

**DRAFT
COMPREHENSIVE CONSERVATION PLAN
AND
ENVIRONMENTAL ASSESSMENT**

**NORTH MISSISSIPPI NATIONAL WILDLIFE REFUGE COMPLEX
GRENADA, MISSISSIPPI**

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I. Background

INTRODUCTION

The U.S. Fish and Wildlife Service (Service) has developed this Draft Comprehensive Conservation Plan (CCP) to provide a foundation for the management and use of the North Mississippi National Wildlife Refuge Complex (Complex), headquartered in Grenada, Mississippi. The plan is intended to serve as a working guide for the Complex'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 (NEPA) of 1969. Compliance with NEPA is being achieved through the involvement of the public and the inclusion of an Environmental Assessment (EA) in Section B. When fully implemented, this plan will strive to achieve the vision and purposes of each refuge within the Complex.

The plan's overriding consideration is to carry out the purposes for which each 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 has been prepared by a planning team composed of representatives from each of the refuges in the Complex; the Service's Jackson, MS Ecological Services field office; and the Mangi Environmental Group, a contractor. In developing this plan, the planning team and refuge staff have incorporated the input of the Mississippi Department of Wildlife, Fisheries, and Parks, other agencies, non-governmental organizations, local citizens, the public, and stakeholders. This public involvement and the planning process itself are described in the Plan Development section (Chapter III).

The plan represents the Service's preferred alternative and is being put forward after considering three other alternatives, as described in the accompanying EA. After reviewing public comments and management needs, the planning team developed these alternatives in an attempt to determine how to best meet the goals and objectives of the Complex. The proposed alternative is the Service's recommended course of action for the future management of the Complex, and is embodied in this CCP.

PURPOSE AND NEED FOR PLAN

The purpose of this Comprehensive Conservation Plan is to identify the role that the Complex will play in support of the mission of the National Wildlife Refuge System, and to provide long-term guidance to the refuges' management programs and activities. The plan is needed to:

- Provide a clear statement of direction for the future management of the Complex;
- Provide neighbors, visitors, non-governmental partners, and government officials with an understanding of the Service's management actions on and around the Complex;

- Ensure that the Service’s management actions, including land protection and recreational and educational programs, are consistent with the mandates of the National Wildlife Refuge System Improvement Act of 1997;
- Ensure that the management of the Complex considers federal, state, and county plans; and
- Provide a basis for the development of budget requests for the Complex’s operational, maintenance, and capital improvement needs.

A critical management consideration for the Service is to communicate with the public and include public participation in its efforts to carry out the mission of the National Wildlife Refuge System. Many agencies, organizations, institutions, businesses, and private citizens have developed relationships with the Service to advance the goals of the Refuge System.

This Draft CCP supports the Partners-in-Flight Initiative, Lower Mississippi Valley Migratory Bird Wetland Conservation Initiative, North American Waterfowl Management Plan, Western Hemisphere Shorebird Reserve Network, National Woodcock Management Plan, and the National Wetlands Priority Conservation Plan.

THE 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 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 NATIONAL WILDLIFE REFUGE SYSTEM

The National Wildlife Refuge System (Refuge System) manages over 96 million acres on over 540 refuges throughout the nation including Puerto Rico and the U.S. Virgin Islands. This is the largest collection of lands on earth specifically managed for wildlife. The mission of the Refuge 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 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 CCP 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, cumulatively referred to as ecological integrity, 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 CCPs for all refuges. The development of these plans is ongoing nationally. Consistent with the Act, all CCPs 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, 16 years and older, fished, hunted, or observed wildlife, generating \$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 surrounding communities grew to 120 per refuge, up from 87 jobs in 1995, pouring more than \$2.2 million into local economies. 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 Refuge System, surrounding communities benefited with \$4.43 in recreation expenditures and \$1.42 in job-related income (Caudill and Laughland, unpubl. data).

Volunteerism continues to be a major contributor to the successes of the Refuge System. In the Southeast Region for 2004: 6,349 volunteers supported 125 stations and contributed 293,937 hours, a service valued at \$5,052,777.

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.
- Ecological integrity must be maintained.
- Growth of refuges must be strategic.
- The National Wildlife Refuge System serves as a model for habitat management with broad participation from others.

NORTH MISSISSIPPI NATIONAL WILDLIFE REFUGE COMPLEX COMPREHENSIVE CONSERVATION PLAN

This draft CCP for the North Mississippi National Wildlife Refuge Complex, consisting of three national wildlife refuges – Coldwater River, Dahomey, and Tallahatchie – as well as a number of smaller fee title properties and floodplain and conservation easements, is being prepared as mandated by the National Wildlife Refuge System Improvement Act of 1997 to guide management actions and direction for the Complex over the next 15 years. Fish and wildlife conservation will receive first priority in refuge management; wildlife-dependent recreation will be allowed and encouraged as long as it is compatible with, or does not detract from, the legislated purposes of the three refuges that make up the Complex.

LEGAL POLICY CONTEXT

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. Refer to Appendix F for a complete listing of relevant legal mandates.

By law, lands within the National Wildlife Refuge System are closed to public use unless specifically opened. All programs and uses must be evaluated based on mandates set forth in the National Wildlife Refuge System Improvement Act of 1997. Those 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.

RELATIONSHIP TO THE MISSISSIPPI DEPARTMENT OF WILDLIFE, FISHERIES, AND PARKS

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 (MDWFP) (<http://www.mdwfp.com>) is a state-partnering agency with the Service, charged with enforcement responsibilities for migratory birds and endangered species, as well as managing the state's natural resources. The total area owned or managed by the State of Mississippi in support of wildlife, recreation, and fisheries is 828,408 acres, including 42 wildlife management areas (WMA's), 29 state parks encompassing 823,297 acres; and 21 lakes totaling 5,111 acres.

The MDWFP directs the state's wildlife conservation program and provides public recreation opportunities, including an extensive hunting and fishing program, on several WMAs and parks located near the Complex. The MDWFP's participation and contribution throughout this CCP process has been invaluable, and is continuing 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 have the MDWFP staff participated in biological reviews, public meetings, and field reviews as part of the CCP process, they also are an active partner in annual hunt coordination planning and various wildlife and habitat surveys. Two of the three refuges in the Complex, Dahomey and Tallahatchie, have an active hunting and fishing program conducted in cooperation with the MDWFP. A key part of the CCP process is the integration of common objectives between the Service and the MDWFP, where appropriate.

ASSISTANCE TO PRIVATE LANDOWNERS

Service policy for involvement with private landowners in developing and implementing habitat improvement projects was outlined in the National Wildlife Refuge System Improvement Act (NWRISA) of 1997 and the Partners for Fish and Wildlife (PFW) Program. Additional authorities reside within the Fish and Wildlife Act (1956) and the Fish and Wildlife Coordination Act (1934).

Section 5, Item (4) (E) of the National Wildlife Refuge System Improvement Act of 1997 specifically states that the Service shall "ensure effective coordination, interaction, and cooperation with owners of land adjoining refuges and the fish and wildlife agency of the States in which the units of the Refuge System are located."

The PFW Program Policy states that in ranking and selecting private lands projects for funding and technical assistance, the highest priority shall be placed on those projects that would provide important and direct benefits to the goals and objectives of any nearby units of the National Wildlife Refuge System.

Most of the land within the Complex work area is privately owned. These privately owned lands should play an important role in the restoration and reestablishment of native habitats needed to support the diverse fish and wildlife resource 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.

The Service has several existing programs that are dedicated 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 currently resides within the PFW Program. Additional funding and technical assistance for private lands are also available through several other Service-funded programs, including the Challenge Cost-Share Program (CCS), the Mississippi Partners for Wildlife Program, Migratory Birds Program, and several grant programs within the Threatened and Endangered Species Program.

Under the PFW Program, landowners may receive up to \$25,000 for on-the-ground project implementation. Exceptions to the \$25,000 limit per private landowner may be requested in unique or special circumstances. PFW projects typically receive a minimum 50% in-kind cost share and require a minimum 10-year commitment from the landowner. Typically, landowner agreements are for more than 20 years. Since the PFW Program was initiated 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 River Valley (LMRV). Over the past several years, the PFW Program has provided from between \$350,000 to \$400,000 in project funds each year for projects within the entire LMRV.

The Mississippi Partners for Wildlife Program is funded separately from the PFW Program, receiving funding primarily through the Service's Refuge Challenge Cost-Share Program. The CCS Program also requires at least a 50% cost share from other partners. In Mississippi, this partnership involves private landowners, Ducks Unlimited, and the MDWFP. Approximately \$50,000 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 (USDA) 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 (WRP), the Conservation Reserve Program (CRP), 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 WRP, administered by the Natural Resources Conservation Service (NRCS), 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. The 2002 Farm Bill provides authorization for over 1,000,000 additional acres at a rate of approximately 250,000 acres per year. Much of the enrolled acreage for the WRP (over 45%) has previously come from the LMRV.

All of the various conservation programs under the Farm Bill have specific eligibility and other important project selection criteria. This information is readily available through the Internet or from USDA, and Service biologists assigned to work with private landowners are very knowledgeable about these programs.

LOWER MISSISSIPPI RIVER VALLEY ECOSYSTEM

OVERVIEW

The North Mississippi National Wildlife Refuge Complex lies within a physiographic region known as the Lower Mississippi River Alluvial Valley (LMRV; Figure 1). The LMRV was once a 25-million-acre complex of forested wetlands that extended along both sides of the Mississippi River from Illinois to Louisiana. Historically, the extent and duration of seasonal flooding from the Mississippi River fluctuated annually, recharging the LMRV's aquatic systems and creating a rich diversity of dynamic habitats that supported a vast array of fish and wildlife resources.

ECOLOGICAL THREATS AND PROBLEMS

Forest Loss and Fragmentation

The LMRV has changed markedly over the last 100 years as civilization spread throughout the region. Since European settlement, it has been estimated that 20 million acres of bottomland forested wetlands have been lost (Figure 2). The greatest changes to the landscape have been in the form of land clearing for agriculture and flood control projects.

Although these changes have allowed people to settle and earn a living in the area, they have had a tremendous effect on biological diversity, biological integrity, and environmental health of the Lower Mississippi River Alluvial Valley. Immense areas of bottomland hardwood forests have been reduced to forest fragments ranging from very small tracts just a few acres in size, with limited functional value, to a few large areas of more than 10,000 acres that have maintained many of the original functions and values of bottomland hardwood forest. Species endemic to the LMRV that have become extinct, endangered, or threatened include the red wolf, Florida panther, ivory-billed woodpecker, and Louisiana black bear.

Breeding bird surveys show continuing declines in species and species populations. The avian species most adversely affected by fragmentation include those that are area-sensitive (dependent on large continuous blocks of hardwood forest); those that depend on forest interiors; those that depend on special habitat requirements, such as mature forests or a particular food source; and/or those that depend on good water quality.

More than 70 species of breeding migratory songbirds are found in the region. Some of these species, including Swainson's warbler, prothonotary warbler, wood thrush, and cerulean warbler, have declined significantly and need large forested blocks to recover, survive, and thrive.

Fragmentation of bottomland hardwood forests has left many of the remaining forested tracts as biological oases surrounded by inhospitable agricultural lands. Intensive agriculture has removed most of the forested corridors along sloughs that formerly connected forest patches. The loss of connectivity between the remaining forested tracts hinders the movement of wildlife between tracts and reduces the functional values of many remaining smaller forest tracts. The lost connections also result in a loss of gene flow needed to maintain genetic viability and diversity within wildlife populations. Restoring the connections to allow gene flow and reestablish travel corridors is particularly important for some wide-ranging species.

Figure 1. Lower Mississippi Alluvial Valley

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

Alterations to Hydrology

In addition to the loss of vast acreage of bottomland-forested wetlands, there have been significant alterations in the region's hydrology due to urban development, river channel modification, flood control levees, reservoirs and deforestation, as well as degradation to 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 (Fredrickson and Heitmeyer 1988).

Instead of natural hydrology, large-scale, man-made hydrological alterations have changed the spatial and temporal patterns of flooding throughout the entire LMRV. In addition, these alterations have reduced both the extent and duration of annual seasonal flooding (with some conspicuous exceptions, like most of the Coldwater River Refuge). 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. Because wetlands depend on a dynamic interface of hydrologic regimes to maintain water, vegetation, and animal complexes and processes, restoration is especially difficult (Mitsch and Gosselink 1993).

Siltation of Aquatic Ecosystems

Aquatic systems, including lakes, rivers, sloughs, and bayous, have been degraded as a result of deforestation and hydrologic alteration. 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, the non-point source runoff of excess nutrients and contaminants is threatening the area's remaining aquatic resources.

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 like 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 (non-native) vegetation capable of aggressive growth is further threatening viability of aquatic systems. These invasive aquatic species threaten the natural aquatic vegetation important to aquatic systems, and choke waterways to a degree that often prevents recreational use.

Furthermore, non-native wildlife and fish have been successfully introduced or released in this temperate climate. Animals like the nutria compete with native wildlife for limited resources and many, like feral hogs, have caused extensive habitat damage and alterations.

CONSERVATION PRIORITIES AND INITIATIVES

Declines in the LMRV's bottomland hardwood forests and their associated fish and wildlife resources have prompted the Service to designate this forest system as an area of special concern. A collaborative effort involving private, state, and federal conservation partners is now underway to implement a variety of tools to restore the functions and values of wetlands in the LMRV. The goal is to prioritize and manage wetlands to most effectively maintain and possibly restore the biological diversity in the LMRV. Some areas are prioritized as focus areas for reforestation.

It is widely recognized, however, that most of the 20+ million acres of forested wetlands that have been cleared and converted to other uses in the LMRV will not be reforested. Some areas would have lower value for reforestation and are targeted for intensive management for non-forest-dependent species, such as waterfowl and shorebirds. Through cooperative efforts, apportioning resources, and the focusing of available programs, the LMRV's biological diversity can be improved.

North American Waterfowl Management Plan Lower Mississippi Valley Joint Venture

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

The initial LMRVJV effort has expanded to also establish population objectives for shorebirds and neotropical migratory forest-nesting birds. The LMRVJV 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 LMRV.

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 (PIF) in 1990. PIF 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 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. PIF has a number of initiatives underway, including a North American Landbird Conservation Plan.

Migratory Bird Conservation Zones

Another cooperative private-state-federal partnership involving the North American Waterfowl Management Plan, PIF, and the LMRVJV has identified a number of Migratory Bird Conservation Zones. LMRV Forest Bird Conservation Areas are shown in Fig. 3. The three refuges in the Complex are identified in these zones and are core areas. 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, like the Louisiana black bear, that prefer and thrive in large forested blocks.

Most MBCZs 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 LMRV, 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. Oftentimes, management for one species or species group 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 Dahomey NWR 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 land (Reinecke and Baxter 1996). 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 LMRV. The North Mississippi National Wildlife Refuge Complex uses a system of levees, water control structures, pumps, and wells to provide dependable seasonally flooded croplands and moist soil areas as part of its waterfowl and shorebird habitat step-down objectives. If totally reforested, the Complex would not be able to meet its waterfowl/shorebird habitat step-down objectives. Setting habitat and species objectives from the perspective of the LMRV is advantageous because it looks at the regional context (i.e. the “big picture”) and enables managers to plan and provide habitat for a diversity of species throughout their range.

Figure 3. Lower Mississippi Alluvial Valley Forest Bird Conservation Areas

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 the flooding and drying regime drives the ecosystem in the LMRV. The plant and animal communities throughout the LMRV 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 LMRV. Ditches can be plugged and structures installed to control and manage water in an effort to mimic historic flood cycles and to meet waterfowl/shorebird habitat objectives.

II. The Complex

INTRODUCTION AND HISTORY

The North Mississippi National Wildlife Refuge Complex, formerly the Mississippi Wetland Management District, is comprised of three distinct work areas. Each contains a national wildlife refuge and all Farmer Home Administration (FmHA) tracts within that area. The three refuges plus 128 FmHA properties total 33,746 acres, with the Complex headquartered in Grenada (Figure 4). Since the Complex was established in 1989 and assigned administrative responsibility for Coldwater River, Dahomey, and Tallahatchie NWRs, the overriding collective thrust has been the creation, restoration, and enhancement of wetlands on public and private lands. The Complex provides habitat for large concentrations of wintering waterfowl and numerous species of neotropical migrants (Public Use Review, 1,3).

The Complex has a staff of ten full-time permanent employees (Table 1). In 2004, 42 volunteers contributed approximately 1,000 hours towards wildlife and maintenance projects for Dahomey NWR and Tallahatchie NWR. There are also active Youth Conservation Corps (YCC) and internship programs.

PURPOSE AND ECOSYSTEM CONTEXT

Although the Complex has an overriding purpose of providing for the habitat needs of migratory birds, with an emphasis on waterfowl, each refuge within the Complex has a unique purpose and establishing legislation. For this plan, we are combining the refuges due to their proximity to each other, the similarity of issues and habitats, shared management and personnel, and in order to address the value of managing these refuges as a true complex of lands within the LMRV. The collective goals, objectives, and strategies of the complex will not detract from, but rather support the individual purposes guiding each refuge in the Complex.

WINTERING HABITAT FOR WATERFOWL

The LMRV is a critical ecoregion for wintering North American migratory waterfowl (Reinecke et al., 1989). The Complex provides important foraging and resting (refuge) habitats within the LMRV for migratory ducks and geese and thus fits into the large-scale, collaborative planning and habitat management initiative called the North American Waterfowl Management Plan (NAWMP), described in Chapter I of this CCP. NAWMP selected the Lower Mississippi Valley Joint Venture (LMRVJV) as one of the wintering habitat focus areas. One of the LMRVJV's first tasks was to find a model or decision tool for determining how much habitat was needed and a way to relate this objective to the population goals of NAWMP. The solution was to view wintering areas as responsible for contributing to the spring breeding population goals of NAWMP proportional to the percentage of ducks historically counted in wintering areas (Loesch et al., 1994, Reinecke and Loesch 1996).

Figure 4. Regional vicinity map of North Mississippi National Wildlife Refuge Complex

Table 1. Acres managed by current staffing, North Mississippi National Wildlife Refuge Complex

Refuge Headquarters	Refuges Managed	Acres Managed	Complex/Refuge Staff
Complex Headquarters (located in Grenada, MS)	Coldwater River NWR (2,374 acres) Dahomey NWR (9,431 acres) Tallahatchie NWR (4,199 acres)	16,004 acres in NWRs (fee title) + 260 acres (school board lease) + 17,212 acres in 128 FmHA tracts = 33,476 total acres managed by complex	Project Leader (GS-13) Refuge Manager (GS-12) Dahomey: Refuge Manager (GS-12) Private Lands Biologist (GS-12) Wildlife Biologist (GS-12) Refuge Operations Specialist (GS-9) Park Ranger (GS-9)-vacant Office Automation Assistant (GS-7) Equipment Operator x2 (WG-10)
Complex Staff TOTAL			10

There is currently no staff based at Coldwater River or Tallahatchie NWRs. Development/management there is handled by the North Mississippi National Wildlife Refuge Complex.

Sources: *Biological Review (2003), Public Use Report (2002) and 2002 Annual Narrative*

Table 2. Land acquisition history, North Mississippi National Wildlife Refuge Complex

YEAR	Coldwater River NWR (acres)	Dahomey NWR (acres)	Tallahatchie NWR (acres)
2003			116
2001	306		
1997			1,656
1996	298	260	
1995	40		
1993		9,269	
1992			1,870
1991	1,730	162	557
TOTAL	2,374	9,691	4,199

Source: USFWS – Realty

Table 3. Location of each refuge, North Mississippi National Wildlife Refuge Complex

Refuge	County	Location
Coldwater River	Quitman/Tallahatchie	five miles south of Crowder, MS on Dummy Line Road
Dahomey	Bolivar	ten miles southwest of Cleveland, MS and 22 miles northeast of Greenville
Tallahatchie	Grenada/Tallahatchie	nine miles west of Holcomb, MS on U.S. Highway 8

Table 4. Establishment date, legislation, and purpose of each refuge within the North Mississippi National Wildlife Refuge Complex

Refuge	Year Established	Establishment Legislation	Refuge Purpose
Coldwater River	1991 as Black Bayou unit of Tallahatchie NWR 2000 as "stand alone" refuge	Migratory Bird Conservation Act; Consolidated Farm and Rural Development Act	"...for use as inviolate sanctuary, or for any other management purpose, for migratory birds," and for conservation purposes, under the Consolidated Farm and Rural Development Act
Dahomey	1992	Migratory Bird Conservation Act; Fish and Wildlife Act of 1956; Emergency Wetlands Resource Act of 1986	"...for use as inviolate sanctuary, or for any other management purpose, for migratory birds," "...for the development, advancement, management, conservation, and protection of fish and wildlife resources..." and "for the conservation of the Wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions."
Tallahatchie	1991	Migratory Bird Conservation Act, Consolidated Farm and Rural Development Act	"...for use as inviolate sanctuary, or for any other management purpose, for migratory birds," and for conservation purposes, under the Consolidated Farm and Rural Development Act

To contribute ducks to spring populations, wintering areas have to provide sufficient habitat to ensure adequate winter survival. To quantify winter habitat requirements, the LMRVJV had to identify limiting factors and the LMRVJV assumed foraging habitat was most likely to limit waterfowl populations in the LMRV (Reinecke et al. 1989). The methodology for doing so is discussed more thoroughly in the 2002 Biological Review for the Complex.

The LMRVJV has established habitat objectives for the LMRV. These objectives were 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 habitats is required to provide an important part of the food resources (e.g., native weed seeds, small grains, and invertebrates) required by waterfowl wintering in the LMRV. Agricultural grains are high in carbohydrates (i.e., “hot foods”) needed by waterfowl to maintain body temperature during cold periods in winter. Acorns and other native weed seeds (moist-soil seeds) and invertebrates provide higher levels of protein and other nutrients used by waterfowl to complete other important functions during the winter period, such as molting and improving body condition for return migration to the breeding grounds as well as egg-laying. These objectives have been stepped down for private and public lands throughout the LMRV, including the North Mississippi National Wildlife Refuge Complex. They are shown in Table 5.

Table 5. Migrating and wintering waterfowl foraging habitat objectives established by the LMRVJV for the Complex (acres)

Habitat	Objective (Acres)	Current Capability (Acres)	(+/-Acres)
Coldwater River NWR			
Forested wetland	700	0 ¹	-700
Scrub-shrub	0	31	+ 31
Moist-soil	190	190 ²	0
Unharvested cropland	0	0	0
Dahomey NWR			
Forested wetland	750	440	-310 ³
Moist-soil	318	200 ⁴	-118
Unharvested cropland	218	84 ⁵	-134
Harvested cropland	0	253 ⁵	+253
Tallahatchie NWR			
Forested wetland	80	0	-80 ⁶
Moist-soil	852	690	-162
Unharvested cropland	212	50	-162
FmHA			
Forested wetlands	0	0	0
Moist-soil	3,000	0 ⁷	-3,000
Unharvested crop	0	0	0

¹ 700-acre reforested area with water management capability (currently not functional) could serve as a greentree reservoir in the future.

² Current capability is actually 415 acres of which 225 acres are devoted to fall migrating shorebird habitat.

³ Ducks Unlimited MARSH Agreement assumes 800 acres flooded, refuge estimates 750 acres are flooded, actual acres flooded is estimated to be 440 acres.

⁴ Assumes one of two 100-acre impoundments on the south end of the refuge is in moist-soil every year.

⁵ Assumes that agricultural grain crops are cooperatively farmed at a 75:25 exchange rate, with the refuge receiving 25% unharvested crop that is left in the field and 75% of the crop harvested; all is flooded in winter.

⁶ 100-acre reforested area with water management capabilities could possibly serve as a greentree reservoir in the future.

⁷ Foraging habitat capabilities on these properties are unknown due to the lack of accurate information.

HABITAT FOR FOREST-DEPENDENT BIRDS

Despite being highly fragmented, the productive hardwood forests of the Mississippi Delta play an important role in providing migration and breeding habitat for forest-breeding birds, as well as those dependent on forests for other activities such as foraging or wintering. By increasing block size and improving timber stand structure, this habitat has the potential to provide much greater benefit for this wide variety of non-game birds, many of which are listed in Table 6.

Table 6. Forest-dependent birds in the Complex work area

Species	Priority	Use	Preferred habitat
Swainson's warbler	Extremely high	Nesting Foraging	Dense understory Open moist ground
Cerulean warbler	Extremely high	Breeding, nesting & foraging	Canopy of sawtimber trees (mature timber)
Swallow-tailed kite	Extremely high	Breeding & nesting	Superemergent trees, possibly cypress
Prothonotary warbler	High	Breeding	Cavity nester – usually in trees above open water
Red-headed woodpecker	High	Breeding	Cavity nester
Northern parula	High	Breeding	Canopy, usually with Spanish moss
Kentucky warbler	High	Breeding	Nests in patches of dense ground cover
Yellow-billed cuckoo	High	Breeding	Midstory and canopy
Wood thrush	High	Breeding Foraging	Midstory Moist ground
American woodcock	High	Foraging	Open moist ground but under very dense understory cover
Black duck	High	Wintering	Open water
Wood duck	Moderate	Breeding	Cavity nesting over or near open water
Acadian flycatcher	Moderate	Breeding	Open midstory
Eastern wood-pewee	Moderate	Breeding	Open canopy
Carolina chickadee	Moderate	Breeding	Cavity nester
Mississippi kite	Moderate	Breeding	nests in trees along edges in open country
Baltimore oriole	Moderate	Breeding	Scattered hardwoods in open country
Ruby-throated hummingbird	Moderate	Breeding	Woody vegetation in moist habitats, usually near tubular flowers
Blue-gray gnatcatcher	Moderate	Breeding	Mature and moist hardwood forests

Species	Priority	Use	Preferred habitat
Hooded warbler	Moderate	Breeding	Dense understory
Bald eagle	Moderate	Breeding	Nests in superemergent trees large enough to support massive nests
Rusty blackbird	Moderate	Wintering	Winter roost in canopy; forages on the ground
Yellow-throated warbler	Local/regional interest	Breeding	Canopy, usually with Spanish moss
American redstart	Local/regional interest	Breeding	Hardwood forests, usually near water
Yellow-throated vireo	Local/regional interest	Breeding	Open canopy
Summer tanager	Local/regional interest	Breeding	Open canopy
Pileated woodpecker	Local/regional interest	Breeding	Mature and extensive forest, with dead trees for nesting

As it has with setting waterfowl habitat objectives, the LMRVJV has undertaken a coordinated effort to identify Bird Conservation Areas (BCA's) throughout the LMRV for restoration of forest blocks that support sustainable breeding populations of area-sensitive, high priority forest-breeding bird species. There are seven BCA's in the Complex work area with established forest block size objectives (Table 7). Selective reforestation through private land programs or expansion of existing refuges would contribute toward forest block objectives.

