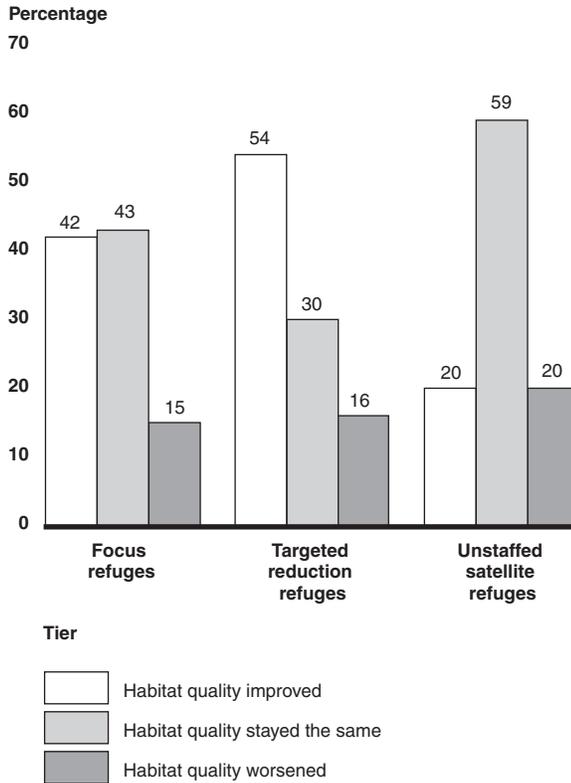
Figure 12: Change in Quality of Waterfowl Habitat by Refuge Tier, Fiscal Years 2002 through 2007



Source: GAO analysis of Fish and Wildlife Service data.

Notes: Results are based on data from 381 refuges that provided usable responses to the corresponding questions on our survey and that reported that providing waterfowl habitat was a priority at their refuge. See app. II for further details on this analysis.

Figure 13: Change in Quality of Other Migratory Bird Habitat by Refuge Tier, Fiscal Years 2002 through 2007



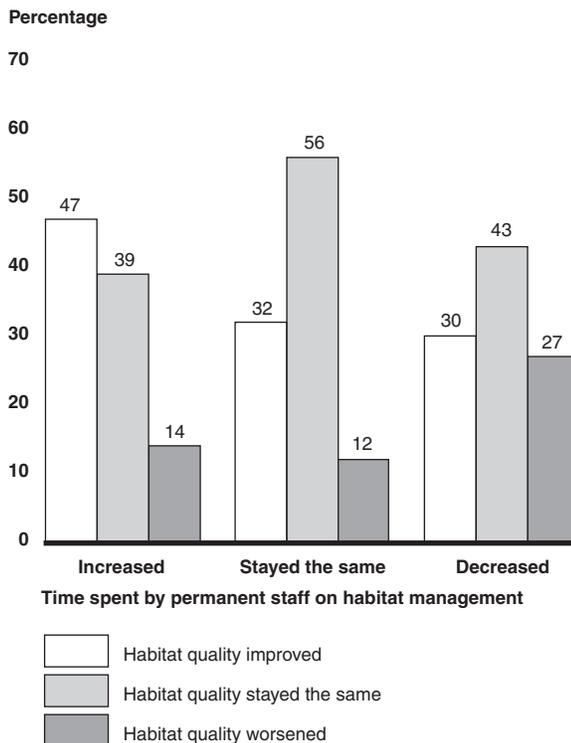
Source: GAO analysis of Fish and Wildlife Service data.

Notes: Results are based on data from 407 refuges that provided usable responses to the corresponding questions on our survey and that reported that providing habitat for other migratory birds was a priority at their refuge. See app. II for further details on this analysis.

In addition to analyzing the change in quality by tier, we analyzed changes in the quality of habitat as a function of the time spent by permanent staff at a refuge on habitat management activities. We found that refuge managers were more likely to report that habitat quality improved at refuges that increased the time spent on habitat management since 2002 than for those that reduced time, and were less likely to report that habitat quality worsened (see fig. 14). These results were consistent with our

analysis of the change in quality of habitat as a function of staffing level changes at complexes and stand-alone refuges.²⁶

Figure 14: Change in Quality of Waterfowl Habitat by Change in Time Spent on Habitat Management Activities, Fiscal Years 2002 through 2007



Source: GAO analysis of Fish and Wildlife Service data.

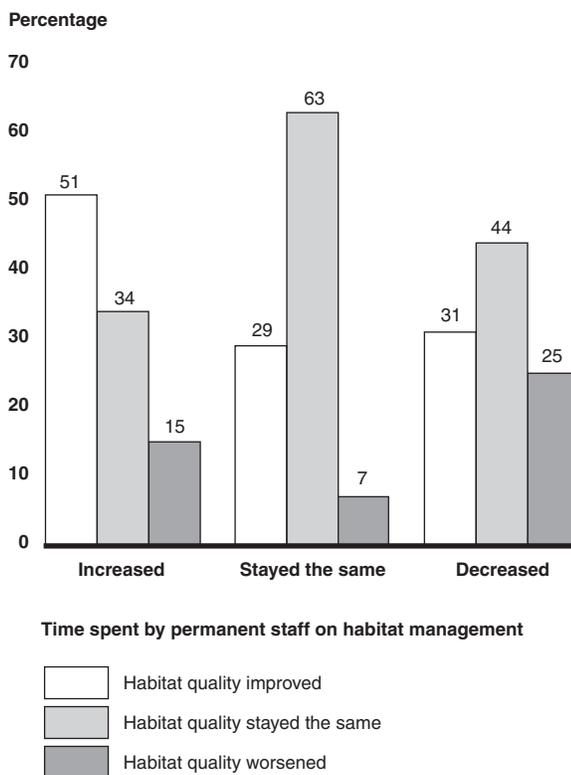
Notes: Results are based on data from 374 refuges that provided usable responses to the corresponding questions on our survey and that reported that providing waterfowl habitat was a priority at their refuge. See app. II for further details on this analysis.

The odds of habitat for waterfowl improving rather than worsening were significantly higher at refuges where staff time on habitat management activities increased rather than decreased between fiscal years 2002 and 2007. For example, among refuges where staff time increased, more than three times as many refuges experienced improved habitat for waterfowl (47 percent) as experienced worsened habitat (14 percent). In contrast, among refuges where staff time decreased, nearly the same number of

²⁶See app. II for a discussion of the models developed for this analysis.

refuges experienced improved habitat for waterfowl (30 percent) as experienced worsened habitat (27 percent). We found similar results when comparing change in staff time with the change in habitat quality for other migratory birds (see fig. 15).

Figure 15: Change in Quality of Other Migratory Bird Habitat by Change in Time Spent on Habitat Management Activities, Fiscal Years 2002 through 2007



Source: GAO analysis of Fish and Wildlife Service data.

Notes: Results are based on data from 400 refuges that provided usable responses to the corresponding questions on our survey and that reported that providing habitat for other migratory birds was a priority at their refuge. See app. II for further details on this analysis.

When we developed statistical models of habitat change, refuges where staff time on habitat management activities increased were about 3.0 times more likely than refuges where staff time decreased to report improved, rather than worsened, habitat for both waterfowl and other migratory birds, even after accounting for the effects of tier designation and the change in external factors, such as extreme weather and agricultural activity, that may cause habitat problems.

Resource prioritization at refuges obviously influences the ability of refuges to maintain quality habitat. Refuge managers told us that decisions on how many resources to direct to refuges are based on a variety of factors. Some managers weigh the management needs of all the refuges within a complex, taking into account the relative importance of the habitats as well as the amount of time and resources needed for the management activities. Unstaffed satellite refuges generally are smaller and have lower-priority habitats and, in some cases, the refuges are limited in what management can do, according to managers. Because some unstaffed refuges are located some distance from equipment and supplies and from where refuge staff are located, these distances and associated costs are taken into account as well. Other managers told us that they will undertake efforts mainly in response to specific problems identified at these refuges, while otherwise they generally do not expend resources for habitat management. According to refuge managers, it often is difficult to know what needs to be done at unstaffed refuges because staff generally do not visit the refuges very frequently to monitor the habitats.

Even though the condition of many habitats is improving, many of these are still not high quality. Specifically, 40 percent of waterfowl habitats that improved since 2002 were still of moderate quality or poorer in 2007, while 65 percent of habitats that stayed in the same condition were of moderate quality or poorer. Similarly, for other migratory birds, 40 percent of habitats that improved in condition since 2002 were of moderate or poorer quality in 2007 and 55 percent of habitats that stayed in the same condition were of moderate quality or poorer. Refuge managers reported that, on average, habitats on about 44 percent of refuges for each of several types of key species—waterfowl, other migratory birds, threatened and endangered species, candidate threatened and endangered species, and state species of concern—were of high quality in 2007.²⁷ A similar percentage of refuges deemed their habitats to be of moderate quality, and 7 percent to 20 percent of refuges reported habitats to be of low quality, depending on the species type (see table 5).

²⁷Candidate species are those for which FWS has sufficient information on their biological status and threats to propose them as endangered or threatened under the Endangered Species Act, but for which development of a listing regulation is precluded by other higher-priority listing activities. A state species of concern, although not a formal term, is a species determined to be threatened, declining in population, rare, or unique by individual states' natural resource departments.

Table 5: Habitat Quality by Species Type, Fiscal Year 2007

Species type	Percent of habitats reported as high quality	Percent of habitats reported as moderate quality	Percent of habitats reported as low quality
Waterfowl	41	39	20
Other migratory birds	47	47	7
Threatened and endangered species	48	40	12
Candidate threatened and endangered species	37	46	17
State species of concern	47	41	13

Source: GAO.

Notes: Refuge managers identified habitat quality for specific threatened and endangered species, candidate species, and state species of concern occurring on their refuges that are aggregated into these general “types of species” categories. Not all species occurred on every refuge. Some rows may not sum to 100 due to rounding.

Habitat quality is determined by the availability of several key components, including fresh water, food sources, and nesting cover, among other things, and the absence of habitat problems, such as invasive species. High-quality habitat generally provides adequate amounts of each of these main habitat components and is not significantly affected by habitat problems, while low-quality habitat generally lacks these components and may have significant problems. Moderate-quality habitat has a mixture of good and bad attributes. For example, a habitat may have an excellent tree canopy that provides good nesting areas and protection, but the underlying vegetation may be inadequate as a food source due to an infestation of an invasive species that has driven out native plants. Some aspects of moderate-quality habitat are acceptable, but the problems must be addressed overall for these habitats to fully support the species that depend on them, according to managers with whom we spoke.

Other migratory birds, threatened and endangered species, and state species of concern appear to be faring the best with 47 percent or more of habitats on refuges deemed to be of high quality and 13 percent or less of habitats of low quality. Habitats for waterfowl and species that are candidates for listing under the Endangered Species Act are doing somewhat worse. Refuge managers told us that these findings may in part reflect the difficulty in addressing the very specific habitat needs of these

species and a lack of focus on addressing those needs because they are not yet listed under the act.

We spoke with some managers who have areas of robust, high-quality habitat on their refuge. For instance, Cache River NWR in Arkansas has approximately 65,000 acres of bottomland hardwood—45,000 acres of which are in pristine condition, with the remaining 20,000 acres in the early stages of regrowth after being restored from prior agricultural use. This refuge serves as an annual wintering area for 250,000 to 500,000 waterfowl including mallards, pintail, widgeon, gadwall, teal, and wood ducks. The refuge eradicated invasive kudzu plants using herbicides and its high-quality habitat provides necessary food, water, and cover for these waterfowl and also supports a variety of other migratory birds including warblers, indigo buntings, bluebirds, shorebirds, and wading birds.

However, we also spoke to managers who reported low-quality habitat on their refuges. At Bowdoin NWR in northern Montana, for example, habitat is compromised by water quality and quantity problems as a result of activities on nearby lands, including haying and cropland use. The quantity of water that the refuge receives is insufficient to allow adequate flow-through of the water supply and, as a result, the water available for the refuge contains high levels of residual salt as well as agricultural chemicals, which affect the composition of vegetation and the survival of invertebrates. While a variety of bird species uses the refuge, including waterfowl, shorebirds, bald eagle, peregrine falcons, and piping plover—a federally listed threatened and endangered species—some populations of these species have declined over time.

In addition to habitat quality, whether a refuge's habitat is meeting the needs of key species types is an important indicator as to a refuge's effectiveness in meeting its conservation mission. Our survey found that refuge managers reported that habitats at a majority of refuges were meeting the needs of key species types to a moderate or large extent in 2007 (see table 6).

Table 6: Extent to Which Habitat Is Meeting the Needs of Species, Fiscal Year 2007

Species type	Percent of habitats meeting the needs of the species to a large extent	Percent of habitats meeting the needs of the species to a moderate extent	Percent of habitats meeting the needs of the species to a small or no extent
Waterfowl	47	29	25
Other migratory birds	54	37	9
Threatened and endangered species	43	26	22
Candidate threatened and endangered species	37	28	26
State species of concern	44	30	21

Source: GAO.

Notes: Refuge managers identified habitat quality for specific threatened and endangered species, candidate species, and state species of concern occurring on their refuges that are aggregated into these general “types of species” categories. Not all species types occurred on every refuge. Some rows may not sum to 100 due to rounding and survey responses such as “no basis to judge.”

Some refuge managers indicated that poor-quality habitat could still meet the needs of some species to a large extent, just as high-quality habitat could fail to meet the needs of some species to a large extent depending on the species’ needs. High-quality habitat could fail to meet the needs of a given species if, for instance, the species’ population was too large for the refuge to support or if other species were competing for the same refuge habitat, according to managers. In contrast, a habitat of moderate quality could meet the needs of a species if that species population was small.

Species that are candidates for listing under the Endangered Species Act appear to be faring the worst, while other migratory birds appear to be faring the best with regard to how well the habitat is meeting species’ needs. It is important to note that wildlife refuges are not necessarily intended to provide habitat for all types of species—some refuges were established to serve the needs of specific species such as waterfowl or a particular endangered species, for example—and do not necessarily focus on providing habitat for other species. When managers were asked to rate the importance of their habitat for the different types of key species we asked about, some of the refuge managers that reported low-quality habitats also rated the habitat as having low importance or priority for the

Habitat Problems and External Threats Are Increasingly Affecting Refuges

species in question.²⁸ For instance, about 56 percent of waterfowl habitat that managers reported as low quality, they also considered that habitat on their refuge to be low-priority habitat or not a priority for waterfowl; they considered about 28 percent of low-quality habitat for other migratory birds to be low-priority habitat or not a priority.

Refuge managers reported that many refuges were negatively affected by a number of problems and external factors, including invasive species, habitat fragmentation, water quantity and quality problems, and soil erosion, and that these problems and factors were increasing (see table 7).

Table 7: Common Refuge Problems Affecting Habitat and Trends in These Problems, Fiscal Years 2002 through 2007

Problem	Percent of refuges reporting as a large problem	Percent of refuges reporting as a moderate problem	Percent of refuges reporting the problem as increasing
Invasive plants	55	23	55
Habitat fragmentation	44	21	57
Invasive animals	21	21	23
Lack of water	18	13	25
Soil erosion	15	13	22
Water pollution	11	17	12

Source: GAO.

Invasive plant infestation was the most frequently reported problem, cited as a large problem on more than half of refuges and a moderate problem on nearly a quarter of refuges, and was reported to be increasing on more than half of refuges. This concern is consistent with information from the most recent refuge system performance report as well, which shows that more than 2.3 million acres of refuge lands are infested by invasive plants and more than 80 percent of refuges have at least some invasive plants present. Refuge managers with whom we met during site visits stressed that invasive plants have become a problem that affects the quality of their refuges' habitats and threatens the quality of the refuge system as a whole.

²⁸For waterfowl and other migratory birds we asked refuge managers to rate the priority of their habitat with regard to the purpose of their refuge. For threatened and endangered species, candidate species, and state species of concern, managers were asked to rate the importance of the habitat on their refuge in relation to the total amount of habitat available to the species both on and off the refuge.

According to managers, these invading plants overtake native plant species that are used by animals for food and shelter, and have deleterious effects on biological diversity. For instance, the refuge manager at Merritt Island NWR in Florida told us that 30,000 acres of habitat on the refuge are infested with invasive plants including Australian pine, Brazilian pepper, Old World climbing fern, guinea grass, and cogongrass. In fact, the Brazilian pepper has infested every one of the 75 water level control structures on the refuge, with some impoundments more than 50 percent overtaken by the invasive plant. These invasive plants are eliminating native habitat and negatively impacting migrating birds such as rails, bitterns, sparrows, Florida scrub-jays, and other species, according to the refuge manager.

We observed a common invasive plant, purple loosestrife, at several refuges we visited. Purple loosestrife crowds out native plants and can dramatically reduce food, shelter, and nesting sites for wetland-dependent species (see fig. 16).

Figure 16: Purple Loosestrife



Source: GAO.

The refuge manager responsible for Antioch Dunes NWR north of San Francisco, described her refuge as being “in a constant uphill battle” against invasive plants, including vetch, thistles, and various grasses. The refuge is home to two endangered plants that depend on dune habitat on the refuge—the Contra Costa wallflower and the Antioch Dunes evening primrose—as well as the Lange’s Metalmark butterfly, a federal endangered butterfly species that occurs only on this refuge. However, the

refuge has been inundated with a variety of invasive plants that, if not constantly addressed, threaten to overtake the native habitat, including the naked stem buckwheat on which the butterfly depends. The refuge manager told us that the butterfly population declined for 4 consecutive years, losing about 50 percent of the population each year, but increased in fiscal year 2007.

In addition, refuge officials told us that invasive plants, like many other problems, can worsen if they are not dealt with swiftly. For example, a refuge may be able to completely eradicate an invasive plant if it addresses it early and thoroughly. In some cases this may require actions for several years in a row, as invasive plants frequently require consistent investment and treatment strategies from year to year. If not treated early, the infestation may spread exponentially and become a serious, long-term problem. Gains made in one year can be lost many times over if control efforts are not sustained.

Invasive animals also are problematic for refuges and were reported to be a large problem on one-fifth of refuges. For example, nutria, a large rodent species from South America, has infested refuges in east, west, and Gulf coast states.²⁹ Nutria can wreak havoc on water level control at refuges by burrowing into and destabilizing streambanks and damaging water control structures (see fig. 17).

²⁹Nutria are semiaquatic rodents that weigh about 12 to 15 pounds and also are known as coypu.

Figure 17: Nutria and Streambank Damage



Source: GAO.

Habitat fragmentation was the second-most frequently identified problem for refuges, reported as a large problem at 44 percent of refuges, and increasing on 57 percent of refuges. Habitat fragmentation occurs when corridors of continuous habitat are disrupted, often by human development activities, which affects the refuge system's ability to accomplish its wildlife conservation mission. The seriousness of this issue was highlighted at a recent meeting of the Western Governors' Association by the release of a report on wildlife corridors.³⁰ Specifically, the report discusses the rapid changes due to development across the United States—but in the West in particular—and how this adversely affects wildlife, and emphasizes the need for habitat connectivity for species survival. Some species, for example, require large areas of homogenous habitat for successful nesting, foraging, or movement. Managers at refuges close to urban centers showed us examples of development adjacent to their refuge that have cut off natural habitat corridors, which can lead to animals trying to cross busy roads or can cut them off from other members of their species leading to genetic homogeneity and inbreeding.

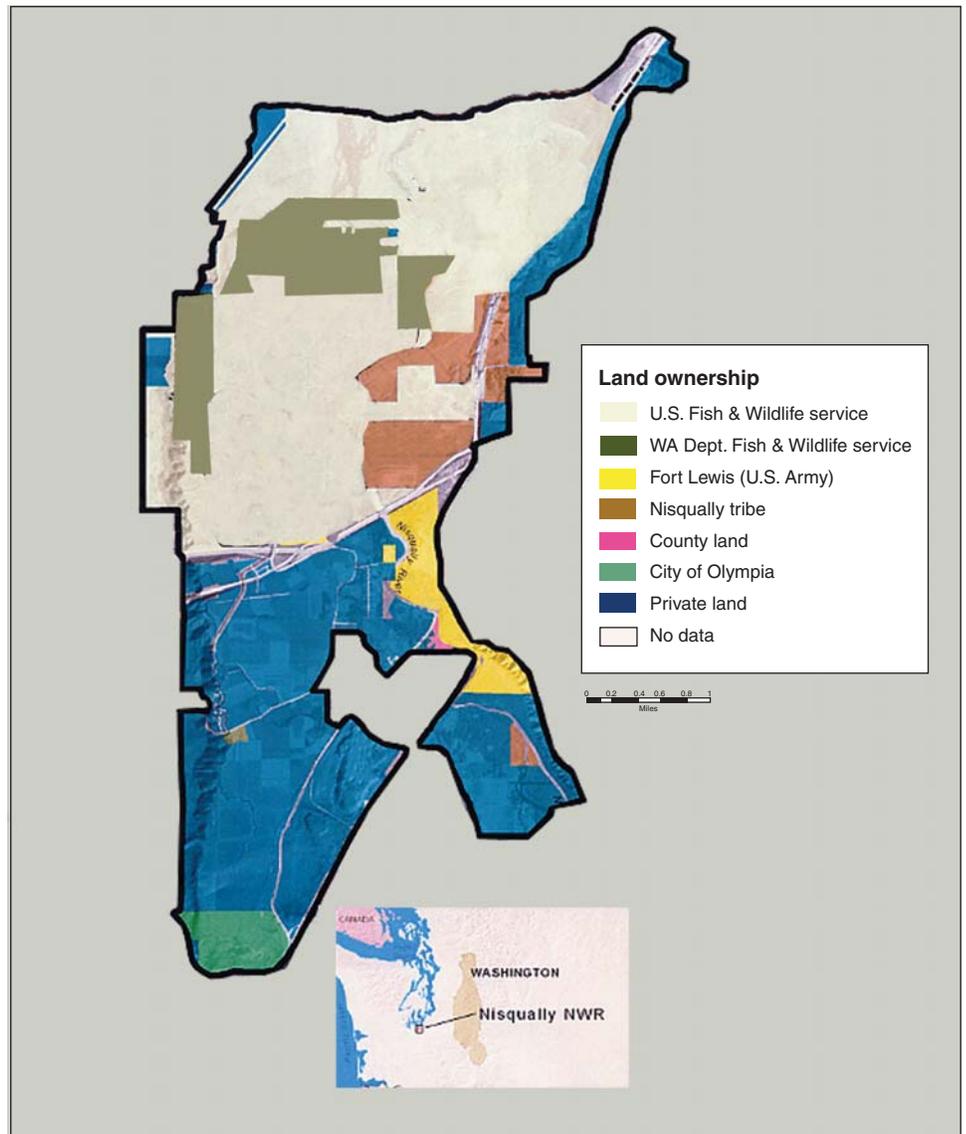
³⁰Western Governors' Association, *Wildlife Corridors Initiative Report* (Jackson, Wyoming, 2008).

For example, the refuge manager at Great Swamp NWR in New Jersey told us that increased development surrounding the refuge has fragmented or eliminated habitat. Valuable woodlots adjacent to refuge lands are decreasing in size or disappearing altogether around the refuge, limiting suitable nesting areas for species such as the red-shouldered hawk—a state threatened species. In addition, the manager said that movement by the bog turtle—a federal threatened species—has been constrained by fragmentation of its habitat. Managers of more rural refuges talked about increasing pressures to convert lands to agricultural uses, citing factors such as the increasing price of corn, or to industrial uses, such as oil and gas development.

