St. Catherine Creek National Wildlife Refuge

Comprehensive Conservation Plan

U.S. Department of the Interior
Fish and Wildlife Service
Southeast Region

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COMPREHENSIVE CONSERVATION PLAN

ST. CATHERINE CREEK NATIONAL WILDLIFE REFUGE

Adams and Wilkinson Counties, Mississippi

U.S. Department of the Interior
Fish and Wildlife Service
Southeast Region
1875 Century Boulevard
Atlanta, Georgia 30345

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SECTION A. COMPREHENSIVE CONSERVATION PLAN

I. Background

INTRODUCTION

The U.S. Fish and Wildlife Service (Service) has developed this Comprehensive Conservation Plan to provide a foundation for the management and use of St. Catherine Creek National Wildlife Refuge, headquartered in Sibley, Mississippi. The plan is intended to serve as a working guide for the refuge's management programs and actions over the next 15 years.

The plan was developed in compliance with the National Wildlife Refuge System Improvement Act of 1997 and Part 602 (National Wildlife Refuge System Planning) of the Fish and Wildlife Service Manual. The actions described within this plan also meet the requirements of the National Environmental Policy Act of 1969. Compliance with the Act was achieved through the involvement of the public and the inclusion of a Draft Environmental Assessment. When fully implemented, this plan will strive to achieve the vision and purposes of the refuge.

The plan's overriding consideration is to carry out the purposes for which the refuge was established. Fish and wildlife are the first priority in refuge management, and public use (wildlife-dependent recreation) is allowed and encouraged as long as it is compatible with, or does not detract from, the refuge's mission and purposes.

The plan was prepared by a core Service planning team composed of representatives from the refuge; the Service's Jackson, Mississippi, field office; and the Mangi Environmental Group, a Service contractor. In developing this plan, the core team incorporated a number of suggestions and recommendations from the Mississippi Department of Wildlife, Fisheries, and Parks; other state, federal, and local agencies; nongovernmental organizations; local citizens; the general public; and stakeholders. This public involvement and the planning process itself are described in Chapter III, Plan Development. The plan represents the Service's preferred alternative and is being put forward after considering three other alternatives, which were described in the draft environmental assessment. After reviewing the public comments and management needs, the core team developed these alternatives in an attempt to determine how to best meet the goals and objectives of St. Catherine Creek National Wildlife Refuge. Alternative D, the preferred alternative, is the Service's recommended course of action for the future management of the refuge, and is embodied in this plan.

PURPOSE AND NEED FOR THE PLAN

The National Wildlife Refuge System Improvement Act of 1997 requires the development of comprehensive conservation plans for all national wildlife refuges by 2012. This plan for the St. Catherine Creek Refuge will identify the role of the refuge in supporting the mission of the National Wildlife Refuge System and provide guidance in refuge management and public use activities. The plan articulates the refuge's management direction (goals, objectives, and strategies) for the next 15 years. Specifically, the plan is needed to

- provide a clear statement of management direction for the refuge;
- provide refuge neighbors, visitors, and government officials with an understanding of the Service's management actions on and around the refuge;

- ensure that the Service's management actions, including its land protection, recreational, and educational programs, are consistent with the mandates of the National Wildlife Refuge System;
- ensure that management of the refuge is consistent with federal, state, and county plans; and
- provide a basis for development of the refuge's budget requests for operational, maintenance, and capital improvement needs.

This comprehensive conservation plan was developed to address the refuge's important natural resource, compatible wildlife-dependent recreation, and administrative needs. Specifically, there is a need to restore and conserve diverse habitats, species populations, and biological integrity; conserve natural and cultural resources through partnerships, protection, and land acquisition from willing sellers; provide opportunities for appropriate, compatible wildlife-dependent recreation, environmental education, and interpretive programs; and provide effective and efficient administration of the refuge.

PLANNING PROCESS

This plan outlines a vision for the refuge and was prepared in compliance with the National Wildlife Refuge System Improvement Act of 1997 and the National Environmental Policy Act of 1969, as amended.

In complying with these Acts, the refuge has actively sought the involvement of the public in its comprehensive planning. The Acts also require the Service to seriously consider all reasonable alternatives to major actions on national wildlife refuges, including a no action alternative. These alternatives, including the no action alternative, were described in the draft environmental assessment.

In developing this plan, the Service completed a four-step planning process, as follows:

- Established and organized a planning team for the purpose of developing the refuge's comprehensive conservation plan;
- Held a public scoping meeting to identify the important opportunities, concerns, and issues relating to future management of the refuge;
- Prepared a draft comprehensive conservation plan and environmental assessment for public review and comment; and
- Evaluated the comments of the public in the preparation of this comprehensive conservation plan.

IDENTIFYING THE PRIORITY ISSUES

In August 2003, the Service assembled a planning team at the refuge headquarters to begin the scoping process for developing a draft plan for St. Catherine Creek National Wildlife Refuge. The planning team members included staff from the St. Catherine Creek Refuge; a refuge planner from the Service's Jackson, Mississippi, field office; and representatives from other refuges. They are listed in Appendix XIII, Consultation and Coordination.

The planning team developed a vision statement for the refuge and identified a number of issues and concerns that were likely to affect future management of the refuge. The team also identified several draft goals for the management direction of the refuge, and planned the agenda for a public scoping meeting.

The public scoping meeting was held at the Natchez Convention Center in Natchez, Mississippi, on November 6, 2003. The meeting attendees identified a variety of issues, concerns, and opportunities for future management of the refuge. Their comments, as well as those written on comment sheets provided at the meeting, are summarized in Appendix IV.

After identifying the priority issues and opportunities, the planning team began the process of preparing sections of the draft plan and environmental assessment. Information concerning the refuge's physical, biological, and socioeconomic environment was compiled and is described in Chapter II, Refuge Environment.

Possible alternatives for the management of the refuge were identified. These alternatives and their sets of objectives or management actions were described in Chapter III of the draft environmental assessment. The potential impacts of each alternative on the physical, biological, cultural and historic, and socioeconomic environments were also described in the draft environmental assessment.

This planning process included lands within and adjacent to the refuge's current approved acquisition boundary. The process identified a continued need over the next few years to acquire the remaining inholdings within the acquisition boundary from willing sellers as opportunities arise. Particular acquisition efforts were focused on the divestiture of three disjunct tracts in exchange for lands within the approved acquisition boundary, as outlined in Chapter I of the draft environmental assessment.

This final plan is now being distributed to officials of federal, state, and local government agencies; private organizations; and the general public.

POLICIES AND LEGAL MANDATES

U.S. FISH AND WILDLIFE SERVICE

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

The U.S. Fish and Wildlife Service manages the 96-million acre National Wildlife Refuge System, comprised of more than 540 national wildlife refuges, thousands of small wetlands, and other special management areas. It also operates 66 national fish hatcheries, 64 fishery resource offices, and 78 Ecological Services field stations. The agency enforces federal wildlife laws; administers the Endangered Species Act; manages migratory bird populations; restores nationally significant fisheries; conserves and restores wildlife habitat such as wetlands; and helps foreign governments with their conservation efforts. It also oversees the Federal Aid program that distributes hundreds of millions of dollars in excise taxes on fishing and hunting equipment to state fish and wildlife agencies.

The Service is the primary federal agency responsible for conserving, protecting, and enhancing the nation's fish and wildlife populations and their habitats. Although it shares some conservation responsibilities with other federal, state, tribal, local, and private entities, the Service has specific trustee responsibilities for migratory birds, threatened and endangered species, anadromous fish, and certain marine mammals.

NATIONAL WILDLIFE REFUGE SYSTEM

The National Wildlife Refuge System manages over 96 million acres on refuges throughout the nation, including Puerto Rico and the U.S. Virgin Islands. It is the world's largest collection of lands and waters specifically managed for fish and wildlife.

The mission of the System, as defined by the National Wildlife Refuge System Improvement Act of 1997, is:

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

The National Wildlife Refuge System Improvement Act of 1997 established, for the first time, a clear mission of wildlife conservation for the National Wildlife Refuge System. The Act states that each refuge shall be managed to

- fulfill the individual purpose of each refuge;
- fulfill the mission of the Refuge System;
- consider the needs of fish and wildlife first; fulfill the requirement of developing a comprehensive conservation plan for each unit of the Refuge System, and fully involve the public in the preparation of these plans;
- maintain the biological integrity, diversity, and environmental health of the Refuge System;
- recognize that wildlife-dependent recreation activities, including hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation, are legitimate and priority public uses; and
- retain the authority of refuge managers to determine compatible public uses.

Following passage of the Act in 1997, the Service immediately began efforts to implement the direction of the new legislation, including the preparation of comprehensive conservation plans for all refuges. The development of these plans is ongoing nationally. Consistent with the Act, all comprehensive conservation plans are being prepared in conjunction with public involvement, and each refuge is required to complete its plan within a 15-year schedule.

Approximately 38 million people visited the country's national wildlife refuges in 2002, mostly to observe wildlife in their natural habitats. As this visitation continues to grow, significant economic benefits are being generated to local communities that surround the refuges. Economists have reported that national wildlife refuge visitors contribute more than $400 million annually to the local economies. In 2001, 82 million U.S. residents aged 16 years and older fished, hunted, or observed wildlife, generating a national total of $108 billion. In a study completed in 2002 on 15 refuges in 14 states around the nation, visitation had grown 36% in seven years. At the same time, the number of jobs generated in the surrounding communities grew to 120 per refuge, up from 87 jobs in 1995, pouring more than $2.2 million into the economies of local communities. Other findings also validate the belief that communities near refuges benefit economically. Expenditures on food, lodging, and transportation grew to $6.8 million per refuge, up 31% from $5.2 million in 1995. For each federal dollar spent on the National Wildlife Refuge System, the surrounding communities have benefited with $4.43 in recreational expenditures and $1.42 in job-related income (U.S. Census Bureau 2002).

Volunteerism continues to be a major contributor to the successes of the Refuge System. In 2002, volunteers contributed more than 1.5 million person-hours on refuges nationwide, a service valued at more than $22 million.

The wildlife and habitat vision for the national wildlife refuges stresses the following principles:

- Wildlife comes first.
- Ecosystems, biodiversity, and wilderness are vital considerations in refuge management.
- Refuges must be healthy.
- Growth of refuges must be strategic.
- The National Wildlife Refuge System serves as a model for habitat management with broad participation from others.

OTHER LEGAL MANDATES

Administration of national wildlife refuges is guided by the mission and goals of the National Wildlife Refuge System, congressional legislation, presidential executive orders, and international treaties. Policies for management options of refuges are further refined by administrative guidelines established by the Secretary of the Interior and by policy guidelines established by the Director of the Fish and Wildlife Service. The establishing authorities, Public Law 104, Stat. 2957 (Section 108, H.R. 3338), and the National Wildlife Refuge System Improvement Act of 1997, the legal and policy guidance for the operation of national wildlife refuges, are described in Appendix III.

Lands within the National Wildlife Refuge System are closed to public uses unless specifically and legally opened. The Service must evaluate all programs and uses based on the following mandates set forth in the National Wildlife Refuge System Improvement Act of 1997. These mandates are to

- contribute to ecosystem goals, as well as refuge purposes and goals;
- conserve, manage, and restore fish, wildlife, and plant resources and their habitats;
- monitor the trends of fish, wildlife, and plants;
- manage and ensure appropriate visitor uses, as those uses benefit the conservation of fish and wildlife resources and contribute to the enjoyment of the public (these uses include hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation); and
- ensure that visitor activities are compatible with refuge purposes.

NATIONAL AND REGIONAL CONSERVATION PLANS AND INITIATIVES

Conservation priorities for national wildlife refuges in the Lower Mississippi River Valley focus on threatened and endangered species, trust species, and species of concern. By working with others, the Service is more effective in achieving its overall mission and management goals. The Service uses a combination of land protection and habitat management methods to compensate for bottomland hardwood habitat loss and to meet shared/common long-term goals established for this area. Several national and regional conservation plans and initiatives help the Service to focus its management, including the Lower Mississippi River Joint Venture; the North American Waterfowl Management Plan; Partners is Flight; U.S. Shorebird Conservation Plan; North American Waterbird Conservation Plan; Migratory Bird Conservation Zones; and the Black Bear Conservation Committee.

LOWER MISSISSIPPI RIVER JOINT VENTURE

The Service and other agencies rank bottomland hardwood forests along the lower Mississippi River as the highest conservation priority for management efforts. The Lower Mississippi River Joint Venture (a consortium of public and private conservation groups) has initiated cooperative efforts to restore lands that provide maximum benefits to migratory songbirds. It has also identified conservation areas on which to focus future land protection and restoration efforts. The long-term goal is to provide forested islands, called forest bird conservation zones, in the Lower Mississippi River Valley that range in size from 10,000 to more than 100,000 acres. The forest bird conservation zones are also priority areas for forest restoration and will someday serve as important anchors for biological diversity.

NORTH AMERICAN WATERFOWL MANAGEMENT PLAN

The North American Waterfowl Management Plan is an international action plan to conserve migratory birds throughout the continent. The plan's goal is to return migratory waterfowl populations to their 1970s levels by conserving wetland and upland habitats. Canada, the United States, and Mexico are signatories to the plan. The plan is a partnership of federal, state, provincial, and municipal governments, nongovernmental organizations, private companies, and many individuals, all working toward the achievement of better wetland habitats for the benefit of migratory birds, other wetland-associated species, and people (Reinecke and Baxter 1996).

LOWER MISSISSIPPI VALLEY JOINT VENTURE

Several coordinated conservation efforts have been initiated to set priorities and establish focus areas to overcome the impacts of human-caused hydrologic changes and forest fragmentation. Under the North American Waterfowl Management Plan, a cooperative private-state-federal partnership known as the Lower Mississippi Valley Joint Venture (LMVJV) was established in 1986. Its intent is to help provide sufficient wintering waterfowl habitat throughout the Lower Mississippi Valley. The LMVJV partners have worked together to establish step-down management objectives (expressed in the number of duck-use-days and the number of acres of flooded habitat) for public and private lands throughout the Lower Mississippi Valley.

The initial LMVJV effort has expanded to also establish population objectives for shorebirds and neotropical migratory forest-nesting birds. The LMVJV is working with the U.S. Shorebird Conservation Working Group to establish step-down objectives for shorebird foraging habitat for the fall migration period throughout the Lower Mississippi Valley.

PARTNERS IN FLIGHT

Growing concern about declines in many land bird species not covered by existing conservation initiatives led to the launching of Partners in Flight in 1990. Partners in Flight is an international cooperative effort of government agencies, philanthropies, professional organizations, conservation groups, industry, academia, and private individuals. Its initial focus was on neotropical migrants—species of birds that breed in North America and winter in Central and South America—but its emphasis has now expanded to encompass most land birds and other species requiring terrestrial habitats. Partners in Flight has a number of initiatives underway, including a North American Landbird Conservation Plan. St. Catherine Creek National Wildlife Refuge is in the Mississippi Alluvial Valley Physiographic Area Plan under Partners in Flight (Partners in Flight, n.d.).

UNITED STATES SHOREBIRD CONSERVATION PLAN

The U.S. Shorebird Conservation Plan is a partnership effort being undertaken throughout the United States to ensure that stable and self-sustaining populations of shorebird species are restored and protected. The plan was developed by a wide range of agencies, organizations, and shorebird experts for separate regions of the country. It identifies conservation goals; critical habitat conservation needs; key research needs; and proposed education and outreach programs to increase awareness of shorebirds and the threats they face. The St. Catherine Creek Refuge lies within the Lower Mississippi Valley/Western Gulf Coastal Plain planning region.

NORTH AMERICAN WATERBIRD CONSERVATION PLAN

The Waterbird Conservation for the Americas initiative, launched in 1998, provides a continental framework and guide for conserving the waterbirds of North America, Central America, and the Caribbean. A product of the initiative is the North American Waterbird Conservation Plan. The plan provides for the conservation and management of 210 species of waterbirds, including seabirds, coastal waterbirds, wading birds, and marsh birds. The refuge contributes to the implementation of this plan by providing potential habitat for the little blue heron, tricolored heron, reddish egret, white ibis, and wood stork.

MIGRATORY BIRD CONSERVATION ZONES

Another cooperative private-state-federal partnership involving the North American Waterfowl Management Plan, Partners in Flight, and the Lower Mississippi Valley Joint Venture has identified a number of Migratory Bird Conservation Zones. The refuge is identified in these zones. The purpose of identifying these zones is to focus a number of private, state, and federal restoration programs into specific areas in an effort to provide maximum benefits for neotropical migratory forest interior-nesting birds.

The goal of this collaborative restoration effort is to provide islands or blocks of forested habitat in an otherwise highly fragmented landscape. The targeted block sizes range from 10,000 to 100,000 acres. Such areas are large enough to support viable populations of various suites of neotropical migratory songbirds. These areas will also support other species, such as the Louisiana black bear, that prefer and thrive in large forested blocks.

Most Migratory Bird Conservation Zones encompass an existing or proposed wildlife management area or national wildlife refuge. These public lands serve as anchors of biodiversity that are enhanced and supported by the expansion of forested blocks, either through public or private management.

One of the biggest challenges to the restoration efforts underway in the Lower Mississippi Valley, and one that affects refuges in particular, is the need to meet long-term management objectives that address comprehensive ecosystem needs, including those of wintering migratory waterfowl, neotropical migratory birds, shorebirds, wading birds, bears, and other wide-ranging species. Management for one species or species group often conflicts with the management objectives for another species or species group. The tendency is to pursue short-term priorities that frequently change as scientific knowledge expands and interests in special resources shift. Caution must be exercised to prevent the start-up of restoration actions that are difficult to reverse and fail to meet the long-term, comprehensive management needs of the ecosystem or a specific area within the ecosystem. An example might be a tendency to totally reforest large portions of a refuge in an effort to reduce fragmentation and create acreage to meet an objective for forest interior-nesting birds.

Such an approach would overlook the critical habitat needs of waterfowl and shorebirds that require a complex of seasonally flooded croplands, moist soil areas, and forested wetlands.

The habitat goals of the Lower Mississippi Valley Joint Venture can only be met through active management of croplands, moist soil areas, and forested wetlands on both public and private lands. Active management (i.e., vegetation manipulation and hydrology restoration) is required to compensate for the spatial and temporal habitat changes that have been caused by deforestation and hydrologic alterations throughout the Lower Mississippi Valley. To compensate for these habitat changes on refuge lands, the St. Catherine Creek Refuge—as part of its waterfowl and shorebird habitat step-down objectives—uses a system of levees, water control structures, pumps, and wells to provide dependable, seasonally flooded croplands and moist soil areas. If it is totally reforested, the refuge would not be able to meet its waterfowl and shorebird habitat step-down objectives. Setting habitat and species objectives from the perspective of the Lower Mississippi Valley is advantageous because it looks at the regional context—the big picture—and enables managers to plan and provide a diverse spectrum of habitats for a diversity of species throughout their range.

Although reforestation is probably the best solution for restoring the vast forests that have been converted to row-crop agriculture, it must be remembered that hydrology (flooding) drives the ecosystem in the Lower Mississippi Valley. The plant and animal communities throughout the valley are dependent upon the hydrologic cycle. It is incumbent upon land managers to manage hydrology in an effort to restore the ecological diversity that once characterized the Lower Mississippi Valley. Ditches can be plugged and structures installed to control and manage water in an effort to mimic the historic flood cycles and meet waterfowl and shorebird habitat objectives.

BLACK BEAR CONSERVATION COMMITTEE – LOUISIANA BLACK BEAR RECOVERY PLAN

The Louisiana black bear is a threatened subspecies that occurs on the refuge. The recovery goals for this species, as identified in the recovery plan, are to establish two viable populations in Louisiana and restore and protect habitat supporting and connecting those populations. The Service, in conjunction with many partners, has prioritized habitat restoration areas for black bears in Louisiana. Similar areas (zones) are being developed for Mississippi that would complement those in Louisiana. The movement of black bears through habitat corridors that connect large forested blocks would then promote genetic exchange among the current isolated bear populations in the Lower Mississippi River Valley. The refuge is within the highest rankings of these Mississippi zones. The purpose of identifying these zones is to focus a number of private, state, and federal restoration programs into specific areas in an effort to provide maximum benefits for the Louisiana black bear, through the restoration of habitat and travel corridors and the protection and expansion of existing habitats.

The goal of this effort is to identify potential priority corridors to connect existing blocks of habitat, both public and private. These lands serve as anchors of biodiversity that are enhanced and supported by the expansion of forested blocks, either through public or private management. The U.S. Department of Agriculture is working with the Service and landowners to restore forests on private lands to contribute to the recovery of the Louisiana black bear. Conservation management on private lands is extremely important to fish and wildlife resources. The synergy of all federal, state, tribal, and private organizations—working together—will ensure that the Service not only protects the more important areas, but also reduces redundancy and overlap.

The recovery of the Louisiana black bear involves a major conservation endeavor between federal, state, and private participants. These include the Service; the Natural Resources Conservation Service; state agencies; universities; private conservation organizations (Bear Education and Restoration group of Mississippi); and the Black Bear Conservation Committee. The mission of the

Black Bear Conservation Committee, which includes public and private partners in Mississippi, Louisiana, and east Texas, is to promote the restoration of the Louisiana black bear in its historic range through education, research, and habitat management. The committee's efforts focus on the goals identified in the Service's recovery plan, which are to establish viable populations; promote various land protection methods that will establish migration corridors; and protect habitat. The goal is to restore and protect a series of large forest blocks and to identify specific focus areas that would provide connecting corridors between these blocks.

ECOSYSTEM CONTEXT

The Lower Mississippi River Valley once supported a vast bottomland hardwood forest complex that extended along the Mississippi River from Illinois to Louisiana. Today, less than 20 percent of this bottomland hardwood forest remains. Most of it is fragmented or occurs in scattered patches throughout the region. Figure 1 provides an overview of the Lower Mississippi River Alluvial Valley and the conservation lands in and around it.

Floodwaters once recharged the valley's wildlife habitats and created rich, dynamic systems that supported a diverse abundance of fish and wildlife. Today, the Mississippi River Valley is bisected by levees. Its hydrologic flows are restricted by flood control projects and agricultural diversions. Its water quality is significantly impacted by agricultural and industrial runoff. The rivers and water bodies throughout are highly turbid and laden with pesticides, and support only a small fraction of the once abundant aquatic resources. These declines have prompted the Service to designate the bottomland hardwood forests found in this ecosystem as areas of special concern (Bailey 1995).

Sustainable communities and species conservation and recovery require the joint efforts of private landowners and local communities, as well as state and federal governments. The Service is focusing efforts to adopt collaborative resource partnerships within and outside the agency to reduce the declining trend of fish and wildlife populations and their biological diversity; establish conservation priorities; clarify goals; and solve common threats and problems associated with fish and wildlife resources. The specific biological objectives for species groups in the Lower Mississippi River Valley—which are targeted in this comprehensive conservation plan—reflect those of the Partners in Flight Plan; North American Waterfowl Management Plan; U.S. Shorebird Conservation Plan; Western Hemisphere Shorebird Reserve Network; and plans for the recovery of the Louisiana black bear.

ECOLOGICAL THREATS AND PROBLEMS

National wildlife refuges in the Lower Mississippi River Valley serve as part of the last safety net to support biological diversity, which is the greatest challenge facing the Service. The impacts, underlying causes, and threats to biological diversity within the Lower Mississippi River Valley include

- the loss of sustainable communities, including the loss of 20 million acres of bottomland hardwood forests (Figure 2);
- the loss of connectivity between bottomland hardwood forest sites (e.g., forest fragmentation);
- the effects of constructing navigation and water diversion projects;
- the effects of agricultural and timber harvesting practices;
- the simplification of the remaining wildlife habitats within the ecosystem and their gene pools; and
- the cumulative habitat effects of land and water resource development activities.

As a result of these causes and threats, many species endemic to the Lower Mississippi River Valley have become threatened, endangered, or extinct.

Figure 1. Lower Mississippi River Alluvial Valley

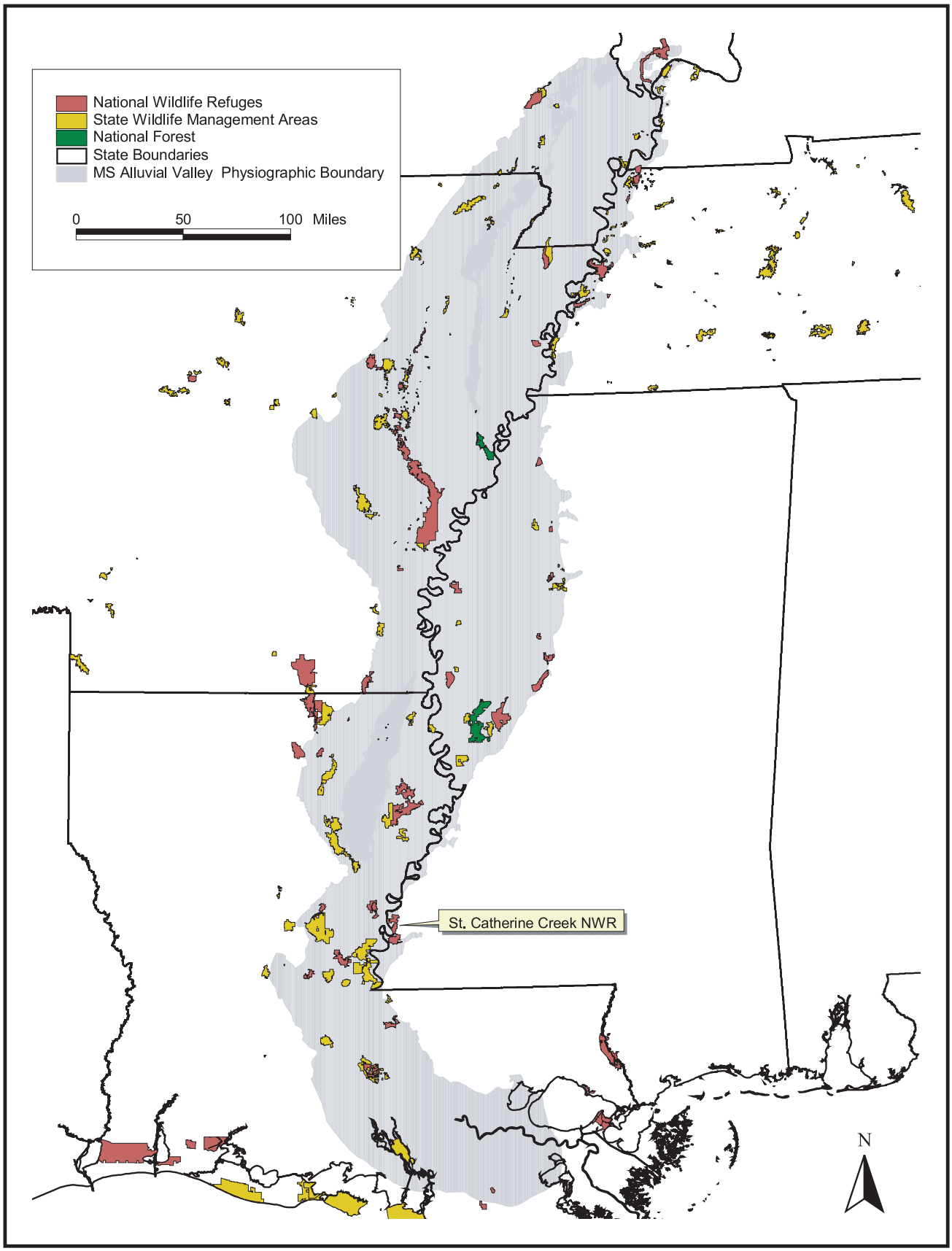
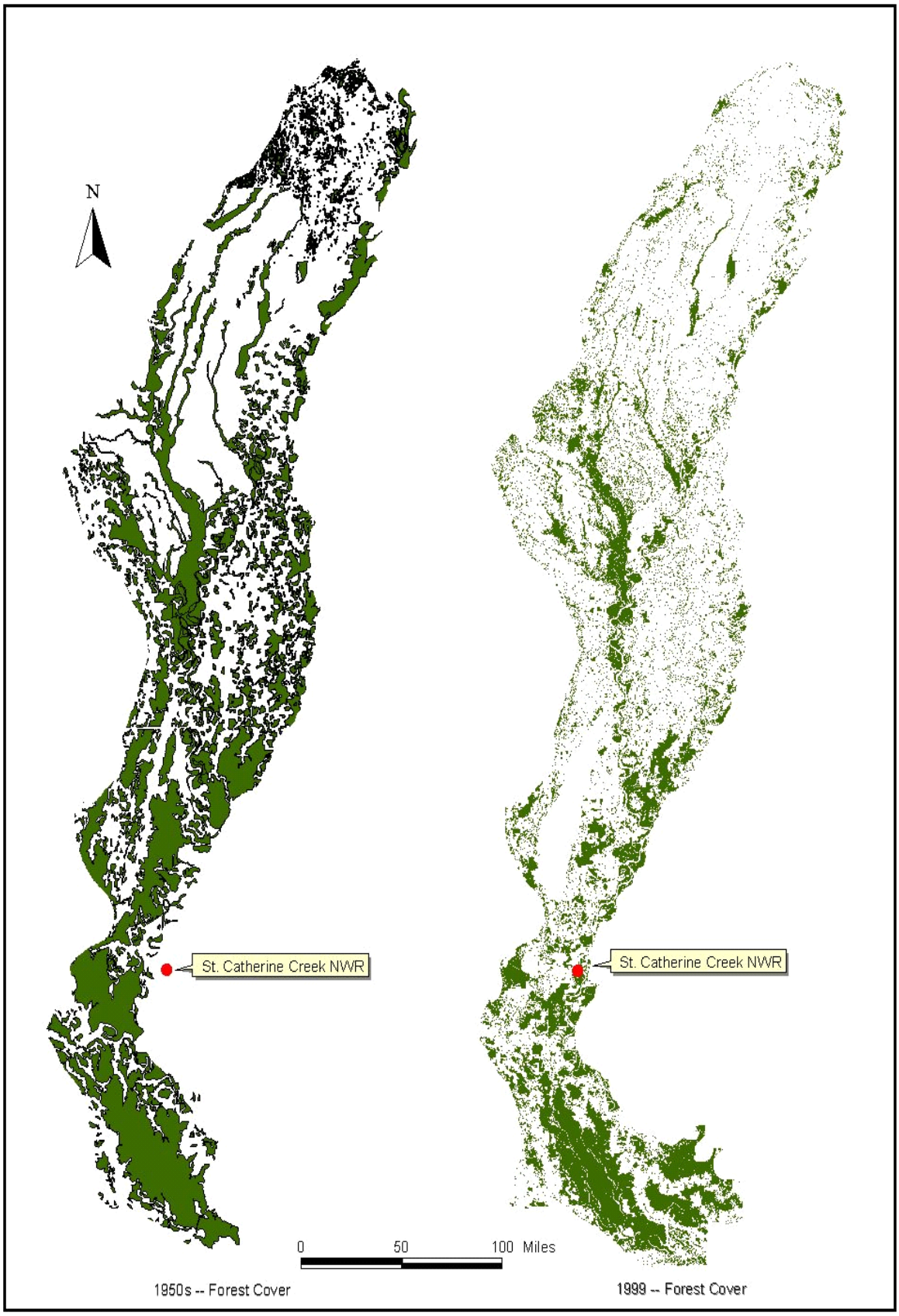


Figure 2. Forest cover changes in the Lower Mississippi River Alluvial Valley



Elimination of forest habitats and forest fragmentation have decimated wildlife species throughout the Lower Mississippi River Valley. Wildlife most adversely affected by fragmentation are those that are area-sensitive or dependent on special habitat requirements, such as large, mature blocks of forest that offer secure nesting habitat and a particular food source.

The more than 70 species of songbirds that use the region for breeding and migration habitat are affected by forest fragmentation, primarily through high rates of nesting failure due to predation and cowbird parasitism. Some of these species, including the Swainson's warbler, prothonotary warbler, wood thrush, and cerulean warbler, have declined significantly. They need the benefits of large forest blocks to recover and sustain their existence. The lack of bottomland hardwood forests and the impacts associated with fragmented forests also pose a serious threat to other migratory bird populations, the black bear, and other resident wildlife species.

Modifications to the historic floodplains have also caused major declines in the fishery and in aquatic resources productivity. The non-point source runoffs of sediments, excess nutrients, pesticides, and herbicides have reduced the ecological functions of the area's remaining fishery resources, and are a continuing threat. The Service's Draft Fisheries and Aquatic Resources Strategic Management Plan for the Lower Mississippi River Valley ecosystem identifies 67 species of fish as endangered and 39 species as threatened. In addition, 16 other species are species of concern or proposed for federal listing.

ALTERATIONS TO HYDROLOGY

In addition to the loss of vast acreages of bottomland-forested wetlands, significant alterations have occurred in the region's hydrology due to urban development; river channel modification; flood control levees; reservoirs; and deforestation, as well as degradation of aquatic systems from excessive sedimentation and contaminants.

The natural hydrology of a region is directly responsible for the connectedness of forested wetlands and indirectly responsible for the complexity and diversity of habitats through its effects on topography and soils. Natural resource managers recognize the importance of dynamic hydrology to forested wetlands and waterfowl-habitat relationships.

Instead of natural hydrology, large-scale, man-made hydrological alterations have changed the spatial and temporal patterns of flooding throughout the entire Lower Mississippi Valley. In addition, these alterations have reduced both the extent and duration of annual seasonal flooding. The loss of this annual flooding regime has had an enormous impact on the forested wetlands and their associated wetland-dependent species.

In view of the hydrologic changes, it is very difficult—if not impossible—to fully emulate and reconstruct the structure and functions of a natural wetland. According to Mitsch and Gosselink (1993), restoration of wetland functions is especially difficult because wetlands depend on a dynamic interface of hydrologic regimes to maintain water, vegetation, and animal complexes and processes.

SILTATION OF AQUATIC ECOSYSTEMS

Aquatic systems, including lakes, rivers, sloughs, and bayous, have been degraded as a result of deforestation and hydrologic alterations. Clearing of bottomland hardwood forests has led to an accelerated accumulation of sediments and contaminants in all aquatic systems. Many water bodies are now filled with sediments, greatly reducing their surface area and depth. Concurrently, non-point source runoffs of excess nutrients and contaminants are threatening the area's remaining aquatic resources.

The hydrologic alterations have basically eliminated the geomorphological processes that created oxbow lakes, sloughs, and river meander scars. Consequently, the protection, conservation, and restoration of these aquatic resources take on an added importance in light of the alterations associated with flood control and navigation.

PROLIFERATION OF INVASIVE AQUATIC PLANTS AND ANIMALS

Compounding the problems faced by aquatic systems is the growing threat from invasive aquatic vegetation such as coffeeweed and willows. Static water levels caused by the lack of annual flooding and reduced water depths resulting from excessive sedimentation have created conditions favorable for the establishment and proliferation of several species of invasive aquatic plants. Additionally, the introduction of exotic (nonnative) vegetation capable of aggressive growth is further threatening the viability of aquatic systems. These invasive aquatic plants threaten the natural aquatic vegetation important to aquatic systems, and choke waterways to a degree that often prevents recreational use.

Furthermore, nonnative wildlife and fish have been successfully introduced or released in this temperate climate. Animals such as nutria and wild hogs compete with native wildlife for limited resources, and have caused extensive habitat damage and alterations.

RELATIONSHIP TO STATE WILDLIFE AGENCY

A provision of the National Wildlife Refuge System Improvement Act of 1997, and subsequent bureau policy, is that the Service shall ensure timely and effective cooperation and collaboration with other federal agencies and state fish and wildlife agencies during the course of acquiring and managing refuges. This cooperation is essential in providing the foundation for the protection and sustainability of fish and wildlife throughout the United States.

The Mississippi Department of Wildlife, Fisheries, and Parks is a state-partnering agency with the Service, charged with enforcement responsibilities for migratory birds and endangered species, as well as with managing the state's natural resources. The total area owned or managed by the Department in support of the state's wildlife, recreation, and fisheries is 828,408 acres. This includes 42 state wildlife management areas and 29 state parks encompassing 823,297 acres, and 21 lakes totaling 5,111 acres (Mississippi Department of Wildlife, Fisheries, and Parks, n.d.).

The Department directs the state's wildlife conservation program and provides public recreation opportunities, including an extensive hunting and fishing program, on several wildlife management areas and parks located near the refuge. The Department's participation and contribution throughout the refuge's comprehensive conservation planning process has been invaluable. It continues to work with the Service to provide ongoing opportunities for an open dialogue with the public to improve the ecological sustainability of fish and wildlife in Mississippi. Not only has the Department staff participated in biological reviews, public meetings, and field reviews as part of the planning process, they also are an active partner in the coordination and planning of hunting programs and various wildlife and habitat surveys. A key part of the comprehensive planning process is the integration of common objectives between the Service and the Department, where appropriate.

II. Refuge Description

INTRODUCTION

St. Catherine Creek National Wildlife Refuge was established in 1990 to preserve wintering habitat for mallards, pintails, and blue-winged teal and to provide production habitat for wood ducks to meet the goals of the North American Waterfowl Management Plan. The refuge's management practices provide excellent wintering waterfowl habitat. The refuge also provides critical resources for wading birds, shorebirds, neotropical migratory birds, and resident wildlife in the Lower Mississippi River Valley.

The refuge is located within Adams and Wilkinson counties in west central Mississippi (Figure 3). Its western boundary lies along about 18 miles of the Mississippi River, approximately seven miles south of the City of Natchez. The northernmost boundary is about two miles south of Natchez. The eastern boundary generally follows the bluffs that run along the eastern side of the Mississippi River from Vicksburg, Mississippi, to Baton Rouge, Louisiana. The Homochitto River forms the refuge's southern boundary. The refuge can be reached by U.S. Highway 61 and several county roads.

There are three contiguous units on the refuge: the northernmost Cloverdale Unit, the Butler Lake Unit, and the southernmost Sibley Unit (Figure 4). The refuge's headquarters facility is located on the Sibley Unit and can be reached by York Road, which is maintained by Adams County. On the refuge, Pintail Lane is the main access and service road to the Sibley Unit. Hutchings Landing provides the main access to the Butler Lake Unit. The Cloverdale Unit is a waterfowl sanctuary and is closed to public access. The main refuge road to the Cloverdale Unit is often submerged during flooding.

The refuge also includes three disjunct tracts, which were described in Chapter I of the draft environmental assessment. Two of these tracts were acquired through Farmers Home Administration farm foreclosures and were assigned to the refuge in 1995. The third tract was part of the Sibley Unit acquisition and is outside the established acquisition boundary (U.S. Fish and Wildlife Service 2001a; 2004b).

The refuge currently owns a total of 24,931 acres within an approved acquisition boundary of 34,732 acres (Figure 5). This ownership includes 502 acres of 16th section land leased from the Adams County School Board. A history of the refuge's acquisition of lands, purchased from willing sellers within the approved acquisition boundary, is provided in Appendix IX.

Efforts to acquire additional lands within the refuge's approved acquisition boundary remain an ongoing process. Considerable efforts to lease or acquire both 16th section lands within the acquisition boundary have not been successful.

Historically, the refuge lands were entirely forested; however, nearly two-thirds of the refuge was cleared and converted to row-crop agriculture during the 1960s before Service ownership. Flooding from the Mississippi and Homochitto rivers was, and still is, an annual event. Farming under these conditions was difficult and required unconventional methods. These methods included the construction of levees on the floodplain; the use of pumps to dewater parts of the area; and the planting of crops by aerial application. The former owners leased exclusive hunting rights to the property, particularly on the Sibley Farms Unit where deer and waterfowl were the primary attractions. Several conservation features were initiated and waterfowl use of the area was very high.