Overall future desired condition of mature wetland forests would be to emphasize (1) increasing stand structural diversity by favoring retention of largest trees (removing surrounding potentially competing trees), (2) opening up stands to allow light to reach the ground in support of better understory structure, and (3) group selection-sized openings to further structural complexity and support regeneration of shade-intolerant tree species (oaks) where needed.

Table 7. Bird Conservation Area (BCA) forest core acreages and deficit in the Complex work area

BCA Name	Core goal	Core acreage	Deficit
Coldwater Creek (Coldwater River NWR)	2,100	0	-2,100
Coahoma	8,106	14,216	Achieved
O'Keefe	2,100	472	-1,628
Tunica	5,200	15,383	Achieved
Malmaison (Tallahatchie NWR)	5,200	6,654	Achieved
Dahomey (Dahomey NWR)	2,100	521	-1,579
Whittington	7,300	37,215	Achieved

A core forest area is that contiguous block of interior forest that is 1.6 miles from all forest edges. This protective core forest habitat is essential to many of the highest priority bird species, such as the cerulean warbler and swallow-tailed kite. Based on this definition, Dahomey is the only refuge of the three in the Complex to have sufficient acreage to refer to its core forest habitat. Research has shown that up to 20-30% of a study tract can be degraded by fragmentation before neotropical migrant songbirds begin treating a contiguous tract as separate patches. If a mile buffer (in which there have been substantial encroachments) within the BCA surrounding Dahomey NWR is included in this calculation, the 20-30% figure has already been surpassed. Managed early successional openings of between one and five acres that serve as habitat for resident and migratory wildlife game species are not considered to impact the block nature of the forest tract [BioReview, 37-38].

One species of interest, the American woodcock, is showing significant long-term declines in the eastern United States. Habitat loss, including the loss of preferred, safe, nocturnal wintering habitats, is likely a key factor. The Complex may be important in helping the Service to meet its objectives in the North American and Regional Woodcock Management Plans. Woodcock/quail management is an explicit goal of Coldwater River NWR [BioReview, 43].

SCRUB-SHRUB HABITAT

Scrub-shrub (or early successional) associated birds are another group of vulnerable avian species within the southeast (see Table 8). These species are generally considered a lower priority than mature forest species within the LMRV, but some species may benefit temporarily during the early years of reforestation, especially the white-eyed vireo, painted bunting, orchard oriole, and Bell's vireo. However, good opportunities exist for overall effective bird conservation through the establishment and maintenance of scrub-shrub sites throughout the Complex, including edges and small blocks within existing refuges and FmHA tracts. Many of these FmHA tracts are generally isolated from larger forest blocks.

Table 8. Scrub-shrub associated birds in the Complex work area

Species	Priority	Use	Preferred habitat
Breeding			
Painted bunting	High	Breeding	Dense thickets of shrubs, saplings, or second-growth trees
White-eyed vireo	High	Breeding	Dense and usually moist thickets
Bell's vireo	High	Breeding	Streamside thickets or upland scrub oaks
Orchard oriole	High	Breeding	Scattered hardwood trees in open country
Yellow-breasted chat	Moderate	Breeding	Dense cover of shrubs or saplings
Northern bobwhite	Moderate	Breeding	Ground-nester
Field sparrow	Moderate	Breeding? Wintering	
Transients			
Golden-winged warbler	Extremely high		
Cerulean warbler	High		

Species	Priority	Use	Preferred habitat
Transients			
Blue-winged warbler	High		
Bay-breasted warbler	High		
Canada warbler	High		
Blackburnian warbler	High		
Palm warbler	High		
Bobolink	High		
Veery	High		
Philadelphia vireo	High		
Black-billed cuckoo	Moderate		
Olive-sided flycatcher	Moderate		
Willow flycatcher	Moderate		
Least flycatcher	Moderate		
Chestnut-sided warbler	Moderate		
Black-throated green warbler	Moderate		
Mourning warbler	Moderate		

Scrub-shrub species apparently are able to withstand cowbird and depredation problems better within smaller blocks of habitat (i.e., 50-100 acres, possibly as small as 25-acre patches) than mature forest priority species, many of which require thousands of contiguously forested acres. With better information, the project leader and his staff may want to consider targeting certain sites for this habitat phase. Sites selected for long-term maintenance of scrub-shrub will require periodic disturbances. One option for minimizing the frequency of disturbance (to set back succession) necessary to maintain scrub-shrub habitat would be to plant areas with native fruit-producing, shrub species such as plum, swamp dogwood, devil's-walking-stick, deciduous holly, and various species of hawthorn.

GRASSLAND HABITAT

The emphasis on "grassland" habitat conditions used by high priority species on the Complex is likely restricted to forest restoration sites actually more often dominated by "brushy" annuals. Priority grassland species are mostly found at the Complex during migration and winter, but a few species may breed in small numbers (Table 9). Recently planted reforestation sites constitute the primary habitats on the refuges. However, higher sites with sandy soils (i.e., poorer quality sites) dominated by broomsedge (*Andropogon* spp.) should be maintained in particular for wintering LeConte's sparrows. Priority grassland species include sparrows (principally LeConte's, but also grasshopper and possibly lark), sedge wren, bobolink, and raptors (most notably bald eagle, northern harrier, short-eared owl, and loggerhead shrike).

Table 9. Grassland-dependent birds in the Complex work area

Species	Priority	Use	Preferred habitat
Henslow's sparrow	High	Wintering	
LeConte's sparrow	High	Wintering	
Sedge wren	High	Wintering	
Short-eared owl	High	Wintering	
Dickcissel	Moderate	Breeding	Herbaceous cover where vegetation is at least 2 feet high
Northern bobwhite	Moderate	Breeding	Ground-nester
Loggerhead shrike	Moderate	Breeding Foraging	Tree or shrub nesting Forages on ground
Field sparrow	Moderate	Breeding Wintering	scattered saplings, shrubs, and tall herbaceous cover; wintering - dense cover of herbs, particular tall composites
Northern harrier	Moderate	Wintering	
Grasshopper sparrow	Moderate	Wintering	
Field sparrow	Moderate	Breeding? Wintering	

HABITAT FOR MIGRATING SHOREBIRDS

Throughout the LMRV, habitat for spring (northward) shorebird migration is probably provided in most years with normal rainfall and evaporation rates. Peak migration is expected 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 LMRV and the lack of rainfall in this highly modified hydrological environment have led to a severe shortage of fall habitat for shorebirds. Opportunities do exist however to provide good quality habitat for southbound migrants in fall. A focus on providing shorebird habitat is considered the highest non-game bird priority for the Complex. The LMRVJV-coordinated shorebird (fall migration) habitat objective for Coldwater River NWR is 225 acres of mudflats and for former FmHA tracts is currently listed as an additional 100-200 acres.

Within the larger context, about 1,500 acres of habitat have been tentatively identified for Mississippi towards supporting a tentative LMRV population objective of 500,000 shorebirds during southbound migration.

High priority shorebird species include the stilt sandpiper, buff-breasted sandpiper, western sandpiper, short-billed dowitcher, and Wilson's phalarope. Those of moderate priority are the semipalmated sandpiper, sanderling, greater yellowlegs, dunlin, common snipe, least sandpiper, willet, American avocet, and killdeer.

HABITAT FOR MARSHBIRDS AND COLONIAL WATERBIRDS/WADING BIRDS

Secretive marshbirds, including rails and bitterns, are mostly found on the Complex during migration and winter, but may breed in small numbers. Ricefields, moist soil units, and unmanaged herbaceous marsh dominated by cattail, rushes, and other perennials constitute the primary habitats on the Complex. Management for these species coincides well with ongoing wetland restoration practices on many of the former FmHA sites and, to a lesser degree, management practices targeting waterfowl. Included in this group are “secretive marshbirds” (e.g., rails, bitterns, grebes, moorhens, and coots) and raptors (most notably bald eagle and northern harrier).

Complex holdings support several colonial wading bird rookeries. Shallow water areas found on the refuge during late summer and fall provide critical foraging opportunities for long-legged wading birds such as wood storks, herons, egrets, and ibis. The primary management tools are to 1) protect rookeries from disturbance and, where possible, maintain standing water under nest trees throughout the nesting season to minimize nest predation by raccoons, and 2) incorporate water level management for wading birds into shallow water management for waterfowl and shorebirds. In the shallow water provided for wading birds, they will be searching for foraging habitat rich in small fish and crustaceans, a much different food source than is targeted in waterfowl and shorebird management.

High priority species are the least tern (interior population-foraging on open water), white ibis (breeding?, migrant), and the American white pelican (wintering). Species of local or regional interest include the wood stork (migrant), roseate spoonbill (migrant), glossy ibis (migrant), double-crested cormorant (breeding, wintering), anhinga (breeding), great blue heron (breeding), great egret (breeding), snowy egret (breeding), little blue heron (breeding), cattle egret (breeding), green heron (breeding), yellow-crowned night-heron (breeding).

MONITORING RAPTORS

The Complex has two records (from August 1999) of one extremely high priority raptor: the swallow-tailed kite (migration, breeding - nest in superemergent trees, possibly cypress). However, these individuals appear to have been dispersing juveniles rather than residents. The Complex also has several species of moderate priority, including the Mississippi kite (breeding - nest in trees along edges in open country), loggerhead shrike (breeding - nest in tree or shrub, forages on ground, wintering), northern harrier (wintering), and bald eagle (wintering, nesting possible - nests in superemergent trees large enough to support massive nests). The Complex will identify and monitor year round occurrence and abundance of raptors.

REPLICATING HISTORIC FOREST CONDITIONS

About 80 percent of the forestlands in the LMRV has been cleared and converted to other land uses, leaving only remnant, fragmented forested tracts. Fish and wildlife resources have been similarly impacted, leaving remnant populations that must be managed to meet refuge purposes and to achieve their maximum potential. Some of the most unique forested habitats remaining in the delta are forested ridges. Because of the importance of the remaining delta forests to the wildlife resources on the Complex and 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 areas almost exclusive of other habitats. Mallards, gadwall, and wigeon all utilize flooded forested habitat as one of the complex of preferred habitats.

Flooding of forest habitat 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 given stands should not be flooded.

LEGAL POLICY

The administration of the Complex is guided by a variety of international treaties, federal laws, and Presidential executive orders. Management options under each refuge's establishing authority and the National Wildlife Refuge System Improvement Act of 1997 (the legal and policy guidance for the operation of national wildlife refuges) are contained in the documents and acts listed in Appendix H.

RESOURCE AND MANAGEMENT DESCRIPTIONS

COLDWATER RIVER NATIONAL WILDLIFE REFUGE

Coldwater River NWR, formerly the Black Bayou Unit of the Tallahatchie NWR, consists of 2,469 acres of fee title lands (see Figure 5). Over half of this acreage is abandoned old fields of poorly drained soils that flood most winters.

A 495-acre portion of Coldwater River NWR contains 25 ponds that were previously managed as a commercial catfish operation. These ponds range in size from 9 to 21 acres, and are now managed for shorebirds, migratory waterfowl, and marsh birds. A Water Management Plan guides the active management on the 16 ponds with wells and water control structures. Coldwater River's unique mix of habitats and proximity to the migration corridors of the Little Tallahatchie River and the Panola-Quitman Floodway attract a high diversity of migrant waterbirds all year round.

About 300 acres of old-field habitat on the west side of the refuge are managed for grassland birds. A natural sump of 250 to 300 acres along the east side and a similar area in the west central portion of the refuge have been reforested with hardwoods, but due to the wetness, *Baccharis*, willow and button bush thickets now dominate many acres. This area holds thousands of mallards during annual winter flooding. Another approximately 750 acres have been reforested with native hardwoods with varying degrees of success. No cooperative farming is used on Coldwater River NWR.

Figure 5. Coldwater River National Wildlife Refuge land cover types

DAHOMNEY NATIONAL WILDLIFE REFUGE

Dahomey NWR is located in Bolivar County in the western part of the Complex near the Mississippi River (see Figure 6). Dahomey's 8,126 acres of woodlands is the largest contiguous tract of bottomland hardwood habitat occurring outside the Mississippi River main line levee in northwest Mississippi. Dahomey's forestland is a relic of a habitat type that once predominated throughout the Lower Mississippi Delta. Unfortunately, stream channelization and levee construction activities in the vicinity of the refuge have reduced historical flooding regimes to the point that a significant portion of the habitat within Dahomey is no longer subject to periods of seasonal inundation.

In 1994, the Complex installed levees, pipes, and water control structures in two streams occurring within the refuge, creating an approximately 600-acre greentree reservoir. During 1999, the Complex converted an 85-acre agricultural field into four moist soil impoundments. In 2001, Ducks Unlimited constructed two levees on the southern portion of the refuge to create two moist soil units totaling 223 acres.

Dahomey consists of 8,126 acres of mature bottomland hardwood forest (596 of which are occupied by the greentree reservoir), 104 acres of fallow fields, 308 acres of moist soil units, 297 acres of agricultural fields, 849 acres of early successional reforestation areas, and 7 acres of permanent water (in a lake and numerous drainage ditches). The moist soil units are managed primarily for wintering waterfowl.

TALLAHATCHIE NATIONAL WILDLIFE REFUGE

Until 2000, Tallahatchie consisted of the Bear Lake and Black Bayou Units. In 2000, the latter became a separate refuge – Coldwater River NWR. The Bear Lake unit retained the name Tallahatchie. Today the refuge is a 4,199-acre patchwork of cultivated farmlands, old fields, reforested lands, and small, scattered plots of bottomland hardwood forest bisected by the meandering Tippo Bayou, its centerpiece. The refuge is located in Grenada and Tallahatchie counties (see Figure 7). Its lands, like those of Coldwater River and Dahomey NWRs, lie within the Mississippi River Alluvial Valley, referred to locally as the "Delta," where topography is flat and much of the soil is of the heavy clay, hydric variety that has been subject to extensive clearing and drainage efforts. The old oxbows and low-lying fields along Tippo Bayou are permitted to flood each winter and hold large concentrations of waterfowl. Most of the agricultural land (628 acres) on the refuge is devoted to corn, soybeans and rice. This represents about 15% of the refuge land use. Twenty-five percent of the crops produced are left on the ground for wildlife through the Service's cooperative farming program. Most of the remainder of the refuge has been reforested through planting efforts by Complex staff.

CLIMATE

The area's climate is a humid, warm-temperate, continental type characteristic of the southern United States. The average yearly rainfall is 52 inches; March is the wettest month with an average of 5.6 inches and August the driest with 2.4 inches. Tropical storms or hurricanes coming from the Gulf of Mexico may occasionally bring several days of heavy rain. Thunderstorms, which usually bring the heaviest rains, are occasionally accompanied by hail and tornados. Drought conditions during the summer may increase the danger of fire. Average annual snowfall is less than an inch.

Figure 6. Dahomey National Wildlife Refuge land cover types

Figure 7. Tallahatchie National Wildlife Refuge land cover types

January is usually the coldest month, while July is normally the hottest. Winters are mild, with temperatures seldom remaining below freezing for long. Summers are hot and humid with heat indexes commonly reaching 110-115°F. The average growing season is 219 days, from March 25 to October 30.

PHYSIOGRAPHY, GEOGRAPHY, AND SOILS

Within the region, the Mississippi Delta is an alluvial plain of the Mississippi River reaching from Memphis, Tennessee, to Vicksburg, Mississippi. It is 75 miles wide at the widest point near the middle, tapering on each end. The river flows along the western edge, while the eastern edge is bordered by steep bluffs that rise 200 feet above the elevation of the Delta. The Delta is composed of alluvial soils deposited primarily by the Mississippi River with surface features resulting from the meandering of the Mississippi and lesser streams like the Tallahatchie River. Old channels, oxbow lakes, brakes, sloughs, and other features developed in areas that bordered the main river channels, while slackwater areas farther from the channel resulted in broad flats. These features intermixed as the Mississippi meandered across the Delta.

The alluvial soils in the lower Mississippi Delta range from silts and clays in the more poorly drained areas to sandier, coarser-grained soils on natural levees and ancient sandbars. Due to the location of waterfowl-oriented refuges in wetland areas, most of the soils within the Complex are silts and clays, which have fine texture, low permeability and high shrink-swell potential. The surface layer is often hard when dry, friable when moist, and plastic when wet, making moisture content an important consideration when working the soil. There are lighter soils in limited areas, but most of the broad natural levees adjacent to major streams are privately owned cotton production areas.

HYDROLOGY

The water table is very shallow in the Delta. Irrigation wells are drilled to a depth of 100-120 feet, reaching an aquifer connected to the Mississippi River.

Historically, the refuges were subject to winter/spring flooding by the Mississippi River. The Lower Delta was completely flooded five times between 1882 and 1927, despite the river levee. Since then, the mainline Mississippi River levee has been substantially upgraded, preventing widespread flooding from the river.

Within the vicinity of, and in, Dahomey NWR, stream channelization and levee construction activities have reduced historical flooding regimes to the point that a significant portion of the habitat within the refuge is no longer subject to periods of seasonal inundation. This has had a striking impact on the refuge's vegetation community, a remnant of a habitat type that was once dominant throughout the Lower Mississippi Valley. Therefore, one of the Complex's objectives for Dahomey NWR is to restore and manage seasonal hydro-periods within its wetland habitat.

In 1994, the Complex installed levees, pipes, and water control structures in two streams occurring within Dahomey NWR, creating an approximately 600-acre greentree reservoir. During 1999, the Complex converted an 85-acre agricultural field into 4 moist soil impoundments. In 2001, Ducks Unlimited constructed two levees on the southern portion of the refuge to create two moist soil units totaling 223 acres.

Tippo Bayou bisects the portion of the Tallahatchie Refuge north of State Highway 8 and generally forms the eastern boundary of the refuge south of State Highway 8. Normally highly turbid, Tippo Bayou depends primarily on ricefield runoff for base flow. Except for high water periods, the bayou is shallow and has low dissolved oxygen (DO) levels. Out-of-bank flooding of Tippo Bayou occurs on an annual basis and may cause portions of the refuge to be inaccessible from December to April. Eight water control structures have been installed and one levee has been constructed.

Coldwater River NWR is located 4.5 miles north of the confluence of the Panola-Quitman Floodway and the Tallahatchie River. Bounded by those two water bodies, the Refuge experiences heavy flooding. Typically beginning in November, water begins to accumulate north of the confluence and backs northward to the Refuge. A large portion of Coldwater River NWR is under water from November to April.

WATER QUALITY

Agricultural runoff from any source in the Delta carries organochlorine (OC) pesticides, which are bound to soil particles. These pesticides, heavily used for years in the Delta, have persisted in the soil for over 15 years since their use was banned, and likely will exist for many more. Pesticide contamination is an issue to be confronted on all stations of the Complex. Fish and wildlife species are subject to contain OC compounds that may exceed predator protection levels or human consumption concern levels.

North Carolina State University completed the Lower Mississippi River Ecosystem Study, which determined chemical contamination at 26 national wildlife refuges in the LMRV. Field sampling for the study spanned a six-year period from 1995 to 2000. Dahomey and Tallahatchie NWR's were included in the study.

Results of the sample analyses indicate that contaminant/water quality problems occur on both Dahomey and Tallahatchie refuges. Concentrations of DDTM were above concern levels in sediment samples. DDTM, toxaphene, and current use pesticides concentrations in water samples exceeded the Environmental Protection Agency's chronic water quality criteria for those contaminants. It also appears that several of the waterbodies contain high levels of suspended solids, turbidity, and nutrients, and that dissolved oxygen levels are at or near zero for extended periods.

Contaminated runoff from agricultural land is likely causing the contaminant/water quality problems. To reduce contaminated runoff entering the refuge, best management practices (BMPs) such as drop inlet structures, minimum till practices, vegetative field borders, and grassed waterways should be installed on agricultural land in the watersheds, and some of the agricultural land with high erosion rates should be revegetated. In addition, concentrations of DDTM, toxaphene, and current use pesticides should be monitored in fish and wildlife, and investigations should be undertaken to determine organochlorine pesticides concentrations in fish, and aquatic oriented wildlife such as wood ducks, raccoons, and fish eating birds and mammals. Also, temperature and pH, along with concentrations of suspended solids, nutrients, and turbidity should be determined for the streams and lakes.

BMPs can also be implemented through the Service's Private Lands Program, the Natural Resource Conservation Service's Wetland Reserve and Conservation Reserve Programs, and the Mississippi Soil and Water Conservation Commission's Clean Lakes Program. These federal and state agency programs pay about 75 percent of the cost of the BMPs, and the landowner pays the remainder.

Siltation, whether pesticide-laden or not, is a concern throughout the Complex, particularly wetlands that receive agricultural runoff such as those on Dahomey NWR, and the Tippo Bayou area in Tallahatchie NWR. These areas not only have diminished water quality, but are filling in, resulting in a loss of aquatic habitat.

FLORA

The cover type for the Delta was primarily bottomland hardwood forest prior to the clearing, which began with settlement by Europeans around 1820. The dominant forest type was oak-gum-cypress. Canebrakes originally covered the broader flats of slightly higher ground. They were very extensive on the natural levees forming almost pure stands. Most of the surviving forests now occupy lower ground too wet for agriculture, and are dominated by wet-site species. These wetlands have a fluctuating water level and are semi-dry part of the year. The lowest areas contain cypress and buttonbush throughout the Complex. Cypress is complemented or somewhat replaced in some low areas by swamp tupelo on all the stations. Other woody species in permanent or semi-permanent flooded areas include swamp privet, water elm, black willow, and water locust. At slightly higher elevations are green ash, red maple, cottonwood, sugarberry, honey locust, sycamore, bitter pecan, overcup oak, American elm, and Nuttall oak. Extensive flats support scattered deciduous holly (possum haw) in the mid-story, while higher elevations grow extensive stands of dwarf palmetto (*Sabal minor*). Hardwoods on still higher sites include willow oak, pecan, sweet gum, black locust, and water oak. Prominent vines include poison ivy, cross-vine, Virginia creeper, muscadine grape, and false grape in forested areas, and ladies' eardrops, peppervine, and trumpet creeper in more open situations.

Vegetation associations vary between refuges. Coldwater River NWR has distinctly wetter conditions, with fewer areas to support species found on well-drained soils. Since the refuge was acquired, over 1,300 acres of marginal agricultural fields have been reforested with bottomland hardwood tree species such as Nuttall oak, willow oak, water oak, bald cypress, green ash, and others [5-page gloss on Coldwater]. Black willows are prevalent along all internal drainages [Bio rev, iii]. Similarly, over 1200 acres of marginal agricultural fields have been reforested with bottomland hardwood tree species on Tallahatchie NWR.

Vegetation also varies within refuges, according to topography. The distribution of bottomland hardwood species across floodplains is primarily a function of a soil moisture gradient in which a couple of feet can be telling [FMPH, 80]. On Dahomey NWR, red oak-gum is the principle forest type. Cruise observations reveal a transition to elm-ash-sugarberry forest type [FHMP, 87].

FAUNA

Mammals

Mammals occurring on the Complex represent most species extant in the Delta. Large mammals include the whitetail deer, which are abundant on all stations, the feral hog (an invasive species), especially on Tallahatchie, and the American black bear, which occasionally is seen on Dahomey Refuge (though not a permanent resident).

Medium-sized mammals include opossum, armadillo, eastern cottontail, swamp rabbits, beaver, muskrat, mink, nutria, coyote, red fox, gray fox, raccoon, striped skunk, river otter, and bobcat. The nutria was introduced from South America and is a noteworthy invasive species. Beavers have a tremendous potential impact on bottomland hardwoods. They interfere with wildlife control activities by plugging culverts, ditches, and water control structures [2002 annual review, 12]. Problems associated with the impounding of water by beaver are proving to be the single greatest threat to timber resources within the Complex [FHMP, 86].

Armadillo extended their range into this part of Mississippi some time during the latter half of the 20th century. Their impact here has not been investigated. Coyotes are also a recent arrival, with first sightings recorded in the 1980's. Their presence is thought to be responsible, among other things, for the scarcity of foxes. River otters seem to have made a comeback in recent years. Raccoons are abundant and tend to overpopulate.

Small mammals have not been surveyed on the Complex, but potentially include (number of species in parentheses) shrews (3), bats (12), chipmunk (1), squirrel (3), new world rats and mice (7), voles (1), old world rats and mice (3), weasel (1), rabbits(2) [FHMP, 17], and mink (1).

Birds

Over 225 species of migratory birds use the Complex, of which some 77 species breed here. Ten species with Partners in Flight concern scores of 20 or more are common or abundant; including prothonotary warbler, painted bunting, red-headed woodpecker, yellow-billed cuckoo, wood thrush, white-eyed vireo, yellow-breasted chat, Carolina chickadee, loggerhead shrike, and dickcissel.

The most abundant wintering waterfowl species is the mallard followed variously by, green-winged teal, northern pintail, northern shoveler, and gadwall, among the ducks, and snow and blue geese, and greater white-fronted geese among the geese. Wood ducks and hooded mergansers are common nesters in the spring and summer.

The Complex provides excellent habitat for breeding colonial wading birds. Nesting species include the great blue heron, great egret, snowy egret, little blue heron, cattle egret, yellow-crowned night heron, anhinga, green heron, and more recently, double-crested cormorants. White ibis have occupied rookeries in the past, but have not nested on the refuges for several years. They are considered a priority species under the colonial waterbird objective for the Complex.

About 20 species of shorebirds use the refuge complex, especially where habitat is managed intensively. Some of the most numerous species are least sandpipers, pectoral sandpipers, semipalmated plovers, greater yellowlegs, and stilt sandpipers.

Reptiles

A survey of reptiles has not been done on any of the refuges. In 2001, the refuge staff initiated calling frog surveys to monitor refuge frog populations, as well as beginning an overall inventory of amphibians and reptiles on the three traditional refuge properties (Coldwater River, Dahomey, and Tallahatchie NWR's.) [BioReview, 44] A list has been prepared based on species ranges and personal encounters by the refuge staff; including alligators (1 species), turtles (15 spp.), lizards (8 spp.), and snakes (31 spp.).

Various species of water snakes are common or abundant, especially the broad-banded and diamond-backed water snakes. Poisonous snakes include the copperhead, cottonmouth, and timber (canebrake) rattlesnake. Rat snakes of mixed or uncertain subspecies, are a serious nest predator, climb well, and are abundant on the Complex. Racers and western ribbon snakes are also common.

The most commonly seen turtle species is the red-eared slider, whose range spans the three refuges in the Complex. Alligator snappers have been trapped on the Tallahatchie NWR, while common snappers and western spiny softshell turtles are known to inhabit all three refuges [annual nar. 2002, 4].

The ground skink and the five-lined skink are two of the most common lizard species.

Amphibians

Calling frog surveys and searches for salamander breeding sites were begun in 2001 throughout the Complex. The number of species that may occur on the refuge include: salamanders (12), toads (3), treefrogs (9), narrow-mouthed toad (1), spadefoot toads (1) and true frogs (5). Cricket frogs, green treefrogs, bullfrogs, bronze frogs, and southern leopard frogs are abundant. Salamanders, although present, are rarely encountered with the exception of the marbled salamander which can frequently be found in the spring at Dahomey NWR. When completed, the results from the reptile and amphibian inventory, as well as the calling frog surveys, will be incorporated into a GIS-based database. The calling frog survey data will be submitted to the North American Amphibian Monitoring Program, a national database.