Habitat fragmentation sometimes occurs within a refuge’s “approved acquisition boundary.”³¹ A refuge’s approved acquisition boundary delineates an area that has been approved for inclusion in a national wildlife refuge but does not necessarily indicate that the entire area inside this boundary has been—or ever will be—acquired by FWS. An important conservation strategy for the refuge system that was codified in the Improvement Act is the ability to acquire important habitats, when possible. Thus, many refuges have acquisition plans for lands adjacent to or near existing refuge lands to complete or supplement current refuge habitat. For example, the acquisition plan for Nisqually NWR outside of Olympia, Washington, includes 4,470 acres for eventual purchase within its approved acquisition boundary (see fig. 18). The refuge manager at Nisqually reported that increasing urban development is one of the biggest problems facing the refuge. In addition to impacts such as reduced water quality and increased crime, the manager told us that quality habitat around the refuge is being lost to development despite an active refuge acquisition program, because the refuge cannot address all habitat and land protection needs at the pace necessary to offset habitat loss. Overall, the refuge system has purchased only limited amounts of land within the last 5 years, growing the system at approximately 0.25 percent per year. When asked about their ability to manage an even larger refuge system—a logical concern given the funding and staffing concerns currently facing the refuge system—several managers were quick to point out that simply protecting lands from development was a critical first step in conserving wildlife, even if they did not have the resources to actively manage the land.

³¹Refuge managers we spoke with considered land within the approved acquisition boundary but not yet purchased to be “refuge lands” for conceptual discussion purposes.

Figure 18: Nisqually National Wildlife Refuge Approved Acquisition Boundary



Source: Fish and Wildlife Service.

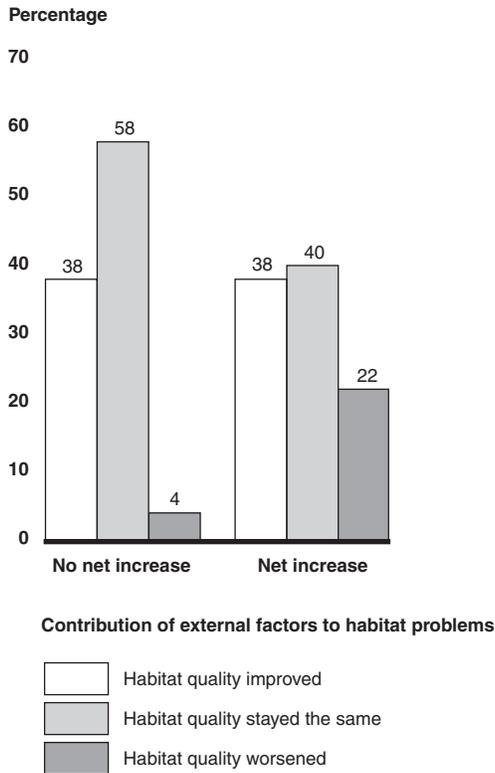
As noted previously, refuge managers also reported a number of external factors that contribute to habitat problems on refuges, including extreme weather and development, and that the contribution of these factors increased during our study period. Refuge managers told us that extreme weather has caused water levels to vary, which can result in the drying of wetlands, increased fire, and actual changes in the size and location of

species ranges. Development activities also can increase air, soil, and water pollution to refuge lands and waters. For example, the refuge manager at Ridgefield NWR, which lies in a small watershed in southern Washington, told us increased urban development means more impervious surfaces such as roads, driveways, and sidewalks, thus increasing the amount of water polluted with oil, gasoline, yard chemicals, and animal waste, among other things, that runs directly into the refuge during rainfall, and decreases the amount of water that permeates the soil. In addition, development can increase visitation at refuges, which can negatively impact refuge resources. For instance, the refuge manager at the Upper Mississippi NWR told us that recreational boating has led to trash dumping, trampling of habitat, and excessive noise. Likewise, Ridgefield NWR must deal with increased litter, illegal dumping, increased trespassing, and damage to the habitat from increased refuge visitation levels. Agricultural activities near the refuges also can contribute pollutants to refuge lands and waters from runoff from animal waste and fertilizers, for example.

Not surprisingly, managers reported that habitat was more likely to worsen at refuges where there was an increase in external factors that contribute to habitat problems, such as extreme weather and off-refuge agricultural activities (see fig. 19).³² For example, among refuges that reported no net increase in external factors, about 9.5 times more refuges reported improved waterfowl habitat (38 percent) than reported worsened waterfowl habitat (4 percent). By contrast, among refuges that experienced a net increase in external factors, the number of refuges that experienced improved waterfowl habitat (38 percent) was much closer to the number that experienced worsened habitat (22 percent).

³²We combined results from a series of survey questions to classify refuges as either having a net increase or no net increase in the contribution of external factors to habitat problems. See appendix II for further discussion of our methodology.

Figure 19: Change in the Quality of Waterfowl Habitat by Change in the Contribution of External Factors, Fiscal Years 2002 through 2007

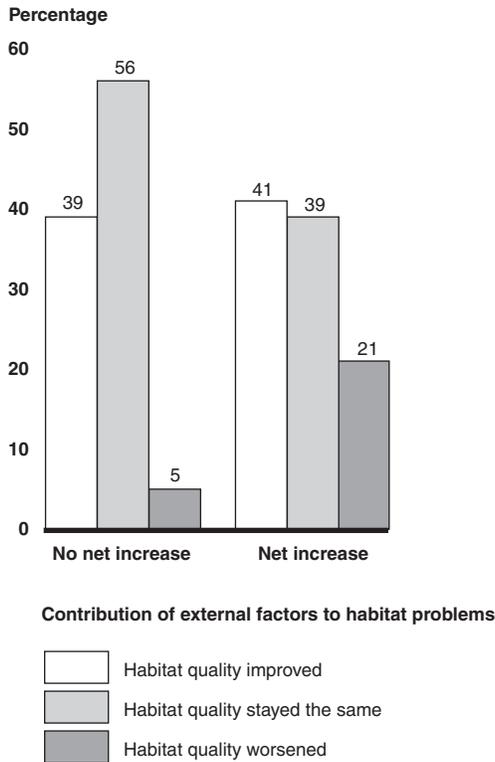


Source: GAO analysis of Fish and Wildlife Service data.

Notes: Results are based on data from 381 refuges that provided usable responses to the corresponding questions on our survey and that reported that providing waterfowl habitat was a priority at their refuge. See app. II for further details on this analysis.

We found similar results for the change in other migratory bird habitat (see fig. 20).

Figure 20: Change in the Quality of Other Migratory Bird Habitat by Change in the Contribution of External Factors, Fiscal Years 2002 through 2007



Source: GAO analysis of Fish and Wildlife Service data.

Notes: Results are based on data from 407 refuges that provided usable responses to the corresponding questions on our survey and that reported that providing habitat for other migratory birds was a priority at their refuge. See app. II for further details on this analysis.

Based on our statistical models, which assess the effects of a change in external factors while adjusting for the effects of tier designation and the change in staff time, we estimate that refuges that experienced no net increase in the number of external factors were about 7.0 times more likely to experience improved, rather than worsened, waterfowl habitat quality and 5.1 times more likely to experience improved, rather than worsened, habitat quality for other migratory birds.

Time Spent on Certain Habitat Management Activities Increased at Many Refuges

Refuge managers reported increasing the time spent on a number of key habitat management activities on many refuges between fiscal years 2002 and 2007 (see table 8).

Table 8: Habitat Management Activities That Increased the Most at Refuges, Fiscal Years 2002 through 2007

Activity	Percent of refuges that somewhat or greatly increased time spent on activity	Percent of refuges that somewhat or greatly decreased time spent on activity
Addressing invasive plants	61	9
Conducting comprehensive conservation planning	59	6
Coordinating with nearby landowners	49	7
Conducting habitat restoration projects	48	14
Conducting routine habitat management activities	43	18
Conducting inventory and monitoring surveys of habitat conditions	41	19
Conducting inventory and monitoring surveys of wildlife populations	39	21

Source: GAO.

Not surprisingly, given the number of refuges with invasive plant problems, refuge managers reported somewhat or greatly increasing time spent addressing invasive plant infestations on 61 percent of refuges, while somewhat or greatly decreasing time spent on this activity at only 9 percent of refuges. The refuge system’s national strategy for managing invasive species states that “invasive species are, collectively, the single greatest threat to native plants, fish, and wildlife with the potential to degrade entire ecosystems;” however, eradicating or effectively controlling invasive species through actions such as controlled burning, mowing, manual removal, and herbicide application is often resource intensive. For example, Antioch Dunes NWR is using a combination of managed grazing, herbicide application, manual removal, and tractors and other equipment to prevent several invasive species from harming two endangered plant species and an endangered butterfly species.

In fiscal year 2007, about \$9.8 million was budgeted for specific invasive species activities. For example, about \$2.3 million was budgeted for invasive species strike teams in five specific areas of the country. These teams were designed to eradicate newly identified infestations before they become widespread with the goal of saving substantial funds in the long

run. In addition, more than \$500,000 was budgeted for mapping and tracking invasive plants on refuges and coordinating volunteer work for invasive species control activities. Eradication programs for specific species also were budgeted funds, such as \$700,000 for nutria eradication at the Blackwater NWR and Eastern Neck NWR in eastern Maryland and the Southeast Louisiana Refuges Complex; over \$1.3 million for spartina grass eradication at the Willapa NWR and Grays Harbor NWR in western Washington; and about \$200,000 for an exotic rodent species at the Pacific Remote Islands NWR Complex. In addition to these specific programs, refuge managers also may spend resources on other invasive species-related activities on their refuges.

Despite these investments, however, performance data from fiscal year 2007 show that only about 12 percent of the acreage identified as infested with invasive plants was treated in fiscal year 2007. The estimated cost of unfunded invasive species control projects found in the refuge system's operational needs database was more than \$150 million dollars at the end of 2007. The refuge system's national strategy for invasive species control states that nearly half of all refuges report that invasive species infestations interfere significantly with their wildlife management objectives. Given that refuge managers reported that invasive plants were increasing at many refuges and that new invasive species gain a foothold in the United States every year, refuges will likely be constantly battling this problem.

As might be expected given reported improvements in habitat quality during our study period, refuge managers reported increasing the time spent on basic habitat management activities such as haying, mowing, prescribed burning, or manipulating water levels on 43 percent of refuges and increasing time spent on habitat restoration activities, such as planting native grasses or trees, and creating water control structures, such as levees, at about 48 percent of refuges since fiscal year 2002. Basic management activities represent the day-to-day work that refuge staff perform to protect, conserve, and improve habitat conditions. Refuge managers, biologists, maintenance workers, and others routinely monitor water impoundments to ensure water levels are optimal for migrating birds, for instance. Restoration projects often have longer-term timelines and are meant to re-establish native habitats on the refuge. Such restoration projects—which may be as extensive as a restoration of a 100-acre grove of bottomland hardwood forest that could take nearly 50 years to complete, or as small as constructing a water impoundment to flood a small wetland area that could be constructed in a couple of months—are key to attracting and sustaining wildlife populations. Managers reported

decreasing the time spent on basic management and restoration activities at 18 percent and 14 percent of refuges, respectively.

Refuge managers' responses on changes in the time spent on inventory and monitoring surveys of habitat conditions and wildlife populations—which are key activities that allow refuges to identify, report on, and manage wildlife populations and specific problems—were more mixed. Refuge managers reported increasing the time spent on these activities at 40 percent of refuges, while decreasing time spent on 20 percent of refuges since 2002. These surveys are an important way to understand how well wildlife populations and habitats are doing and whether a refuge is accomplishing its habitat management goals. Managers told us that having accurate data on habitat conditions and wildlife populations, among other things, is critical as they develop and deploy their comprehensive conservation plans. In addition, a number of refuge managers told us that their comprehensive conservation planning efforts led them to increase the amount of survey work they conducted, as the planning efforts require baseline data on habitat and wildlife conditions. For example, Rappahannock River Valley NWR in Virginia increased its inventory and monitoring surveys, partly to support development of its comprehensive conservation plan. In addition, accurate data from these surveys are important for correctly reporting data for FWS's annual performance report and for early identification of problems affecting habitat. In the case of invasive species, for instance, a small infestation can spread exponentially over a very short time period.

Some managers indicated that they are conducting fewer surveys, some of which are of lower quality. The managers said that they are depending more on volunteers or temporary workers to do the surveys, which can limit the survey quality because volunteers may not have the requisite background, experience, or training in biological survey methods. Some refuge managers told us that they have had to cut back on needed survey work due to staffing and funding shortfalls, while a few others told us that increasingly available and easy-to-use technologies have helped them increase the amount of survey work being done.

Relatedly, refuge managers reported increasing time spent developing comprehensive conservation plans at nearly 60 percent of refuges since 2002—about two-thirds of refuges reported engaging in planning activities in fiscal year 2007. This is not surprising, given the requirement that all refuges must complete their plans by 2012, and the fact that less than 50 percent have been completed to date. The conservation planning process can be time consuming, given the need to hold public meetings, conduct environmental reviews, and coordinate with state and local entities.

During our interviews, several refuge managers told us that they generally did not obtain additional staff to develop these plans; instead, they have had to shift responsibilities from existing staff or curtail other refuge management activities to devote time to the plans. For example, one refuge manager reported that the refuge set aside an invasive species eradication project after several years of implementation in order to work on the conservation plan for the refuge. To minimize the time such planning has taken away from other refuge activities, some refuge managers we interviewed told us that they or their staff worked on the plans on their own time. One refuge manager reported that he worked on the comprehensive conservation plan on weekends and converted the refuge's biologist to a full-time planner on a temporary basis. Another manager stated that refuge staff attended fewer public meetings that were not related to the comprehensive conservation plan so they would not have to cut back on other refuge work.

Consistent with the importance that FWS places on working with owners of lands adjacent to and near refuges, refuge managers reported coordinating with landowners at more than 85 percent of refuges in 2007 and increasing the time spent on this activity at 50 percent of refuges since 2002. This coordination with adjacent landowners is increasing as concerns about habitat fragmentation and off-refuge pollution grow, and FWS increasingly is considering the need to deal with the broader ecosystems of which the refuges are a part. In addition, two refuge managers noted that coordination with adjacent landowners has the added benefit of being a good outreach tool and of giving the refuge, and the refuge system, a better image and a more positive status with the broader public. Some refuges have employees specifically designated to undertake these efforts, while others depend on the work of the refuge manager for these efforts.

Permanent staff and volunteers increased the time spent on habitat management activities at 48 percent and 45 percent of refuges, respectively (see table 9). However, consistent with shifts in resources as a result of workforce planning, permanent and temporary staff time spent on habitat management decreased at 29 percent and 19 percent of refuges, respectively.

Table 9: Change in Time Spent by Type of Worker on Habitat Management Activities, Fiscal Years 2002 through 2007

Type of staff	Percent of refuges reporting an increase in time spent	Percent of refuges reporting that time spent stayed the same	Percent of refuges reporting a decrease in time spent	Percent of refuges reporting not using this type of staff
Permanent staff	48	21	29	2
Volunteers	45	30	10	15
Temporary staff	32	23	19	27
Cooperators	32	35	7	27
Contract workers	25	23	7	46

Source: GAO.

Refuge managers have discretion over the activities on which staff spend their time. For instance, individual refuges face different challenges—due to such things as natural weather cycles and increases or decreases in habitat problems or external factors affecting habitat—that managers need to address. Other influences over how to prioritize staff time may result from management decisions, such as the decision to focus more on working with adjacent landowners, or statutory requirements, such as the comprehensive conservation plans that must be completed.

In discussing habitat management activities with refuge managers, managers indicated that unstaffed satellite refuges will generally only see habitat management work on an infrequent or “as-needed” basis. For instance, the manager for a refuge complex in southern Washington state told us that the complex’s unstaffed satellite refuge, which is not open to the public, gets management attention only during a few weeks per year when equipment and staff are available. Similarly, an unstaffed refuge in a complex in New Hampshire has been visited by refuge staff only five times in the past 7 years, according to the complex manager.

Based on our site visits, we learned that some refuges were attempting to address reductions in permanent staff by relying on volunteers or contractors more heavily. However, our survey results indicated that refuges that increased permanent staff time on habitat management were more likely to increase time spent by volunteers and contractors than refuges that decreased permanent staff time (see table 10).

Table 10: Percent Increase or Decrease in Time Spent on Habitat Management by Nonpermanent Workers as a Function of Permanent Staff Time Spent on Habitat Management, Fiscal Years 2002 through 2007

Increase or decrease in permanent staff time	Type of Staff	Percent of refuges reporting increase in time spent	Percent of refuges reporting time spent stayed the same	Percent of refuges reporting decrease in time spent
Refuges reporting increased permanent staff time on habitat management	Temporary	71	23	6
	Contract	61	36	3
	Volunteers	70	28	2
	Cooperators	63	34	3
Refuges reporting decreased permanent staff time on habitat management	Temporary	12	28	60
	Contract	27	35	38
	Volunteers	40	30	30
	Cooperators	28	48	25

Source: GAO.

While volunteers and contractors perform important functions, they cannot replace refuge staff because they must be managed, trained, and supervised. Across the board, if a refuge reported an increase in time spent on habitat management by permanent staff, they generally also spent more time on habitat management activities by all other type of worker; rarely did these refuges reduce the amount of time other workers spent on these activities, indicating the importance—as nearly every refuge manager we spoke with did—of permanent staff in order to carry out needed refuge work. For refuges that reduced permanent staff time on habitat management activities, the results were much more mixed. These refuges reported significantly more decreases in the amount of time that other workers spent on habitat management activities, and it does not appear to hold true that refuges that reduce staff necessarily rely more heavily on other types of workers. In particular, refuges where permanent staff time on habitat management activities decreased were significantly more likely to report decreases in time spent by volunteers at refuges and less likely to report increases in volunteer time, as compared to refuges where permanent staff increased. This likely reflects the catch-22 that refuge managers face with regard to volunteers—while having people interested in helping the refuge can help relieve their workload, volunteers still need direction, oversight, and sometimes training by refuge staff. While some refuge managers indicated that they would not be able to accomplish their habitat management objectives without their volunteer corps, there also is

Refuge Managers Are
Concerned about Their Ability
to Maintain Habitat Conditions

concern about the over-reliance on volunteers to assist with these activities because their availability over the long term is not guaranteed and volunteerism levels can fluctuate greatly.

In light of increasing problems and threats affecting refuge conditions, as well as recent funding and staffing constraints, refuge managers and regional and headquarters officials expressed concern about refuges' abilities to sustain or improve current habitat conditions for wildlife into the future; our survey results corroborate these concerns. While each refuge operates under unique circumstances and faces unique habitat challenges, refuge managers across the system are concerned about a variety of specific threats to their individual refuge habitats and to the refuge system as a whole. Although our survey results do not indicate major declines in habitat quality since fiscal year 2002, many managers are concerned about their ability to maintain quality conditions in the future.

Even though our survey showed that a large number of refuges increased staff time on habitat management activities, some refuge managers we interviewed explained that staff were simply working longer hours to get the work done. Several refuge managers repeatedly indicated that they are still trying to do everything possible to maintain adequate habitat, especially habitats for key species, such as waterfowl, other migratory birds, and threatened and endangered species, despite growing habitat problems and other factors affecting refuge habitats and an increasing administrative workload that reduces the amount of time refuge staff can spend performing habitat management work. Several managers said that attention to key habitats is the last thing that will stop receiving management attention in the event of declining funding. They told us that refuge staff are very dedicated to the purpose and mission of the refuge system, but that they fear employee burnout. Several managers even said that they have to limit the amount of time staff spend at the refuge, as these employees are working overtime without extra pay.

The Quality of Visitor Service Programs Improved More Often Than Worsened between Fiscal Years 2002 and 2007, but Some Programs Were Poor Quality in 2007 and Refuge Managers Are Concerned about the Quality of Visitor Services in the Future

The quality of visitor services improved on one-fifth to nearly one-half of refuges between fiscal years 2002 and 2007, but environmental education and interpretation programs worsened at some refuges and were of poor quality at about one-third of refuges in 2007. Although some refuges have increased the time spent on these services, refuge managers are concerned about their continued ability to provide high-quality visitor services to the public given recent funding and staffing changes.

Quality of Visitor Service Programs Varied within the Refuge System between Fiscal Years 2002 and 2007

Encouragingly, visitor services quality was reported as staying stable or improving since 2002 by the vast majority of refuge managers responding to our survey. Most notably, environmental education and interpretation programs showed the largest percentage of refuges reporting improvement, although these programs also showed the largest percentage reporting declines as well, as compared to other visitor services (see table 11).

Table 11: Change in Quality of Visitor Services Programs, Fiscal Years 2002 through 2007

Visitor Service	Percent of refuges reporting improved quality	Percent of refuges reporting quality stayed the same	Percent of refuges reporting quality worsened
Hunting	26	65	9
Fishing	19	68	13
Wildlife observation	36	56	8
Wildlife photography	27	65	8
Environmental education	40	39	22
Environmental interpretation	47	38	15

Source: GAO.

Notes: Refuges may not have programs in all six areas. Some rows may not sum to 100 due to rounding.

Our survey found that four of the six key visitor services provided to the public were of moderate or better quality at most refuges in 2007, but

environmental education and interpretation were reported to be low quality at about one-third of refuges (see table 12).

Table 12: Quality of Visitor Services Programs, Fiscal Year 2007

Visitor Service	Percent of refuges with high- or very high-quality programs	Percent of refuges with moderate-quality programs	Percent of refuges with low- or very low-quality programs
Hunting	56	35	9
Fishing	33	44	23
Wildlife observation	55	35	10
Wildlife photography	42	41	17
Environmental education	36	31	33
Environmental interpretation	32	36	32

Source: GAO.

Note: Refuges may not have programs in all six areas.

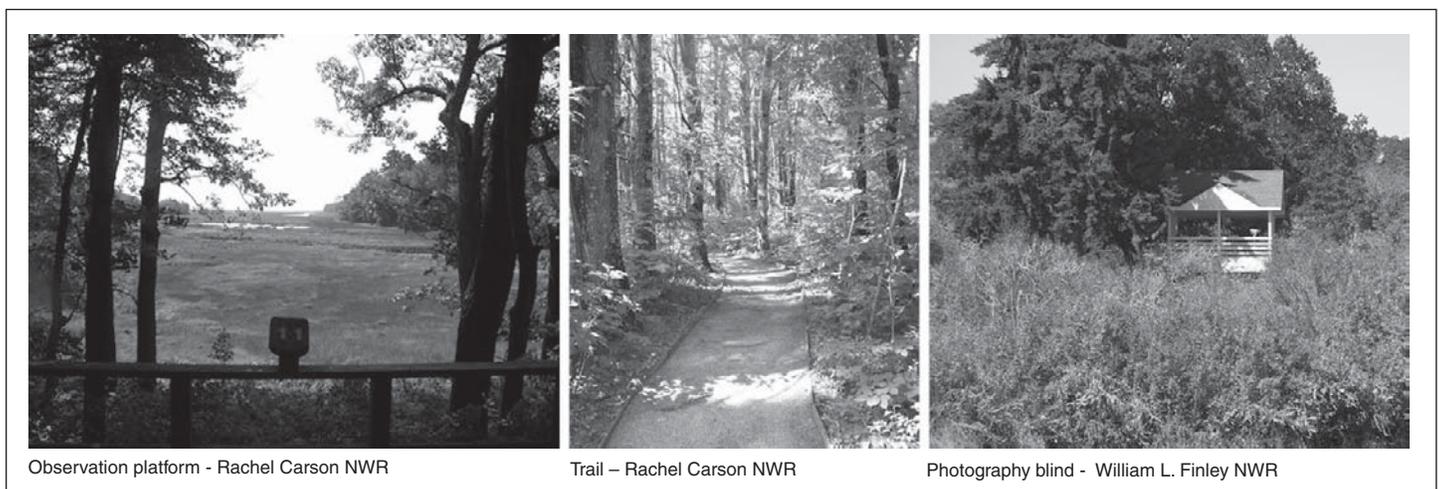
Visitor services deemed moderate quality did not invoke the same level of concern from refuge managers as did habitat deemed moderate quality. While managers would prefer high-quality programs, moderate quality does not jeopardize the survival of certain species, as moderate-quality habitat may. Hunting and wildlife observation programs topped the list of visitor services in quality, with high-quality programs at more than half of refuges and just about 10 percent of refuges with low-quality programs. Some managers told us that there is a focus on ensuring that hunting programs are successful because of the significant public demand for hunting on refuges. They also noted that it is fairly easy to support wildlife observation, as well as photography, via regular refuge infrastructure such as roads and trails; therefore, it is not resource intensive for refuges to implement and manage high-quality programs for these activities.