Figure 3. Regional location

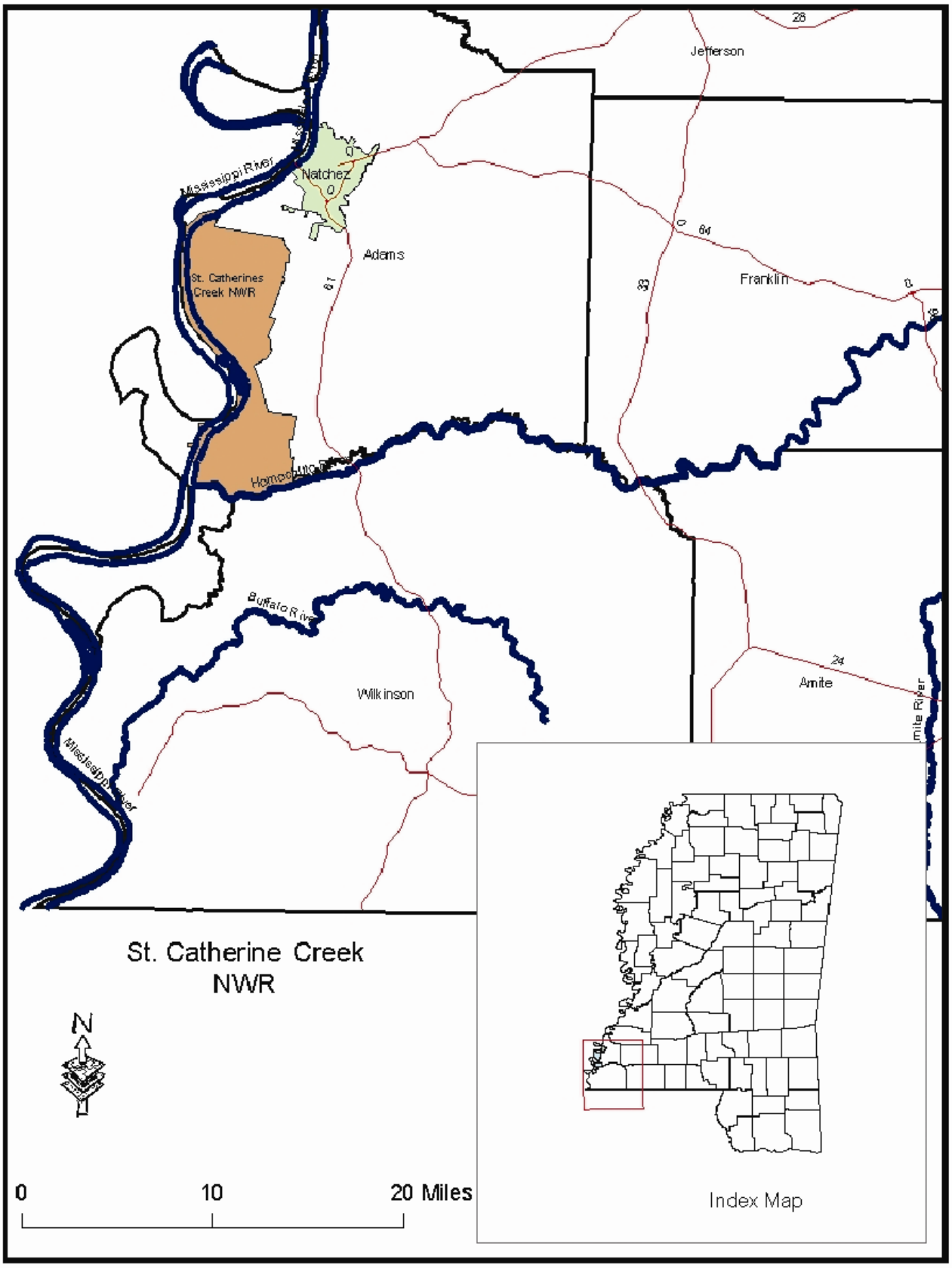


Figure 4. Management Units of St. Catherine Creek National Wildlife Refuge

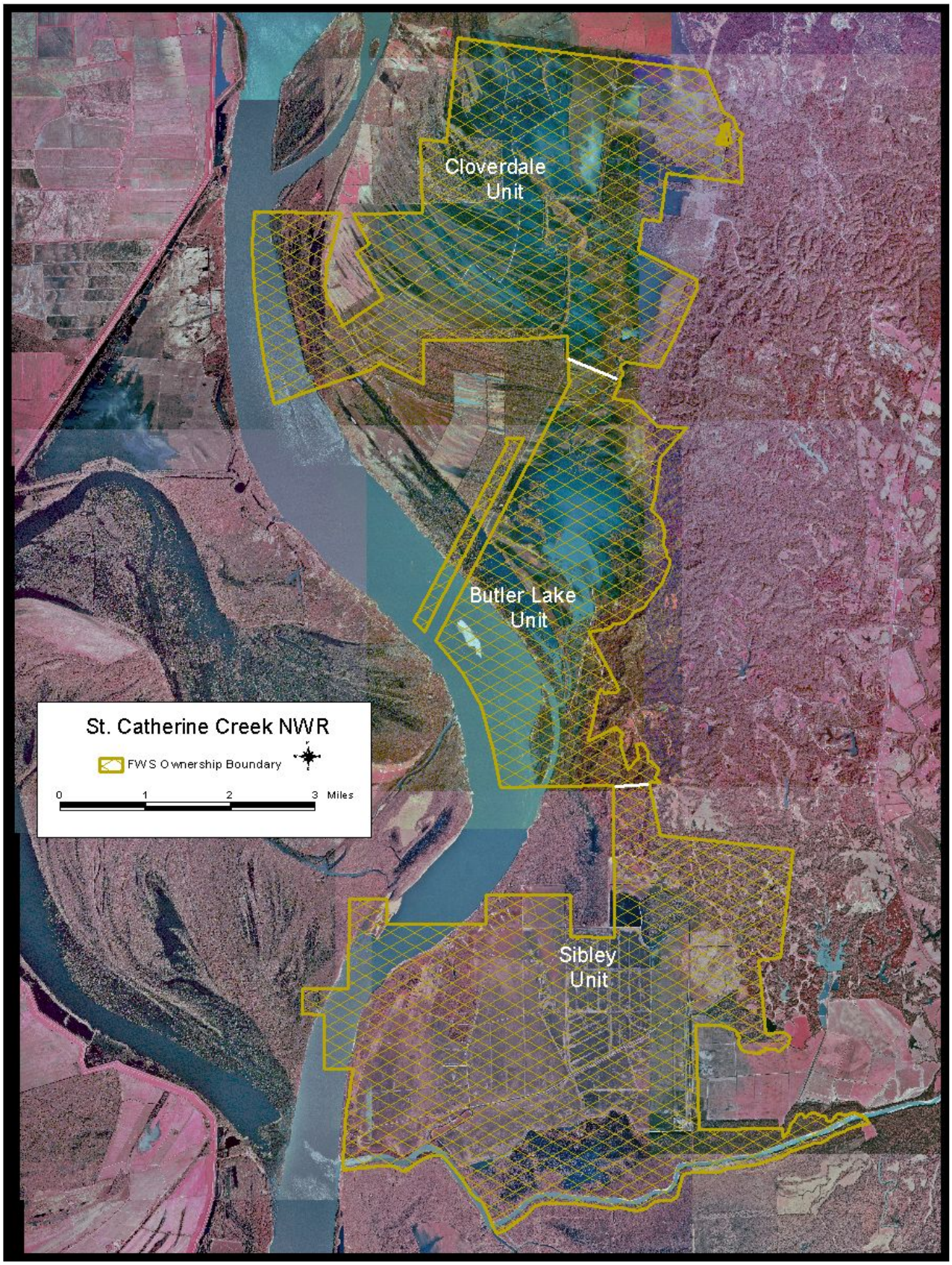
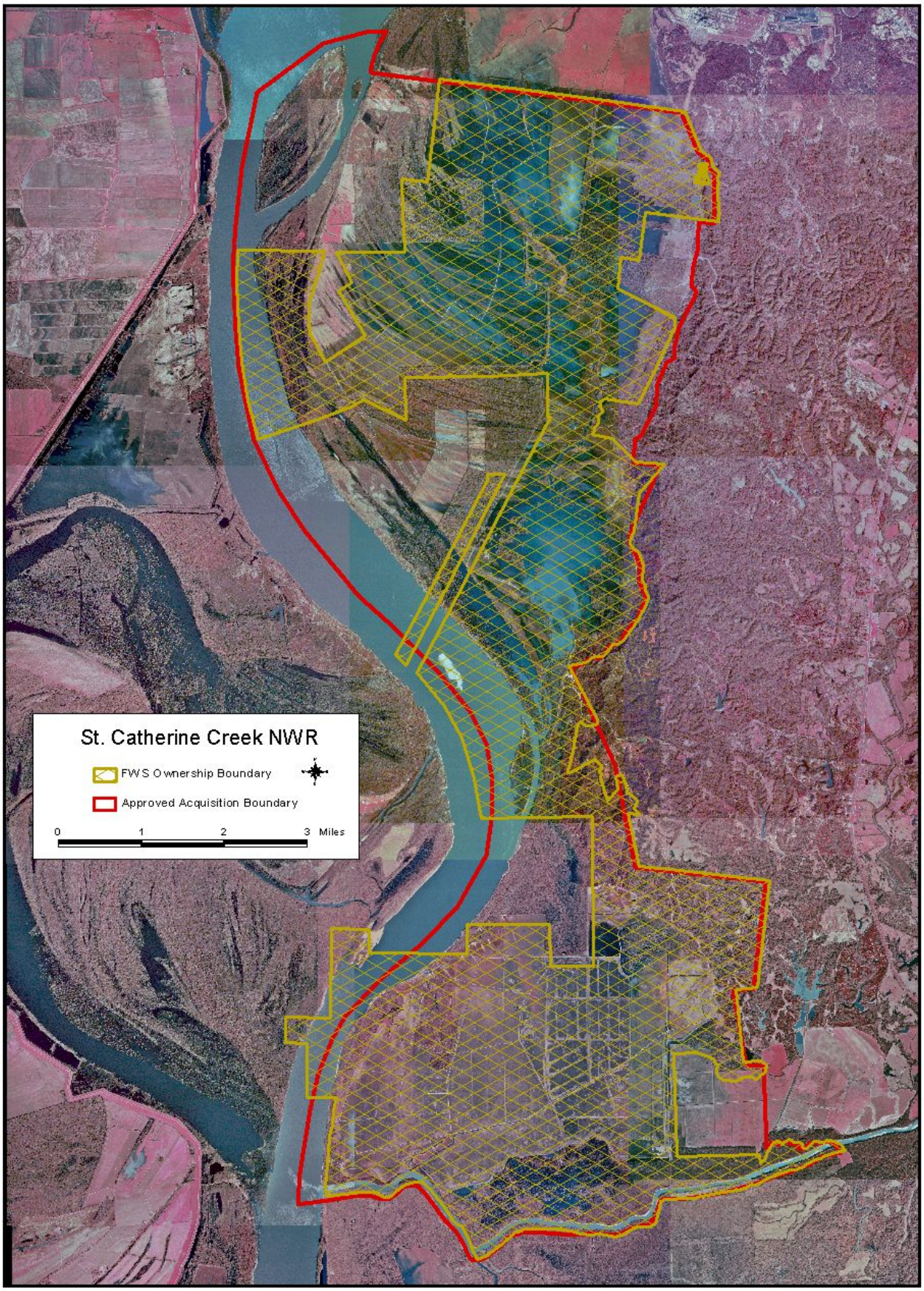


Figure 5. Approved acquisition boundary, St. Catherine Creek National Wildlife Refuge



About 9,100 acres of the refuge's management boundary consist of bottomland hardwoods and bluff forest habitat. Several endangered or threatened species inhabit or nest on the refuge. Many species of neotropical migratory birds and bats use the refuge's forests. In addition, several impoundments and flooded timber in two lakes provide greentree reservoirs and habitat for other migratory birds, including wintering habitat for waterfowl and bald eagles. The refuge provides the potential for roughly 1,500 acres of moist soil habitat, which is essential for the thousands of shorebirds, migratory waterfowl, and wading birds that visit the refuge every year.

Visitors enjoy public use of the refuge for fishing, hunting, hiking, wildlife photography, wildlife observation, and environmental education and interpretation. The refuge also hosts several activities each year, including special birding events and youth fishing and hunting events.

REFUGE PURPOSES

St. Catherine Creek National Wildlife Refuge was established in January 1990 under the authority of the Migratory Bird Conservation Act (16 U.S.C. & 715d). The purposes of the refuge are to

- provide "wintering habitat for wood ducks and to meet the habitat goals presented in the North American Waterfowl Management Plan";
- "… preserve a dynamic alluvial floodplain ecosystem, provide needed waterfowl winter habitat in the Lower Mississippi River Valley, and assure available water during December for migrating waterfowl";
- preserve wintering habitat for mallard, pintail, blue-winged teal, and wood duck; and
- provide wintering and production habitat for migratory and resident waterfowl.

The intent of the refuge then is clearly for preservation, improvement, and creation of wintering and reproductive habitat for waterfowl.

Management efforts since 1990 have focused on the following objectives:

- Provide and maintain optimum habitat for migratory waterfowl consistent with the overall objectives of the Mississippi Flyway and North American Waterfowl Management plans.
- Provide habitat and protection for all migratory birds, endangered species, and other trust resources.
- Provide habitat for a more natural-like diversity of wildlife and plant species.
- Provide opportunities for wildlife-oriented recreation and environmental education, when and where appropriate and compatible with other refuge objectives.

SPECIAL DESIGNATIONS OF THE REFUGE

The Partners in Flight initiative has identified the Homochitto Forest Bird Conservation Area as a potential 20,000-acre forest block objective. This area includes (1) the refuge's Sibley Unit and (2) another 10, 000-acre forest block objective, the St. Catherine Creek Forest Bird Conservation Area, which includes the refuge's Butler Lake and Cloverdale units.

Although they do not have a special designation, the loess bluffs, which flank the eastern side of the Mississippi River from Vicksburg, Mississippi, to Baton Rouge, Louisiana, provide a unique habitat at the refuge. The freshwater springs flowing from the base of the bluffs are habitat for unique or rare fish, plant, and insect species, including the spring darter (U.S. Fish and Wildlife Service 2004d).

RESOURCE THREATS AND PROBLEMS

ECOLOGICAL THREATS AND PROBLEMS

National wildlife refuges in the Lower Mississippi River Valley serve as part of the last safety net to support biological diversity and this is the ultimate challenge facing the Service. Like other refuges in this river valley, the St. Catherine Creek Refuge has lost bottomland hardwood forests; experienced the effects of agriculture on the historic habitats that once flourished on refuge lands; and struggles to manage the conditions resulting from the near annual flooding from the Mississippi and Homochitto rivers, which often deposits large amounts of sediment and frequently damages the levees on the refuge.

CONSERVATION PRIORITIES AT THE ST. CATHERINE CREEK REFUGE

The refuge is an important conservation area in the Lower Mississippi River Valley. It provides a diversity of wetland habitats for migratory birds, including wintering waterfowl; shorebirds; wading birds; neotropical migratory birds; and raptors, as well as habitat for other resident wildlife, including threatened and endangered species.

The refuge contains numerous lakes, ponds, and impoundments that provide critical habitat for migratory birds. Some of these impoundments are managed to provide moist soil habitat for migratory waterfowl. The Service, in partnership with conservation organizations and private industry, has also reforested almost 12,000 acres of formerly cleared agricultural land at the refuge, primarily with bottomland hardwood species, to restore habitat for resident and migratory birds , two special concern bat species, and other wildlife.

REFUGE ENVIRONMENT

PHYSICAL RESOURCES

Soils and Topography

The refuge lies at the eastern edge of the Mississippi Alluvial Plain ecosystem province, at the base of the loess bluffs that parallel the Mississippi River. The province consists of flat to gently sloping, broad floodplain and low terraces made up of alluvial soils and loess deposits. The only noticeable slopes are sharp terrace scarps and natural levees that rise sharply to several meters above the adjacent bottomlands or stream channels. Oxbow lakes are prevalent.

The refuge consists of several distinct topographic features: the riverfront, natural levees, ridges and swales, basins and flats, and loess bluff hills. The riverfront is a flat, low-lying area between natural levees and the Mississippi River. These areas consist of sandbars and old river scars in various stages of oxbow development.

The natural levees parallel the river and are formed by the heaviest sediments, which are the first to settle as the river seasonally rises and inundates the floodplain. The surface texture of the soils on natural levees and low riverfronts are silt loam to sandy loam, and most soils have a clay horizon and associated subsoil clay increase. Soil drainage is related to its position on the levee and ranges from well to poorly drained.

The ridges and swales are the remnant landforms resulting from the river’s historic meanders. The basins and flats consist of bottomland swamp areas occupying low elevations near the bluff line. The soils in the bottomland swamp areas are normally clayey and poorly drained.

The loess bluff hills are characterized by irregular topography with rolling hills punctuated by steep bluffs and deep ravines. The soils on these hills consist of thick deposits of loess on top of coastal plain sediment.

The prominent soil associations found on the St. Catherine Creek Refuge are Sharkey; Crevasse-Commerce-Robinsonville; Sharkey-Tunica-Newellton; Alder-Convent; Memphis-Natchez; and Newellton-Commerce (Scott 2000; State Soil Geographic, n.d.).

Hydrology

The refuge's hydrology is greatly influenced by the annual inundation of floodwaters from the Mississippi and Homochitto rivers. There are approximately 1,300 acres of perennially flooded lakes, including Gilliard Lake; Butler Lake; Salt Lake; Lake Lucille; and an impounded wetland called Swamp Lake. Salt Lake and Lake Lucille are oxbows formed by the Mississippi River. In addition, Old Saint Catherine Creek, a perennial stream, flows from north to south though the refuge into the Mississippi River at Catherine Bend.

The remaining water bodies, which total 1,700 acres, consist of 35 impoundments ranging from two to 200 acres in size. These are formed by earthen natural and/or man-made levees that hold intermittent floodwaters. In the absence of natural floodwaters, the refuge staff is able to flood 700 acres of these impoundments by pumping water from four water wells. An additional 350 acres can be flooded by using Swamp Lake.

These refuge impoundments, along with several commercial aquaculture ponds distributed throughout the region, provide bodies of moist soil and mudflat habitat for shorebirds (Mississippi Alluvial Valley/West Gulf Coastal Plain Working Group 2000).

Water Quality

Section 303(d) of the Clean Water Act requires the states to identify water bodies that do not meet one or more applicable water quality standards and for which total maximum daily levels are needed. Mississippi's Section 303(d) List of Water Bodies identifies the impaired water bodies, and also establishes a priority ranking for such waters, taking into account the severity of the pollution and the uses to be made of the water bodies. The Section 303(d) listing requirement applies to water bodies impaired by point and non-point sources.

Like the Mississippi River, Butler Lake and Old Saint Catherine Creek are listed by the U.S. Environmental Protection Agency as 303(d)-listed impaired waters for aquatic life support. The pollutants that exceed water quality standards include pesticides, nutrients, and sediment. Both Butler Lake and Old Saint Catherine Creek also have low dissolved oxygen (Mississippi Department of Environmental Quality 2004).

Climate

The summer and fall seasons in southwestern Mississippi are typically very warm and humid, sustained by persistent tropical air flowing in from the Gulf of Mexico. Thunderstorms are frequent during these seasons and keep rain and river levels fluctuating. Prolonged droughts are rare. Winters are mild, with temperatures averaging around 50 degrees Fahrenheit, and very seldom going below freezing.

In summer, the average daytime temperature stays close to 80 degrees, though temperatures near 100 are not uncommon. The relative humidity is also high during the summer months, averaging around 90 percent.

The prevailing wind is from the south, and is highest in the spring at about 8 miles per hour. Severe local storms, including tornadoes, occasionally strike in the area, causing damage in local areas. Every few years, in summer or autumn, a tropical depression or remnant of a hurricane that has moved inland from the Gulf of Mexico causes extremely heavy rains, lasting two or three days.

The normal rainy season occurs from December to May, with an annual average precipitation of about 75 inches. Backwater flooding from the Mississippi River has a major impact on refuge management, because 90 percent of the refuge lies within the alluvial floodplain. River stage information is closely monitored throughout the year, and is imperative for successful short-term and long-term water management planning at the refuge.

BIOLOGICAL RESOURCES

The habitats on the refuge offer a wide variety of ecological niches for wildlife. Bottomland hardwood forests, including cypress swamps and upland hardwood forests, cover 90 percent of the refuge. The other habitats consist of wetlands, cleared land, and open water.

Threatened and Endangered Species

Three threatened and three endangered species are known to occur on the refuge: the bald eagle, Louisiana black bear, fat pocketbook mussel, least tern, and wood stork (if east coast population), respectively.

Bald eagles *(Haliaeetus leucocephalus),* a threatened species, nest on the refuge. Three bald eagle nests were located in the 1999 nesting season; two were active and produced five young. In 2002 there were at least seven individual bald eagles (four adults and three sub-adults) on the refuge at one time. Nest sites on the refuge are protected and disturbance is minimized.

Sightings of the American alligator (*Alligator mississippiensis*), a threatened by similarity of appearance species, are common on the refuge. At this time, no active management occurs outside of protection for this species.

The Louisiana black bear *(Ursus americanus luteolus*) has been observed on the refuge. It is threatened throughout its historic range, which includes eastern Texas, Louisiana, and southwest Mississippi. Currently, no single systematically derived population estimate exists for the Louisiana black bear; however, based upon numerous studies of bears in Louisiana conducted by Louisiana State University and University of Tennessee researchers, the Louisiana black bear population is roughly estimated at 300 to 400 adult animals.

While male bears may be found throughout their range, reproducing females were only known to occur in four disjunct areas (referred to as occupied habitat) in Louisiana until one reproducing female was documented in Mississippi in 2005.

In 2001, the Service, in cooperation with the Louisiana Department of Wildlife and Fisheries, the Black Bear Conservation Committee, and Louisiana State University, began a multi-year Louisiana black bear repatriation project. The purpose of that project is to encourage the genetic exchange and dispersal of bears into unoccupied habitats by establishing a new, viable subpopulation between the existing subpopulations in the Tensas and Upper Atchafalaya

Basins. The project involves translocating Louisiana black bears to an unoccupied portion of their historic range in east central Louisiana. The repatriation area is a 100,000-acre complex of publicly owned lands (consisting of Lake Ophelia National Wildlife Refuge and the Red River and Three Rivers Wildlife Management Areas) in Avoyelles and Concordia Parishes, Louisiana, located just southwest across the Mississippi River from the St. Catherine Creek Refuge.

Since March 2001, 23 adult females and 55 cubs have been translocated as part of that ongoing project. There are two known occurrences of bears from that population crossing the Mississippi River into the State of Mississippi. Specifically, in March 2005, a radio-collared female from Louisiana crossed the river and had five cubs in Wilkinson County, south of the refuge. The next month, another female crossed the river and was last tracked on Glascock Island, bordering the western edge of the refuge. A general increase of bear sightings in southwest Mississippi over the last two years further indicates a potential for increased bear use of the refuge area.

The endangered fat pocketbook mussel (*Potamilus capax*) has been documented on the refuge in the Old Saint Catherine Creek channel. The mussel is characterized by a rounded, greatly inflated shell, thin to moderately thick, with an S-shaped hinge (U.S. Fish and Wildlife Service 2003a).

The interior population of the least tern (*Sterna antillarum*) is an endangered species and has recently been sighted on the refuge. It breeds in isolated areas along the Missouri, Mississippi, Ohio, Red, and Rio Grande river systems. Dams, reservoirs, and other changes have eliminated most of the historic habitat for the interior population of least tern.

Wood storks *(Mycteria americana*), are common on the refuge during the early summer and fall. The east coast population of wood storks is endangered while the Mexican population is not. Studies are currently underway to determine whether the storks that are common at St. Catherine Creek NWR every fall are part of the east coast population or Mexican population.

Species of concern on the refuge include the peregrine falcon, Rafinesque's big-eared bat, southeastern myotis, white pelican, black-necked stilt, white ibis, paddlefish, and spring darters.

Birds

Preservation, improvement, and creation of habitat for waterfowl and neotropical migratory birds are the primary goals for the refuge, which is host to at least 159 species of birds throughout the year. Year-round residents include the wood duck, numerous songbirds and neotropicals, and wild turkey.

With its location in the Mississippi Flyway, thousands of migratory waterfowl, shorebirds, and wading birds visit the refuge seasonally. The refuge provides a complex of shallow flooded habitats, including moist soil, croplands, scrub-shrub, and bottomland forests that these birds need for foraging.

Waterfowl

About 30,000 migratory waterfowl were found on the refuge in the 1999-2000 midwinter migratory bird survey, including mallard, pintail, wood duck, gadwall, wigeon, and spoonbill. Large numbers of these, as well as the green-winged teal, ringneck, and scaup, were also found in the 2002 midwinter flight survey.

Wood ducks are common year-round residents on the refuge and typically inhabit secluded areas such as forested wetlands, wooded and shrub swamps, tree-lined rivers and sloughs, and beaver ponds. Management of preferred habitats is somewhat limited by the drastic water level rises on the Mississippi River that flood much of the refuge for many months each year. Swamp Lake, Gilliard Lake, Butler Lake, and several impoundments in the Cloverdale Unit remain flooded in fall and provide good habitat for wintering and resident wood ducks during the driest time of the year in Mississippi, when habitat tends to be limited (U.S. Fish and Wildlife Service 2001b; 2002b).

Shorebirds, Gulls, and Terns

The refuge is within the Central Region used for administrative management of woodcock under the American Woodcock Management Plan. The refuge provides some preferred habitat for the woodcock. This includes wintering habitat such as bottomland hardwood forests with brush and understory, as well as moist to wet, dense shrubby/scrub forests or dense vine/shrub/cane tangles in forest settings that these birds prefer in the daytime.

Other shorebirds commonly found on the refuge include greater and lesser yellowlegs, numerous species of sandpipers, killdeer, plover, black-necked stilts, common snipe, and others drawn to moist soil management units and other impounded wetlands. These areas provide critical roosting and feeding habitat that these birds need as they move through the Lower Mississippi River Valley.

Peak spring shorebird migration is April to mid-May (but tends to extend from mid-March to late May). The almost annual spring flooding often extends well into the summer months, severely limiting good northbound shorebird habitat on the refuge in some years. Southbound migration starts in early July, peaks August through September, and usually ends by mid-October. Annual backwater flooding by the Mississippi River provides an opportunity to impound some of the floodwater for shorebirds. In most years, up to 80 percent of the refuge may be flooded by the Mississippi River at some time during winter and spring. If adequate floodwater is impounded or pumped until fall migration begins in late July, some of the best shorebird habitat in the Lower Mississippi River Valley may be provided at this refuge.

Wading Birds

Large numbers of wading birds are present, including the great blue heron and great egret, which are year-round residents. During the summer the refuge hosts large numbers of snowy and cattle egrets, wood storks, little blue herons, green herons, and white and glossy ibises. Black-crowned and yellow-crowned night herons are commonly seen at dusk and at night feeding in ditches and sloughs.

Other Resident and Migratory Birds

The mature hardwood/pine stands in the loess bluffs, which cover approximately 4,000 acres along the eastern boundary of the refuge, are a favorite neotropical migratory bird habitat and attract birders visiting the refuge.

Several species of woodpeckers, the ruby-throated hummingbird, cardinals, jays, sparrows, wrens, crows, finches, and a wide variety of other birds inhabit the refuge.

The refuge supports a thriving wild turkey population, which is generally limited to the loess bluff habitat. However, turkeys are also observed in the bottomland hardwood stands along rivers, creeks, and wetlands closely associated with the bluffs.

Raptors, including red-tailed hawks, red-shouldered hawks, and American kestrels are common year-round residents. Northern harriers winter on the refuge. Osprey, black vultures, turkey vultures, great horned and barred owls, barn owls, burrowing owls, and Mississippi kites are also seen on the refuge. The bald eagle and the peregrine falcon are winter residents of the refuge and are observed near water bodies such as Swamp Lake. Golden eagles are occasionally spotted on the refuge.

A list of bird species known to inhabit the refuge is included in Appendix VII.

Mammals

At least 19 different species of mammals are known to occur on the refuge. Year-round residents include the white-tailed deer, gray and fox squirrels, rabbit, raccoon, opossum, otter, beaver, and muskrat. Nutria and wild boar, both nonnative species, also occur.

The great diversity of habitat supports an abundance of game mammals. White-tailed deer occupy virtually all habitat types throughout the refuge, along with bobcat, coyote, raccoon, fox, and wild hogs. Recently reforested areas provide an abundance of dense early successional cover over the previously cleared farmland. This habitat type is highly preferred by the refuge's deer population, and is also used by raccoon, bobcat, coyote, and hogs, as well as eastern cottontail and swamp rabbits.

The mosaic of remnant bottomland hardwood/cypress stands, which are distributed throughout the alluvial floodplain, are heavily used by all of these mammals, as well as by the refuge's very healthy squirrel population, including both eastern gray and fox squirrels and the black phase of the fox squirrel. Gray squirrels dominate the mixed hardwood/pine stands of the refuge's loess bluff hills habitat.

Because of its highly adaptable nature and reproductive capabilities, the refuge's white-tailed deer population has the greatest potential to negatively impact habitat over time. The refuge currently manages the population by allowing hunting, which is restricted and monitored, with the goal of keeping the deer population healthy and in balance with the carrying capacity of the habitat.

Six species of bats have been documented on the refuge including Rafinesque's big-eared bats, the least known of all North American bat species. This species has been located in only five areas in Mississippi including St. Catherine Creek NWR. These insect-eating bats are a species of concern and are known to roost and breed on the refuge. There are two established maternal colonies; one colony consists of approximately 50 individuals, while the other is a smaller colony of approximately 10 individuals.

The southeastern myotis bat has been documented from the same five areas as Rafinesque's big-eared bat with one additional site. Two maternal colony roosts for the southeastern myotis have been located on property adjacent to the refuge. Both of these roost contain over 5,000 individuals and are the largest known colonies for this species in Mississippi.

Reptiles and Amphibians

Currently, 54 species of reptiles and amphibians are known to occur on the refuge. The most notable is the American alligator. Various snakes, including the garter snake, canebrake rattlesnake, cottonmouth, and southern copperhead, inhabit the refuge. Turtles are also common and include the box, mud, snapping, and map turtles.

Fish

Several species of fish are known to occur on the refuge. These include game fish such as crappie, bluegill and other sunfishes; largemouth bass; and white bass, as well as flathead, blue, and channel catfish. Carp, buffalo, and gar are also abundant. Backwater flooding from the Mississippi River restocks permanently flooded lakes and sloughs. The Gilliard, Butler, Swamp, and Salt lakes are permanent waters and become holding basins for fish when they are trapped as backwaters recede. The natural restocking of fish by backwater flooding helps to create consistent, high quality fishing opportunities (U.S. Fish and Wildlife Service 2001b; 2002b).

Paddlefish and spring darters are species of concern that inhabit the refuge. A close relative of the sturgeon, only one species of paddlefish is native to waters of the Mississippi River in the United States. Dams have caused a sharp decline in paddlefish distribution and abundance in the United States (Jenkins and Burkhead 1993).

Mussels

Ten species of freshwater mussels have been found on the refuge (Table 1). The fat pocketbook mussel is the only endangered mussel species that inhabits the refuge (U.S. Fish and Wildlife Service 2004d).

Table 1. Mussels at St. Catherine Creek National Wildlife Refuge.

Common Name	Scientific Name
Yellow Sand Hill	*Lampsilis teres*
Giant Floater	*Anodonta grandis*
Fragile Paper Shell	*Leptodea fragilis*
Fat Pocketbook	*Potamilus capax*
Southern Maple Leaf	*Quadrula apiculata)*
Flat Floater	*Anodonta suborbiculata*
Pink Paper Shell	*Potamilus ohiensis*
Texas Lilliput	*Toxolasur texasensis*
Maple Leaf	*Quadrula quadrula*
Paper Pond Shell	*Anodonta lubeullis*

Habitats

About 50 percent of the refuge is reforested agricultural land, as shown in Table 2. The remaining lands consist of existing upland hardwood forests in the bluffs; bottomland hardwood forests on the alluvial plain; moist soil areas; cropland; and open water. Rain and backwater flooding fill the depressions and basins in low areas, creating excellent habitat for waterfowl, shorebirds, and wading birds with the exception of reforested areas and willow-invaded abandoned agricultural fields, the forests on the refuge are mid-aged with closed canopies of vigorous growth potential.

Table 2. St. Catherine Creek National Wildlife Refuge, 1990 and 1999 habitats.

Habitat	1990	1999
Cropland	4,500 acres	1,693 acres
Bottomland Forest	1,540 acres	7,398 acres
Moist soil	1,456 acres	1,456 acres
Bluff Forest	176 acres	1,694 acres
Permanent (Managed) Shrub/scrub	0 acres ridge 0 acres flooded	0 acres ridge 178 acres flooded
Reforested Mixed Bottomland Hardwood	0 acres	11,728 acres
Open Water	295 acres	295 acres
TOTAL	**6,511 acres**	**24,442 acres**

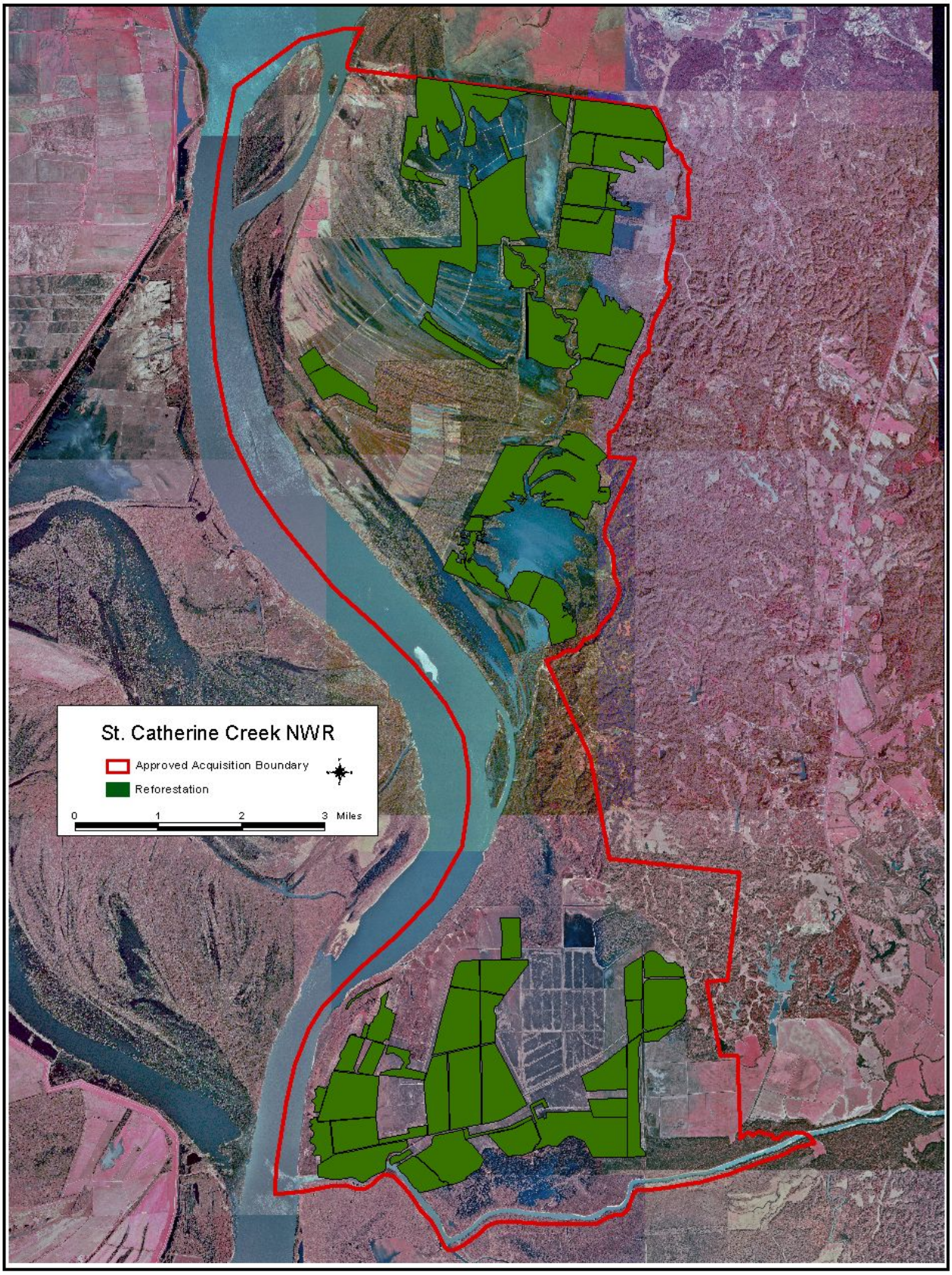
The upland hardwood forests are vegetated with oak, gum, elm, ash, and pine. The hardwoods on the loess bluffs are dominated by oak-hickory.

The 7,400 acres of bottomland hardwood forests include flooded timber (flooded forests/greentree reservoirs) in Gilliard Lake, Swamp Lake, and several impoundments. Primarily cypress swamps, these flooded forests provide important habitat for wood ducks, Rafinesque's big-eared bats, southeastern myotis, and some wading birds throughout the year.

The refuge has reforested roughly 12,000 acres of the former agricultural land in the floodplain to restore areas to as near natural conditions as possible and provide valuable habitat for wildlife (Figure 6). Twenty-seven species of bottomland hardwoods, including cypress, green ash, overcup oak, and Nutall oak, have been planted as of 2000 (U.S. Fish and Wildlife Service 2001a; 2004b).

The few hundred acres of shrub/scrub provide much needed habitat for many of the avian species present on the refuge.

Figure 6. Reforestation sites



Due to its location on the alluvial floodplain of the Mississippi River, the refuge has an abundance of wetland habitats, including about 1,300 acres of perennially flooded lakes and 1,500 acres of moist soil management units. The moist soil management units are managed primarily for waterfowl. Each year, the moist soil management units support about 20,000–30,000 shorebirds; 60,000–100,000 migratory waterfowl; and 10,000–50,000 wading birds. Common management techniques for this type of habitat vary from water level manipulation and mechanical disturbance to agricultural production.

The nutrient-rich soils in these impoundments produce an abundant variety of moist soil vegetation, including smartweed, common millet, red rooted nutsedge, spangletop, pigweed, spikerush, and panic grass, all of which are used by waterfowl when water conditions are optimal. However, dense stands of undesirable sesbania or cocklebur may grow when the rivers flood areas from late winter until late summer and a rapid river fall is coupled with warm, dry soil conditions. These plants are of little value to waterfowl. In some years, the refuge staff mows the moist soil management units and applies approved pesticides to control cocklebur infestation and stimulate growth of desirable moist soil vegetation.

A Lower Mississippi River Joint Venture foraging habitat objective for the refuge is 900 acres of moist soil habitat. Although the refuge is managing 1,500 acres of this type of habitat, the moist soil habitats on the refuge are flooded by Mississippi River backwaters well into the growing season almost annually. In addition, providing shorebird habitat also reduces the amount of moist soil foraging habitat by 20 to 40 percent annually.

The Old Saint Catherine Creek channel, Butler Lake, Gilliard Lake, Swamp Lake, and Salt Lake are the largest permanent water features, along with numerous other smaller lakes, sloughs, and brakes found across the refuge (Table 3).

Table 3. Largest permanent lakes on the refuge.