Fish

Fish populations consist mostly of rough fish that can withstand hot, murky water with low oxygen content such as long-nosed gar, buffalo, carp, bowfin and shad. Sport fish such as largemouth bass, bream (panfish), and channel catfish have been stocked in suitable waters. A wide variety of fish species exist in the larger streams and bayous including largemouth bass, various bream, and crappie.

THREATENED AND ENDANGERED SPECIES

Animals

Several federally listed threatened and endangered animals may occur on the Complex. Numbers of the threatened bald eagle (*Haliaeetus leucocephalus*) are on the rise locally and this large raptor is more frequently sighted throughout the Complex than it used to be. Nesting has been documented at nearby lakes. The endangered least tern (*Sterna antillarum*) is an occasional visitor to managed moist soil units and open water wetlands in search of foraging habitat mostly during summer months. The interior population of the least tern breeds in isolated areas along the Missouri, Mississippi, Ohio, Red, and Rio Grande river systems. From late April to August, terns use barren to sparsely vegetated sandbars along rivers, sand and gravel pits, or lake and reservoir shorelines. Dams, reservoirs, channelization, and other changes to river systems have eliminated most historic least tern habitat. The endangered wood stork (*Mycteria americana*) is provided excellent habitat for breeding in Complex. Shallow water areas found on the Complex during late summer and fall provide long-legged wading birds with critical foraging opportunities.

The peregrine falcon (*Falco peregrinus*), an occasional visitor to the Complex, was listed as an endangered species in 1970, but was de-listed in 1999 as a result of recovery of its populations from successful efforts at captive breeding and reintroductions. The paddlefish (*Polyodon spathula*) can reach nearly seven feet in length and 200 pounds. It is a former candidate species for federal listing and is still considered a species of management concern. It was once abundant in the Mississippi, Missouri and Gulf Coast drainages, so much so that it was commercially harvested as a source of eggs for caviar. There is evidence that Tippo Bayou is a staging ground for spawning by the paddlefish. To date, however, spawning has not been documented.

The black bear was once distributed throughout Mississippi. However, because of excessive harvest and habitat loss, black bear populations have been severely reduced. The Complex is located entirely within the historic range of the state listed endangered American black bear (*Ursus a. americanus*). It also borders, to the south, the range of the federally listed threatened Louisiana black bear (*Ursus a. luteolus*). Though no breeding population has been documented in Mississippi, several individual bears, including females with cubs, have been sighted on the Complex, most notably along the Mississippi River in Bolivar County.

Efforts by the Black Bear Conservation Committee and its member agencies are currently underway to restore bears to their historic range, with current focus on the Louisiana black bear within the state of Louisiana. However, bear sightings in the lower Mississippi Delta have increased dramatically over the last few years, suggesting a possible expansion of these bears across the Mississippi River from existing natural and repatriated bear populations in Louisiana.

Also, a breeding population of black bears currently exists in the White River National Wildlife Refuge (NWR) in southeast Arkansas, to the west and across the Mississippi River from the Complex. Individual bears have been documented crossing the river into Mississippi. Consequently, there is a possibility that more White River NWR bears could immigrate into the Complex. It should be noted that the subspecific status of the White River NWR bear population is unresolved.

Plants

The endangered pondberry (*Lindera melissifolia*) is a rarely seen deciduous shrub that grows in seasonally flooded wetlands and on the edges of sinks and ponds. Much of the lands where pondberry was historically found have been ditched and converted to agricultural fields. The drainage and flooding of wetlands, cattle grazing, domestic hog foraging, and timber cutting have also adversely affected pondberry abundance. Pondberry has been found on Service property in Bolivar County. Its presence on Dahomey NWR in Bolivar County has not yet been verified; however, an ecological assessment conducted there concludes that suitable habitats for pondberry do exist and that its presence there is very likely (Stewart, 1990). It has not yet been documented on other properties administered by the Complex. [FHMP, 18]

CULTURAL RESOURCES

Cultural resources include historic properties as defined in the National Historic Preservation Act (NHPA), cultural items as defined in the Native American Graves Protection and Repatriation Act (NAGPRA), archaeological resources as defined in the Archeological Resources Protection Act (ARPA), sacred sites as defined in Executive Order 13007, *Protection and Accommodation of Access To "Indian Sacred Sites,"* to which access is provided under the American Indian Religious Freedom Act (AIRFA), and collections. As defined by the NHPA, a historic property or historic resource is any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (NRHP), including any artifacts, records, and remains that are related to and located in such properties. The term also includes properties of traditional religious and cultural importance (traditional cultural properties), which are eligible for inclusion in the NRHP as a result of their association with the cultural practices or beliefs of an American Indian tribe. Archaeological resources include any material of human life or activities that is at least 100 years old, and that is of archaeological interest.

Section 106 of the NHPA provides the framework for federal review and consideration of cultural resources during federal project planning and execution. The implementing regulations for the Section 106 process (36 CFR Part 800) have been promulgated by the Advisory Council on Historic Preservation (ACHP). The Secretary of the Interior maintains the NRHP and sets forth significance criteria (36 CFR Part 60) for inclusion in the register. Cultural resources may be considered "historic properties" for the purpose of consideration by a federal undertaking if they meet NRHP criteria. The implementing regulations at 36 CFR 800.16(v) define an undertaking as "a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency, including those carried out by or on behalf of a Federal agency; those carried out with Federal financial assistance; those requiring a Federal permit, license or approval; and those subject to state or local regulation administered pursuant to a delegation or approval by a Federal agency." Historic properties are those that are formally placed in the NRHP by the Secretary of the Interior, and those that meet the criteria and are determined eligible for inclusion.

Like all federal agencies, the Service must abide by Section 106 of the NHPA. Cultural resources management in the Service is the responsibility of the Regional Director and is not delegated for the Section 106 process when historic properties could be affected by Service undertakings, for issuing archeological permits, and for Indian tribal involvement. The Regional Historic Preservation Officer (RHPO) advises the Regional Director about procedures, compliance, and implementation of the several cultural resources laws. The Refuge Manager assists the RHPO by early informing the RHPO about Service undertakings, by protecting archeological sites and historic properties on Service managed and administered lands, by monitoring archeological investigations by contractors and permittees, and by reporting violations.

The Complex follows these procedures to protect the public's interest in preserving its cultural/historic legacy that may potentially occur on the Complex. Whenever construction work is undertaken that involves any excavation with heavy earth-moving equipment like tractors, graders and bulldozers, such as for the development of moist soil units, the Complex contracts with a qualified archaeologist/cultural resources expert to conduct an archaeological survey of the subject property. The results of this survey are submitted to the RHPO as well as the State Historic Preservation Officer (SHPO), which in Mississippi is an official within the Historic Preservation Division of the Mississippi Department of Archives and History. The SHPO reviews the surveys and determines whether cultural resources will be impacted, that is, whether any properties listed in or eligible or eligible for listing in the NRHP will be affected. If cultural resources are actually encountered during construction activities, the Complex is to notify the SHPO immediately. To date, no properties on the Complex have been determined to be eligible for the NRHP.

This region of Mississippi has long been settled and used by humans, in good part because of its mild winters and abundant fish and wildlife resources. Prior to European settlement, a number of Indian tribes inhabited the Delta. In the northern part of the Complex, the Quizquiz tribe were predecessors of the historic Tunica. Only one village of Quapaw was identified in 1763, with the rest in Arkansas. The first Europeans to travel through the Delta were the Spaniards of De Soto's expedition of the 1540's. Next were the French who arrived in the mid-1600's. The Europeans had a devastating affect on the Indians of this area. A number of tribes are mentioned by the French as living in the Delta, but almost all had disappeared from the area by 1750, as a result of disease, warfare, and migration. In 1802 the land was sold to the United States as part of the Louisiana Purchase (Heisler, 1978).

The Lower Mississippi River is noted for its prehistoric earthen mounds, erected by the area's indigenous inhabitants. Although the first people entered what is now Mississippi about 12,000 years ago, the earliest major phase of earthen mound construction in this area did not begin until some 2,100 years ago. Mounds continued to be built sporadically for another 1,800 years. Of the mounds that remain today, some of the earliest were built to bury important members of local tribal groups. These mounds were usually rounded, dome-shapes. Later mounds were rectangular, flat-topped earthen platforms upon which temples or residences of chiefs were erected.

Eight hundred years ago, the lower Mississippi Delta was home to highly organized societies. There were roads, commerce, and cultural centers anchored by large and impressive earthen monuments. Wonders of geometric precision, these earthworks were the centers of human life. However, mound construction was already in a period of decline in the 1500s, when the first Europeans arrived in the region and brought with them epidemic diseases that decimated native populations across the Southeast. As a result, by the time sustained contact with European colonists began about 1700, the long tradition of mound building was reaching its end. Surviving mounds are protected because they are owned by state or federal agencies committed by law to their preservation. Most of the mounds in Mississippi, however, are on privately owned land. As a result, many mounds have been irreparably damaged or completely destroyed by modern development and looting. Indian mounds, therefore, are critically endangered cultural sites (Indian Mounds of Mississippi, NPS 2002). The Complex includes at least one documented mound on the Pennington FmHA property.

RECREATION AND VISITOR SERVICES

The Complex contains abundant populations of fish and wildlife, including a number of game species. The opportunity for consumptive and non-consumptive wildlife dependent recreation attracts many members of the public to the refuges and FmHA properties; in recent years the Complex has received about 100,000 visits annually. Hunting and fishing are the most popular public uses on the Complex's three refuges and many FmHA properties, and are provided in accordance with federal, state, and refuge regulations.

Hunting is the most popular recreational activity throughout the Complex. This includes hunting on some of the FmHA fee title properties where the activity had existed prior to acquisition by the Complex [public use review,1]. The hunting program is monitored and partially funded through general hunt permits, currently \$12.50 each, and valid for most types of game. Deer, rabbits, squirrels, raccoons, waterfowl, feral swine, and turkey may be taken on the Complex during the appropriate seasons. In 2003, approximately 1,500 hunters received hunting permits for the Complex. That same year, only a very limited number of fishing permits were issued. On Dahomey NWR, an eight-acre lake was constructed in 1999 and stocked with bass, bream, and catfish. It was subsequently opened to fishing by the public.

Wildlife observation and photography are other public uses at the Complex. Coldwater NWR is closed to the general public because of its critical importance as a wildlife sanctuary, but wildlife may be observed from public roads on the eastern and western boundaries of the refuge. On Dahomey and Tallahatchie NWR, many of the refuge roads are open to the public and several Special Use Permits are issued annually to photographers. Nonetheless, most of the participation in these activities is incidental, as there are no formal programs to encourage expanding and participating in these activities.

Environmental education and interpretation are also provided on an as-needed basis. Staff have responded to requests for interpretive programs, but there are no refuge-specific programs and no dedicated staff to develop and conduct an effective education and outreach program.

SOCIOECONOMIC ENVIRONMENT

The traditional refuges administered by the Complex lie within the counties of Tallahatchie, Bolivar, Grenada, and Quitman. In addition, complex-administered FmHA properties occupy these as well as 11 surrounding counties. The westernmost counties are found within what is referred to as the Mississippi Delta while the easternmost counties are located in the Mississippi Hill Country. The entire Complex region is largely rural, and the Delta area containing the three refuges has an economy based on manufacturing and agriculture; principle crops are cotton, soybeans, corn, rice, and catfish. Much or most of the counties' land bases are used for agriculture (see Table 10).

Table 10. Percent of the Tallahatchie, Grenada, Bolivar and Quitman counties' land base used for agricultural production

County	Total Area (square miles)	Area used for agriculture 2002* sq. miles (%)
Tallahatchie	652	331 (51%)
Grenada	449	99 (22%)
Bolivar	906	578 (64%)
Quitman	406	207 (51%)

* Includes cultivated and grazing land (pasture) but not forestry/timberland

(Source: Agricultural Statistical Service, USDA, conversion of head of cattle to acres performed by Jack Curry, Mississippi Development Authority, 2/02, 2/03, 2/24, 2004)

Mississippi is the most economically depressed state in the nation, with lower than average household and per capita income and educational attainment levels. However, with the exception of Bolivar County (8.3% unemployment in the 2000 U.S. Census), the counties surrounding the Complex actually have unemployment rates below the national average. Tables 11 and 12 provide additional demographic and geographic information about Tallahatchie, Grenada, Bolivar and Quitman counties.

Table 11. County employment data

County	Leading Industry	Sources of Earnings	Unemployment Rate (MS state, 5.7%)
Tallahatchie	Manufacturing	23.3%	4.9%
Grenada	Manufacturing	27.7%	3.4%
Quitman	Educational, health and social services	19.6%	4.4%
Bolivar	Educational, health and social services	26.2%	8.3%

Source: *Census 2000 Summary File 3 (SF 3) - Sample Data*, American Fact Finder, U.S. Census Bureau

OUTDOOR RECREATION ECONOMICS

The fish and wildlife of the Mississippi Delta, including those of the Complex, are economically important (Table 13). In addition to commercial fishing on the Mississippi River, hunting, recreational fishing, wildlife viewing, and wildlife photography are economically important to local businesses. Resident and nonresident hunting and fishing revenues for the state total \$13.7 million dollars for 525,479 licenses (MS Development Authority 2002). These hunters and anglers spend an estimated \$1.8 billion in the state annually (Gillette, 2000).

Unfortunately, a general lack of regard for the preservation of fish and wildlife resources, combined with wetland clearing and draining, has led to the loss of valuable fishery spawning grounds and the loss of habitat for many wildlife species. In the attempt to restore and protect some of these resources, the Complex serves an important role, not only by providing habitat for a diversity of plant and wildlife species, but also as a place where people can go to enjoy these resources, either through observation or more directly through hunting or fishing.

The refuges of the Complex have become vital to the rural communities economies' in which they reside, not only with the activities they provide, but through employment opportunities to individuals who themselves contribute to the local economy. With improved access, facilities and staffing, these refuges can serve as pivotal attractions providing a much needed and important commodity in the economic life of these communities. Hunting and fishing and more recently, eco-tourism, 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 Complex may become even more important to the local community. It can benefit 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 dollars to the local economy.

TOURISM

Overall, tourism within the counties of Tallahatchie, Bolivar, Grenada, and Quitman does not contribute significantly to the local economy (Table 14). Music, festivals, casinos, historical sites, and outdoor recreation are some of the tourism opportunities available in northern Mississippi. It has been recognized that there are tourism opportunities in these counties, but there is a lack of infrastructure and expertise to effectively position these areas as heritage and cultural tourism destinations. The State of Mississippi has initiated plans to develop the "Mississippi Millennium Blues Trail," which would pass through the counties surrounding the Complex. A study was commissioned by the Mississippi Department of Tourism to determine the baseline and potential development of new and existing attractions that may draw tourists to this area. It was identified that the potential was here, but that for the most part, had yet to be developed and promoted. The local chapter of the Audubon Society is currently developing a Mississippi River birding trail which would follow Hwy 1 (Old River Road) along the Mississippi River mainline levee.

Table 12. Geographic and demographic statistics for the four counties including refuges within the Complex

County	Land Area (sq. miles)	Population	% population change (1990-2000)	Median Age	Per capita Income (\$)	**% below poverty	% White	% Black	% Hispanic	% Asian	% Native American
Tallahatchie	652	14,903	-2.0	33.3	10,749	26.8	39.4	59.4	0.9	0.4	0.1
Bolivar	906	40,633	-3.0	29.8	12,088	27.9	33.2	65.1	1.2	0.5	0.1
Grenada	449	23,263	7.9	35.7	13,786	17.6	57.9	40.9	0.6	0.3	0.1
Quitman	406	10,117	-3.6	30.8	10,817	28.6	30.5	68.6	0.5	0.2	0.1

Sources: U.S. Census 2000, Demographic Profiles, U.S. Census Bureau; Fact Finder, U.S. Census Bureau; Center for Population Studies, University of Mississippi;

Table 13. 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 14. Estimated county tourism & recreation (T&R) revenues/employment

County	Total T&R Revenues	Total T&R Employment	Total Establishment Based Employment	T&R Employment Percentage
Tallahatchie	\$1,904,596	24	2,410	1
Bolivar	\$22,475,718	382	13,300	2.9
Grenada	\$34,162,697	615	11,270	5.5
Quitman	\$2,258,241	25	1,830	1.4

(Mississippi Development Authority, Division of Tourism, 2003)

III. Plan Development

OVERVIEW

In preparation for developing the CCP, the Complex conducted a biological review and a public use review in the summer of 2002. Initial CCP planning began in September 2003 with a meeting of planning team members. Early in the process of developing this draft plan, the planning team identified a list of issues and concerns that were likely to be associated with the conservation and management of the North Mississippi National Wildlife Refuge Complex. Formal public involvement began with the scoping process in November 2003, through which interested stakeholders were able to register their concerns, thereby ensuring that these would be considered in developing the CCP.

Planning team members reviewed the results of this internal and external scoping and used them, along with supporting goals, objectives and strategies, to develop four different management alternatives for the Complex. The four alternatives were evaluated in an Environmental Assessment (EA), Section B in this document, and the preferred alternative forms the basis of the CCP itself. The Draft CCP and Draft EA are being released to the public for review and comment. The Service will examine all comments and suggestions received and decide whether revisions to the plan are in order. The CCP then becomes the general plan guiding management decisions and actions on the Complex for the next 10-15 years, although it is possible to amend the plan before that, if warranted.

PLANNING PROCESS AND PUBLIC INVOLVEMENT

Prior to starting the CCP planning process per se, the Complex conducted a biological review and a public use review in 2002 (finalized in 2003), which provided detailed analysis of resources and existing programs in these fundamental areas, and offered recommendations for future management in the form of goals, objectives, and strategies.

The biological review was held during the week of June 3-7, 2002. The team was comprised of biologists, managers, foresters and non-Service managers/biologists whose combined expertise represented some of the premier wildlife and habitat management experience found in the state. The biological review team provided a critical examination of current programs, culminating in a range of alternatives identifying data needs, habitat objectives, opportunities for improvement, and so forth, all while emphasizing future partnership opportunities on mutual interests. The October 2003 final Biological Review report summarizes the recommendations submitted by the biological review teams.

The public use review team (comprised of Complex and Regional Office staff) also met in 2002. After reviewing existing public use programs, facilities and opportunities, the team prepared a Public Use Review Report that outlines recommendations on public use at the Complex. Emphasis was placed on the main six, generally compatible wildlife-dependent public use opportunities, namely hunting, fishing, wildlife observation, wildlife photography, environmental education, and interpretation.

Initial CCP planning began in September 2003 with a meeting of planning team members. At and following this meeting, an initial list of issues was identified by the planning team and refuge staff. The team also developed a mailing list of the public, landowners, state and tribal agencies, non-profit organizations, local governments, and other interested stakeholders. Letters were then sent notifying these parties of the CCP process that was just getting underway, encouraging their participation, and informing them of two upcoming open house-style scoping meetings that would be held in November 2003 at the Complex headquarters in Grenada, Mississippi and at Delta State University in Cleveland, MS. That letter and notices published in local newspapers also stated that even if a person or group was unable to attend either of these meetings, they could send in written comments to the Complex headquarters.

On November 11, 2003 at the Complex headquarters, and on the following day on November 12 at Delta State University, the public scoping meetings were conducted to obtain information and concerns from the public. The open house sessions each lasted from 5 to 9 p.m. with brief presentations at 7 p.m. by members of the planning team. The presentations touched on the need to prepare a CCP, its purpose, how the public could participate, and an overview of the resources and programs of the Complex. Planning team staff had prepared maps and exhibits and placed these around the room for the public to view.

Six people attended the first open house in Grenada and about 15 people attended the second open house at Delta State. After the presentations, participants were invited to make oral comments or ask questions, which a number did. A comment form was also made available to attendees, which asked questions prompting written responses about what they saw as the main issues facing Coldwater River, Dahomey, and Tallahatchie refuges. Overall, the Complex received about a dozen sets of written comments, both comment forms and letters. A total of approximately 25 individuals provided oral and/or written comments. Input obtained from all of these meetings and correspondence was considered in developing this draft plan.

The following comments were received via the public scoping process:

Recreation and Visitor Services

- Upgrade and maintain the refuges so that they are accessible (especially to the inner-most parts of the refuges) as well as visitor-friendly (especially for handicapped persons) (x3).
- Long-range plans should include facilities for bird watching, photography, and wildlife observation. Incorporate Dahomey NWR into Audubon birding trail.
- Should develop new programs for public use, thereby attracting more tourists to the Delta.
- Road system is good.
- ATVs should be allowed on specified gravel paths for retrieving of game, with due restrictions placed on their use (x2).
- Better enforce closed areas on refuges from encroaching hunters.
- Allow for a limited amount of rifle and muzzle-loading hunting on Dahomey.

- The Complex offers some of the only public hunting opportunities in the vicinity.
- Should use available resources/funds to try to acquire more land.

Wildlife Management

- Increase the populations of game species, especially deer, on Dahomey (x4)
- Increase the deer population by limiting the number of does harvested for several years.
- Remove size restriction on bucks for the youth hunt. Increase the size restriction on bucks for general hunts (X2).
- Determine impacts of wild hogs and coyotes on deer and other game species (x2).
- Forest management should take hunters more into consideration.
- Increase number of food plots.
- Habitat management is right on track. No changes necessary (x3).
- Repair levees (x2).
- There seem to be fewer pintail and canvasback ducks than in the past.

Staff and Staffing

- More staff needed (x3).
- Staff should be more considerate of visitors/ hunters with health problems.
- Partners for Fish and Wildlife
- The Partners for Wildlife program is very successful and appreciated (x2)
- CRP (Conservation Reserve Program) good for this area.

ISSUES AND CURRENT CONDITIONS

A result of these biological and public use reviews and scoping meetings was the development of a list of significant issues that needed to be addressed in the CCP. Alternatives for addressing these issues were developed in the Environmental Assessment (Section B). The preferred alternative formed the basis for the objectives and strategies to achieve the goals developed by the planning team. This process ensures that the most significant issues are resolved or given priority over the life of this plan. Below is a summary of these significant issues along with some discussion of their impacts to the resource.

FISH AND WILDLIFE POPULATIONS

Threatened and Endangered Species

Recovery and protection of threatened and endangered plants and animals is an important responsibility delegated to the Service and its national wildlife refuges. Several federal threatened and endangered species are thought to use, or could use, the North Mississippi National Wildlife Refuge Complex, including the bald eagle, wood stork, Louisiana black bear, and the least tern [FHMP, 122]. The bald eagle and Louisiana black bear are threatened (the bald eagle is proposed for delisting), while the wood stork and least tern are both endangered.

Pondberry, the only threatened or endangered plant species believed to occur on the Complex, has been found on Service property in Bolivar County. Its presence on Dahomey NWR in Bolivar County has not yet been verified; however, an ecological assessment conducted there concludes that suitable habitats for pondberry do exist and that its presence there is very likely (Stewart, 1990). It has not yet been documented on other properties administered by the Complex. [FHMP, 18]

Invasive Species

An "invasive species" is defined as a species that is 1) non-native (or alien) to the ecosystem under consideration, and 2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health. (Executive Order 13112). Invasive species can be plants, animals, and other organisms (e.g., microbes). Deliberate or inadvertent human actions are the primary means of invasive species introductions.

Several invasive species occur on the Complex. Some of the more prominent and obvious are feral hogs, coyote, nutria, and armadillo. These wildlife species were either accidentally released and became acclimated to living in the wild, were intentionally released for sport or trade, or have expanded their range. These animals have been sporadically controlled by lethal means.

Invasive plants, insects, and smaller organisms are more difficult to recognize and monitor. The Complex does not have an invasive species monitoring program to detect not only their initial introduction, but rate of spread and their impacts. However, we know several invasive plants, such as Johnson grass and kudzu, which have spread across the Complex, overtaking and displacing native vegetation. Control of these invasive plant species has been opportunistic and sporadic, using both biological and chemical means.

The Complex does not have an "Invasive Species Management Plan". There are no structured programs or funding specifically provided for an invasive species management program.

Resident Wildlife

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."

While the Service and the Refuge System's priority is the protection of federal trust species (migratory birds, threatened and endangered species, interjurisdictional fishes and marine mammals), this mission clearly states that these refuges should also provide for other wildlife, such as resident species. In other words, by acquiring refuge lands, we also assume responsibility for managing the resident wildlife that may be dependent on refuge resources, but not to the exclusion or detriment of the purpose for which the refuge was established. A variety of wildlife species indigenous to the Lower Mississippi Alluvial Valley inhabit the Complex. Some of the more notable are those easily seen by the general public, such as white-tailed deer, wild turkey, and cottontail rabbits. Many of these species are also available to the public for hunting opportunities, which elevates their importance to the public and land managers.

The Northern bobwhite quail historically and traditionally has been one of the most important and cherished of game birds in the south. However, for the last several decades, bobwhite quail and many other small game species associated with early successional stages and grasslands have declined at an average of three percent per year, and in the last 10 years the rate of decline has escalated to about six percent per year. While many factors have contributed to this decline – including predators, pathogens, and pesticides – the primary cause of decline is deteriorating habitat quality. This is due to advanced natural succession, intensive monoculture farming, more intensive timber management, reduced use of prescribed burning, and the extensive use of exotic grasses including fescue and Bermuda grass. Bobwhite quail prefer an interspersion of woodlands, brush, grass, and croplands. Although early successional habitat is present on the Complex properties, it does not meet the annual needs of the target species. Quail and other wildlife have little or no accessible protective cover adjacent to feeding/nesting areas [BioReview, 39].

Agricultural farming practices have become more mechanized, and chemical control of pests has increased dramatically. Small patchwork farms that once provided nesting, brood rearing and protective cover have been replaced by large monoculture farm operations that have eliminated thousands of miles of weedy ditch banks and fence rows.

Another upland game species, wild turkey, can be found on every refuge in the Complex. Predation and habitat loss have caused dramatic population declines in the past, causing the closure or limiting of hunting seasons. Hunted populations should continue to be monitored to ensure they are not over-harvested. Management actions for quail and grassland birds would also benefit turkey production and survival.

Beaver, another resident wildlife species, have become pests, building dams that hold water on trees, causing die-offs of mature bottomland hardwoods. Incidental trapping by Special Use Permit has been ineffective in the past. However, this issue must be addressed or many more acres of critical forests will be lost and will take decades to recover.