Environmental education and interpretation programs received the lowest marks, with about one-third of refuges with low-quality programs; about the same percentage of refuges had programs deemed high quality. Managers told us that education and interpretation are among the most resource-intensive visitor service programs because they require staff time for developing and delivering educational supplies, as well as infrastructure, such as classrooms. Refuge managers we met with told us that, for these reasons, environmental education and interpretation

programs often are among the first areas to be cut when a refuge faces competing demands.

A major factor influencing the quality of visitor services—beyond the abundance of fish and wildlife populations—is the amount and quality of refuge infrastructure and the availability of supplies. For example, the availability of trails and tour routes is essential to providing the public with access to what refuges have to offer and is generally important for supporting any type of visitor service activity. Hunting and fishing infrastructure depends largely on physical structures such as duck blinds, boat launches, and fishing platforms. Providing wildlife observation and photography opportunities simply requires adequate access to the refuge, but can be enhanced through observation platforms and photography blinds. Figure 21 shows examples of infrastructure for wildlife observation and photography.

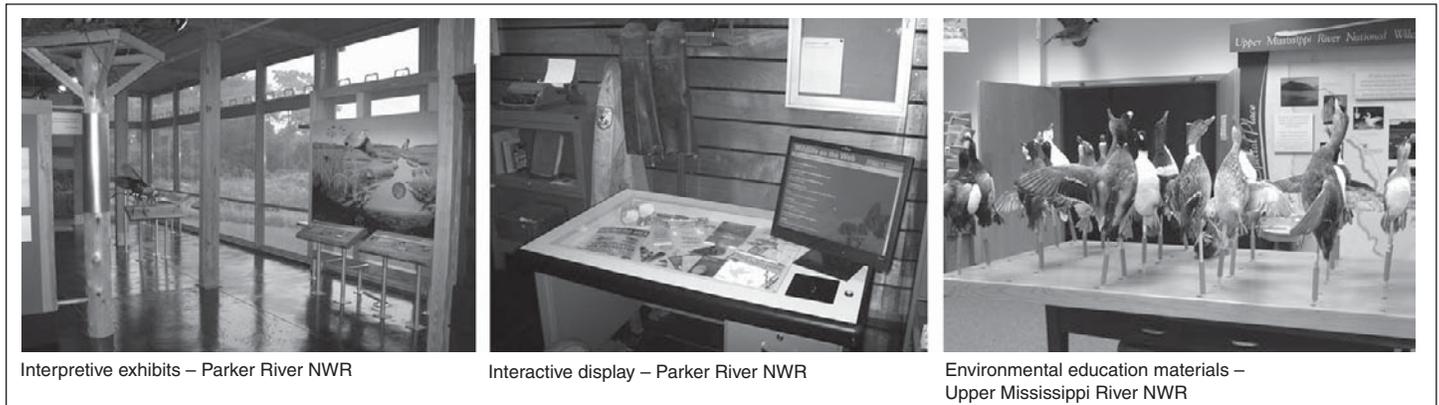
Figure 21: Examples of Visitor Services Infrastructure for Wildlife Observation and Photography



Source: GAO.

Environmental education depends on physical infrastructure, such as classrooms, and supplies, such as workbooks, handouts, and microscopes. Environmental interpretation also depends on physical infrastructure such as informational kiosks and interpretive signs along trails. Figure 22 shows examples of infrastructure for environmental education and interpretation.

Figure 22: Examples of Visitor Services Infrastructure for Environmental Education and Interpretation



Source: GAO.

The amount and quality of visitor services infrastructure stayed about the same or increased on the vast majority of refuges since 2002 (see table 13).

Table 13: Infrastructure Quantity and Condition Changes, Fiscal Years 2002 through 2007

Type of infrastructure	Quantity of infrastructure			Condition of infrastructure		
	Quantity increased	Quantity stayed the same	Quantity decreased	Condition improved	Condition stayed the same	Condition worsened
Trails and tour routes ^a	41	54	5	39	35	26
Hunting infrastructure	21	75	4	22	66	12
Fishing infrastructure	25	70	5	27	49	24
Wildlife observation infrastructure	37	60	3	36	47	17
Wildlife photography infrastructure	35	63	3	30	58	12
Education infrastructure	28	66	6	30	52	18
Interpretation infrastructure	57	38	5	50	32	19

Source: GAO.

Note: Some rows may not sum to 100 for the quantity of infrastructure or condition of infrastructure, due to rounding.

^aTrails and tour routes can be used to support all types of visitor service programs.

According to refuge managers and regional officials, improvements at least partly reflect the initiative to focus funding on small-scale visitor services infrastructure, such as improvements to parking lots and construction of informational kiosks and restrooms. The increased ability of refuges to implement such projects likely is responsible for refuge managers' assessments of improvements in environmental interpretation. However, infrastructure conditions worsened at between 12 percent and 26 percent of refuges. According to refuge managers, this reflects that, in many cases, refuges have insufficient staff and funding to keep up with necessary infrastructure maintenance and repairs. In addition, many managers we interviewed reported that they still lack enough infrastructure to deliver quality visitor services and meet the demand for these services. Refuge managers reported that insufficient infrastructure has negatively impacted the quality of education and interpretation programs to at least a moderate extent on about 60 percent of refuges, photography and observation programs on about 40 percent of refuges, and hunting and fishing programs on about 20 percent of refuges. Some refuge managers reported that there is no infrastructure at all on their refuges for the visiting public. In addition, some refuge managers reported not being able to meet public demand for some programs. For example, one refuge manager told us that while many local schools request environmental education programs, the refuge must turn them down because they have no facilities to accommodate school groups. Some refuge managers we spoke with indicated that they would be able to stimulate additional demand for all visitor services if they could improve the amount and quality of infrastructure, including trails, hunting blinds, boat launches, photography blinds, and observation platforms.

Change in Time Spent on Visitor Service Activities Varied across the Refuge System

Consistent with the improvements in program quality noted for environmental education and interpretation (at 40 percent and 47 percent of refuges, respectively), managers reported increases in the time spent on these programs at 44 percent of refuges. These programs, however, also received less time on 29 percent and 27 percent of refuges, respectively. Overall, at least one in five refuges reported a decrease in staff time for each visitor service area (see table 14).

Table 14: Change in Time Spent on Visitor Services, Fiscal Years 2002 through 2007

Visitor service	Percent of refuges that somewhat or greatly increased time spent	Percent of refuges that spent the same amount of time spent	Percent of refuges that somewhat or greatly decreased time spent
Hunting	29	46	25
Fishing	20	60	20
Observation	34	45	21
Photography	25	54	21
Education	44	27	29
Interpretation	44	28	27

Source: GAO.

Notes: Percentages in this table represent changes in staffing for those refuges that report time spent on a given visitor service. Some rows may not sum to 100 due to rounding.

In some cases, according to several refuge managers, the changes in time spent may reflect a shift in staffing due to workforce planning, while in other cases, it may reflect the prerogative of refuge managers to move staff away from visitor services in favor of needed habitat management activities.

Not surprisingly, more than half of refuge managers reported increasing the amount of time spent on visitor services by volunteers (see table 15). Refuge managers said that volunteers frequently are relied upon to help manage visitor centers and deliver education programs. Given staff reductions due to workforce planning and comments from managers that visitor services are the first to be cut when resources are constrained, it also is not surprising to see that time spent by permanent staff on visitor services had been reduced at more than one-third of refuges. When comparing these results to those for habitat management, more refuges increased permanent, temporary, and contractor staff time on habitat management activities than increased their time on visitor services activities. Conversely, more refuges increased time spent by volunteers and cooperators on visitor services than on habitat management.

Table 15: Change in Time Spent on Visitor Services by Type of Worker, Fiscal Years 2002 through 2007

Worker	Percent of refuges reporting increased time spent	Percent of refuges reporting time spent stayed the same	Percent of refuges reporting decreased time spent
Permanent staff	38	26	37
Temporary staff	32	41	26
Contract worker	28	61	11
Volunteer	57	31	13
Cooperators	38	54	8

Source: GAO.

Notes: Percentages in this table represent changes in staffing for those refuges that report time spent on a given visitor service; some refuges do not use some types of workers. Some rows may not sum to 100 due to rounding.

We found that the time spent by various types of workers on visitor service activities as a function of increases or decreases in time spent by permanent staff were similar to the results for the time spent on habitat management. Specifically, as with time spent on habitat management, refuges that reported an increase in permanent staff time for visitor services were more likely than those reporting a decrease also to report an increase in other staff time. For example, refuges that reported an increase in permanent staff time spent on visitor services were eight times more likely to report an increase in the time spent by temporary staff on these programs than refuges that reported a decrease in permanent staff time. Refuges where permanent staff time increased also were twice as likely to increase volunteer time (see table 16).

Table 16: Percent Increase or Decrease in Nonpermanent Worker Time Spent on Visitor Services as a Function of Permanent Staff Time Spent on Visitor Services, Fiscal Years 2002 through 2007

	Type of staff	Percent of refuges reporting increased time spent	Percent of refuges reporting time spent stayed the same	Percent of refuges reporting decreased time spent
Refuges reporting increased permanent staff time	Temporary	69	23	8
	Contract	46	54	0
	Volunteers	81	17	2
	Cooperators	62	36	2
Refuges reporting decreased permanent staff time	Temporary	8	35	57
	Contract	12	64	25
	Volunteers	43	29	29
	Cooperators	24	59	18

Source: GAO.

Note: Some rows may not sum to 100 due to rounding.

This analysis also is consistent with our analysis of changes in staff time as a function of staff increases or decreases at a stand-alone refuge or complex.³³ In addition, those refuges that increased time spent on habitat management also tended to be the refuges that spent more time on visitor services. Specifically, refuges that reported spending more permanent staff time doing habitat management work were almost five times more likely to report spending permanent staff time providing visitor services, and refuges that reported spending less permanent staff time doing habitat management work were about four times more likely to report a decrease in permanent staff time providing visitor services. Again, this suggests that some refuges are seeing an overall gain in staff—most likely at focus refuges—while others are seeing an overall loss—likely at targeted-reduction and unstaffed satellite refuges.

As with habitat management activities, a lack of staff was identified as a key factor hindering the quality of some visitor service programs. Refuge managers identified staffing as a key factor negatively affecting the quality of environmental education and environmental interpretation programs at

³³Data on FTE changes are available only for complexes and stand-alone refuges and not for refuges that are part of complexes.

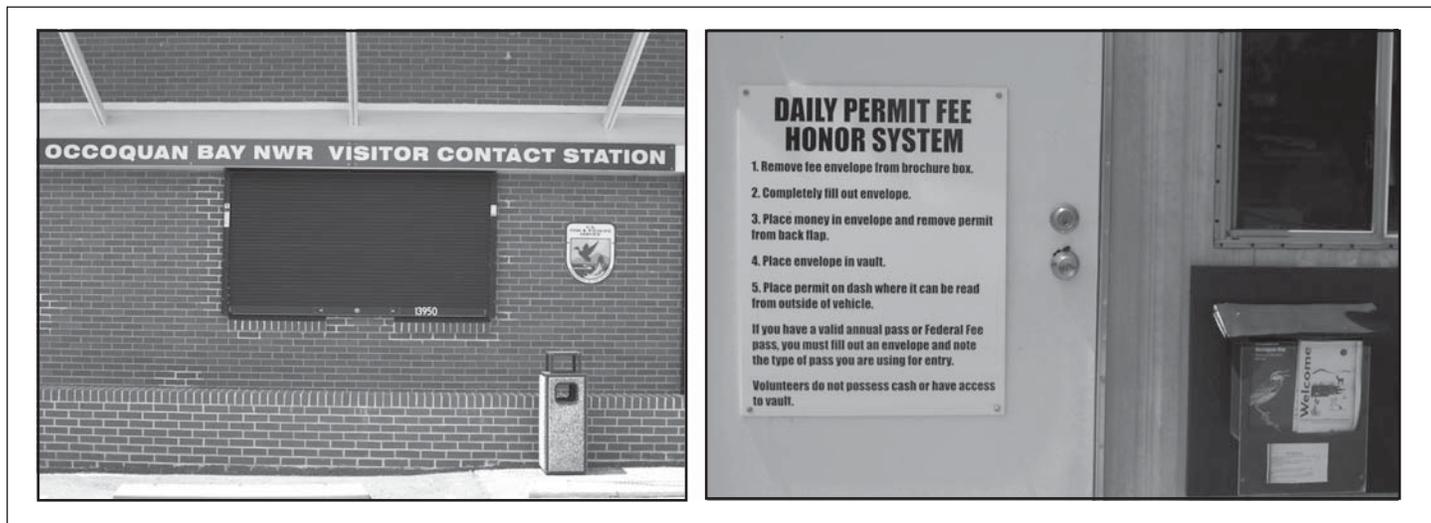
85 percent of refuges; staffing was cited as negatively affecting hunting programs at more than 50 percent of refuges.³⁴ According to refuge managers and regional documentation, some visitor service programs that were active in the past have had to be cut back due to staffing. For instance, plans to renovate a building used for environmental education at Wallkill River NWR in New Jersey were halted when staff reductions made it impossible to continue the refuge's emphasis on environmental education. Minnesota Valley NWR reported a 13 percent drop in the number of students participating in environmental education after the loss of park ranger staff, and Kodiak NWR reported that it curtailed its educational programs due to the elimination of an environmental education specialist position. In other cases, refuge managers told us that they do not seek out groups that would be interested in programs at the refuge because there simply are not enough refuge employees to provide the additional education and interpretation services that would be needed if more visitors were to come to the refuge. Similarly, some refuges do not have adequate staff to administer check stations full time during hunting seasons or adequate law enforcement personnel to enforce permitting requirements and take limits. The refuge manager at Cape Romain NWR in South Carolina reported an approximate 20 percent reduction in participation of the refuge's hunting program after the refuge lost a park ranger.

Some stakeholder groups have voiced serious concerns with the deteriorating condition of visitor services and public access to refuges due to recent funding trends and assert that the refuge system needs substantially more funding to fulfill the requirements of the Improvement Act. Some have noted concerns with refuges reducing hours or closing refuges to the public because of staff constraints. According to our survey of refuge managers, however, these concerns do not reflect widespread conditions. A very small number—about 4 percent—of refuges have decreased the hours they are open to the public, while slightly more than 12 percent indicated that they have actually increased the hours they are open. However, the change in the number of hours that visitor centers are open to the public varied quite substantially. Specifically, for those refuges that reported having visitor centers, 20 percent indicated that visitor center hours increased, while about 27 percent reported that hours decreased. For example, the visitor contact station at Occoquan Bay NWR has been closed for several years due to staffing shortages; instead, the refuge relies on an “honor fee” system (see fig. 23). Survey results do not

³⁴This includes only those refuges that reported spending any staff time on a particular visitor service.

show a significant difference among the three refuge tiers with regard to changes in the hours refuges are open to the public. However, according to our survey, targeted reduction refuges were almost twice as likely as focus refuges to have decreased the hours that their visitor center is open. This is most likely due to staffing changes resulting from workforce planning, which were targeted at targeted-reduction refuges.

Figure 23: Fee Box at Occoquan National Wildlife Refuge



Source: GAO.

Refuge Officials Are Concerned about Maintaining High-Quality Visitor Services into the Future

While some refuges have visitor services staff and sufficient infrastructure, refuge managers indicated that staffing changes, partially resulting from workforce planning, and a lack of resources for increasing and maintaining infrastructure, raise concerns about their ability to provide quality visitor services into the future. In fact, in response to an open-ended question concerning the biggest threats to visitor services on refuges, a large majority of managers cited either funding, staffing, and infrastructure as primary threats to the quality of visitor service delivery; almost 75 percent of refuge managers singled out staffing alone as the key problem affecting visitor services. As noted previously, refuge managers tend to focus resources on maintaining habitat conditions in times of tight budgets, at the expense of visitor services. Refuge managers also are concerned about the impact that the increasing administrative workload incurred by nonadministrative refuge staff is having on the refuges' ability to deliver visitor services—also noted as a major concern for refuges' ability to maintain habitat management.

Managers also expressed concern about a continued, and in some cases increasing, dependence on volunteers to keep up with public demand for visitor services. Volunteers help refuges with a large variety of visitor services activities including operating visitor centers, providing education and interpretive services, and building and maintaining interpretative kiosks and other infrastructure. However, managers told us that although volunteers provide valuable services, they cannot fully replace lost refuge staff. In addition, volunteerism levels are unpredictable, and many of the refuge managers we met with indicated that volunteer levels have generally been declining. Furthermore, as noted previously, even if a refuge has a good supply of volunteers, it will still need to devote employee time to training, supervising, and coordinating volunteers.

Refuge managers and regional and headquarters officials expressed concern about the long-term implications of declining and low-quality visitor services occurring at some refuges. Many refuge managers cited the importance of providing opportunities for the public to utilize refuge resources—in particular, ensuring they have positive outdoor experiences and providing them with meaningful educational and interpretative services—to the future of the refuge system. This helps ensure that refuges have visibility in the community, that the public understands the purpose and importance of what the refuge system does, and that refuges are thought of as a vital community resource. Refuge managers told us that positive recreational and educational experiences help ensure public support for refuge operations, and outreach and public education help bolster the number of people interested in volunteer opportunities on refuges. These activities also are important, according to refuge managers, because the refuge system increasingly is turning toward partnerships with private landowners in an effort to maintain and improve ecosystems both on and around refuges; public education about the refuge system can increase the viability of important refuge partnerships with nonprofit environmental and land management organizations who work with adjacent landowners, other federal and state land management agencies, and others on conservation efforts. Refuge officials also told us that public perception of land management work assists with land acquisitions, inasmuch as more private landowners will be willing to work with the agency on land transactions. In addition, refuge managers cited the availability of visitor services as a way to get young people interested in future careers with the refuge system and instill in children an appreciation for wildlife and the outdoors and an interest in maintaining these resources.

Concluding Observations

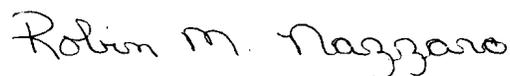
In light of continuing federal fiscal constraints and an ever-expanding list of challenges facing refuges, maintaining the refuge system as envisioned in law—where the biological integrity, diversity, and environmental health of the refuge system are maintained; priority visitor services are provided; and the strategic growth of the system is continued—may be difficult. While some refuges have high-quality habitat and visitor service programs and others have seen improvements since 2002, refuge managers are concerned about their ability to sustain high-quality refuge conditions and continue to improve conditions where needed because of expected continuing increases in external threats and habitat problems affecting refuges. Already, FWS has had to make trade-offs among refuges with regard to which habitat will be monitored and maintained, which visitor services will be offered, and which refuges will receive adequate law enforcement coverage. FWS's efforts to prioritize its use of funding and staff through workforce planning have restored some balance between refuge budgets and their associated staff costs. If threats and problems afflicting refuges continue to grow as expected, it will be important for the refuge system to monitor how these shifts in resources are affecting refuge conditions.

Agency Comments and Our Response

GAO provided Interior with a draft of this report for its review and comment. The department provided technical comments that we have incorporated as appropriate. The department's comments are presented in appendix VI.

As agreed with your offices, unless you publicly announce the contents of this report earlier, we plan no further distribution until 2 days from the report date. At that time, we will send copies of this report to interested congressional committees, the Secretary of the Interior, and other interested parties. We will also make copies of this report 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 offices have 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. Key contributors to this report are listed in appendix VII.



Robin Nazzaro
Director, Natural Resources
and Environment

Appendix I: Scope and Methodology

The objectives of this study were to (1) describe changing factors that the National Wildlife Refuge System experienced from fiscal years 2002 through 2007, including funding and staffing changes, and (2) examine how habitat management and visitor services changed during this period. To address these objectives, we reviewed relevant laws, regulations, and policies as well as numerous agency documents discussing the refuge system. We also reviewed other reports that related to refuge system operations such as reports on climate change and possible impacts on refuges published by the U.S. Environmental Protection Agency, on development and impacts on wildlife by the Western Governors' Association, and on challenges facing the refuge system by the Cooperative Alliance for Refuge Enhancement—a consortium of groups interested in the refuge system.

We obtained and analyzed funding and staffing data from the Federal Financial System and the Federal Personnel Payroll System, and refuge planning and performance data from the U.S. Fish and Wildlife Service's (FWS) Refuge Annual Performance Planning System. We worked with national program officials to identify the 222 complexes and stand-alone refuges that existed during the time period we reviewed. We interviewed database technicians and their managers to understand how the information in these databases is compiled and maintained. Where necessary, we worked with database technicians to ensure their output files contained needed data elements, and we validated our resulting analyses with regional and national program officials. Our review of the data and our discussions with program officials indicated that the payroll and personnel databases were sufficiently reliable for the purposes of our review. We used the performance planning system to assist in site selection and determined that it was sufficiently reliable for this purpose.

We analyzed the obligations data in both nominal and inflation-adjusted terms. To remove the effects of inflation, we adjusted nominal dollars using the Gross Domestic Product (GDP) Price Index for Government Consumption Expenditures and Gross Investment (federal nondefense sector), with 2002 as the base year. The price index reflects changes in the value of government output, measured by the cost of inputs, including compensation of employees and purchases of goods and services. Consistent with the proportion of FWS's operating expenditures on personnel, this price index is more heavily weighted by changes in federal workers' compensation than the overall GDP price index.

We met with officials at refuge system headquarters, refuge offices at 4 FWS regions (Hadley, Massachusetts; Denver, Colorado; Portland, Oregon; and Minneapolis, Minnesota), and 19 refuges, and conducted phone

interviews with officials at the other 4 regional offices and about 50 additional refuges. We selected refuges for site visits in order to see a range in geographic location, visitation level, refuge prioritization level, and type of management activities and challenges.