Gilliard Lake	The Swamp Lake	Butler Lake	Salt Lake
A 721-acre natural wetland located on the Sibley Unit that contains a mosaic of bald cypress and buttonbush cover. Provides fishing and a hunting area for waterfowl.	A 163-acre lake on the Sibley Unit that is especially suited for bank fishing.	A 464-acre open water wetland with scattered bald cypress along its perimeter. Located on the Butler Unit, it provides exceptional fishing opportunities. Open to waterfowl hunting during the designated season.	On the Butler Unit, this oxbow lake of about 70 acres provides prime bass and crappie fishing.

In 1999, about 1,700 acres of refuge land was utilized for grain crop production, which is an important source of food and provides habitat for wildlife on the refuge. For example, the portion of the Cloverdale unit that is currently farmed provides the hot food sources critical to waterfowl during extreme cold periods. This crop production is achieved under Cooperative Farm Agreements. In 2004, although 1,900 acres were available for crop production under the co-op farming agreement, only 300 acres were planted due to backwater flooding during the growing season.

Unique Habitat

The loess bluffs, which flank the eastern side of the Mississippi River from Vicksburg, Mississippi, to Baton Rouge, Louisiana, provide a unique habitat at the refuge. The upper third of the bluff is habitat to many species of plants and animals of special concern in Mississippi. Numerous freshwater springs flow from the base of the bluffs. At least 12 of these springs occur on the refuge and several have unique or rare fish, plant, and insect species, including the spring darter (U.S. Fish and Wildlife Service 2004d).

Special Focus Areas for Conservation

The refuge and the adjacent Homochitto National Forest are an important focus area for bird conservation, bat conservation, and black bear recovery efforts.

The Partners in Flight Bird Conservation Plan for the Mississippi River Alluvial Plain identified one potential 20,000-acre forest block objective, the Homochitto Forest Bird Conservation Area. This area includes the refuge's Sibley Unit and another 10,000-acre forest block, the St. Catherine Creek Forest Bird Conservation Area, which includes the Butler Lake and Cloverdale Units of the refuge.

There is a concerted effort to recover Louisiana black bears by protecting and expanding existing forest habitat blocks, connecting these forest blocks with forested corridors to facilitate movement of bears between blocks, and "repatriating" female bears into areas that are not currently occupied. Most of this effort is now focused in Louisiana and from 2001–2005, 23 females with new born cubs have been repatriated to Lake Ophelia National Wildlife Refuge and the Red River/Three Rivers Wildlife Management Areas just across the Mississippi River from the refuge.

The refuge and nearby Homochitto National Forest are the largest nearly contiguous forested block in Mississippi that is protected. While the Louisiana black bear recovery plan focuses on populations in Louisiana, once efforts in Louisiana are nearing completion, the refuge would be a natural place to reintroduce bears in Mississippi and would complement the Louisiana population. This focus area is related to the larger regional efforts of the Black Bear Conservation Committee, which includes public and private partners in Louisiana, Mississippi, and Texas.

The refuge is involved with the Bear Education and Restoration (BEaR) group of Mississippi, a team representing federal and state agencies, special interests, timber companies, and others interested in restoring black bears to their native habitat in the state of Mississippi. In a 1997 study conducted by Mississippi State University, a portion of the refuge and the adjacent Homochitto National Forest were identified as a forest block that would be one of the best areas in the state for initial restoration efforts. This forest block also overlays the forest bird conservation zone that was identified by Partners in Flight and the black bear habitat restoration zones identified by the Service and partners.

Forest Management

Crops such as soybeans and winter wheat were grown on the floodplain of the refuge before its acquisition by the Service. The Service has placed a high priority on reforesting much of the cleared land to benefit forest-nesting neotropical migrants and other forest-dwelling wildlife. In previous years, seedlings were donated by partners and public entities. The Service provided equipment and personnel from throughout the Lower Mississippi River Valley to plant these seedlings in an effort to reforest as much land on the refuge each year before the Mississippi River inundated much of the refuge.

Past reforestation included several hundred acres of old fields on the bluffs, which provide valuable food that is used by wildlife at various times of the year. The refuge is protecting upland hardwoods along the bluff line for neotropical migratory songbirds.

More recently refuge reforestation occurred on the floodplain, which was cleared for agriculture in the 1960s and 1970s. The refuge has planted 12,000 acres in this area with cypress, green ash, overcup oak, and Nutall oak to restore areas to as near natural conditions as possible and provide valuable habitat for wildlife. However, due to annual flooding, willow has been aggressive in invading much of the reforested areas. It grows rapidly, shades out the desired seedlings and small plantings, and is difficult to control without also killing desired seedlings (U.S. Fish and Wildlife Service 2001a; 2004b).

Water Management and Impoundments

Flooding from the Mississippi and Homochitto rivers is an annual event and can cover the entire floodplain of the refuge (about 65 to 70 percent of the refuge) for a few days to several months of the year. Historically, maximum flooding occurs in late winter and spring, while dry periods are usually experienced in the summer and fall.

Water management is necessary to meet a primary objective of the refuge, which is to enhance aquatic habitat to provide support for migrating and wintering waterfowl. Waterfowl management also benefits shorebirds, wading birds, and other aquatic species. Overall, the refuge is managing approximately 1500 acres of moist soil-impounded water for waterfowl, wading birds, and shorebirds.

Prior to Service ownership, nearly two-thirds of the refuge was cleared and converted to row-crop agriculture. Flooding from the rivers made farming difficult for farmers, who constructed levees on the floodplain and used wells and pumps to manage the water levels to meet their crop production needs. The Service has maintained and improved this system of levees and ditches and converted them for water management for wildlife.

Water management includes the use of impoundments formed by levees containing water control structures, which are used to manipulate impounded water. Management of these impoundments allows the refuge staff to retain backwater and rain water to create additional habitat in areas that would otherwise become dry. Prior to predicted flooding (usually in the mid- to late winter), the refuge staff opens water gate structures in the levees to reduce the impact of rising and falling floodwaters on roads and levees. As the backwater from the river recedes (usually in early summer, but sometimes later), the staff closes the water control structures (gates and riser boards) to capture as much water as possible for the moist soil management units. The water in the impoundments is drawn down incrementally in spring and summer to provide feeding and resting areas for shorebirds, wading birds, and other migrant species and to provide moist soil habitat for wintering waterfowl. Many of these impoundments are manipulated through moist soil management practices, including mechanical disturbance such as mowing, to provide natural forage for waterfowl.

The refuge manages 35 impoundments that range from about two to 200 acres in size in the Cloverdale and Sibley Farm units (Figure 7). These include a well, pump, levees, and underground pipes provided by Ducks Unlimited through the MARSH Program in 1992. This program facilitates water management on seven impoundments totaling at least 85 acres in the Cloverdale Unit.

The refuge also passively manages the Butler Lake and Gilliard Lake areas.

The water management capability at the refuge is extremely limited. About 700 acres can be flooded through either of four water wells and pumps powered by diesel engines. Swamp Lake on the Sibley Unit is typically filled by water from the loess bluff springs. About 350 acres of a moist soil management unit can be flooded from Swamp Lake, which, except in drought years, has served as a reliable source of water to flood impoundments for shorebirds and waterfowl. The remainder of the moist soil habitat depends on Mississippi River and Homochitto River flooding and rainfall to provide water to meet waterfowl management objectives.

Invasive Plant and Pest Wildlife Species

Exotic species including kudzu, Japanese climbing fern, and Japanese honeysuckle are of great concern. Kudzu occurs on about 20 acres of the refuge and can expand from adjoining private property. Japanese climbing fern is wide spread on the Sibley Unit.

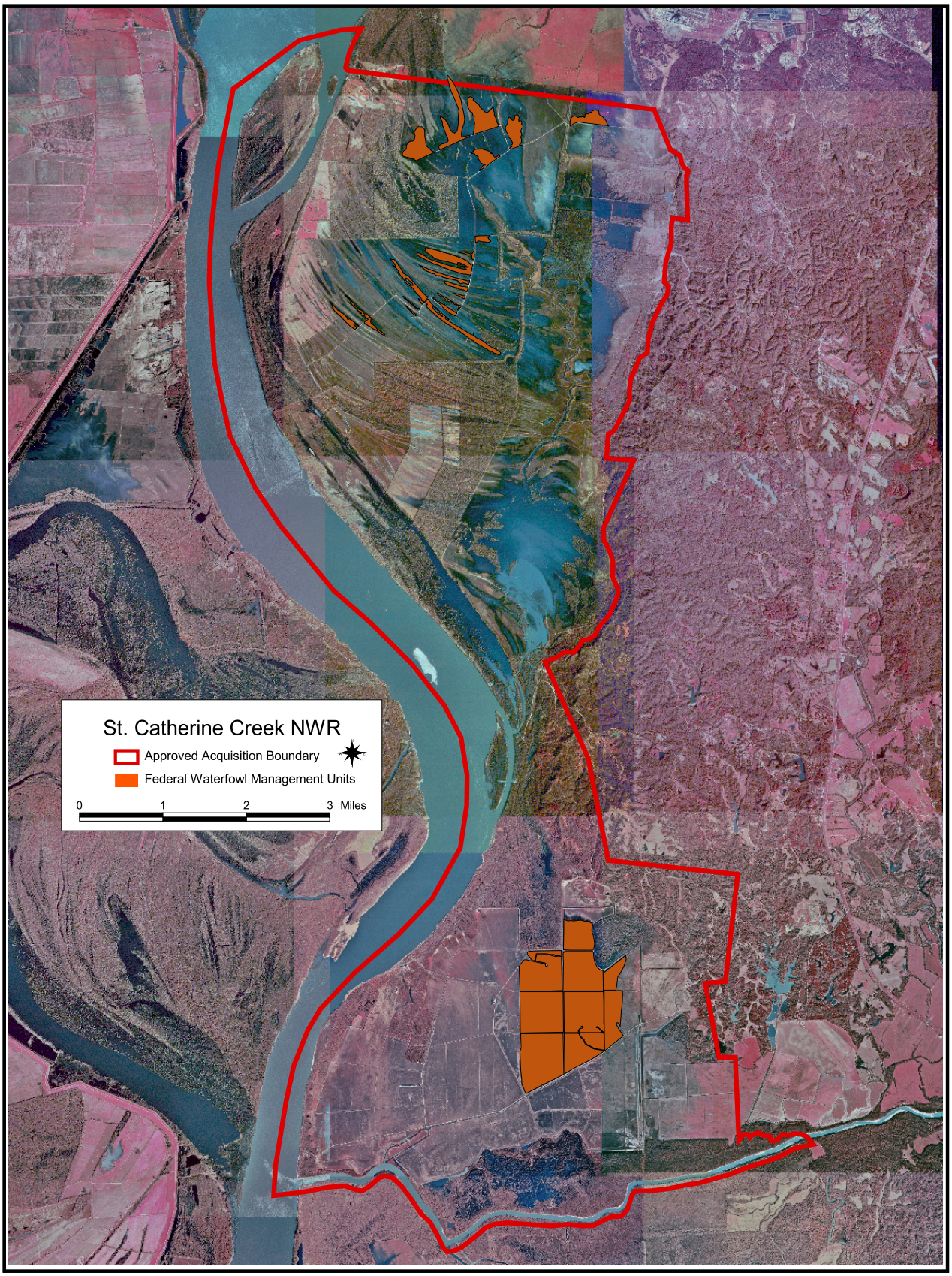
In recent years, common salvinia, an invasive exotic species, has become a significant problem. Salvinia grows rapidly to cover the surface of lakes and streams, spreading aggressively by vegetative fragments. It forms floating mats that shade and crowd out important native plants. In 2002, salvinia covered three-quarters of Gilliard Lake and a large portion of Swamp Lake. The refuge closed these lakes to the public to protect other lakes on and off the refuge not yet affected, because salvinia is easily spread to other water bodies by boats, trailers, motors, fishing tackle, and anchors. Salvinia is very detrimental to native aquatic plants and to fish and invertebrates living in the waters. The refuge used Avast (fluridone), an approved herbicide, to control salvinia in 2003.

Native noxious plants include black willow, cottonwood, cocklebur, and ironwood. Natural succession is primarily to willow, cottonwood, and sycamore and then to ash and sugarberry, with oaks, primarily overcup and Nutall oaks, in the third generation of succession. Early successional tree species, such as eastern cottonwood and black willow, will quickly invade and forest virtually all of the open land on the refuge. Willow has been particularly detrimental to reforestation efforts. It grows rapidly and shades out the desired seedlings and small plantings of hardwoods and cypress.

These species are so aggressive that woody plant control in the moist soil areas is a problem. With or without reforestation, willow and cottonwood will quickly cover any open areas on the refuge. Mowing removes only the above-ground portion of willows, and the root systems resprout and grow at an accelerated rate. The seedlings being planted cannot compete well with this accelerated growth. As a result, the refuge has used herbicides to kill the roots of treated willows.

The refuge also attempts to control nuisance wildlife, especially wild hogs. Wild hogs continuously root for food in levees and roadways, causing a lot of damage and weakening flood control levees, which in turn increases the refuge's maintenance costs. Because of their extremely diverse diet, the wild hogs also compete heavily with native wildlife species for food. They can be aggressive toward humans in some situations. Control techniques include shooting and capturing in baited traps. Hunters are allowed to take them incidental to deer hunting.

Figure 7. Waterfowl Management Units



Nutria, an exotic species introduced from South America, are prolific breeders and very destructive to marsh habitat. Because they are colonial in habitat, nutria often overharvest edible plants within their small range, resulting in the killing of desirable species. They also burrow in levees, damaging and weakening them.

The refuge attempts to control beaver because they destroy trees and interfere with the refuge's water management objectives. They can have a tremendous impact on bottomland hardwoods by interfering with the refuge's water control activities, plugging culverts, ditches, and water control structures. Beaver control involves the removal of dams and debris that plug ditches and culverts, as well as trapping and shooting.

Raccoons are also a nuisance. Nest predation by raccoon on turkey, wood duck, and songbirds can become so great that it limits the reproductive success of these species. With the loss of top predators, raccoon numbers are much higher than under more natural conditions.

Land Uses

The management of public lands is essential for sustaining and enhancing wildlife habitat used and enjoyed by growing numbers of people in Mississippi. The state has 13 national wildlife refuges, five national forests, and three national parks. Mississippi also has three national wilderness areas, two of which are managed by the Desoto National Forest and the other by the National Park Service at Gulf Islands National Seashore.

The Mississippi Department of Wildlife, Fisheries, and Parks manages approximately 42 wildlife management areas (WMAs) and 29 state parks encompassing 823,297 acres, as well as 21 lakes totaling 5,111 acres. Three of these WMAs and two state parks are located near the refuge (Figure 8). The Department coordinates the state wildlife conservation program and provides public recreation opportunities, including an extensive hunting and fishing program. The wildlife management areas closest to the refuge are Sandy Creek and Caston Creek, both located on the Homochitto National Forest (Mississippi Department of Wildlife, Fisheries, and Parks, n.d.).

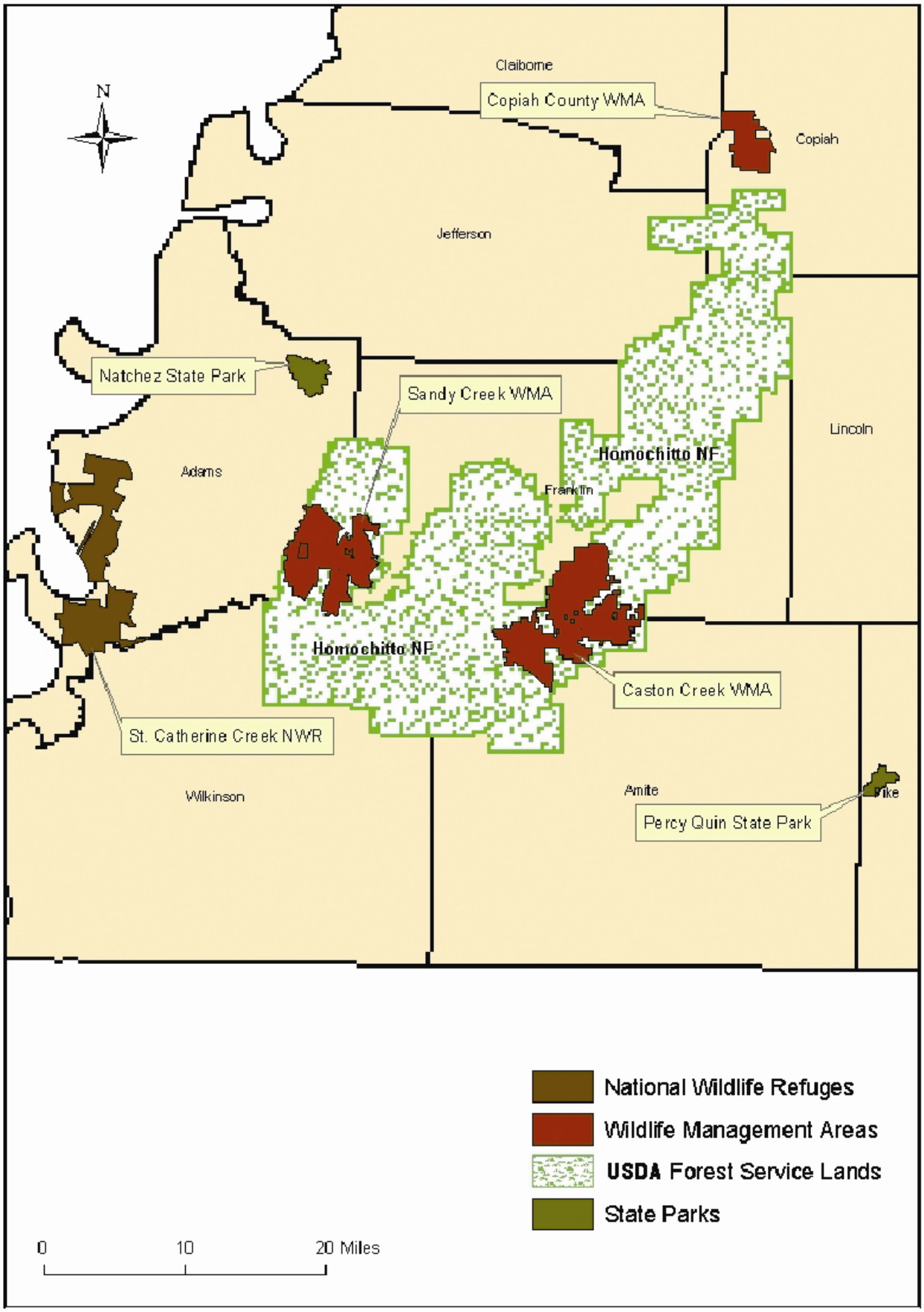
West of the refuge, on the Louisiana side of the Mississippi River, are Bayou Cocodrie National Wildlife Refuge and the Red River/Three Rivers State Wildlife Management Area Complex near Ferriday, Louisiana.

REFUGE MANAGEMENT AND ADMINISTRATION

The refuge has a staff of six permanent employees. The staff receives assistance from volunteers, including a Friends Group (the St. Catherine Creek Refuge Association, a 501[c] 3 nonprofit corporation); college student interns; and Youth Conservation Corps enrollees. In addition to managing forest areas and water impoundments for migratory birds and wildlife diversity, and efforts to acquire land within the approved refuge acquisition boundary from willing sellers, major management and administrative activities associated with refuge programs and facilities include:

- providing education and visitor services in support of hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation;
- administering cooperative farming agreements;
- managing oil and gas leases and easements; and
- providing and supporting other activities, such as law enforcement, various research projects, and facility and infrastructure maintenance.

Figure 8. Wildlife Management Areas in relation to St. Catherine Creek



Cooperative Farming

Cooperative farming is a term used for cropping activities done by a local farmer on land that is owned by the Service in fee title, or controlled by the Service through a restrictive easement or other means. This type of activity is usually conducted on a short-term basis (three years or less). It is a mutually beneficial arrangement that produces crops for the farmer and provides food for waterfowl and other wildlife.

The cropping is done under the terms and conditions of a Cooperative Farming Agreement or Special Use Permit issued by the refuge manager. It is only compatible on previously disturbed areas that have acceptable levels of chemical residue, noxious weeds, or nonnative plant species or ecotypes, or on sites that require the honoring of land use clauses under a purchase agreement. The cooperative farmers are allowed to harvest a portion of the crop grown in exchange for leaving 25 percent of the crop unharvested, or for providing in-kind services to enhance the farm operation and wildlife habitat.

The refuge's cooperative farming program produces grain crops, which are an important source of food and provide habitat for wildlife. These grains provide high calorie, hot foods to supplement the natural foods for waterfowl during extreme cold periods. The refuge currently has one 1,500-acre cooperative farming agreement with Davidson Farms for soybean production on the Cloverdale Unit (Figure 9).

Oil and Gas Easements

Pre-existing oil and gas operations were on refuge lands when the refuge was first established in 1990. While the federal government owns the surface lands in the National Wildlife Refuge System, in some cases private parties own the subsurface mineral rights and have the legal authority to explore for and extract oil and gas. The persons holding these privileges have the full right to develop their minerals, subject to provisions for maximum protection of wildlife and other resources.

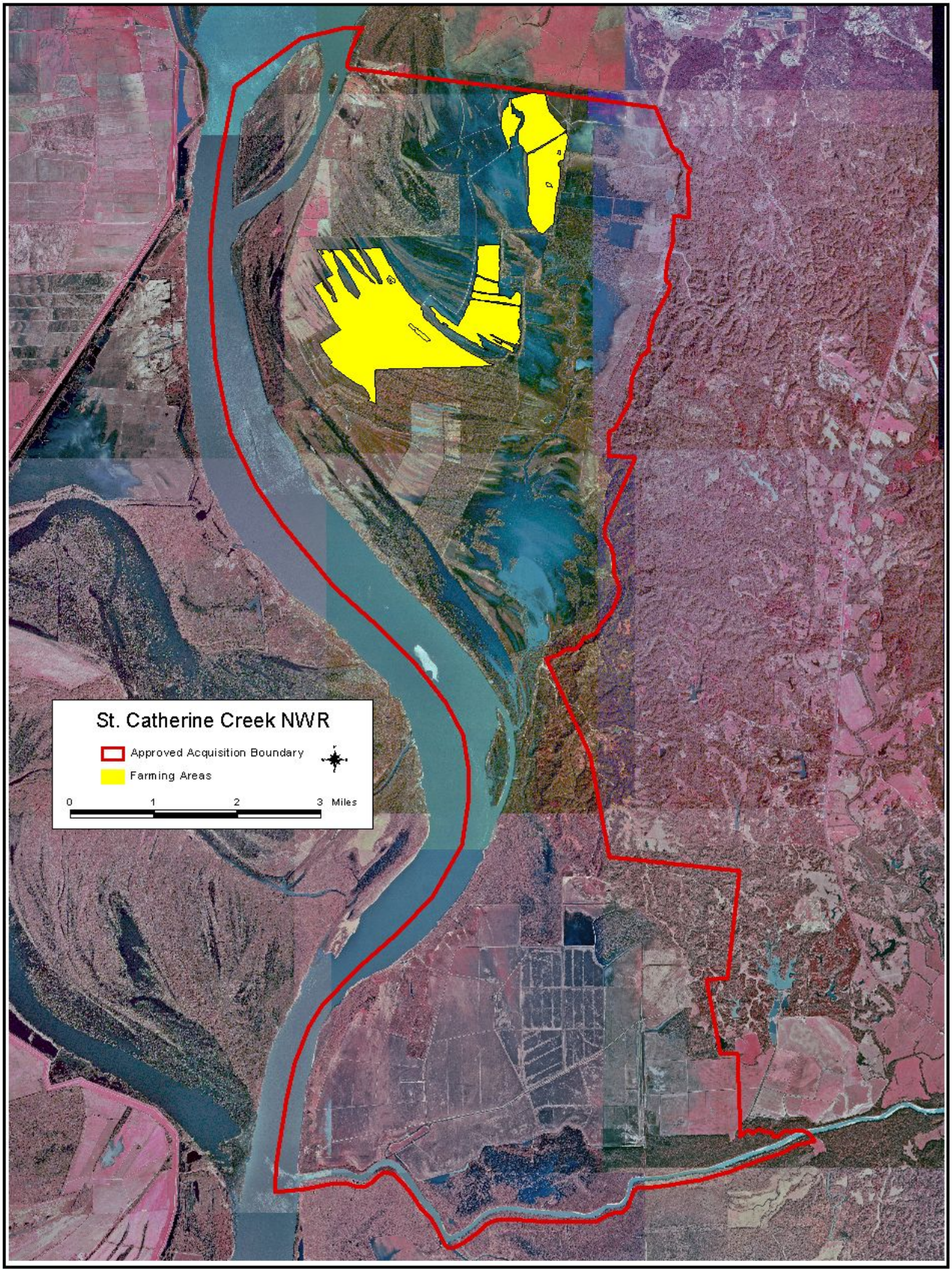
At least 155 of the nation's 575 refuges have some past or present oil and gas activities, including exploration, drilling and production, or transit pipelines. Active oil and gas transmission pipelines cross at least 207 refuges. Spills of oil and gas, as well as brine, which are common by-products from active wells, can harm refuge wildlife and habitat. Infrastructure networks can also damage refuge habitat by changing the hydrology of the refuge ecosystem (General Accounting Office 2003).

The St. Catherine Creek Refuge has 20 active oil wells, 1 gas well, 8 saltwater injection wells, 30 inactive wells, 8 tank batteries, over 40 miles of pipeline, and unknown miles of active and inactive flow lines. Several test wells in the last few years have yielded no results, indicating a dying field.

At least 25 abandoned wells have been sealed under state requirements in the last 10 years. Previously, pipelines were used to transport oil and gas off the refuge; currently tanker trucks are used. The owners routinely inspect their equipment to ensure proper functioning and refuel the equipment periodically.

The refuge has been aggressive in its cleanup program for removal of all nonfunctional or out-of-service oil field infrastructure, refuse, abandoned junk, and unauthorized garbage dumps. The refuge works closely with the Mississippi Oil and Gas Board to monitor the oil and gas companies operating on the refuge and in coordinating the cleanup of inoperable and abandoned oil production facilities and routine inspections. The refuge staff also works with the oil production companies to ensure that annual upgrades and needed maintenance of facilities meets all legal and environmental compliance requirements.

Figure 9. Farming areas, St. Catherine Creek National Wildlife Refuge



Law Enforcement

Regulatory and informational signs, as well as refuge brochures at the kiosk, provide information for the public about refuge regulations and public use access. In 2002 there were 79 citations, primarily for hunting, trespassing, and fishing violations; and 204 reported incidents, primarily for trespassing, oil and gas violations, larceny, theft, and littering (U.S. Fish and Wildlife Service 2001b; 2002b).

Research

The refuge also supports an impressive array of ongoing research projects being conducted by universities, the Service, and other federal agencies. These include a University of Nebraska five-year study of parasites affecting turtle populations within the refuge; a Jackson State University study on the rare Rafinesque's big-eared bat; University of Memphis research on the influence of shorebird foraging on macroinvertebrates; and U.S. Department of Agriculture satellite telemetry studies on wood storks. The refuge supports these and other research projects by providing refuge housing for researchers, a vehicle, and staff assistance when available.

Road Maintenance

Road erosion is prevalent on the refuge. Backwater flooding from the rivers causes high erosion of the refuge's secondary roads. Roads popular for fishing and hunting activities must be continually graded and replenished with gravel. This high maintenance endeavor is offset by funds from the Recreation Fee Demonstration Program. The funds from this program, initiated in 1997, have been used to promote and maintain public use facilities. In 2002, funds from 1,768 permit sales were used to purchase gravel to improve refuge roads; to purchase a telephone system for the headquarters; and to remodel the refuge shop/office to include a new conference room.

EDUCATION AND VISITOR SERVICES

Public awareness and interest has grown annually since the refuge was established in 1990. Total public use in 2002 was estimated at 28,235 visitors; in 2003 at 26,845 visitors; and in 2004 at 28,980 visitors. Hiking, tours, bird watching, and photography, which are characterized as nonconsumptive uses, have increased slowly but substantially in recent years. In order to continue to enhance nonconsumptive use, the refuge has focused efforts on developing new, as well as improving existing hiking trails and on providing facilities for environmental education and for scouting activities. In 2004, the Magnolia Nature Trail, which attracts wildlife observers interested in viewing neotropical migrants, wading birds, ducks, and raptors, was extended from 1.4 to 3.0 miles and improved with a new parking area, an interpretive kiosk, a scenic overlook, and park benches.

The Service maintains a permanent exhibit and brochures at the City of Natchez Visitor Center. The refuge staff often provides support for the center's special events. The refuge headquarters has an entrance area set aside for visitors, but there are no specific exhibits on migratory bird management.

The refuge hosts several onsite special events, including an event for local children's homes, as well as an established youth deer hunting weekend, a youth turkey hunt, and a youth fishing rodeo on a recently established 1.5-acre, youth-only fishing pond. The refuge promotes the special events through radio and newspaper advertisements and on the refuge's web site.

The refuge supports the local Natchez Birding Festival. In addition, refuge staff members often serve as guest speakers at meetings of local civic organizations and for classroom and assembly lectures at local schools.

Hunting and fishing are the predominant consumptive public uses on the refuge. A diversity of hunting and fishing opportunities make the refuge very popular with sportsmen in the area. White-tailed deer, duck, and squirrel hunting are the most popular hunting activities.

Hunting is regulated and requires special permits. It closely mirrors the seasons and matches the bag limits set by the Mississippi Department of Wildlife, Fisheries, and Parks. Deer harvests are limited to archery and muzzleloader. Although the muzzleloader and bow and arrow are considered primitive methods that present more of a challenge to hunters, they are also safer in heavily visited areas. Beaver, nutria, raccoons, bobcats, and coyote may be taken during any scheduled refuge hunt with weapons legal for that hunt. Feral hogs may only be taken with bow and arrow and muzzleloaders during the designated archery and primitive weapon deer seasons.

Waterfowl hunting is restricted to Butler Lake, Salt Lake, and Gilliard Lake. The duck season occurs in December/January, with mallard, gadwall, teal, and wood duck being the most popular harvests.

Fishing continues to grow in popularity. It is the second most popular public use activity and requires a refuge permit. Recreational fishing is open year-round for crappie, bream and other sunfish, largemouth bass, white bass, catfish, carp, buffalo fish, and gar.

CULTURAL RESOURCES

No cultural resource surveys have been conducted to document archeological sites, historic buildings or structures, or ethnographic resources on refuge lands. Therefore, it is unknown if the refuge has any unidentified cultural resources within its boundaries.

Local and regional archeological resources date from the Paleo-Indian Era (9,500–800 BC); the Archaic Era (8,000–500 BC); the Woodland Era (500 BC–900 AD); and most significantly, the Mississippi Era (900–1541 AD). This last era was known especially for its Temple Mound ceremonial mound centers, several of which survive in the landscape of the Lower Mississippi River Valley today (National Park Service 2002).

The French settled Adams County, Mississippi, in 1716 by establishing Fort Rosalie, which stimulated European settlement in the region. The high bluffs above the Mississippi provided a healthful climate. The river provided trade connections and the area was, and is, surrounded by rich soils suitable to agriculture

Over time, the British (from 1763), the Spanish (in 1779), and the Americans (in 1798) controlled the area, which later became the City of Natchez. In 1798, the area became a part of the United States Territory and settlement increased.

By the 1790s the staple crops of tobacco and indigo were displaced by cotton, which led to the growth of the plantation system. In 1811, steamboat service on the Mississippi River began and Natchez was located at the geographic center of the largest cotton-producing region in the world.

There were no significant Civil War battles in the area. After the war, cotton production and the plantation economy continued, but sharecropping replaced slavery. Migration of African Americans out of the region made labor scarce. By 1900 the steamboat was in decline, and when the boll weevil struck in 1908, the economy—which was based on cotton—was nearly ruined.

Oil was found nearby in 1943. In the years following World War II, manufacturing jobs, agriculture (cotton and soybeans), and oil production formed the basis of the local economy. Today, timber, oil, and tourism are the major industries in the county and surrounding area (City of Natchez, n.d.; Mississippi Department of Archives and History, n.d.; Natchez Chamber of Commerce, n.d.).

SOCIOECONOMIC ENVIRONMENT

Population and Employment

The total population of Adams County was estimated at 33,573 in 2002, or one percent of state's population (U.S. Census Bureau, 2003). This estimate reflects a slight decline from the 34,340 people counted during the 2000 Census. The people of Adams County have a per capita income of $15,778, just below the state average of $15,853. The percent of individuals below the poverty level, 25.9%, is slightly higher than the state average of 19.9 percent. Educational attainment for the county is comparable to the state average, with 73 percent of persons over 25 with high school diplomas or higher.

Unemployment rates tend to be higher than the state or national averages. Adams County has an annual 7.9 percent unemployment rate, compared to a state average of 6.8 percent and a national average of 6.0 percent. The major industries for the county and the surrounding region include paper, timber, oil, and tourism. Oil was a dominant factor in the local economy until the 1980s. Because of the wealth of historic attractions in the area, tourism is the most rapidly growing job sector. The City of Natchez, located to the north of the refuge, serves as the major regional commercial and medical center for a 50-mile radius (Natchez-Adams County Economic Development Authority, n.d.; U.S. Census Bureau 2000; U.S. Department of Labor 2002).

Outdoor Recreational Economics

The fish and wildlife resources of the Lower Mississippi Alluvial Valley, including those of St. Catherine Creek National Wildlife Refuge, are economically important (Table 4). In addition to commercial fishing on the Mississippi River, hunting, recreational fishing, wildlife viewing, and wildlife photography are economically important to local businesses.

The refuge provides activities that contribute to the economies of the nearby rural communities. Hunting and fishing, and more recently, ecotourism, including wildlife observation and photography and environmental interpretation, are increasingly being seen as desirable industries. As the population increases and the number of places left to enjoy wildlife decreases, the refuge may become even more important to the local community. It benefits the community directly by providing recreational and employment opportunities for the local population and indirectly by attracting tourists from outside the area to generate additional income to the local economy (Caudill and Laughland 2002; Mississippi Development Authority 2004; U.S. Census Bureau 2003a). The estimated tourism revenues for 2003 are presented in Table 5.

Refuge Revenue Sharing

By law, the refuge is exempt from paying property tax, and instead makes in lieu payments to Adams, Wilkinson, Copiah, Lincoln, and Pike counties through the Refuge Revenue Sharing Act established by Congress. This program provides a method of collecting monetary receipts from revenue-generating activities on refuges within the nation, pooling them together, and paying them out to counties containing refuge lands. Payments for acquired land are computed on whichever of the following formulas is greatest: (1) three-fourths of one percent of the fair market value of the lands acquired in fee title; (2) 25 percent of the net refuge receipts collected;

or (3) 75 cents per acre of the lands acquired in fee title within the county. If the receipts generated on refuges do not meet the entitlement amount, Congress may approve additional funds to make up the shortfall. However, historically, these payments have been lower than these formulas. Table 6 summarizes the revenue-sharing payments made by the Service for St. Catherine Creek National Wildlife Refuge to five counties over five years

Table 4. Activities by participants, 16 years old and older, throughout Mississippi.

Activity	# of Participants	Activity Days	Average Days/ participant	Total Expenditures ($1,000)	Trip-related Expenditures ($1,000)	Equipment and Other ($1,000)	Average $/ participant	Average trip Expenditure / day
Fishing	*586,000	9,500,000	16	$211,000	$118,000	$93,000	$363	$13
Hunting	**357,000	8,500,000	24	$360,000	$132,000	$227,000	$969	$16
Wildlife Watching	***631,000	NA	NA	$303,000	$36,000	$267,000	$481	NA

**136,000 nonresidents, 450,000 residents*
***111,000 nonresidents, 245,000 residents*
****55,000 nonresidents, 576,000 residents*
Source: 2001 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation in Mississippi

Table 5. Estimated county tourism revenues/employment (FY 2003).

County	Total Tourism Revenues	Total Tourism Employment	Total Establishment Based Employment*	Tourism Employment Percentage
Adams	$96,217,471	2,360	13,740	17.2

**Total Establishment Based Employment reflects CY 2002 data at the county level, per the Mississippi Employment Security Commission's May 2003 Annual Averages, 2001 – Forward. This is the nonagricultural employment total by county based on monthly averages, but not the residence-based data (the Civilian Labor Force).*
Source: Mississippi Development Authority/Tourism Division, 2004

Table 6. Refuge revenue-sharing payments, 1999–2003.

FY	Adams	Copiah	Lincoln	Pike	Wilkinson	TOTALS
2003	$38,296.00	$258.00	$92.00	$53.00	$4,323.00	$43,022.00
2002	$39,845.00	$268.00	$95.00	$55.00	$4,498.00	$44,761.00
2001	$42,652.00	$287.00	$102.00	$59.00	$4,815.00	$47,915.00
2000	$41,788.00	$281.00	$100.00	$58.00	$4,717.00	$46,944.00
1999	$53,893.00	$321.00	$114.00	$71.00	$2,852.00	$57,251.00

III. Plan Development

OVERVIEW

In preparing for the development of this comprehensive conservation plan, a biological review was conducted on the St. Catherine Creek Refuge in December 1999 and a visitor services review was completed in May 2003. Initial planning began in August 2003 with a meeting of the planning team members. Early in the process of developing the draft plan, the planning team identified a list of issues, concerns, and opportunities that were likely to be associated with the conservation and management of the refuge. Formal public involvement began with a public scoping meeting in November 2003, through which the public and interested stakeholders registered their concerns. This public input was considered in developing the plan (U.S. Fish and Wildlife Service 2001a; 2003d).

The planning team then combined the results of the internal and public scoping reviews and used them, along with supporting goals, objectives, and strategies, to develop four different management alternatives for the refuge. The four alternatives were presented and evaluated in the Draft Environmental Assessment. The preferred alternative formed the basis of the Draft Comprehensive Conservation Plan itself. The draft plan and environmental assessment was distributed to officials of federal, state, and local government agencies, private organizations, and the general public for review and comment. The Service examined all comments and suggestions received and decided whether revisions to the plan were in order. The comprehensive conservation plan was then prepared, and becomes the general guide for management decisions and actions on the refuge for the next 15 years, subject to further revision and public review during that period, if warranted.

PLANNING PROCESS AND PUBLIC INVOLVEMENT

During the week of December 6-10, 1999, a team of biologists, managers, foresters, and non-Service managers and biologists, whose combined expertise represented some of the premier wildlife and habitat management experience found in the state, conducted a wildlife and habitat management review on the refuge. This biological review team critically examined the refuge's current programs, and recommended a range of alternatives identifying data needs, habitat objectives, and opportunities for improvement, all while emphasizing future partnership opportunities on mutual interests. The biological review team presented its recommendations in a Wildlife and Habitat Management Review Report, which was submitted in October 2001.

In 2002, a visitor services review team comprised of staff from the refuge and the Service's Regional Office met at the refuge. This team also included public use specialists, park rangers, and managers from several other national wildlife refuges. After reviewing the St. Catherine Creek Refuge's existing public use programs, facilities, and opportunities, the team prepared a Visitor Services Review Report in May 2003, which outlined recommendations on public use at the refuge. Emphasis was placed on the Service's "big six" wildlife-dependent public uses, namely hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation.

Work on the refuge's draft comprehensive conservation plan and environmental assessment began in August 2003 when a planning team consisting of refuge staff and personnel from other refuges met at the refuge headquarters in Sibley, Mississippi. The team developed a vision statement for the refuge and identified a number of issues and concerns that were likely to affect future management of the refuge. The team also developed a mailing list and public outreach plan.

The planning team held a public scoping meeting and open house on November 6, 2003, at the Natchez Convention Center in Natchez, Mississippi. This meeting was coordinated with officials of other government agencies, various organizations, and the surrounding communities. The meeting was publicized in several ways. A letter and flier were sent to those on the mailing list, which included refuge users, government and civil leaders, congressional staff, private organizations, and other interested parties. Information announcing the public scoping meeting was also sent to the local newspaper, and a public service announcement was sent to the local radio station.