Migratory Birds

Ducks

All refuges within the Complex have a purpose that gives priority to migratory birds over all other wildlife species. This purpose guides a majority of the operation and management actions on the refuges. Management actions include providing agricultural hot foods, moist soil areas and forested wetlands, to meet the feeding, resting and breeding needs of migratory and resident waterfowl. Comments from the biological review teams and the public provided overwhelming support to continue or expand these programs with specific stipulations for improving and focusing efforts. In support of the North American Waterfowl Management Plan, the LMVJV office assigned each refuge minimum habitat objectives needed to provide sufficient water, food, sanctuary, and resting/loafing areas to meet the needs of wintering waterfowl. The objectives are based on the best available information available. There currently are a number of research projects studying the available resources and habitat on private lands, the results of which will likely alter objectives in the future.

The amount of refuge croplands and moist soil areas needed to meet the habitat objectives and the numbers of waterfowl that these areas can support merit particular attention. Lands currently in agricultural crops that exceed that needed to meet the objectives, would be evaluated for conversions to moist soil, early successional habitats or reforestation to address the needs of other species of migratory and non-migratory birds and mammals. Providing undisturbed waterfowl sanctuaries while providing quality hunting opportunities is another significant issue.

Geese

Geese were addressed separately due to their unique habitat needs compared to ducks. Goose species, including snow, white-fronted, and Canada geese, prefer feeding and resting in more open fields with little or no standing water. Thousands of geese winter on the Complex. Goose use on the Complex tends to be sporadic and primarily restricted to Coldwater River and Tallahatchie NWR's and only a few FmHA tracts. Concentrations are generally restricted to less than 5,000 birds at any one time.

Any management actions for snow geese should support the "Arctic Tundra Habitat Emergency Conservation Act" to reduce the snow/Ross' goose populations that have experienced rapid population growth reaching levels such that they are damaging habitats on their arctic and sub-arctic breeding areas in Canada. This degradation may be irreversible and has negatively impacted other bird populations. Natural marsh habitats on some migration and wintering areas also have been impacted. In addition, goose damage to agricultural crops has become a problem. There is increasing evidence that lesser snow and Ross' geese act as reservoirs for the bacterium that causes avian cholera. The threat of avian cholera to other bird species likely will increase as these goose populations expand.

Non-game birds

Neotropical migratory birds are a species group of special management concern. Broad species groups including breeding forest landbirds, breeding scrub-shrub landbirds, transient song(land) birds, marsh and grassland birds, shorebirds (addressed below), colonial waterbirds/wading birds, and raptors. The Partners in Flight Bird Conservation Plan for the Mississippi Alluvial Valley has habitat objectives for all these groups of birds, but all of these groups can be accommodated on existing and restored habitats throughout the Complex. Habitat needed for the most area-sensitive species, namely interior forest dependent birds, has been evaluated and habitat objectives established. The plan identifies Dahomey NWR as the only refuge within the Complex currently having the necessary size for creating a block of interior forest habitat that meets minimum critical standards. The other two refuges will need to be expanded first. Large interior forest blocks are extremely rare along the entire LMRV due to clearing of lands, primarily for agriculture. Nevertheless, the birds continue to follow historical migratory pathways along the Mississippi Flyway. This has resulted in a direct correlation between the decline of the forests with the decline of the populations of bird species, particularly those with sensitive habitat needs. Balancing the needs of waterfowl, which require more open habitat, with the needs of these imperiled songbirds is a significant issue that generated much discussion during the biological review.

Another issue is lack of baseline information on all groups of birds throughout the Complex. There have been limited surveys on specific areas on the Complex (mostly presence/absence data for species occurrence) as well as aerial winter waterfowl surveys of the Complex's refuges and properties since 1996, but comprehensive and standardized surveys of all of the refuges and for all habitat types are lacking.

Shorebirds

Habitat for spring (northbound) shorebird migration in the LMRV is not considered to be limited. The acreage of open, bare-soil areas, flooded by spring rains, at this point, provides ample habitat. Peak migration occurs from March to mid-May.

Southbound migration starts in early July, peaks August through September, and tapers off toward winter, usually lasting until at least the end of October. Lack of shallow-flooded or mudflat habitats in late summer/fall results in a severe shorebird habitat shortage. Given that a focus on providing shorebird habitat is considered one of the highest non-game bird priorities for the Complex, it is important that existing shorebird management practices be continued and improved upon.

A 1500-acre habitat target has been identified for the entire state of Mississippi as necessary to support a tentative LMRV population objective of 500,000 shorebirds during southbound migration. This migration figure is based on conservative assumptions, and experts believe that the objective figure may need to be as much as twice that estimate. An information need in connection with this effort is to document overall use of the Complex and determine peak passage of the various shorebird species.

Managing moist soil for both waterfowl and shorebirds can be done provided managers have full water level management capabilities enabling them to ensure drawdown and flooding of impoundments at critical times. The Complex has been focusing its shorebird management efforts on Coldwater River NWR. There is good water level control as well as data on the success of these impoundments providing for both waterfowl and shorebirds. It was recognized by the biological review team that there are also other opportunities within the Complex, including former catfish ponds at the Henson and Kimbrough FmHA Tracts, to conduct similar successful programs.

HABITATS

Bottomland Hardwood Management and Restoration

The Complex is situated within the physiographic region known as the Lower Mississippi Valley (LMRV). The LMRV was once a 25-million acre forested wetland complex that extended along both sides of the Mississippi River from Illinois to southern Louisiana. The extent and duration of annual flooding from the Mississippi River fluctuated annually and served to recharge aquatic systems and create rich, dynamic habitats that supported a vast array of fish and wildlife resources.

As civilization pushed westward, the highest, least flood prone lands were cleared and converted to rich farmland. With success in agriculture and an expanding human population, more land was being cleared and additional flood control measures were implemented. Today, the LMRV is bisected by levees and a myriad of flood control projects and supports less than five million acres of bottomland hardwood forests. The fish and wildlife resources have mirrored the decline in the forest.

Although reforestation is the obvious “fix” for the vast forests that have been converted to row-crop agriculture, it must always be remembered that hydrology (flooding) drives the ecological system in the LMRV. It is imperative that managers remember that reforestation is only part of the solution. Restoring or mimicking a natural hydrologic cycle in conjunction with reforestation is needed.

Large areas have been reforested on the Complex. In many areas, fragmentation has decreased and structure and food sources have been generated. Federal programs such as carbon sequestration have driven some of these efforts. Nevertheless, little is known about managing these reforested bottomland hardwood habitats. There is little historical information on “what was here” and how it was structured prior to European settlement. Only recently have studies addressed this issue. It has been assumed, in many cases, that all trees are good, no matter where they are planted. Only recently, we have come to realize that some of the smaller, isolated reforested lands, such as FmHA properties, serve to perpetuate the hostile “edge effect” for some species. These smaller reforested sites provide little habitat to neotropical migrant species of special concern. Hindsight tells us that leaving some of these areas in a scrub-shrub habitat would have been more conducive to the priority bird species using these small areas.

The other issue related to reforestation is the discussion on diverse structure and stands that are attractive to commercial harvest. Commercial harvests have been a valuable tool in managing existing hardwood stands, often the only tool. Scheduled harvests are essential to maintaining a healthy forest that is diverse and provides structure and desirable tree species. While nature will eventually alter forest conditions, this slow process on the limited remaining acres will not provide the most desirable habitat in the interim.

As lands are removed from row crop agriculture and previously converted agricultural lands are acquired, the potential for reforestation in conjunction with water management capabilities will expand.

Agricultural Crops for Waterfowl

Farming operations within the Complex are conducted in support of specific waterfowl objectives set for each refuge. Specific agricultural crops provide cover and supplement more nutritional “natural foods” with high calorie “hot foods” for migratory waterfowl. In addition, farming can be used to set back succession and control weeds in moist soil units. The main cooperative farming crops on the Complex are rice, corn, milo and soybeans.

All farming operations are conducted cooperatively with local farmers (except at Coldwater River Refuge, where co-op farming is not practiced). Cooperative farming is a mutually beneficial arrangement where the farmer is allowed to farm refuge land under certain guidelines and restrictions including location of crops, techniques, crops planted, and chemicals used. Title 50, Part 29, of the Code of Federal Regulation and Service policies require that the value of a refuge’s share of cooperatively grown crops be set at rates that reflect the fees and charges received by private landowners in the vicinity for similar privileges. The value can be established through the use of competition in selecting cooperators or through an analysis of local market conditions to establish the prevailing rates in the nearest comparable area. Cooperative farmers are authorized through the current Farm Bill to receive direct and counter-cyclical payments.

Approximately 1,200 acres of the Complex are farmed by 3 cooperative farmers. Under the current cooperative farm program guidelines of crop sharing and rotation, this amount of production is needed to meet the current 430-acre objective for the Complex.

Cooperative farming has been a long-standing practice throughout the Refuge System nationwide and has been a mutually beneficial program for both refuge programs and for farmers. However, due to more restrictive regulations regarding approved chemicals, agricultural burning, and the encouraged use of “Best Management Practices,” the use of cooperative farming to achieve objectives needs to be reviewed. Furthermore, due to the steady declines in crop prices in recent years, cooperative farming may no longer be a profitable endeavor for the average farmer. It is becoming more challenging to find farmers who are willing to alter their familiar farming techniques to meet Service agricultural policies. As restrictions are implemented in the name of environmental protection and wildlife conservation, we run the risk of losing our current corps of willing farmers due to hardship and loss of profit.

If USFWS resources were used to fully meet the habitat objectives, there would need to be a significant increase in funding following initial one-time costs. As cooperative farming on the Complex does not place emphasis on growing crops for maximum yield, the use of chemicals to control weeds and insects would be reduced and Best Management Practices (BMP's) could be fully implemented. However, the 430-acre objective would need to be adjusted for this reduced production, BMP programs (such as buffer strips), and crop rotation. Additional staff and equipment would be needed to meet the stated objectives.

Acres that could be flooded or that have been historically used by waterfowl would be given the highest priority for meeting this objective. Most of the surplus acres would be converted to early successional habitats such as grassland, scrub-shrub, and moist soil. Many of these lands are adjacent to similar early successional habitats. Reforesting most of these lands would not contribute to interior forest objectives due to their size and distribution. There may be opportunities to reforest lands that would create buffers to human disturbance along roadsides and trails. In addition, the LMRVJV is reevaluating unharvested crop objectives based on new studies that are determining the value of harvested agricultural fields on private lands. Preliminary results indicate that earlier harvest dates and more efficient harvest techniques have significantly reduced the waste grain available when wintering waterfowl arrive in the Delta. Based on this new information, unharvested crop objectives may increase. Acres maintained in early successional habitat would be more easily converted back to agricultural production.

Moist Soil Management

The Lower Mississippi Joint Venture has established moist soil objectives in support of the North American Waterfowl Management Plan for the North Mississippi National Wildlife Refuge Complex. Moist-soil management refers to management that provides moist soil conditions during the growing season to promote the natural production of beneficial plants. Seeds produced by these plants often attract and concentrate waterfowl and other wetland wildlife species. The decomposing vegetative parts of moist-soil plants also provide substrate for invertebrates, which are critical food for many wetland wildlife species. Factors that determine the success of moist-soil management include the timing and rate of the dewatering, soil disturbance, the stage of plant succession, and the timing and rate of reflooding. Best success is achieved when water levels can be controlled, although good results can be obtained under natural conditions when artificial draining and flooding are not possible.

Waterfowl depend on nutrient-rich seeds and invertebrates for various parts of their lifecycles. While high-calorie agricultural crops ("hot foods") provide the needed energy for wintering migratory waterfowl, it is equally important they receive the nutrients needed to remain healthy and reproduce. "Hot foods must be in close proximity to natural wetlands and moist soil units to facilitate waterfowl access to aquatic invertebrates and other natural foods that are comparatively scarce in croplands.

ECOLOGICAL INTEGRITY

Maintenance of the ecological integrity of the Refuge System is required by the National Wildlife Refuge System Improvement Act of 1997. If we are to truly understand the ecological integrity of these lands, we must gather baseline information on all wildlife and their habitats to document their existence, monitor trends, and understand the impacts of refuge programs on biodiversity. It has been the history of the Refuge System and most land managers, often due to lack of expertise, to focus their efforts on the more common, sometimes recreational, wildlife species. Nevertheless, the mission of the Refuge System, with the exclusion of federal trust species, does not give preference to any one group.

The biological review team recognized that the North Mississippi National Wildlife Refuge Complex is lacking specific data on many resident wildlife species, but in particular, non-game wildlife such as reptiles, amphibians, mussels, insects, small mammals, and their habitats. Most efforts have focused on studying and managing game species like white-tailed deer. While it is recognized that this is an important animal, especially to the hunting public, dozens of other wildlife species and associated habitats still need to be studied. Directing staff and resources to address these data gaps will be critical.

Contaminants and sedimentation have impacted every refuge within the Complex. Agricultural row crops are grown on much of the lands that surround refuges within the Complex. As a result, drainage from watershed lands brings agricultural chemicals into the refuges waters and are bioaccumulating in fish. Historical use of organochlorine pesticides (DDT, PCB's, toxaphene, dieldrine, lindane, etc.), which contain heavy metals (mercury) were commonly used in farming operations, particularly cotton, prior to being banned in the 1970's. Unfortunately, these chemicals do not readily break down and still remain in the substrate of the sediment that was deposited in waters within and surrounding the refuges. These chemicals continue to contaminate fish and other aquatic-dependent resources such as fish-eating birds, wood ducks, and raccoons.

Contaminant levels are particularly extreme on Tallahatchie. Due to levels of current use pesticides, DDTM and toxaphene, found in sampled fish, stream water, and sediment, the MDEQ has issued a limit fish consumption advisory for both benthic and predatory fish at the refuge. All of the refuges are dependent on watersheds and streams and rivers to provide some of the water resources to manage water-dependent habitats. Principal drainage on Dahomey NWR for example, consists of four bayous in addition to man-made ditches and canals. On Coldwater River NWR, where 90 percent of the unit is inundated each spring, floodwaters come from the Tallahatchie, the Yocona, and Little Tallahatchie Rivers as well as the Panola-Quitman Floodway. Studies have shown that runoff from agricultural fields and upstream gravel mining operations have resulted in excessive siltation and turbidity in water bodies throughout the Complex. Wetlands have been filled in, hydrology has been altered, trees have been killed by deepening deposits, and open water habitats have become shallow due to silt-laden waters traversing these areas. This has resulted in loss of important wildlife (including migratory bird) habitat, and has increased densities of undesirable fish populations (common carp, buffalo, gar, bowfin, and freshwater drum). This is supported by studies conducted by the U.S. Geological Survey. In order to maintain ecological integrity on refuge, water quality issues both on and off refuge need to be addressed.

RECREATION AND VISITOR SERVICES

Priority Public Use

The National Wildlife Refuge Improvement Act of 1997 has established six priority public uses on refuge lands when they are compatible and desirable for that specific refuge. These priority uses are hunting, fishing, wildlife observation, wildlife photography, environmental education, and interpretation. The visitor services program of the Complex has always focused on “traditional” recreational uses, primarily hunting, with little emphasis on interpretive and educational activities due to the lack of staff. This lack of effective outreach is evidenced by the general public, either misunderstanding the purposes of the North Mississippi National Wildlife Refuge Complex and the National Wildlife Refuge System, or simply being unaware that we exist. It is the intent of the Complex to expand its visitor services to include these historically “non-traditional” uses (wildlife observation, wildlife photography, interpretation and environmental education) without alienating the more “traditional” visitors. The challenge will be to what degree we can provide for these expanded activities while minimizing conflicts among user groups.

Hunting

Dahomey and Tallahatchie NWRs allow hunting for squirrel, rabbit, bobwhite quail, raccoon, deer, turkey (Dahomey only), waterfowl, snipe, woodcock and feral hogs. In addition, there are youth hunts for deer, turkey (Dahomey only), waterfowl and squirrel. Special facilities are available for mobility impaired hunters. Each hunter must obtain from one of the Hunter Information Stations a user information card. The card must be filled out before hunting and displayed on the vehicle dash. Prior to leaving the refuge the reverse side of the card must be completed and deposited at one of the Hunter Information Stations. There is a \$12.50 permit required to hunt on Dahomey NWR, Tallahatchie NWR, and select FmHA Tracts (small game only).

At present, hunting is not allowed on Coldwater River NWR, and one issue is whether or not this policy should be maintained. Another issue is whether to allow off road vehicles (ORVs) for hunting. The Complex does not currently permit the use of ORVs for hunting (retrieving game) due to their disruption of wildlife and damage to habitat. Overall, there appears to be broad appreciation among the public that the refuges in the Complex offer some of the best hunting opportunities in the vicinity, a sentiment expressed during public scoping meetings for the CCP.

Fishing

Coldwater River, Dahomey, and Tallahatchie NWR's are currently open to fishing at certain periods throughout the year. There are, however, currently very few fishing opportunities on the Complex. The Complex does not support a high-quality fishery. Only a very limited number of permits for fishing were issued in 2003.

The Fisheries and Aquatic Resources Strategic Plan (Plan) for the Southeast Region is a USFWS management document completed in 1997. The Plan recognizes fisheries and aquatic resource management as important. Service activities both on and off refuges list several goals in pursuit of these endeavors. Goal 5 directs the Service to “Provide for sustainable recreational fishing opportunities in the Southeast adequate to meet public needs.” Objective F under this goal states, “Provide and maintain recreational fishing opportunities on FWS (Service) lands” and lists several tasks in conjunction with this pursuit, including “...establish new recreational fishing opportunities... increase access to recreational fishing sites on and across FWS (Service) lands,” and “develop methods for integrated management of migratory bird populations, other animals and plants, and recreational fisheries on FWS (Service) lands.”

Sedimentation, contaminants, and access have been some of the issues hindering the development of a quality fishing program. Most waterways within the Complex have been altered or are artificial, such as former catfish ponds, preventing or impeding natural stocking of desirable gamefish into these waters. This has resulted in larger concentrations of “rough fish”. In addition, the Mississippi Department of Environmental Quality (MDEQ) has issued a health recommendation to not eat bottom feeders more than two times per month, due to their contaminant concentrations. There is a need for consistent notices at boat launching ramps and other places where fisherman can be contacted about MDEQ warning.

Fishing opportunities at the Complex can be maintained and expanded by developing kids fishing days, parking areas, one or more handicapped-accessible piers, and maintaining bank fishing areas.

Wildlife Observation and Photography

Currently, there are limited wildlife viewing opportunities on the Complex. Coldwater River NWR has the greatest potential for wildlife observation. The number and variety of shorebirds, wading birds and waterfowl there create a spectacular sight. The proximity of this north-most refuge to Memphis, and to Interstate 55 provide a potentially larger population base from which to attract visitors. The Audubon Society is proposing to develop a Great River Road Birding Trail that would include Dahomey NWR.

The Complex has two photo-blinds available for wildlife photographers that can be used on a first-come, first-serve basis. There are a number of opportunities for expanding wildlife observation and photography on the Complex, including development of trails and observation decks at some of the more opportune sites on all three refuges. For example, a walking trail around the impoundments at Coldwater River NWR and an accompanying observation deck would offer wildlife watchers and photographers great views of shorebirds, wading birds and waterfowl. Efforts to increase such opportunities appear to have the broad support of surrounding communities and the public.

Environmental Education and Interpretation

Previously, the Complex had a staff person who developed a significant environmental program that included providing programs to schools and developing kits on endangered species and wetlands for teachers to use. While demand was high for these programs, the Complex lost this position. Groups that are interested in partnering with the Complex to develop environmental education opportunities include Delta State University and the Audubon Society. There are four universities within a one hour drive of Grenada, each of which has an annual conservation festival. Environmental education could be expanded in a number of ways, such as staging events like career days, developing an educational natural trail, and using seasonal hires and volunteers to develop and implement environmental education programs, camps, and kits/trunks.

Currently, there is limited interpretation on the three refuges. Through a partnership with Ducks Unlimited, an interpretive trail (Hasserway Trail) was developed at Grenada Lake Recreation Area. There are no interpretive panels at any of the refuges. These can be developed and installed at all three refuges. Interpretation can be organized by themes that reinforce important messages for visitors. Examples of such themes include migratory birds (including waterfowl and neotropical migrants), reforestation, history of FmHA lands, culture and history of the area, bottomland hardwoods and the wildlife that depends on this diminished habitat.

The Complex already engages in a significant amount of outreach. Staff persons are members of local civic groups like the Chamber of Commerce. They help judge the local science fairs and have participated in community events at the Grenada Lake Recreation Area. When staff is available the refuge does some special events such as Migratory Bird Day or National Wildlife Refuge Week. Opportunities for improving outreach include developing a more extensive website, placing general brochures in the State Welcome center on Interstate 55, and putting a portable display in appropriate locations and a permanent display at the Grenada Lake Visitor Center operated by the Corps of Engineers.

Interior Roads and Trails

All roads within the Complex that are currently open to the public are in fair to good shape and usually provide all weather access with a minimal clearance two-wheel drive vehicle (except when flooded during the winter months). Federal, State or County highways and U.S. Army Corps of Engineers (COE) levees currently run adjacent to or bisect portions of all refuges within the Complex. Coldwater River is presently not open to the public. Many of the current interior roads were constructed to facilitate farming and/or timber harvest. As refuge programs were developed, only certain roads and trails were maintained for public and refuge use.

Two Executive Orders govern off road vehicle (ORV) use on federal public lands: Executive Order 11644, signed by President Nixon in 1972, and Executive Order 11989 signed by President Carter in 1977. Together these orders require that ORVs on public lands must be managed to “protect the resources of those lands, to promote the safety of all users of those lands, and to minimize conflicts among the various uses of those lands.” The orders also require that when ORV routes are designated, federal land managers must minimize damage to soils, watershed, vegetation, and other land resources, minimize wildlife harassment and impacts to wildlife habitat and minimize conflicts between ORV use and other uses of the land. These policies and orders have a direct effect on our ban of ORVs on the refuges of the Complex. Studies have shown that the excessive off-trail use of ORVs can have a detrimental effect on habitats. These impacts can include soil erosion, altering natural water flow, destroying the root systems of plants and spreading noxious and invasive weeds. Thus, we have prohibited their use on the Complex. Also, due to the small size of the refuges within the complex and several good access points, there is little to no need for ORV use. Most Complex users have no problem with this policy, though some hunters have requested the use of ORVs to retrieve game.

Visitor Facilities

Currently, the complex has two offices. The first office is located in Grenada, MS on Highway 7 and is the headquarters for the Complex. This office receives about 11,000 visitors annually. The second office is located at Dahomey NWR in Boyle, MS on Hwy 446. Both offices serve the purpose of providing office space for staff and general information for visitors. At the present, no refuge of the Complex, nor the Complex itself, has a visitor center. Furthermore, neither Tallahatchie nor Coldwater River NWRs have manned offices.

Although Tallahatchie and Dahomey NWR offer several miles of hiking trails through the use of gravel roads and abandoned logging roads, the Complex is significantly lacking designated interpretive trails and signage on all refuges.

Recreation Opportunities on Farmers Home Administration (FmHA) Fee Title Tracts

The Complex contains 128 separate FmHA tracts, totaling over 17,000 acres and dispersed throughout the Complex work area. The public use on these FmHA tracts is largely confined to small game hunting on a limited number of properties. These tracts of land are scattered throughout northern Mississippi and most are blocks of land smaller than 200 acres.

CULTURAL RESOURCES MANAGEMENT

With the enactment of the Antiquities Act of 1906, the federal government recognized the importance of cultural resources to the national identity and sought to protect archaeological sites and historic structures on those lands owned, managed, or controlled by the United States. The body of historic preservation laws has grown dramatically since 1906. The National Historic Preservation Act of 1966 and its Section 104 have a particular bearing on all federal agencies. Several themes recur in the laws and the promulgating regulations. They include: 1) each agency is to systematically inventory the “historic properties” on their holdings and to scientifically assess each property’s eligibility for the National Register of Historic Places; 2) federal agencies are to consider the impacts to cultural resources during the agencies’ management activities and seek to avoid or mitigate adverse impacts; 3) the protection of cultural resources from looting and vandalism are to be accomplished through a mix of informed management, law enforcement efforts, and public education; and 4) the increasing role of

consultation with groups, such as Native American tribes and African American communities, to address how a project or management activity may impact specific archaeological sites and landscapes deemed important to those groups.

A number of targeted cultural resource inventories have been completed at different sites throughout the Complex. Whenever the Complex proposes an action that will result in excavation or substantial ground disturbance, like constructing a moist soil unit, it conducts a cultural resources survey. However, no overall inventory of the Complex's cultural resources has been carried out to date, and the Complex currently has no Cultural Resources Management Plan.

PRIVATE LANDS AND FOREST FRAGMENTATION

The three refuges that comprise the North Mississippi National Wildlife Refuge Complex are truly islands in a sea of privately owned agricultural lands, particularly Dahomey NWR. The refuges, along with other federal and state-owned tracts, are some of the best examples of the bottomland habitat that once dominated the landscape of the Mississippi Delta. In fact, Dahomey NWR's 8,126-acre bottomland hardwood forest is the largest contiguous tract of bottomland hardwood habitat outside the Mississippi River main line levee in northwest Mississippi [2002 Annual Nar., p. vii]. A continual threat to these remaining habitats and the fish and wildlife that inhabit them is fragmentation and destruction through intensive agriculture, one-time high-grade timber harvests, federal flood control projects, and certain catfish farming practices.

It is recognized by all federal land managers that we will never own enough land to meet the habitat needs of resident and migratory wildlife with which we are entrusted. The vast majority of these needed lands are in private ownership. While many landowners are actively managing their lands for wildlife, many would benefit from assistance, both in knowledge and resources, to provide the optimal benefit to some of the more imperiled wildlife species, including forest interior songbirds and endangered and threatened species. With limited resources, it is necessary to identify a management "Focus Area" in which to concentrate our efforts. This area would also be studied for those lands that would be suitable and beneficial for inclusion in the Refuge System to meet the goals and objectives of the Complex, and national, state, and regional plans to preserve and protect wildlife, fisheries, and their habitats.

GENERAL ADMINISTRATION

Funding and Staffing

Funding has been insufficient to support current refuge programs. Lack of staff and inadequate facilities have prevented the Complex from realizing its purposes and management objectives. While this is true for all the refuges within the Complex it is especially noteworthy at Coldwater River NWR, where intensive management of the former catfish pond moist-soil management complex is highly recommended but there is simply not adequate staffing. Overall, at the Complex, the lack of adequate staff has had a negative impact on biological, maintenance, and visitor services programs including degrading facilities, limiting wildlife and habitat projects, and restricting the development of a visitor services program.

Biological and public use review teams as well as the public identified a need for additional staff. The biological review identifies a need to add two or three biologists, a forester, and three or four biological/forestry technicians/equipment operators to the current staff. The top recommendation in the public use review is for a full-time public use staff person.

Three full-time employees departed in 2002. There is currently no staff based at Coldwater River or Tallahatchie NWRs. Development/management there is handled by the North Mississippi National Wildlife Refuge Complex.

Monitoring, Inventory, Research and Adaptive Management

Management decisions are currently based on the best available data and past personal experiences. In preparing for the biological review and further evidenced by comments received by the review team, it is apparent that there are vast data gaps with regard to the habitat, wildlife, fisheries, and biodiversity within the Complex.