Given the differences in the refuges across the system and the need to gather information on a range of topics, we surveyed all 585 units within the refuge system—including stand-alone refuges and refuges within complexes. Survey respondents primarily were refuge managers or project leaders of refuge complexes. Survey questions were crafted to obtain information on a variety of issues, including how the following changed between fiscal years 2002 and 2007: the quality of various types of habitat, the extent of various habitat problems, the extent to which external factors affected habitat problems, the amount of time spent on various management activities, the amount and quality of visitor services infrastructure, and the quality of visitor services. We also inquired about their activities between fiscal years 2002 and 2007, and their perspectives on the challenges facing the refuge system and refuge management and reporting.¹

During our site visits and in interviews with 9 randomly selected refuge managers, we explored various potential survey questions to confirm we were eliciting the information we intended and whether managers could answer the questions in a clear, consistent manner with minimal difficulty in data recall, among other things. When it became clear that we needed to include “pick lists” of possible answers for certain questions, we utilized knowledge gained from prior interviews and obtained feedback from 12 refuge managers about what should be included in these lists. We conducted formal pretests with 8 refuge managers and used structured probes to determine: (1) if respondents had the information and knowledge necessary to answer the question, (2) if respondents interpreted the questions in the same way as other respondents, (3) if respondents interpreted the questions as we intended, (4) if respondents felt that the response categories offered the correct level of precision, and (5) if respondents felt that we used the terminology commonly used by refuge managers. After changes were incorporated to address pretesting concerns, we sent the survey to a random sample of 10 refuge managers to complete and “validate” the survey. No concerns were raised during the validations about respondent bias, response burden, relevancy of the questions, ability of the respondent to answer, or confidence in response

¹We did not ask questions about the quality of their programs in 2002 because we determined that these questions would not produce reliable responses.

accuracy. We also obtained comments from refuge system officials in headquarters. We then distributed the survey to all refuge units. Subsequently, we determined that 538 units should be included in our scope of analysis because FWS does not have full management responsibility for all of its units. We received an 81 percent response rate for this subset of refuges used in our analysis. We conducted follow-up interviews with 14 refuge managers to verify that we were correctly interpreting responses and to clarify certain points. See appendix II for a detailed discussion of the analysis of this survey.

Below is a summary of the key questions we are reporting on from the survey. We also asked other questions that we do not specifically report on to obtain further context.

- In fiscal year 2007, how would you rate the overall quality of habitat for waterfowl, other migratory birds, threatened and endangered species, and state species of concern? (Note: Refuges only answered these questions if they had the specified species on their refuge.)
- In fiscal year 2007, to what extent did the condition of the habitat on your refuge meet the needs of waterfowl, other migratory birds, threatened and endangered species, and state species of concern? (Note: Refuges only answered these questions if they had the specified species on their refuge.)
- Between fiscal year 2002 and fiscal year 2007, did the overall quality of habitat on your refuge improve, stay the same, or worsen for waterfowl, other migratory birds, threatened and endangered species, and state species of concern? (Note: Refuges only answered these questions if they had the specified species on their refuge.)
- In fiscal year 2007, how much of a problem were the following for the condition of the habitat on your refuge and did these problems increase, stay the same, or decrease between fiscal years 2002 and 2007: invasive plants, invasive animals, water pollution, soil contamination, air pollution, noise pollution, light pollution, plant disease, animal disease, habitat fragmentation on or around refuge, lack of water, excessive water, wildfire damage, storm damage, soil erosion, damage to habitat from recreational use, damage to habitat from crime, and other human disturbances? (Note: respondents were able to write in other problems occurring on their refuge.)
- In fiscal year 2007, how much did the following factors contribute to the habitat problems on your refuge and did they increase, stay the same, or decrease between fiscal years 2002 and 2007: extreme weather (such as drought, flood, wind, and temperature), off-refuge agriculture (such as

pesticide runoff, soil erosion, and manure), off-refuge industry (such as energy development, mining, logging, and military activities), off-refuge human settlement (such as roads, construction, housing, septic systems, and airports), rights of way (from roads and utilities), on-refuge sources of pollution (such as energy production, grazing, and legacy waste), on-refuge activities (such as visitation and fire suppression), inadequate water rights, and other factors (respondents could write in)?

- In fiscal year 2007, did workers on your refuge (including permanent employees, temporary employees, contract workers, volunteers, and cooperators) conduct the following habitat management activities and did the amount of time spent on these activities increase, stay the same, or decrease between fiscal years 2002 and 2007: addressing invasive plants, addressing invasive animals, addressing water pollution, addressing soil contamination, addressing air pollution, addressing light pollution, addressing plant disease, addressing animal disease, conducting routine habitat management activities, conducting habitat restoration projects, conducting inventory and monitoring surveys of habitat condition, conducting inventory and monitoring of wildlife populations, addressing habitat fragmentation, addressing lack of water, addressing excessive water, addressing damage to habitat from wildfire, addressing damage to habitat from storms, addressing damage to habitat from recreational use, addressing damage to habitat from crime, doing conservation planning, and coordinating with nearby landowners?
- Between fiscal years 2002 and 2007, did the amount of time spent by the following types of workers to conduct habitat management activities on your refuge increase, stay the same, or decrease: permanent employees, temporary employees, contract workers, volunteers, and cooperators?
- In fiscal year 2007, did your refuge provide the following visitor services: hunting, fishing, wildlife observation, wildlife photography, environmental education, and environmental interpretation?
- If you did not provide some of the six visitor services, what were the reasons: not compatible with refuge, lack of resources to provide, or other reasons?
- Between fiscal years 2002 and 2007, did the hours of the refuge or the visitor center on your refuge (if there is one) increase, stay the same, or decrease?
- Between fiscal years 2002 and 2007, did the quantity and condition of the following types of visitor services infrastructure increase, stay the same, or decrease: trail and tour routes, hunting infrastructure (such as blinds

and check stations), fishing infrastructure (such as boat launches, docks, and platforms), wildlife observation infrastructure (such as platforms and viewing areas), wildlife photography infrastructure (such as blinds, platforms, and viewing areas), education infrastructure (such as buildings and study locations), and interpretation infrastructure (such as signs, kiosks, and exhibits)?

- Between fiscal years 2002 and 2007, did the amount of time spent by all workers on your refuge (including permanent employees, temporary employees, contract workers, volunteers, and cooperators) to provide the following visitor services increase, stay the same, or decrease: hunting, fishing, wildlife observation, wildlife photography, environmental education, and environmental interpretation?
- Between fiscal years 2002 and 2007, did the amount of time spent by the following types of workers to provide visitor services on your refuge increase, stay the same, or decrease: permanent employees, temporary employees, contract workers, volunteers, and cooperators?
- In fiscal year 2007, how would you rate the overall quality of the following visitor services at your refuge and did the quality improve, stay the same, or worsen between fiscal years 2002 and 2007: hunting, fishing, wildlife observation, wildlife photography, environmental education, and environmental interpretation?
- In your professional judgment, what are the biggest threats to the condition of habitat and visitor services at your refuge?
- In your professional judgment, what are the biggest threats to the condition of habitat and visitor services for the National Wildlife Refuge System?
- Do you feel that the criteria for placing refuges into tiers were appropriate to distinguish among competing priorities of the refuges in your region?
- Between fiscal years 2002 and 2007, did the number of work days spent by your refuge's nonadministrative staff on selected administrative activities increase, stay the same, or decrease?

We conducted our work between July 2007 and September 2008 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence

obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. We also conducted reliability assessments of the data we obtained electronically and determined those data to be of sufficient quality to be used for the purposes of this report.

Appendix II: Statistical Analysis of Habitat Change

During our site visits to wildlife refuges, during our interviews with refuge managers, and in written responses to our survey questions, refuge managers asserted that staff reductions threaten the quality of wildlife habitat. To test these assertions, we developed statistical models that assess whether staffing change is associated with changes in habitat quality. In particular, our models assess whether refuges where staff spent decreased time on habitat management activities between fiscal years 2002 and 2007 were more likely than other refuges to report that habitat conditions worsened rather than improved. In assessing this likelihood, our models account for refuge characteristics other than change in staff time that might impact habitat conditions, including tier designation, which indicates relative importance of a refuge compared to other refuges, and the change in external factors, such as extreme weather and off-refuge agriculture, that contribute to habitat problems. The results of our models show that habitat was more likely to worsen, rather than to improve, at refuges where staff time decreased between fiscal years 2002 and 2007 compared to those where staff time increased, even after adjusting for these other characteristics.

Data Used in Our Analysis

Our analysis assesses the change in the quality of waterfowl and other migratory bird habitat as a function of three key refuge characteristics: (1) the change in staff time spent on habitat management, (2) tier designation, and (3) the change in external factors that contribute to habitat problems. Frequency counts for the key variables used in our analysis are presented in table 17.

Table 17: Summary Statistics for Habitat Change and Refuge Characteristics, Fiscal Years 2002 through 2007

Variables	Number	Percent
Change in quality of habitat for waterfowl		
Improved	145	38%
Stayed the same	167	44%
Worsened	69	18%
Total	381	100%
Change in quality of habitat for other migratory birds		
Improved	163	40%
Stayed the same	175	43%
Worsened	69	17%
Total	407	100%

Appendix II: Statistical Analysis of Habitat Change

Variables	Number	Percent
Change in time spent by permanent staff on habitat management activities		
Increased	209	49%
Stayed the same	91	21%
Decreased	127	30%
Total	427	100%
Refuge tier		
Focus	148	34%
Targeted reduction	155	36%
Unstaffed satellite	134	31%
Total	437	100%
Change in external factors that contribute to habitat problems		
Net increase	109	25%
No net increase	328	75%
Total	437	100%

Source: GAO's survey of wildlife refuge managers; tier designations come from FWS.

Note: Some columns may not sum to 100 percent because of rounding. The total number of refuges differs for each variable because of differing response rates for the corresponding questions in our survey.

To measure habitat change, we used responses to a question on our survey, which asked whether the overall quality of habitat on a refuge improved, stayed the same, or worsened between fiscal years 2002 and 2007. The question was asked separately for both waterfowl and for other migratory birds, leading to two indicators of the change in habitat quality. We used these two indicators to develop separate statistical models for waterfowl and for other migratory birds.

To measure the first key refuge characteristic, the change in staff time spent on habitat management activities, we used data from a question on our survey, which asked whether the total amount of time that permanent staff spent conducting habitat management activities on a particular refuge between fiscal years 2002 and 2007 increased, stayed the same, or decreased. For the second key refuge characteristic, tier designation, we obtained data from FWS for each refuge. In 2006, the agency designated refuges as focus, targeted reduction, or unstaffed satellite refuges. In our analysis, tier designation represents the relative importance of a given refuge within a complex as the agency determined in 2006. To measure the third key refuge characteristic, the impact of external factors, we used responses to a question on our survey, which asked whether the contribution of various external factors to habitat problems on a refuge

increased, stayed the same, or decreased between fiscal years 2002 and 2007.¹ We used these data to classify refuges into two groups. Refuges in the first group, which we refer to as having a net increase in external factors, reported that the contribution to habitat problems increased for more of these factors than it decreased. Refuges in the second group, which we refer to as having no net increase in external factors, reported that either the contribution of these factors decreased for more factors than it increased or that the contribution of these factors increased for the same number that it decreased.

Refuges were included in our analysis if they indicated that providing habitat for waterfowl or other migratory birds was at least somewhat of a priority and if they provided usable responses to each of the key survey questions described above. Of the 437 refuges that responded to our survey, 40 were excluded from our analysis of the change in waterfowl habitat because they reported that providing this type of habitat was not a priority at their refuge. Similarly, 14 refuges were excluded from our analysis of the change in other migratory bird habitat for the same reason. Of the remaining 397 refuges, 374 provided useable responses for all key survey questions and were included in our analysis of waterfowl habitat, while 400 of the remaining 423 refuges provided sufficient responses to be included in our analysis of other migratory bird habitat.

Cross-Tabulations between Habitat Change and Refuge Characteristics

Before developing statistical models, we cross-tabulated data on the change in habitat quality against data for the three key refuge characteristics described above (namely, the change in staff time, tier designation and the change in external factors). The results of these cross-tabulations show that, although habitat was more likely overall to improve than it was to worsen, the odds of improving rather than worsening, vary considerably depending upon the characteristics of a refuge. Complete results of these cross-tabulations, along with tests of the statistical significance of these associations, are presented in tables 18 and 19.

¹The list of external factors included extreme weather, agriculture, industry, human settlement, rights of way, on-refuge pollution, on-refuge activities, and inadequate water rights. Through a series of chi-square tests, we determined that the net change in external factors could be expressed, without losing significant explanatory power, as a variable with two categories. Only 16 refuges reported experiencing a net decrease in the contribution of external factors. Because this group of refuges was too small to be analyzed independently it was combined with the group of refuges that reported experiencing no net change in the contribution of external factors thereby comprising the “no net increase” category.

Appendix II: Statistical Analysis of Habitat Change

Table 18: Change in Quality of Waterfowl Habitat by Various Characteristics of Refuges, Fiscal Years 2002 through 2007

	Habitat quality improved		Habitat quality stayed the same		Habitat quality worsened		Total number
	Number	Percent	Number	Percent	Number	Percent	
Time spent by permanent staff on habitat management							
Increased	87	47%	73	39%	27	14%	187
Stayed the same	24	32%	42	56%	9	12%	75
Decreased	34	30%	48	43%	30	27%	112
Total	145	39%	163	44%	66	18%	374
(Chi-Square = 17.131, df = 4, Sig. = .002)							
Refuge tier							
Focus	56	42%	50	38%	27	20%	133
Targeted reduction	68	48%	49	35%	25	18%	142
Unstaffed satellite	21	20%	68	64%	17	16%	106
Total	145	38%	167	44%	69	18%	381
(Chi-Square = 28.056, df = 4, Sig. < .001)							
Contribution of external factors to habitat problems							
No net increase	34	38%	52	58%	4	4%	90
Net increase	111	38%	115	40%	65	22%	291
Total	145	38%	167	44%	69	18%	381
(Chi-Square = 17.382, df = 2, Sig. < .001)							

Source: GAO's survey of wildlife refuge managers; tier designations come from the Fish and Wildlife Service.

Note: The numbers in this table exclude 40 refuges that indicated that providing habitat for waterfowl was not a priority according to the purpose of their refuge. Some columns may not sum to 100 percent because of rounding. For the time spent by permanent staff on habitat management, the total number of refuges is lower because fewer refuges responded to the corresponding question on our survey.

Appendix II: Statistical Analysis of Habitat Change

Table 19: Change in Quality of Other Migratory Bird Habitat by Various Refuge Characteristics, Fiscal Years 2002 through 2007

	Habitat quality improved		Habitat quality stayed the same		Habitat quality worsened		Total number
	Number	Percent	Number	Percent	Number	Percent	
Time spent by permanent staff on habitat management							
Increased	101	51%	68	34%	30	15%	199
Stayed the same	24	29%	52	63%	6	7%	82
Decreased	37	31%	52	44%	30	25%	119
Total	162	41%	172	43%	66	17%	400
(Chi-Square = 31.796, df = 4, Sig. < .001)							
Refuge tier							
Focus	60	42%	61	43%	21	15%	142
Targeted reduction	79	54%	44	30%	24	16%	147
Unstaffed satellite	24	20%	70	59%	24	20%	118
Total	163	40%	175	43%	69	17%	407
(Chi-Square = 32.874, df = 4, Sig. < .001)							
Contribution of external factors to habitat problems							
No net increase	38	39%	55	56%	5	5%	98
Net increase	125	41%	120	39%	64	21%	309
Total	163	40%	175	43%	69	17%	407
(Chi-Square = 15.918, df = 2, Sig. < .001)							

Source: GAO's survey of wildlife refuge managers; tier designations come from the Fish and Wildlife Service.

Note: The numbers in this table exclude 14 refuges that indicated that providing habitat for other migratory birds was not a priority according to the purpose of their refuge. Some columns may not sum to 100 percent because of rounding. For the time spent by permanent staff on habitat management, the total number of refuges is lower because fewer refuges responded to the corresponding question on our survey.

These cross-tabulations show that the change in habitat quality is associated with the change in staff time. For example, as shown in table 18, among refuges where staff time increased, more than three times as many refuges experienced improved habitat for waterfowl (47 percent) as experienced worsened habitat (14 percent). By contrast, among refuges where staff time decreased, nearly the same number of refuges experienced improved habitat for waterfowl (30 percent) as experienced worsened habitat (27 percent). We found similar results when comparing change in staff time with the change in habitat quality for other migratory birds (table 19).

The cross-tabulations also indicate that changes in habitat quality depend, in part, upon tier designation. Focus and targeted reduction refuges were more likely than unstaffed satellite refuges to experience improved rather than worsened habitat. For example, as shown in table 18, between fiscal years 2002 and 2007, more than twice as many focus refuges experienced improved waterfowl habitat (42 percent) as experienced worsened waterfowl habitat (20 percent). At unstaffed satellite refuges, by contrast, habitat for these birds worsened almost as frequently as it improved, with 20 percent of refuges experiencing improved quality and 16 percent experiencing worsened quality. The cross-tabulations show a similar disparity among tiers with regard to changes in the quality of habitat for other migratory birds (table 19).

Finally, our cross-tabulations indicate that changes in habitat quality also depend upon the change in external factors that contribute to habitat problems. For example, among refuges that reported no net increase in external factors, about nine times more refuges reported improved waterfowl habitat (38 percent) than reported worsened waterfowl habitat (4 percent), as shown in table 18. By contrast, among refuges that experienced a net increase in external factors, the number of refuges that experienced improved waterfowl habitat (38 percent) was much closer to the number that experienced worsened habitat (22 percent). We found similar results for the change in other migratory bird habitat (table 19).

Although the results of the cross-tabulations are strong and statistically significant, they provide only a partial assessment of the relationship between habitat change and refuge characteristics. This is because the cross-tabulations compare habitat change with each refuge characteristic individually without accounting for the influence of the other characteristics. For this reason, we developed statistical models that allow us to account for the effects of all of these characteristics simultaneously.

Formulation of Statistical Models

Our statistical models, technically referred to as a multinomial logistic regression, were used to assess the effects of each refuge characteristic on the change in habitat quality while adjusting for the effects of the other characteristics. These models estimate the effects of each refuge characteristic on (1) the odds of habitat improving, rather than worsening, and (2) the odds of habitat staying the same, rather than worsening. For example, our models estimate the number of times more likely that habitat is to improve, rather than to worsen, at refuges where staff time increased compared to refuges where staff time decreased, controlling for the effects of tier designation and the change in external factors. Similarly, our

models estimate effects for tier designation and for the change in external factors.

In order to test the adequacy of our models, we verified that our data contained a sufficient number of refuges with each combination of characteristics, each model adequately fit the data based on chi-square goodness-of-fit tests, and high associations among the refuge characteristics would be unlikely to confound model estimates. We used robust regression techniques to adjust for the fact that refuges clustered within the same complex may have provided similar responses to survey questions. In order to be confident that the estimates from our regression models are robust to various specifications, we formulated and tested several alternative models to ensure that we obtained similar estimates for the effects of staffing change, tier designation, and change in external factors. The statistical analysis was performed by a senior research methodologist and was reviewed by a managing methodologist and a professional statistician. Their review assessed the model specification, model development, model results, and the conclusions derived from these results. In order to ensure that the analysis was free of programming errors, each line of the computer syntax used to develop the model was verified by a senior data analyst.

Results of Statistical Models

Our regression models indicate that change in staff time and tier designation are associated with changes in habitat quality. These findings are true for both waterfowl and other migratory bird habitat. The models indicate that these associations are statistically significant even after adjusting for other refuge characteristics, including the change in external factors. The results of our regression models are presented in tables 20 and 21. In particular, highlights include:

- The odds of habitat improving, rather than worsening, were significantly greater at refuges where staff time increased compared to those where staff time decreased. Specifically, we estimate that refuges where staff time increased were about 3.0 times more likely than refuges where staff time decreased to report improved, rather than worsened, habitat for both waterfowl and other migratory birds.
- The odds of habitat improving, rather than worsening, were higher at focus and targeted reduction refuges as compared to unstaffed satellite refuges. For example, we estimate that focus refuges were 3.4 times more likely than unstaffed refuges to experience improved rather than worsened habitat quality for other migratory birds and that targeted reduction refuges were 3.9 times more likely. Targeted reduction refuges were also

significantly more likely than unstaffed satellite refuges to experience improved rather than worsened waterfowl habitat, although focus refuges were not significantly different from unstaffed refuges in this regard.

- Change in external factors is strongly associated with habitat change. For example, refuges that experienced no net increase in the number of external factors were about 7.0 times more likely to experience improved, rather than worsened, waterfowl habitat quality and 5.1 times more likely to experience improved, rather than worsened habitat quality for other migratory birds.

Our models also found that the change in staff time and the change in external factors were associated with an increased likelihood of habitat quality staying the same rather than worsening. In particular, we found the following:

- The odds of habitat staying the same rather than worsening were higher at refuges where staff time stayed the same. Specifically, we estimate that refuges where staff time stayed the same were 3.9 times more likely than refuges where staff time decreased to report that habitat for other migratory birds stayed the same rather than worsened. This effect was only marginally significant for waterfowl habitat.
- The odds of habitat staying the same rather than worsening were higher at refuges that did not experience a net increase in external factors that contribute to habitat problems. Specifically, we estimate that refuges that experienced no net increase in external factors were 8.0 times more likely to report that waterfowl habitat stayed the same, rather than worsened, and 5.8 times more likely to report that other migratory bird habitat stayed the same rather than worsened.

The key results of our models are robust to alternative specifications. We tested for the presence of interaction effects between staff time and tier designation, that is, whether the effect of a change in staff time depends upon tier, but found no evidence of such an effect. We fit models that accounted for habitat priority using data from a question on our survey that asked: according to the purpose of each refuge, how much of a priority is providing habitat for waterfowl and other migratory birds. The results of these models show that the estimated effects of staff change and tier designation did not diminish after accounting for habitat priority, indicating that the effects of staff change and tier are not limited to lower priority habitats. We also fit models that used data on the change in the number of full-time equivalent staff at the complex level, rather than survey data about changes in staff time at the refuge level, as a measure of

Appendix II: Statistical Analysis of Habitat Change

staffing change between fiscal years 2002 and 2007. These models found results similar to those reported above: namely, that refuges that were part of complexes that gained staff were significantly more likely than those that were part of complexes that lost staff to report that habitat conditions improved rather than worsened.

Table 20: Regression Results for Change in Quality of Waterfowl Habitat, Fiscal Years 2002 through 2007

Dependent variable: Change in quality of waterfowl habitat

N = 374

Wald Chi-Square = 55.29, df = 10, Sig. < .001

Independent variables	Odds that waterfowl habitat improved rather than worsened			
	Coefficient	Standard error	Wald test (sig.)	Odds Ratio
Intercept	1.195	.750	.111	
Staff time increased	1.086	.420	.010	2.962
Staff time stayed the same	.773	.494	.118	2.166
Staff time decreased (reference)	.	.	.	.
No net increase in external factors	1.953	.617	.002	7.047
Net increase in external factors (reference)	.	.	.	.
Focus refuges	.624	.441	.157	1.867
Targeted reduction refuges	.936	.409	.022	2.550
Unstaffed satellite refuges (reference)	.	.	.	.
Independent variables	Odds that waterfowl habitat stayed the same rather than worsened			
	Coefficient	Standard error	Wald test (sig.)	Odds ratio
Intercept	2.759	.726	.000	
Staff time increased	.456	.452	.313	1.578
Staff time stayed the same	.844	.478	.077	2.327
Staff time decreased (reference)	.	.	.	.
No net increase in external factors	2.075	.643	.001	7.963
Net increase in external factors (reference)	.	.	.	.
Focus refuges	-.707	.448	.114	.493
Targeted reduction refuges	-.545	.412	.186	.586
Unstaffed satellite refuges (reference)	.	.	.	.