The open house forum for the meeting was designed to solicit maximum public involvement and interaction with refuge staff to discuss the future management of the refuge. Fifteen citizens attended the meeting (U.S. Fish and Wildlife Service, n.d.a; n.d.b; 2003b; 2003c).

Refuge planning policy requires a wilderness review concurrent with the comprehensive conservation planning process. On January 27, 2005, the refuge planning team inventoried the lands within the refuge and found no areas that meet the eligibility criteria for a Wilderness Study Area as defined by the Wilderness Act. Therefore, the suitability of refuge lands for wilderness designation is not analyzed further in this plan. The results of the wilderness inventory are included in Appendix VI.

ISSUES AND CONCERNS

The citizens who attended the public scoping meeting and open house provided 16 comments and suggestions for the planning team's consideration. A summary of the public scoping comments is provided in Appendix IV. The citizens' issues and comments are categorized into fish and wildlife populations; habitat; land protection and conservation; education and visitor services; and continued public and agency involvement.

FISH AND WILDLIFE POPULATIONS

While considerable data is available on some populations such as white-tailed deer and waterfowl, there is a lack of data and the subsequent need to identify and inventory current populations of plants and other wildlife, especially those that are federally listed as threatened or endangered, and then determine which populations are in need of monitoring on the refuge. Shorebirds need to be surveyed and data collected in accordance with established protocols. Breeding habitat and rookery surveys for nongame birds should be conducted on a regular basis. Inventories are needed for freshwater mussels, reptiles, and amphibians. Citizens expressed support for increasing the regulation of deer hunting and for reducing the number of duck hunting days to provide more sanctuary for ducks.

HABITAT

Loss of habitat and invasive species are two refuge habitat issues. Management of willows invading the currently reforested areas is a major issue for forest habitat restoration. The amount and type of crops needed to support migratory birds needs further definition. Baseline data are needed on the existing shrub/scrub habitat. A comparison of research data and current water management are needed to optimize moist soil habitat for waterfowl, shorebirds, and fish. The loess bluffs, running generally north-south along the eastern boundary of the refuge adjacent to the floodplain, need protection from erosion, which may be exacerbated by timber harvest practices when those harvests are not properly implemented. These bluffs provide a unique and vital habitat corridor for forest-breeding birds in the Lower Mississippi River Valley. The springs and seeps on the loess bluffs need to be inventoried to create the buffer zones necessary to protect these unique areas on the refuge. Some citizens suggested more aggressive control of the feral hog population, possibly by allowing additional opportunities to harvest hogs to help decrease the hog population.

LAND PROTECTION AND CONSERVATION

Habitat loss and fragmentation are issues across the country. A "Conservation Partners Focus Area" should be identified in southern Adams and northern Wilkinson counties. Within this focus area, a contiguous forested corridor would be created between the refuge and the Homochitto National Forest (Figure 10). Land exchanges, in particular the exchange of noncontiguous land for contiguous land within the refuge's current approved acquisition boundary, should be pursued. Boundary surveys need to be completed. In addition, archaeological and cultural resource site surveys are needed, since few data exist. While citizens had no specific comments on land protection, they did comment on refuge administration issues such as the need to widen York Road, the main entrance; and suggested that refuge roads be built up and kept graded for easier access and for erosion control.

EDUCATION AND VISITOR SERVICES

Environmental education, interpretation, and wildlife observation opportunities have tremendous potential for educating visitors about refuge issues and resources. Fishing opportunities can be increased by providing a boat launching site and fishing pier for disabled anglers. Citizens expressed support for involving children in special youth hunts; setting aside a special area for youth hunters during the state gun hunt; and setting aside a special field for dove hunting. Citizens also felt that there should be increased opportunities for public involvement and that the refuge should provide more public awareness about the refuge, such as listing the refuge as a stopping point on a proposed state scenic byway, or having a "living" exhibit at the Natchez Visitor Center. Some citizens suggested that the refuge reduce or eliminate the muzzleloader hunting season and offer archery as the primary hunting method. The refuge's current visitor use facilities are shown in Figure 11.

CONTINUED PUBLIC AND AGENCY INVOLVEMENT

Public and agency involvement continued throughout the development of the draft comprehensive conservation plan and its associated draft environmental assessment. The refuge was proactive in notifying parties about the availability of the draft plan and environmental assessment for public review. The refuge used a mailing list that the staff developed for contacting private individuals, Mississippi congressional contacts, the governor's office, other federal agencies, state agencies, local agencies, tribal governments, and nongovernmental organizations. Fliers, press releases, and notices on the refuge's web site were used to promote the participation of interested parties in reviewing the draft.

Figure 10. Proposed Conservation Focus Area

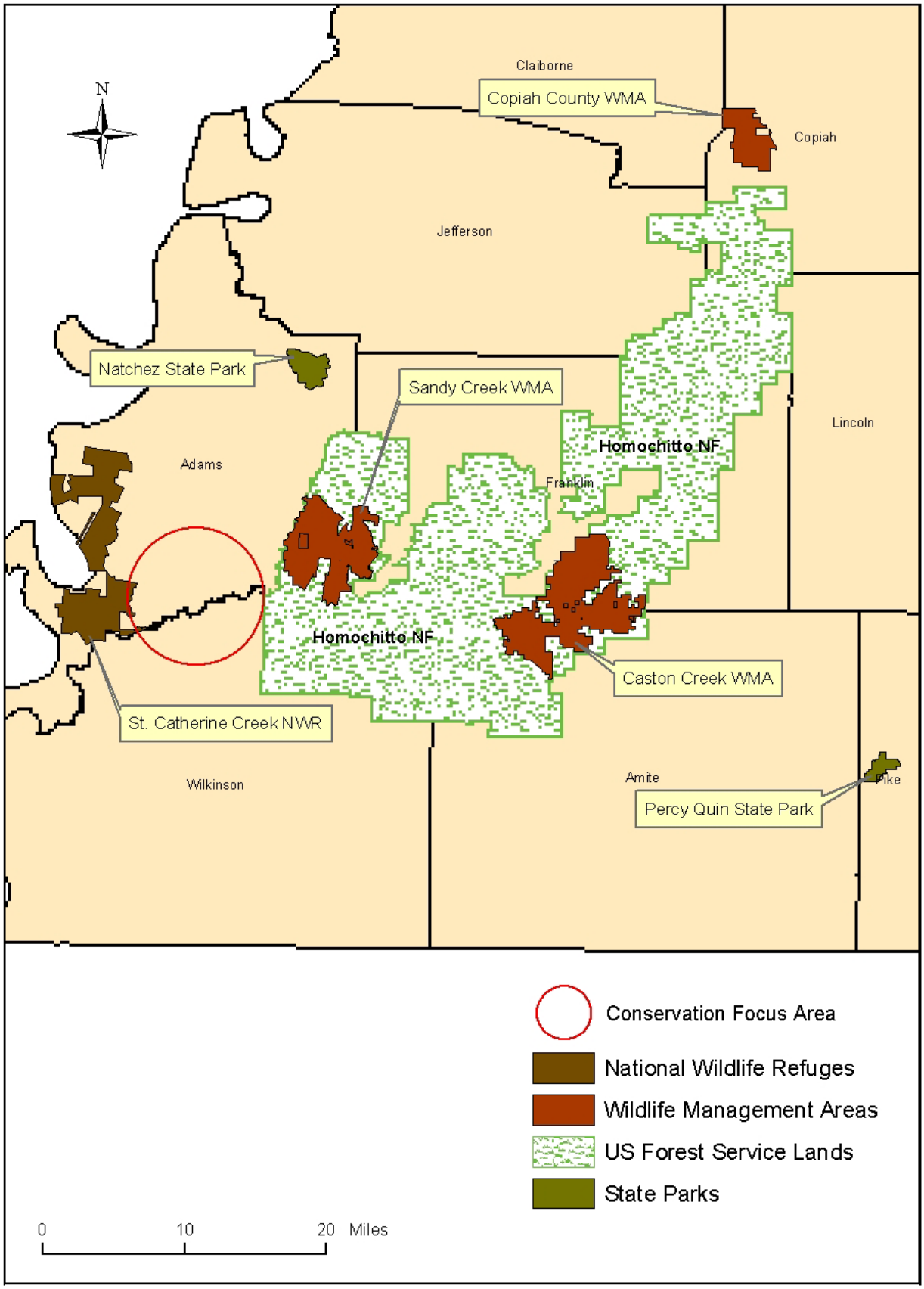
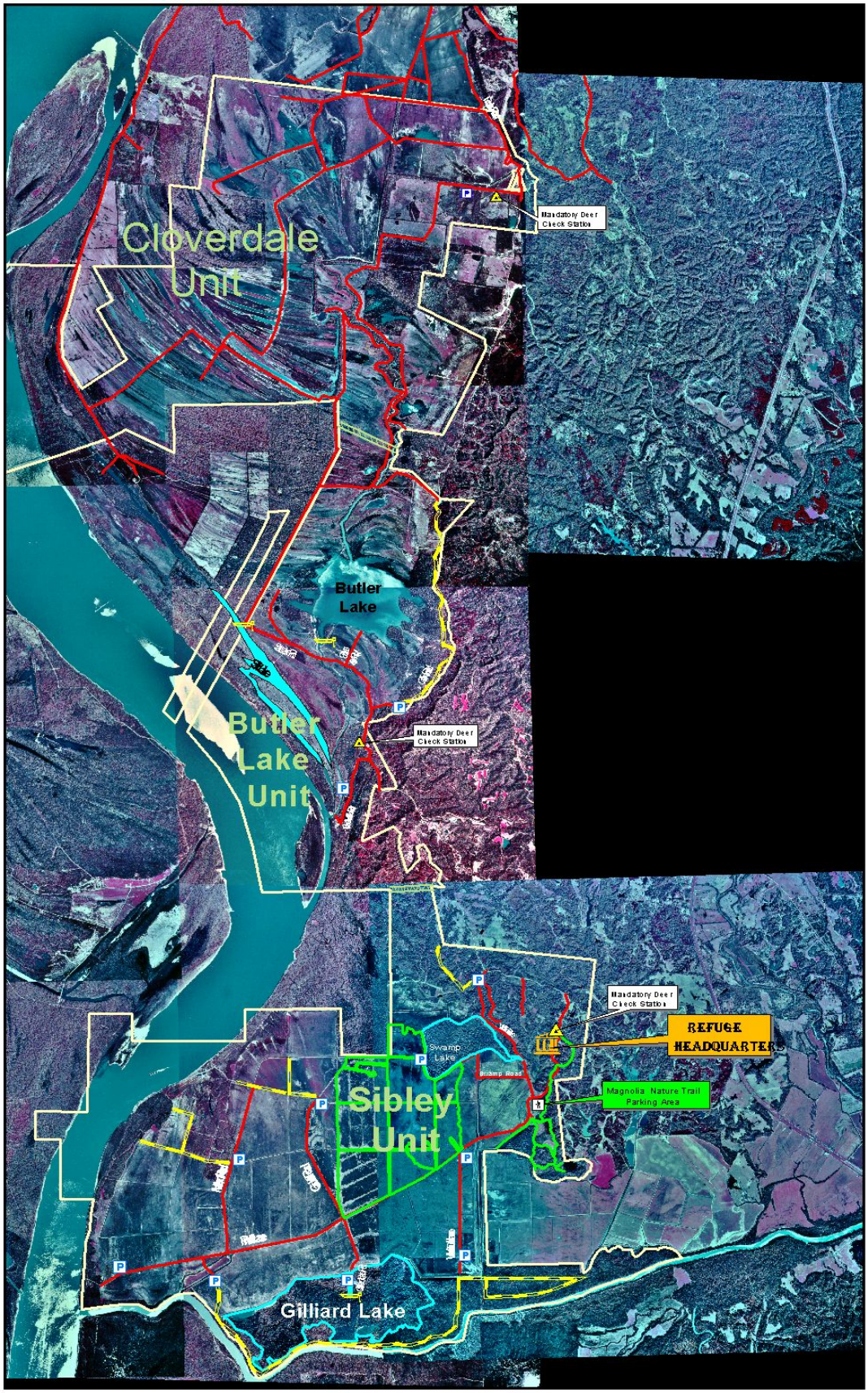


Figure 11. Existing and proposed public use facilities at St. Catherine Creek National Wildlife Refuge



IV. Management Direction

INTRODUCTION

Described below is the Comprehensive Conservation Plan for managing St. Catherine Creek National Wildlife Refuge over the next 15 years. This plan contains the goals, objectives, and strategies that will be used to achieve the refuge vision and serve the purposes of the refuge and the missions of the Refuge System and Service.

Four alternatives for managing the refuge were considered and analyzed. The Service selected Alternative D, Balanced Habitat Management and Public Use Program, as the preferred alternative. The other alternatives evaluated were Alternative A, Current Management Direction (No Action Alternative); Alternative B, Public Use Emphasis; and Alternative C, Habitat Management Emphasis. All of these alternatives were described and evaluated in the Draft Environmental Assessment.

St. Catherine Creek National Wildlife Refuge is a vital link in the Lower Mississippi River Valley ecosystem, and has a focus on managed forests and wetlands for waterfowl. The preferred alternative is expected to result in created, maintained, and more intensively managed moist soil units for migratory and resident waterfowl; improved forest habitat values for nongame land birds; enhanced resident wildlife populations; increased protection of threatened, endangered, and trust species; increased invasive exotic plant eradication and control; increased habitat restoration; increased cultural resource protection; increased compatible wildlife-dependent recreation; and enhanced environmental education and interpretation.

A common theme throughout this plan is that wildlife conservation is the first priority in refuge management. Public use is allowed if compatible and appropriate with wildlife and habitat conservation, the refuge vision, the purposes of the refuge, and the missions of the National Wildlife Refuge System and the Service. In evaluating public uses, additional consideration is provided to the impacts to surrounding landowners. Specifically, wildlife-dependent recreational uses (i.e., fishing, hunting, wildlife observation, wildlife photography, and environmental education and interpretation) are specifically mentioned in the National Wildlife Refuge System Improvement Act of 1997 as being generally appropriate uses of the National Wildlife Refuge System. Of course, for any given refuge, managers must still determine the appropriateness and compatibility of a particular use, given specific circumstances.

VISION

St. Catherine Creek National Wildlife Refuge will be managed to protect, enhance, and restore a system of lands and waters to provide high quality habitat for wildlife, fisheries, and plants within the alluvial valley of the Mississippi River and adjacent loess bluffs for the benefit of present and future generations of Americans. Historically, most of this area supported vast bottomland hardwood forests: however, the majority of this habitat was cleared for agricultural production during the 1960s and 1970s. At the St. Catherine Creek Refuge, the Service has the unique opportunity to restore the natural diversity, abundance, and ecological functions of native bottomland hardwood habitat. Through the reforestation of thousands of acres of flood-prone croplands, management of early successional vegetation, and implementation of other management actions, many fish and wildlife species including waterfowl, other migratory birds, and threatened and endangered species will thrive.

The foreseeable future is one of habitat restoration and protection, reforestation, land acquisition, increased staff and facilities, and opportunities for appropriate and compatible wildlife-dependent public use. Partnerships with local communities, agencies, and citizens will be enhanced and developed to increase public awareness of the environmental issues facing all the partners and foster stewardship of natural and cultural resources in the area.

MANAGEMENT PLAN SUMMARY

The goals, objectives, and strategies that follow are the Service's responses to the issues, concerns, and needs expressed by the planning team, the refuge staff, other Service staff, other governmental agencies, and the public. These goals, objectives, and strategies reflect the Services' commitment to achieve the mandates of the National Wildlife Refuge System Improvement Act of 1997; the mission of the Refuge System; the North American Waterfowl Management Plan; the Partners in Flight Plan; and the purposes and vision for the St. Catherine Creek Refuge. The Service will pursue these goals and objectives over the 15-year life of the plan.

GOALS, OBJECTIVES, AND STRATEGIES

The goals, objectives, and strategies are organized using sub-goals and objectives that are delineated by individual refuge units. This method allows consideration of the variation in biodiversity throughout the refuge, and the more thorough pursuit of the broader goals of fish and wildlife populations, habitat, land protection and conservation, and wildlife-dependent recreation and environmental recreation.

GOAL 1 – FISH AND WILDLIFE POPULATIONS

Assess, conserve, manage, enhance, and restore to viable levels populations of native fish and wildlife species representative of the Lower Mississippi Alluvial Valley, with special emphasis on waterfowl, other migratory birds, and threatened and endangered species.

Discussion: The paramount purpose of the St. Catherine Creek Refuge is to provide habitat for migratory birds. The refuge has been designated as an Important Bird Area, based on significant numbers of birds found on the refuge during different times of the year.

The refuge has a variety of habitats, including two major swamps and their associated lakes (i.e., Alligator Lake and Gilliard Lake); loess bluffs and associated upland hardwoods; riverfront hardwoods and willow thickets; cypress-tupelo swamps; reforested croplands; moist soil units; and an agricultural area.

Management programs include water management; reforestation; cooperative farming; and waterfowl sanctuary areas that provide feeding, resting, and loafing habitat for several species of ducks.

Sub-goal: Migratory Bird Management

Provide habitats sufficient to meet the habitat and population goals and objectives of established national and regional plans, including the North American Waterfowl Management Plan; U.S. Shorebird Conservation Plan; Partners in Flight Plan; North American Woodcock Management Plan; and Mississippi Flyway Waterfowl Plans.

Discussion: Concern over waterfowl population declines in the 1980s resulted in the establishment of the North American Waterfowl Management Plan, which focused the attention of federal, state, and private conservation groups on critical wintering and breeding areas. The Lower Mississippi Valley

Joint Venture was selected as one of the wintering focus areas. In setting habitat objectives for the joint venture, it was agreed that foraging habitat was the limiting factor and objectives were set based on food production and acres by habitat type for the complex of habitats, including harvested and unharvested cropland, moist soil areas, and flooded forest land. Each of these habitat types provide the variety of food resources (i.e., native seeds, small grains, and invertebrates) required by waterfowl wintering in the Lower Mississippi River Valley. Step-down objectives were established by states for public and private lands. Each segment of habitat must be provided in order to meet the wintering waterfowl needs in the Lower Mississippi Valley Joint Venture. These step-down objectives are shown in Table 10 of this plan.

Objective 1: Migratory Waterfowl
Annually provide a complex of wintering waterfowl habitats (i.e., croplands, moist soil, greentree reservoirs, and permanent water) that includes a minimum of 900 acres of moist soil habitat to meet the step-down objectives of the North American Waterfowl Management Plan, Lower Mississippi River Valley Joint Venture, and other Mississippi Flyway waterfowl objectives.

Strategies:

Refugewide

1.1 – Provide five operational wells and pumps to facilitate moist soil management in place by 2008.

1.2 – Create, maintain, and manage a total of 1,500 to 1,800 acres of moist soil utilizing disking, herbicides, small grain farming, and water management to maximize production of heavy seed-producing annual plants, with an annual goal of 900 acres of quality moist soil habitat.

1.3 – Manipulate 1/4 to 1/3 of the moist soil units annually via disking, planting, mowing, and using other means to assure production of quality foods and prevent succession to undesirable plants. Some fall disking or other soil disturbance may be necessary to encourage the growth of desirable native vegetation.

1.4 – Install water level gauges on all moist soil units and lakes by 2009.

1.5 – For each moist soil unit, maintain records of land treatments (e.g., disking and herbicide treatments), maintain records of flood and drawdown rates and dates, and correlate plant and bird response to these events.

1.6 – Conduct general plant surveys throughout the growing season (biweekly) and more in-depth moist soil plant surveys at least twice annually in all moist soil management units. Survey and assess migratory bird response related to habitat availability.

1.7 – Develop methods to utilize Mississippi River overflow events to manage refuge moist soil units.

1.8 – Work closely with wildlife and habitat management biologists in conducting plant surveys and developing management recommendations using the Moist Soil Expert System or a similar evaluation methodology.

1.9 – Establish and conduct standardized waterfowl surveys at least monthly from September through October and twice monthly from November through March.

1.10 – Monitor plants in moist soil impoundments and document resulting vegetation and waterfowl response. Weekly monitoring may be necessary in spring and early summer when drawdowns are initiated and vegetation begins to emerge.

Sibley Unit

1.11 – Intensively manage 1,000–1,300 acres as moist soil sites to provide foraging habitat for wintering waterfowl and migrating shorebirds.

1.12 – Investigate the need and opportunities to cooperatively farm 200 to 400 acres in this unit, with the long-range target of accomplishing this with refuge personnel and equipment.

Butler Lake Unit

1.13 – Consider Salt Lake and Butler Lake as permanent roosting, resting, and feeding areas for waterfowl, shorebirds, and wading birds. Continue limited waterfowl hunting (three half-days per week) on both lakes during the established state season. Continue to limit fishing from March 1 through the end of early bow season (mid-November) each year.

Cloverdale Unit

1.14 – Maintain 1,200 acres of cooperative farming, with Service crop shares used to provide hot food for waterfowl and to maintain moist soil areas. Cropped sites can be rotated to provide soil disturbance essential for optimum moist soil plant production.

1.15 – Maintain several (two to four) of the overgrown moist soil units (i.e., units 15-18 and 35) as shrub wetlands to provide waterfowl cover, wood duck brood rearing, wading bird foraging, and habitat for nongame migrant songbirds.

1.16 – Intensively manage Long Lake and existing moist soil areas created in natural swales in units 14 and 19-28.

1.17 – As feasible, create four to eight new moist soil sites north and east of the existing moist soil sites.

1.18 – Install one additional well and additional underground irrigation line to provide managed water to all existing and future constructed moist soil areas.

Objective 2: Wood Ducks
Provide year-round habitat necessary to support and enhance wood duck populations, and support banding objectives of the Mississippi Flyway Council.

Discussion: Wood ducks are common year-round residents of the Lower Mississippi River Valley and the refuge. They typically inhabit secluded areas such as forested wetlands, wooded and shrub swamps, tree-lined rivers and sloughs, and beaver ponds. Preferred foods include acorns, other hard and soft mast, various seeds, and invertebrates. While the refuge provides important habitat for wintering and resident wood ducks, the Wildlife and Habitat Management Review states that the river's drastic water level rises, which flood much of the refuge for long durations each year, severely limit management opportunities to ensure preferred habitat.

Strategies:

2.1 – Maintain several areas (e.g., sloughs in the Cloverdale Unit and the Swamp) for wood duck production areas where low shrubby vegetation will be promoted and flooding will be maintained until late summer.

2.2 – Maintain flooded habitats in the Swamp, Gilliard Lake, Salt Lake, and possibly other areas (e.g., water management units 16-18 and 35) to provide habitat for wood ducks in the fall.

2.3 – As reforestation sites mature, greentree reservoirs should be considered to benefit wintering wood ducks and other migratory waterfowl.

2.4 – Expand the wood duck nest box program. Regional guidelines should be followed to establish a minimum of 50 predator-proof boxes at select locations where flooding would not usually overtop predator shields. The boxes should be monitored at least annually as manpower allows.

2.5 – Establish a pre-season banding quota of 200 wood ducks to help achieve flyway and national wood duck banding goals. This strategy will be predicated on the hiring of a Biologist and Biological Science Technician.

Objective 3: Woodcock
Enhance American woodcock habitat to contribute to the objectives of the American Woodcock Management Plan, with emphasis on the Lower Mississippi River Valley.

Discussion: The American woodcock is a migratory game bird that occurs throughout the eastern United States. In 1990, the American Woodcock Management Plan was completed with the objective of protecting and enhancing wintering and migration habitat on public lands to increase the woodcock carrying capacity. The refuge is in the Central Region used for administrative management of woodcock.

Woodcock feed almost exclusively on earthworms and must stay south of the line of frozen soil in the winter. Wintering habitat includes moist bottomland hardwood forests with brush and understory, especially when found in association with agricultural fields. During the daytime, these birds prefer to occupy moist to wet, dense shrubby/scrub forests, or dense vine/shrub/cane tangles in forest settings.

Strategies:

3.1– Inventory suitable wintering habitat on the refuge and enhance daytime cover (e.g., scrub-shrub) on ridges between several of the sloughs in the Cloverdale unit. Reforestation sites provide good nighttime and later daytime cover for woodcock. Prepare in the longer term to provide daytime and nighttime cover by timber management, maintaining some early to mid-successional (scrub/shrub) habitats.

3.2 – Maintain at least five to 10 fields that are five to 20 acres in size for nighttime feeding areas that are in close proximity to forested/scrub/shrub habitat that is suitable daytime habitat for woodcock.

3.3 – Conduct crepuscular flight and nighttime counts annually to assess woodcock usage of the refuge several times from mid-November through mid-March.

3.4 – Develop woodcock demonstration sites on the refuge by 2009.

Objective 4: Nongame Migratory Land Birds
Annually manage habitats to improve forest habitat values for nongame migratory birds and contribute to the Partners in Flight objectives stepped down for the St. Catherine Creek Refuge. These objectives are largely dependent on the filling of critical needs (e.g., Biologist and Biological Technician).

Discussion: A wide-range goal for the Lower Mississippi River Valley is to establish self-sustaining populations for all of the forest-breeding bird species.

The Partners in Flight Conservation Plan for the Mississippi River Alluvial Plain includes a 20,000-acre forest block, the Homochitto Forest Bird Conservation Area. This block objective, known as the St. Catherine Creek Forest Bird Conservation Area, includes the refuge's Sibley Unit. This objective is largely dependent on the filling of critical needs (e.g., Biologist and Biological Science Technician).

Strategies:

4.1 – Maintain and restore forestland habitats as necessary to contribute to objectives for St. Catherine Creek National Wildlife Refuge and the Homochitto National Forest, and contribute to the Three Rivers Forest Bird Conservation Areas.

4.2 – Create and maintain several 25- to 100-acre patches of scrub-shrub habitat on ridges between moist soil units in the Cloverdale Unit and possibly other areas.

4.3 – Establish a series of 40 point counts along the loess bluffs and conduct counts once each year during the nesting season. Expand data collection to determine densities of nesting pairs in likely optimal habitat conditions and determine nesting success for mature forest birds.

4.4 – Establish transects through reforestation sites and document use by priority scrub-shrub bird species. If detected, determine nesting success for Bell's vireo and other priority species, as resources permit.

4.5 – Conduct marsh and grassland bird surveys to document use of actively managed sites, compared with nearby fallow areas. Focus on secretive marsh birds first, sparrows second, and raptors last.

4.6 – Document transient land bird use of existing forested and recently reforested sites to expand overall understanding of these species and their habitat needs while migrating to and from their breeding (or wintering) grounds.

4.7 – Enlist volunteers (e.g., area birdwatchers, state birding groups, and universities) to help fulfill these and other recommendations. Hire a full-time Wildlife Biologist and one Biological Science Technician by 2007 to achieve these and other refuge objectives.

Objective 5: Shorebirds and Wading Birds
Annually manage refuge habitats to improve shorebird habitat values to help achieve the Partners in Flight step-down objectives of 200 to 400 acres of shorebird fall migration habitat on the refuge.

Discussion: Throughout the Lower Mississippi Valley, habitat for spring (northward) shorebird migration is probably provided in most years with normal rainfall and evaporation rates. Peak migration is expected from April to mid-May (but extends from mid-March to late May).

Southbound migration starts in early July, peaks August through September, and ends by mid-October. Disruption of normal evaporation patterns over the last 50 years in the Lower Mississippi Valley and the lack of rainfall in this highly modified hydrological environment have resulted in a severe shorebird habitat shortage. Opportunities do exist, however, to provide good quality habitat for southbound migrants in fall. A focus on providing shorebird habitat is a nongame bird priority for the refuge. As outlined in the Wildlife and Habitat Management Review for the refuge, systemwide and conservation roles that the refuge could accomplish toward meeting the Lower Mississippi Valley Joint Venture Ecosystem Team objectives include integrated planning/management to meet waterfowl and other migratory bird habitat needs at local/Regional/Flyway scales, as well as monitoring population trends of migratory birds. Contributions that the refuge could provide to the U.S. Shorebird Conservation Plan include managing at least 200 acres of impoundments for shorebirds (late summer/early fall) and improving water management capabilities (e.g., wells) on at least 1,000 acres of impoundments for shallow water-feeding waterfowl and other aquatic birds (moist soil management featured).

Within the larger context, about 1,500 acres of habitat have been tentatively identified for Mississippi towards supporting a tentative Lower Mississippi Valley population objective of 500,000 shorebirds during southbound migration. Habitat objectives for shorebirds are tentative with the assumptions that (1) an average shorebird weighs 45 grams; (2) stays at a site for 10 days; (3) requires about 8 grams of food per day; (4) chironomids are the primary food source; and that (5) they must gain 1 gram of biomass per day to continue their migration.

Priority species occurring on the refuge include the following: High – stilt sandpiper, buff-breasted sandpiper, western sandpiper, short-billed dowitcher, and Wilson's phalarope; Moderate – semipalmated sandpiper, sanderling, greater yellowlegs, dunlin, common snipe, least sandpiper, willet, American avocet, and killdeer.

Shorebird habitat should be a combination of mudflats and shallow water (0–4") with a dense invertebrate population available July 15–October 31. Monitoring shorebird responses to habitat management would include a greater focus on habitat conditions, including a weekly survey of water levels, vegetative response to water regimes, invertebrate food productivity, and whether shorebirds are present or not.

American woodcock populations in this region declined 19% from 1968 to 1990. Population declines are thought to be the result of land use changes associated with land conversion and the maturing of forest habitats. Woodcock numbers may be decreasing because of insufficient nesting and brood habitat types. Woodcock and quail need exposed soil and patchy cover for optimum foraging. In addition, woodcock need moist thickets containing high understory stem basal area with little or no ground litter.

Wintering habitat includes moist bottomland hardwood forests with dense brush and understory, especially when found in close association with agricultural fields and old-field habitat. These sites are typically wet thickets, with a high density of plant stems, and with the ground open and clear. Typical cover includes privet, cane, and briars that result from openings in the canopy. The scrub-shrub and dense habitats found in certain portions of the refuge provide good daytime cover for woodcock. These habitats result from reforestation, old-field succession, and ice storms.

At dusk, woodcocks move to open or brushy fields to forage and conduct courtship activities. These habitats include agricultural fields that were not fall-disked and sparse grasslands that may have received a cool fall burn to create patchy openings of exposed soil interspersed between grass clumps 1 to 3 feet in height. Woodcocks are closely tied to earthworms, which are their major food

resource. The grassland areas provide habitat preferred by other priority species (e.g., Northern bobwhite and winter grassland birds).

This objective is largely dependent on the filling of critical needs (e.g., Biologist and Biological Science Technician).

Strategies:

5.1 – Focus shorebird monitoring for southbound migrants, using established protocols. Expand existing efforts by implementing a standard route and conduct shorebird surveys following the International Shorebird Survey protocol, meaning surveys every 10 days, minimum once a month.

5.2 – Manage 200 to 400 acres of habitat for shorebirds each year, preferably with late summer drawdown of spring floodwater. Impoundments should be reflooded a minimum of two to three weeks before migration begins to allow invertebrates to repopulate the soils.

5.3 – Continue monitoring water regime, vegetative responses, invertebrate food productivity, and presence/abundance of shorebirds.

Sub-goal: Other Wildlife and Fisheries

Restore and manage for native biodiversity the fisheries and aquatic resources of wetlands and adjacent uplands within the floodplain of the Mississippi River.

Objective 1: Fisheries and Aquatic Resources
Restore and manage the fishery and aquatic resources found in ponds, springs, overflow streams, and lakes on the refuge by conducting surveys, managing water levels, and regulating harvest.

Discussion: Unlike most of the leveed alluvial plain along the Mississippi River, the refuge is somewhat unique. It has not been leveed and still receives overbank flooding from the river, and it supports a very productive fishery. The refuge must first assess the fishery resource to determine the status of its native biodiversity.

Strategies:

1.1 – Coordinate with the U.S. Army Corps of Engineers to halt erosion on Gilliard Lake by 2006.

1.2 – Continue to coordinate with Natchitoches Fish Hatchery to provide stock source for Kid's Ponds and establish special regulations/events to best utilize the limited fisheries in these ponds.

1.3 – Restore historic spring seeps along Cabin Road through road reconstruction and replacement of water control structures.

1.4 – Establish buffer zones around loess bluff springs/seeps.

1.5 – Census/monitor mussels every three years in St. Catherine Creek and refuge lakes.

Objective 2: Herptofauna
Within two years of plan approval, establish surveys to determine the occurrence/abundance of herptofauna on the refuge.

Discussion: Reptiles and amphibians are key species in helping biologists to evaluate the environmental health of an ecosystem. Knowledge of which species occur on the refuge is fundamental to an understanding of the biodiversity of the area.

This objective is largely dependent on the filling of critical needs (e.g., Biologist and Biological Science Technician).

Strategies:

2.1 – Sample representative habitats for reptiles using drift fences, pitfall, and funnel traps in an array set-up on randomly selected sites on the refuge.

2.2 – Sample for amphibians using drift fences and pitfall traps in conjunction with reptile monitoring.

2.3 – Establish routes for anuran call counts. Follow North American Amphibian Monitoring Program protocol.

2.4 – Establish annual alligator surveys by 2007.

Objective 3: Other Resident Species
Annually manage to maintain healthy, resident wildlife populations, including white-tailed deer and wild turkey.

Discussion: Refuge habitats are managed to ensure healthy, viable resident populations consistent with sound biological principals and other objectives of the plan.

White-tailed deer have the potential to adversely affect habitats unless their numbers are maintained at, or slightly below, carrying capacity. The refuge hunt program helps maintain herd levels while offering quality hunting opportunities to the public. Current harvest data indicate an annual harvest of 146 deer in 2002. Population level indicators for this plan will include surveys and harvest data.

Wild turkey will benefit from increased management. Additional hunting opportunities may become available as the turkey population reaches a level that can support such activities.

Strategies:

3.1 – Maintain a stable deer population through a program of either-sex hunting and by establishing annual harvest strategies based on harvest data, surveys, and other factors such as influence of backwater flood events.

3.2 – Conduct deer health checks every 5–7 years and monitor habitat conditions to determine health and population of deer on the refuge.

3.3 – Evaluate refuge for suitable grassland habitat sites that may be managed for a variety of early successional species including bobwhite quail and wild turkey.

Sub-goal: Threatened and Endangered Species

Maintain and restore habitat for the federally listed species found in the Lower Mississippi Valley and adjacent loess bluffs.

Objective 1: Louisiana Black Bear Recovery
Support recovery actions for the threatened Louisiana black bear.

Discussion: The Louisiana black bear is listed as a threatened species under the Endangered Species Act primarily due to habitat loss and fragmentation. The recovery goals for this species, as identified in the recovery plan, are to establish two viable populations in Louisiana and restore and protect habitat supporting and connecting those populations. The Service and partnering agencies and organizations have been conducting recovery activities throughout its range, which includes southwest Mississippi. One of those activities involves a concerted effort to protect, expand, and connect existing habitat blocks. This involves connecting large forest blocks with forested corridors to facilitate movement of bears between blocks and facilitate genetic exchange. The refuge and nearby Homochitto National Forest are the largest nearly contiguous forested block in Mississippi that is protected and has been identified as one of the best areas in the state for black bear restoration efforts.

With the potential of having a bear population in the future, there are two main areas the refuge should focus on in the short term: forest management and education. If in the future bears do increase on the area, the refuge should also have personnel trained to handle bears and most importantly to deal with potential human/bear conflicts.

Habitat management to benefit bears generally focuses on maintaining suitable den sites, ensuring availability of preferred food resources, and maintaining or creating adequate travel and dispersal corridors. Diversity is the key to maintaining good bear habitat. Timber species, size classes, cavities, openings, corridors, food sources, etc. are important considerations for all phases of forest management. In addition, most forest management practices for game species such as white-tailed deer and eastern wild turkey will generally benefit bears.

Whether bears move naturally into the area or are moved there as part of a reintroduction program, the effort needs to be preceded by public education. This may come in the form of school programs, landowner workshops, posted signs, pamphlets, town meetings, etc. Refuge personnel will work with the state bear restoration group and others to accomplish this goal.

Strategies:

1.1 – Provide trained staff to deal with problem-bear issues and education in the vicinity of the refuge.

1.2 – Promote the establishment of a contiguous forested corridor along the Homochitto River between the refuge and Homochitto National Forest and along the Mississippi River through refuge outreach and private lands programs.

1.3 – Promote reintroduction of the Louisiana black bear into southwest Mississippi through participation in partnerships with Homochitto National Forest, the Black Bear Conservation Committee, and the Bear Education and Restoration group of Mississippi.

Objective 2: Species of Concern
Maintain and enhance the Mississippi River floodplain and adjacent loess bluff habitat for other listed species and species of concern.

Discussion: Species of concern and threatened or endangered species that do or may occur on the refuge include the Louisiana black bear, bald eagle, interior least tern, peregrine falcon, Rafinesque's big-eared bat, southeastern myotis, white pelican, black-necked stilt, white ibis, paddlefish, spring darters, and fat pocketbook mussel.

Strategies:

2.1 – Continue protection of eagle nests and foraging areas.

2.2 – Continue protection of abandoned houses used by Rafinesque's big eared bats and conduct research as warranted regarding movement patterns and special needs (e.g., frequency and distribution).

2.3 – Support bat inventory and research on the refuge.

2.4 – Protect freshwater mussel habitat in St. Catherine Creek and continue surveys to confirm the presence of the listed habitat for fat pocketbook mussel.

2.5 – Assure water quality protection for all aquatic species. Obtain water quality baseline data of all refuge wetlands by 2010.

GOAL 2 – HABITAT

Conserve, manage, enhance, or restore the natural diversity, abundance, and ecological functions of refuge habitats and associated plant communities in support of national and regional plans.

Discussion*:* Habitat management will be used to restore the ecological integrity, biological diversity, and environmental health of all refuge lands, while providing benefits to a wide range of resident, migratory, and threatened and endangered species. The refuge's habitat management procedures, including activities ranging from no intervention to intensive manipulation of soils, water, topography, and vegetation, would be consistent with the Service's Refuge Manual.

Objective 1: Reforestation and Forest Management
Manage existing forests to increase vertical structure and provide habitat for a diversity of species, especially priority migrant birds.

Discussion: Approximately 80 percent of the forest lands in the Lower Mississippi Valley have been cleared and converted to other land uses, leaving only remnant forested tracts. Fish and wildlife resources have been similarly affected, leaving remnant populations that must be managed to meet the refuge's purposes and achieve maximum potential. To date, the forest resources have had a minimum of inventory work conducted. Some of the most unique forested habitats remaining in the Delta are forested ridges. Because of the importance of the remaining forests to wildlife resources on the refuge and the conservation priorities set forth in various plans, forest resources should be managed to mimic old-growth forests and increase vertical vegetative structure.

Several species of waterfowl heavily utilize flooded forested habitat in winter for resting and foraging for acorns, other fruits, various seeds, and invertebrates. Wood ducks seek these habitats almost exclusive of other habitats. Mallards, gadwall, and wigeon all use flooded forested habitat as one of the complex of preferred habitats. These areas are vital to waterfowl for pair bonding, loafing, sanctuary, thermal cover, and feeding. It is important to manage these areas to provide all of these elements.

Care should be taken in the timing, frequency, and duration of flooding. Flooding in winter should mimic or enhance natural flood conditions. Typically, flooding should occur only during the dormant period for deciduous hardwoods common in each impoundment. Flooding should never occur before the dormant period starts in late fall (mid-November to late-December) and only rarely after green-up in the spring. Flooding dates and duration should be varied annually and in some years should not be flooded. Fredrickson's *Greentree Reservoir Management Handbook* (Fredrickson and Batema

1993) should be consulted for management guidance. It is important to understand that three-fourths of the refuge may be flooded by the Mississippi River for up to eight months (December–January), negating any opportunity to manage flooding.