Issues addressed by the review team and identified by refuge staff include lack of baseline information on many of the fish, plants, insects, and wildlife dependent on these refuge lands. The review team also recognized the lack of scientifically sound inventory and monitoring methods which in turn hinders the setting of Complex and national objectives. In addition, a lack of information on the current population, rate of spread, and structured control measures of invasive species has resulted in random control methods that may not be the most effective techniques in the long term.

There is a tremendous opportunity to cooperate with partners, including other federal agencies, state agencies, Non-government organizations, and universities to conduct research on the various resources and habitat restoration programs being carried out on the Complex. There are several projects that have been completed and contributed to our understanding of the Complex resources. However, there are many more opportunities to actively pursue partnerships that not only can benefit the Complex, but also further other management and restoration efforts throughout the LMRV.

IV. Draft Comprehensive Conservation Plan

INTRODUCTION

This proposed plan contains the goals, objectives, and strategies that will be used to achieve the refuge vision over the next 15 years.

Three other alternatives for managing the Complex were considered and the planning team chose Alternative D (Enhanced Wildlife Management and Public Use Program) as the preferred alternative or proposed action. The other alternatives evaluated were Alternative A - No Action (Current Management Direction), Alternative B, Public Use Emphasis, and Alternative C, Wildlife Management Emphasis. All of these alternatives are described and evaluated in the Environmental Assessment.

Implementing the preferred alternative will result in a diversity of habitats for a variety of wildlife and fish species while meeting the Complex's primary purpose of providing habitat for wintering waterfowl. Specific results will include increased waterfowl and songbird use and production; increased habitat for forest interior-dependent wildlife; enhanced resident wildlife populations; restored wetlands and hydrology; and greater opportunities for a variety of compatible wildlife-dependent public use.

An overriding concern reflected in this CCP is that wildlife conservation is the first priority in refuge management. Public use is allowed if compatible and appropriate with wildlife and habitat conservation. Wildlife-dependent public uses – hunting, fishing, wildlife observation, photography, environmental education and interpretation – will be emphasized. Each of these activities is specifically mentioned in the National Wildlife Refuge System Improvement Act of 1997 as being a generally appropriate use of the National Wildlife Refuge System. Of course, for any given refuge, managers must still determine the compatibility of a particular use given specific circumstances.

VISION

The vision for the North Mississippi National Wildlife Refuge Complex is as follows:

Based on sound science, the North Mississippi National Wildlife Refuge Complex will protect, manage, and, where appropriate, restore a system of lands and waters to provide for wildlife, fisheries, and plants and their habitats within Northern Mississippi for the benefit of present and future generations of Americans. These Refuges contain some of the most important migratory bird habitats in the National Wildlife Refuge System and will continue to be focal points for the protection, management, restoration, and enjoyment of resident wildlife, migratory birds and other federal trust resources within the Lower Mississippi River Alluvial Valley and Central Gulf Ecosystems.

The Complex will expand its role in land protection efforts by acquiring within approved acquisition boundary additional habitats for migratory birds and other federal trust species and by working with all interested parties to promote conservation efforts on non-refuge lands. The Complex will play a critical role in reducing forest fragmentation and lead in reforestation and restoration of bottomland hardwoods and other wetlands. The Complex will provide and promote research opportunities that address an understanding of the resource management needs of the Lower Mississippi River and Central Gulf Ecosystems.

The Complex will build partnerships to promote the ecological health of the landscape, wildlife-dependent recreation, and the historical and cultural resources of the region. When compatible, wildlife-dependent recreational opportunities for hunting, fishing, wildlife observation, wildlife photography, environmental education, and interpretation will be provided while promoting the public's understanding of the purposes for the Complex and the mission of the Refuge System.

COMPREHENSIVE CONSERVATION PLAN

GOALS, OBJECTIVES, AND STRATEGIES

The goals, objectives, and strategies outlined below are the Service's response to the issues, concerns, and needs expressed by the planning team, the refuge staff, and the public. These goals, objectives, and strategies reflect the Service's 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, the vision for the North Mississippi National Wildlife Refuge Complex and the purposes of Coldwater River, Dahomey, and Tallahatchie refuges. Depending upon the availability of funds and staff, the Service intends to accomplish these goals, objectives, and strategies during the next 15 years.

Goal 1 – Promote the conservation and management of migratory birds within northern Mississippi in a manner that supports treaties and national and international plans and initiatives.

Background: The paramount purpose of the Complex is to provide habitat for migratory birds. Each of the three refuges has been nominated as an "Important Bird Area," based on significant numbers of birds found on the refuges at different times of the year.

The Complex has a variety of habitats, including flooded timber, grasslands, ponds, and moist soil, as well as management programs including croplands and waterfowl sanctuary areas, that provide feeding, resting, and loafing habitat for tens of thousands of wintering ducks and geese each year and nesting habitat for wood ducks and hooded mergansers.

Non-game waterbird groups include shorebirds, marsh and wading birds, and colonial waterbirds. The most important foraging habitats for these groups consist of former commercial catfish ponds converted to moist-soil management units. Breeding colonial/wading birds find nesting habitat in brakes, swamps, and a few wooded impoundments throughout the Complex.

Objective 1-1: Migratory Waterfowl

Over the next 15 years, provide habitat to increase current objectives for migrating and wintering waterfowl as shown in Table 15 below. Annually monitor waterfowl response to management actions.

Table 15. Habitat objectives for migratory waterfowl (acres)

Habitat	Current Objective	Increased Objective
Coldwater River NWR		
Forested wetland	700	2520
Moist-soil	190	684
Dahomey NWR		
Forested wetland	750	900
Moist-soil	318	382
Unharvested crop	218	262
Tallahatchie NWR		
Forested wetland	80	528
Moist-soil	852	5623
Unharvested crop	212	1399

Discussion: Concern over waterfowl population declines in the 1980's 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 (LMRVJV) was selected as one of the wintering focus areas. In setting habitat objectives for the LMRVJV, 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 are required to 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 state for public and private lands. Each segment of habitat must be provided if the wintering waterfowl needs in the LMRVJV area are to be met. These step-down objectives are shown in Table 2-5 of this CCP.

Strategies:

Prepare a Biological Inventory/Monitoring Plan by 2008, which includes refuge-specific waterfowl inventory and monitoring protocols, standardized routes, and computerized databases.

Conduct waterfowl inventories at least twice monthly (October to mid-March). Couple aerial counts with ground counts on the more visible areas of the refuge to establish a correction factor for aerial surveys.

Continue long-term process of seeking willing sellers of lands with value or potential value as waterfowl habitat within the authorized acquisition boundaries of each refuge.

Objective 1-2: Wood Duck Nest Boxes

Per the biological review, provide year round habitat and maintain a program of 600 well-maintained nest boxes throughout the Complex necessary to enhance wood duck populations.

Discussion: Wood ducks are common year-round residents of the LMRV and the Complex. Preferred habitats include forested wetlands, wooded and shrub swamps, tree-lined rivers, streams, sloughs, and beaver ponds. Wood ducks seek food in the form of acorns, other soft and hard mast, weed seeds, and invertebrates found in shallow flooded timber, shrub swamps, and along stream banks. They loaf and roost in more secluded areas and dense shrub swamps. Wood ducks are cavity nesters, seeking cavities in trees within a mile of water. Brood survival is higher in situations where nests are close to water. Due to loss of bottomland hardwoods and overharvest, wood ducks were almost extirpated in the early 1900's. Even today, forestry practices and competition for nest sites from a host of other species limit reproduction. Nest boxes are commonly used to supplement natural cavities and increase local production of wood ducks. Box programs are not a panacea. They must be maintained – requiring time to clean and repair at least annually. Production can be increased by more frequent checks and cleaning of boxes, but this must be weighed with other time constraints.

Currently there are approximately 75 nest boxes on the Complex. Adequate habitat is available to support 2-3 times as many on existing lands in the refuges. The numerical target of 600 nest boxes assumes both intensification of efforts on existing habitats and expansion of lands within the refuges up to the authorized boundaries.

Strategies:

Place a minimum of 50 new boxes per year for the next 10 years as habitat and staffing limitations allow.

Replace and relocate boxes to meet regional guidelines as existing wood duck nest boxes deteriorate.

Place boxes such that they are not visible from one box to the next or at least 100 yards apart.

Place boxes in areas that are readily accessible for semiannual inspections.

Check boxes at least twice annually (once pre-season and once at the end of the first peak of nesting).

Place predator guards on all box structures.

Place boxes no more than one mile from a water source and close to available scrub-shrub habitat. Where feasible and where dump nesting does not occur, place boxes over standing water

Maintain all cull trees that have or may develop natural nesting cavities and are within one mile of a water source. This will also benefit many other cavity nesting species (woodpeckers, mergansers, squirrels, etc.).

Place boxes above mean high water mark to prevent them from being flooded and to facilitate management of the program (maintenance, box checks, etc.).

Evaluate nest efficiency and nesting success in boxes and adjust the program accordingly.

Evaluate duckling survival in and use of various habitats on each refuge.

Objective 1-3: Wood Duck Banding

Increase the preseason (July-September 15) flyway and state banding objective by eight times (corresponding to the increase in nest boxes), with increased emphasis on the entire Complex contributing to these data.

Discussion: Because wood ducks are secretive, it is difficult to monitor their population status and survival using visual counts similar to the method used for most other species of waterfowl. Pre-season wood duck banding is the only method used for estimating wood duck populations, survival, and possibly other population parameters. State banding quotas by sex and age have been established by the Mississippi and Atlantic Flyways and the state quotas have been allocated to various state and federal facilities around Mississippi. The Complex contributes toward achieving the annual Mississippi pre-season banding quota. The pre-season period extends from July through September and, for statistical purposes, it is assumed that all ducks that are in the same age and sex class and banded during this 3-month period, have the same survival rate. In Mississippi and several other southern states with a special wood duck or teal season, the pre-season banding period is stopped September 15 to prevent any potential conflicts (i.e., baiting) with hunters.

All wood duck quotas assigned to the Complex are for the preseason (July - September 30) banding period. In the past, the Complex banded quite a few adult hens in boxes prior to July 1. These ducks are more vulnerable to predation during periods of nesting and brood rearing and have survival rates lower than those banded later in summer. Breeding season banding may occur when staff is available to assess survival rates and return of nesting hens.

Strategies:

Expand banding program to include more sites throughout the Complex, particularly as the wood duck box program is expanded.

As funding becomes available, hire two, GS-5, six-month seasonal biological technicians to monitor and maintain wood duck boxes and conduct preseason trapping and banding program throughout the Complex.

Continue to examine the most effective means of trapping and banding wood ducks; ensuring the objective is met with minimal effort and resources.

Objective 1-4: Marsh and Wading Birds

Within three years of the plan's approval, determine marsh and wading bird use of wetland habitats, with special emphasis on the black rail, yellow rail, king rail, American bittern, least bittern, and wood stork. Annually conduct management activities that will enhance marsh bird habitat.

Discussion: In addition to wetlands such as the former catfish ponds, rice fields and moist-soil units would be the primary habitat for this group on the Complex. Included in this group are "secretive marshbirds" (rails, bitterns, grebes, moorhens, gallinules, and coots).

No specific population objectives have been established for these species at this time within the LMRV, but survey/monitoring protocols (secretive marshbird surveys) can be used for tracking peak movements in and out of the Complex and to document responses to habitat management.

"Secretive marshbird surveys" employ a taped playback-response protocol along a designated route for pied-billed grebes (breeding), rails and bitterns. The protocols developed were intended to survey breeding birds, but these should also be useful for surveying birds during migration (and winter) as most rails vocalize all year.

Priority species include the following: High – black rail, yellow rail; Moderate – American bittern, king rail, bald eagle, northern harrier; Local or Regional Interest – least bittern.

Strategies:

Collect baseline data on marshbird populations, use of impoundment habitats and responses to various water management regimes, with special emphasis on black and yellow rails and least bitterns.

Track bird use by date, location and habitat type (vegetated, flooded moist-soil areas, flooded rice fields, and permanent impoundments containing a significant amount of rank emergent vegetation in shallow water).

By 2007, establish a route along levee roads most likely to support marsh habitats for summer, migration, and winter secretive marshbird counts, with summer counts focusing on black rail, king rail, and least bittern. Surveys can be set up as a random sample of stops across the refuge or may be targeted on actively managed versus unmanaged units to judge responses to management practices.

By 2007, establish an additional roadside route within each refuge's acquisition boundary along wetlands which potentially support marshbirds.

Conduct surveys three times per month, with priority on mid-March to mid-April and mid-August to late November. The direction of the survey should be alternated from one survey to the next.

Through the effective use of moist-soil management, maintain a diversity of marsh plant communities among impoundments to support an equally diverse marsh associated avifauna.

Objective 1-5: Colonial Waterbirds

Within two years of the plan's approval, identify, map, and develop monitoring protocol for colonial waterbird rookeries and provide foraging habitat.

Discussion: Complex provides excellent habitat for breeding colonial wading birds. For example, Coldwater River NWR has a rookery dominated by great blue herons and great egrets. Shallow water areas found on the refuge during late summer and fall provide critical foraging opportunities for long-legged wading birds such as wood storks and herons, egrets, and ibis. The primary management tools are to 1) protect rookeries from disturbance and, where possible, maintain standing water under nest trees throughout the nesting season to minimize nest predation by raccoons, and 2) incorporate water level management for wading birds into shallow water management for waterfowl and shorebirds. (In the shallow water habitat provided for wading birds, they will be searching for foraging habitat rich in small fish and crustaceans, a much different food source than is targeted in waterfowl and shorebird management.)

Priority species include the following: High - least tern (interior population-foraging on open water), white ibis (breeding?, migrant), American white pelican (wintering); Local or Regional Interest - wood stork (migrant), roseate spoonbill (migrant), glossy ibis (migrant), anhinga (breeding), great blue heron (breeding), great egret (breeding), snowy egret (breeding), little blue heron (breeding), cattle egret (breeding), green heron (breeding), yellow-crowned night-heron (breeding).

Strategies:

By 2009, provide additional nesting structures to expand rookeries.

By 2010, provide data on nesting success to the state coordinator.

Locate, geo-reference, protect from disturbance, and monitor (nesting population by species) colonial waterbird rookery sites in the Complex work area, especially on refuge properties.

Conduct aerial survey of work area to locate rookeries in April and determine potential disturbance factors. Survey active rookeries in June following existing Colonial Waterbird Monitoring Program guidelines established through the Mississippi Museum of Natural Science and coordinate data transfer to the Museum of Natural Science (contact Museum Ornithologist for information). This monitoring program may be modified to meet regional or national standards.

Record white pelican use on refuges to determine periods of use and peak annual populations. Make contact with local aquaculture facilities to gain information on the presence and numbers of pelicans in the area.

Where possible, provide foraging habitat by maintaining shallow ponds and "run-out" sites in summer and fall. Attempt to integrate waterbird foraging habitat management into waterfowl and shorebird habitat management.

Work with the LMRVJV Office to update colonial waterbird step-down objectives for the Complex.

Objective 1-6: Shorebirds (including Woodcock)

By 2014, provide 653 acres of high quality migration habitat for shorebirds, including woodcock. Annually monitor shorebird use and contribute data to the International Shorebird Survey.

Discussion: Throughout the LMRV, habitat for spring (northward) shorebird migration is probably provided in most years with normal rainfall and evaporation rates. Peak migration is expected 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 LMRV and the lack of rainfall in this highly modified hydrological environment leads to 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 considered the highest non-game bird priority for the Complex. The current LMRVJV coordinated shorebird (Fall migration) habitat objective for Coldwater River NWR is 225 acres of mudflats and for FmHA tracts is an additional 100-200 acres.

Within the larger context, about 1,500 acres of habitat have been tentatively identified for Mississippi towards supporting a tentative LMRV 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 include the following: High - stilt sandpiper, buff-breasted sandpiper, western sandpiper, short-billed dowitcher, Wilson's phalarope; Moderate - semipalmated sandpiper, sanderling, greater yellowlegs, dunlin, common snipe, least sandpiper, willet, American avocet, 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 in general are present or not.

American woodcock populations in this region have declined an average of 1.6% per year from 1968 – 2002 (Kelley 2002). Population declines are thought to be the result of land use changes associated with land conversion and the maturing of forest habitats. Woodcock numbers appear low on the Complex 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 (BA) 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 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 refuges provide good daytime cover for woodcock. These habitats result from reforestation, old field succession, and ice storms.

At dusk, woodcock 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. Woodcock 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).

Strategies:

Conduct annual shorebird surveys following the International Shorebird Survey protocol to document shorebird use of the Complex overall and peak passage of the various shorebird species. The ISS is essentially a route selected by refuge staff using existing roads and covering as much potential habitat as possible.

Investigate and research methods of habitat management favoring proliferation of Chironomids in the moist-soil rotation scheme (shorebird phase). Drawdowns among moist-soil units should be staggered and overlapped and continue slowly to provide mud-flat habitat throughout the entire migration period, mid-July to November.

Develop a moist-soil habitat rotation scheme which provides fall shorebird habitat on at least 25% of the acreage being rotated.

Install tilt pipes for precise water control in all impoundments used for shorebird management.

Keep records of habitat conditions including water levels (weekly). Record dates that mudflats are exposed.

Develop forest management plans that provide preferred woodcock habitat that includes:

Diurnal cover and foraging habitat (thickets and shrub areas with high vertical stem density in the understory and wet soil). These habitats can be created in existing forest stands through patch or group thinning and patch clearcuts that also benefit other high priority bird species.

Nocturnal habitat (wet agricultural fields (not fall disked) and wet "old field" or grassland habitats with exposed soil and patchy cover 1 to 3 feet in height created by cool fall burns). The 275-acre field at Coldwater River NWR should be maintained as an old field by strip disking and burning portions on a 3-year rotation.

Take advantage of rights-of-way and other permanent forest openings to create woodcock habitat.

Inventory suitable woodcock wintering habitat on the refuge and conduct evening flight counts, nighttime counts, and flush counts to assess woodcock presence/absence and relative abundance on the refuge at least twice monthly from mid-November to mid-March. Night-lighting in the fields is another option preferred by some experienced in woodcock surveys to determine use.

Utilize hunter surveys and flush counts using dogs (pointers) to assess presence/absence and relative densities of woodcock.

Preserve all “cane” habitat areas on the refuge and recognize the need to maintain scrub/shrub wetlands/uplands preferred by this species.

Determine the feasibility of developing woodcock habitat demonstration sites to serve as educational opportunities for public and private land managers, realizing that habitat management for woodcock is similar to management for other priority species.

Objective 1-7: Forest Birds

Within two years of the plan’s approval, survey forest breeding birds with point counts tied to spatially discrete, georeferenced, habitat specific locations to assess the preferred habitat, presence/absence, and relative abundance of all forest breeding species

Discussion: No comprehensive survey of forest birds, breeding or migratory, has been completed on the Complex. As such, there is no information on what areas and habitats are most widely used.

Despite being highly fragmented, the productive hardwood forests of the Mississippi Delta play an important role in providing migration and breeding habitat for forest breeding birds. By increasing block size and improving timber stand structure, there is potential for this habitat to play a much larger role for this wide range of non-game birds. As it has with setting waterfowl habitat objectives, the LMRVJV has undertaken a coordinated effort to identify Bird Conservation Areas (BCA’s) throughout the LMRV for restoration of forest blocks that support sustainable breeding populations of area-sensitive, high priority forest breeding bird species. There are seven BCA’s in the Complex work area with established forest block size objectives. Selective reforestation through private land programs or expansion of existing refuges would contribute toward forest block objectives.

Bird population data are very limited for many of the refuges in Region 4. The Complex is no exception. Bird population data are critical for establishing baseline conditions that can later be used to assess management actions and compare future habitat conditions. Forest breeding birds should be surveyed with point counts using the protocol in Hamel et al. (1996).

In terms of achieving population objectives for forest landbirds, an average of 6-9 pairs of Swainson’s warblers (drier end of the spectrum) and 11-19 pairs of prothonotary warblers (wetter end of the spectrum) per 100 acres within optimal habitat could be considered as indicators of healthy neotropical migrant populations overall. Spot-map protocols could provide these data. Monitoring nest success would provide better evidence of population health.

Overall future desired condition of mature wetland forests would be to emphasize: (1) increasing stand structural diversity by favoring retention of largest trees (removing surrounding potentially competing trees), (2) opening up stands to allow light to reach the ground in support of better understory structure, and (3) group selection-sized openings to further structural complexity and support regeneration of shade-intolerant tree species (oaks) where needed. (See attached copy of “General Recommendations for Hardwood Forest Management to Improve Wildlife Habitat in the LMRV.”)

Priority species include the following: Extremely High - Swainson's warbler (breeding - nest in dense understory, forages on open moist ground), swallow-tailed kite (breeding - nest in superemergent trees, possibly cypress), cerulean warbler (breeding - nest and forage in canopy of sawtimber trees); High - prothonotary warbler (breeding - cavity nester, usually in trees over open water), red-headed woodpecker (breeding - cavity nester), northern parula (breeding - canopy, usually with Spanish moss), Kentucky warbler (breeding - nest in patches of dense ground cover), yellow-billed Cuckoo (breeding - midstory and canopy), wood thrush (breeding - midstory, forage on moist ground), American woodcock (forages on open moist ground but under very dense understory cover), black duck (wintering - open water); Moderate - wood duck (breeding - cavity nesting over or near open water), Acadian flycatcher (breeding - open midstory), eastern wood-pewee (breeding - open canopy), Carolina chickadee (breeding - cavity nester), Mississippi kite (breeding - nest in trees along edges in open country), Baltimore oriole (breeding - scattered hardwoods in open country), ruby-throated hummingbird (breeding - woody vegetation in moist habitats, usually near tubular flowers), blue-gray gnatcatcher (breeding - mature and moist hardwood forests), hooded warbler (breeding - dense understory), bald eagle (breeding - nests in superemergent trees large enough to support massive nests), rusty blackbird (wintering - winter roost in canopy, forages on the ground); Local or Regional Interest - yellow-throated warbler (breeding - canopy, usually with Spanish moss), American redstart (breeding - hardwood forests, usually near water), yellow-throated vireo (breeding - open canopy), summer tanager (breeding - open canopy), pileated woodpecker (breeding - mature and extensive forest, with dead trees for nesting).

Strategies:

Over the life of the CCP, increase existing acreage of mature forested habitats and increase the vertical structural diversity of reforested sites to significantly improve habitat conditions for forest breeding birds, with emphasis on priority species to meet the objectives established by Partners In Flight and the LMRVJV [see Table 2-7].

Collect baseline bird population data and monitor bird population responses to habitat restoration and management using, at a minimum, point counts (with 30 or more points per refuge) that will provide data for both canopy and understory species. All habitat types should be sampled proportionately, according to their presence on the refuge. All data will be reported to the LMRVJV office.

Conduct annual surveys using the established protocol.

Ensure that georeferenced (GPS) habitat data are collected and documented on all point locations. All data should be translated into a GIS format for analysis and distribution.

Generate a GIS layer that displays georeferenced survey points by habitat types and associated structure and species distribution and occurrence.

Conduct point count surveys once per year during mid to late May.

Conduct the point counts in the same sequence from one year to the next (i.e., same direction, and sequence of points within a morning and among mornings), with the same observer, if possible.

Compare productivity of breeding birds in mature forest adjacent to "hard" agricultural edges and adjacent to "soft" moist-soil, scrub/shrub or reforested edges.

Begin more involved protocols after collecting five years of baseline data. These protocols should address not only species occurrences, but also their relative rates of reproductive success and/or post-fledging survival in response to management protocols.

Use a combination of private lands, land acquisition, and on-refuge work to reforest some strategic tracts, increasing the forest block size of BCA's and providing the greatest benefits to priority forest breeding birds. The LMRVJV has developed a model and maps that show priority reforestation sites that will provide the greatest benefits for forest breeding birds. The long term objective is to meet the forest core objectives for each of the BCA's in the Complex work area.

Objective 1-8: Scrub-Shrub Birds

Maintain existing early successional habitats along buffer strips and within two years after the plan's approval convert up to 10% of acquired agricultural lands throughout the Complex to scrub-shrub, supporting priority scrub-shrub breeding species.

Discussion: The extensive edge habitat and likely elevated numbers of nest predators and brown-headed cowbirds may work against having a healthy and complete forest breeding bird community until reforestation efforts are well-advanced. Scrub-shrub associated species are another group of vulnerable species within the Southeast. These species are generally considered a lower priority than mature forest species within the LMRV, but possibly some species will benefit temporarily during the early years of reforestation, especially white-eyed vireo, painted bunting, and orchard oriole (only one record for Bell's vireo from the area - Tunica Co., but areas on and around the refuge should be searched for the presence of this species). However, good opportunities for overall effective bird conservation through the establishment and maintenance of scrub-shrub sites throughout Complex, including edges and small blocks within existing Refuges and many of the FmHA tracts. Many of these FmHA tracts are generally isolated from larger forest blocks.

Scrub-shrub species apparently are able to withstand cowbird and depredation problems better within smaller blocks of habitat (i.e., 50-100 acres, possibly as small as 25-acre patches) than mature forest priority species, many of which require thousands of contiguously forested acres. With better information, the project leader and his staff may want to consider targeting certain sites for this habitat phase. Sites selected for long-term maintenance of scrub-shrub will require periodic disturbances. One option for minimizing the frequency of disturbance (to set back succession) necessary to maintain scrub-shrub habitat would be to plant areas with native fruit-producing, shrub species such as plum, swamp dogwood, devil's-walking-stick, deciduous holly, and various species of hawthorn.

Habitat for these species should increase on existing reforested areas during the next five years. Each of these fields should be monitored for use by these species by conducting a series of point counts (if the habitat patch allows for several points to be established).

Priority species include the following: High - painted bunting (breeding - dense thickets of shrubs, saplings, or second-growth trees), white-eyed vireo (breeding - dense, and usually moist thickets), Bell's vireo (breeding - streamside thickets or upland scrub oaks), orchard oriole (breeding - scattered hardwood trees in open country); Moderate - yellow-breasted chat (breeding - dense cover of shrubs or saplings), northern bobwhite (breeding - ground-nester), field sparrow (breeding?, winter).

Strategies:

Test restoration of scrub-shrub habitats using 500 acres of converted agricultural land in patches of 20 to 100 acres at 5 to 20 locations. In the long term (15 year planning horizon), monitor bird response and if not getting breeding priority species (see below) or if maintenance of scrub-shrub habitats is too costly, then these areas should be reforested - either through planting back to trees or through natural succession.

Maintain scrub-shrub habitat and structure (vegetation no more than 20 ft. high), through species planted, disking, chemicals, or burning to set back succession.

Monitor bird population presence and responses to habitat restoration using direct counts and point counts focusing on breeding painted buntings, white-eyed vireos, and orchard orioles.