Source: GAO analysis of Fish and Wildlife Service data.

Table 21: Regression Results for Change in Quality of Other Migratory Bird Habitat, Fiscal Years 2002 through 2007

Dependent variable: Change in quality of other migratory bird habitat

N = 400

Wald Chi-Square = 67.56, df = 10, Sig. < .001

Independent variables	Odds that other migratory bird habitat improved rather than worsened			
	Coefficient	Standard error	Wald test (sig.)	Odds ratio
Intercept	.589	.628	.349	
Staff time increased	1.101	.388	.005	3.008
Staff time stayed the same	1.122	.611	.067	3.072
Staff time decreased (reference)	.	.	.	.
No net increase in external factors	1.635	.567	.004	5.132
Net increase in external factors (reference)	.	.	.	.
Focus refuges	1.218	.375	.001	3.381
Targeted reduction refuges	1.373	.339	.000	3.949
Unstaffed satellite refuges (reference)	.	.	.	.

Independent variables	Odds that other migratory bird habitat stayed the same rather than worsened			
	Coefficient	Standard error	Wald test (sig.)	Odds ratio
Intercept	2.098	.594	.000	
Staff time increased	.265	.416	.524	1.304
Staff time stayed the same	1.364	.580	.019	3.914
Staff time decreased (reference)	.	.	.	.
No net increase in external factors	1.761	.563	.002	5.819
Net increase in external factors (reference)	.	.	.	.
Focus refuges	.143	.370	.698	1.154
Targeted reduction refuges	-.212	.354	.548	.809
Unstaffed satellite refuges (reference)	.	.	.	.

Source: GAO analysis of Fish and Wildlife Service data.

Limitations of Our Analysis

Although our models demonstrate that improved habitat quality is significantly associated with increased staff time, and that worsened habitat quality is significantly associated with decreased staff time, it is subject to certain limitations. First, our data on habitat change are based on the perception of refuge managers rather than on direct measurements of habitat conditions. To minimize this limitation, we conducted more than two dozen pretests to ascertain, before administering our survey, that land

managers could provide valid responses to these questions. Second, while our model identifies a statistical association between the change in habitat condition with the change in staffing, it is not able to assess whether staffing changes actually caused changes in habitat quality. Statistical correlation is necessary but not sufficient evidence to demonstrate causation. Third, because of the dynamic nature of wildlife habitat, the effects of staffing changes may not appear immediately. Staffing cuts may result in a reduction in habitat management activities, which may not find their effect on habitat for several years. Conversely, restoration projects may take several years to see an effect. Fourth, we do not have data on the initial quality of habitat; while we were confident that refuge managers could assess trends at their refuge, we were not confident that they could accurately rate the quality of habitat in fiscal year 2002, 6 years prior to the administration of our survey. As a result, we are unable to determine, for example, whether refuges that improved in quality were already of high quality or whether refuges that worsened were already of low quality. In spite of these limitations, our models are consistent with the assertions made by refuge managers in showing that decreases in staff are strongly associated with worsening habitat, although the actual size of the effect might be somewhat higher or lower than we estimate it to be.

Appendix III: Deferred Maintenance

Deferred maintenance is maintenance to repair, rehabilitate, dispose of, or replace buildings and other facilities. Deferred maintenance projects are monitored in the Service Asset and Maintenance Management System (SAMMS), which tracks, among other things, asset maintenance and capital improvement needs.¹ SAMMS replaced the Maintenance Management System (MMS) database in 2005 because refuge system management wanted to move toward a more comprehensive system, according to a refuge system official. Refuge managers identify maintenance needs and document the needs in SAMMS via work orders. If these needs have not been addressed after 1 year, they are eligible to become deferred maintenance projects. In addition, regional facility managers conduct condition assessments of refuge buildings, grounds, equipment, and infrastructure, during which they may find assets that should have been entered into SAMMS but were not. In this case the asset may be identified as deferred maintenance without the 1-year waiting period. Furthermore, deferred maintenance projects are limited to those projects that require less than 25 percent capital improvement; will be completed within 2 years; cost at least \$5,000, but less than \$750,000; and have repair costs that do not exceed the asset's current replacement value.

The deferred maintenance backlog appears to be increasing, but the actual change in the backlog cannot be determined because the refuge system implemented several recordkeeping changes between fiscal years 2002 and 2007. Specifically, refuge system officials stated that the following recordkeeping changes occurred during this time period.

1. Each refuge asset is now entered into SAMMS as a single project, whereas multiple assets could have been entered as a single project in MMS.
2. All assets must now be entered into SAMMS, including inexpensive assets such as signs and fencing, whereas only the more expensive refuge assets, such as buildings, were typically entered into MMS.
3. The refuge system implemented comprehensive condition assessments—which will take place once every 5 years—to better determine maintenance deficiencies, and the data were entered into SAMMS between fiscal years 2006 and 2007.

¹Capital improvement is the construction, installation, or assembly of a new asset, or the alteration, expansion, or extension of an existing asset to accommodate a change of function or unmet programmatic needs, or to incorporate new technology.

4. The Federal Highway Administration completed an assessment of the maintenance needed on refuges' public-use roads, one of the most expensive assets to maintain, and the newly identified roads projects were entered into SAMMS between fiscal years 2006 and 2007.

Taken together, these recordkeeping changes limit our ability to assess yearly trends in the refuge system's deferred maintenance backlog. However, refuge system officials reported that the changes allow them to maintain more complete and accurate information about the condition of refuge assets. For example, the requirement that all assets be entered as separate projects in SAMMS was made to allow refuge system officials to determine if the cost of maintenance was greater than the current replacement value of each individual asset. According to refuge management, it was too difficult to assess the maintenance cost relative to the current replacement value when multiple assets were listed as one project in MMS. Table 22 presents the refuge system's deferred maintenance backlog by region for fiscal years 2002 through 2007.

Table 22: Deferred Maintenance Backlog by Region, Fiscal Years 2002 through 2007

Dollars in nominal thousands

	2002	2003	2004	2005	2006	2007
Region 1	\$164,921	\$168,911	\$169,409	\$206,805	\$310,192	\$429,375
Region 2	\$75,736	\$88,242	\$116,497	\$91,748	\$92,486	\$112,929
Region 3	\$65,235	\$146,339	\$180,670	\$143,455	\$208,996	\$265,819
Region 4	\$137,665	\$203,227	\$391,635	\$427,463	\$441,171	\$1,029,451
Region 5	\$96,344	\$116,353	\$155,408	\$119,954	\$104,964	\$155,069
Region 6	\$84,930	\$142,477	\$132,298	\$220,262	\$260,532	\$292,899
Region 7	\$38,128	\$65,960	\$120,403	\$116,170	\$37,561	\$114,363
Region 8 ^a	\$0	\$0	\$0	\$50,121	\$72,570	\$82,683
Total	\$662,959	\$931,509	\$1,266,320	\$1,375,978	\$1,528,472	\$2,482,589

Source: NWRS.

^aRegion 1 split into Region 1 and Region 8, beginning in 1998. According to a refuge official, Region 8 deferred maintenance backlog dollars were still included in Region 1's dollars until 2005.

The refuge system received increased funding from fiscal year 2002 through fiscal year 2004 to address its deferred maintenance backlog, although the funding decreased from 2004 through 2007. For example, Congress funded 2 years worth of deferred maintenance in fiscal year 2001, and this combined total became the new base funding amount in fiscal year 2002, according to refuge system management. Although we cannot determine the extent to which the additional funding helped the

refuge system address the backlog, for the reasons outlined above, several senior refuge system officials asserted that the funding has had a positive impact and that the refuge system's assets appear to be in better condition now than before the funding increase.

Appendix IV: Refuge Operating Needs System

The Refuge Operating Needs System (RONS) is the refuge system database for cataloging operational requirements such as staff, equipment, and planned projects at refuges throughout the system. According to refuge system management, it is intended to be a full inventory of funding needs for annual operations at field stations. Refuge managers determine their total needs on the basis of operational plans, congressional direction, and departmental priorities, and enter these needs as projects into the electronic RONS database.

Since its inception in the early 1990s, RONS has been one of the primary tools refuge system officials use to develop estimates for additional funding needed to address high-priority projects at certain refuges. These project estimates are included in budget requests submitted annually to congressional appropriators. In reports that accompany the refuge system's annual appropriation, Congress indicates whether the program's RONS project requests are fully funded. In fiscal year 2002, 108 RONS projects were funded; 5 years later, there were 4 projects included in the 2007 budget submission.

Refuge system management told us that some RONS projects are given a higher priority than others. During the fiscal year 1998 congressional appropriations process, appropriations staff asked the refuge system to set priorities within RONS, and also directed them to conduct an analysis to determine minimum staffing levels at refuges. To fulfill this requirement, refuge system officials divided existing RONS projects into two tiers: (1) tier 1, consisting of staffing projects as determined by the minimum staffing analysis as well as other high-priority projects that were deemed critical to the mission of the refuge, and (2) tier 2, comprising projects that were considered to be lesser priorities.

At the end of fiscal year 2007, the total value of RONS projects awaiting funding was just over \$1 billion. According to refuge system officials, these projects are sometimes referred to as the RONS backlog (adopting the language used to describe the system's deferred maintenance). Tier 1 projects are for mission-critical needs and therefore would be comparable to backlogged maintenance projects; at the end of fiscal year 2007, tier 1 projects encompassed about 2,300 unfunded projects totaling about \$300 million. Conversely, tier 2 projects describe activities associated with expanded capabilities, not unmet requirements, and thus refuge system officials do not consider these projects to be "behind schedule" in the same sense as those in the system's deferred maintenance backlog. Table 23 presents the RONS project backlog, containing both tier 1 and tier 2 projects, for fiscal years 2002 through 2007.

Table 23: RONS Project Backlog, Fiscal Years 2002 through 2007

Dollars in millions						
	2002	2003	2004	2005	2006	2007
Number of projects	8,427	6,066	6,077	6,076	6,068	8,474
Total project cost	\$971.6	\$1,066.2	\$1,366.8	\$1,366.5	\$707.9	\$1,044.1

Source: GAO analysis of FWS data.

Note: Project costs are presented in nominal dollars.

According to the refuge system’s RONS manager, the refuge system’s leadership targets tier 1 projects for funding unless explicitly directed to target tier 2. However, evolving national-level priorities can result in tier 2 projects receiving funding before their tier 1 counterparts. For example, the increased attention on law enforcement following the attacks of September 11, 2001, resulted in funding for law enforcement personnel as part of projects that were placed in tier 2. Overall, a quarter of RONS projects funded from fiscal years 2002 through 2007 were identified as tier 2 projects, as shown in table 24.

Table 24: RONS Projects Selected for Funding, Fiscal Years 2002 through 2007

Dollars in millions		
	Tier 1	Tier 2
Number of projects	385	129
Percentage of whole	75%	25%
Total project cost	\$47.7	\$20.9
Percentage of whole	70%	30%

Source: GAO analysis of FWS data.

Headquarters officials maintain oversight over the RONS inventory, periodically removing projects that are no longer needed, according to the RONS manager. Moreover, between 2000 and 2006, headquarters attempted to keep the number of projects in the RONS inventory stable in order to make progress in reducing the backlog.¹ During this period, refuge managers were prevented from entering new project requests into the database. In fiscal year 2006, refuge system officials reviewed RONS’

¹While project costs were frozen for tier 1 projects, tier 2 project costs were allowed to increase by a small percentage each year to reflect the trend in annual inflation.

second tier of projects, deleting entries that appeared to be out of date. This accounted for much of the 48 percent drop in total project cost between fiscal years 2005 and 2006, as seen in table 23. The database was then reopened in 2007 to allow for new project entries from refuge managers. However, several managers that we spoke with on our site visits were unaware that the database had been reopened, or had given up entering RONS projects altogether due to the many years that the database was closed to new entries. Other managers perceived little realistic chance that their projects would be funded, given the magnitude of the project backlog and the fact that the number of projects requested significantly outpaces the ability of the refuge system to secure RONS funding. Table 25 presents the ratio of projects in the RONS backlog to each project that received funding for fiscal years 2002 through 2007. As shown in the table, there were 2,119 projects in the RONS backlog for every 1 project that received funding in fiscal year 2007. Similarly, for every \$1 in funding directed toward RONS projects in 2007, there were \$1,469 worth of unfunded projects in the backlog.

Table 25: Ratio of RONS Project Backlog to Funded Projects, Fiscal Years 2002 through 2007

	2002	2003	2004	2005	2006	2007
Ratio of total projects in backlog to number of projects funded	78:1	41:1	31:1	152:1	379:1	2119:1
Ratio of total cost of project backlog to amount funded	\$73:1	\$53:1	\$52:1	\$228:1	\$298:1	\$1,469:1

Source: GAO analysis of FWS data.

Appendix V: Total Core Obligations, Nominal and Inflation-Adjusted (in 2002 Dollars), and Core FTEs, Fiscal Years 2002 through 2007

(Dollars in thousands)	Fiscal year					
	2002	2003	2004	2005	2006	2007
Total, FWS Region 1						
Funding, nominal dollars	44,072	44,880	45,534	45,726	46,391	47,876
Funding, inflation-adjusted	44,072	43,188	41,553	40,034	39,164	39,049
FTEs	326.8	361.8	360.8	331.8	337.2	334.2
Region 1, NWRS offices						
Funding, nominal dollars	6,829	8,283	8,710	5,219	7,089	8,027
Funding, inflation-adjusted	6,829	7,970	7,949	4,569	5,985	6,547
FTEs	42.3	56.0	64.0	35.8	38.6	39.7
Big Island NWR Complex^a - Hakalau Forest NWR						
Funding, nominal dollars	1,405	1,339	1,130	1,034	1,025	1,026
Funding, inflation-adjusted	1,405	1,288	1,032	905	865	836
FTEs	11.0	9.6	10.9	10.7	11.0	9.3
Deer Flat NWR						
Funding, nominal dollars	511	588	613	680	524	531
Funding, inflation-adjusted	511	566	560	596	442	433
FTEs	5.1	6.2	6.3	6.1	6.0	5.7
Hawaiian and Pacific Islands NWR Complex – Guam NWR, Midway Atoll NWR, and Papahānaumokuākea Marine National Monument						
Funding, nominal dollars	3,709	2,377	5,463	6,719	7,350	7,991
Funding, inflation-adjusted	3,709	2,288	4,985	5,882	6,205	6,518
FTEs	15.3	12.9	13.3	17.1	23.6	23.8
Kauai NWR Complex^a - Hanalei NWR, Huleia NWR, and Kīlauea Point NWR						
Funding, nominal dollars	949	1,438	1,070	889	975	645
Funding, inflation-adjusted	949	1,384	977	778	823	526
FTEs	7.4	7.6	7.5	6.9	7.9	6.4
Kootenai NWR						
Funding, nominal dollars	958	1,265	586	376	578	398
Funding, inflation-adjusted	958	1,217	535	329	488	324
FTEs	5.8	5.3	4.8	4.7	5.3	4.7
Little Pend Oreille NWR						
Funding, nominal dollars	1,548	1,827	1,561	1,143	1,930	1,333
Funding, inflation-adjusted	1,548	1,758	1,424	1,001	1,629	1,087
FTEs	15.5	18.8	16.9	14.4	15.7	15.5

Appendix V: Total Core Obligations, Nominal and Inflation-Adjusted (in 2002 Dollars), and Core FTEs, Fiscal Years 2002 through 2007

	2002	2003	2004	2005	2006	2007
Malheur NWR						
Funding, nominal dollars	2,210	2,942	2,259	2,131	2,207	2,630
Funding, inflation-adjusted	2,210	2,831	2,062	1,866	1,863	2,145
FTEs	26.9	23.5	22.7	20.8	20.3	21.1
Maui NWR Complex^a – Kakahaia NWR and Kealia Pond NWR						
Funding, nominal dollars	448	524	737	396	357	459
Funding, inflation-adjusted	448	504	673	347	302	375
FTEs	3.7	4.4	4.7	4.0	3.5	3.8
Mid-Columbia River NWR Complex – Cold Springs NWR, Columbia NWR, Conboy Lake NWR, McKay Creek NWR, McNary NWR, Saddle Mountain NWR, Toppenish NWR, and Umatilla NWR						
Funding, nominal dollars	9,397	6,575	5,817	9,396	6,616	6,434
Funding, inflation-adjusted	9,397	6,327	5,309	8,226	5,585	5,247
FTEs	49.7	60.8	55.4	60.6	55.5	54.1
Nisqually NWR Complex – Grays Harbor NWR and Nisqually NWR						
Funding, nominal dollars	772	870	1,007	822	961	1,718
Funding, inflation-adjusted	772	838	919	719	811	1,401
FTEs	6.9	7.6	7.6	7.8	7.6	7.2
Oahu NWR Complex^a – James Campbell NWR, Oahu Forest NWR, and Pearl Harbor NWR						
Funding, nominal dollars	1,334	1,190	831	1,254	964	788
Funding, inflation-adjusted	1,334	1,146	758	1,098	814	643
FTEs	6.9	6.7	7.9	8.2	7.2	6.4
Oregon Coast NWR Complex – Bandon Marsh NWR, Cape Meares NWR, Nestucca Bay NWR, Oregon Islands NWR, Siletz Bay NWR, and Three Arch Rocks NWR						
Funding, nominal dollars	1,157	1,193	747	1,070	1,030	916
Funding, inflation-adjusted	1,157	1,148	681	937	869	747
FTEs	6.2	7.6	7.6	7.3	8.1	8.3
Pacific Remote Islands NWR Complex^a – Baker Island NWR, Hawaiian Islands NWR, Howland Island NWR, Jarvis Island NWR, Johnston Island NWR, Kingman Reef NWR, Palmyra Atoll NWR, and Rose Atoll NWR						
Funding, nominal dollars	1,587	2,039	1,609	1,682	1,697	1,687
Funding, inflation-adjusted	1,587	1,962	1,468	1,473	1,433	1,376
FTEs	11.3	12.9	11.1	12.7	10.9	12.6
Ridgefield NWR Complex – Franz Lake NWR, Pierce NWR, Ridgefield NWR, and Steigerwald Lake NWR						
Funding, nominal dollars	1,066	1,333	949	1,123	1,090	798
Funding, inflation-adjusted	1,066	1,283	866	983	920	651
FTEs	13.3	12.5	12.7	13.4	12.1	8.4
Sheldon-Hart Mountain NWR Complex – Sheldon NWR and Hart Mountain National Antelope Refuge						
Funding, nominal dollars	2,645	2,573	2,838	3,572	3,201	2,679

Appendix V: Total Core Obligations, Nominal and Inflation-Adjusted (in 2002 Dollars), and Core FTEs, Fiscal Years 2002 through 2007

	2002	2003	2004	2005	2006	2007
Funding, inflation-adjusted	2,645	2,476	2,590	3,128	2,702	2,185
FTEs	30.7	29.1	29.3	23.6	21.9	23.6
Southeast Idaho NWR Complex – Bear Lake NWR, Camas NWR, Grays Lake NWR, Minidoka NWR, and Oxford Slough WMD						
Funding, nominal dollars	2,132	1,996	2,751	1,944	2,086	1,922
Funding, inflation-adjusted	2,132	1,921	2,511	1,702	1,761	1,567
FTEs	17.5	20.1	19.7	18.8	18.0	17.5
Tualatin River NWR						
Funding, nominal dollars	501	1,228	1,186	970	534	669
Funding, inflation-adjusted	501	1,182	1,083	850	451	546
FTEs	3.9	4.7	6.3	6.0	5.9	5.9
Turnbull NWR						
Funding, nominal dollars	1,596	1,408	1,162	1,141	1,617	1,464
Funding, inflation-adjusted	1,596	1,354	1,061	999	1,365	1,194
FTEs	17.4	17.5	16.1	14.8	16.2	17.4
Washington Maritime Complex – Copalis NWR, Dungeness NWR, Flattery Rocks NWR, Protection Island NWR, Quillayute Needles NWR, and San Juan Islands NWR						
Funding, nominal dollars	564	586	493	501	481	1,303
Funding, inflation-adjusted	564	564	450	439	406	1,063
FTEs	5.6	5.7	5.9	5.7	4.9	4.2
Willamette Valley NWR Complex – Ankeny NWR, Baskett Slough NWR, and William L. Finley NWR						
Funding, nominal dollars	1,327	1,296	1,317	1,956	1,403	1,860
Funding, inflation-adjusted	1,327	1,247	1,202	1,712	1,185	1,517
FTEs	11.4	14.1	12.9	14.0	14.4	13.1
Willapa NWR – Lewis and Clark NWR, Julia Butler Hansen Refuge for the Columbia White Tail Deer, and Willapa NWR						
Funding, nominal dollars	1,426	2,012	2,696	1,708	2,676	2,599
Funding, inflation-adjusted	1,426	1,936	2,460	1,495	2,259	2,120
FTEs	13.2	18.4	17.0	18.7	22.8	25.6
Total, FWS Region 2						
Funding, nominal dollars	43,636	50,392	50,193	52,406	53,667	56,984
Funding, inflation-adjusted	43,636	48,491	45,805	45,882	45,307	46,479
FTEs	424.1	456.2	477.8	472.9	476.3	448.2
Region 2, NWRS offices						
Funding, nominal dollars	6,242	5,720	6,449	7,569	7,795	7,672
Funding, inflation-adjusted	6,242	5,505	5,885	6,627	6,580	6,257
FTEs	34.5	42.7	50.5	48.6	52.9	44.9

**Appendix V: Total Core Obligations, Nominal
and Inflation-Adjusted (in 2002 Dollars), and
Core FTEs, Fiscal Years 2002 through 2007**

	2002	2003	2004	2005	2006	2007
Aransas/Matagorda Island NWR Complex – Aransas NWR						
Funding, nominal dollars	2,555	2,071	2,536	2,280	2,882	3,216
Funding, inflation-adjusted	2,555	1,993	2,315	1,996	2,433	2,623
FTEs	25.0	22.4	26.5	26.9	26.1	27.3
Attwater Prairie Chicken NWR						
Funding, nominal dollars	749	950	1,234	1,441	717	1,411
Funding, inflation-adjusted	749	914	1,126	1,262	605	1,151
FTEs	6.8	8.7	8.3	8.2	8.0	8.5
Balcones Canyonlands NWR						
Funding, nominal dollars	1,714	2,223	1,377	2,183	1,966	2,188
Funding, inflation-adjusted	1,714	2,139	1,256	1,911	1,660	1,785
FTEs	14.6	16.0	14.1	13.9	16.9	15.0
Bill Williams River NWR						
Funding, nominal dollars	923	794	772	548	579	628
Funding, inflation-adjusted	923	764	705	480	489	512
FTEs	3.7	4.9	5.7	6.2	6.2	5.4
Bitter Lake NWR						
Funding, nominal dollars	1,114	808	1,006	701	862	852
Funding, inflation-adjusted	1,114	778	918	614	728	695
FTEs	11.9	8.9	9.2	7.7	8.7	7.0
Bosque Del Apache NWR						
Funding, nominal dollars	2,289	2,724	3,880	3,277	4,520	4,015
Funding, inflation-adjusted	2,289	2,621	3,541	2,869	3,816	3,275
FTEs	21.2	27.6	37.4	29.2	37.4	35.1
Buenos Aires NWR						
Funding, nominal dollars	1,943	2,114	2,317	3,160	3,232	3,146
Funding, inflation-adjusted	1,943	2,035	2,115	2,767	2,728	2,566
FTEs	23.3	23.7	24.2	32.5	30.5	25.2
Buffalo Lake NWR						
Funding, nominal dollars	383	462	492	390	374	463
Funding, inflation-adjusted	383	444	449	342	315	377
FTEs	4.9	5.0	5.4	5.2	4.1	4.1
Cabeza Prieta NWR						
Funding, nominal dollars	923	1,190	1,243	1,255	1,214	1,541
Funding, inflation-adjusted	923	1,145	1,134	1,099	1,025	1,257
FTEs	9.0	11.1	11.4	11.0	11.0	10.6