The refuge's Wildlife and Habitat Management Review describes several potential contributions that the refuge can make to Partners in Flight, the U.S. Shorebird Conservation Plan, and the North American Wading Bird Plan, including reforestation of approximately 10,000 acres of current/past agricultural land to bottomland hardwoods; expansion of the refuge boundary to include the unique loess bluffs; and enhancement of the density of giant river cane thickets in order to provide vertical structure in the forest. Contributions to the Lower Mississippi River Ecosystem Team objectives include providing protection/restoration of bottomland hardwood forests and associated functions and structure (U.S. Fish and Wildlife Service 2001b; 2002b; Fredrickson and Reed 1988).

Strategies:

1.1 – Incorporate greater native tree species diversity into any future reforestation efforts, placing emphasis on matching species to the planting site.

1.2 – Establish buffer zones (100–200 feet) around all of the loess bluff springs and the steeper portions of the ridges to assure protection of these special areas.

1.3 – Develop a Timber Management Plan by 2008.

1.4 – Initiate timber management using commercial harvest and other methods (e.g., firewood cutting) to increase vertical structure and cane thickets for forest-breeding birds.

1.5 – Monitor success of reforestation activities.

Objective 2: Refuge Farm Operations
Continue to annually support 1,500 to 1,700 acres of row crop production to provide for the needs of numerous waterfowl species and to obtain management services necessary to maintain proper moist soil areas. Strive to reduce cooperative farming by phasing in refuge force-account work aimed toward a future goal of 300–600 acres of valuable grain crops.

Discussion: Agricultural crops provide cover and high calorie, hot foods to supplement natural foods. In addition, farming is used to set back succession and control weeds in moist soil units.

Cooperative farming has been a long-standing practice throughout the Refuge System nationwide, and is a mutually beneficial program. However, due to more restrictive regulations regarding approved chemicals, agricultural burning, and the encouraged use of Best Management Practices, it is becoming more challenging to find farmers who are willing to alter their familiar farming techniques to meet refuge requirements. In addition, the steady decline in crop prices over the previous few years has reduced the cooperative farmer's profit margin. As restrictions increase, the number of willing cooperative farmers will diminish due to hardship and profit loss. Therefore, the use of cooperative farming to achieve waterfowl objectives may not be a management option in the future.

The cooperative farmer's objective is to grow crops that produce maximum yields. Refuge farming efforts would focus on supplementing food sources for migratory waterfowl. Therefore, chemical use to control weeds and insects would be reduced. Force-account farming would allow a reduction in the number of acres farmed. However, additional resources and equipment would be needed to farm refuge lands to meet the stated objectives.

Strategies:

2.1 – Retain cooperative farming as long as needed to provide services to the refuge and its associated wildlife, including improvement and maintenance of impoundments and moist soil units to benefit waterfowl, shorebirds, and wading birds.

2.2 – Work to build refuge staff and funding sufficient to force-account farm on the refuge to reduce the amount of cropland to 300 to 600 acres of crops annually, and to be able to conduct other wildlife management activities without the assistance of a cooperative farming program by 2008.

Objective 3: Invasive Plant Control
Within three years of comprehensive conservation plan approval, inventory, monitor, control, and, where possible, eliminate invasive plants on the refuge, with a priority on those species that have the greatest impact on wildlife habitat.

Discussion: A pest is any terrestrial or aquatic plant or animal that interferes or threatens to interfere at an unacceptable level with the attainment of refuge objectives or which poses a threat to human health. Currently, several species of plants and wildlife occurring on the refuge have achieved "pest" status.

Many invasive moist soil plant species are difficult to control without intensive herbicide use. Soil disturbances and water level fluctuations necessary for migratory shorebird and waterfowl management often encourage germination of those invasive species present in the natural seed bank. Eradication of undesirable species is often impossible and unnecessary to achieve. Some of these plants, such as willow (*Salix* spp.) offer desirable vertical structure when occurring in low densities in southern moist soil impoundments. Other aggressive plant species offer little food value or cover and are extremely difficult to control once established, except with approved herbicide treatments.

Noxious exotic plants on the refuge include kudzu, Japanese climbing fern, Japanese honeysuckle, Chinese tallow, and cogon grass. Kudzu and cogon grass form thick monotypic stands that crowd out other desirable plants.

Native noxious plants include black willow, cottonwood, cocklebur, and ironwood.

Strategies:

3.1 – Inventory invasive plant distribution on the refuge.

3.2 – Control invasive plants using herbicides during appropriate seasons based on U.S. Department of Agriculture guidelines and research.

Objective 4: Nuisance Animal Control
Within three years of comprehensive conservation plan approval, develop baseline data, especially related to beaver, wild hogs, nutria, and raccoon.

Discussion: Wildlife pests, some native and some nonnative, are often difficult to control and impossible to eradicate. The beaver is a native species with both advantages and disadvantages. The refuge is situated along major watercourses and will continue to hold and attract beavers. Periodic and persistent dam removal should occur as needed where dams impede desired water flow necessary for shorebird and waterfowl management or cause damage to bottomland forests and reforestation sites.

Beavers are native to the refuge; however, their dam-building activities can cause flooding, and their habit of burrowing can damage the refuge's levees and roads. As a result, they strongly interfere with the refuge's water management activities.

Wild hogs on the refuge are the result of Eurasian wild boars released on the property by the previous landowners. These wild hogs, which are nonnative, are a problem on the refuge because their rooting destroys understory vegetation, levees, and roads. The refuge is extremely concerned with the presence of wild hogs. In addition to a pig's ability as an omnivore to eat virtually anything, studies have shown that an adult wild hog will consume 160 pounds of hard mast during a single winter. Where hard mast is present, as much as 84% of a hog's diet will consist of acorns. In areas like the refuge, where the major habitat type is bottomland hardwoods and its associated hard mast production, wild pigs are efficient competitors with native wildlife, including deer, turkey, quail, squirrels and waterfowl. Competition for food resources is only one part of the wild pig problem. In addition to being a host for various diseases, such as swine brucellosis, wild pigs cause enormous structural damage to levees and roadways by rooting large holes while feeding on grasses, roots, tubers, and stems.

Nutria, an exotic species, are prolific breeders. They are destructive to marsh habitat and burrow in levees, damaging and weakening them.

Raccoon, a native predatory species, may negatively impact other species. Nest predation on turkey, wood duck, and songbirds can become so great that it limits the reproductive success of these species. Raccoon overpopulation may also facilitate the spread of canine distemper, a common close-contact type of disease, to other species such as fox and coyote.

Strategies:

4.1 – Develop a Nuisance Animal Control Plan by 2008.

4.2 – Implement surveys to determine population trends of nutria, wild hogs, opossum, raccoon, and beaver by 2008.

4.2 – Fully implement the Nuisance Animal Control Plan by 2010.

GOAL 3 – LAND PROTECTION AND CONSERVATION

Identify, conserve, and enhance the integrity of the lands within the refuge and contribute to the conservation and restoration of fish, wildlife, and cultural resources found within the surrounding alluvial valley and associated bluffs.

Discussion: Many of the resource management problems that a refuge is concerned with, such as water quality, invasive plants, and nuisance animals, originate outside the refuge's boundary. To address these problems affecting the wildlife and plant communities of the refuge, management seeks to develop partnerships with state and county natural resource agencies, conservation organizations, and neighboring landowners.

Public awareness and education are keys to resolving many resource issues. As a partner, the Service would monitor programs to address existing threats and identify future threats; offer technical advice; evaluate potential land acquisition opportunities from willing sellers within the approved acquisition boundary; and promote and execute public awareness and education programs. Through these roles, the refuge will seek to become a community leader in natural and cultural resource protection. Through a common mission emanating from partnerships, a healthy ecosystem can be achieved.

Objective 1: Land Acquisition
Continue land acquisition program to purchase inholdings within the approved acquisition boundary from willing sellers at the appraised market value.

Discussion: The protection of additional lands is subject to how these lands contribute to the refuge's biological needs and meet funding priorities nationwide. Land acquisition is also dependent on whether the landowners are interested in selling their lands. The purchase of land within the acquisition boundary of the refuge will assist in overall efforts to improve habitat for wildlife, including songbirds and black bears.

The refuge is focusing on trying to exchange some of its tracts that are noncontiguous with refuge land in order to acquire land that is both contiguous with refuge lands and within the approved acquisition boundary. This effort includes three tracts outside the refuge's contiguous boundary. One of these tracts is about a 400-acre property within the privately owned Glasscock Island Trust, which is west of the refuge on the Louisiana side of the Mississippi River. There are also two tracts in Mississippi, formerly Farmers Home Trust properties that are currently owned by the Service. All three tracts are currently being appraised.

Strategies:

1.1 – Identify all inholders, update address and contact lists, and inquire as to their willingness to sell by 2007.

1.2 – Work with partner organizations, such as The Nature Conservancy, The Conservation Fund, and others, to acquire land.

1.3 – Continue to pursue the potential exchange of isolated refuge tracts for inholdings adjacent to the Cloverdale, Butler Lake, or Sibley units.

Objective 2: Contaminants and Water Quality
Monitor and quickly react to contaminant issues affecting the refuge's habitats and fish and wildlife resources.

Discussion: There were oil and gas wells on the refuge when it was first established in 1990. The refuge has 18 active wells; 30 inactive wells; seven tank batteries; over 40 miles of pipeline; and unknown miles of active and nonactive flow lines. The Service performed a contaminants survey on the refuge in 1996. As discussed in the Biological Review, the survey found normal mercury and other contaminant levels.

Strategies:

2.1 – Develop and maintain a GIS database on location and status of all petroleum-related facilities on or adjacent to the refuge.

2.2 – Continue to work with ExxonMobil and others (Environmental Protection Agency, Mississippi Department of Environmental Quality) to abate pollution associated with the oil industry, and rid the refuge of abandoned oil facilities by 2010.

Objective 3: Private Lands
Annually work with private landowners to provide sound biological advice on conservation measures that promote wildlife and native landscapes in southwest Mississippi.

Discussion: The Service's authorities for involvement with private landowners in developing and carrying out habitat improvement projects are found in The National Wildlife Refuge System Improvement Act of 1997 and in the policy documents for the Partners for Fish and Wildlife Program. Additional authorities reside within the Fish and Wildlife Act and the Fish and Wildlife Coordination Act.

Much of the land in the vicinity of the refuge is privately owned. These privately owned lands play an important role in the restoration and reestablishment of native habitats needed to support the diverse fish and wildlife resources for which this geographic area was historically known. Existing or potential habitat on private lands is essential for achieving the goals and objectives of national and regional plans, such as the North American Waterfowl Management Plan, Partners in Flight Plan, Mississippi River Alluvial Valley Bird Conservation Plan, and Strategic Fisheries Plan. A specific potential contribution to the North American and Flyway Waterfowl Management Plans of the refuge is to broaden partnerships with private landowners regarding wetland protection/restoration and statewide waterfowl objectives.

The Service has several existing programs that are directed to providing technical assistance and funding for priority habitat projects on private lands. The Service's primary project delivery mechanism for habitat projects on private lands is the Partners for Fish and Wildlife Program. Additional funding and technical assistance support for private lands is also available through several other Service-funded programs, including the Challenge Cost-Share Program, the Mississippi Partners for Wildlife Program, Migratory Birds Program, and several grant programs within the Threatened and Endangered Species Program.

Under the Partners for Fish and Wildlife Program, landowners may receive up to $25,000 for on-the-ground project implementation. Partners projects typically receive a minimum 50% in-kind cost share and require a minimum 10-year commitment from the landowner. Typically, the landowner agreements are for more than 20 years. Since the initiation of the Partners Program in 1988, approximately 87,000 acres of bottomland forest wetlands have been planted, and over 20,000 acres of other habitat projects have been completed within the Lower Mississippi Valley.

The Mississippi Partners for Wildlife Program is funded separately from the Service's Partners for Fish and Wildlife Program, receiving funding primarily through the Service's Refuge Challenge Cost-Share Program. The Challenge Cost-Share Program also requires at least a 50% cost share from other partners. In Mississippi, this partnership involves private landowners, Ducks Unlimited, Delta Wildlife, the Mississippi Fish and Wildlife Foundation, and the Mississippi Department of Wildlife, Fisheries, and Parks. Approximately $40,000 in Service funds are made available each fiscal year through this partnership agreement. These funds are used to provide water control structures to private landowners to flood harvested cropland during the fall and winter (November 15–February 28). This partnership provides significant benefits for wintering waterfowl, other migratory birds, and water quality.

The Farm Bill Conservation Programs, available through the U.S. Department of Agriculture under the 2002 Farm Bill, provide significant opportunities for the development and implementation of habitat improvement projects on private lands. These programs include the Wetland Reserve Program, the Conservation Reserve Program, the Wildlife Habitat Incentives Program, and the Environmental Quality Incentives Program. Many millions of dollars are available to eligible private landowners for habitat conservation under these programs. For example, under the Wetlands Reserve Program administered by the Natural Resources Conservation Service, over 100,000 acres of permanent and 30-year easements, directed to restore natural wetlands and native vegetation, have been implemented in Mississippi since 1990.

Strategies:

3.1 – Identify inholdings (private parcels within the refuge boundary) and initiate dialogue concerning conservation measures to employ on these lands.

3.2 – Work with private landowners on off-refuge lands to promote reforestation and wetlands restoration/management to reduce fragmentation and to provide wintering waterfowl habitat.

Objective 4: Archaeological Resources
Over the life of the comprehensive conservation plan, identify, evaluate the importance of, and seek the appropriate protective designation of cultural resources on the refuge, in accordance with existing legal requirements, regulations, and professional standards. Where special cultural resources exist, provide public outreach opportunities when appropriate.

Discussion: Cultural resource and historic preservation laws outline several considerations, which include (1) the requirement that each agency should inventory the historic and cultural resource sites present on the agency's lands, and assess the sites' eligibility for listing on the National Register of Historic Places; (2) consideration of impacts to cultural resources during implementation of the agency's management activities; (3) protection of cultural resources from looting and vandalism; and (4) consultation with groups, such as the Native American tribes and African American communities, to address how management activities might impact archaeological sites deemed important to those groups.

Strategies:

4.1 – Develop a scope of work for a comprehensive archaeological survey of the refuge, a cost estimate, and ranking factors for contractor selection by 2007 (regional archaeologist). Secure funding by 2009.

4.2 – Conduct a refugewide archaeological survey by 2010.

4.3 – Continue to collect location information on historic properties from refuge employees and the public.

4.4 – Develop a Geographic Information System (GIS) layer for the refuge's archaeological and historic sites.

4.5 – Integrate cultural resource preservation into refuge management plans to protect cultural resources in perpetuity.
4.6 – Catalog refuge artifacts and historic documents and assure their appropriate archival.

4.7 – Complete an Archaeological Resources Protection Plan by 2015 to protect and conserve the refuge's archaeological sites.

Objective 5: Law Enforcement
Over the life of the comprehensive conservation plan, conduct law enforcement activities to protect refuge visitors and to support national, regional, and refuge-specific regulations and population objectives.

Discussion: The National Wildlife Refuge System consists of more than 540 refuges and 37 wetland management districts. The System manages over 95 million acres in every state and several island territories. Visitation is increasing at an annual average of 6.6%. Between 2.3 and 2.4 million people are expected to visit the national wildlife refuges over the next several years.

Protecting the natural resources of the refuges and ensuring the safety of refuge visitors are fundamental responsibilities of the Refuge System. Currently, the St. Catherine Creek Refuge's law enforcement program consists of one full-time officer.

This comprehensive conservation plan recommends a substantial increase in public use facilities offered to the visiting public over the next 15 years. This increase will certainly cause a substantial increase in visitation and an increased need for refuge law enforcement capabilities.

Strategies:

5.1 – Develop and implement a Law Enforcement Plan for refuge operations by 2007.

5.2 – Strengthen law enforcement relationships with Adams and Wilkinson counties and the Mississippi Department of Wildlife, Fisheries, and Parks.

Objective 6: State Relationships/Coordination/Partnerships
Enhance state relationships, develop better community coordination, and foster interagency partnerships.

Discussion: Significant problems affecting the wildlife and plant communities of the refuge are also issues faced by state and county resource agencies. The refuge will continue its coordination with the Mississippi Department of Wildlife, Fisheries, and Parks; continue to include state personnel in planning activities; and seek to form new partnerships with state and county natural resource agencies to foster stewardship of the area's natural and cultural resources.

Strategies:

6.1 – Continue close coordination with the Mississippi Department of Wildlife, Fisheries, and Parks on hunting and fishing programs on the refuge and expand their participation in refuge planning activities.

6.2 – Continue interagency agreement with the Mississippi Forestry Commission to provide initial response in wildfire situations.

6.3 – Continue to coordinate with the Mississippi Department of Environmental Quality on oil and gas operations on the refuge.

6.4 – Develop a partnership with the Natchez Convention and Visitors Bureau to promote compatible, sustainable nature-oriented recreation and experiences for visitors to the Natchez area.

6.5 – Develop a partnership with the Natchez Chamber of Commerce to promote sustainable tourism and development in the Natchez area.

6.6 – Develop a partnership with the Homochitto National Forest to promote reintroduction of the Louisiana black bear into southwest Mississippi.

Objective 7: Budget, Personnel, and Equipment
Secure adequate budget, staff, and equipment necessary to restore and manage habitats and wildlife populations on refuge wetlands and adjacent uplands at such a level to meet national, regional, and refuge-specific objectives.

Discussion: The administrative functions associated with a refuge include a wide array of activities that are critical to the mission of the National Wildlife Refuge System and the purpose of each refuge. These functions include staffing; training; budgeting; planning; refuge access; law enforcement; facilities; community relations; partnering; and maintenance. Refuges must have the appropriate staff, facilities, equipment, and resources in order to accomplish their goals and objectives.

Strategies:

7.1 – Construct a larger headquarters and visitor contact station with appropriate space and floor plan to accommodate staff, storage, safety, visitor, and educational needs by 2010.

7.2 – Increase refuge staff positions to implement programs needed to address and/or resolve the issues addressed in this plan. Minimal needs include a wildlife biologist; a biological science technician; a public use specialist; a heavy equipment operator; and a tractor operator.

7.3 – Provide continuing education and training opportunities to all staff to ensure a highly competent and motivated team.

7.4 – Provide safe and efficient equipment and vehicles to perform needed refuge operations and maintenance.

7.5 – Provide up-to-date, computer-based systems to perform refuge operations and planning functions.

7.6 – Provide computer training to refuge staff to ensure all refuge data is stored in a manageable, retrievable database that can be used for analysis and data sharing.

GOAL 4 – WILDLIFE-DEPENDENT RECREATION AND ENVIRONMENTAL EDUCATION

Provide the public with opportunities for high quality, appropriate and compatible wildlife-dependent recreational activities, environmental education, and interpretation, and promote outreach opportunities that lead to a greater understanding and enjoyment of fish, wildlife, and their habitats, as well as of cultural resources.

Discussion: Under the provisions in the National Wildlife Refuge System Improvement Act of 1997, the Service provides recreational opportunities that reflect the unique qualities and features of national wildlife refuges. Opportunities for compatible wildlife-dependent recreation will create a greater awareness of the biological environment and instill a conservation ethic in refuge visitors. Fishing, hunting, wildlife observation, wildlife photography, and environmental education and interpretation will be allowed as the primary public uses of the refuge.

Objective 1: Hunting
Expand the current hunting program on the refuge and continue to provide a quality and safe outdoor experience.

Discussion: The National Wildlife Refuge System Improvement Act of 1997 recognizes hunting as one of the six priority public uses of the refuge system. These uses, "where compatible with the Refuge System mission and purposes of the individual refuges," are considered "legitimate and appropriate public uses…through which the American public can develop an appreciation for fish and wildlife" and shall receive "priority consideration in refuge planning and management." The Act further states that, "In administering the System, the Secretary shall…provide increased opportunities for families to experience compatible wildlife-dependent recreation, particularly opportunities for parents and their children to safely engage in traditional outdoor activities, such as hunting and fishing..."

St. Catherine Creek National Wildlife Refuge allows hunting for both big game and small game in designated areas. Hunting is regulated, requires special permits, and closely mirrors the state seasons. White-tailed deer and squirrel hunting are the most popular hunting activities. Only one deer per day may be harvested and state yearly bag limits apply. Beavers, nutria, raccoons, bobcats, and coyotes may be taken during any scheduled refuge hunt with weapons legal for that hunt. Feral hogs may only be taken with bow and arrow and muzzleloaders during the designated archery and primitive weapon deer seasons. Waterfowl hunting is restricted to Butler Lake, Salt Lake, and Gilliard Lake.

Strategies:

1.1 – Continue mornings-only waterfowl hunting three days per week in Gilliard Lake, Butler Lake, and Salt Lake. Evaluate the need for quota hunts to reduce hunter conflicts.

1.2 – In 2004, raise the threshold for closure of waterfowl hunting from river stages of 28 to 30 feet on the Butler Lake Unit and 32 to 34 feet on the Sibley Unit, based on the Natchez gauge.

1.3 – Evaluate opening new areas for waterfowl hunting via quota hunts in the Cloverdale Unit and/or less accessible areas throughout the refuge by the 2006 season.

1.4 – Continue to use public hunting as a means to control and manage the wild hog population.

1.5 – Deer numbers should be controlled while providing a quality recreational experience for the purpose of maintaining herd health and habitat management. Production of trophy deer should be a secondary benefit of proper deer management.

1.6 – Explore the feasibility of providing mourning dove hunting.

1.7 – Continue hosting the popular shorebird day in August and expand public use opportunities, such as additional birding trails, birding events, observation platforms, etc.

Objective 2: Fishing
Enhance opportunities for sport fishing on the refuge by improving the existing boat launching sites and providing a fishing pier for anglers with disabilities.

Discussion: Fishing requires a permit, and recreational fishing is open year-round for crappie, bream, sunfish, largemouth bass, white bass, catfish, carp, buffalo fish, and gar. The refuge has an established youth fishing rodeo in addition to a youth deer hunting weekend and youth turkey hunt.

Strategies:

2.1 – Within two years of comprehensive conservation plan approval, repair the boat ramps at Gilliard and Salt lakes.

2.2 – Within three years of plan approval, construct a universally accessible fishing pier and parking area at Swamp Lake.

Objective 3: Maximize Interpretive Values
Enhance interpretation on existing trails, design and install interpretive displays on new trail, update kiosk with standard interpretive panels, and improve visitor access

Discussion: There are currently limited opportunities for interpretation on the refuge. Interpretation often plays a key role in helping the refuge staff integrate conservation into the overall purpose of the refuge. Many opportunities exist for special events and volunteer guided programs, such as bird hikes.

Strategies:

2.1 – Interpret wetlands and develop trail guides for Magnolia Trail by 2006.

2.2 – Provide orientation/information signs at all major refuge entrances, check stations, boat ramps, and parking areas by 2008.

2.3 – Work with state and county officials to seek funds for widening and improving York Road from U.S. Highway 61 to the refuge.

2.4 – Develop a trans-refuge trail from Wildlife Drive to James Tract by 2007.

Objective 3: Maximize Outreach Efforts
Create new and enhance existing outreach opportunities through additional resources and increased use of volunteers.

Discussion: Through the comprehensive conservation and visitor service plans, goals are set, measurable objectives are determined, strategies are identified, and evaluation criteria are established for all visitor services. Careful planning provides the visiting public with opportunities to enjoy and appreciate the refuge's fish, wildlife, plants, and other resources. As a result, the visiting public will develop an understanding and appreciation of each individual's role in the environment today and into the future.

The current staff is doing some good community outreach and working to develop a variety of partnerships, but without a staff person dedicated to visitor services, it will be very difficult to develop consistent visitor service programs through sustained outreach activities.

Strategies:

3.1 – Participate in the tourism program sponsored by the Natchez Chamber of Commerce and the Convention and Visitors Bureau.

3.2 – Present annual program to city, county, and state officials to update them on the refuge's management activities and plan implementation.

3.3 – Increase outreach efforts and train more staff to present programs.

3.4 – Hire a refuge biological technician to assist with outreach efforts by 2007.

Objective 4: Increase Education Programs
Within three years of the plan's approval, the refuge will receive five teacher-led class visits per year

Discussion: Educational programs can enhance public awareness and understanding of the refuge environment, its importance in the flyway, and the issues associated with the management of habitats to support migratory birds and the other resident wildlife. The programs can instill an appreciation of a healthy environment while demonstrating to landowners that human activities and wildlife can successfully co-exist.

Currently, whenever possible, the refuge provides support to Natchez Visitor Center activities, providing outreach to the public about the refuge. In addition, the refuge hosts several on-site special events, including those for youth, such as an event for local children's homes, the youth deer hunting weekend, etc. In addition, whenever possible, the refuge staff serves as guest speakers at meetings and local civic organizations and for classroom and assembly lectures at local schools. A more consistent outreach program, as well as a strong volunteer program, will be essential to assist the staff in implementing a successful outreach, education, and visitor use program.

Strategies:

4.1 – Work with local high schools to involve students interested in wildlife and fisheries management, biology, or natural resources through internships on the refuge.

4.2 – Develop a classroom to host school groups in the new visitor contact station by 2010.

4.3 – Develop educational panels that interpret native wildlife and their habitats for display at local schools and/or visitor centers.

4.4 – Partner with the Friends of St. Catherine Creek National Wildlife Refuge and the Audubon Society to sponsor a bird banding demonstration for school groups on the refuge by 2007.

Objective 5: Staffing
Staff the refuge and update refuge facilities to optimize visitor services and wildlife-oriented recreation.

Discussion: The current staff of six at the refuge includes the refuge manager, assistant refuge manager, an office assistant, a maintenance worker, an engineering equipment operator, and a law enforcement officer. Faced with many pressing management issues such as exotic species invasions, law enforcement concerns, and increased visitation, additional resources will be needed to address the goals of the plan and better protect the resources for which the refuge was established.

Strategies:

5.1 – Hire a biological technician to assist with interpretive, environmental education, outreach, and recreation programs to support 45,000 visitors annually by 2010.

5.2 – Write and implement a Visitor Services Plan by 2011.

5.3 – Construct a new visitor contact station to include an environmental education classroom by 2010.

5.4 – Hire a full-time wildlife biologist and one technician by 2007 to achieve the refuge's biological objectives.

V. Plan Implementation

INTRODUCTION

This comprehensive conservation plan outlines an ambitious course of action for the management of St. Catherine Creek National Wildlife Refuge over the coming 15 years. The ability to enhance the refuge's wildlife habitats while expanding the area of those habitats within the acquisition boundary will require a commitment of staff and resources. Likewise, expanding the refuge's relatively limited public use facilities will take increased resources.

As mentioned in previous chapters of this plan, refuge lands are managed using proven scientific practices, sound biological principles, current research, and best professional judgment, as provided under the National Wildlife Refuge System Improvement Act of 1997 and the Fish and Wildlife Service Manual. Congress has defined a clear mission of wildlife conservation for all national wildlife refuges, which unlike other public lands, are dedicated to the conservation of the nation's fish and wildlife resources. Recreational uses are accommodated where appropriate and compatible, while still meeting the congressional mandate of wildlife first.

PROJECT SUMMARIES

To implement the comprehensive conservation plan, the refuge proposes projects that reflect the basic needs identified by Service staff, other governmental agencies, the public, and the planning team. These projects address the management of wildlife and habitat, resource protection, education and visitor services, and refuge administration.
There are no estimates of potential land purchases, because land values are subject to the time of sale and to market values at the time of purchase. All of the lands acquired at the refuge over the last 14 years have been purchased from willing sellers. The refuge will continue to pursue its willing seller policy toward the purchase of lands within the approved acquisition boundary of the refuge. In particular, efforts will focus on exchanging some of the refuge's currently noncontiguous (disjunct) tracts of land for contiguous tracts within the refuge's approved acquisition boundary.

More specifically, the refuge presently owns three tracts of land outside the contiguous boundary of the refuge. One is a 600-acre property within the privately owned Glasscock Island Trust, which lies west of the refuge on the Louisiana side of the Mississippi River. The other two tracts are in Mississippi; they are formerly Farmers Home Administration properties that were transferred to the Service for conservation purposes. All three tracts are currently being appraised, with the objective of offering them in exchange for tracts from willing sellers that are contiguous with current refuge lands and within the existing acquisition boundary.

The administration of lands acquired within the approved acquisition boundary is not expected to require additional operational or management funds. In particular, exchanging the noncontiguous tracts to acquire contiguous tracts may have a beneficial effect on the refuge's operational and management costs.

The refuge already has several step-down management plans that address some of the proposed projects. (Step-down plans are individual and specific management plans that outline the refuge's proposed actions and their benefits.) Some of these existing step-down plans will need to be revised. For the other proposed projects, step-down plans will need to be developed.

To achieve the goals and objectives developed for the refuge, the proposed management strategies are grouped into 23 specific projects, described as follows and summarized in Table 7.

Project 1: Survey habitat and wildlife populations.

Systematic surveys based on standard protocols need to be conducted to determine the presence and distribution of vertebrate, invertebrate, and plant communities on the refuge. These surveys are required in order to provide baseline data to assist managers in their habitat management practices. The most pressing needs are surveys of freshwater mussels, invertebrates, birds, and reptiles. To gather this data, the refuge is proposing to add additional biological staff. The estimated first-year cost of this project is $200,000, with a recurring cost of $80,000.

Project 2: Enhance wildlife populations and habitats.

This project will enhance the refuge's wildlife and habitat management programs by providing a permanent wildlife biologist. This position is needed to manage a wide variety of wildlife, including several threatened and endangered species, as well as bottomland and upland habitats. The refuge has never had a staff biologist; consequently, biological data on which to base management decisions are largely lacking. The proposed biologist will be responsible for conducting game and nongame censuses, gathering hunter harvest data, and accomplishing a broad range of habitat evaluation and management programs. The employee will manage 27 moist soil impoundments for up to 200,000 waterfowl, shorebirds, and wading birds annually. The position will facilitate greater emphasis on the management of all wildlife and their habitats on the refuge. The estimated first-year cost of this project is $139,000, with recurring costs of $74,000.

Project 3: Restoration of refuge wetland habitats.

This project will focus on long-term restoration of the refuge's wetland areas. As the reforested areas of the refuge mature, it will be necessary to reestablish biological diversity which was previously lost through large-scale clearing of land for agricultural purposes. A biological science technician was identified as necessary during the Wildlife and Habitat Management Review, which was completed in support of the comprehensive conservation planning process. Examples of displaced communities include plants (e.g., river cane and other wetland plants); amphibians (e.g., frogs and newts); reptiles (e.g., alligator and snapping turtles); mussels (e.g., endangered fat pocketbook mussel); and others as appropriate. The estimated first-year cost of this project is $124,000, with a recurring cost of $59,000.

Project 4: Protect refuge resources and visitors.

An additional full-time refuge law enforcement officer is needed to ensure the safety of the visiting public and to increase protection of the refuge's natural resources and facilities. The St. Catherine Creek Refuge hosts over 30,000 visitors annually. The officer's presence, surveillance, and visitor contacts are important to visitor safety and are critical in reducing crime on the refuge. The estimated first-year cost of this project is $129,000, with a recurring cost of $64,000.

Project 5: Provide outreach and environmental education at the St. Catherine Creek Refuge.

An environmental education specialist is needed to develop an education and outreach program for the Mississippi-Louisiana area. The communities of Natchez, Mississippi, and Vidalia, Louisiana, continue to demand—at an ever increasing rate—environmental education from the staff of the St. Catherine Creek Refuge. The addition of this position, as recommended by the comprehensive

conservation plan's Visitor Services and Environmental Education Review, will enable the refuge to better serve local communities through education of local school children, residents, and civic groups on refuge issues and the environment. This employee will also handle outreach and public affairs for the refuge. The estimated first-year cost of this project is $147,000, with a recurring cost of $82,000.

Project 6: Monitor oil and gas activities on the refuge.

This project will better administer the oil and gas industry impacts on the refuge, and study the impacts of these structures on the refuge's natural resources. The refuge has 18 active wells; 30 inactive wells; seven tank batteries; over 40 miles of pipeline; and unknown miles of active and inactive flow lines requiring great vigilance and compliance monitoring. The addition of a contaminants specialist position, to be stationed at St. Catherine Creek National Wildlife Refuge but also servicing the other refuges in the Lower Mississippi River Ecosystem, is necessary to deal with the refuge's legal and environmental issues surrounding this industry. The refuge works closely with the oil industry to assure legal compliance, but this coordination places great strain on a staff of six with numerous other management duties. This additional position was identified as a necessity in the comprehensive conservation plan's Wildlife and Habitat Management Review, which was completed in 1999. The estimated first-year cost of this project is $132,000, with a recurring cost of $82,000.

Project 7: Improve road and levee maintenance on the refuge.

A WG-8 Equipment Operator is needed to improve maintenance of the refuge's roads, levees, parking lots, and other infrastructure. This additional position will enable the refuge to improve visitor services and successfully accomplish management goals. The 25,000-acre refuge currently has only one equipment operator, who is responsible for the maintenance of more than 40 miles of gravel and dirt roads and over 25 miles of levees. The refuge's existing roadways are constructed of gravel or dirt and require frequent rehabilitation and repairs (e.g., grading, ditching, culvert installation, and filling holes). Improving the refuge's ability to perform routine maintenance will dramatically decrease long-term maintenance costs, resulting in a significant savings to the Service over time. The public will benefit from improved visitor services, and refuge personnel will have improved administrative access. Water management capabilities and flood control will also be greatly enhanced, and in-house construction projects can be performed in a timely manner. The estimated first-year cost of this project is $131,000, with a recurring cost of $62,000.

Project 8: Rehabilitate levees and water control structures.

The refuge's existing levees are in need of repairs due to flood erosion, hog rooting, and daily use. The current water control structures have been deteriorated due to corrosion. Rehabilitation will involve reshaping and filling portions of the levees, along with replacing water control structures. These efforts will provide stable levees and functional water control structures, thereby reducing backwater flooding and increasing the staff's ability to effectively manage the moist soil units for waterfowl, shorebirds and wading birds. The estimated cost of this project is $89,000.

Project 9: Construct an observation tower on the Sibley Unit.

This platform will allow bird watchers and other refuge visitors to observe migrating waterfowl, shorebirds, and other wetland-related wildlife. The project includes the construction of an enclosed overlook, and the development of an access trail and associated parking area. Visitors to the observation platform will have an increased opportunity to photograph and observe wildlife. The estimated cost of this project is $63,000.

Project 10: Construct a trans-refuge birding trail system.

This project is for the construction of a trans-refuge foot trail system. It will run from the refuge's office on the Sibley Unit at the south end of the refuge to the Cloverdale Unit at the north end. The trail will cross St. Catherine Creek at two points, and a cabled foot bridge will be constructed at these locations. Signage will be necessary, both instructional and educational. This project will enable the refuge to meet its responsibilities to the visiting public regarding wildlife observation and photography. The estimated cost of this project is $72,000.

Project 11: Repair Sibley Unit outflow pipe.

An outflow pipe at the pumping station levee on the Sibley Unit is in need of repair. The pipe has separated at a joint, which is approximately 10 feet in diameter and 30 feet under the ground. This break is causing serious erosion and threatens to destroy an important existing roadway that accesses a major portion of the refuge. The pipe needs to be excavated, repaired by welding, and covered again by incremental packing with dirt. The estimated cost of this project is $28,000.

Project 12: Repair boat ramp at Gilliard Lake.

The public boat ramp at Gilliard Lake has severely deteriorated over the years due to flooding by the Mississippi River. This lake is one of the most popular in the Natchez area for birding, hunting, and fishing. The boat ramp is difficult to use and is unsafe for the public and refuge staff. Repair of the ramp was identified as a high priority in the recently completed Visitor Services and Environmental Education Review, which has been incorporated into the comprehensive conservation plan. The project's estimated cost is $34,000.

Project 13: Rehabilitate Salt Lake boat ramp.

The Salt Lake boat ramp is used extensively by the public for fishing and waterfowl hunting. Presently, the ramp is too steep and is hazardous. Past attempts at repairs have been unsuccessful due to the presence of abandoned oil well flow lines under the surface. Extensive grading and excavating are needed to prepare the site for concreting, which will correct the problem. The estimated cost of this project is $42,000.

Project 14: Rehabilitate refuge houses.

Three refuge houses, built in 1967, need major repairs. These houses are currently being used as quarters for refuge staff, interns, and volunteers. Needed repairs include new interior paint, carpeting, heating and air conditioning units, and gas stoves. The electrical wiring does not conform to current building codes and needs updating. The windows leak and need replacement, along with exterior doors. The 38-year-old bathroom fixtures are also worn and need replacing. The lights and ceiling fans need upgrading; the ceiling fans are worn and wobble. The wood soffit and fascia need patching and covering with vinyl to reduce maintenance costs. In addition, the houses' septic systems do not function properly and need to be replaced. All three houses need new roofs. The estimated cost of this project is $107,000.

Project 15: Replace refuge office/visitor contact station and parking lot.

The refuge's current office building is inadequate for a growing and projected staff. It is too small to accommodate the visiting public, including area school groups. It has no public restroom facilities. The current building is a wood-framed, converted hunting camp and storage shed. The building was

sided with aluminum and converted to an office. Its wiring is not to code; its insulation is inadequate; and much of the wood material beneath the siding is rotten. This project would replace the current building with a 3,000-square-foot office complex and visitor contact facility, including a 20-foot by 30-foot conference room. The proposed facility would also be functional for Service meetings and special programs for the public. The parking lot serves the refuge office and is the primary contact point for most refuge visitors. The current lot is composed of gravel on dirt; during rainy periods, it becomes muddy and develops potholes. Paving the area would eliminate these problems and the parking lot would no longer need to be graded and graveled on a regular basis. During wet weather, the public must currently walk through mud, which is then tracked into the office. The estimated cost of this project is $690,000.

Project 16: Construct a universally accessible fishing pier and parking area.

Fishing in Swamp Lake is currently only from the bank. A universally accessible concrete fishing pier and parking area for anglers with disabilities would increase access to the lake and provide an enhanced outdoor experience for visitors to the refuge. A concrete pier, as opposed to wood, will withstand the damaging flood events experienced annually along the Mississippi River. These facilities will provide all visitors with adequate access to the refuge fishing area. The estimated cost of this project is $64,000.

Project 17: Rehabilitate Butler Lake entrance road and parking lot.

The 1.7-mile entrance road to the Butler Lake boat ramp is in poor condition due to flooding by the Mississippi River and is in urgent need of repair. This road provides access to one of the most popular fishing, birding, and duck hunting sites in the Natchez, Mississippi, area. The road needs to be elevated, ditched, and graveled, and have culverts installed. Repairs will begin at the refuge's entrance and extend to the intersection of Salt Lake Road. The parking area is currently dirt/gravel and in poor condition due to annual flooding by the Mississippi River. This parking area is used by a variety of refuge visitors (hikers, birders, hunters, and fishermen). The renovations should include expansion, elevation, gravel, and signage. The improvements would reduce the chance of vehicles getting stuck during periods of heavy rains, reduce long-term maintenance costs, and improve visitor services. The project's estimated cost is $760,000.

Project 18: Rehabilitate the Wildlife Driving Tour Road and parking area.

There is a need to renovate and pave with asphalt 1.6 miles of existing access road located on the Sibley Unit for use as a Wildlife Driving Tour. This drive will begin just north of the maintenance shop, extend to York Road, and then join into Pintail Lane. This wildlife drive will increase public visitation and nonconsumptive use opportunities. The public parking area on the proposed wildlife drive is currently composed of dirt/gravel and in poor condition. This parking area is used by hikers, birders, hunters, and fishermen. Renovations should include expansion, elevation, gravel, and signage. The improvements would reduce the chance of vehicles getting stuck during periods of heavy rains. In addition, they will reduce long-term maintenance costs and improve visitor services. The estimated cost of this project is $1,169,000.