Establish line transects through scrub-shrub habitats to monitor transient songbird occurrence and stop-over activities. Transects should be surveyed a minimum of weekly (or at least bi-weekly) during both spring and fall migrations. It is recommended that coverage of two routes on consecutive mornings, once each week, from the last week of March to the last week of May and again from late August (early July if possible) to the end of October be surveyed.

Reevaluate newly acquired/protected lands for the value of maintaining the scrub-shrub habitats vs. reforesting these areas to contribute to the creation of interior forest habitats.

Objective 1-9: Grassland Birds

Maintain existing acres of grasslands and within five years of the plan's approval convert up to 10% of acquired agricultural lands throughout the Complex to grasslands to support priority grassland bird species. Conduct baseline information surveys and continue to monitor bird responses to management and habitat alterations.

Discussion: The emphasis on 'grassland' habitat conditions used by high priority species on the Complex is likely restricted to forest restoration sites actually more often dominated by "brushy" annuals. Priority grassland species are mostly found at the Complex during migration and winter, but a few species may breed in small numbers. Recently planted reforestation sites should constitute the primary habitats on the refuge. However, higher sites with sandy soils (i.e., poorer quality sites) dominated by broomsedge (*Andropogon* spp.) should be maintained in particular for wintering LeConte's sparrows. Priority grassland species include sparrows (principally LeConte's, but also grasshopper and possibly lark), sedge wren, bobolink, and raptors (most notably bald eagle, northern harrier, short-eared owl, and loggerhead shrike).

No specific population objectives have been established for these species at this time within the LMRV, but survey and monitoring protocols (transects and area searches) can be used for tracking peak movements on and off of the refuges and to document responses to habitat management.

Priority species include the following: High - Henslow's sparrow (wintering), sedge wren (wintering), short-eared owl (wintering), LeConte's sparrow (wintering); Moderate - dickcissel (breeding - herbaceous cover where vegetation is at least 2 feet [0.6 m] high), northern bobwhite (breeding - ground-nester), loggerhead shrike (breeding - tree or shrub nesting, forages on ground), field sparrow (breeding - scattered saplings, shrubs, and tall herbaceous cover; wintering - dense cover of herbs, particular tall composites), northern harrier (wintering), grasshopper sparrow (wintering), field sparrow (breeding?, winter).

Strategies:

Create and maintain open grassland habitat for selected bird species. The most likely candidate areas are the 275-acre field at Coldwater River NWR and FmHA tracts with unsuccessful reforestation to date.

Determine the location of “hotspots” (poorer quality sites with sandy soils) and promote the development of grassy-herbaceous ground cover, in particular broomsedge.

Determine the extent and evaluate the use grasslands and associated bird communities using point counts and transects (project prairie bird) protocols focusing on breeding and wintering species. Conduct 3-6 surveys per season with at least one or two within each of the following periods: (1) 15 November-31 December, (2) 1 January-15 February, and (3) 16 February-10 March.

Maintain grassland habitat through burning, disking, chemicals, and select plantings.

Delay mowing and burning of levees and fields from March through mid-August.

Establish at least one transect of 100 m in each discrete patch of grassland habitat and use project prairie bird protocol to count wintering bird populations (as other areas are located/added, add new transects). If these habitats do not receive the bird response or become unmanageable, consideration must be given to allowing these areas, which were probably forested under natural conditions, to return to a forest condition. Refuge priorities to maintain grassland habitat must be weighed against other habitat and population management priorities to most effectively meeting the refuge purposes with limited staff and equipment.

Objective 1-10: Raptors

Within two years of the plan’s approval, determine the extent and evaluate the use of refuge habitats by raptors at a Complex-wide scale.

Discussion: The northern harrier and all other raptors, as well as the loggerhead shrike, are best surveyed along an established route (i.e., roadside survey). Conducting surveys at least twice per month from mid-September to the end of March is recommended for non-breeding populations, including transients (and may include some early breeding for some species). The refuge staff should also participate in the National Midwinter Bald Eagle Count and report the data to the Raptor Research and Technical Assistance Center in Boise, Idaho.

Priority species include the following: Extremely High - swallow-tailed kite (migration, breeding - nest in superemergent trees, possibly cypress), Moderate - Mississippi kite (breeding - nest in trees along edges in open country), loggerhead shrike (breeding - nest in tree or shrub, forages on ground, wintering), northern harrier (wintering), bald eagle (wintering, nesting possible - nests in superemergent trees large enough to support massive nests).

Strategies:

Provide perching and nesting structures where necessary to enhance populations.

Implement a network of roadside surveys for wintering and breeding raptors, focusing on priority species. Alternate direction from one survey to the next.

Establish a migration hawk-watch station at a prominent site(s) on the refuge(s) to survey for migrating raptors.

Conduct transient bird surveys at least twice per month from mid-September to the end of March.

Conduct annual National Midwinter Bald Eagle count and report the data to the Raptor Research and Technical Assistance Center in Boise, Idaho.

GOAL 2 – Implement a program of science-based stewardship of the fish and wildlife resources associated with the North Mississippi National Wildlife Refuge Complex.

Background: 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."

While the Service and Refuge System's priority is the protection of federal trust species (migratory birds, threatened and endangered species, interjurisdictional fish and marine mammals) this mission clearly states that these refuges also should provide for other wildlife, such as resident species. In other words, by acquiring refuge lands, we also assume responsibility for managing the resident wildlife that also may be dependent on these refuge resources. However, this management must never be to the exclusion or detriment of the purpose for which the refuge was established.

A variety of wildlife species indigenous to the LMRV inhabit the Complex. Some of the more notable wildlife are those easily seen by the general public, e.g. white-tailed deer, wild turkey, cottontail rabbits. Many of these species are also available to the public for hunting opportunities, which elevates their importance to the public and land managers with hunting programs. However, Service policy requires us to maintain the "biological integrity, diversity, and environmental health of the National Wildlife Refuge System" (Federal Register, January 16, 2001). If we are to truly understand the biodiversity and environmental health of these lands we must gather baseline information on all wildlife and their habitats to document their existence, monitor trends, and understand the impacts of refuge programs.

The following objectives are intended to provide the biological foundation to pursue the purpose and maximize the wildlife values of the Complex. Depending upon the availability of funds and personnel, Complex managers should attempt to fulfill these objectives within 15 years. Periodic reviews of the progress made toward accomplishment of these objectives and possible modifications should be conducted as advances are made in scientific knowledge affecting the management of fish and wildlife resources. The Complex plays a key role in a number of national, regional, and system-wide conservation plans that are referenced in this report. Fulfillment of the following objectives and strategies will contribute significantly to those plans.

Objective 2-1: Game Species

For the duration of the plan, manage game populations to maximize quality hunting opportunities while maintaining habitat for federal trust resources.

Discussion: Most resident game species are habitat generalists while the desired migratory bird community tends to gravitate toward habitat specialization. Three of five key game species (deer, rabbit, and quail) tend toward early habitat successional stages, one (tree squirrels - both fox and gray) tends toward later habitat successional stages, and one (wild turkey) needs important components of both early and later successional stages.

The majority of early successional habitat on the Complex is a by-product of other management actions. The early successional habitats occurring on the Complex seem to be a function of one of three things: farming (USFWS or co-op; comprising a very small percentage [$<5\%$] of total land area), reforestation efforts (currently available early successional habitat will be lost in less than 5 years), or flooding regimes (natural or man-made). The Complex currently maintains approximately 600 acres of fallow fields. These fields are mowed periodically to prevent invasion by wood plants.

Wildlife game studies have found that as little as 3-5 % of a land base managed in early successional openings can yield appreciable population gains. This is demonstrably true for white-tailed deer, northern bobwhite, and wild turkey. It is also true for migratory species such as American woodcock as well as herptile, and invertebrate populations. Whether the openings occur as a result of small clearcuts, roadways, pipelines, tornadoes, or bulldozers is of little importance. The important point is to maintain these critical feeding and reproductive areas – especially in the Complex where the emphasis is on contiguous blocks of bottomland hardwood forest. In fact, for resident wildlife game species, it would be difficult to overstate the importance of managed early successional areas in the Complex. Scarcity of areas important for brood-rearing or “bugging” for ground-nesting birds assures these patch openings will be used in far greater proportion to their availability. Mature, open, bottomland hardwood forests are biological deserts for most resident wildlife game species for nine months of every year if judged on food availability, brood-rearing, and nesting cover, although with good forest management this can be remedied. Focusing grassland and shrub management for birds on smaller blocks of land, such as FmHA properties, may be a practical alternative, depending on the surrounding habitat.

Hard mast production is highly variable in the South compared to the Midwest. Southern hard mast crops may fail two out of every five years. Heavy hard mast crops occur generally every 4-6 years. To avoid constant fluxes in resident wildlife game populations due to hard mast crop variability, there must be openings somewhere in order to meet critical nesting, brood-rearing, “bugging”, and browse habitat needs for ground nesting birds and white-tailed deer. With planning, these openings can be accomplished without sacrificing habitat requirements for desired avian species such as neotropical migrants.

Managed early successional openings for resident and migratory wildlife game species does not mean agricultural co-op farming. Neither does it mean a clearcut allowed to regenerate naturally. It does mean an intended permanent opening allowed to regenerate in strips of natural vegetation up to 3 years or openings that may be planted in an annual or perennial legume requiring a minimum of maintenance while benefiting ground nesting resident game birds and white-tailed deer. These areas will be clear at ground level and will enhance invertebrate production. They may be strips within a field or may be an entire field. Openings should remain between 1-5 acres. By maintaining pH at or near 7.0 for optimum seed germination combined with fall mowing or light fall disking, these openings should require only a single planting lasting for 5-7 years. However, in the interest of good forest management and the reduction of fragmentation, these openings should be along road shoulders, fire breaks, and other necessary and existing openings.

Strategies:

General

By 2007, develop and implement a Biological Inventory and Monitoring Plan. This plan will include key indicator resident wildlife species. Integrate population objectives for resident species into the refuge's habitat management plans.

Encourage research, inventory, and monitoring activities on the Complex, when compatible with the refuge purpose and management.

Manage lands to maintain representative flora and fauna characteristic of the LMRV, and serve as a repository of fauna and flora native to the LMRV and the Complex, when compatible with refuge purpose and management.

Identify and maintain 3-4% of Complex landbase in a variety of early successional areas in ecotonal sites as critical nesting and brood-rearing sites for resident wildlife reproduction.

Identify, maintain, and enhance areas/species of soft mast production to help mitigate effects of drought and lack of hard mast availability during the year.

Maintain annual survey indices (call counts, spotlight surveys, brood surveys) and harvest/visitor use records for resident wildlife game species.

Burn (wherever possible), strip disk (on the thirds principle) or herbicide (spot treat as needed) old fields to set back natural plant succession, and increase nesting and brood rearing habitat in larger areas not reforested in oak seedlings. Lightly disk fire lanes surrounding forested stands to encourage growth of legumes, attract insects, and create a mosaic of bare ground and vegetation that provides feeding and brood-rearing cover.

White-tailed deer

Maintain a stable deer population through a program of either-sex hunting. Aim for removal of approximately one-third to one-half of the herd annually with a 1:1 harvest ratio of the sexes.

Conduct herd health checks every 5-7 years and monitor habitat conditions to determine the health and population of deer on the Complex.

Construct deer grazing exclosures (10' x 10' or larger) throughout habitat types and in closed areas (where deer become concentrated) to help gauge herd densities and impacts to refuge vegetative communities and migratory bird management programs.

Evaluate deer populations and adjust hunting programs as needed. Be prepared to increase the length of deer season, the use of rifles, the doe harvest, or all the above as the deer population increases.

Upland game birds

Refrain from mowing levees, powerline/pipeline right-of-ways, and roadsides until August 1. These are the only reproduction areas for resident ground nesting birds (especially as seedlings in reforestation areas increase in age). Peak reproductive effort barring a flood year will have occurred prior to August, even for second and third re-nesting efforts. Areas of high vehicular use should be mowed prior to May 1 to make them less attractive to birds attempting to nest. These practices will also minimize brown-headed cowbird habitat.

Plant and maintain understory species such as dogwood, wild cherry, grapes and berries. All of these are important in the wild turkey's year-round diet. These species benefit a variety of both wildlife and migratory birds and should be protected wherever they appear during cutting and thinning operations.

Leave field borders or 20-ft. buffer strips around large fields. This small field loss can result in 20-25% gains in reproductive effort. Reduce back to bare soil every third year.

Do not use chemicals on the buffer strips and use chemicals minimally within fields. Some chemicals have direct toxic impacts on quail, particularly chicks, and chemicals have indirect impacts by reducing the insect populations that quail depend on for food.

Within fields maintained for quail habitat, maintain 15-20% woody cover, 10-15% fallow areas, 15-20% grassy areas, and 40-60% row crop. Woody cover should be available every 200 yards.

Monitor population responses to quail management practices and hunting programs.

Develop partnerships with Mississippi Department of Wildlife, Fisheries and Parks and interested NGO's to assist in upland game bird management.

Objective 2-2: Non-Game Species

Within 10 years of the plan's approval, reestablish historical hydrological and habitat regimes to increase Refuge biodiversity to the maximum extent feasible. Biannually monitor non-game species response to restoration activities.

Discussion: Historically, the extent and duration of seasonal flooding from the Mississippi River fluctuated annually, recharging the LMRV's aquatic systems and creating a rich diversity of dynamic habitats that supported a vast array of fish and wildlife resources. Instead of natural hydrology, large-scale man-made hydrological alterations have changed the spatial and temporal patterns of flooding throughout the entire LMRV. In addition, these alterations have reduced both the extent and duration of annual seasonal flooding (with the conspicuous exception of most of Coldwater River Refuge). The loss of this annual flooding regime has had a huge impact on the forested wetlands and their associated wetland-dependent species.

In view of these profound hydrologic changes, it is very difficult – if not impossible – to fully simulate or reconstruct the structure and functions of a natural wetland. Restoration of wetland functions is especially difficult since wetlands depend on a dynamic interface of hydrologic regimes to maintain water, vegetation, and animal complexes and processes. Attempts to restore the hydrological regime in the LMRV and on the Complex include green tree reservoirs and water control devices that serve to manage and create moist soil units.

Reptiles and amphibians are significant components of the LMRV. They are abundant on the Complex and are functionally important in most freshwater and terrestrial habitats. Many species of herpetofauna are wide-ranging and may serve as key indicator species in evaluating the environmental health of an ecosystem. Knowledge of which species occur on the North Mississippi National Wildlife Refuge Complex is fundamental to an understanding of the biological diversity of the area.

Identifying and conserving breeding sites for amphibians, especially for salamander species, is critical. The habitat type is variable according to species, but one type which is easily overlooked in management is ephemeral pools. Depressions that hold water for less than a year may be found in almost any area, but additional factors such as vegetation characteristics, water quality, and historic use determine whether a given species may use them for breeding sites. Many salamanders are philopatric, returning as adults to breed in the site where they hatched and developed. If breeding sites are active, this is an indication that suitable habitat exists or has recently existed nearby to support adult populations.

Manipulating habitats for other species opens the possibility of inadvertently eliminating breeding sites. This would be highly disruptive and possibly devastating to the local population, especially in the case of salamanders, which are less mobile than frogs and reptiles and more apt to be impacted by loss of a breeding site. In the interest of diversity and of managing for all native species, breeding sites should be identified and conserved, especially for species which are not common.

Currently, the refuge staff is conducting calling frog surveys to monitor refuge frog populations, as well as beginning an overall inventory of amphibians and reptiles on the three traditional refuge properties. This information will be incorporated into a GIS-based database. The calling frog survey data will be submitted to a national database (the North American Amphibian Monitoring Program).

In terms of monitoring populations, clearly not everything can be done (or even the majority of items) without additional personnel and financial support. However, the highest priority needs may be identified and then determine which protocols can be accomplished immediately, which can be done with additional volunteers or slight adjustments to present staff work schedules, and will require additional resources.

Although the majority of acreage in the Complex has been in the National Wildlife Refuge System for over 10 years, very little is known regarding the species present on these properties. In order to fully inventory the species occurring on the complex, it will be necessary to obtain additional staff (Refuge Biologist, Biological Technician, etc.) and develop partnerships with local universities and museums.

Most of the properties managed by the Complex are located in the Mississippi Delta. Additional attention needs to be directed to the few properties located in the hills portion of the state. There are likely to be species on these properties that are absent from the sites on the delta.

Strategies:

General

By 2007, develop and implement a Biological Inventory and Monitoring Plan (also mentioned under previous objective). This plan will include key indicator resident wildlife species, including non-game animals.

Encourage research, inventory, and monitoring activities on the Complex, when compatible with the refuge purpose and management.

Manage lands to maintain representative flora and fauna characteristic of the Delta region of the LMAV, and serve as a repository of fauna and flora native to the LMAV and the Complex, when compatible with refuge purpose and management.

Work with partners (state museum, universities, etc.) to conduct formal censuses on refuge properties, including FmHA lands.

By 2007, construct and maintain GIS-based database for recording wildlife sightings on refuge properties.

Conduct timber stand improvement to help develop a thicker understory/midstory component of saplings, seedlings, etc., conducive to non-game bird groups and woodcock.

Non-game birds

See previous sections under Goal 1.

Reptiles and amphibians

By 2008, conduct amphibian and reptile inventories to establish baseline information on species occurrence and habitat utilization.

Locate and map (using GIS) reptile and amphibian breeding sites and identify species of use.

Conserve breeding sites by maintaining the current vegetation component and water regime. Establish buffer zones, if necessary, to protect from pesticide or silt contamination.

Conduct annual counts of egg masses to determine use of sites by salamanders and frog species

Conduct a calling frog survey three times annually according to the North American Amphibian Monitoring Program (NAAMP) protocols.

Establish standardized reporting methods for incidental sightings to include: species, date, property, specific location, and habitat type as minimum information required and size, sex, and age data as additional information where possible.

Objective 2-3: Fishes

For the duration of the plan, continue to enhance spawning habitats and improve water quality at Coldwater River, Dahomey and Tallahatchie NWRs to maintain healthy, sustainable fish populations.

Discussion: There is evidence that Tipppo Bayou, the most notable aquatic resource on Tallahatchie refuge, is being used as a staging area for spawning by paddlefish. Spawning, however, has not been documented on the refuge to date.

For all three refuges in the Complex, very little is known regarding non-game fish occurrence. Coldwater River NWR experiences flooding on an annual basis, with water backing up from the Tallahatchie River and the Panola-Quitman Floodway. Dahomey NWR is transected by numerous drainage ditches and bayous. In addition to Tipppo Bayou, Tallahatchie NWR has numerous oxbows and sloughs that are disconnected from any flowing waters. All three of these refuges should host a diverse assortment of minnows and rough fish.

Strategies:

Support efforts of Pvt. John Allen Fish Hatchery to restore warm and cool water species of concern in the Central Gulf Coast and Lower Mississippi Valley Ecosystems.

Provide assistance when requested by the Pvt. John Allen Fish Hatchery.

Conduct fish inventories to establish baseline information on species occurrence and habitat utilization.

Work with Pvt. John Allen Fish Hatchery or other interested groups to determine the extent of use of Tipppo Bayou by paddlefish.

GOAL 3 – Protect and restore habitat for federal and state threatened and endangered species found in the Lower Mississippi River Ecosystem.

Background: Recovery and protection of threatened and endangered plants and animals is an important responsibility delegated to the Service and its National Wildlife Refuges. Several federal threatened and endangered species are thought to use, or could use North Mississippi National Wildlife Refuge Complex lands, including the bald eagle, wood stork, Louisiana black bear, and the least tern. In addition, the federally listed endangered pondberry potentially exists on the refuge. It has been found on a Service easement in Bolivar County. Its presence on Dahomey NWR in Bolivar County has not yet been verified; however, an ecological assessment concludes that suitable habitats for pondberry do exist and that its presence there is very likely.

As do many states, the State of Mississippi keeps a continually updated list of sensitive plants and animals that are threatened, endangered, or of concern in Mississippi itself. The Mississippi Natural Heritage Inventory, maintained by the Mississippi Museum of Natural History, uses a ranking system developed by The Nature Conservancy, under which each listed species is assigned two ranks, one representing its range-wide or global status, and the other representing its status in the state. With regard to animals, Bolivar County has 15 listed species, Grenada six species, Quitman one species, and Tallahatchie five species. The species represent a wide range of taxa, including birds, mollusks, turtles, fish, and crustaceans. With regard to plants, Bolivar County has nine listed species, Grenada 42 species, Quitman five species, and Tallahatchie County 12 species. A number of these species undoubtedly occur on the Complex refuges and FmHA properties.

Objective 3-1: Inventory

By 2009, inventory the distribution and habitat use of all threatened and endangered species on the Complex and contribute to their recovery.

Discussion: In that the three listed bird species (bald eagle, wood stork, least tern) above are occasional visitors to the Complex and the one plant species has not actually been discovered to date (although it is strongly suspected to occur), the most appropriate actions staff can take at this time are to inventory and monitor occurrences of threatened and endangered species. Likewise with state-listed species, no systematic inventories have been taken.

Strategies:

Support the efforts of Pvt. John Allen Fish Hatchery to restore populations of paddlefish, alligator gar, pallid sturgeon, and native walleye within the Central Gulf and Mississippi Alluvial Valley Ecosystems.

Support the efforts of the Jackson Field Office to restore populations of Louisiana and American black bear to the Mississippi delta.

By 2007, prepare a Biological Inventory and Monitoring Plan for the Complex which includes protocols for monitoring endangered and threatened species.

Monitor and maintain records of sightings of all threatened and endangered species on the Complex including location and habitat type.

Implement vertebrate and invertebrate species inventories on the Complex to identify the presence, population status, and distribution of threatened and endangered species.

Enhance, restore, protect and manage imperiled species habitat using available conservation tools, including habitat management on existing land (federal, state and private), conservation easements, partnership agreements, conservation agreements, and land acquisition from willing sellers.

Monitor the population status of species of special concern and candidate species on the Complex.

Objective 3-2: Habitat development and management for black bears

By 2015, ensure the forest management plan is compatible with habitat management for black bears.

Discussion: Special consideration should be given to population monitoring and habitat management for any black bears on the Complex. Due to the lack of substantial blocks of forested habitats in the upper Mississippi River delta, reforestation of bottomland hardwood forests could provide connecting corridors from the river riparian area to much of the Complex. This would provide additional habitats for an expanding population of bears. Efforts with regards to bears should focus on forest management and education.

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. Timber species, size classes, cavities, openings, corridors, food sources, etc., are important considerations for all phases of forest management. However, most forest management practices for resident fish and wildlife populations will generally benefit bears. Identification of properties that could provide wooded corridors between the Mississippi River riparian areas and the Complex should be given a priority.

Whether bears move naturally into the area or are reintroduced, public education is vital. This may come in the form of school programs, landowner workshops, posted signs, pamphlets, town meetings, etc. The Complex should have Service personnel trained in bear relocation techniques. Also, protocol to deal with potential human/bear conflicts should be established. Complex personnel are also encouraged to work with state bear restoration groups and others to accomplish this goal.

Strategies:

Forest Management

Provide a diverse mix of hard and soft mast producing species to provide year-round food and cover.

Protect existing den trees and create den areas by leaving felled treetops for ground nesting cover on areas of higher elevation.

Utilize uneven age stand management and limit clearcut areas.

Monitor and maintain records of bear sightings, bear sign (scat, prints, clawed trees), and potential den trees (>36" dbh, especially if cypress, tupelo or oak and containing a cavity, or any large tree with claw marks), including exact location and habitat type. Records should also be reported to the Mississippi Department of Wildlife, Fisheries, and Parks state bear biologist.

Establish forested corridors connecting areas of the Complex with other forested lands and the riparian lands along the Mississippi River through the Partners for Fish and Wildlife Program and the formation of other partnerships.

Education

Provide staff training to promote bear awareness and education in the vicinity of the Complex.

Provide staff training on bear relocation and human/bear issues.

GOAL 4 – Maintain and/or restore ecological systems within the Mississippi Alluvial Valley and Central Gulf Ecosystems which mimic historical conditions.

Background: Habitat management will be used to maintain and, where appropriate and practical, restore elements of ecological integrity, 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 4-1: Moist Soil

Manage a minimum of 6,689 acres of shallow impounded wetlands (see Table 4-1) on the 3 traditional refuges for optimum production of moist-soil plants, invertebrates, or hard mast for a variety of wetland dependent migratory birds while meeting the objectives established for dabbling ducks by the Lower Mississippi Valley Joint Venture (LMRVJV).

Discussion: Moist-soil management refers to management of land to provide moist soil conditions during the growing season to promote the natural production of beneficial plants. Seeds produced by these plants often attract and concentrate waterfowl and other wetland wildlife species. The decomposing vegetative parts of moist-soil plants also provide substrate for invertebrates, which are critical food for many wetland wildlife and fish. Although small grain crops provide high energy for migrating waterfowl, these artificial foods do not provide the same nutrients found in these natural foods. The loss of wetlands in the surrounding areas has made these artificial wetlands essential to the health and survival of wetland-dependent wildlife species.

It is imperative to only manage those acres which can be managed well. Poorly managed moist soil units provide greatly reduced benefits to waterfowl and shorebirds and may develop into thick willow stands or cultivate invasives and pest plants.

Strategies:

Install depth gauges on all impoundments.

Maintain early successional moist soil plant communities and control undesirable plants by mechanical disking, herbicides, water level manipulation, or rotating agricultural crops periodically (considering the magnitude of the moist-soil objective, every effort needs to be made in terms of strategies to keep the designated acreage in moist-soil habitat).

Control perennials and other emergents, maintain deep water levels, greater than three feet, while providing loafing and feeding areas for waterfowl and waterbirds, habitat for fish and developing populations of invertebrates, including crawfish.

Provide shallow water depths in late spring and early summer to concentrate prey for long-legged waders such as Wood Storks (State listed), Little Blue Herons, and White Ibis (both declining).

Begin final drawdown of water levels in mid-summer to expose mud-flats for southbound shorebirds.

Actively solicit and logistically support research by universities, U.S. Geological Survey, or other research entities to conduct applied investigations to answer management questions and enhance capabilities to provide for target species.

Work closely with Wildlife Habitat and Management and LMRVJV biologists to develop and implement a system to record water levels, habitat manipulations, plant coverage, and migratory bird response in all appropriate impoundments and use adaptive management procedures to improve results.

Work toward complete water control on all shallow impoundments managed for waterfowl.

Develop a protocol for managing moist-soil areas with only partial water control, using 400 pounds per acre as a minimum production rate. If the minimum can not be achieved consider planting millet or converting to row crops.

Develop a step-down management plan for all impounded water including moist-soil, field impoundments, permanent water, and green tree reservoirs, incorporating all listed strategies.

Develop a GIS database of all water management units that includes floodable acreage, water control structures, soil types, vegetation transects, flood chronologies, and manipulations.

Conduct and keep records of in-depth plant surveys at least twice annually in all moist-soil management units.

Objective 4-2: Forest Management

Manage existing forest areas according to the existing forest management plan for the Complex. Reforest additional acquisitions where appropriate.