Appendix V: Total Core Obligations, Nominal and Inflation-Adjusted (in 2002 Dollars), and Core FTEs, Fiscal Years 2002 through 2007

	2002	2003	2004	2005	2006	2007
Caddo Lake NWR						
Funding, nominal dollars	95	141	148	242	283	299
Funding, inflation-adjusted	95	136	135	212	239	244
FTEs	0.7	1.0	1.0	2.3	2.3	3.0
Cibola NWR						
Funding, nominal dollars	997	1,418	921	1,675	1,021	1,640
Funding, inflation-adjusted	997	1,364	841	1,467	862	1,338
FTEs	7.0	6.1	6.9	7.5	5.8	6.0
Deep Fork NWR						
Funding, nominal dollars	445	414	428	529	715	581
Funding, inflation-adjusted	445	398	391	463	604	474
FTEs	4.3	3.6	4.7	4.2	5.4	5.2
Hagerman NWR						
Funding, nominal dollars	452	978	986	599	604	711
Funding, inflation-adjusted	452	941	900	524	510	580
FTEs	7.6	5.8	6.2	6.7	5.9	5.9
Havasu NWR						
Funding, nominal dollars	1,238	2,062	1,294	822	984	827
Funding, inflation-adjusted	1,238	1,984	1,181	720	831	674
FTEs	12.7	16.2	14.8	8.1	7.3	7.6
Imperial NWR						
Funding, nominal dollars	1,003	958	1,199	1,369	840	1,404
Funding, inflation-adjusted	1,003	922	1,095	1,199	709	1,145
FTEs	7.5	7.4	7.4	9.7	7.2	7.2
Kofa NWR						
Funding, nominal dollars	561	644	747	701	1,489	796
Funding, inflation-adjusted	561	620	681	614	1,257	649
FTEs	6.1	7.0	6.7	7.0	7.8	6.5
Las Vegas NWR						
Funding, nominal dollars	543	614	643	503	454	467
Funding, inflation-adjusted	543	591	587	440	383	381
FTEs	4.4	5.9	5.9	5.6	4.9	4.6
Little River NWR – Little River NWR and Little Sandy NWR						
Funding, nominal dollars	325	331	611	545	486	500
Funding, inflation-adjusted	325	319	557	477	410	408

Appendix V: Total Core Obligations, Nominal and Inflation-Adjusted (in 2002 Dollars), and Core FTEs, Fiscal Years 2002 through 2007

	2002	2003	2004	2005	2006	2007
FTEs	3.5	3.9	4.4	4.4	5.1	4.9
Maxwell NWR						
Funding, nominal dollars	352	356	366	345	320	312
Funding, inflation-adjusted	352	342	334	302	270	254
FTEs	2.3	3.8	4.2	3.4	3.0	2.9
Muleshoe NWR – Grulla NWR and Muleshoe NWR						
Funding, nominal dollars	234	258	303	272	370	269
Funding, inflation-adjusted	234	248	276	238	312	220
FTEs	3.7	3.4	3.9	3.0	3.1	3.2
Salt Plains NWR						
Funding, nominal dollars	757	856	852	906	1,015	886
Funding, inflation-adjusted	757	824	778	793	857	723
FTEs	8.8	9.8	9.7	9.7	9.2	9.8
San Andres NWR						
Funding, nominal dollars	432	494	492	428	554	432
Funding, inflation-adjusted	432	475	449	375	468	352
FTEs	4.4	4.1	4.0	3.9	3.6	3.8
San Bernardino NWR – Leslie Canyon NWR and San Bernardino NWR						
Funding, nominal dollars	474	740	539	875	725	698
Funding, inflation-adjusted	474	712	492	766	612	569
FTEs	5.3	7.1	5.9	5.9	5.6	5.5
Sequoyah NWR – Ozark Plateau NWR and Sequoyah NWR						
Funding, nominal dollars	716	954	980	898	1,044	935
Funding, inflation-adjusted	716	918	894	786	881	762
FTEs	8.9	10.1	9.4	9.8	10.2	9.4
Sevilleta NWR						
Funding, nominal dollars	1,193	1,387	1,149	811	803	912
Funding, inflation-adjusted	1,193	1,335	1,049	710	678	744
FTEs	11.4	8.5	8.8	8.3	9.3	8.3
South Texas Refuges Complex – Laguna Atascosa NWR, Lower Rio Grande Valley NWR, and Santa Ana NWR						
Funding, nominal dollars	5,241	5,645	5,770	6,583	5,978	6,755
Funding, inflation-adjusted	5,241	5,432	5,266	5,763	5,047	5,510
FTEs	63.0	63.0	64.3	65.9	60.8	58.0
Texas Chenier Plain Refuges Complex – Anahuac NWR, McFaddin NWR, Moody, NWR, and Texas Point NWR						
Funding, nominal dollars	2,866	4,617	3,834	3,813	3,426	4,280
Funding, inflation-adjusted	2,866	4,443	3,499	3,339	2,892	3,491

**Appendix V: Total Core Obligations, Nominal
and Inflation-Adjusted (in 2002 Dollars), and
Core FTEs, Fiscal Years 2002 through 2007**

	2002	2003	2004	2005	2006	2007
FTEs	27.9	30.1	30.3	31.1	30.9	29.7
Texas Midcoast Refuges Complex – Big Boggy NWR, Brazoria NWR, and San Bernard NWR						
Funding, nominal dollars	2,424	3,436	3,331	2,862	3,169	3,693
Funding, inflation-adjusted	2,424	3,307	3,040	2,506	2,675	3,012
FTEs	27.6	31.7	31.5	30.6	26.5	25.2
Tishomingo NWR						
Funding, nominal dollars	734	853	471	817	818	683
Funding, inflation-adjusted	734	821	430	715	691	557
FTEs	5.7	7.1	5.8	7.1	8.7	7.8
Trinity River NWR						
Funding, nominal dollars	406	497	426	428	580	580
Funding, inflation-adjusted	406	478	388	375	490	473
FTEs	2.3	4.4	5.2	4.5	5.8	6.0
Washita NWR – Optima NWR and Washita NWR						
Funding, nominal dollars	541	570	532	567	620	573
Funding, inflation-adjusted	541	549	486	496	524	467
FTEs	6.6	5.8	6.9	7.9	7.2	7.7
Wichita Mountains Wildlife Refuge						
Funding, nominal dollars	2,774	3,112	2,866	3,013	3,229	3,619
Funding, inflation-adjusted	2,774	2,995	2,615	2,638	2,726	2,952
FTEs	37.9	39.2	37.3	37.3	38.9	37.0
Total, FWS Region 3						
Funding, nominal dollars	42,409	48,931	49,839	50,991	53,845	54,225
Funding, inflation-adjusted	42,409	47,086	45,482	44,644	45,457	44,228
FTEs	401.4	446.9	476.2	472.0	490.4	480.7
Region 3, NWRS offices						
Funding, nominal dollars	4,969	5,943	6,151	6,238	8,095	7,706
Funding, inflation-adjusted	4,969	5,719	5,614	5,462	6,834	6,285
FTEs	34.6	42.8	44.8	46.7	56.4	62.5
Agassiz NWR						
Funding, nominal dollars	1,025	1,078	1,229	1,505	1,616	1,304
Funding, inflation-adjusted	1,025	1,037	1,122	1,317	1,365	1,064
FTEs	10.4	11.8	12.3	12.0	12.6	12.8
Big Muddy National Fish and Wildlife Refuge						
Funding, nominal dollars	608	543	598	626	736	714
Funding, inflation-adjusted	608	523	546	548	621	582

**Appendix V: Total Core Obligations, Nominal
and Inflation-Adjusted (in 2002 Dollars), and
Core FTEs, Fiscal Years 2002 through 2007**

	2002	2003	2004	2005	2006	2007
FTEs	4.5	5.1	6.0	5.0	6.4	6.5
Big Oaks NWR						
Funding, nominal dollars	852	835	739	860	765	782
Funding, inflation-adjusted	852	803	674	753	646	638
FTEs	7.1	8.7	6.6	7.5	8.9	8.3
Big Stone NWR – Big Stone NWR, Big Stone WMD, and Northern Tallgrass Prairie NWR						
Funding, nominal dollars	979	1,082	1,345	1,271	1,532	1,121
Funding, inflation-adjusted	979	1,041	1,227	1,113	1,293	915
FTEs	8.7	10.9	12.1	11.6	10.7	11.4
Crab Orchard NWR						
Funding, nominal dollars	2,062	1,715	2,557	1,710	2,247	2,219
Funding, inflation-adjusted	2,062	1,651	2,334	1,497	1,897	1,810
FTEs	20.6	19.6	19.6	20.5	22.5	21.4
Cypress Creek NWR						
Funding, nominal dollars	680	716	888	759	589	674
Funding, inflation-adjusted	680	689	810	665	497	550
FTEs	6.9	6.9	8.1	7.8	6.7	6.1
Desoto NWR – Desoto NWR and Boyer Chute NWR						
Funding, nominal dollars	1,754	2,224	2,043	2,177	1,853	2,162
Funding, inflation-adjusted	1,754	2,140	1,864	1,906	1,564	1,763
FTEs	19.9	21.2	23.7	23.3	23.2	17.9
Detroit Lakes WMD – Detroit Lakes WMD and Hamden Slough NWR						
Funding, nominal dollars	1,497	1,426	1,435	1,711	1,652	1,767
Funding, inflation-adjusted	1,497	1,373	1,310	1,498	1,395	1,442
FTEs	15.1	17.8	17.8	17.1	16.9	17.2
Detroit River International Wildlife Refuge						
Funding, nominal dollars	0	56	77	273	290	316
Funding, inflation-adjusted	0	54	70	239	245	258
FTEs	0	0	0.6	1.2	2.0	2.1
Fergus Falls WMD						
Funding, nominal dollars	1,449	1,745	1,716	3,739	2,466	1,686
Funding, inflation-adjusted	1,449	1,679	1,566	3,274	2,082	1,375
FTEs	18.3	21.0	23.1	20.7	22.9	17.1
Horicon NWR – Fox River NWR, Gravel Island NWR, Green Bay NWR, and Horicon NWR						
Funding, nominal dollars	1,018	923	1,081	1,183	1,413	1,087
Funding, inflation-adjusted	1,018	888	987	1,035	1,193	887

**Appendix V: Total Core Obligations, Nominal
and Inflation-Adjusted (in 2002 Dollars), and
Core FTEs, Fiscal Years 2002 through 2007**

	2002	2003	2004	2005	2006	2007
FTEs	9.5	9.4	11.3	10.6	11.9	11.7
Illinois River NWR Complex – Chautauqua NWR, Emiquon NWR, and Meredosia NWR						
Funding, nominal dollars	604	760	629	747	569	1,227
Funding, inflation-adjusted	604	731	574	654	481	1,001
FTEs	6.2	6.7	6.8	5.8	5.8	6.1
Leopold WMD						
Funding, nominal dollars	721	1,103	1,055	848	1,210	682
Funding, inflation-adjusted	721	1,062	963	743	1,022	556
FTEs	7.4	8.9	9.7	8.7	10.6	7.8
Litchfield WMD						
Funding, nominal dollars	1,177	1,016	1,131	1,225	1,381	1,400
Funding, inflation-adjusted	1,177	978	1,032	1,073	1,166	1,142
FTEs	12.2	12.9	14.0	14.9	15.3	15.7
Mark Twain NWR Complex – Port Louisa NWR, Clarence Cannon NWR, Great River NWR, Middle Mississippi River NWR, and Two Rivers NWR						
Funding, nominal dollars	1,826	2,337	2,534	2,725	2,765	2,944
Funding, inflation-adjusted	1,826	2,249	2,312	2,386	2,335	2,401
FTEs	17.6	19.5	22.8	22.9	22.9	23.5
Mingo NWR – Mingo NWR, Ozark Cavefish NWR, and Pilot Knob NWR						
Funding, nominal dollars	835	922	1,175	1,063	874	1,260
Funding, inflation-adjusted	835	887	1,072	931	738	1,028
FTEs	9.5	9.6	12.0	11.0	9.0	11.0
Minnesota Valley NWR – Minnesota Valley NWR and Minnesota Valley WMD						
Funding, nominal dollars	1,739	2,792	2,534	2,449	2,397	1,937
Funding, inflation-adjusted	1,739	2,687	2,313	2,144	2,023	1,580
FTEs	18.8	18.5	20.5	20.9	19.4	18.4
Morris WMD						
Funding, nominal dollars	1,460	1,744	1,292	1,263	1,370	1,510
Funding, inflation-adjusted	1,460	1,678	1,179	1,105	1,156	1,232
FTEs	14.4	16.4	15.1	15.6	15.2	15.5
Muscatatuck NWR						
Funding, nominal dollars	762	784	670	788	723	585
Funding, inflation-adjusted	762	755	611	690	610	477
FTEs	7.6	7.1	6.3	5.8	6.2	6.0
Neal Smith NWR						
Funding, nominal dollars	1,490	1,341	1,432	1,478	1,158	1,416

**Appendix V: Total Core Obligations, Nominal
and Inflation-Adjusted (in 2002 Dollars), and
Core FTEs, Fiscal Years 2002 through 2007**

	2002	2003	2004	2005	2006	2007
Funding, inflation-adjusted	1,490	1,290	1,306	1,294	977	1,155
FTEs	13.9	15.6	18.0	17.5	15.3	14.3
Necedah NWR						
Funding, nominal dollars	1,592	1,352	1,783	1,490	1,951	1,899
Funding, inflation-adjusted	1,592	1,301	1,627	1,304	1,647	1,549
FTEs	13.1	15.7	17.2	15.7	14.5	15.3
Ottawa NWR – Cedar Point NWR, Michigan WMD, Ottawa NWR, and West Sister Island NWR						
Funding, nominal dollars	1,106	1,224	1,292	866	1,819	1,553
Funding, inflation-adjusted	1,106	1,177	1,179	758	1,535	1,267
FTEs	8.9	9.4	10.2	9.1	12.7	10.5
Patoka River NWR						
Funding, nominal dollars	308	308	327	411	373	404
Funding, inflation-adjusted	308	297	298	360	315	329
FTEs	2.9	3.0	3.0	3.2	3.1	3.1
Rice Lake NWR – Mille Lacs NWR and Rice Lake NWR						
Funding, nominal dollars	618	714	563	696	726	597
Funding, inflation-adjusted	618	687	514	610	613	487
FTEs	6.7	7.0	6.5	6.3	6.2	6.0
Rydell NWR – Glacial Ridge NWR and Rydell NWR						
Funding, nominal dollars	346	768	385	400	415	723
Funding, inflation-adjusted	346	739	352	351	350	590
FTEs	1.5	3.3	3.5	4.6	5.5	4.3
Seney NWR – Harbor Island NWR, Huron NWR, Kirtlands Warbler WMA, and Seney NWR						
Funding, nominal dollars	916	1,397	1,110	1,245	1,075	1,185
Funding, inflation-adjusted	916	1,345	1,013	1,090	907	966
FTEs	8.9	12.3	12.3	11.4	10.9	12.3
Sherburne NWR – Crane Meadows NWR and Sherburne NWR						
Funding, nominal dollars	1,155	1,421	1,487	1,755	1,823	1,849
Funding, inflation-adjusted	1,155	1,368	1,357	1,536	1,539	1,508
FTEs	13.1	15.6	16.1	17.6	17.5	18.2
Shiawassee NWR – Michigan Islands NWR and Shiawassee NWR						
Funding, nominal dollars	917	1,160	1,052	1,009	853	1,549
Funding, inflation-adjusted	917	1,116	960	884	720	1,264
FTEs	9.9	9.9	8.5	8.9	8.2	7.4
Squaw Creek NWR						
Funding, nominal dollars	664	1,327	1,021	830	759	876

Appendix V: Total Core Obligations, Nominal and Inflation-Adjusted (in 2002 Dollars), and Core FTEs, Fiscal Years 2002 through 2007

	2002	2003	2004	2005	2006	2007
Funding, inflation-adjusted	664	1,277	932	727	641	714
FTEs	8.0	7.5	8.4	8.6	8.4	8.7
St. Croix WMD						
Funding, nominal dollars	498	579	637	648	624	630
Funding, inflation-adjusted	498	557	581	567	527	514
FTEs	4.7	5.4	7.2	6.5	7.7	6.7
Swan Lake NWR						
Funding, nominal dollars	540	680	692	399	313	479
Funding, inflation-adjusted	540	654	632	349	264	390
FTEs	5.3	6.0	5.4	4.2	3.2	2.9
Tamarac NWR – Tamarac NWR and Tamarac WMD						
Funding, nominal dollars	702	1,035	1,011	869	744	761
Funding, inflation-adjusted	702	996	923	760	628	621
FTEs	7.1	7.8	8.0	8.6	8.9	8.4
Union Slough NWR – Iowa WMD and Union Slough NWR						
Funding, nominal dollars	567	450	1,103	809	968	771
Funding, inflation-adjusted	567	433	1,006	708	817	629
FTEs	5.3	4.7	4.4	6.2	7.2	7.3
Upper Mississippi River NWR – Driftless Area NWR, Trempealeau NWR, and Upper Mississippi River National Wildlife and Fish Refuge						
Funding, nominal dollars	4,037	4,148	3,843	3,814	4,525	4,478
Funding, inflation-adjusted	4,037	3,991	3,507	3,340	3,820	3,653
FTEs	35.8	38.7	42.1	40.4	42.1	43.0
Whittlesey Creek NWR						
Funding, nominal dollars	123	325	361	273	284	333
Funding, inflation-adjusted	123	313	329	239	239	271
FTEs	1.3	1.8	3.1	3.7	3.6	3.9
Windom WMD						
Funding, nominal dollars	812	959	859	838	893	1,637
Funding, inflation-adjusted	812	923	784	734	754	1,335
FTEs	6.2	8.7	9.2	10.2	10.3	9.4
Total, FWS Region 4						
Funding, nominal dollars	73,973	76,684	80,369	83,209	90,190	107,060
Funding, inflation-adjusted	73,973	73,793	73,343	72,851	76,140	87,323
FTEs	684.1	716.9	752.3	717.7	720.7	701.5

**Appendix V: Total Core Obligations, Nominal
and Inflation-Adjusted (in 2002 Dollars), and
Core FTEs, Fiscal Years 2002 through 2007**

	2002	2003	2004	2005	2006	2007
Region 4, NWRS offices						
Funding, nominal dollars	6,975	8,244	10,469	12,250	12,541	12,603
Funding, inflation-adjusted	6,975	7,933	9,554	10,725	10,588	10,280
FTEs	45.3	52.0	62.5	62.1	65.4	61.1
Arthur R. Marshall Loxahatchee NWR – Arthur R. Marshall Loxahatchee NWR and Hobe Sound NWR						
Funding, nominal dollars	2,261	3,159	2,801	2,366	3,496	3,639
Funding, inflation-adjusted	2,261	3,040	2,556	2,072	2,952	2,968
FTEs	23.9	27.1	21.8	24.4	25.1	21.6
Bayou Cocodrie NWR – Bayou Cocodrie NWR and Tensas River NWR						
Funding, nominal dollars	1,304	1,406	1,529	1,532	1,577	1,978
Funding, inflation-adjusted	1,304	1,353	1,395	1,341	1,331	1,614
FTEs	17.7	18.6	18.4	17.6	17.1	15.7
Caribbean Islands Refuges Complex – Buck Island NWR, Cabo Rojo NWR, Culebra NWR, Desecheo NWR, Green Cay NWR, Laguna Cartagena NWR, Navassa Island NWR, Sandy Point NWR, and Vieques NWR						
Funding, nominal dollars	945	1,253	2,714	3,201	2,700	2,682
Funding, inflation-adjusted	945	1,206	2,477	2,802	2,279	2,188
FTEs	16.5	13.7	32.9	27.8	29.0	28.0
Carolina Sandhills NWR – Carolina Sandhills NWR and Pee Dee NWR						
Funding, nominal dollars	1,519	1,700	1,759	1,641	2,102	2,346
Funding, inflation-adjusted	1,519	1,636	1,605	1,437	1,774	1,914
FTEs	20.7	18.9	18.7	18.0	18.8	16.2
Catahoula NWR						
Funding, nominal dollars	466	431	468	463	423	340
Funding, inflation-adjusted	466	415	427	405	357	278
FTEs	3.3	3.8	3.7	4.3	4.0	3.4
Central Arkansas Refuges Complex – Bald Knob NWR, Big Lake NWR, Cache River NWR, and Wapanocca NWR						
Funding, nominal dollars	1,398	1,604	1,693	1,844	2,273	1,815
Funding, inflation-adjusted	1,398	1,544	1,545	1,615	1,919	1,481
FTEs	14.1	14.1	14.8	14.4	15.9	15.2
Central Louisiana Refuges Complex – Grand Cote NWR and Lake Ophelia NWR						
Funding, nominal dollars	988	927	1,108	1,047	1,002	1,011
Funding, inflation-adjusted	988	892	1,011	917	846	824
FTEs	7.9	9.5	9.8	8.8	8.5	7.3
Chassahowitzka NWR – Chassahowitzka NWR, Crystal River NWR, Egmont Key NWR, Passage Key NWR, and Pinellas NWR						
Funding, nominal dollars	845	650	732	863	1,031	1,089
Funding, inflation-adjusted	845	626	668	756	870	889

**Appendix V: Total Core Obligations, Nominal
and Inflation-Adjusted (in 2002 Dollars), and
Core FTEs, Fiscal Years 2002 through 2007**