Project 19: Rehabilitate Magnolia Trail and parking area.

The Magnolia Trail is a three-mile nature trail located on the refuge's Sibley Unit. Sections of the trail are hard to recognize, so appropriate signage needs to be installed. Parts of the trail are eroding, which necessitates relocation of the trail in places; and a footbridge needs to be constructed to facilitate safe crossing of drainages by the visiting public. The Magnolia Trail parking area is currently

dirt/gravel and in poor condition. This parking area is used by many types of refuge visitors (hikers, birders, and fishermen) and provides access to a three-mile walking/hiking trail that leads to a large rookery. It also gives visitors access to fishing opportunities in high water conditions. The renovations should include expansion, elevation, gravel, and signage. The improvements would reduce the chance of vehicles getting stuck during periods of heavy rains and reduce the long-term maintenance costs, as well as improve visitor services. The estimated cost of this project is $76,000.

Project 20: Rehabilitate Carthage Linwood boat ramp parking lot.

The dirt and gravel parking area at the Carthage Linwood boat ramp is currently in poor condition due to annual flooding by the Mississippi River. It is used mainly by fishermen and as extra parking for hunters. The renovations should include expansion, elevation, gravel, and signage. These improvements would reduce the chance of vehicles getting stuck during periods of heavy rains, reduce long-term maintenance costs, and improve visitor services. The project's estimated cost is $18,000.

Project 21: Rehabilitate Lakeview Drive parking lot.

The Lakeview Drive parking lot is currently dirt/gravel and in poor condition due to annual flooding by the Mississippi River. This parking area is used by hikers, birders, hunters, and fishermen. The renovations should include expansion, elevation, gravel, and signage. The improvements would reduce the chance of vehicles getting stuck during periods of heavy rains. They would also reduce the long-term maintenance costs and improve visitor services. The estimated cost of this project is $11,000.

Project 22: Rehabilitate Pintail Lane.

Pintail Lane is the main entrance road into the refuge and is used by over 30,000 visitors per year. This project will include widening, elevating, and ditching for adequate drainage, and paving 1.5 miles of Pintail Lane. The estimated cost of this project is $350,000.

Project 23: Construct an office complex and visitor contact station with an environmental education classroom.

At present, the refuge has no facility to meet the ever-increasing demand to provide environmental education and interpretive services for tourists, local schools, civic groups, and nonprofit organizations such as scout groups. In addition, the refuge has little space to meet its expanding administrative responsibilities, particularly with regard to office space for additional staff. A visitor center would significantly enhance the refuge's ability to meet these needs and fulfill its mission. The estimated cost of this project is $1,300,000.

Annual funding for staff, facilities, operations, and maintenance is a critical part of project implementation. The general cost estimates, provided in Table 7, will be updated and adjusted annually. These projects address essential needs, such as reducing or eliminating significant biological threats and problems; meeting the mission requirements of the National Wildlife Refuge System; and fulfilling the purposes for which the refuge was established.

Table 7. Summary of projects and costs for St. Catherine Creek National Wildlife Refuge.

Projects	Initial Project Cost	Recurring Base Cost
1. Survey habitat and wildlife populations	$200,000	$80,000
2. Enhance wildlife populations & habitat	$139,000	$74,000
3. Restoration of refuge wetland habitat	$124,000	$59,000
4. Protect refuge resources and visitors	$129,000	$64,000
5. Provide outreach and environmental education	$147,000	$82,000
6. Monitor oil and gas activities	$132,000	$82,000
7. Improve road and levee maintenance	$131,000	$62,000
8. Rehabilitate levees and water control structures	$89,000	-0-
9. Construct an observation tower	$63,000	-0-
10. Construct a trans-refuge birding trail system	$72,000	-0-
11. Repair Sibley Unit outflow pipe	$28,000	-0-
12. Repair boat ramp at Gilliard Lake	$34,000	-0-
13 Rehabilitate Salt Lake boat ramp	$42,000	-0-
14. Rehabilitate refuge houses	$107,000	-0-
15. Replace refuge office/visitor contact station and parking lot	$690,000	-0-
16. Construct a universally accessible fishing pier and parking area	$64,000	-0-
17. Rehabilitate Butler Lake entrance road and parking lot	$760,000	-0-
18. Rehabilitate Wildlife Driving Tour Road and parking area	$1,169,000	-0-
19. Rehabilitate Magnolia Trail and parking area	$76,000	-0-
20. Rehabilitate Carthage Linwood boat ramp and parking area	$18,000	-0-
21. Rehabilitate Lakeview Drive parking lot	$11,000	-0-
22. Rehabilitate Pintail Lane	$350,000	-0-
23. Construct an office complex and visitor contact station with an environmental education classroom	$1,300,000	-0-

STAFFING AND FUNDING

Implementing the vision set forth in this plan will require changes in the refuge's organizational structure. Existing staff members would direct their time and energy in new directions, and new staff members will be added to assist these efforts. The following tables identify the current and future additional positions.

Table 8. Current staff at St. Catherine Creek National Wildlife Refuge.

Position	Full-time Equivalent (FTEs)
Refuge Manager	1
Assistant Refuge Manager	1
Office Assistant	1
Maintenance Worker	1
Engineering Equipment Operator	1
Refuge Ranger (Law Enforcement Officer)	1

Table 9. Additional staff identified to implement the comprehensive conservation plan for St. Catherine Creek NWR.

Funding Year Target (FY)	Position Required	RONS Project #
2007	Wildlife Biologist GS-11	00010
2008	Refuge Operations Specialist GS-5/7/9	00011
2007	Tractor Operator WG-8	00014
2007	Biological Technician GS-9	0006
2008	Engineering Equipment Operator WG-8	00016
2007	Park Ranger (Law Enforcement) GS-7	03000
2008	Public Use Specialist GS-7	0006

As presented earlier, this comprehensive conservation plan has outlined a vision for the refuge and included the management goals, objectives, and strategies needed to realize that vision. The current level of resources will not move the refuge beyond the current habitat and public use condition. The pre-plan staff levels do not allow adequate interactions with the public for education, interpretation, information, safety, or enforcement purposes. In addition, habitat management objectives and strategies are not achievable with the current resources. The rate at which the refuge achieves its full potential of contributing locally, regionally, and nationally to important wildlife outputs will depend on the resources provided for those purposes. Increased resources on the refuge will result in long-lasting protection, maintenance, and enhancements to its forest, wetland, and moist soil habitats, as well as its public use facilities and programs.

The Service will use this comprehensive conservation plan to focus attention on addressing the operation and maintenance needs of the refuge. The Service will also seek the help and cooperation of conservation partners to either fully or partially support the proposed projects.

PARTNERSHIP OPPORTUNITIES

Developing partnerships with individuals, as well as with private and public organizations, is crucial for helping the refuge to meet its goals.

Private citizens who contribute volunteer services are involved in just about every aspect of refuge management. These volunteers provide skills and energy that are invaluable in assisting the refuge staff. They often accomplish tasks that would otherwise go undone. By becoming knowledgeable about the refuge and its wildlife, volunteers also become advocates in the local community.

Public outreach includes a variety of programs and support services that the refuge provides to the public, special groups, other government agencies, and individuals. It includes technical assistance to state agencies on special problems and publications, as well as presentations to local civic groups and schools.

Developing and maintaining partnerships will enable the refuge to achieve its goals and objectives, minimize costs, share funding, and build relationships with others. While the Service does not have management responsibilities for lands outside the refuge, it is important for the Service to identify wildlife needs area-wide. To maintain and enhance wildlife outside of the refuge, the refuge will focus its efforts on continuing to develop partnerships with the Mississippi Department of Wildlife, Fisheries, and Parks; the U.S. Forest Service; the Mississippi State Historic Preservation Office; and Mississippi State University, as well as with biologists, private citizens, environmental organizations, scientific organizations, and other agencies.

Collaboration with colleges and universities and with conservation organizations will enable the refuge to carry on its extensive plans for research, monitoring, and education. To create awareness and expand environmental education efforts in the community, the refuge will continue to establish partnerships with local organizations and school systems.

STEP-DOWN MANAGEMENT PLANS

While a comprehensive conservation plan is a strategic plan that guides the direction of the refuge, a step-down management plan provides specific guidance on activities such as habitat, fire, and public use management. As with comprehensive conservation plans, step-down plans are developed in accordance with the National Environmental Policy Act (NEPA), which requires the identification and evaluation of alternatives and public review prior to their implementation. The St. Catherine Creek Refuge has two existing step-down plans: a Law Enforcement Plan, which was approved in 1999; and a Fire Management Plan, which was approved on October 5, 2001. Table 10 lists the step-down plans the refuge has proposed to develop, with their target completion dates.

MONITORING AND ADAPTIVE MANAGEMENT

Adaptive management is a flexible approach to the long-term management of biotic resources. It is directed and redirected over time based on the results of ongoing monitoring activities and other information. As a result, projects are implemented within a framework of scientifically driven

Table 10. Step-down plans to be developed or updated.

Plan	Fiscal Year Completion Date
Hunting	December 2006
Fishing	December 2006
Habitat Management	December 2007
Forest Management	December 2008
Visitor Services and Environmental Education	December 2008
Sign	December 2009
Croplands Management	December 2009
Nuisance Animal Control	December 2009
Inventory and Monitoring	December 2009

experiments to test predictions and assumptions. The biological programs are systematically evaluated to determine the effects of management on wildlife populations. This information is used to refine approaches and determine how effectively the plan's goals and objectives are being accomplished. The evaluations are then provided to interested parties and partners. If the evaluations indicate that the plan's strategies are yielding undesirable effects on targeted and nontargeted species and/or communities, the comprehensive conservation plan will be revised.

The refuge's adaptive management approach will emphasize monitoring of wildlife populations as well as habitat restoration and management. Population monitoring will include banding of wood ducks; crepuscular flight and nighttime counts for woodcock; shorebird surveys; surveys of occurrence and abundance of herptofauna; monitoring for a healthy population of white-tailed deer and turkey; and inventories and surveys of invasive plants and nuisance animals. Habitat monitoring primarily involves restoration and management of fisheries for native diversity; habitat for listed species; wintering habitat for waterfowl; flooded habitats for wood duck; and shrub-scrub habitat for woodcock. Additionally, emphasis will be placed on managing the existing forests for increasing vertical structure to provide habitat for a diversity of species, particularly priority migrant birds.

PLAN REVIEW AND REVISION

This comprehensive conservation plan will be reviewed every five years to determine the need for revision. A revision would be needed if and when there is a significant development, such as a change in ecological conditions or a major refuge expansion. The fiscal plan would be augmented by detailed step-down management plans to address the completion of specific strategies in support of the refuge's goals and objectives. Revisions to the comprehensive conservation plan and the step-down management plans would be subject to public review and the NEPA process.

Appendix I. Glossary

Adaptive Management	A process in which projects are implemented within a framework of scientifically driven experiments to test predictions and assumptions outlined within the comprehensive conservation plan. The analysis of the outcome of project implementation helps managers determine whether current management should continue as is, or whether it should be modified to achieve desired conditions.
Alternative	A set of objectives and strategies needed to achieve refuge goals and the desired future condition.
Approved Acquisition Boundary	A project boundary which the Director of the Fish and Wildlife Service approves upon completion of the detailed planning and environmental compliance process.
Biological Diversity	The variety of life forms and processes, including the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur.
Biological Integrity	The biotic composition, structure, and functioning at genetic, organism, and community levels comparable with historic conditions, including the natural biological processes that shape genomes, organisms, and communities.
Compatible Use	A wildlife-dependent recreational use, or any other use on a refuge that will not materially interfere with or detract from the fulfillment of the mission of the Service or the purposes of the refuge.
Comprehensive Conservation Plan (CCP)	A document that describes the desired future conditions of the refuge, and specifies management actions to achieve refuge goals and the *(CCP)* the mission of the National Wildlife Refuge System.
Community	A distinct assemblage of plants that develops on sites characterized by particular climates and soils, and the species and populations of wild animals that depend on the plants for food, cover and/or nesting.
Cooperative Agreement	A simple habitat protection action in which no property rights are acquired. An agreement is usually long-term and can be modified by either party. Lands under a cooperative agreement do not necessarily become part of the National Wildlife Refuge System.

Corridor	A route that allows movement of individuals from one region or place to another.
Cover Type	The present vegetation of an area.
Cultural Resources	The remains of sites, structures, or objects used by people of the past.
Ecosystem	A dynamic and interrelated complex of plant and animal communities and their associated nonliving environment.
Ecosystem Approach	A strategy or plan to protect and restore the natural function, structure, and species composition of an ecosystem, recognizing that all components are interrelated.
Ecosystem Management	Management of an ecosystem that includes all ecological, social, and economic components that make up the whole of the system.
Ecotone	An edge or transition zone between two or more adjacent but different plant communities, ecosystems, or biomes.
Endangered Species	Any species of plant or animal defined through the Endangered Species Act as being in danger of extinction throughout all or a significant portion of its range, and published in the *Federal Register*.
Environmental Assessment (EA)	A systematic analysis to determine if proposed actions would result in a significant effect on the quality of the environment.
Extirpation	The localized extinction of a species that is no longer found in a locality or country, but still exists elsewhere in the world.
Federal Trust Species	All species for which the federal government has primary jurisdiction, including federally threatened or endangered species, migratory birds, anadromous fish, and certain marine mammals.
Fee-title	The acquisition of most or all of the rights to a tract of land. There is a total transfer of property rights with the formal conveyance of a title. While a fee-title acquisition involves most rights to a property, certain rights may be reserved or not purchased, including water rights, mineral rights, or use reservation (the ability to continue using the land for a specified time period, or the reminder of the owner's life).
Finding of No Significant Impact	A document prepared in compliance with the National Environmental Policy Act, supported by an environmental assessment that briefly presents why a federal action will have no significant effect on the human environment and states that an environmental impact statement, therefore, will not be prepared.

Floodplain Woods	Bottomland hardwood forests. Consists of hardwoods (old-growth and midsuccession-aged timber) and cypress/tupelo stands found on low ridges that drain slowly and are subject to flooding. Group includes overcup, willow, and water oaks, sweetgum, and green ash. Old-growth trees typically exceed 120 years in age. Red oaks were removed in the 1940s. Midsuccession trees are logged timber that may need restoration to improve wildlife habitat.
Fragmentation	The process of reducing the size and connectivity of habitat patches. The disruption of extensive habitats into isolated and small patches.
Goals	Descriptive statements of desired future conditions.
Historic Conditions	The composition, structure, and functioning of ecosystems resulting from natural processes that we believe, based on sound professional judgment, were present prior to substantial human-related changes to the landscape.
Inholding	Privately owned land inside the boundary of a national wildlife refuge.
Issue	Any unsettled matter that requires a management decision. For example, a resource management problem, concern, a threat to natural resources, a conflict in uses, or in the presence of an undesirable resource condition.
Moist Soil Management	The technique of using water management structures in seasonally flooded impoundments to stimulate the production of natural plant species on exposed mudflats by regulating the timing of water removal in the spring.
National Environmental Policy Act of 1969	A Federal law that requires all agencies, including the Service, to examine the environmental impacts of their actions, incorporate environmental information, and use public participation in the planning and implementation of all actions. Federal agencies must integrate this Act with other planning requirements, and prepare appropriate policy documents to facilitate better environmental decision-making.
National Wildlife Refuge System	All lands, waters, and interests therein, administered by the U.S. Fish and Wildlife Service as wildlife refuges, wildlife ranges, wildlife management areas, waterfowl production areas, and other areas for the protection and conservation of fish, wildlife and plant resources.
Neotropical Migratory Bird	A bird species that breeds north of the United States-Mexican border and winters primarily south of that border.

Objectives	Actions to be accomplished to achieve a desired outcome or goal. Objectives are more specific, and generally more measurable, than goals.
Planning Team	A planning team prepares the comprehensive conservation plan. Planning teams are interdisciplinary in membership and function. A team generally consists of the a planning team leader; Refuge Manager and staff biologists; staff specialists or other representatives of Service programs, ecosystems or regional offices; and state-partnering wildlife agencies as appropriate.
Preferred Alternative	The alternative determined by the decision-maker to best achieve the refuge purpose, vision, and goals; contributes to the refuge system mission, addresses the significant issues; and is consistent with principles of sound fish and wildlife management.
Refuge Operating Needs System	A national database that contains the unfunded operational needs of each refuge. Projects included are those required to implement approved plans and meet goals, objectives, and legal mandates.
Scoping	A process for determining the scope of issues to be addressed by a comprehensive conservation plan and for identifying the significant issues. Involved in the scoping process are federal, state and local agencies; private organizations; and the general public.
Species	A distinctive kind of plant or animal having distinguishable characteristics, and that can interbreed and produce young. In taxonomy, a category of biological classification that refers to one or more populations of similar organisms that can reproduce with each other but is reproductively isolated from – that is, incapable of interbreeding with – all other kinds of organisms.
SPOA	Source Population Objective Area.
Strategies	A general approach or specific actions to achieve objectives.
Step-down Management Plans	Step-down management plans provide the details necessary to implement management strategies and projects identified in the comprehensive conservation plan.
Threatened Species	Those plant or animal species likely to become endangered species throughout all of or a significant portion of their range within the foreseeable future. A plant or animal identified and defined in accordance with the 1973 Endangered Species Act and published in the *Federal Register*.

Trust Species	Species for which the Fish and Wildlife Service has primary responsibility, including most federally listed threatened and endangered species, anadromous fish once they enter the inland coastal waterways, and migratory birds.
Vegetation	Plants in general, or the sum total of the plant life in an area.
Vegetation Type	A category of land based on potential or existing dominant plant species of a particular area.
Watershed	The entire land area that collects and drains water into a stream or stream system.
Wetland	Areas such as lakes, marshes, bogs, and streams that are inundated by surface or ground water for a long enough period of time each year to support, and that do support under natural conditions, plants and animals that require saturated or seasonally saturated soils.
Wildlife Corridor	A landscape feature that facilitates the biologically effective transport of animals between larger patches of habitat dedicated to conservation functions. Such corridors may facilitate several kinds of traffic, including frequent foraging movement, seasonal migration, and the once-in-a-lifetime dispersal of juvenile animals. These are transitional habitats and need not contain all the habitat elements required by migrants for long-term survival or reproduction.
Wildlife-dependent Recreational Use	A use of refuge that involves hunting, fishing, wildlife observation and photography, or environmental education and interpretation, as identified in the National Wildlife Refuge System Improvement Act of 1997.
Wildlife Diversity	A measure of the number of wildlife species in an area and their relative abundance.

Appendix II. References and Literature Cited

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Appendix III. Legal Mandates

Rivers and Harbor Act (1899) (33 U.S.C. 403): Section 10 of this Act requires the authorization by the U.S. Army Corps of Engineers prior to any work in, on, over, or under a navigable water of the United States.

Antiquities Act (1906): Authorizes the scientific investigation of antiquities on federal land and provides penalties for unauthorized removal of objects taken or collected without a permit.

Migratory Bird Treaty Act (1918): Designates the protection of migratory birds as a federal responsibility. This Act enables the setting of seasons, and other regulations including the closing of areas, federal or nonfederal, to the hunting of migratory birds.

Migratory Bird Conservation Act (1929): Establishes procedures for acquisition by purchase, rental, or gift of areas approved by the Migratory Bird Conservation Commission.

Fish and Wildlife Coordination Act (1934), as amended: Requires that the Fish and Wildlife Service and state fish and wildlife agencies be consulted whenever water is to be impounded, diverted or modified under a federal permit or license. The Service and state agency recommend measures to prevent the loss of biological resources, or to mitigate or compensate for the damage. The project proponent must take biological resource values into account and adopt justifiable protection measures to obtain maximum overall project benefits. A 1958 amendment added provisions to recognize the vital contribution of wildlife resources to the Nation and to require equal consideration and coordination of wildlife conservation with other water resources development programs. It also authorized the Secretary of Interior to provide public fishing areas and accept donations of lands and funds.

Migratory Bird Hunting and Conservation Stamp Act (1934): Authorized the opening of part of a refuge to waterfowl hunting.

Historic Sites, Buildings and Antiquities Act (1935), as amended*:* Declares it a national policy to preserve historic sites and objects of national significance, including those located on refuges. Provides procedures for designation, acquisition, administration, and protection of such sites.

Refuge Revenue Sharing Act (1935), as amended*:* Requires revenue-sharing provisions to all fee-title ownerships that are administered solely or primarily by the Secretary through the Service.

Transfer of Certain Real Property for Wildlife Conservation Purposes Act (1948): Provides that upon a determination by the Administrator of the General Services Administration, real property no longer needed by a federal agency can be transferred without reimbursement to the Secretary of Interior if the land has particular value for migratory birds, or to a state agency for other wildlife conservation purposes.

Federal Records Act (1950): Directs the preservation of evidence of the government's organization, functions, policies, decisions, operations, and activities, as well as basic historical and other information.

Fish and Wildlife Act (1956): Established a comprehensive national fish and wildlife policy and broadened the authority for acquisition and development of refuges.

Consolidated Farm and Rural Development Act (1961): Authorized a major expansion of U.S. Department of Agriculture lending activities, which at the time were administered by the Farmers Home Administration but are now through the Farm Service Agency. Major loan programs include farm ownership, farm operating, and emergency disaster loans.

Refuge Recreation Act (1962): Allows the use of refuges for recreation when such uses are compatible with the refuge's primary purposes and when sufficient funds are available to manage the uses.

Wilderness Act (1964), as amended*:* Directed the Secretary of Interior, within 10 years, to review every roadless area of 5,000 or more acres and every roadless island (regardless of size) within the National Wildlife Refuge System and National Park System, and to recommend to the President the suitability of each such area or island for inclusion in the National Wilderness Preservation System, with final decisions made by Congress. The Secretary of Agriculture was directed to study and recommend suitable areas in the National Forest System.

Land and Water Conservation Fund Act (1965): Uses the receipts from the sale of surplus federal lands, outer continental shelf oil and gas sales, and other sources for land acquisition under several authorities.

National Wildlife Refuge System Administration Act (1966), as amended by the National Wildlife Refuge System Improvement Act (1997) 16 U.S.C. 668dd668ee. (Refuge Administration Act): Defines the National Wildlife Refuge System and authorizes the Secretary to permit any use of a refuge provided such use is compatible with the major purposes for which the refuge was established. The Act clearly defines a unifying mission for the National Wildlife Refuge System; establishes the legitimacy and appropriateness of the six priority public uses (hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation); establishes a formal process for determining compatibility; established the responsibilities of the Secretary of Interior for managing and protecting the System; and requires a comprehensive conservation plan for each refuge by the year 2012. The 1997 Act also amended portions of the Refuge Recreation Act and National Wildlife Refuge System Administration Act of 1966.

National Historic Preservation Act (1966), as amended: Establishes as policy that the federal government is to provide leadership in the preservation of the nation's prehistoric and historic resources.

Architectural Barriers Act (1968): Requires federally owned, leased, or funded buildings and facilities to be accessible to persons with disabilities.

National Environmental Policy Act (1969): Requires the disclosure of the environmental impacts of any major federal action significantly affecting the quality of the human environment.

Uniform Relocation and Assistance and Real Property Acquisition Policies Act (1970), as amended: Provides for uniform and equitable treatment of persons who sell their homes, businesses, or farms to the Service. The Act requires that any purchase offer be no less than the fair market value of the property.

Endangered Species Act (1973): Requires all federal agencies to carry out programs for the conservation of endangered and threatened species.

Rehabilitation Act (1973): Requires programmatic accessibility in addition to physical accessibility for all facilities and programs funded by the federal government to ensure that anybody can participate in any program.

Archaeological and Historic Preservation Act (1974): Directs the preservation of historic and archaeological data in federal construction projects.

Clean Water Act (1977): Requires consultation with the Corps of Engineers (404 permits) for major wetland modifications.

Surface Mining Control and Reclamation Act (1977) as amended (Public Law 95-87) (SMCRA): Regulates surface mining activities and reclamation of coal-mined lands. Further regulates the coal industry by designating certain areas as unsuitable for coal mining operations.

Executive Order 11988, Floodplain Management (1977): Directs each federal agency to provide leadership and take action to reduce the risk of flood loss and minimize the impact of floods on human safety, and preserve the natural and beneficial values served by floodplains.

Executive Order 11990, Management of Wetlands (1977)*:* Directs federal agencies to (1) minimize the destruction, loss, or degradation of wetlands and (2) preserve and enhance the natural and beneficial values of wetlands when a practical alternative exists.

Executive Order 12372 (Intergovernmental Review of Federal Programs): Directs the Service to send copies of the environmental assessment to state planning agencies for review.

American Indian Religious Freedom Act (1978): Directs agencies to consult with native traditional religious leaders to determine appropriate policy changes necessary to protect and preserve Native American religious cultural rights and practices.

Fish and Wildlife Improvement Act (1978): Improves the administration of fish and wildlife programs and amends several earlier laws, including the Refuge Recreation Act, the National Wildlife Refuge System Administration Act, and the Fish and Wildlife Act of 1956. It authorizes the Secretary of Interior to accept gifts and bequests of real and personal property on behalf of the United States. It also authorizes the use of volunteers on Service projects and appropriations to carry out a volunteer program.

Archaeological Resources Protection Act (1979), as amended: Protects materials of archaeological interest from unauthorized removal or destruction and requires federal managers to develop plans and schedules to locate archaeological resources.

Federal Farmland Protection Policy Act (1981), as amended*:* Minimizes the extent to which federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses.

Emergency Wetlands Resources Act (1986): Promotes the conservation of migratory waterfowl and offsets or prevents the serious loss of wetlands by the acquisition of wetlands and other essential habitats.

Federal Noxious Weed Act (1990): Requires the use of integrated management systems to control or contain undesirable plant species, and an interdisciplinary approach with the cooperation of other federal and state agencies.

Native American Graves Protection and Repatriation Act (1990): Requires federal agencies and museums to inventory, determine ownership of, and repatriate cultural items under their control or possession.

Americans with Disabilities Act (1992): Prohibits discrimination in public accommodations and services.

Executive Order 12898 (1994): Establishes environmental justice as a federal government priority and directs all Federal agencies to make environmental justice part of their mission. Environmental justice calls for fair distribution of environmental hazards.

Executive Order 12996, Management and General Public Use of the National Wildlife Refuge System (1996): Defines the mission, purpose, and priority public uses of the National Wildlife Refuge System. It also presents four principles to guide management of the System.

Executive Order 13007, Indian Sacred Sites (1996): Directs federal land management agencies to accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners, avoid adversely affecting the physical integrity of such sacred sites, and where appropriate, maintain the confidentiality of sacred sites.

National Wildlife Refuge System Improvement Act (1997): Considered the "Organic Act of the National Wildlife Refuge System." Defines the mission of the System, designates priority wildlife-dependent public uses, and calls for comprehensive refuge planning.

National Wildlife Refuge System Volunteer and Community Partnership Enhancement Act (1998): Amends the Fish and Wildlife Act of 1956 to promote volunteer programs and community partnerships for the benefit of national wildlife refuges, and for other purposes.

National Trails System Act (1968), as amended: Mandates the Secretary of Interior and thus the Service to protect the historic and recreational values of congressionally designated National Historic Trail sites.

Appendix IV. Public Involvement

SUMMARY OF PUBLIC SCOPING COMMENTS

Comments from the Public Scoping Meeting and Open House, held on November 6, 2003, at the Natchez Convention Center, Natchez, Mississippi

- There needs to be more public involvement.
- Involve the area children (special youth hunts – deer, duck, squirrel, rabbit, etc.). If the kids are involved, the parents and grandparents will be involved as well.
- There should be a dove field for dove hunting.
- More aggressive control of the hog population.
- Additional maintenance is needed for access and erosion control.
- Better management of deer herd – deer population is too low in comparison to years past.
- Drastically reduce or eliminate muzzleloader season – offer archery season as the primary hunting season instead.
- Reduce duck hunting activity – provide more sanctuary for ducks by reducing the number of days for hunting.
- Do not allow hunters to harvest small/young bucks and does. Regulate deer population by going to an 8-point rule or better (or 12-inch inside spread or better).
- Mr. Tipton (Visitor Center): Feels public awareness is inadequate. He would like to put a "living" exhibit at the visitor center and have the refuge contribute to its maintenance and upkeep. He would also like the refuge to be listed as a stopping point on a proposed state scenic byway.
- Allow campsites on the refuge.
- Widen York Road (the main entrance to the refuge).
- Allow small game hunters to harvest hogs. This would have a greater impact on decreasing the hog population. The best opportunity to take hogs is after deer season (during the small game season in February); the refuge doesn't allow hog hunting at that time.
- Have a special area set aside for youth hunters during the state youth gun hunt – or do not allow adult hunters to hunt on that particular weekend.
- More maintenance is needed on roads. Build them up (crown the roads) and keep them graded for easier access.

PUBLIC COMMENTS ON THE DRAFT CCP/EA AND SERVICE RESPONSES

The following comments were received from the Animal Protection Institute (API):

Comment: The Draft CCP/EA admits that population data on the refuge is lacking. Therefore, to attempt to determine compatible wildlife-dependent recreation and "nuisance" animal management for the refuge until this process has been completed may violate the mandates of the National Wildlife Refuge System Improvement Act. This is especially true for the consideration of hunting and trapping since both activities result in the direct and intentional removal of species and can negatively impact populations, particularly when such activities are geographically focused in a particular region and/or on a particular species.

Response: The discussion of fish and wildlife populations under *Issues and Concerns* has been clarified. The refuge is lacking population data on a number of species such as nongame migratory birds, shorebirds, wading birds, herpetofauna, aquatic resources, and threatened and endangered species. However, population data on other species such as white-tailed deer and waterfowl is readily available. The hunting of deer and waterfowl are important to meeting population and habitat management objectives either locally or nationally. Deer are abundant on the refuge and the population can sustain current hunting pressure. Because of its highly adaptable nature and reproductive capabilities, the refuge's white-tailed deer population has the greatest potential to negatively impact habitat over time. The refuge currently manages the population by allowing hunting, which is restricted and monitored, with the goal of keeping the deer population healthy and in balance with the carrying capacity of the habitat.

Continental waterfowl populations are generally healthy and can sustain a certain level of recreational hunting. Hunting of waterfowl at St. Catherine Creek NWR provides an important recreational opportunity for many local waterfowl hunters. Rabbit and squirrel hunting is a popular local pursuit which is sustainable. Neither of these species is in decline. The hunting of raccoons is conducted as a means to reduce predators which negatively impact numerous other species.

Future hunting and recreational use plans will strive to provide adequate protection within the refuge to provide for the needs game species and still provide quality hunting opportunities.

Considerable data has also been collected on nuisance plants and animals. Under Objective 4 (page 61), the problems with wild hogs and nutria are discussed. Habitat damage from these nonnative animals has been documented and control efforts will continue. Beavers are native and local populations have greatly expanded due to land use changes and lack of trapping due to low pelt prices. Almost two-thirds of the refuge was agricultural land when acquired by the Service. A major reforestation effort has restored over 11,000 acres to native bottomland hardwoods. Uncontrolled beaver activity would result in severe damage to these areas from prolonged flooding which also promotes willow sprouting (i.e., willows compete with the hardwood seedlings). Beaver activities also interfere with water management for waterfowl, shorebirds, and wading birds. The goal is to reduce the amount of beaver activity in certain areas, not eliminate beavers from the refuge.

Comment: The current trapping program should be suspended. API contends that FWS must either fully analyze its trapping program in a revised Draft CCP/EA and recirculate an amended version for public comment or suspend the current trapping programs until these programs are fully analyzed, publicly reviewed, and brought into compliance with refuge policies, regulations, and statues.

Response: The only trapping done on the refuge is by the staff on an as-needed basis to control habitat damage caused by beavers or wild hogs. The refuge staff strictly regulates this occasional

trapping to ensure visitor safety and to reduce the take of nontarget wildlife species. This trapping has been effective in reducing nuisance animals as evidenced by less damage to reforestation sites, levees and water control structures.

In 1996, the International Association of Fish and Wildlife Agencies (IAFWA) began a program to develop Best Management Practices (BMPs) for trapping wildlife in the United States. BMPs improve an activity by developing recommendations based on sound scientific information while maintaining practicability.

Once completed, the BMPs for trapping furbearers will be provided to federal/state agencies and trappers for incorporation into trapper education and wildlife management programs. In addition to improving wildlife management in the United States, the research and resulting BMPs may be used by other countries to improve their programs. BMPs will also be used by the United States to address international commitments to identify and promote the use of humane traps and trapping methods for capturing wildlife. These BMPs will be incorporated into the refuge's trapping program.

The following comments were received from Defenders of Wildlife:

Comment: Quantify the impacts of oil and gas activities on the refuge including number of acres covered by oil and gas infrastructure (well pads, pipelines, processing and other facilities, roads), and the number and size of oil, brine, and other spills since the refuge was established.

Response: The information on oil and gas activities in the CCP has been expanded and updated.

Comment: The FWS should develop stronger standards for oil and gas management and permitting.

Response: A Special Use Permit, issued by the Regional Office, is required for all oil and gas activities. These permits contain any special conditions necessary to protect refuge resources. The owners of mineral rights have the legal right to extract these minerals, even if they do not own the surface, and the refuge manager may not unduly interfere with this right. The refuge manager may regulate or place reasonable conditions on such activity in an effort to minimize the impact on wildlife resources and ensure reclamation.

The following comments were received from an unsigned letter:

Comment: Consider a 15-inch minimum spread throughout the entire deer season for buck harvest.

Response: Comment noted.

Comment: Evaluate the need for quota hunts to reduce hunter conflicts and better ensure hunter safety.

Response: The need for quota hunts is not deemed necessary at this time; however, this issue is evaluated each year prior to the hunting season. Quota hunts would be implemented if hunting pressure, overharvest, or safety becomes an issue.

Comment: If the 15-inch minimum spread rule is not passed, consider reducing the number of hunting days for muzzleloaders by at least fifty percent or consider eliminating the use of modern in-line muzzleloaders.

Response: The refuge has prevented the use of the new center fire single shot rifles authorized by the State for primitive weapon season and has maintained the refuge status quo of muzzleloaders only. The refuge has also instituted a primitive traditional firearm (no in-lines) only hunt in late December to reduce harvest during the rut without reducing opportunity. This policy may be expanded in the future as it has been very well received. Reducing hunter days brings resistance from the State of Mississippi and a large segment of the public and must be justified by biological need. This is currently not biologically justified.

Comment: Eliminate ATV use with the exception of permitted deer retrieval.

Response: ATV trails are necessary to promote harvest in less accessible areas and to allow older and/or less fit hunters the opportunity to access more desirable hunting. These trails are kept to a minimum and no new trails are planned.

Comment: Allow small game hunters to harvest hogs in non-reforested areas.

Response: Safety was one reason, but not the only one for stopping hog hunting during the small game season. The manager and others received complaints from legitimate small game hunters about hog hunters interfering with their hunts. A more compelling reason than this is that shotguns and .22 rifles which are the only weapons authorized during small game hunts are inadequate and unethical for hog hunting and lead to crippling as well as unneeded negative publicity from the public.

Comment: Allow the practice of hog trapping by staff and approved volunteers to aid in the reduction of the hog population.

Response: Staff may trap at any time when assigned by the manager and deemed necessary to address a specific target area. Time, workload and manpower constraints must be considered. If the refuge is able to hire a wildlife technician, this would be one of that person's duties. The hog population is currently under good control through shooting by staff and deer hunters as well as encouraging refuge neighbors to aggressively kill hogs through trapping and hunting. Nothing in the CCP precludes the use of volunteers for this purpose as well.

Comment: Drastically reduce access to the closed area by staff and visitors.

Response: Access to the closed area is tightly controlled. Staff will continue to have access on an as-needed basis for management purposes. The only time visitors are allowed in is for such management activities such as waterfowl, bald eagle and shorebird surveys and biological field trips, as well as research activities. Oil operators and the cooperative farmers must have access limited to the scope of their work as well.

The following comments were received from the St. Catherine Creek Refuge Association:

Comment: Allow an annual youth lottery hunt in the Cloverdale Unit.

Response: This proposal is currently under consideration by the refuge manager pending working out all necessary logistics. Nothing in the plan precludes holding such a hunt although holding hunts in a closed area is not a generally accepted practice and if implemented would be on a very restricted basis.

Comment: Allow approved volunteers to trap hogs on the refuge.

Response: Hog trapping is not currently needed on the majority of the refuge. Hog populations are currently at their lowest level in a many years on most areas. Using volunteers is a viable alternative but would be a management decision based on current need and should not be permanent blanket policy, but implemented as needed to address a specific problem area. This policy would be complicated by devising a fair way of assigning who gets to trap as well as checking the background of the volunteer to ensure they are ethical and qualified. Safety was only one issue regarding stopping hog hunting during the small game season. The manager and others received complaints from legitimate small game hunters who were being interfered with by hog hunters. One of the most compelling reasons not to allow it is that shotguns and .22 rifles are inadequate and unethical weapons for taking hogs. Although they can certainly be taken with these weapons, many are wounded and lost. Hog hunters currently have 57 days of archery and 47 days of muzzleloader deer season (a total of 104 days) in which to harvest all the hogs they want.

Comment: Consider a 15-inch minimum inside spread for buck harvest.

Response: Comment noted.

The following comments were received from the Mississippi Museum of Natural Science:

Comment: St. Catherine Creek National Wildlife Refuge is an important area for several bat species, including Rafinesque's big-eared bat (*Corynorhinus rafinesquii*) and the southeastern myotis (*Myotis austroriparius*), which are both species of special concern. There is some mention of Rafinesque's big-eared bat in this document; however, I feel that the southeastern myotis should be noted and comments regarding the importance of conserving habitat for both species should be further emphasized in this document.

Response: Concur, changes made to final CCP.

Comment: This is an inadequate discussion of herbicides and their potential impacts on the refuge's resources. Until you have some idea of what your proposed herbicide program entails, you cannot accurately conclude that no risks are present. Before you issue your final EA it is important that you discuss in sufficient detail your proposed herbicide program. Only then will you be able to identify *all* the environmental impacts that may result from the use of herbicides and what measures will be taken to mitigate these impacts.

Response: The Service's Pest Management Policy and Responsibilities (30 AM 12, August 8, 1990) and additional 1993 guidance provided by the Service Director, covers activities on Service lands involving pesticides (i.e. herbicides).

Approval of Pesticide Use Proposals (PUPs) depends upon compliance with provisions of 30 AM 12, 7 RM 14 and with the Department's Pest Management Policy, as described in the DM, Part 517-1. Any pesticide used must be registered by the Environmental Protection Agency (EPA) in full accordance with the Federal Insecticide, Fungicide, and Rodenticide Act, as amended, and as provided in regulations, orders, or permits issued by the EPA. Full consideration will be given at all times to the safety of humans, fish and wildlife, and other non-target organisms. The ultimate goal of a strong Integrated Pest Management (IPM) program is to benefit trust resources by relying less on pesticides.

Comment: In addition, you need to adequately assess the impacts of certain road "rehabilitation" projects identified in the CCP. While these projects are generally limited to resurfacing gravel roads, you acknowledge that soil erosion and water siltation may be potential impacts. However, you fail to adequately discuss these impacts. This is of particular concern because two watersheds located within the refuge (Butler Lake and Old Saint Catherine Creek) are listed by the EPA as Section 303(d)-listed impaired waters for aquatic life support. These waters also contain pollutants that exceed water quality standards. Both watersheds have high levels of pesticides, nutrients, and sediment and low dissolved oxygen.

Before you issue your final EA, you must assess the impacts on these resources and discuss what measures will be taken to ensure that road construction activities will not further impair these waters.