Discussion: About 80 percent of the forest lands in the LMRV has 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 purpose and to achieve the maximum potential. To date, the forest resources have had a minimum of inventory work conducted. A stand inventory and GIS mapping database must be established. A Forest Habitat Management Plan has recently been completed. Some of the most unique forested habitat remaining in the Delta are forested ridges. Because of the importance of the remaining forests to the wildlife resources on the refuge and conservation priorities set forth in various plans, the 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 utilize 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. These areas can be enhanced for waterfowl utilization by making them more accessible. Ducks like openings in the woods to allow them easy access. Small groups of trees (3-5) that dominate canopy coverage can be removed to provide the opening that ducks prefer for landing. 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.

Strategies:

Follow the recently developed Forest Habitat Management Plan, including its wildlife and tree species to be favored, reforestation methods, prescription-writing methods, timber marking and thinning procedures, harvest policy, and record-keeping procedures.

Complete a forest inventory and a GIS mapping database of the refuge forests. Utilize database information to schedule stand treatments and project manpower and other resource needs. The inventory may be a light baseline inventory of approximately 1% using the compartmental breakdown of like habitats noted in the Dahomey assessment. A more intense cruise will be needed prior to prescription writing.

Take advantage of carbon sequestration dollars to complete remaining reforestation activities (new plantings and replantings).

Prioritize reforestation efforts to enhance or create: (1) landscape linkages for wide-ranging species such as black bear and (2) a critical forested habitat mass to benefit forest interior birds and other species needing larger blocks of habitat.

Manage for a natural representation of tree species and densities in reforestation efforts, with reasonable attempts made at mimicking natural spacing (i.e., avoid "planted rows").

Direct reforestation efforts to produce a merchantable forest that is desirable to commercial loggers to help implement forest management practices in the future.

Consider increasing species diversity at time of establishment. Plant a greater percentage of hard mast species in areas where light-seeded species are less than 1/4 mile away, allowing those species to reseed naturally.

Develop and implement management guidelines and practices for existing hardwood plantations using the attached "General Recommendations for Hardwood Forest Management to Improve Wildlife Habitat in the Lower Mississippi River Valley."

Develop treatments to improve species diversity and habitat value of plantations. Pursue a general forest management strategy to provide the most natural species representation and structure to benefit the widest array of site-appropriate species and forest management options.

Consider the feasibility of spot planting specially grown containerized trees (e.g., root pruned or other) to help ensure a hard mast component within a reasonable period of time, especially on FmHA properties.

Flood greentree reservoirs only during the dormant period - never flood before dormancy and rarely after green-up. Flooding dates and duration should be varied annually and in some years should not be flooded.

Inventory and monitor tree vigor and diversity, including regeneration of red oaks. Modify flood management to achieve forest and wildlife management objectives.

Continue to establish firelanes around reforestation areas until crown closure lowers the level of fuels resulting from herbaceous plants in the understory.

Hire a forester even though the forested landbase is currently fairly small. Areas such as Dahomey will not receive the attention they deserve until a position is created for someone who can devote a considerable amount of time to caring for the forest. Additionally hire a technician to assist in management activities such as cruising timber, marking, and monitoring.

Survey refuges for any potential endangered species (e.g., pondberry) that may influence timber management decisions.

Objective 4-3: Invasive and Pest Management

For the duration of the plan, inventory, monitor, and control where possible invasive plant and animal populations to minimize or eliminate negative effects on native flora and fauna.

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

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 *Sesbania* spp. (coffeeweed) or *Salix* spp. (willow) offer desirable vertical structure when occurring in low densities in southern moist soil impoundments. Other aggressive plant species such as trumpet creeper, morning glory, and redvine offer little food value or cover and are extremely difficult to control once established except with approved herbicide treatments.

Similarly, wildlife pests, some native some non-native, are often difficult to control and impossible to eradicate. The nutria is an introduced species that can rapidly attain high population levels. Nutria feed largely on aquatic plants, typically uprooting the plant as it feeds. At high densities, nutria can rapidly remove a large proportion of the wetland vegetation. Additionally, nutria burrow into earthen levees and can cause them to leak or blow out. Currently, the Walker Tract of Tallahatchie NWR and Coldwater River NWR support high densities of nutria. Nutria occur throughout the Delta and have been detected infrequently on Dahomey NWR and the main tract of Tallahatchie NWR.

The beaver is a native species with both advantages and disadvantages. Situated along major watercourses, the Complex will continue to hold and attract beaver. 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.

The Complex should be 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 Complex where the major habitat type is bottomland hardwoods and its associated hard mast production, feral pigs will be efficient competitors with native wildlife, including deer, turkey, quail, squirrels and waterfowl for available hard mast resources. Competition for food resources is only one part of a feral pig problem. In addition to being a host of various diseases such as swine brucellosis, feral pigs cause enormous structural damage to levees and roadways by rooting large holes while feeding on grasses, roots, and stems. The feral hog population on the Complex should be curtailed by any means possible; such control is both practical and attainable.

Other native species such as striped skunks, raccoons, and double-crested cormorants can occasionally reach such high population densities that they interfere with Complex objectives and may require control.

Strategies:

By 2008, develop GIS inventory and monitoring of problem areas for plants as well as areas in the natural seed bank that are producing beneficial wildlife plants that meet refuge objectives. Inventory, monitor, and control populations of wildlife that have become pests.

To control willows, cut and flood, dry and apply Roundup, or hack and squirt using herbicides. Disk every 3 years to set back succession.

In problem impoundments, use Rodeo to kill unwanted vegetation prior to manipulating water levels. Thus, desirable moist soil plants can thrive. Disking and mowing may also be advantageous in certain scenarios. Consider using cooperative farming in problem impoundments when staff is unavailable to help set back succession.

By 2008, establish standardized method of reporting problem areas where plants/animals are discovered.

Track hog movements, as they tend to establish movement patterns. Use baiting in the summer to attract individual feral hogs to a trap. Use "repeater traps" to increase the number of hogs captured in a single trap. Take advantage of naturally occurring funnels leading into fields used by feral pigs to set traps.

Increase hunter harvest of feral hogs through education and additional hunting opportunities.

Use traps and rifles to reduce nutria populations. Focus efforts in late winter and early spring when the young are most vulnerable and the adults appear less wary.

Utilize GS-7 biological technician to implement trapping program of identified pest species (e.g. beaver, nutria, hogs) on the Complex.

Develop management guidelines (contracts, special use permits, special conditions) to administer a trapping program consistent with sound biology, Service guidelines, refuge purposes, and the conservation of ecosystem functions.

Set protocol in dealing with different species. Some species can be managed with mechanical disturbance or simply adjusting the timing of the initiation and rate of drawdown. If necessary, use herbicides to control aggressive plant species, ensuring that label directions are followed. (Monitor areas that are sprayed to ensure that non-target organisms are not impacted. Discontinue use of herbicide if negative impact is detected.) If beaver are not impacting a roadway, water control structure, or other critical juncture, leave them alone.

Establish and prioritize units that most need protection from invasive plant or animal pest species presence.

Identify and take advantage of naturally occurring beneficial plant stands or beaver “ponds” that can be drawn down and seeded in late summer then reflooded by beavers for waterfowl use.

Develop a Complex-wide Integrated Pest Management Plan by 2006.

Install effective beaver guards or water diversion structures on all water control structures that are perpetually disabled by beaver dams.

GOAL 5 – Increase the land base of the Complex and contribute to the protection and restoration of fish and wildlife resources found within Northern Mississippi.

Background: The authorized acquisition boundaries of Coldwater River, Dahomey and Tallahatchie NWR’s allow for considerable expansion in the size of individual Refuges within the Complex. This expansion will take place over the long term, and will emphasize those tracts that have the greatest potential to enhance the ecological integrity of the protected land base.

Objective 5-1: Land Acquisition

Continue to acquire the remaining 31,573 acres of land within the current Refuge acquisition boundaries, with special emphasis on those areas that would (1) improve access, (2) contribute to national and regional objectives, (3) reduce impacts to refuge resources, or (4) provide additional wildlife-dependent recreational opportunities.

Discussion: The Complex has acquired approximately one third of the lands within its current acquisition boundaries. Certain critical inholdings are still needed to meet habitat and public use objectives. These include foraging and sanctuary habitats for waterfowl and Bird Conservation Area forest block objectives, as well as providing access to visitors, reducing off-refuge impacts, and protecting unique habitats, with opportunities to expand and establish manageable units. The lands within and surrounding Dahomey NWR are part of interior forest objectives established by the LMRVJV in support of the Partners in Flight Plan for the LMRV.

Strategies:

Highest acquisition priority should be placed on acquiring inholdings and other tracts that will significantly improve management opportunities to meet objectives established by various national and regional plans.

By 2006, develop an outreach program that provides information on land acquisition and easement programs, for the benefit of landowners within the boundary expansion areas.

Develop partnerships with conservation organizations such as The Nature Conservancy, The Trust for Public Land, and The Conservation Fund to support land acquisition needs.

Focus land acquisition efforts on properties adjacent to existing refuge lands within the Bird Conservation Areas.

Objective 5-2: Private Lands

Provide assistance to private landowners within our 26-county Complex work area. This assistance will be directed towards restoring habitats for wintering waterfowl and forested wetlands to achieve objectives of national and regional plans for the LMRV and Central Gulf Ecosystems.

Discussion: Service authorities for involvement with private landowners in developing and carrying out habitat improvement projects are found in The National Wildlife Refuge System Improvement Act (NWRISA) of 1997, and the policy documents for the PFW 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 Complex 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 resource 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, Mississippi River Alluvial Valley Bird Conservation Plan, and Strategic Fisheries Plan.

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 PFW 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 PFW Program, landowners may receive up to \$25,000 for on-the-ground project implementation. PFW projects typically receive a minimum 50% in-kind cost share and require a minimum 10-year commitment from the landowner. Typically, landowner agreements are for more than 20 years. Since the PFW Program was initiated 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 LMRV. The PFW Program provides base funding for 1 (one) full-time private lands biologist stationed at the Complex.

The Mississippi Partners for Wildlife Program is funded separately from the PFW Program, receiving funding primarily through the Service's Refuge Challenge Cost-Share (CCS) Program. The CCS Program also requires at least a 50% cost share from other partners. In Mississippi, this partnership involves the private landowners, Ducks Unlimited, Delta Wildlife, 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/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 USDA 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 (WRP), 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 WRP, administered by the Natural Resources Conservation Service (NRCS), 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:

Develop a 5-year Strategic Plan for developing and carrying out habitat improvement projects within defined habitat focus areas on private lands within the Complex work area. The plan should focus restoration and other efforts on priority reforestation sites established by coordinated planning efforts like the LMRVJV rather than simply an opportunistic approach to project selection.

Develop and carry out an Annual Work Plan for addressing priority private lands issues identified under the 5-year plan and other appropriate sources.

Target private lands within Bird Conservation Areas for projects through the Partners for Fish and Wildlife (PFW) program.

Expand the PFW/private lands program at the Complex to more effectively involve other interested partners, such as the Mississippi Department of Wildlife, Fisheries, and Parks, NRCS, Delta Wildlife, Ducks Unlimited, and the Mississippi Fish and Wildlife Foundation, in program development, policy and implementation.

To the extent possible, leverage Service project funds and technical assistance with private landowners and other partners (e.g., Mississippi Dept. of Wildlife, Fisheries and Parks, Ducks Unlimited, Mississippi Fish and Wildlife Foundation, etc.).

Integrate Service private lands programs and initiatives with existing USDA conservation programs under the 2002 Farm Bill. Ensure that all Service projects on private lands are coordinated with the appropriate District Conservationist with the NRCS in order to maximize technical assistance and access to all appropriate conservation programs and opportunities.

Ensure that the PFW biologist assigned to the Complex is fully utilized in developing and carrying out authorized activities under approved Service strategic plans and activities defined under the PFW and other private lands initiatives.

Objective 5-3: Focus Areas

Use conservation tools such as conservation easements, partnership agreements, and technical assistance to protect, restore, and manage the highest priority habitats within this area (see Figure 8).

Discussion: The work area for the Complex includes 28 counties in northern Mississippi. Within this work area are two “focus areas.” Each focus area is a contiguous block made up of refuge lands, Bird Conservation Zones, other public lands, and private lands. The objective for these “Partners for Conservation” focus areas will be to work with partners (state, federal, and non-governmental organizations) and private landowners to focus available resources to (1) help achieve the objectives of national and regional plans; (2) develop corridors for wildlife; (3) create habitat for waterfowl, wintering and breeding; (4) reduce off-refuge impacts to refuge resources; (5) provide better public access to refuge lands; and (6) restore critical interior forest habitat for trust species needing large blocks of interior bottomland hardwood forests. By concentrating efforts within these focus areas, the program is likely to provide more wildlife benefits than if the effort were spread throughout the Complex work area.

The focus areas are primarily cleared agricultural lands interspersed with small remnants of bottomland hardwoods, seasonally flooded and permanent wetlands, and cypress brakes. Alluvial floodplains, hydric soils, and old river scars characterize this area. Although now a landscape of cotton, corn, soybeans, rice, and catfish ponds, this area was once a rich network of bottomland hardwood wetlands interspersed with natural openings that supported an immense variety of forest interior birds and other fish and wildlife.

Figure 8. North Mississippi National Wildlife Refuge Complex Focus Areas

As with any plan or recovery project, by concentrating resources and partnership efforts, a more structured program can be created that will encourage future endeavors to be “focused” on lands that will have the greatest impact on national and regional recovery and management plans for imperiled federal trust species and their habitats. The three refuges in the Complex are identified in separate Bird Conservation Zones (BCZ), in an effort to provide maximum benefits for neotropical migratory birds. The “Partners for Conservation” focus areas will link several BCZ’s and provide increased opportunities for partnership efforts . These areas include: 1) Dahomey NWR BCZ, the Whittington BCZ along the east side of the Mississippi River, and lands linking the two areas, and 2) the Malmaison BCZ surrounding Tallahatchie NWR, the O’Keefe BCZ surrounding Coldwater River NWR, the Coldwater Creek BCZ to the north of Coldwater River NWR, and lands linking these three BCZs.

Strategies:

Conduct further analysis of habitats and land ownership within the focus areas to serve as a basis for building partnerships with landowners desiring to improve wildlife habitat on their lands.

By 2008, develop a “Partners for Conservation” outreach program that explains the concept and objectives of this focused partnership, private lands effort.

Maintain a list of landowners within the “Partners for Conservation” focus area to provide information on opportunities to participate in future conservation programs in their area.

All future boundary expansion proposals will be within these focus areas.

Within one year of the plan’s approval, develop a mailing list of potential partners, including state, federal, and conservation organizations.

Objective 5-4: Contaminants and Siltation

Continue to monitor contaminants concentrations in fish, wildlife, and waterbodies of the refuges while reducing siltation.

Discussion: The Fish and Wildlife Service contracted with North Carolina State University to conduct the Lower Mississippi River Ecosystem Study, which investigated chemical contamination at 26 National Wildlife Refuges in the LMRV. The field sampling for the study spanned a six year period and involved sampling water, sediment, and fish at the refuges. Dahomey and Tallahatchie NWR’s were included in the study. Sixty-four water samples, ten fish samples, and fourteen sediment samples were collected from the refuges and analyzed for organochlorine pesticides, mercury, and current use pesticides. The benthic fish species collected included common carp, channel catfish, and smallmouth buffalo, and the predator fish species included largemouth bass, white crappie, and spotted gar.

Results of the analyses of the samples indicate that contaminant problems exist at both refuges. Concentrations of DDTM were above the predator protection level of 1.0 ppm in benthic fish species, and those concentrations are high enough to issue a limit consumption advisory for benthic fish. The Mississippi Department of Environmental Quality will issue a limit fish consumption advisory when DDTM concentrations in fish reach 1.0 ppm. Toxaphene concentrations were above the predator protection level of 0.1 ppm in benthic and predator fish. Toxaphene concentrations were high enough to issue a limit fish consumption advisory for both benthic and predatory fish. A fish consumption advisory is issued when toxaphene reaches a concentration of 0.4 ppm in fish. DDTM concentrations were above concern levels in sediment samples. Concentrations of current use pesticides, DDTM, and toxaphene, exceeded the U.S. Environmental Protection Agency's chronic water quality criteria in water samples.

Field inspections have been completed on the stream and lakes. It is suspected that concentrations of suspended solids, nutrients, and turbidity are elevated most of the year in the waterbodies, and that there are extended periods when dissolved oxygen levels are at or near zero. In addition, water temperatures in the streams probably rise above 95 degrees Fahrenheit during the summer months.

Many of the fertilizers and pesticides leave fields attached to soil particles and it appears that sheet erosion on agricultural land in the watershed is the cause of the contaminants/water quality problems common throughout the Lower Mississippi Valley. It is also the primary source of the contaminant problems at the refuge.

Beginning in 2001, malformed frog surveys have been conducted annually on Dahomey and Tallahatchie NWR's. Surveys have shown that as much as seventeen percent of the metamorphs collected had some type of deformity. The normal rate of deformity is about three percent or less. This finding indicates that something may be adversely affecting amphibians on the refuge. Some possible causes of the high rate of deformities include pesticides, metals, bacteria, viruses, ultraviolet radiation from thinning of the ozone layer, and elevated nutrients.

Coldwater River NWR is composed of abandoned catfish ponds and former agricultural fields. During normal rainfall, drainage from the adjacent agricultural lands flows east to the Tallahatchie River, and does not flow onto the refuge lands. However, highly turbid, contaminated flood waters from the Tallahatchie River appear to back onto the refuge where the water slows, allowing larger soil particles to drop out of suspension and colloidal particles are adsorbed onto leaves, trees, and woody debris. When the flood waters reach the abandoned catfish ponds, most of the contaminated soil has fallen out in the surrounding forested land. As a result, it is not likely that serious contaminant/water quality problems occur on the refuge. Even though serious contaminant/water quality problems are not expected, investigations should be conducted to determine contaminant levels in water, sediment, fish, and aquatic oriented wildlife.

Also at Coldwater River, large growths of filamentous algae can occur during the late spring and summer months on the catfish ponds. These large algae growths likely deplete the oxygen in the ponds when they begin to die. The large algal blooms are likely caused by nutrients originating from the surrounding agricultural land. These nutrients reach the abandoned catfish ponds because they are water soluble and would not fall out of suspension. These ponds typically receive water from the surrounding drainage ditches that is backed into the ponds during the late fall and winter. Spraying the algae with herbicides or adding super-phosphate would help control the algae.

Strategies:

Reduce sheet erosion within the watershed.

Determine if DDTM and toxaphene are elevated in aquatic-oriented wildlife species including wood ducks, raccoons, and fish eating birds and mammals.

At a minimum of once every five years, monitor contaminants concentrations in fish and wildlife species of the refuges.

On a bimonthly basis, determine concentrations of nutrients, suspended solids, fecal coliform bacteria, and dissolved oxygen for lakes and streams.

Implement BMPs (drop inlet structures, reforestation, vegetative field borders, etc.) on agricultural land with high sediment yields by using the Service's Private Lands Program, the Natural Resource Conservation Service's Wetland Reserve and Conservation Reserve Programs, and the Mississippi Soil and Water Conservation Commission's Clean Lake Program.

Collect fish samples every three to five years and have the samples analyzed for organochlorine pesticides.

Write contaminants study proposals and submit to the Lower Mississippi River Ecosystem Team, the Washington Office, and outside sources for funding.

Continue to monitor breeding pools to determine extent and severity of malformations in frogs. Obtain funding to conduct contaminant investigations on the areas at Dahomey NWR that contained frogs with a high rate of deformity. Monitor areas receiving runoff from herbicides applied to manage invasive species on the refuge to ensure that refuge management activities are not adversely affecting non-target organisms.

Reduce large, filamentous algal blooms in the catfish ponds through application of herbicides at the appropriate time.

GOAL 6 – Identify and protect cultural resources on the Complex in accordance with federal and state historic preservation laws and regulations.

Objective 6-1: Cultural Resources

By 2010, identify, evaluate the importance of, and seek the appropriate protective designation of cultural resources throughout the Complex, in accordance with existing legal requirements, regulations, and professional standards. Where significant cultural resources exist, provide public outreach opportunities where appropriate.

Background: The Complex follows standard National Historic Preservation Act Section 106 procedures to protect the public's interest in preserving its cultural/historic legacy that may potentially occur on the Complex. Whenever construction work is undertaken that involves any excavation with heavy earth-moving equipment like tractors, graders and bulldozers, such as for the development of moist soil units, the Complex contracts with a qualified archaeologist/cultural resources expert to conduct an archaeological survey of the subject property. The results of this survey are submitted to the RHPO as well as the SHPO, which in Mississippi is an official within the Historic Preservation Division of the Mississippi Department of Archives and History. The SHPO reviews the surveys and determines whether cultural resources will be impacted, that is, whether any properties listed in or eligible for listing in the National Register of Historic Places (NRHP) will be affected. If cultural resources are actually encountered during construction activities, the Complex is to notify the SHPO immediately. To date, no properties on the Complex have been determined to be eligible for the NRHP.

Strategies:

By 2010, conduct a Phase I archeological survey of the non-flooded areas of the refuges, by qualified personnel, as a necessary first step in cultural resources management.

Conduct a Phase II investigation if archeological resources are identified during the Phase I survey. In this, the eligibility of identified resources for listing on the NRHP is evaluated prior to any disturbance.

Conduct a Phase III data recovery If resources identified in Phases I and II are determined to be eligible. This will recover data and mitigate adverse effects of any undertaking.

By 2009, prepare a Cultural Resources Management Plan (CRMP) for the Complex.

Follow procedures outlined in CRMP for consultation with RHPO, SHPO, and potentially interested American Indian tribes.

Follow procedures detailed in CRMP for inadvertent discoveries of human remains.

Ensure archeological and cultural values are described, identified, and taken into consideration prior to implementing undertakings.

Develop a step-down plan for surveying lands to identify archeological resources and for developing a preservation program.

GOAL 7 – Increase the public understanding, use, and enjoyment of the natural resources of the Complex, consistent with the principle that wildlife comes first on national wildlife refuges.

Background: The National Wildlife Refuge System Administration Act, as amended by the National Wildlife Refuge System Improvement Act of 1997, states that compatible wildlife-dependent recreational uses are the priority public uses of the National Wildlife Refuge System (hunting, fishing, wildlife observation, wildlife photography, environmental education, and interpretation) and will receive enhanced consideration over other general public uses. Other uses will be permitted only when it is determined that they are legally mandated, provide benefits to the Service, occur due to special circumstances, or facilitate one of the priority wildlife-dependent recreational uses. See 605 FW 1, General Guidance, and 603 FW 1, Appropriate Refuge Uses. Where conflicts do not exist with the refuge purpose (e.g., migratory bird management, where applicable), refuge properties should be open for priority, wildlife-dependent public uses of the refuges as listed in the National Wildlife Refuge Improvement Act of 1997.

Objective 7-1: Visitor Services Plan

By 2009, develop a visitor services plan.

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

Currently there is not a Visitor Services Plan for the Complex.

Strategies:

By 2009, develop an up-to-date Visitor Services Plan that reflects current legislation, director's orders, initiatives, policy, and the mission of the Complex, the Refuge System and the Service. The plan should also address the current and future visitor services and recreation needs of refuges visitors.

When funding becomes available, hire one public use staff person for the Complex.

Objective 7-2: Visitor Centers

By 2014, explore the feasibility of building visitor centers on Highway 82 at the Povall FmHA Tract and jointly with the Pvt. John Allen Fish Hatchery.

Discussion: At the present time, the Complex does not have a visitor center. We propose to add two in the next 15 years that would be located to attract visitors in different parts of the Complex. It makes sense to cooperate with the Pvt. John Allen Fish Hatchery in planning, constructing and operating a visitor center that would serve both the hatchery and the Complex.

Strategies:

Work with the Service to develop visitor centers with architecture that is resource-efficient and energy-conserving, and/or reflective of local or regional, cultural and historic themes.

Complex management and outreach personnel should work closely with exhibit designers to develop exhibits based on appropriate themes for the Complex.

One or both visitor centers should have a small theater that can project slide shows or wildlife-oriented documentary films.

By 2009, develop an introductory audio-visual program to welcome and orient visitors to the Complex.

Develop a cadre of volunteers who can assist with staff of the visitor centers.

Objective 7-3: Visitor Contact/Administration Stations

By 2014, develop Visitor Contact/Administration Stations at all 3 traditional refuges on the Complex.

Discussion: At present, the Complex has two visitor contact/administration stations, one at the Complex headquarters in Grenada, and one at Dahomey NWR. At both locations, visitors can obtain Complex brochures, maps, hunting and fishing regulations, and other Service information. They can also meet and speak with Complex staff. This objective would keep these two visitor contact stations and add two more at Coldwater River and Tallahatchie refuges. These stations would be in addition to the two proposed visitor centers mentioned above.

Strategies:

Obtain and place good signs for motorists on approach routes to visitor contact stations.

Work with Mississippi DOT to place road signs at nearby intersections of major routes.

Visitor contact stations should be well-stocked with adequate informational literature and staffed, if possible.

To serve the public after hours or when the visitor contact station is closed, install kiosks at all visitor contact stations with information and brochures about the Fish and Wildlife Service, Refuge System, and Complex.

Objective 7-4: Hunting

Expand current hunting program throughout the Complex 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 Refuge 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...”

Dahomey and Tallahatchie NWRs allow hunting for squirrel, rabbit, bobwhite quail, raccoon, deer, turkey (Dahomey only), waterfowl, snipe, woodcock and feral hogs. In addition, there are youth hunts for deer, turkey (Dahomey only), waterfowl and squirrel. Dates for small game, bow hunting (deer), and primitive weapon hunting (deer) approximate state seasons. Duck and goose hunting are allowed Wednesday/Saturday/ Sunday mornings during state seasons. During the conservation order, snow goose hunting is allowed seven days a week one-half hour before sunrise to one-half hour after sunset. Unplugged shotguns and electronic calling devices are allowed and there are no bag or possession limits and no stamps needed. Special facilities are available for mobility impaired hunters. Each hunter must obtain from one of the Hunter Information Stations a user information card. There is a \$12.50 permit required to hunt on Dahomey NWR, Tallahatchie NWR, and select FmHA Tracts (small game only).

Strategies

Develop 1-2 panel kiosks at each check station and at the boat launch that state the Service and Refuge System missions along with refuge purposes. Consider the use of in-house graphics in the short-term.

Objective 7-5: Fishing

Work closely with Pvt. John Allen Fish Hatchery to expand current fishing opportunities over the next 10 years as outlined in the Biological Review.