	2002	2003	2004	2005	2006	2007
FTEs	8.3	7.5	7.4	8.6	10.1	9.7
Clarks River NWR						
Funding, nominal dollars	741	501	509	502	577	978
Funding, inflation-adjusted	741	482	464	440	487	798
FTEs	3.7	4.9	5.2	4.7	5.1	4.7
Eufaula NWR						
Funding, nominal dollars	520	855	1,472	566	967	932
Funding, inflation-adjusted	520	823	1,343	496	817	760
FTEs	7.2	7.9	7.4	6.8	6.7	6.3
Florida Panther NWR – Florida Panther NWR and Ten Thousand Islands NWR						
Funding, nominal dollars	1,576	1,793	1,651	1,742	1,966	2,052
Funding, inflation-adjusted	1,576	1,725	1,507	1,525	1,659	1,674
FTEs	15.0	17.3	15.6	15.0	17.2	18.0
Gulf Coast Refuges Complex – Bon Secour NWR, Grand Bay NWR, and Mississippi Sandhill Crane NWR						
Funding, nominal dollars	2,662	2,415	2,143	2,620	3,788	2,708
Funding, inflation-adjusted	2,662	2,324	1,956	2,294	3,198	2,209
FTEs	22.9	23.1	22.5	22.3	23.9	22.8
Holla Bend NWR – Holla Bend NWR and Logan Cave NWR						
Funding, nominal dollars	348	394	417	383	441	649
Funding, inflation-adjusted	348	379	380	335	372	529
FTEs	5.0	5.0	4.9	4.6	5.0	5.0
J.N. Ding Darling NWR – Caloosahatchee NWR, Island Bay NWR, J. N. Ding Darling NWR, Matlacha Pass NWR, and Pine Island NWR						
Funding, nominal dollars	1,194	1,827	1,754	1,792	1,879	1,701
Funding, inflation-adjusted	1,194	1,759	1,600	1,569	1,586	1,387
FTEs	13.0	14.9	16.3	15.8	17.0	15.6
Lower Suwannee NWR – Cedar Keys NWR and Lower Suwannee NWR						
Funding, nominal dollars	958	975	872	1,092	1,027	1,131
Funding, inflation-adjusted	958	939	796	956	867	922
FTEs	10.0	12.1	12.5	10.5	10.5	7.5
Mattamuskeet NWR – Cedar Island NWR, Mattamuskeet NWR, and Swanquarter NWR						
Funding, nominal dollars	1,180	1,463	1,131	2,129	1,928	1,283
Funding, inflation-adjusted	1,180	1,408	1,032	1,864	1,628	1,047
FTEs	10.6	12.8	12.4	10.7	10.6	11.0

Appendix V: Total Core Obligations, Nominal and Inflation-Adjusted (in 2002 Dollars), and Core FTEs, Fiscal Years 2002 through 2007

	2002	2003	2004	2005	2006	2007
Merritt Island NWR – Archie Carr NWR, Lake Wales Ridge NWR, Lake Woodruff NWR, Merritt Island NWR, Pelican Island NWR, St. Johns NWR						
Funding, nominal dollars	3,547	3,682	3,979	3,324	5,099	4,918
Funding, inflation-adjusted	3,547	3,543	3,631	2,910	4,305	4,011
FTEs	38.4	41.6	44.7	38.2	43.4	44.1
National Key Deer Refuge – Crocodile Lake NWR, Great White Heron NWR, Key West NWR, and National Key Deer Refuge						
Funding, nominal dollars	1,229	1,529	1,229	1,216	993	1,634
Funding, inflation-adjusted	1,229	1,471	1,122	1,065	839	1,333
FTEs	13.1	13.7	14.0	12.3	10.1	11.0
North Carolina Coastal Refuges Complex – Alligator River NWR, Currituck NWR, MacKay Island NWR, Pea Island NWR, Pocosin Lakes NWR, and Roanoke River NWR						
Funding, nominal dollars	5,371	6,381	5,306	5,269	5,855	5,924
Funding, inflation-adjusted	5,371	6,140	4,842	4,613	4,943	4,832
FTEs	55.1	50.7	54.2	49.7	49.2	48.0
North Florida Refuges Complex – St. Marks NWR and St. Vincent NWR						
Funding, nominal dollars	2,266	2,333	2,299	2,383	2,538	2,463
Funding, inflation-adjusted	2,266	2,245	2,098	2,086	2,143	2,009
FTEs	23.8	26.5	27.2	25.0	24.3	22.9
North Louisiana Wildlife Refuge Complex – Black Bayou Lake NWR, D'Arbonne NWR, Handy Brake NWR, Red River NWR, and Upper Ouachita NWR						
Funding, nominal dollars	1,405	1,675	1,546	1,471	1,748	1,948
Funding, inflation-adjusted	1,405	1,612	1,411	1,288	1,475	1,589
FTEs	13.7	13.9	16.0	15.3	15.4	15.7
North Mississippi Refuges Complex – Coldwater River NWR, Dahomey NWR, and Tallahatchie NWR						
Funding, nominal dollars	871	1,584	1,264	1,632	1,247	1,247
Funding, inflation-adjusted	871	1,525	1,154	1,429	1,053	1,017
FTEs	7.2	8.4	8.8	11.8	12.6	12.3
Noxubee NWR – Choctaw NWR and Noxubee NWR						
Funding, nominal dollars	1,893	1,703	1,844	2,464	2,183	2,057
Funding, inflation-adjusted	1,893	1,639	1,683	2,157	1,843	1,678
FTEs	20.0	21.4	19.0	18.4	19.7	18.8
Okefenokee NWR – Banks Lake NWR and Okefenokee NWR						
Funding, nominal dollars	7,397	2,583	3,122	2,533	3,056	19,368
Funding, inflation-adjusted	7,397	2,485	2,849	2,218	2,580	15,797
FTEs	33.6	30.4	32.1	31.0	32.4	34.5

Appendix V: Total Core Obligations, Nominal and Inflation-Adjusted (in 2002 Dollars), and Core FTEs, Fiscal Years 2002 through 2007

	2002	2003	2004	2005	2006	2007
Piedmont NWR – Bond Swamp NWR and Piedmont NWR						
Funding, nominal dollars	934	1,102	1,206	1,243	1,109	1,538
Funding, inflation-adjusted	934	1,061	1,101	1,088	936	1,254
FTEs	13.0	14.0	13.7	13.2	11.7	12.2
Savannah Coastal Refuges Complex – Blackbeard Island NWR, Harris Neck NWR, Pinckney Island NWR, Savannah NWR, Tybee NWR, Wassaw NWR, and Wolf Island NWR						
Funding, nominal dollars	3,537	2,548	3,110	3,702	3,981	4,494
Funding, inflation-adjusted	3,537	2,452	2,838	3,241	3,361	3,666
FTEs	30.8	30.7	30.5	31.6	32.4	32.1
South Arkansas Refuges Complex – Felsenthal NWR, Overflow NWR, and Pond Creek NWR						
Funding, nominal dollars	1,766	1,536	1,450	1,401	1,971	1,673
Funding, inflation-adjusted	1,766	1,478	1,323	1,227	1,664	1,364
FTEs	17.3	17.5	18.4	15.9	16.8	15.9
South Carolina Low Country Refuges Complex – Cape Romain NWR, Ernest F. Hollings Ace Basin NWR, Santee NWR, and Waccamaw NWR						
Funding, nominal dollars	2,244	2,909	2,905	2,896	2,972	3,567
Funding, inflation-adjusted	2,244	2,800	2,651	2,535	2,509	2,910
FTEs	22.0	25.9	29.6	27.9	26.5	27.4
Southeast Louisiana Refuges Complex – Atchafalaya NWR, Bayou Sauvage NWR, Bayou Teche NWR, Big Branch Marsh NWR, Bogue Chitto NWR, Breton NWR, Delta NWR, and Mandalay NWR						
Funding, nominal dollars	3,189	2,946	3,116	2,527	2,868	2,533
Funding, inflation-adjusted	3,189	2,835	2,843	2,213	2,421	2,066
FTEs	31.4	30.6	29.5	25.9	20.5	24.1
Southwest Louisiana NWR Complex – Cameron Prairie NWR, Lacassine NWR, Sabine NWR, and Shell Keys NWR						
Funding, nominal dollars	2,909	3,809	3,472	4,045	3,065	2,540
Funding, inflation-adjusted	2,909	3,665	3,169	3,541	2,588	2,072
FTEs	29.7	32.3	31.5	32.6	24.8	24.7
St. Catherine Creek NWR – Cat Island NWR and St. Catherine Creek NWR						
Funding, nominal dollars	825	925	988	939	1,035	605
Funding, inflation-adjusted	825	890	902	823	874	494
FTEs	6.6	7.1	7.2	6.7	6.0	5.5
Tennessee NWR – Cross Creeks NWR and Tennessee NWR						
Funding, nominal dollars	1,690	2,029	1,978	2,269	2,216	2,712
Funding, inflation-adjusted	1,690	1,953	1,805	1,986	1,871	2,212
FTEs	17.8	18.5	16.8	18.0	16.2	15.1

Appendix V: Total Core Obligations, Nominal and Inflation-Adjusted (in 2002 Dollars), and Core FTEs, Fiscal Years 2002 through 2007

	2002	2003	2004	2005	2006	2007
Theodore Roosevelt NWR Complex – Hillside NWR, Holt Collier NWR, Mathews Brake NWR, Morgan Brake NWR, Panther Swamp NWR, Theodore Roosevelt NWR, and Yazoo NWR						
Funding, nominal dollars	1,528	2,215	2,147	2,461	2,197	1,648
Funding, inflation-adjusted	1,528	2,131	1,959	2,155	1,855	1,344
FTEs	16.7	19.5	17.2	17.3	17.2	15.1
West Tennessee Refuge Complex – Chickasaw NWR, Hatchie NWR, Lake Isom NWR, Lower Hatchie NWR, and Reelfoot NWR						
Funding, nominal dollars	2,863	2,923	2,734	2,615	2,426	3,192
Funding, inflation-adjusted	2,863	2,813	2,495	2,290	2,048	2,603
FTEs	22.2	21.4	23.6	21.3	21.5	20.5
Wheeler NWR – Cahaba River NWR, Fern Cave NWR, Key Cave NWR, Mountain Longleaf NWR, Sauta Cave NWR, Watercross Darter NWR, and Wheeler NWR						
Funding, nominal dollars	1,246	1,258	2,011	1,623	2,548	2,383
Funding, inflation-adjusted	1,246	1,211	1,835	1,421	2,151	1,944
FTEs	12.8	13.5	15.3	15.2	17.2	19.1
White River NWR						
Funding, nominal dollars	1,385	1,414	1,444	1,163	1,365	1,676
Funding, inflation-adjusted	1,385	1,361	1,318	1,018	1,152	1,367
FTEs	13.9	16.2	16.2	14.5	13.4	13.6
Total, FWS Region 5						
Funding, nominal dollars	40,357	46,190	46,516	47,363	46,931	47,458
Funding, inflation-adjusted	40,357	44,448	42,449	41,468	39,621	38,709
FTEs	364.2	370.6	370.6	379.1	371.0	365.7
Region 5, NWRS offices						
Funding, nominal dollars	5,372	7,272	7,812	7,541	7,257	6,805
Funding, inflation-adjusted	5,372	6,998	7,129	6,602	6,127	5,551
FTEs	37.9	50.4	51.8	53.1	51.8	48.9
Back Bay NWR						
Funding, nominal dollars	928	1,637	1,616	1,392	1,771	1,645
Funding, inflation-adjusted	928	1,575	1,475	1,219	1,495	1,341
FTEs	12.4	11.7	11.6	11.1	11.7	12.7
Bombay Hook NWR						
Funding, nominal dollars	686	750	811	869	820	1,342
Funding, inflation-adjusted	686	722	740	761	692	1,094
FTEs	8.3	7.3	7.0	8.3	8.9	8.9
Canaan Valley NWR						
Funding, nominal dollars	691	798	771	847	916	811

Appendix V: Total Core Obligations, Nominal and Inflation-Adjusted (in 2002 Dollars), and Core FTEs, Fiscal Years 2002 through 2007

	2002	2003	2004	2005	2006	2007
Funding, inflation-adjusted	691	768	703	741	773	662
FTEs	7.4	7.9	7.3	7.9	10.3	9.3
Cape May NWR – Cape May NWR and Supawna Meadows NWR						
Funding, nominal dollars	970	1,120	885	1,744	898	662
Funding, inflation-adjusted	970	1,078	808	1,526	758	540
FTEs	7.2	7.9	6.4	6.7	6.3	5.0
Chesapeake Marshlands NWR Complex – Blackwater NWR, Eastern Neck NWR, Martin NWR, and Susquehanna NWR						
Funding, nominal dollars	2,845	2,980	3,230	3,872	3,513	3,762
Funding, inflation-adjusted	2,845	2,868	2,947	3,390	2,966	3,069
FTEs	28.9	27.3	27.4	27.8	28.6	28.2
Chincoteague NWR – Chincoteague NWR, Eastern Shore of Virginia NWR, Fisherman Island NWR, and Wallops Island NWR						
Funding, nominal dollars	2,504	2,273	3,001	2,548	2,205	3,006
Funding, inflation-adjusted	2,504	2,187	2,738	2,231	1,862	2,451
FTEs	29.6	27.8	28.7	29.5	27.7	28.5
Eastern Massachusetts NWR Complex – Assabet River NWR, Great Meadows NWR, Mashpee NWR, Massasoit NWR, Monomoy NWR, Nantucket NWR, Nomans Land Island NWR, and Oxbow NWR						
Funding, nominal dollars	1,537	1,967	2,274	1,695	2,063	1,939
Funding, inflation-adjusted	1,537	1,893	2,075	1,484	1,741	1,582
FTEs	14.5	12.6	14.8	16.5	14.8	16.0
Eastern Virginia Rivers NWR Complex – James River NWR, Plum Tree Island NWR, Presquile NWR, and Rappahannock River Valley NWR						
Funding, nominal dollars	665	758	900	1,112	1,379	1,004
Funding, inflation-adjusted	665	729	821	974	1,164	819
FTEs	5.4	5.1	7.1	8.6	7.9	8.4
Edwin B. Forsythe NWR						
Funding, nominal dollars	1,039	1,232	1,275	1,159	1,065	1,127
Funding, inflation-adjusted	1,039	1,186	1,164	1,015	899	919
FTEs	12.6	12.1	11.9	12.2	9.7	9.7
Great Bay NWR – Great Bay NWR, John Hay NWR, and Wapack NWR						
Funding, nominal dollars	349	334	383	506	157	295
Funding, inflation-adjusted	349	321	349	443	132	241
FTEs	3.0	2.7	1.1	1.0	1.0	1.0
Great Dismal Swamp NWR – Great Dismal Swamp NWR and Nansemond NWR						
Funding, nominal dollars	1,576	1,385	1,736	1,582	1,669	1,523
Funding, inflation-adjusted	1,576	1,333	1,585	1,385	1,409	1,242
FTEs	14.6	12.1	11.9	11.4	14.4	13.4

Appendix V: Total Core Obligations, Nominal and Inflation-Adjusted (in 2002 Dollars), and Core FTEs, Fiscal Years 2002 through 2007

	2002	2003	2004	2005	2006	2007
Great Swamp NWR – Great Swamp NWR, Shawangunk Grasslands NWR, and Wallkill River NWR						
Funding, nominal dollars	1,478	2,488	2,047	2,265	2,640	3,039
Funding, inflation-adjusted	1,478	2,395	1,868	1,983	2,229	2,479
FTEs	16.3	16.2	16.0	15.7	14.7	15.2
Iroquois NWR – Erie NWR and Iroquois NWR						
Funding, nominal dollars	1,816	2,234	2,378	1,435	1,470	1,528
Funding, inflation-adjusted	1,816	2,150	2,170	1,256	1,241	1,246
FTEs	13.3	14.4	14.1	13.4	13.0	13.6
John Heinz NWR at Tinicum						
Funding, nominal dollars	1,021	1,279	1,005	1,072	1,119	1,112
Funding, inflation-adjusted	1,021	1,231	918	938	945	907
FTEs	9.9	11.9	11.5	11.9	11.8	10.8
Lake Umbagog NWR						
Funding, nominal dollars	639	808	586	611	741	510
Funding, inflation-adjusted	639	777	535	535	626	416
FTEs	6.2	6.6	5.7	4.7	4.0	4.0
Long Island NWR Complex – Amagansett NWR, Conscience Point NWR, Elizabeth A. Morton NWR, Oyster Bay NWR, Seatuck NWR, Target Rock NWR, and Wertheim NWR						
Funding, nominal dollars	1,355	1,661	1,164	1,047	1,945	1,278
Funding, inflation-adjusted	1,355	1,598	1,062	917	1,642	1,043
FTEs	12.4	11.0	10.6	10.1	10.1	9.7
Maine Coastal Islands NWR Complex – Carlton Pond WMD, Cross Island NWR, Franklin Island NWR, Petit Manan NWR, Pond Island NWR, Seal Island NWR, and Sunkhaze Meadows NWR						
Funding, nominal dollars	1,025	950	1,048	1,371	1,135	1,272
Funding, inflation-adjusted	1,025	914	956	1,200	959	1,037
FTEs	11.6	10.2	10.4	10.9	10.7	10.0
Missisquoi NWR						
Funding, nominal dollars	511	548	718	1,204	595	717
Funding, inflation-adjusted	511	527	656	1,054	502	585
FTEs	5.8	6.0	6.2	6.0	5.2	5.8
Montezuma NWR						
Funding, nominal dollars	916	1,158	1,259	964	739	1,120
Funding, inflation-adjusted	916	1,114	1,149	844	624	914
FTEs	9.3	9.1	8.3	8.4	7.1	8.2
Moosehorn NWR – Aroostook NWR and Moosehorn NWR						
Funding, nominal dollars	962	1,814	1,133	1,406	1,136	1,463

Appendix V: Total Core Obligations, Nominal and Inflation-Adjusted (in 2002 Dollars), and Core FTEs, Fiscal Years 2002 through 2007

	2002	2003	2004	2005	2006	2007
Funding, inflation-adjusted	962	1,745	1,034	1,231	959	1,193
FTEs	10.2	10.7	11.8	13.4	13.1	11.7
Ohio River Islands NWR						
Funding, nominal dollars	503	648	770	1,019	704	708
Funding, inflation-adjusted	503	624	703	892	595	578
FTEs	6.0	5.4	5.6	5.9	5.3	5.9
Parker River NWR – Parker River NWR and Thatcher Island NWR						
Funding, nominal dollars	1,912	1,719	1,230	1,049	1,089	1,432
Funding, inflation-adjusted	1,912	1,654	1,122	919	919	1,168
FTEs	12.2	15.3	11.5	10.2	10.5	11.4
Patuxent Research Refuge						
Funding, nominal dollars	2,679	3,074	2,667	3,534	3,759	3,996
Funding, inflation-adjusted	2,679	2,958	2,434	3,094	3,174	3,260
FTEs	23.3	24.9	27.6	25.6	22.4	23.5
Potomac River NWR Complex – Elizabeth Hartwell Mason Neck NWR, Featherstone NWR, and Occoquan Bay NWR						
Funding, nominal dollars	571	630	817	618	786	640
Funding, inflation-adjusted	571	606	746	541	664	522
FTEs	7.1	6.2	7.2	6.8	7.8	6.3
Prime Hook NWR						
Funding, nominal dollars	1,189	1,114	1,409	1,040	721	777
Funding, inflation-adjusted	1,189	1,072	1,285	911	609	634
FTEs	9.0	8.7	8.1	9.1	7.7	6.9
Rachel Carson NWR						
Funding, nominal dollars	626	772	735	855	802	750
Funding, inflation-adjusted	626	743	670	749	677	612
FTEs	8.7	8.1	8.3	7.8	8.4	7.3
Rhode Island NWR Complex – Block Island NWR, John H. Chafee NWR, Ninigret NWR, Sachuest Point NWR, and Trustom Pond NWR						
Funding, nominal dollars	2,396	1,109	1,122	1,093	1,178	1,102
Funding, inflation-adjusted	2,396	1,067	1,024	957	995	899
FTEs	9.5	8.9	8.1	10.4	10.8	10.5
Silvio O. Conte NFWR – Silvio O. Conte National Fish and Wildlife Refuge, and Stewart B. McKinney NWR						
Funding, nominal dollars	1,596	1,678	1,736	1,914	2,657	2,092
Funding, inflation-adjusted	1,596	1,615	1,584	1,676	2,243	1,706
FTEs	11.6	12.1	12.8	15.0	15.6	15.4

Appendix V: Total Core Obligations, Nominal and Inflation-Adjusted (in 2002 Dollars), and Core FTEs, Fiscal Years 2002 through 2007

	2002	2003	2004	2005	2006	2007
Total, FWS Region 6						
Funding, nominal dollars	48,107	54,250	56,229	53,547	56,519	57,948
Funding, inflation-adjusted	48,107	52,204	51,313	46,882	47,714	47,265
FTEs	497.8	528.5	531.8	525.6	519.2	505.4
Region 6, NWRS offices						
Funding, nominal dollars	7,132	9,184	11,362	10,267	10,461	11,207
Funding, inflation-adjusted	7,132	8,839	10,368	8,989	8,832	9,141
FTEs	61.2	72.4	73.0	73.3	74.3	80.9
Arapaho NWR – Arapaho NWR, Bamforth NWR, Hutton Lake NWR, Mortenson Lake NWR, and Pathfinder NWR						
Funding, nominal dollars	792	834	615	749	655	639
Funding, inflation-adjusted	792	803	561	656	553	521
FTEs	7.7	7.1	6.9	7.5	7.0	5.9
Arrowwood NWR – Arrowwood NWR, Arrowwood WMD, Chase Lake NWR, Chase Lake Prairie Project WMD, Half-Way Lake NWR, Hobart Lake NWR, Johnson Lake NWR, Sibley Lake NWR, Stoney Slough NWR, Tomahawk NWR, and Valley City WMD						
Funding, nominal dollars	1,788	2,034	2,145	1,808	1,811	2,279
Funding, inflation-adjusted	1,788	1,958	1,957	1,583	1,529	1,859
FTEs	22.4	21.0	22.5	23.4	23.7	21.2
Audubon NWR – Audubon NWR, Audubon WMD, Camp Lake NWR, Hiddenwood NWR, Lake Ilo NWR, Lake Nettie NWR, Lake Otis NWR, Lake Patricia NWR, Lost Lake NWR, McLean NWR, Pretty Rock NWR, Sheyenne Lake NWR, Stewart Lake NWR, and White Lake NWR						
Funding, nominal dollars	1,178	1,226	1,275	935	1,162	1,276
Funding, inflation-adjusted	1,178	1,180	1,163	819	981	1,041
FTEs	12.1	14.4	14.1	12.3	13.9	14.6
Bear River Migratory Bird Refuge						
Funding, nominal dollars	871	961	1,014	1,109	1,116	1,432
Funding, inflation-adjusted	871	925	926	971	942	1,168
FTEs	10.1	12.1	11.7	11.7	11.3	11.7
Benton Lake NWR – Benton Lake NWR, Benton Lake WMD, and Blackfoot Valley WMA						
Funding, nominal dollars	772	1,268	1,201	1,162	1,009	1,181
Funding, inflation-adjusted	772	1,220	1,096	1,017	852	963
FTEs	8.4	8.8	7.8	9.4	8.9	8.0
Bowdoin NWR – Black Coulee NWR, Bowdoin NWR, Bowdoin WMD, Creedman Coulee NWR, Hewitt Lake NWR, Lake Thibadeau NWR						
Funding, nominal dollars	669	834	817	832	729	677
Funding, inflation-adjusted	669	802	745	728	616	552
FTEs	5.8	5.9	6.9	8.2	7.5	7.4

Appendix V: Total Core Obligations, Nominal and Inflation-Adjusted (in 2002 Dollars), and Core FTEs, Fiscal Years 2002 through 2007