Response: There are no short or long-term road construction projects planned except for paving 2.5 miles of Pintail Lane which will effectively reduce long-term erosion and by its location has no potential to impact St. Catherine Creek. Any project with the potential for depositing fill into Butler Lake or St. Catherine Creek would be covered by Corps of Engineers 404 Permit on a case-by-case basis. All road projects undertaken on the refuge are completed with every consideration and precaution taken to minimize erosion.

Comment: Before you issue your final EA you must discuss what areas you are considering opening for waterfowl hunting. Once these areas are identified, you must address the potential impacts. Once this analysis is complete, you will be better able to determine whether the refuge will meet national plan goals.

Response: Opening the Cloverdale Unit for quota hunts is addressed on page 68.

The following comments were received from Neal Lewis:

Comment: Consider restrictions on deer harvest by inside spread (14-inch or 15-inch).

Response: Comment noted.

Comment: Increase resources to transmit nutrients from soil to the deer herd (food plots, etc).

Response: Natural foods including browse and mast also transmit soil nutrients to deer. Food plots are not a viable option due to the following reasons: (1) lack of time, manpower and money to plant food plots; (2) hunter conflicts over choice food plots; (3) possibility of disease spread as deer congregate around food plots; (4) public perception of "catering" to deer hunters and promoting practices considered by many as not "fair chase;" and (5) food plots will artificially increase the deer carrying capacity, resulting in severe deer browsing damage to over 11,000 acres of hardwood seedlings already planted.

Comment: Allow bow hunting only for the refuge except every third year for muzzleloader season.

Response: Comment noted.

Comment: Consider closing the refuge for a year or so to allow maintenance and repair of roads, bridges, culverts, etc. while the deer herd is allowed to recover in numbers and age.

Response: Maintenance is ongoing on an as-needed basis.

Comment: Allow flexibility in the plan to monitor and adjust seasons, etc. based on site-specific studies. Hire a qualified third party consultant to evaluate and make recommendations for future deer herd management.

Response: Flexibility already exists to adjust seasons. These determinations are made by the refuge staff in concert with the Mississippi Department of Wildlife, Fisheries, and Parks. These decisions are based on current harvest needs to control and maintain healthy populations.

Comment: The refuge policy of strict enforcement of trivial regulations is unnecessary and could be considered harassment in some cases. Management should focus on spending more manpower and resources on the refuge itself rather than issuing citations for trivial violations.

Response: All refuge regulations are necessary to protect game populations and the public, ensure each hunter has an equal opportunity to harvest game and fish resources, and to gather hunting and fishing harvest data (i.e., daily use cards which provide information on numbers of users as well as game and fish harvested so these data may be used for management purposes and justifying future budget requests). The U.S. Attorney and Federal judges review these regulations for legality.

Comment: Do not allow the development of pine forests in lieu of natural hardwood forests.

Response: National wildlife refuges do not plant pines in areas formerly forested by hardwoods but always endeavor to utilize species that closely match what was found there historically.

Comment: It appears that management is coordinating the duck hunting seasons well with other seasons on the refuge.

Response: Comment noted.

Appendix V. Compatibility Determinations

Introduction

The Fish and Wildlife Service reviewed several uses for compatibility during the comprehensive conservation planning process for St. Catherine Creek National Wildlife Refuge. Descriptions and anticipated impacts of each of these uses are addressed in this appendix

Refuge Name: St. Catherine Creek National Wildlife Refuge

Uses: Several uses were evaluated to determine their compatibility with the Refuge System and mission and purposes of the refuge: (1) hunting; (2) fishing; (3) wildlife observation and photography; (4) environmental education and interpretation; (5) research studies; and (6) cooperative farming.
Location: Adams and Wilkinson Counties, Mississippi

Establishing and Acquisition Authority: Migratory Bird Conservation Act, Refuge Recreation Act

Refuge Purposes: "…for use as an inviolate sanctuary, or for any other management purposes, for migratory birds." 16 U.S.C. § 715d (Migratory Bird Conservation Act)

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

Description of Use: ***Hunting***

Hunting would continue to be conducted on all areas of the refuge, with the exception of the waterfowl sanctuary area which is located on the Cloverdale Unit and on and around the Magnolia Nature Trail which is located on the Sibley Unit.

Hunting is allowed from October 1 to February 28. Waterfowl hunting is only allowed on Tuesdays, Thursdays and Saturdays from 30 minutes before sunrise to noon during the state season.

All hunters are required to be in possession of an Annual Pubic Use Permit which costs $12.50 per year. Residents under the age of 16 and age 65 and older receive a permit free of charge. All youth hunters under the age of 16 must complete a state-approved hunter's safety training course.

Hunting is a popular and valid utilization of wildlife resources and is one of the "Big 6" recreational activities identified and authorized by the Congress in the Refuge Improvement Act of 1997.

Availability of Resources:

Administration of the hunting program will require several days of work by one or more staff members. Estimated time needed to complete various tasks are as follows:
Prepare Annual Hunt Plan – 1 staff day
Prepare and update Regulations and Brochure – 3 staff days
Attend annual hunt coordination meeting – 1 staff day

Submit 50CFR Updates – 1 staff day
Sell Annual Public Use Permits – 23 staff days
Painting boundaries and erecting boundary signs – 5 staff days
Check station maintenance – 3 staff days
Law Enforcement activities – 225 staff days
Road maintenance – 20 staff days
Gather and analyze Daily Visitor Use Reporting cards – 15 staff days
TOTAL of 297 staff days

Special equipment, facilities, or improvements necessary to support the use:

Two 4-wheel drive trucks, two all-terrain vehicles (ATVs), and two boats with trailers are required for law enforcement activities. Two wheelchair-accessible hunting blinds are provided for use by wheelchair-dependent hunters. ATV trails must be maintained prior to and during scheduled hunts. Periodic road maintenance is required not only on public access roads but on Service employee-only roads which are used for law enforcement activity access. Available resources and revenues are adequate to ensure compatibility.

Maintenance costs:

Boundary painting, sign replacement, vehicle, boat and ATV maintenance, fuel costs, ATV trail maintenance, check station maintenance, wheelchair-accessible hunting blind maintenance, and road maintenance are all costs associated with this use. The estimated annual cost of these maintenance items is $15,000.00.

Monitoring costs:

Approximately $2,600.00.

Offsetting revenues:

Annual Public Use Permits generate approximately $18,000.00. The refuge receives 80% of this amount which is used for road maintenance, signage, and supplies in support of hunting and fishing activities.

Anticipated Impacts of the Use:

Short-term impacts:

Hunting has been permitted as a compatible recreational activity on St. Catherine Creek National Wildlife Refuge since 1992 with no documented disturbance with refuge habitats and no noticeable impact on the abundance or diversity of species hunted as well as on non-target species. Localized short-term disturbance may occur, but no noticeable effect on populations has been noted or documented through ongoing monitoring efforts. Hunting program restrictions implemented due to safety concerns include the closure of small game hunting during general muzzleloader and youth rifle deer hunts, and the requirement that all firearms deer hunters wear state-mandated and approved hunter orange upper garments and hats. These restrictions are closely monitored for effectiveness. Littering and vehicle traffic are tightly controlled through refuge regulations and law enforcement activities.

Long-term impacts:

To date, there is no indication of adverse biological impacts associated with the refuge hunting program. In fact, deer hunting continues to be an effective tool in maintaining deer populations in a healthy state while protecting habitat and tree plantations from overbrowsing by deer. Long-term effects are monitored by refuge staff who annually plan and adjust hunting seasons to meet habitat and wildlife population management objectives in order to mitigate any long-term impacts. Vegetation trampling is minimal and not a factor.

Cumulative impacts:

The timing and duration of the refuge hunting program does not coincide or interfere with most other uses of the refuge and would not result in cumulative impacts to refuge resources.

Public Review and Comment: The period of public review and comment began on November 3, 2005 and ended on December 9, 2006. The following methods were used to solicit public review and comment:

Posted notice at refuge headquarters
Public notice sent to area newspapers with wide local distribution
The Natchez Democrat (Natchez MS), published the entire week of November 6, 2003
The Woodville Republican (Woodville MS), publication date not known
The Daily Leader (Brookhaven MS), publication date not known
Franklin County Advocate, publication date not known
Public meeting – held November 6, 2003 at the Natchez Convention Center, Natchez MS
The following comments were received from the Animal Protection Institute (API):

Comment: The Draft CCP/EA admits that population data on the refuge is lacking. Therefore, to attempt to determine compatible wildlife-dependent recreation and "nuisance" animal management for the refuge until this process has been completed may violate the mandates of the National Wildlife Refuge System Improvement Act. This is especially true for the consideration of hunting and trapping since both activities result in the direct and intentional removal of species and can negatively impact populations, particularly when such activities are geographically focused in a particular region and/or on a particular species.

Response: The discussion of fish and wildlife populations under Issues and Concerns has been clarified. The refuge is lacking population data on a number of species such as non-game migratory birds, shorebirds, wading birds, herptofauna, aquatic resources, and threatened and endangered species. However, population data on other species such as white-tailed deer and waterfowl is readily available. Deer heath checks – adaptive strategy. There is a need to conduct more frequent waterfowl surveys during fall and winter to assess waterfowl response to various management schemes (see strategy 1.9).

Considerable data has also been collected on nuisance plants and animals. Under Objective 4, the problems with wild hogs and nutria are discussed. Habitat damage from these non-native animals has been documented and control efforts will continue. Beavers are native and local populations have greatly expanded due to land use changes and lack of trapping due to low pelt prices. Almost two-thirds of the refuge was agricultural land when acquired by

the Service. A major reforestation effort has restored over 6,000 acres to native bottomland hardwoods. Uncontrolled beaver activity would result in severe damage to these areas from prolonged flooding to willow sprouting (i.e. willows compete with the hardwood seedlings). Beaver activities also interfere with water management for waterfowl, shorebirds, and wading birds. The goal is to reduce the amount of beaver activity in certain areas, not eliminate beavers from the refuge.

We concur that more data is needed on raccoons prior to initiating a control program for this species. Strategy 4.2 states that surveys will be implemented to determine population trends of several species including raccoon. No control program for raccoon will be initiated under these surveys have been completed and a Nuisance Control Plan has been approved.

All public comments were addressed during this process. However, they are too voluminous to include in this document, but may be viewed by accessing the administrative record.

This compatibility determination was part of the Draft Comprehensive Conservation Plan and Environmental Assessment for St. Catherine Creek National Wildlife Refuge, which was announced in the *Federal Register* and made available for public comment for 30 days.

Determination (check one below):

_____ Use is Not Compatible

__X__ Use is Compatible with Following Stipulations

Stipulations Necessary to Ensure Compatibility:

Waterfowl hunting is allowed on Tuesdays, Thursdays, and Saturdays from 30 minutes before sunrise until noon during the state season and is only allowed on three lakes in order to prevent excessive disturbance of waterfowl populations.

Deer hunting is allowed by archery and muzzleloader only in order to allow maximum participation while achieving desired harvest objectives and reducing safety hazards to hunters. Hunters are required to check all harvested deer at a mandatory check station. Deer harvest data are gathered and utilized by staff to formulate annual hunt plans as well as monitor long-term herd health.

Hunters may shoot wild hogs during archery, muzzleloader, youth and wheelchair-dependent deer hunts. There is no bag limit on hogs as they are a nuisance species and refuge staff utilize hunting as a tool to assist in the control of wild hog populations.

Turkey hunting is allowed for youth and wheelchair-dependent hunters only on a limited permit drawing system due to limited turkey habitat and relatively small numbers of turkeys. The turkey population can easily sustain youth and wheelchair-dependent hunting, but could not support additional hunting pressures that would be presented by an open adult hunt.

Justification:

Hunting is one of the "Big 6" priority public uses identified by Congress in the Refuge Improvement Act of 1997. This use is compatible with the establishing legislation of the refuge and poses no negative short or long-term impact on the refuge mission, goals or objectives. Deer hunting is used as a management tool to protect natural habitat and tree plantations while maintaining the herd in a healthy, viable state. Hog hunting is used as one of several management tools to control an exotic nuisance species which destroys habitat, damages roads and levees, and competes with native wildlife for available forage. Hunting provides tens of thousands of man hours of compatible outdoor recreation to area families.

If the proposed use is an economic use of refuge natural resources, how would it contribute to the purposes of the refuge or the mission of the National Wildlife Refuge System?

The cooperative farming program provides supplemental foods for migrating and wintering waterfowl as well as other migratory bird species and native wildlife at minimal cost to the government.

NEPA Compliance for Refuge Use Decision: *Place an X in appropriate space.*

____ Categorical Exclusion without Environmental Action Statement
____ Categorical Exclusion and Environmental Action Statement
__X__ Environmental Assessment and Finding of No Significant Impact
____ Environmental Impact Statement and Record of Decision

Mandatory 10- or 15-Year Re-Evaluation Date: ___July 10, 2021___

Description of Use: ***Fishing***

Recreational freshwater fishing is allowed on refuge lakes, ponds, borrow pits, ditches, and St. Catherine Creek as well as portions of the Mississippi River where the refuge owns the bottom. Visitors fish from the banks of the refuge waters or by boat.

Fishing is authorized in all refuge waters except for small impoundments and ponds located in the waterfowl sanctuary area on the Cloverdale Unit and areas located within the Magnolia Nature Trail.

Fishing is allowed from March 1 through the end of archery season in late November.

All fishermen are required to be in possession of an Annual Public Use Permit which costs $12.50 per year. Residents under the age of 16 are not required to possess an Annual Public Use Permit for fishing. Residents age 65 and older receive a permit free of charge.

Fishing is a popular and valid utilization of wildlife resources and is one of the "Big 6" recreational activities identified and authorized by the Congress in the Refuge Improvement Act of 1997.

Availability of Resources:

Administration of the fishing program will require several days work by one or more staff members. Estimated time needed to complete various tasks are as follows:
Prepare and update Regulations Brochure – 3 staff days
Submit 50CFR Updates – 1 staff day

Sell Annual Public Use Permits – 23 staff days
Boat ramp maintenance – 5 staff days
Law Enforcement activities – 100 staff days
Road maintenance – 20 staff days
Gather and analyze Daily Visitor Use Reporting Cards – 15 staff days
TOTAL of 167 staff days

Special equipment, facilities, or improvements necessary to support the use:

One 4-wheel drive truck, two boats with trailers, and one all-terrain vehicle (ATV) are required for law enforcement activities. Periodic road maintenance is required not only on public accessible roads but on service employee only roads which are used for law enfocement activity access. Boat ramps are maintained on an annual and as-needed basis. Available resources and revenues are adequate to ensure compatibility.

Maintenance costs:

Sign replacement, boat ramp and road maintenance, fuel costs, and vehicle, outboard motor and ATV maintenance are all costs associated with this use. The estimated annual cost of these maintenance items is $10,000.00.

Monitoring costs:

Approximately $2,600.00.

Offsetting revenues:

Annual Public Use Permits generate approximately $18,000.00. The refuge receives 80% of this amount which is used for road maintenance, signage, and supplies in support of fishing and hunting activities.

Anticipated Impacts of the Use:

Short-term impacts:

Fishing has been permitted as a compatible recreational activity on St. Catherine Creek National Wildlife Refuge since 1991 with no documented disturbance of refuge habitats. Short-term impacts may include littering around parking areas and along banks as well as damage to gravel roads while still wet after flood waters recede.

Long-term impacts:

To date, there is no indication of adverse biological impacts associated with the refuge fishing program. The Mississippi River floods most of the refuge fishing areas each year, which provides for annual re-stocking of all native fish species. Fish diversity and abundance is of a magnitude that could never be negatively impacted by recreational fishing. Vegetation trampling is minimal and not a factor.

Cumulative impacts:

There are no known or expected cumulative impacts to the refuge or its fishery from recreational fishing.

Public Review and Comment: The period of public review and comment began on November 3, 2005 and ended on December 9, 2006. The following methods were used to solicit public review and comment:

Posted notice at refuge headquarters
Public notice sent to area newspapers with wide local distribution
The Natchez Democrat (Natchez MS), published the entire week of November 6, 2003
The Woodville Republican (Woodville MS), publication date not known
The Daily Leader (Brookhaven MS), publication date not known
Franklin County Advocate, publication date not known
Public meeting – held November 6, 2003 at the Natchez Convention Center, Natchez MS
All public comments were addressed during this process. However, they are too voluminous to include in this document, but may be viewed by accessing the administrative record.

This compatibility determination was part of the Draft Comprehensive Conservation Plan and Environmental Assessment for St. Catherine Creek National Wildlife Refuge, which was announced in the *Federal Register* and made available for public comment for 30 days.

Determination (check one below):

_____ Use is Not Compatible

__X__ Use is Compatible with Following Stipulations

Stipulations Necessary to Ensure Compatibility:

Fishing is allowed during daylight hours only. Commercial fishing and the possession of commercial fishing equipment is not allowed. State creel and possession limits apply. State license and a $12.50 refuge Annual Public Use Permit is required for all fishermen age 16 and older. Fishermen age 65 and older receive a refuge permit free of charge.

Justification:

Fishing is one of the "Big 6" priority public uses identified and authorized by Congress in the Refuge Improvement Act of 1997. This use is compatible with the establishing legislation of the refuge and poses no negative short or long-term impact on the refuge mission, goals or objectives.

NEPA Compliance for Refuge Use Decision: *Place an X in appropriate space.*

____ Categorical Exclusion without Environmental Action Statement
____ Categorical Exclusion and Environmental Action Statement
__X__ Environmental Assessment and Finding of No Significant Impact
____ Environmental Impact Statement and Record of Decision

Mandatory 10- or 15-Year Re-Evaluation Date: ___July 10, 2021___

Description of Use: ***Wildlife Observation and Photography***

Wildlife observation and photography are included in the "Big 6" priority public uses identified and approved by Congress in the Refuge Improvement Act of 1997. These activities may occur while walking, driving, or boating.

Wildlife observation and photography would continue to be conducted on all areas of the refuge, with the exception of the waterfowl sanctuary area which is located on the Cloverdale Unit.

Permitted year-round during daylight hours only.

All visitors are required to complete a Daily Visitor Use Reporting Card. Portable blinds may be used for observation and photography. A permanent wildlife observation/photography blind is provided along the Magnolia Nature Trail and may be used on a first-come first-served basis.

Wildlife observation and photography are popular and valid non-consumptive uses of wildlife resources and are included in the "Big 6" recreational activities identified and authorized by Congress in the Refuge Improvement Act of 1997.

Availability of Resources:

Administration of the wildlife observation and photography program will require several days work by one or more staff members. Estimated time needed to complete various tasks are as follows:
Trail and observation blind maintenance – 10 staff days
Road maintenance – 20 staff days
Gather and analyze Daily Visitor Use Reporting Cards – 15 staff days
Provide visitor information to the public – 260 staff days
Update and print Trail Maps and Observation Checklist – 2 staff days
TOTAL of 307 staff days

Special equipment, facilities, or improvements necessary to support the use:

Two all-terrain vehicles (ATVs), two tractors with bushhog and blades, one motor grader, one dump truck, two 4-wheel drive trucks, and one backhoe loader are all needed to maintain roads and roadsides and the Magnolia Nature Trail. Benches, interpretive signs, and a permanent wildlife observation/photography blind is provided along the Magnolia Nature Trail. Available resources and revenues are adequate to ensure compatibility.

Maintenance costs:

Vehicle, equipment and ATV maintenance, fuel costs, sign replacement, wildlife observation/photography blind maintenance, bench replacement, and road maintenance are all costs associated with this use. The estimated annual cost of these maintenance items is $15,000.00.

Monitoring costs:

Approximately $2,600.00.

Offsetting revenues: None

Anticipated Impacts of the Use:

Short-term impacts:

Wildlife observation and photography has been permitted as a compatible recreational activity on St. Catherine Creek National Wildlife Refuge since 1994 with no significant negative impacts on wildlife or habitat. Short-term impacts may include disturbance of waterfowl, wading birds, and shore birds in refuge impoundments and moist soil units. However, these impacts are minor and intermittent and pose no lasting impact on these and other wildlife populations. Littering and vehicle traffic are tightly controlled through refuge regulations and law enforcement activities.

Long-term impacts:

To date, there is no indication of long-term adverse biological impacts associated with the refuge wildlife observation and photography program. These activities have been permitted since 1994 and waterfowl use has remained essentially the same while utilization by wading birds and shore birds has increased. Vegetation trampling is minimal and not a factor.

Cumulative impacts:

There are no known or expected cumulative impacts.

Public Review and Comment: The period of public review and comment began on November 3, 2005 and ended on December 9, 2006. The following methods were used to solicit public review and comment:

Posted notice at refuge headquarters
Public notice sent to area newspapers with wide local distribution
The Natchez Democrat (Natchez MS), published the entire week of November 6, 2003
The Woodville Republican (Woodville MS), publication date not known
The Daily Leader (Brookhaven MS), publication date not known
Franklin County Advocate, publication date not known
Public meeting – held November 6, 2003 at the Natchez Convention Center, Natchez MS
All public comments were addressed during this process. However, they are too voluminous to include in this document, but may be viewed by accessing the administrative record.

This compatibility determination was part of the Draft Comprehensive Conservation Plan and Environmental Assessment for St. Catherine Creek National Wildlife Refuge, which was announced in the *Federal Register* and made available for public comment for 30 days.

Determination (check one below):

_____ Use is Not Compatible

__X__ Use is Compatible with Following Stipulations

Stipulations Necessary to Ensure Compatibility:

Daylight use only. Motor vehicles are restricted to public roads only as indicated in refuge regulations brochure. All visitors are required to complete a Daily Visitor Use Reporting Card. Visitors may not

haze or harass wildlife at any time. No commercial photography or videography is allowed without a fee-required special use permit. The public may not enter the waterfowl sanctuary area on the Cloverdale Unit.

Justification:

Wildlife observation and photography are included in the "Big 6" priority public uses identified and authorized by Congress in the Refuge Improvement Act of 1997. This use is compatible with the establishing legislation of the refuge and poses no negative short or long-term impact on the refuge mission, goals or objectives.

NEPA Compliance for Refuge Use Decision: *Place an X in appropriate space.*

____ Categorical Exclusion without Environmental Action Statement
____ Categorical Exclusion and Environmental Action Statement
_X_ Environmental Assessment and Finding of No Significant Impact
____ Environmental Impact Statement and Record of Decision

Mandatory 10- or 15-Year Re-Evaluation Date: July 10, 2021

Description of Use: ***Environmental Education and Interpretation***

Environmental education and interpretation are included in the "Big 6" priority public uses as identified and authorized by Congress in the Refuge Improvement Act of 1997. Refuge staff and volunteers host school children, tour groups, scout groups, conservation groups, and other interested groups and organizations for refuge tours, nature walks, and special events. These activities usually include some form of interpretation or educational talk and/or presentation.

Environmental education and interpretation would continue to be conducted on the Magnolia Nature Trail or at refuge waterfowl impoundments in moist soil units.

These activities are usually conducted on weekdays during normal duty hours, but may occur on weekends through special request given enough advance notice. These activities are essentially hosted year-round on an as-requested basis with the exception of federal holidays.

Interested parties may contact the refuge by telephone, email, regular mail, or in person to submit a request for an environmental education or interpretative opportunity. These activities will be placed on the refuge calendar and a staff member or volunteer will be assigned to support this activity on the requested date.

Environmental education and interpretation are popular and valid uses of wildlife resources and are included in the "Big 6" priority public uses identified and authorized by Congress in the Refuge Improvement Act of 1997. This provides an opportunity for the Service to educate the public on conservation of wildlife, wildlife habitat, and other natural resources as well as present the Service mission to the public and improve public support.

Availability of Resources:

Administration of the environmental education and interpretive program will require several days work by one or more staff members. Estimated time needed to complete various tasks are as follows:

Provide educational information to the public – 20 staff days
Support and/or conduct activities – 10 staff days
Scheduling activities – 2 staff days
TOTAL of 32 staff days

Special equipment, facilities, or improvements necessary to support the use:

Slide, overhead, and powerpoint projectors, projector screen, conference room, one vehicle, and various supplies and handouts, including refuge-specific brochures and checklists. Available resources and revenues are adequate to ensure compatibility.

Maintenance costs:

Facility, trail and road maintenance, sign maintenance and replacement, vehicle maintenance, fuel costs, and litter removal are all costs associated with this use. The estimated annual cost of these maintenance items is $10,000.00.

Monitoring costs:

Approximately $500.00.

Offsetting revenues: None

Anticipated Impacts of the Use:

Short-term impacts:

Environmental education and interpretive activities have been permitted on St. Catherine Creek National Wildlife Refuge since 1994. There has been and continues to be no measurable negative impact associated with these activities on the refuge. Littering and vehicle traffic are tightly controlled through refuge regulations and law enforcement activities.

Long-term impacts:

There has been and continues to be no measurable negative long-term impact associated with these activities on the refuge. Vegetation trampling is minimal and not a factor.

Cumulative impacts:

There has been and continues to be no measurable negative cumulative impact associated with these activities on the refuge.

Public Review and Comment: The period of public review and comment began on November 3, 2005 and ended on December 9, 2006. The following methods were used to solicit public review and comment:

Posted notice at refuge headquarters
Public notice sent to area newspapers with wide local distribution
The Natchez Democrat (Natchez MS), published the entire week of November 6, 2003
The Woodville Republican (Woodville MS), publication date not known
The Daily Leader (Brookhaven MS), publication date not known

Franklin County Advocate, publication date not known
Public meeting – held November 6, 2003 at the Natchez Convention Center, Natchez MS
All public comments were addressed during this process. However, they are too voluminous to include in this document, but may be viewed by accessing the administrative record.

This compatibility determination was part of the Draft Comprehensive Conservation Plan and Environmental Assessment for St. Catherine Creek National Wildlife Refuge, which was announced in the *Federal Register* and made available for public comment for 30 days.

Determination (check one below):

_____ Use is Not Compatible

__X__ Use is Compatible with Following Stipulations

Stipulations Necessary to Ensure Compatibility:

All activities must be scheduled and approved in advance with refuge manager.

Justification:

Environmental education and interpretation are included in the "Big 6" priority public uses identified by Congress in the Refuge Improvement Act of 1997. This use is compatible with the establishing legislation of the refuge and poses no negative short or long-term impact on the refuge mission, goals or objectives.

NEPA Compliance for Refuge Use Decision: *Place an X in appropriate space.*

____ Categorical Exclusion without Environmental Action Statement
____ Categorical Exclusion and Environmental Action Statement
__X__ Environmental Assessment and Finding of No Significant Impact
____ Environmental Impact Statement and Record of Decision

Mandatory 10- or 15-Year Re-Evaluation Date: ___July 10, 2021___

Description of Use: ***Resource Research Studies***

This activity would allow university professors and their students, nongovernmental researchers, and governmental scientists access to the St Catherine Creek National Wildife Refuge's natural environment to conduct both short- and long-term research projects and surveys.

These activities would continue to be conducted on all areas of the refuge with prior approval and scheduling with the refuge manager.

Permitted year-round with prior approval by refuge manager.

These activities would be conducted throughout the refuge in a variety of habitats. Activities carried out during approved research projects and surveys may be limited to avoid unnecessary disturbance to refuge resources or ongoing management activities. The activities would be varied in scope and

duration to satisfy the requirement of the research project or survey. Projects may involve everything from a limited one-time sampling or survey to long-term study projects. Research projects and surveys would be conducted by universities, state and federal government representatives, and rarely by private individuals. The refuge would act solely in a supportive role, providing minimal assistance in most cases.

The outcome of this research would result in better knowledge of our natural resources and improved methods to manage, monitor, and protect the refuge resources. Furthering the knowledge of the impacts and benefits of management decisions, life histories of wildlife species utilizing the refuge, and interrelationships of habitats and wildlife occurring on the refuge is crucial to the effective management of the refuge.

Availability of Resources:

Administration of the research and study program will require several staff days by one or more staff members. Estimated time needed to complete various tasks are as follows:
Review requests – 2 staff days
Issue special use permits – 2 staff days
Maintaining volunteer quarters – 2 staff days
Providing incidental support – 2 staff days
TOTAL of 8 staff days

Special equipment, facilities, or improvements necessary to support the use:

A refuge vehicle may be provided for use while on the refuge if research or wildlife inventory is being conducted in support of a specific refuge need. Available resources and revenues are adequate to ensure compatibility.

Maintenance costs:

Volunteer quarters, volunteer vehicle and fuel costs are associated with this use. The estimated annual cost of these maintenance items is $2,000.00.

Monitoring costs: None

Offsetting revenues: None

Anticipated Impacts of the Use:

Short-term impacts:

There should be no significant adverse impacts from scientific research on the refuge. The knowledge gained from the research would provide information to improve management techniques for trust resource species. Impacts such as collection of small numbers of plants and/or animals and temporary disturbance to wildlife could occur, but would not be significant. Littering and vehicle traffic are tightly controlled through refuge regulations and law enforcement activities.

Long-term impacts:

There would be no long-term negative impacts associated with this use. There would, however, be long-term benefits by adding additional knowledge to be used in achieving management goals and objectives. Vegetation trampling is minimal and not a factor.

Cumulative impacts:

No adverse cumulative effects are anticipated.

Public Review and Comment: The period of public review and comment began on November 3, 2005 and ended on December 9, 2006. The following methods were used to solicit public review and comment:

Posted notice at refuge headquarters
Public notice sent to area newspapers with wide local distribution
The Natchez Democrat (Natchez MS), published the entire week of November 6, 2003
The Woodville Republican (Woodville MS), publication date not known
The Daily Leader (Brookhaven MS), publication date not known
Franklin County Advocate, publication date not known
Public meeting – held November 6, 2003 at the Natchez Convention Center, Natchez MS
All public comments were addressed during this process. However, they are too voluminous to include in this document, but may be viewed by accessing the administrative record.

This compatibility determination was part of the Draft Comprehensive Conservation Plan and Environmental Assessment for St. Catherine Creek National Wildlife Refuge, which was announced in the *Federal Register* and made available for public comment for 30 days.

Determination (check one below):

_____ Use is Not Compatible

__X__ Use is Compatible with Following Stipulations

Stipulations Necessary to Ensure Compatibility:

All scientific research, collection, inventory and other activities must receive prior approval by the refuge manager, who will then issue a Special Use Permit for the proposed project. Copies of any data, reports, and publications will be provided to the refuge for our records upon completion of the project. Any unusual occurrences or situations will be reported immediately to the refuge manager.

Justification:

The benefits derived from sound research provide a better understanding of individual species and the environmental communities present on the refuge. Research projects will be designed to minimize impacts and disturbance.

NEPA Compliance for Refuge Use Decision: *Place an X in appropriate space.*

___ Categorical Exclusion without Environmental Action Statement

___ Categorical Exclusion and Environmental Action Statement

_X_ Environmental Assessment and Finding of No Significant Impact

___ Environmental Impact Statement and Record of Decision

Mandatory 10- or 15-Year Re-Evaluation Date: ___July 10, 2016___

Description of Use: ***Cooperative Farming***

Cooperative farming is not one of the six priority wildlife dependent public uses of the National Wildlife Refuge System but is an existing economic activity that supports the refuge's migratory bird management trust responsibility. Through cooperative farming agreements, the refuge maintains 1,000 to 1,500 acres annually planted to agricultural crops to provide food and resting habitat for wintering migratory waterfowl, as well as other wildlife. This acreage occurs throughout the refuge's river bottomlands in and around impoundments. The cooperative farmer grows soybeans, leaving a percentage of the crop standing in the field or plants refuge shares of more desirable wildlife crops. Additionally, as part of the farming contract, the farmer maintains the roadways, performs mowing and does levee and culvert maintenance as needed.

Cooperative farming would continue to be conducted on the Cloverdale Unit of the refuge, which is closed to public entry and serves as a refuge waterfowl sanctuary area.

Farming agreements would permit farming activities from January 1 to December 31, weather conditions permitting.

Cooperative farming would be permitted through the cooperative farming agreement process. Agreements could cover one year or five year increments. Farming agreements would be prepared and monitored by the refuge. Farmers would be limited to using herbicides and insecticides approved through the pesticide use proposal procedures. Cooperators would supply the refuge with annual pesticide use information.

Winter waterfowl management is St. Catherine Creek NWR's primary wildlife resource trust responsibility. Cooperative farming is the most cost effective means available for producing winter forage for migrating and wintering waterfowl and providing roosting and resting habitat under current resource levels.

Availability of Resources:

Administration of the cooperative farming program will require several days work by one or more staff members. Estimated time needed to complete various tasks are as follows:
Prepare Cooperative Farming Agreement – 2 staff days
Prepare Pesticide Use Proposals – 2 staff days
Prepare Region 4 Intra-Service Section 7 Biological Evaluation – 2 staff days
Prepare Pesticide Use Report – 1 staff days
Meet with Cooperative Farmers – 3 staff days
Monitor farming activities through the growing season - 5 staff days

Conduct various administrative tasks – 1 staff days
Road maintenance – 10 staff days
TOTAL of 26 staff days

Special equipment, facilities, or improvements necessary to support the use:

The refuge's gravel roads and bridges provide access to the farm units. Periodic road maintenance is required. Available resources and revenues are adequate to ensure compatibility.

Maintenance costs:

A portion of the road maintenance is performed by the cooperative farmer as part of the farming agreement. Refuge costs to maintain these roads are estimated to be $5,000.00 annually.

Monitoring costs:

Approximately $1,000.00.

Offsetting revenues: None

Anticipated Impacts of the Use:

Short-term impacts:

Cooperative farming is a critical program that the refuge uses to meet its migratory waterfowl management responsibility for which it was established. Farming provides a steady, reliable winter food source for wintering migratory waterfowl, as well as other wildlife. Farming also sets back succession and controls brushy invasion of open field habitat. The program is the most cost effective means of providing supplemental food for waterfowl and other wildlife.

Possible negative impacts of greatest concern are those associated with the use of pesticides in farming operations. Pesticide use in crop production could have a variety of direct or indirect effects on wild plants and animals, if used outside the guidelines prescribed by pesticide manufacturers. During application care must be taken to place the product only on target areas. Pesticides are applied when wind conditions do not facilitate drift to non-target plants or animals. Pesticides are applied in quantities and under weather conditions that do not promot runoff. To prevent pesticide runoff from entering surface waters, no farming is done within 50 feet of standing water. Virtually all unintended plant impacts are short term.

Processes are in place to assist the refuge to limit possible adverse effects from the use of farm pesticides. Before each proposed pesticide is used in the program it must go through the Pesticide Use Proposal review process. The refuge must also consult with its local Ecological Services Office through the Intra-Service Section 7 Biological Evaluation process to determine if a proposed pesticide use has potential impacts to threatened and/or endangered species.

Field preparation and planting can cause both beneficial as well as negative short-term wildlife impacts. Spring discing alters the wildlife use pattern by temporarily displacing small fauna until vegetative cover regenerates.

Long-term impacts:

The long-term impact of the cooperative farming program is that it provides a cost effective way for the refuge to provide steady, reliable food and habitat for wintering migratory waterfowl. Cooperative farming maintains large open field habitat. If food and habitat are not available yearly or are available sporadically, then migratory waterfowl use can occur only sporadically.

No measure exists to indicate that cooperative farming promotes or causes soil erosion. These refuge river bottoms have been farmed since long before the refuge was established in 1990. The refuge has maintained farming activities since its establishment and the land's productivity has not declined. The refuge is subjected to spring flooding, but rather than erode the refuge's bottomlands these floods continue to build up the soils as the river drops its silt load once it comes out of its banks. Evidence of this soil accumulation process is regularly seen on flooded refuge roads which accumulate silt during flood events.

Cumulative impacts:

Short-term impacts: Farming benefits waterfowl as well as other wildlife species and supports hunting, wildlife observation, wildlife photography, environmental education and interpretation. This activity does not significantly impact any other refuge activity.

Long-term impacts: Farming benefits waterfowl and numerous other wildlife species.

Cumulative: Farming benefits waterfowl and numerous other wildlife species and supports hunting, wildlife observation, wildlife photography, environmental education and interpretation.

Public Review and Comment: The period of public review and comment began on November 3, 2005 and ended on December 9, 2006. The following methods were used to solicit public review and comment:

Posted notice at refuge headquarters
Public notice sent to area newspapers with wide local distribution
The Natchez Democrat (Natchez MS), published the entire week of November 6, 2003
The Woodville Republican (Woodville MS), publication date not known
The Daily Leader (Brookhaven MS), publication date not known
Franklin County Advocate, publication date not known
Public meeting – held November 6, 2003 at the Natchez Convention Center, Natchez MS
All public comments were addressed during this process. However, they are too voluminous to include in this document, but may be viewed by accessing the administrative record.

This compatibility determination was part of the Draft Comprehensive Conservation Plan and Environmental Assessment for St. Catherine Creek National Wildlife Refuge, which was announced in the *Federal Register* and made available for public comment for 30 days.

Determination (check one below):

_____ Use is Not Compatible

__X__ Use is Compatible with Following Stipulations

Stipulations Necessary to Ensure Compatibility:

That policy and guidance is followed and that practice is conducted according to this station's Cropland Management Plan and any subsequent decisions developed through the CCP (Comprehensive Conservation Plan) process.

An annual cooperative farming agreement is developed and signed by the cooperative farmer and the refuge manager or his representative. Annual evaluation and ongoing monitoring of the cooperative farming program will be done to ensure conditions within the cooperative agreement are being complied with and overall condition of the area is not being degraded. Stipulations within the agreement only allow application of approved chemicals. Also, the program should be modified to fulfill new refuge goals developed in the upcoming Comprehensive Conservation Planning process. Staff must monitor the program to ensure farmers are adhering to their farming agreements.

Justification:

The cooperative farming program is a critical component of management for migratory waterfowl and benefits other wildlife, and, thus, fulfills all of the refuge purposes noted above. It also helps meet national waterfowl management objectives.

Farming by means of a cooperative farmer where a share of the crop is left for wildlife consumption is the most economical way to produce the grain foods to feed the wildlife species using the refuge. Options to utilize contracted farmers or refuge employees to conduct this program is not available due to budget constraints.

The cooperative farming program provides supplemental foods for migrating and wintering waterfowl as well as other migratory bird species and native wildlife at minimal cost to the government.

NEPA Compliance for Refuge Use Decision: *Place an X in appropriate space.*

____ Categorical Exclusion without Environmental Action Statement
____ Categorical Exclusion and Environmental Action Statement
__X__ Environmental Assessment and Finding of No Significant Impact
____ Environmental Impact Statement and Record of Decision

Mandatory 10- or 15-Year Re-Evaluation Date: ___July 10, 2016___

Approval of Compatibility Determinations

The signature of approval is for all compatibility determinations considered within the comprehensive conservation plan. If one of the described uses is considered for compatibility outside of the plan, the approval signature becomes part of that determination.

Refuge Manager: W. R. Breland 1/25/06
(Signature/Date)

Regional Compatibility Coordinator: Pamela Horton 6/5/06
(Signature/Date)

Refuge Supervisor: Richard P. Ingram 6/12/06
(Signature/Date)

Regional Chief, National Wildlife Refuge System, Southeast Region: Bud Cheng 6/12/06
(Signature/Date)

Appendix VI. Wilderness Review Summary

WILDERNESS REVIEW
ST. CATHERINE CREEK NATIONAL WILDLIFE REFUGE
JANUARY 27, 2005

The planning team met at St. Catherine Creek National Wildlife Refuge on October 27, 2005, to gather information and conduct field examinations for the refuge's wilderness review. The review team included:

Randy Breland, Project Leader
Steve Brock, Deputy Project Leader
Mike Dawson, Refuge Planner

The wilderness review is a required component of the comprehensive conservation plan. The Wilderness Act defines a Wilderness Area as an area of federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is managed so as to preserve its natural conditions and which

- generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable;
- has outstanding opportunities for solitude or primitive and unconfined type of recreation;
- has at least 5,000 contiguous roadless acres or is of sufficient size to make practicable its preservation and use in an unimpaired condition; or is a roadless island, regardless of size;
- does not substantially exhibit the effects of logging, farming, grazing, or other extensive development or alteration of the landscape, or its wilderness character could be restored through appropriate management, at the time of review; and
- may contain ecological, geological, or other features of scientific, education, scenic, or historic value.

During the inventory phase of the wilderness review, the emphasis is on an assessment of wilderness character within the inventory unit. Special values (i.e., ecological, geological, scenic, historical) should be identified, but are not required. The determination to recommend (or not recommend) a Wilderness Study Area to Congress for wilderness designation will be made through the comprehensive conservation plan decision-making process.

Summary of Wilderness Inventory Findings

The wilderness review team did not identify any refuge lands that meet the criteria for designation as a wilderness study area.

Appendix VII. Species Lists

BIRDS

Scientific Name	**Common Name**
Pelecanus erythrorhynchus	American white pelican
Anhinga anhinga	Anhinga
Phalacrocorax auritus	Double-crested cormorant
Phalacrocorax brasillianus	Neotropical cormorant
Nycticorax nycticorax	Black-crowned night-heron
Nyctanassa violacea	Yellow-crowned night-heron
Butorides striatus	Green heron
Egretta tricolor	Tricolored heron
Egretta caerulea	Little blue heron
Bubulcus ibis	Cattle egret
Egretta thula	Snowy egret
Casmerodius albus	Great egret
Ardea herodia	Great blue heron
Mycteria americana	Wood stork
Plegadis falcinellus	Glossy ibis
Plegadis chihi	White-faced ibis
Eudocimus albus	White ibis
Ajaia ajaja	Roseate spoonbill
Branta canadensis	Canada goose
Aythya collaris	Ring-necked duck
Anas platyrhynchos	Mallard
Anas strepera	Gadwall
Anas crecca	American green-winged teal
Anas americana	American wigeon
Anas acuta	Northern pintail

Scientific Name	**Common Name**
Anas clypeata	Northern shoveler
Anas discors	Blue-winged teal
Aix sponsa	Wood duck
Aythya valisineria	Canvasback
Aythya americana	Redhead
Bucephala clangula	Common goldeneye
Lophodytes cucullatus	Hooded merganser
Rallus elegans	King rail
Fulica americana	American coot
Himantopus mexicanus	Black-necked stilt
Charadrius semipalmatus	Semipalmated plover
Charadrius vociferous	Killdeer
Pluvialis squatrola	Black-bellied plover
Charadrius melodus	Piping plover
Bartramia longicauda	Upland plover
Tringa melanoleuca	Greater yellowlegs
Tringa flavipes	Lesser yellowlegs
Tringa solitaria	Solitary sandpiper
Actitis macularia	Spotted sandpiper
Limnodromus griseus	Short-billed dowitcher
Calidris himantopus	Stilt sandpiper
Gallinago gallinago	Common snipe
Scolopax minor	American woodcock
Calidris pusilla	Semipalmated sandpiper
Calidris mauri	Western sandpiper
Calidris minutilla	Least sandpiper
Calidris melanotos	Pectoral sandpiper

Scientific Name	**Common Name**
Tryngites subruficollis	Buff-breasted sandpiper
Larus delawarensis	Ring-billed gull
Sterna antillarum	Least tern
Chlidonias niger	Black tern
Cathartes aura	Turkey vulture
Coragyps atratus	Black vulture
Haliaeetus leucocephalus	Bald eagle
Ictinia mississippiensis	Mississippi kite
Circus cyaneus	Northern harrier
Accipiter striatus	Sharp-shinned hawk
Accipiter cooperii	Cooper's hawk
Buteo lineatus	Red-shouldered hawk
Buteo platypterus	Broad-winged hawk
Buteo jamaicensis	Red-tailed hawk
Pandion haliaetus	Osprey
Falco sparverius	American kestrel
Colinus virginianus	Northern bobwhite
Meleagris gallopavo	Wild turkey
Zenaida macroura	Mourning dove
Coccyzus americanus	Yellow-billed cuckoo
Tyto alba	Barn owl
Bubo virginianus	Great horned owl
Strix varia	Barred owl
Athene cunicularia	Burrowing owl
Otus asio	Eastern screech owl
Chaetura pelagica	Chimney swift
Archilochus colubris	Ruby-throated hummingbird

Scientific Name	**Common Name**
Ceryle alcyon	Belted kingfisher
Melanerpes carolinus	Red-bellied woodpecker
Colaptes auratus	Northern flicker
Melanerpes erythrocephalus	Red-headed woodpecker
Sphyrapicus varius	Yellow-bellied sapsucker
Picoides pubescens	Downy woodpecker
Picoides villosus	Hairy woodpecker
Dryocopus pileatus	Pileated woodpecker
Tyrannus tryrannus	Eastern kingbird
Tyrannus forficatus	Scissor-tailed flycatcher
Myiarchus crinitus	Great crested flycatcher
Contopus virens	Eastern wood-pewee
Sayornis phoebe	Eastern phoebe
Empidonax virescens	Acadian flycatcher
Tachycineta bicolor	Tree swallow
Progne subis	Purple martin
Stelgidopteryx serripennis	Northern rough-winged swallow
Hirundo rustica	Barn swallow
Cyanocitta cristata	Blue jay
Corvus brachyrhynchos	American crow
Corvus ossifragus	Fish crow
Parus bicolor	Tufted titmouse
Parus carolinensis	Carolina chickadee
Thryothorus ludovicianus	Carolina wren
Regulus satrapa	Golden-crowned kinglet
Regulus calendula	Ruby-crowned kinglet
Polioptila caerulea	Blue-gray gnatcatcher

Scientific Name	**Common Name**
Sialia sialis	Eastern bluebird
Hylocichla mustelina	Wood thrush
Catharus guttatus	Hermit thrush
Turdus migratorius	American robin
Lanius ludovicianus	Loggerhead shrike
Mimus polyglottos	*Northern mockingbird*
Toxostoma rufum	*Brown thrasher*
Vireo griseus	*White-eyed vireo*
Vireo flavifrons	*Yellow-throated vireo*
Vireo olivaceus	*Red-eyed vireo*
Protonotaria citrea	*Prothonotary warbler*
Vermivora pinus	*Blue-winged warbler*
Parula americana	*Northern parula*
Dendroica cerulean	*Cerulean warbler*
Dendroica coronata	*Yellow-rumped warbler*
Dendroica virens	*Black-throated green warbler*
Dendroica dominica	*Yellow-throated warbler*
Dendroica pinus	*Pine warbler*
Wilsonia citrine	*Hooded warbler*
Limnothlypis swainsonii	*Swainson's warbler*
Oporornis formosus	*Kentucky warbler*
Vermivora ruficapilla	*Nashville warbler*
Seiurus motacilla	*Louisiana waterthrush*
Geothlypis trichas	*Common yellowthroat*
Icteria virens	*Yellow-breasted chat*
Setophaga ruticilla	*American redstart*
Cardinalis cardinalis	*Northern cardinal*

Scientific Name	**Common Name**
Guiraca caerulea	*Blue grosbeak*
Passerina cyanea	*Indigo bunting*
Passerina ciris	*Painted bunting*
Pooecetes gramineus	*Vesper sparrow*
Passerculus sandwichensis	*Savannah sparrow*
Melospiza melodia	*Song sparrow*
Spizella pusilla	*Field sparrow*
Spizella passerine	*Chipping sparrow*
Junco hyemalis	*Dark-eyed junco*
Zonotrichia albicollis	*White-throated sparrow*
Zonotrichia leucophrys	*White-crowned sparrow*
Melospiza lincolnii	*Lincoln's sparrow*
Melospiza georgiana	*Swamp sparrow*
Spiza americana	*Dickcissel*
Pipilo erythrophthalmus	*Eastern towhee*
Sturnella magna	*Eastern meadowlark*
Agelaius phoeniceus	*Red-winged blackbird*
Molothrus ater	*Brown-headed cowbird*
Quiscalus quiscula	*Common grackle*
Icterus spurius	*Orchard oriole*
Icterus galbula	*Baltimore oriole*
Piranga rubra	*Summer tanager*
Passer domesticus	*House sparrow*
Carduelis tristis	*American goldfinch*

MAMMALS

Scientific Name	***Common Name***
Didelphis virginiana	Virginia opossum
Dasypus novemcinctus	Nine-banded armadillo
Sylvilagus floridanus	Eastern cottontail
Tamias striatus	Eastern chipmunk
Sciurus carolinensis	Gray squirrel
Sciurus niger	Fox squirrel
Glaucomys volans	Eastern flying squirrel
Castor canadensis	Beaver
Myocastor coypus	Nutria
Canis latrans	Coyote
Procyon lotor	Raccoon
Mephitis mephitis	Striped skunk
Lutra canadensis	River otter
Lynx rufus	Bobcat
Sus scrofa	Wild pig
Odocoileus virginianus	White-tailed deer
Corynorhinus rafinesquii	Rafinesque's big-eared bat
Myotis austroriparius	Southeastern myotis
Lasiurus seminolus	Seminole bat
Nycticeius humeralis	Evening bat
Eptesicus fuscus	Big brown bat
Lasiurus borealis	Red bat
	Rat species
	Mice species

AMPHIBIANS AND REPTILES

Scientific Name	Common Name
Gastrophryne carolinensis	Eastern narrowmouth toad
Bufo americanus	American toad
Bufo woodhousii fowleri	Fowler's toad
Bufo valliceps valliceps	Gulf Coast toad
Hyla cinerea	Green treefrog
Hyla avivoca	Bird-voiced treefrog
Hyla versicolor	Gray treefrog
Pseudacris triseriata feriarum	Upland chorus frog
Pseudacris crucifer	Northern spring peeper
Acris crepitans	Northern cricket frog
Acris gryllus	Southern cricket frog
Hyla gratiosa	Barking treefrog
Hyla squirella	Squirrel treefrog
Rana clamitans	Bronze frog
Rana catesbeiana	Bullfrog
Rana utricularia	Southern leopard frog
Notophthalmus viridescens	Central newt
Ambystoma maculatum	Spotted salamander
Plethodon glutinosus	Mississippi slimy salamander
Eurycea cirrigera	Southern two-lined salamander
Eurycea longicauda	Three-lined salamander
Alligator mississippiensis	American alligator
Macroclemys temminckii	Alligator snapping turtle
Chelydra serpentina	Common snapping turtle
Sternotherus carinatus	Razorback musk turtle
Kinosternon s. hippocrepis	Mississippi mud turtle

Scientific Name	**Common Name**
Stenotherus odoratus	Stinkpot musk turtle
Graptemys kohnii	Mississippi map turtle
Pseudemys concinna	River cooter
Trachemys scripta	Red-eared slider
Terrapene carolina	Three-toed box turtle
Apalone sp.	Softshell turtle species
Terrapene Carolina major	Gulf Coast box turtle
Anolis carolinensis	Green anole
Sceloporus undulatus undulatus	Southern fence lizard
Scincella lateralis	Ground skink
Eumeces fasciatus	Five-lined skink
Eumeces laticeps	Broadhead skink
Nerodia fasciata confluens	Broad-banded water snake
Nerodia erythrogaster flavigaster	Yellowbelly water snake
Nerodia cyclopion	Mississippi green water snake
Thamnophis sirtalis	Eastern garter snake
Thamnophis sauritus	Eastern ribbon snake
Heterodon platirhinos	Eastern hognose snake
Opheodrys aestivus	Rough green snake
Coluber constrictor latrunculus	Blackmask racer
Elaphe o. spiloides	Gray rat snake
Elaphe guttata	Corn snake
Lampropeltis getula holbrooki	Speckled kingsnake
Agkistrodon piscivorus	Western cottonmouth
Agkistrodon contortrix	Southern copperhead
Crotalus horridus	Timber rattlesnake
Crotalus horridus atricaudatus	Canebreak rattlesnake

Appendix VIII. Budget Requests

RONS Project Name	Project No.	Amount
1. Survey habitat and wildlife populations	99010	$280,000
2. Enhance wildlife populations and habitat	99011	$213,000
3. Restoration of refuge wetland habitat	99014	$183,000
4. Protect refuge resources and visitors	03000	$193,000
5. Provide outreach and environmental education	99018	$229,000
6. Monitor oil and gas activities	99017	$214,000
7. Improve road and levee maintenance	99016	$193,000
Total (does not include routine vehicle and equipment replacement)		**$1,505,000**

MMS Project Name	Project No.	Amount
1. Rehabilitate levees and water control structures	02120306	$89,000
2. Construct an observation tower on Sibley Unit	97123364	$63,000
3. Construct a trans-refuge birding trail	9912359	$72,000
4. Repair Sibley Unit outflow pipe	97102387	$28,000
5. Repair boat ramp at Gilliard Lake	00102387	$34,000
6. Rehabilitate Salt lake boat ramp	00102414	$42,000
7. Rehabilitate refuges houses	04134831	$107,000
8. Replace refuge office/visitor contact point and parking area	98110100	$835,000
9. Construct accessible fishing pier and parking lot for visitors with disabilities	97123363	$64,000
10. Rehabilitate Butler Lake entrance road and parking lot	99211099	$760,000
11. Rehabilitate Wildlife Driving Tour Road and parking area	99110103	$1,169,000
12. Rehabilitate Magnolia Trail and parking area	00102389	$76,000
13. Rehabilitate Carthage Linwood boat ramp and parking area	03124873	$18,000
14. Rehabilitate Lakeview Drive and parking area	01114351	$11,000
15. Rehabilitate Pintail Lane	97133092	$350,000
Total		**$3,718,000**

Appendix IX. Land Acquisition History

Land Acquisition History for St. Catherine Creek National Wildlife Refuge			
Acquisition Date	**Acquired From**	**Acreage Amount**	**Acreage Balance**
01/16/90	Anfar Corporation	6,954.74 Acres	6,954.74
01/17/91	Stanley E. Burkley, et al.	219.55 Acres	7,174.29
02/21/91	Armstrong et al.	6,304 Acres	13,478.29
06/17/94	Norman M. Haigh, et al.	4,777 Acres	18,255.29
08/17/94	Morrison Enterprises	1,019 Acres	19,274.29
12/30/94	Carter's Point, Inc.	340 Acres	19,614.29
03/21/95	Norman M. Haigh, et al.	4,418 Acres	24,032.29
08/08/95	Lease Agreement with Natchez Adams County Public Schools - 5 year lease – last renewed on 09/30/99	502.10 Acres	24,534.39
11/14/95	Edward and Eugenie Herring	77 Acres	24,611.39
05/18/99	James Miss. and Texas L.P.	320 Acres	24,931.39

Appendix X. Intra-Service Consultation

INTRA-SERVICE SECTION 7 BIOLOGICAL EVALUATION FORM

Division/Office: St. Catherine Creek National Wildlife Refuge

Refuge Manager/Phone #: Randy Breland (601) 442-6696

Date: April 28, 2005

I. Proposed Action: Implementation of the Comprehensive Conservation Plan.

The U.S. Fish and Wildlife Service (Service) has developed a Comprehensive Conservation Plan (CCP) to provide a foundation for the management and use of St. Catherine Creek NWR. The plan is intended to serve as a working guide for the Complex's management programs and actions over the next 15 years.

II. Location (County and State/attach project area map):

The refuge is located within Adams and Wilkinson counties in west central Mississippi (Figure 3). The western boundary lies along about 18 miles of the Mississippi River about seven miles south of the city of Natchez. The northernmost boundary is about two miles south of Natchez. The eastern boundary generally follows the bluffs that run along the eastern side of the Mississippi River from Vicksburg, Mississippi, to Baton Rouge, Louisiana. The southern boundary is the Homochitto River. The refuge can be reached by U.S. Highway 61 and county roads.

III. Description of Proposed Action (describe in enough detail to allow proper evaluation of project impacts, attach additional pages as needed):

The plan's overriding consideration is to carry out the purposes for which the refuge was established. Fish and wildlife are the first priority in refuge management, and public use (wildlife-dependent recreation) is allowed and encouraged as long as it is compatible with, or does not detract from, the refuge's mission and purposes.

Individual consultations will occur under Section 7 for projects related to endangered species and are not intended to be covered in this document. This CCP prioritizes wildlife and habitat management, and proposes wildlife-dependent, compatible recreational opportunities. Chapter 4 of the CCP outlines specific goals, objectives and strategies to achieve an expanded wildlife and habitat management approach, while optimizing (making the best use of) public use and environmental education opportunities. While seeking concurrences on the general management direction of the refuge, as stated previously, individual consultations will occur for projects specifically related to endangered species and critical habitat.

IV. Species and Habitats Considered:

A. List all federally endangered, threatened, proposed, and candidate species, and describe any associated critical or proposed critical habitat that may be affected by the proposed action. Make a determination of how the proposed action may affect each:

SPECIES/CRITICAL HABITAT	STATUS[1]	DETERMINATION[2]			RESPONSE REQUESTED[3]
		NE	NA	AA	
Bald eagle	T		X		
Least tern	E		X		
Louisiana black bear	T		X		
Fat pocketbook mussel	E		X		

[1]*STATUS: E = endangered, T = threatened, PE = proposed endangered, PT = proposed threatened, CH = critical habitat, PCH = proposed critical habitat, C = candidate species*

[2]*DETERMINATION:*

NE = no effect. This determination is appropriate when the proposed action will not directly, indirectly or cumulatively impact, either positively or negatively, any listed, proposed, candidate species or designated/proposed critical habitat.

NA = not likely to adversely affect. This determination is appropriate when the proposed action is not likely to adversely impact any listed, proposed, candidate species or designated/proposed critical habitat or there may be beneficial effects to these resources.

AA = likely to adversely affect. This determination is appropriate when the proposed action is likely to adversely impact any listed, proposed, candidate species or designated/proposed critical habitat.

[3]*RESPONSE REQUESTED: conference, concurrence, formal consultation*

V. Determination of Effects:

A. Explanation of effects of the action: include direct, indirect, interrelated, interdependent, and cumulative effects (attach additional pages as needed):

Definitions for Effects of the Action:

Direct Effects = are those that are an immediate result of the action.

Indirect Effects = are those that are caused by the action and are later in time but are still reasonably certain to occur. They include the effects of future activities that are induced by the action and that occur after the action is completed.

Interrelated = are those that are part of a larger action and depend on the larger action for their justification.

Interdependent = are those that have no significant independent utility apart from the action that is under consideration.

Cumulative Effects = are those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area.

The proposed CCP should benefit the listed species.

B. Explanation of actions to be implemented to reduce adverse effects: N/A

VI.

Project Leader: Mike Dawson (Signature) 4/28/05 (Date)

No effect:_____

Is not likely to adversely affect: ✓

Is likely to adversely affect:_____

VII. Reviewing Ecological Services Office(ESO) Evaluation:

A. Concurrence ✓ **Nonconcurrence** __

B. Formal Consultation Required __

C. Conference Required __

D. Remarks (attach additional pages if needed):

VIII. Signatory Approval:

ES Supervisor: _____ 4/28/05
Signature Date:

Note: The process ends here if the proposed action is "not likely to adversely affect".

REFUGE CHIEF : _____ 7/7/06
Signature Date

ARD Ecological Services: Noreen E Walsh 7/7/06
Signature Date

Note: These signatures are required for approval of a conference report or biological opinion.

Appendix XI. List of Preparers

Randy Breland
Refuge Manager, St. Catherine Creek National Wildlife Refuge

Steve Brock
Assistant Refuge Manager, St. Catherine Creek National Wildlife Refuge

Mike Dawson
Natural Resource Planner, U.S. Fish and Wildlife Service

Charman Cupit
Office Assistant, St. Catherine Creek National Wildlife Refuge

Kathleen Schmidt
Project Manager, Mangi Environmental Group, Service Contractor

Pam Sarlouis
Document Manager, Mangi Environmental Group, Service Contractor

Appendix XII. Consultation and Coordination

The comprehensive planning process for St. Catherine Creek National Wildlife Refuge involved several consultation and coordination efforts with the public, other agencies, and interested groups. The process incorporated a public scoping meeting and open house, which was held on November 6, 2003, at the Natchez Convention Center in Natchez, Mississippi. The attendees at this public meeting identified a variety of issues, concerns, and opportunities for future management of the refuge, which were ultimately used in preparing this comprehensive conservation plan. Their comments are summarized in Appendix IV.

In addition to this public scoping, the planning process included the expertise, suggestions, and recommendations of a wide variety of natural resource professionals, including managers, biologists, and foresters from the Service; the Mississippi Department of Wildlife, Fisheries and Parks; the U.S. Forest Service; other federal, state, and local government agencies; and nongovernmental organizations. A complete description of the overall public involvement and planning process—including the issues and concerns—is provided in Chapter III, Plan Development, of the comprehensive conservation plan.

A core Service planning team led the planning process and prepared the draft plan and environmental assessment. In developing the plan, the core planning team consulted and was assisted by two other teams, a biological review team and a visitor services review team. The biological review team provided its recommendations through a Wildlife and Habitat Management Review Report. The visitor services team contributed its recommendations in a Visitor Services Review Report. (See Chapter III, Plan Development, for additional details on the work of these two teams.)

The members of these three teams and their agency or organizational affiliations are listed below.

Core Planning Team

- Randy Breland, *Refuge Manager, St. Catherine Creek National Wildlife Refuge, Sibley, Mississippi*
- Steve Brock, *Assistant Refuge Manager, St. Catherine Creek National Wildlife Refuge, Sibley, Mississippi*
- Mike Dawson, *Natural Resources Planner, U.S. Fish and Wildlife Service, Jackson, Mississippi*
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Appendix XIII. Finding of No Significant Impact

St. Catherine Creek National Wildlife Refuge
Comprehensive Conservation Plan
Sibley, Mississippi

Introduction
The U.S. Fish and Wildlife Service (Service) has developed a Comprehensive Conservation Plan (CCP) to provide a foundation for the management and use of St. Catherine Creek National Wildlife Refuge (Refuge) over the next 15 years. An Environmental Assessment has been prepared to inform the public of the possible environmental consequences of implementing the Comprehensive Conservation Plan for St. Catherine Creek National Wildlife Refuge (Refuge). A description of the alternatives, the rationale for selecting the preferred alternative, the environmental effects of the preferred alternative, the potential adverse effects of the action, and a declaration concerning the factors determining the significance of effects, in compliance with the National Environmental Policy Act of 1969, are outlined below. The supporting information can be found in the Environmental Assessment.

Alternatives
In developing the CCP for the Complex, the Service evaluated four alternatives: Alternatives A, B, C, and D.

The Service adopted Alternative D, the "Preferred Alternative," as the plan for guiding the direction of the Refuge for the next 15 years. The overriding concern reflected in this plan is that wildlife conservation assumes first priority in refuge management; wildlife-dependant recreational uses are allowed if they are compatible with wildlife conservation. Wildlife-dependent recreation uses (hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation) will be emphasized and encouraged.

Alternative A – Current Management (No Action)

Under this alternative, the refuge's existing management and public outreach practices would continue at levels and priorities similar to current management. All refuge management actions would be directed towards achieving the primary purposes, including (1) preserving wintering waterfowl habitat (e.g., croplands, moist soil management units, green tree reservoirs, and permanent water); (2) providing production habitat for wood ducks; and (3) meeting the habitat conservation goals of the North American Waterfowl Management Plan, all while contributing to other national, regional, and state goals to protect and restore habitat for shorebirds, wading birds, neotropical breeding birds, woodcock, and federally threatened and endangered species.

The refuge's management programs would continue to be developed and implemented with little baseline biological information. Active habitat management would continue to be implemented through water level manipulations, moist soil and cropland management, and forest management designed to provide a diverse complex of habitats that meet the foraging, resting, and breeding requirements for a variety of species. Table 2 (in Section A, Chapter II of the comprehensive conservation plan) summarizes the current acreages by habitat type. The refuge staff would continue to manage existing bottomland hardwood and upland hardwood forested and reforested areas, open water and impoundments, croplands, and moist soil units.

Land would be acquired from willing sellers within the current approved acquisition boundary. The refuge would continue to pursue the exchange of isolated refuge tracts for inholdings within the acquisition boundary.

Hunting and fishing would continue to be the major focus of the refuge's public use program, with no expansion of current opportunities. Current public use restrictions or prohibitions would remain. While no new trails would be developed, the refuge staff would continue to maintain existing trails. Environmental education and wildlife observation and photography would be accommodated on a case-by-case basis.

The refuge would continue its current plan to request resources to construct a refuge headquarters and visitor contact station on the Sibley Unit, and continue the rehabilitation of existing facilities.

Alternative B - Habitat Management Emphasis

Under this alternative, the emphasis would be on improving the refuge's wildlife resources, while still maintaining those appropriate and compatible public use opportunities that presently exist. Primary management efforts would focus on restoring and enhancing habitats and associated plant communities for the benefit of migratory birds, threatened and endangered species, and other federal trust species. Forest habitat would be managed to develop and enhance vertical structure by manipulating existing timber stands through both commercial and noncommercial harvest methods, and by incorporating greater native tree species in any future reforestation efforts. Conservation and protection efforts would also focus on the unique loess bluff habitats by establishing buffer zones around the spring seep wetlands at the bottom ridges.

The refuge would continue to administer the cooperative farming program and improve impoundments for moist soil units for the increased benefit to waterfowl, shorebirds, and wading birds. Baseline data would be collected; standardized surveys implemented; and populations monitored.

The refuge would inventory and more aggressively monitor, control, and where possible, eliminate invasive plants, with particular attention to those having the greatest negative impact on native habitat and wildlife. Population trend information for nutria, wild hogs, raccoon, and beaver will be developed to better control the detrimental effects of these nuisance animals on habitat and wildlife.

Additional staff would include a wildlife biologist and a biological science technician to accomplish objectives for establishing baseline data on refuge resources and for managing habitats.

The refuge would work closely with partners to identify and acquire land from willing sellers within the current approved acquisition boundary, with emphasis on those lands that can provide additional habitat for trust species. Nontraditional land protection methods would be developed and employed, including exchanges of isolated refuge tracts for inholdings within the acquisition boundary.

Public uses would include hunting, fishing, wildlife observation and photography, and limited interpretation. Under this alternative, outreach and environmental education would occur only as time permits. Hunting and fishing would continue to be the major focus of the refuge's public use program, with no expansion or enhancement of current opportunities. While no new trails would be developed, the refuge staff would continue to maintain the existing trails. All new resources would support wildlife and habitat management programs, with annual maintenance funding to support the upkeep of existing public use facilities. This alternative does not address the increased visitation, which has occurred in the past five years and is predicted to continue into the future.

Alternative C - Public Use Emphasis

This approach would maintain the refuge's current wildlife and habitat management activities, while allowing for significantly more public recreational uses. The refuge would allocate a greater share of its budget to public use. Wildlife-dependent recreation uses, such as environmental education and interpretation; wildlife observation; wildlife photography; fishing; and hunting, would remain priority uses and would be increased whenever they are compatible and appropriate. Increased opportunities to hunt waterfowl, mourning doves, deer, and feral hogs would be developed.

Outreach opportunities would be designed to increase public understanding and enjoyment of fish and wildlife and their habitats. Efforts would include greater participation in the local tourism program and in meetings with city, county, and state officials.

Environmental education and interpretation programs, both on and off the refuge, would be expanded. Some of these would include environmental internships for local high school students, as well as bird banding demonstrations. The refuge's existing interpretative trails would be lengthened, improved, and provided with trail guides. New trails and observation towers would also be added. Orientation and informational signs would be established at all major refuge entrances, check stations, boat ramps, and parking lots. Public use facilities, such as boat launching ramps and piers, would be added for visitors with disabilities.

A new visitor center, with state-of-the-art interactive displays and classrooms, would be needed to accomplish the goals and objectives associated with this alternative. To improve the quality of the visitor experience, the refuge would work with the state and county to widen York Road from U.S. Highway 61 to the refuge.

Additional staff needed to implement this alternative includes an outdoor recreation planner, a law enforcement officer, and a seasonal maintenance worker. These additional employees would be used for developing and presenting both on- and off-site outreach and interpretation programs.

Land acquisition within the current approved acquisition boundary would continue, with emphasis on those lands that can provide additional public use opportunities and access.

Alternative D - Balanced Public Use and Habitat Management (Preferred Alternative)

The Service's planning team has identified Alternative D as the preferred alternative. This alternative was developed based on public input and the best judgment of the planning team. The objectives and strategies presented in the draft comprehensive conservation plan were developed as a direct result of the selection of Alternative D.

Alternate D seeks to optimize the benefits of the refuge to wildlife and people, recognizing that tradeoffs may preclude maximizing benefits to both simultaneously. Alternative D would promote a greater understanding and protection of the fish, wildlife, and their habitats and higher quality, more evenly balanced, recreational and educational programs for visitors.

Under Alternative D, refuge lands would be more intensely managed than at present to provide high quality habitat for wildlife, particularly migratory birds. This would include creating and maintaining additional moist soil units for an annual goal of 1,800 acres of quality moist soil habitat to meet the goals established in the Wildlife and Habitat Management Review, as well as developing methods to maximize use of the Mississippi River's overflow events to provide water for moist soil units. The refuge would establish a banding quota for wood ducks to support the objectives of the Mississippi

Flyway Council, and provide and enhance habitat for woodcock populations to contribute to the objectives of the American Woodcock Management Plan. In addition, the refuge would implement step-down objectives for nongame migratory land birds, as well as for shorebirds and wading birds to support the goals of Partners in Flight.

Fisheries would be emphasized and, where appropriate, restored for native diversity within the floodplain. Refuge habitats will be managed and restored for natural diversity in support of national and regional plans. Forest management will address the need to enhance and develop vertical structure to provide habitat for a diversity of species, particularly priority migrant birds. Any future reforestation efforts will incorporate greater native species diversity.

This alternative would encourage more public recreational and educational uses where appropriate and compatible, while intensifying current habitat management. Hunting and fishing would continue with greater emphasis on the quality of the experience and with more diverse opportunities, including those for youth and for hunters and anglers with disabilities. Education and interpretation would be promoted while providing programs and partnerships with local schools. Wildlife observation and photography opportunities would be expanded, including construction of photo blinds and observation towers. Informational guides and signage that highlight the refuge's management programs, as well as its unique wildlife habitats, would also be developed. The refuge would also undertake efforts to improve road maintenance in order to provide better visitor access.

A visitor center and headquarters office would be constructed on the refuge, with space for interpretation, environmental education, and staff.

Research studies on the refuge would continue to be fostered and partnerships developed with universities and other agencies, with the refuge providing needed resources and study sites. Research on the refuge would also provide benefits to conservation efforts throughout the Lower Mississippi River Valley to preserve, enhance, restore, and manage bottomland hardwood habitat. Inventory and monitoring of birds, freshwater mussels, reptiles, and amphibians would be continued and expanded in order to assess population trends, correlate with environmental pressures, and provide baseline data for use in the development of appropriate management strategies.

Nine additional staff members would be added, including biological, law enforcement, outreach, and maintenance personnel. Providing a wildlife biologist, biological science technician, seasonal maintenance worker, and an additional full-time law enforcement officer would enable the Service to fully develop and manage the refuge's fish and wildlife resources and habitats; provide opportunities and facilities for wildlife observation and photography; provide environmental educational programs that promote a greater understanding of natural resources; and better protect the refuge's natural and cultural resources, as well as its visitors.

Under this alternative, the refuge would continue to acquire lands within the present approved acquisition boundary, for the use of compatible wildlife-dependent public recreation and environmental education opportunities.

Tracts that provide better quality habitat and connectivity to existing refuge lands would receive higher priority for acquisition. The refuge will use other important acquisition tools, including land exchanges, partnerships with conservation organizations, conservation easements with adjacent landowners, leases, and cooperative agreements.

Selection Rationale
Alternative D is selected for implementation because it directs the development of programs to best achieve the Refuge purpose and goals; emphasizes the restoration of open wetland and forest habitats; collects habitat and wildlife data; and ensures long-term achievement of Refuge and Service objectives. At the same time, these management actions provide balanced levels of compatible public use opportunities consistent with existing laws, Service policies, and sound biological principles. It provides the best mix of program elements to achieve desired long-term conditions.

Under Alternatives D, refuge management actions will expand wildlife and habitat programs and enhance public use by focusing on the quality of experiences instead of a quantity of programs and facilities.

Environmental Effects
Implementation of the Service's management action is expected to result in environmental, social, and economic effects as outlined in the comprehensive conservation plan. Habitat management, population management, land conservation, and visitor service management activities on the Complex will result in increased protection for threatened and endangered species; enhanced wildlife populations; habitat restoration; and enhanced opportunities for wildlife-dependent recreation and environmental education. These effects are detailed as follows:

1. Additional staff and resources will create and properly manage the diversity of habitats found on the Refuge, including bottomland hardwoods, shrub/scrub, croplands, moist soil areas, and other wetlands. Active management of these communities will likely result in a greater species diversity and abundance of migratory birds. Baseline data will be collected on populations and habitats and monitoring protocols established. Invasive species will be controlled, which will have a positive effect on the biotic community.

2. Quality wildlife-dependent recreational activities (hunting, fishing, and wildlife observation and interpretation) will continue and environmental education programs will be developed. Improved interpretive and informational programs will increase awareness of the refuge and wildlife and of the mission of the National Wildlife Refuge System.

3. Land will be acquired in an attempt to complete the current approved boundary of the Refuge.

4. Cultural resources will be surveyed, documented, and protected on the Refuge. A new Visitor Center/Headquarters will be constructed.

5. Habitat restoration and management, along with a focus on accessibility and facility developments, will result in improved wildlife-dependent recreational opportunities. While public use will result in some minimal, short-term adverse effects on wildlife, and user conflicts may occur at certain times of the year, these effects are minimized by site design, time zoning, and implementing refuge regulations. Anticipated long-term impacts to wildlife and wildlife habitats of implementing the management action are positive. In the long run, wildlife habitat and increased opportunities for wildlife-dependent recreation opportunities could result in an increase in economic benefits to the local community.

6. Implementing the comprehensive conservation plan is not expected to have any significant adverse effects on wetlands and floodplains, pursuant to Executive Orders 11990 and 11988, as actions will not result in development of buildings and/or structures within floodplain areas, nor will they result in irrevocable, long-term adverse impacts.

Potential Adverse Effects and Mitigation Measures

Wildlife Disturbance

Disturbance to wildlife at some level is an unavoidable consequence of any public use program, regardless of the activity involved. Obviously, some activities innately have the potential to be more disturbing than others. The management actions to be implemented have been carefully planned to avoid unacceptable levels of impact.

As currently proposed, the known and anticipated levels of disturbance of the management action are considered minimal and well within the tolerance level of known wildlife species and populations present in the area. Implementation of the public use program will take place through carefully controlled time and space zoning such as establishment of sanctuary areas, establishment of protection zones around key sites, such as bear dens, closures of unauthorized trails, and routing of new trails to avoid direct contact with sensitive areas, such as nesting bird habitat, etc. All public use activities will be conducted within the constraints of sound biological principles and refuge-specific regulations established to restrict illegal or non-conforming activities. Monitoring activities through wildlife inventories and assessments of public use levels and activities will be utilized, and public use programs will be adjusted as needed to limit disturbance.

User Group Conflicts

As public use levels expand across time, some conflicts between user groups may occur. Programs will be adjusted, as needed, to eliminate or minimize these problems and provide quality wildlife-dependent recreational opportunities. Experience has proven that time and space zonings, such as establishment of separate use areas, use periods, and restricting numbers of users, are effective tools in eliminating conflicts between user groups.

Effects on Adjacent Landowners

Implementation of the management action should not impact adjacent or in-holding landowners. Essential access to private property will continue to be allowed through issuance of special use permits. Future land acquisition will occur on a willing-seller basis only, at fair market values within the approved acquisition boundary. Lands are acquired through a combination of fee title purchases and/or donations and less-than-fee title interests (e.g., conservation easements, cooperative agreements) from willing sellers. Funds for the acquisition of lands within the approved acquisition boundary will likely come from the Land and Water Conservation Fund or the Migratory Bird Conservation Act.

Land Ownership and Site Development

Proposed acquisition efforts by the Service will result in changes in land and recreational use patterns, since all uses on national wildlife refuges must meet compatibility standards. Land ownership by the Service also precludes any future economic development by the private sector. Potential development of access points, trails, and visitor parking areas could lead to minor short-term negative impacts on plants, soil, and some wildlife species. When site development activities are proposed, each activity will be given the appropriate National Environmental Policy Act consideration during pre-construction planning. At that time, any required mitigation activities will be incorporated into the specific project to reduce the level of impacts to the human environment and to protect fish and wildlife and their habitats.

As indicated earlier, one of the direct effects of site development is increased public use; this increased use may lead to littering, noise, and vehicle traffic. While resources and personnel will be allocated to minimize these effects, such allocations make these resources unavailable for other programs.

The management action is not expected to have significant adverse effects on wetlands and floodplains, pursuant to Executive Orders 11990 and 11988.

Coordination
The management action has been thoroughly coordinated with all interested and/or affected parties. Parties contacted include:

All affected landowners
Congressional representatives
Governor of Mississippi
Mississippi Department of Wildlife, Fisheries, and Parks
Mississippi State Historic Preservation Officer
Local community officials
Interested citizens

Findings
It is my determination that the management action does not constitute a major federal action significantly affecting the quality of the human environment under the meaning of Section 102(2)(c) of the National Environmental Policy Act of 1969 (as amended). As such, an environmental impact statement is not required. This determination is based on the following factors (40 C.F.R. 1508.27), as addressed in the Environmental Assessment for St. Catherine Creek National Wildlife Refuge:

1. Both beneficial and adverse effects have been considered and this action will not have a significant effect on the human environment. (Environmental Assessment, pages 115-126).

2. The actions will not have a significant effect on public health and safety (Environmental Assessment, page 109.

3. The project will not significantly affect any unique characteristics of the geographic area such as proximity to historical or cultural resources, wild and scenic rivers, or ecologically critical areas. (Environmental Assessment, page 108).

4. The effects on the quality of the human environment are not likely to be highly controversial. (Environmental Assessment, pages 196-105, and pages 115-126).

5. The actions do not involve highly uncertain, unique, or unknown environmental risks to the human environment. (Environmental Assessment, page 107).

6. The actions will not establish a precedent for future actions with significant effects nor do they represent a decision in principle about a future consideration. (Environmental Assessment, pages 96-105, and page 115-126).

7. There will be no cumulatively significant impacts on the environment. Cumulative impacts have been analyzed with consideration of other similar activities on adjacent lands, in past action, and in foreseeable future actions (Environmental Assessment), page 109.

8. The actions will not significantly affect any site listed in, or eligible for listing in, the National Register of Historic Places, nor will they cause loss or destruction of significant scientific, cultural, or historic resources. (Environmental Assessment, pages 108).

9. The actions are not likely to adversely affect threatened or endangered species, or their habitats. (Environmental Assessment, pages 115-126).

10. The actions will not lead to a violation of federal, state, or local laws imposed for the protection of the environment. (Environmental Assessment, pages 108).

Supporting References

Fish and Wildlife Service. 2005. Draft Comprehensive Conservation Plan and Environmental Assessment for St. Catherine Creek National Wildlife Refuge, Sibley, Mississippi. U.S. Department of the Interior, Fish and Wildlife Service, Southeast Region.

Document Availability

The Environmental Assessment was Section B of the Draft Comprehensive Conservation Plan for the St. Catherine Creek National Wildlife Refuge and was made available in November 2005. Additional copies are available by writing: U.S. Fish and Wildlife Service, 1875 Century Boulevard, Atlanta, GA 30345.

for Sam D. Hamilton
Regional Director

July 10, 2006
Date