	2002	2003	2004	2005	2006	2007
Browns Park NWR						
Funding, nominal dollars	704	797	705	631	898	1,254
Funding, inflation-adjusted	704	767	643	552	758	1,023
FTEs	6.0	7.3	7.4	7.6	8.0	7.7
Charles M. Russell NWR – Charles M. Russell NWR, Charles M. Russell WMD, Hailstone NWR, Halfbreed Lake NWR, Lake Mason NWR, UL Bend NWR, and War Horse NWR						
Funding, nominal dollars	2,370	2,815	2,752	2,781	3,612	3,605
Funding, inflation-adjusted	2,370	2,709	2,512	2,435	3,050	2,941
FTEs	27.9	32.4	29.4	31.6	30.5	31.7
Crescent Lake/North Platte NWR Complex – Crescent Lake NWR and North Platte NWR						
Funding, nominal dollars	980	1,136	1,171	1,033	1,088	1,136
Funding, inflation-adjusted	980	1,093	1,068	904	919	926
FTEs	12.2	12.4	11.5	11.0	12.1	12.3
Devils Lake WMD – Ardoch NWR, Brumba NWR, Devils Lake WMD, Kellys Slough NWR, Lake Alice NWR, Lambs Lake NWR, Little Goose NWR, Pleasant Lake NWR, Rock Lake NWR, Rose Lake NWR, Silver Lake NWR, Snyder Lake NWR, Stump Lake NWR, Sullys Hill National Game Preserve, and Wood Lake NWR						
Funding, nominal dollars	1,671	1,994	2,175	2,468	2,485	2,011
Funding, inflation-adjusted	1,671	1,919	1,985	2,161	2,098	1,640
FTEs	21.3	19.3	22.7	22.6	22.7	19.0
Fort Niobrara NWR – Fort Niobrara NWR, John W. & Louise Seier NWR, and Valentine NWR						
Funding, nominal dollars	2,032	2,067	1,872	1,820	1,825	2,329
Funding, inflation-adjusted	2,032	1,989	1,708	1,593	1,541	1,900
FTEs	19.0	17.1	17.5	17.9	16.3	15.6
Fish Springs NWR						
Funding, nominal dollars	463	462	550	503	972	435
Funding, inflation-adjusted	463	445	502	440	821	355
FTEs	5.3	5.2	5.3	5.3	4.4	4.1
Flint Hills NWR						
Funding, nominal dollars	997	875	1,001	1,134	1,168	1,117
Funding, inflation-adjusted	997	842	914	993	986	911
FTEs	10.3	11.1	12.3	12.2	12.9	12.3
Huron WMD						
Funding, nominal dollars	778	958	885	1,043	1,017	1,302
Funding, inflation-adjusted	778	922	808	913	858	1,062
FTEs	11.9	11.9	10.7	12.1	11.6	11.9

Appendix V: Total Core Obligations, Nominal and Inflation-Adjusted (in 2002 Dollars), and Core FTEs, Fiscal Years 2002 through 2007

	2002	2003	2004	2005	2006	2007
J. Clark Salyer NWR – Buffalo Lake NWR, Cottonwood Lake NWR, Des Lacs NWR, J. Clark Salyer NWR, J. Clark Salyer WMD, Lords Lake NWR, Rabb Lake NWR, School Section Lake NWR, Upper Souris NWR, Willow Lake NWR, and Wintering River NWR						
Funding, nominal dollars	5,599	5,139	4,370	4,417	4,846	3,730
Funding, inflation-adjusted	5,599	4,945	3,988	3,867	4,091	3,043
FTEs	57.3	54.8	54.0	50.4	46.7	33.9
Kirwin NWR						
Funding, nominal dollars	664	561	405	372	729	613
Funding, inflation-adjusted	664	540	370	326	615	500
FTEs	5.9	5.2	5.1	4.0	3.8	5.4
Kulm WMD – Bone Hill NWR, Dakota Lake NWR, Kulm WMD, and Maple River NWR						
Funding, nominal dollars	481	616	636	644	525	653
Funding, inflation-adjusted	481	593	580	563	443	533
FTEs	6.4	7.1	7.7	6.8	5.8	6.2
LaCreek NWR – Bear Butte NWR, Lacreek NWR, and Lacreek WMD						
Funding, nominal dollars	977	1,419	760	755	966	631
Funding, inflation-adjusted	977	1,366	694	661	816	515
FTEs	9.3	9.5	8.2	8.9	7.0	6.1
Lake Andes NWR – Karl E. Mundt NWR, Lake Andes NWR, and Lake Andes WMD						
Funding, nominal dollars	815	662	911	597	637	585
Funding, inflation-adjusted	815	638	831	523	538	477
FTEs	7.4	7.6	8.0	7.3	7.1	6.8
Lee Metcalf NWR						
Funding, nominal dollars	457	1,032	895	577	494	676
Funding, inflation-adjusted	457	994	817	505	417	551
FTEs	4.9	5.8	5.5	5.8	6.3	6.5
Long Lake NWR – Appert Lake NWR, Canfield Lake NWR, Florence Lake NWR, Hutchinson Lake NWR, Lake George NWR, Long Lake NWR, Long Lake WMD, Slade NWR, Springwater NWR, and Sunburst Lake NWR						
Funding, nominal dollars	991	962	873	1,323	840	849
Funding, inflation-adjusted	991	926	797	1,158	709	693
FTEs	9.3	10.7	10.5	11.5	10.4	8.5
Lostwood WMD^b – Crosby WMD, Lake Zahl NWR, Lostwood NWR, Lostwood WMD, and Shell Lake NWR						
Funding, nominal dollars	0	0	0	0	Less than 1	1,117
Funding, inflation-adjusted	0	0	0	0	Less than 1	911
FTEs	0	0	0	0	0	10.6
Madison WMD						
Funding, nominal dollars	676	883	887	1,143	762	792

**Appendix V: Total Core Obligations, Nominal
and Inflation-Adjusted (in 2002 Dollars), and
Core FTEs, Fiscal Years 2002 through 2007**

	2002	2003	2004	2005	2006	2007
Funding, inflation-adjusted	676	850	809	1,000	643	646
FTEs	9.2	9.7	12.4	10.7	9.3	10.1
Marais Des Cygnes NWR						
Funding, nominal dollars	246	611	427	608	540	550
Funding, inflation-adjusted	246	588	390	532	456	449
FTEs	3.0	3.8	3.5	4.7	4.7	5.1
Medicine Lake NWR – Lamesteer NWR, Medicine Lake NWR, and Northeast Montana WMD						
Funding, nominal dollars	1,103	1,016	1,094	923	972	1,515
Funding, inflation-adjusted	1,103	978	998	808	821	1,236
FTEs	10.5	11.2	11.7	10.2	12.2	11.5
National Bison Range – Lost Trail NWR, National Bison Range, Nine-Pipe NWR, Northwest Montana WMD, Pablo NWR, and Swan River NWR						
Funding, nominal dollars	1,504	1,720	1,766	1,492	1,516	1,374
Funding, inflation-adjusted	1,504	1,655	1,612	1,306	1,280	1,121
FTEs	16.3	17.7	16.1	14.2	12.1	11.3
National Elk Refuge						
Funding, nominal dollars	1,637	1,541	2,117	1,293	1,287	1,587
Funding, inflation-adjusted	1,637	1,483	1,932	1,132	1,086	1,294
FTEs	14.1	14.7	14.1	11.6	10.9	11.2
Ouray NWR – Colorado River WMA and Ouray NWR						
Funding, nominal dollars	776	603	740	697	819	716
Funding, inflation-adjusted	776	580	675	610	692	584
FTEs	5.8	6.0	5.9	6.7	6.0	5.8
Quivira NWR						
Funding, nominal dollars	1,263	1,452	1,465	1,337	1,219	1,445
Funding, inflation-adjusted	1,263	1,397	1,337	1,171	1,029	1,179
FTEs	13.3	14.8	15.3	14.9	13.8	13.9
Rainwater Basin WMD						
Funding, nominal dollars	1,283	1,232	1,182	1,300	1,122	1,296
Funding, inflation-adjusted	1,283	1,186	1,079	1,138	947	1,057
FTEs	10.6	13.3	12.5	11.9	11.6	12.9
Red Rock Lakes NWR						
Funding, nominal dollars	457	713	717	564	783	1,100
Funding, inflation-adjusted	457	686	654	493	661	897
FTEs	5.5	7.2	6.3	5.9	6.0	7.0

Appendix V: Total Core Obligations, Nominal and Inflation-Adjusted (in 2002 Dollars), and Core FTEs, Fiscal Years 2002 through 2007

	2002	2003	2004	2005	2006	2007
Rocky Mountain Arsenal NWR – Rocky Mountain Arsenal NWR and Two Ponds NWR						
Funding, nominal dollars	1,162	1,209	1,573	1,149	1,345	1,440
Funding, inflation-adjusted	1,162	1,163	1,436	1,006	1,135	1,175
FTEs	13.7	14.5	15.7	15.1	15.2	14.9
San Luis Valley NWR Complex – Alamosa NWR, Baca NWR, and Monte Vista NWR						
Funding, nominal dollars	1,120	1,504	1,586	1,256	1,370	1,430
Funding, inflation-adjusted	1,120	1,447	1,448	1,099	1,157	1,167
FTEs	10.9	12.9	14.5	14.4	13.3	13.1
Sand Lake NWR – Sand Lake NWR and Sand Lake WMD						
Funding, nominal dollars	979	1,065	1,170	1,888	1,926	1,172
Funding, inflation-adjusted	979	1,025	1,068	1,653	1,626	956
FTEs	12.6	13.0	13.9	12.5	12.2	10.9
Seedskadee NWR – Cokeville Meadows NWR and Seedskadee NWR						
Funding, nominal dollars	767	673	735	830	897	638
Funding, inflation-adjusted	767	648	671	727	757	521
FTEs	6.7	7.4	8.2	8.8	8.0	6.0
Tewaukon NWR – Storm Lake NWR, Tewaukon NWR, Tewaukon WMD, and Wild Rice Lake NWR						
Funding, nominal dollars	1,181	1,229	1,186	1,019	1,641	1,141
Funding, inflation-adjusted	1,181	1,182	1,082	893	1,386	930
FTEs	13.7	13.0	11.8	11.3	18.7	11.1
Waubay NWR – Dakota Tallgrass Prairie WMA, Waubay NWR, and Waubay WMD						
Funding, nominal dollars	773	958	1,192	1,089	1,274	1,017
Funding, inflation-adjusted	773	922	1,087	954	1,075	829
FTEs	10.0	10.5	11.5	12.1	13.1	12.4
Total, FWS Region 7						
Funding, nominal dollars	31,320	36,066	36,734	38,232	39,079	40,244
Funding, inflation-adjusted	31,320	34,706	33,523	33,473	32,992	32,825
FTEs	271.1	284.9	295.6	290.1	277.5	275.5
Region 7, NWRS offices						
Funding, nominal dollars	5,083	7,096	7,746	9,220	7,865	8,872
Funding, inflation-adjusted	5,083	6,829	7,068	8,073	6,640	7,236
FTEs	38.2	44.6	47.7	50.8	47.1	41.9
Alaska Maritime NWR						
Funding, nominal dollars	3,491	3,839	4,094	3,731	3,731	3,832
Funding, inflation-adjusted	3,491	3,695	3,736	3,266	3,150	3,125
FTEs	31.8	33.6	36.9	36.5	33.9	34.6

**Appendix V: Total Core Obligations, Nominal
and Inflation-Adjusted (in 2002 Dollars), and
Core FTEs, Fiscal Years 2002 through 2007**

	2002	2003	2004	2005	2006	2007
Alaska Peninsula/Becharof NWR Complex – Alaska Peninsula NWR and Becharof NWR						
Funding, nominal dollars	1,718	1,909	2,038	1,902	1,883	1,794
Funding, inflation-adjusted	1,718	1,837	1,860	1,665	1,590	1,464
FTEs	15.5	13.1	15.8	12.6	11.2	11.1
Arctic NWR						
Funding, nominal dollars	2,172	2,320	2,232	2,521	2,873	3,079
Funding, inflation-adjusted	2,172	2,233	2,037	2,207	2,426	2,511
FTEs	19.1	19.8	18.7	19.6	20.5	20.3
Innoko NWR						
Funding, nominal dollars	1,118	1,197	1,134	1,117	1,336	1,232
Funding, inflation-adjusted	1,118	1,152	1,035	978	1,128	1,005
FTEs	9.2	8.8	9.3	7.0	8.2	7.8
Izembek NWR						
Funding, nominal dollars	840	865	920	964	1,241	1,043
Funding, inflation-adjusted	840	832	839	844	1,048	851
FTEs	5.0	6.5	6.2	6.7	5.5	6.2
Kanuti NWR						
Funding, nominal dollars	890	969	1,000	1,154	1,543	1,350
Funding, inflation-adjusted	890	933	912	1,011	1,303	1,101
FTEs	7.6	8.4	9.3	9.4	10.7	10.3
Kenai NWR						
Funding, nominal dollars	3,654	4,667	4,102	4,324	4,378	4,805
Funding, inflation-adjusted	3,654	4,491	3,744	3,786	3,696	3,919
FTEs	35.7	40.0	40.1	41.0	38.5	41.5
Kodiak NWR						
Funding, nominal dollars	1,796	1,615	1,889	1,955	2,226	1,979
Funding, inflation-adjusted	1,796	1,554	1,724	1,712	1,879	1,614
FTEs	16.4	15.5	16.2	15.9	15.3	16.1
Koyukuk/Nowitna NWR – Koyukuk NWR and Nowitna NWR						
Funding, nominal dollars	1,483	1,572	1,676	1,627	1,833	1,630
Funding, inflation-adjusted	1,483	1,513	1,530	1,425	1,548	1,329
FTEs	10.5	12.7	14.8	13.4	11.9	11.6
Selawik NWR						
Funding, nominal dollars	1,147	1,088	1,212	1,126	1,471	1,259
Funding, inflation-adjusted	1,147	1,047	1,106	986	1,242	1,027
FTEs	8.6	5.6	7.4	7.1	8.1	8.3

Appendix V: Total Core Obligations, Nominal and Inflation-Adjusted (in 2002 Dollars), and Core FTEs, Fiscal Years 2002 through 2007

	2002	2003	2004	2005	2006	2007
Tetlin NWR						
Funding, nominal dollars	1,777	2,438	2,038	1,816	1,918	2,266
Funding, inflation-adjusted	1,777	2,346	1,860	1,590	1,619	1,849
FTEs	18.0	19.0	17.4	17.4	18.2	18.6
Togiak NWR						
Funding, nominal dollars	1,906	2,071	2,044	1,970	1,961	2,101
Funding, inflation-adjusted	1,906	1,993	1,866	1,725	1,655	1,713
FTEs	17.5	18.0	17.0	16.8	15.6	14.4
Yukon Delta NWR						
Funding, nominal dollars	2,785	2,918	2,962	3,037	2,949	3,034
Funding, inflation-adjusted	2,785	2,808	2,703	2,659	2,490	2,474
FTEs	26.0	24.9	24.3	23.2	21.2	20.7
Yukon Flats NWR						
Funding, nominal dollars	1,460	1,501	1,648	1,767	1,870	1,967
Funding, inflation-adjusted	1,460	1,444	1,504	1,547	1,578	1,604
FTEs	12.3	14.4	14.5	12.7	11.8	12.3
Total, FWS Region 8						
Funding, nominal dollars	23,491	25,825	26,963	31,811	33,063	34,987
Funding, inflation-adjusted	23,491	24,851	24,605	27,851	27,912	28,537
FTEs	227.0	235.1	239.4	262.5	253.4	264.1
Region 8, NWRS offices						
Funding, nominal dollars	0	0	0	4,215	3,832	3,555
Funding, inflation-adjusted	0	0	0	3,690	3,235	2,900
FTEs	0	0	0.1	27.4	22.4	22.1
Desert NWR Complex – Ash Meadows NWR, Desert National Wildlife Range, Moapa Valley NWR, and Pahrnagat NWR						
Funding, nominal dollars	1,455	1,831	1,960	1,933	2,821	2,870
Funding, inflation-adjusted	1,455	1,762	1,789	1,692	2,381	2,341
FTEs	16.8	15.3	16.1	14.6	12.8	13.1
Hopper Mountain NWR Complex – Bitter Creek NWR, Blue Ridge NWR, Guadalupe-Nipomo Dunes NWR, and Hopper Mountain NWR						
Funding, nominal dollars	926	973	810	713	902	992
Funding, inflation-adjusted	926	937	739	624	761	809
FTEs	6.2	7.3	8.1	5.5	5.7	5.2
Humboldt Bay NWR – Castle Rock NWR and Humboldt Bay NWR						
Funding, nominal dollars	862	857	882	911	929	1,009

Appendix V: Total Core Obligations, Nominal and Inflation-Adjusted (in 2002 Dollars), and Core FTEs, Fiscal Years 2002 through 2007

	2002	2003	2004	2005	2006	2007
Funding, inflation-adjusted	862	825	805	797	784	823
FTEs	6.9	7.6	7.4	8.3	7.4	8.0
Kern NWR – Kern NWR and Pixley NWR						
Funding, nominal dollars	669	638	933	818	1,134	1,118
Funding, inflation-adjusted	669	614	851	716	957	912
FTEs	6.4	6.4	8.3	9.5	8.2	7.9
Klamath Basin NWR Complex – Clear Lake NWR, Tule Lake NWR, Bear Valley NWR, Klamath Marsh NWR, Upper Klamath NWR, and Lower Klamath NWR						
Funding, nominal dollars	4,344	3,694	3,888	4,244	4,362	4,457
Funding, inflation-adjusted	4,344	3,555	3,548	3,716	3,682	3,636
FTEs	43.2	44.6	44.2	41.1	39.9	41.7
Modoc NWR						
Funding, nominal dollars	505	689	741	948	848	789
Funding, inflation-adjusted	505	663	676	830	716	644
FTEs	5.1	6.1	6.3	6.1	5.8	6.6
Ruby Lake NWR						
Funding, nominal dollars	1,218	996	966	1,313	759	1,059
Funding, inflation-adjusted	1,218	958	881	1,149	641	864
FTEs	6.4	6.4	7.2	7.5	7.6	7.8
Sacramento NWR Complex – Butte Sink WMA, Colusa NWR, Delevan NWR, North Central Valley WMA, Sacramento NWR, Sacramento River NWR, Sutter NWR, and Willow Creek-Lurline WMA						
Funding, nominal dollars	2,665	2,920	3,337	3,038	3,821	3,900
Funding, inflation-adjusted	2,665	2,810	3,045	2,660	3,226	3,181
FTEs	28.9	32.1	33.6	31.2	32.7	35.8
San Diego NWR Complex – San Diego Bay NWR, San Diego NWR, Seal Beach NWR, and Tijuana Slough NWR						
Funding, nominal dollars	2,326	2,692	2,461	2,701	3,304	3,195
Funding, inflation-adjusted	2,326	2,591	2,246	2,365	2,790	2,606
FTEs	22.9	26.0	27.7	25.8	24.5	26.2
San Francisco Bay NWR Complex – Antioch Dunes NWR, Don Edwards San Francisco Bay NWR, Ellicott Slough NWR, Farallon NWR, Marin Islands NWR, Salinas River NWR, and San Pablo Bay NWR						
Funding, nominal dollars	2,829	4,064	3,588	3,239	3,417	4,463
Funding, inflation-adjusted	2,829	3,911	3,274	2,836	2,885	3,640
FTEs	24.0	23.8	23.5	25.3	26.0	27.6
San Luis NWR Complex – Grasslands WMA, Merced NWR, San Joaquin River NWR, and San Luis NWR						
Funding, nominal dollars	2,512	2,380	3,049	3,383	3,127	3,362
Funding, inflation-adjusted	2,512	2,290	2,782	2,962	2,640	2,742
FTEs	28.5	27.9	27.0	29.6	29.8	32.0

Appendix V: Total Core Obligations, Nominal and Inflation-Adjusted (in 2002 Dollars), and Core FTEs, Fiscal Years 2002 through 2007

	2002	2003	2004	2005	2006	2007
Sonny Bono Salton Sea NWR Complex – Coachella Valley NWR and Sonny Bono Salton Sea NWR						
Funding, nominal dollars	848	1,784	2,064	1,931	1,776	1,869
Funding, inflation-adjusted	848	1,716	1,883	1,691	1,500	1,524
FTEs	10.4	13.6	13.9	13.3	14.0	14.3
Stillwater NWR – Anaho Island NWR, Fallon NWR, and Stillwater NWR						
Funding, nominal dollars	1,444	1,550	1,610	1,701	1,415	1,558
Funding, inflation-adjusted	1,444	1,491	1,469	1,489	1,195	1,271
FTEs	14.9	11.6	10.2	11.2	11.0	10.8
Stone Lakes NWR						
Funding, nominal dollars	888	756	675	725	615	791
Funding, inflation-adjusted	888	728	616	634	519	645
FTEs	6.6	6.3	6.0	6.1	5.7	5.1
Total, NWRS Headquarters (Region 9)						
Funding, nominal dollars	18,357	22,818	20,695	21,876	22,262	21,101
Funding, inflation-adjusted	18,357	21,957	18,886	19,153	18,794	17,211
FTEs	87.0	92.0	105.7	104.1	99.0	88.4
Total						
Funding, nominal dollars	365,720	406,030	413,070	425,160	441,950	467,880
Funding, inflation-adjusted	365,720	390,720	376,956	372,235	373,105	381,623
FTEs	3,284	3,493	3,610	3,556	3,545	3,464

Source: GAO analysis of Fish and Wildlife Service data.

Notes: Numbers may not sum due to rounding. FTE=full-time equivalent. NWR=National Wildlife Refuge. NWRS=National Wildlife Refuge System. WMA=Wildlife Management Area. WMD=Wetland Management District. There were no obligations or FTEs charged for the Neches River NWR, North Dakota WMA, Rocky Flats NWR, and Rocky Mountain Front Conservation Area during the fiscal year 2002 to 2007 time period.

^aThe Big Island NWR Complex, Kauai NWR Complex, Maui NWR Complex, Oahu NWR Complex, and Pacific Remote Islands NWR Complex are sub-complexes of the Hawaiian and Pacific Islands NWR Complex.

^bThe Lostwood WMD complex was formed in 2006 when Lostwood WMD was split off from a complex that had been headquartered at the Des Lacs NWR. Since 2006, Des Lacs NWR has been a satellite of a complex headquartered at the J. Clark Salyer NWR. All of Des Lacs NWR's former satellite refuges are now part of the Lostwood WMD complex.

Appendix VI: Comments from the Department of the Interior



United States Department of the Interior
OFFICE OF THE SECRETARY
Washington, DC 20240



SEP 16 2008

Robin M. Nazzaro
Director, Natural Resources and Environment
Government Accountability Office
441 G Street, N.W.
Washington, D.C. 20548-0001

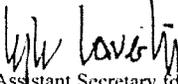
Dear Ms. Nazzaro:

Thank you for the opportunity to review and comment on the Government Accountability Office draft report entitled, "*Wildlife Refuges: Changes in Funding, Staffing and Other Factors Create Concerns about Future Sustainability.*" (GAO 08-797).

The enclosure provides technical comments on the draft report. We hope these comments will assist you in preparing the final report.

If you have any questions, please contact Jacob Lee, Audit Liaison, U.S. Fish and Wildlife Service, at 703-358-2233.

Sincerely,


Assistant Secretary for Fish
and Wildlife and Parks

Enclosure

Appendix VII: GAO Contacts and Staff Acknowledgments

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Staff Acknowledgments

In addition to the individual named above, Trish McClure, Assistant Director; Mark Braza; David Brown; Stephen Cleary; Tim Guinane; Carol Henn; Richard Johnson; Michael Krafve; Alison O'Neill; George Quinn, Jr.; and Stephanie Toby made key contributions to this report.

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