Discussion: A 50-acre oxbow (Long Branch) on Tallahatchie NWR as well as several FmHA tracts under refuge administration have potential for aquatic resource management. Two tracts hold a total of ten ponds formerly used for catfish production. Three of these, a 40-acre pond at the Scott-90 tract and two 20-acre ponds at the Henson-165 tract would be managed for sport fishing. In addition to the Tallahatchie NWR oxbow lake, there are existing oxbows on the following tracts, each of which would require a water control structure, a boat ramp and parking area: the Trainor-219 tract with a 10-acre oxbow of the Tallahatchie River, the Robertson-655 tract with 8-acre oxbow of the Yalobusha River, and the Lindsey-160 and Povall-180 tracts each with a 10-acre oxbow of the Sunflower River. A 300-acre moist soil unit on the Wilkins tract shows potential for incorporating crawfish production into the waterfowl management water regime and is addressed under “Crawfish Management,” below.

If habitat alterations for sport-fishing were necessary and practical at any of these water bodies, recommendations for the outlined below would apply. Otherwise, the ponds would be surveyed and managed according to results of the survey.

At Coldwater River NWR, there are 25 old commercial catfish ponds located on the north boundary which range from 9 to 20 acres in size. The Baton Rouge Fisheries Resource Office proposes that the four northernmost ponds (units A, B, I, J) be managed as a fishery. These units, totaling approximately 64 acres, are adjacent to wells for filling, each has a water control structure, and their location at the north boundary of the refuge may limit trespass into closed areas. The key to establishment and maintenance of a healthy sport fishery is habitat, which includes adequate water quality, spawning substrate, and depth. Harvest management is also important, especially if fishing pressure is heavy. Only bank fishing should be allowed.

At least 5% of each pond would be eight feet deep with most of the remainder four to five feet deep. Banks should slope approximately 2.5:1 (4 foot depth 10 feet from bank) with very little depths shallower than three feet. Islands or bank fingers created from the excavated bottom substrates can serve as isolated fish spawning sites and shorebird/wading bird habitat. Additionally, at least six 10 ft. x 10 ft. pea-gravel spawning beds for "bream" would be constructed in each unit. Ideally, the gravel would be enclosed in a treated-wood frame, on a level substrate at least three feet deep and away from bank fisherman disturbance. If possible, one or two of these beds should be placed around isolated islands away from the bank in two to three feet of water.

Strategies:

Annually survey waterbodies to obtain status of fish population and suitability of existing habitat to support a sport fishery.

By 2010, install water control structures on oxbows and as feasible add launch and parking facilities.

Rehabilitate those waterbodies requiring habitat enhancement measures as determined by the survey.

By 2009, establish a sport fishery by rehabilitating, stocking, and managing catfish ponds A, B, I, and J on Coldwater River NWR and in those waterbodies where stocking is necessary, follow the procedure outlined below.

Drain and rehabilitate each unit as per narrative.

Stock bluegill and redear sunfish (1000/acre at 65%-35% ratio), and channel catfish (100/acre) in the fall.

The following spring stock largemouth bass fingerlings at 100/acre.

Fertilize monthly or as necessary from March 15 to October 15 using powdered N-P-K with high phosphorous (@40%) to maintain an algal bloom (18-inch visibility) to support the fish population.

Initiate a 14-inch minimum length limit on bass when the season is opened for fishing, the second summer (two and one half years) after initial stocking. Restrict bass creel to three per person per day. State restrictions on other species should apply.

Open the area to fishing each year as per refuge waterfowl guidelines (March 15 - October 15).

By 2007, incorporate rice or moist soil plant production with crawfish production to enhance aquatic resources for wildlife and public use on the Wilkins FmHA tract with a target yield of 100-500 pounds of crawfish per acre.

Incorporate crawfish life cycle requirements, which mimic rice/ moist soil plant production water regime (i.e. drain and plant May-June, inundate September-November) on the Wilkins FmHA tract. Where natural crawfish populations (red swamp) don't exist, stock adult crawfish at 10 lbs/acre on a one-time basis or a total of 500 pounds if the whole tract is to be managed for recreational crawfish harvesting.

By 2007, allow use by the public on the Wilkins FmHA tract from April 1 through May 30 with a 70 lb. (two onion sack or one 48qt. cooler) limit per vehicle per day.

Open the area to fishing each year as per refuge waterfowl guidelines (March 15 - October 15).

Objective 7-6: Environmental Education

Within three years of the plan's approval, the Complex will receive five teacher-led class visits per year.

Discussion: Complex staff members have developed and delivered environmental education programs (EE) to local school and civic groups. Additionally, there are endangered species and wetlands kits available for teachers to use with their classes. In general, there is a high demand for EE programs and current staffing levels are insufficient to meet that demand.

Groups that are interested in partnering with the refuge to develop environmental education opportunities include Delta State University and the Audubon Society. There are four universities within a one hour drive of Grenada. Each of these universities has an annual conservation festival.

Each refuge staff person will assess their potential to work with schools in providing an appropriate level of environmental education. The Complex intends to support, if feasible, environmental education through the use of facilities, equipment, educational materials, teacher workshops, and study sites that are safe and conducive to learning.

Strategies:

Designate two events per year for staff to participate, such as field days and career days.

Develop a teacher packet for Hasserway Trail. This could be part of a pre-visit package sent from Corps of Engineers Grenada Lake Visitor Center (work with Regional Office EE coordinator to develop this packet).

If funding permits, hire full time, seasonal, or temporary employee to do EE work, camps, develop kits/trunks (possibly a teacher in summer).

Develop an educational nature trail behind headquarters at Dahomey.

Partner with Delta State to do EE – seek funding from National Fish and Wildlife Foundation to do the traveling (bookmobile) part of these efforts.

Develop a volunteer EE staff.

Develop one teacher workshop per year to train teachers to do self-guided field studies.

Objective 7-7: Wildlife Interpretation

Within five years of the plan's approval, at least 75% of visitors will understand the Complex's contribution to protection and restoration of the Lower Mississippi Alluvial Valley.

Discussion: There is currently limited interpretation on the refuges. Through a partnership with Ducks Unlimited, an interpretive trail (Hasserway Trail) was developed at Grenada Lake Recreation Area. There are no interpretive kiosks at any of the offices. The Complex has opportunities to significantly expand interpretation and increase the awareness of the visiting public. Through this heightened awareness, the Complex hopes to inspire visitors to take positive actions supporting refuge goals and the Refuge System mission.

Strategies:

On Hasserway Trail, add directional signs at decision points on trail by 2006; arrange for or do trail maintenance.

By 2006, install interpretive kiosks at Grenada and Dahomey headquarters.

By 2007, install an interpretive kiosk at Coldwater River.

Interpretation should be organized by themes that will reinforce the most important messages to visitors; examples of themes include:

- deforestation and reforestation
- history of FmHA lands
- culture/history of the area
- bottomland hardwoods and the wildlife that depend on this habitat
- migratory birds (waterfowl, neotropical songbirds, shorebirds, etc.)
- Mississippi Delta
- moist soil management
- history of the names 'Dahomey' and 'Tallahatchie'

Objective 7-8: Wildlife Observation and Photography

Within two years of plan approval, develop one new trail at each refuge and one observation site/deck each at Coldwater River and Tallahatchie refuges.

Discussion: Viewing and photographing wildlife in natural or managed environments will foster a connection between visitors and natural resources. There are limited wildlife viewing opportunities on the Complex at present. Coldwater River NWR has the greatest potential for wildlife observation. The number and variety of shorebirds, wading birds and waterfowl create a spectacular sight. The proximity of this refuge to Memphis, and to the Interstate highway provide a potentially larger population base from which to attract visitors. Audubon is proposing to develop a Great River Road Birding Trail in the vicinity of Dahomey.

There are two photo-blinds at Tallahatchie NWR which could be incorporated into hiking trails.

Strategies:

By 2006, develop walking trail around portion of impoundments at Coldwater River and partner with Ducks Unlimited to develop an observation deck in conjunction with the walking trail.

By 2006, partner with MDOT to develop an observation site on Hwy 8 (possible at the area south of 8 just before the boat launch).

By 2006, develop a trail on Tallahatchie in the area that is down the gravel road on the south side of 8 just past the boat launch road.

By 2006, develop a trail at Dahomey NWR, next to inholding on 446.

Assist with the development of the Audubon Society's Great River Road Birding Trail.

Ensure there is a trail site that is accessible for a school bus and has bus parking and turn around.

GOAL 8: Provide personnel, funding, and facilities needed to ensure that the goals and objectives identified in this Comprehensive Conservation Plan can be achieved.

Background: The administrative functions associated with a refuge include a wide array of activities that are critical to the mission of the 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 appropriate staff, facilities, equipment, and funding in order to accomplish their overall goals and objectives.

Objective 8-1: Facilities

By 2014, develop 25% more office space and maintenance facilities both at the Complex headquarters and at each refuge to enable the expansion of refuge programs and ensure safe and efficient operations – consistent with Service and federal standards – and commensurate with the expansion of the refuge land base.

Discussion: Office space is needed at each of the three refuges if programs are going to expand at any level. Current CCP strategies include additional positions to meet the goals and objectives identified in the CCP. Facilities vary by station. A newly completed facility at Dahomey NWR contains a small maintenance shop and limited office space. Currently, there are no facilities at either Coldwater River or Tallahatchie NWR's.

Strategies:

Build additional office space and maintenance facilities at each of the refuges as they continue to expand out to their respective acquisition boundaries.

Incorporate office space into proposed visitor centers.

Utilize existing structures, if suitable, on acquired lands for either maintenance or equipment storage.

Objective 8-2: Personnel

By 2019, obtain additional staff (18 FTE's) and resources needed as funding allows to accomplish the comprehensive management programs as outlined in this document commensurate with the expansion of the refuge land base.

Discussion: Many of the proposed strategies cannot be implemented without the addition of personnel. For example, the maintenance of early successional habitat is labor intensive, the objectives for which must be modified in accordance with availability of personnel. Some work, such as bird count surveys, may be taken on by volunteers or interns. Slight adjustments to present staff work schedules can be considered, although this, too, requires additional resources.

If the refuge is to make a serious impact on meeting migratory bird objectives and other important biological management objectives, there is a need to add two or three biologists, a forester, and three or four biological/forestry technicians/equipment operators to the current staff. This level of staffing would be expected to provide biological data and management needed to meet many of the "all bird" planning objectives coordinated by the LMRVJV. Highest priority would be to add a refuge biologist and biotech/equipment operator to focus work on the catfish ponds and other priority habitat management and population monitoring work at Coldwater River NWR.

Following the biological review, the Complex filled an existing FTE with a Refuge Biologist. However, although this added a Refuge Biologist to the staff, it did not increase the overall number of FTE's for the Complex.

Strategies:

Hire the personnel indicated above for the purpose of optimizing refuge management activities.

Implement a Complex-wide program that ensures equal consideration is given to all stations within the Complex when funding and other resources become available.

Have quarterly budget meetings with all refuge managers to ensure highest priority projects and maintenance backlogs are identified and ranked across the Complex.

Once funding is allocated, give each refuge manager overseeing a sub-headquarters responsibility for managing their station budget based on identified priorities and planning budget exercises, ensuring each refuge's needs are being met.

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

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

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

By 2008, hire a public use specialist/volunteer coordinator if funding allows.

Objective 8-3: Law Enforcement

Improve Complex law enforcement program with 1.5 additional FTE's, and partnerships.

Discussion: The National Wildlife Refuge System consists of more than 540 refuges and 37 wetland management districts. The Refuge System manages over 95 million acres, in every state and several territories. Visitation is increasing at an annual average of 6.6%. Between 2.3 and 2.4 million additional visitors will be serviced by refuge officers over the next several years.

Protecting the natural resources of the Complex and ensuring the safety of refuge visitors are fundamental responsibilities of the Refuge System. Currently, the Complex law enforcement program consists of one full time officer and two collateral duty officers. During periods of high public use such as hunting seasons, the majority of collateral duty officers' time is spent conducting law enforcement activities many times at the sacrifice of other equally crucial functions.

This CCP recommends a substantial increase in public use facilities offered to the visiting public over the next 15 years. A result of this increase there will certainly be a substantial increase in visitation. If we are to continue offering a very safe place for visitors to enjoy the outdoors, additional full time law enforcement officers are necessary.

Strategies:

Increase law enforcement personnel from current level to a minimum of 2 FTE's if funding allows.

Provide up to date training and equipment to law enforcement officers.

Develop Memoranda of Understanding (MOU's) with state and local law enforcement agencies to facilitate cooperation and assistance in law enforcement activities.

Provide education and outreach programs in the local community as part of a preventive law enforcement effort.

Provide assistance to Service Special Agents and Mississippi Department of Wildlife, Fisheries and Parks conservation officers for off-refuge activities as needed.

Objective 8-4: Friends Group, Volunteer, Partners, and Intern Programs

Provide a highly visible and dynamic volunteer and intern workforce and establish one or more Friends Groups to assist and support all aspects of Complex operations including environmental education, wildlife interpretation, habitat improvement, visitor facilities maintenance, funding needs, etc.

Discussion: Volunteers and refuge support groups fortify refuge staffs with their gift of time, skills, and energy and are integral to the future of the National Wildlife Refuge System. Refuge staff will initiate and nurture relationships with volunteers and refuge support groups, and continually support, monitor, and evaluate these groups with the goal of fortifying important refuge activities. The National Wildlife Refuge System Volunteer and Community Partnership Enhancement Act of 1998 (P.L. 105-242) strengthens the Refuge System's role in developing effective partnerships with various community groups. Whether through volunteers, refuge support groups, or other important partnerships in the community, refuge personnel should seek to make the refuge an integral part of the community, giving rise to a stronger Refuge System.

Currently, Dahomey NWR is developing a friends group.

The Complex has acquired three FEMA trailers to be used as possible housing for volunteers. At present there is minimal use of volunteers. The complex does have a Youth Conservation Corps crew in the summer.

Strategies:

Continue to look for opportunities to partner with (on-going):

- local universities and colleges
- Ducks Unlimited
- local high school and elementary school system
- Audubon Society
- U. S. Department of Agriculture/Natural Resources Conservation Service
- Farm Services Administration
- Chambers of Commerce
- The Natural Conservancy and other land trusts

Utilize pad and trailer at Dahomey NWR and headquarters to encourage participation by individuals needing living space and by those with trailers needing parking space.

Develop camper pad at Coldwater River for RV campers for bird walks, security, maintenance.

By 2008, hire a public use specialist/volunteer coordinator for the Complex.

V. Plan Implementation

This CCP outlines an ambitious course of action for the management of the North Mississippi National Wildlife Refuge Complex over the coming 15 years. The ability to enhance wildlife habitats on the Complex while expanding the area of those habitats within the acquisition boundary of each refuge will require a significant commitment of staff and funding from Congress and the Service. Likewise, expanding the relatively limited public use facilities now available on the three refuges will take increased resources. Consequently, the Complex will continually need appropriate operational and maintenance funding to implement the objectives in this CCP.

FUNDING

In the preceding chapters, the CCP has outlined a vision for the Complex and included the management goals, objectives and strategies needed to realize the Vision. The current level of refuge funding will not move the Complex beyond a slow deterioration of the current habitat and public use condition. 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 staffing. The rate at which each refuge achieves its full potential of contributing locally, regionally, and nationally important wildlife outputs will depend on the resources provided for those purposes. Increased staffing and funding on each refuge unit will result in long-lasting protection, maintenance, and enhancements to Delta forest, wetland, and moist soil habitats and public use facilities and programs.

The following provides a brief description of the highest priority refuge projects (Tier 1), as chosen by the Complex staff and listed in the Refuge Operating Needs System (RONS). A full listing of unfunded refuge projects and operational needs can be found in Appendix D.

REFUGE OPERATING NEEDS – TIER 1 (HIGHEST PRIORITY)

Dahomey NWR – Provide for a full-time law enforcement officer

Objective 8-3

Estimated cost: \$123,000

Provide for a full-time law enforcement officer at Dahomey Refuge, the largest remaining tract of bottomland hardwoods in the northern Mississippi Delta. Dahomey boasts a large hunting program and a growing "non-consumptive use" constituency. There is not currently a full-time law enforcement officer stationed at Dahomey to protect visitors or wildlife and their habitats. Being located near Delta State University, the refuge gets extensive use by researchers, students, and school groups. This project will permit a law enforcement presence and also facilitate data collection during the long and varied hunting seasons, helping to make better informed habitat and public use management decisions. Project benefits will include a decrease in poaching and theft, and a higher degree of public safety and enjoyment on the refuge.

North Mississippi National Wildlife Refuge Complex – Inventory and monitor bottomland forest

Objective 4-2

Estimated cost: \$108,000

The Complex administers three NWRs and numerous FmHA land that encompass approximately 32,000 acres in northwest Mississippi. Approximately 12,000 acres of this land consist of mature bottomland hardwood forest habitat. About 13,000 acres consist of lands that have either been recently reforested or will be reforested in the next 2-3 years. None of the mature forest lands have been completely inventoried and the overall conditions (e.g., health, diversity, age class structure, amount of regeneration, etc.) of them have not been documented or evaluated. A monitoring program will be implemented for all areas that have been recently reforested in order to evaluate their general conditions over time. Information gained will then be used to implement appropriate management practices within all forested areas for the enhancement of wildlife resources.

Coldwater River NWR – Provide for a maintenance worker

Objectives 4-1 & 8-2

Estimated cost: \$125,000

Provide for a maintenance worker at Coldwater River NWR, so existing facilities and resources can be managed and maintained. Coldwater River NWR contains moist soil units, service-owned roads, and bridges. A maintenance worker is needed to maintain service-owned roads for the benefit of visitor and employee health and safety, and to conduct critical habitat management efforts.

Coldwater River NWR – Provide for a GS-12 Refuge Manager

Objective 8-2

Estimated cost: \$152,000

Provide a GS-12 Refuge Manager at Coldwater River Refuge. This is a new refuge and a Refuge Manager meets staffing requirements. A Refuge Manager is needed to provide for adequate administration of all the refuge functions and operations. This project would provide for adequate administration of this refuge and fulfill public use needs that are currently not being met.

Dahomey NWR – Provide for a maintenance worker

Objectives 4-1, 4-2 & 8-2

Estimated cost: \$125,000

Provide for a maintenance worker at Dahomey Refuge, so existing facilities and resources can be managed and maintained. This refuge does not have any maintenance personnel to maintain existing facilities, equipment, and other resources. Therefore, necessary habitat management and maintenance activities are not being implemented, and investments in facilities and habitat management projects are being lost. Dahomey Refuge, the largest remaining tract of bottomland hardwoods in the northern Mississippi Delta region, contains moist soil units, "greentree" reservoirs, service-owned roads, cooperatively farmed lands, visitor information stations, heavy and light duty equipment, and a headquarters facility. This project will provide for a maintenance worker, so essential management and maintenance activities can be implemented and refuge-owned roads can be maintained in a manner that is safe for public use.

Tallahatchie NWR – Provide for a full-time law enforcement officer

Objective 8-3

Estimated cost: \$123,000

The 4,000 acre Tallahatchie Refuge is experiencing poaching and theft year-round. This project will provide a full-time law enforcement officer, a need that remains unmet, to better ensure visitor safety and to better protect refuge wildlife and their habitats. An estimated 65,000 migratory waterfowl are documented annually on this refuge that issues 1,600 public use permits each year. Myriad other wildlife, from deer and turkey to otter and bobcat use this new refuge that is undergoing extensive forest restoration. Resource protection and public safety are suffering without a strong law enforcement presence.

Dahomey NWR – Create moist soil units

Objective 4-1

Estimated cost: \$157,000

Create moist soil units on Dahomey Refuge for the primary benefit of resident and migratory water birds, restoring 1,000 acres of wetland habitat. This project will also provide for the establishment of "greentree" reservoirs within existing forest habitat. Channelization and drainage activities implemented prior to refuge ownership have changed natural water patterns in these wetland areas. Project will include the installation of needed water control structures and other water management features to return the area to more natural conditions, benefiting not only water birds, but numerous wetland-associated wildlife species. Located in the ecologically and culturally unique Mississippi Delta, Dahomey Refuge is the largest remaining tract of bottomland hardwoods in the northern Delta.

Tallahatchie NWR – Provide for a secretary/clerk

Objective 8-3

Estimated cost: \$118,000

Project will provide for a secretary/clerk on Tallahatchie Refuge, a station without any on-site administrative support. This position is necessary to provide essential administrative assistance for permit sales, clerical functions, and basic visitor services that are critical for effective refuge operations. The refuge issues 1,600 hunting permits annually, and without a secretary, the administrative requirements necessary for effective operations of the refuge cannot be met unless the refuge manager refocuses her/his energies. This diminishes the effectiveness of habitat management and other public use management programs. Public needs are presently not being fulfilled due to the lack of necessary administrative support.

North Mississippi National Wildlife Refuge Complex – Provide for wildlife biologist to develop and implement CCP

All objectives

Estimated cost: \$139,000

Initiate planning for the CCP for the entire North Mississippi National Wildlife Refuge Complex by providing for a wildlife biologist who will lead the development of, and help implement, an effective management direction for three National Wildlife Refuges and more than 100 Farmer's Home Administration lands that total over 30,000 acres. The entire refuge complex does not and has not ever had a biologist to lead inventorying, monitoring, or research or help with long-range planning to most effectively realize potential benefits for wildlife and the visiting public.

Dahomey NWR – Provide for a secretary/clerk

Objectives 7-4 & 8-2

Estimated cost: \$118,000

Project will provide for a secretary/clerk on Dahomey Refuge, a station without any on-site administrative support. This position is necessary to provide essential administrative assistance for permit sales, clerical functions, and basic visitor services that are critical for effective refuge operations. The refuge sells approximately 1,000 hunting permits annually, and without a secretary, the administrative requirements necessary for effective operations of the refuge cannot be met unless the refuge manager refocuses her/his energies. This diminishes the effectiveness of habitat management and other public use management programs. Public needs are presently not being fulfilled due to the lack of necessary administrative support.

Tallahatchie NWR – Provide for a maintenance worker

Objectives 4-1 & 8-2

Estimated cost: \$125,000

Tallahatchie Refuge, boasting active public hunting and forest restoration programs, does not have a maintenance worker to properly maintain public facilities or help effectively manage refuge habitats to benefit a host of wildlife species. This project will provide a maintenance worker at this unstaffed refuge. Maintenance of existing roads and facilities is necessary to meet public expectations for a safe, enjoyable refuge visit.

North Mississippi National Wildlife Refuge Complex – Provide for a full-time secretary/clerk

Objective 8-2

Estimated cost: \$110,000

Provide a full-time secretary/clerk to meet the requirements of the refuge fee program, contracting requirements, and other budget and administration duties/policies. Due to the large volume of work at this three-refuge, 30,000-acre, 100+ FmHA tract complex, a second administrative person is needed to meet minimum Service compliance and enable effective operation of purchasing, budget tracking, property management, filing/typing, public inquiry response, and personnel actions. We cannot presently provide the quality and quantity of services expected by the public for the many refuge programs.

Dahomey NWR – Provide for a biologist for critical habitat and wildlife surveys

Multiple objectives under Goals 1, 2 & 4

Estimated cost: \$139,000

A newer national wildlife refuge that was never provided startup funding or staffing, Dahomey Refuge is the largest remaining tract of bottomland hardwoods in the northern Mississippi Delta. This project will provide for a biologist to obtain and evaluate critical habitat and wildlife surveys. This refuge does not have a biologist, and biological information necessary to help make the most informed management decisions is not being obtained. Partnership potential to conduct inventorying and monitoring is great, with the refuge receiving extensive use by researchers, students, and school groups and being located near Delta State University.

Tallahatchie NWR – Provide for a biological technician
Multiple objectives under Goals 1 & 2 and Objective 4-2

Estimated cost: \$97,000

Provide a biological technician to monitor habitats and habitat restoration activities on Tallahatchie, a newer national wildlife refuge that was never provided startup funding or staffing. This unstaffed refuge is a research site for the Mississippi Forestry Division and a "mitigation bank" for the Mississippi Department of Transportation. Tallahatchie could serve as an outstanding example of bottomland hardwood forest restoration, yet does not have biological staff to obtain, interpret, and share critical habitat and wildlife survey data. Without any biological staff, information necessary to help make the most informed management decisions is not being obtained.

North Mississippi National Wildlife Refuge Complex – Provide for a public outreach specialist

Objective 7-1

Estimated cost: \$72,000

Provide a public outreach specialist to create a quality public outreach program for the three-refuge, 30,000-acre, 100+ FmHA tract North Mississippi National Wildlife Refuge Complex. This Complex hosts some of the largest tracts of remaining bottomland hardwood forest left in the ecologically and culturally unique Mississippi Delta region. Currently, the Complex has no outreach personnel or staff to establish close partnerships with many potential community support groups, school groups, and other wildlife-oriented organizations which can provide tremendous volunteer assistance and issues advocacy support. This position will also lead all efforts related to exhibits, news releases, festivals, newsletter, brochures, and public inquiries.

Dahomey NWR – Provide for an assistant refuge manager

Multiple objectives under all goals and Objective 8-2

Estimated cost: \$107,000

Provide an assistant refuge manager to oversee field operations and help direct overall management programs at Dahomey Refuge. Because the refuge is understaffed, there is a 1,000 acre cooperative farming program that does not receive adequate supervision to properly maximize the program's great potential benefit to wildlife. This project would provide the needed staff to also assist with other refuge activities such as public hunting, outreach, education, and the implementation of the CCP.

Dahomey NWR – Provide a forester to manage Dahomey hardwood forests

Objective 4-2

Estimated cost: \$139,000

Provide a forester to more effectively manage Dahomey Refuge, the largest tract of bottomland hardwood forest in the northern Mississippi Delta. Important to a wide variety of wildlife species, the refuge has tremendous potential for forest restoration and management through the planting of trees, appropriate thinning of the existing stand, and the proper management of water levels. However, there are only a refuge manager and an equipment operator stationed at this 9,600-acre refuge, and many parts of the forests are dying due to lack of care. This project will enable forest resources of this refuge to be more properly managed to their fullest potential to provide the fish and wildlife values and recreational benefits expected by the public.

Dahomey NWR – Provide a refuge manager

Multiple objectives under all goals and Objective 8-2

Estimated cost: \$152,000

Provide a refuge manager at Dahomey Refuge to ensure effective habitat management and provide appropriate wildlife-oriented recreation expected by the public. This 10,000-acre refuge, the largest tract of bottomland hardwood forest in the northern Mississippi Delta, was established in 1992 and has only recently been staffed by a refuge operations specialist and biological technician. A refuge manager is needed on this popular refuge to provide adequate leadership and administration for all the required management programs, including the care of 40 outlying properties. Being located near Delta State University and having a strong constituency of area residents, potential refuge improvement projects abound, but are not being met due to lack of attention.

Tallahatchie NWR – Provide for a wildlife biologist

Multiple objectives under Goals 1 & 2 and Objective 4-2

Estimated cost: \$139,000

Provide a wildlife biologist to conduct critical wildlife surveys and manage habitat development projects on Tallahatchie refuge. The refuge, Mississippi Department of Transportation, and private partners such as Ducks Unlimited have invested hundreds of thousands of dollars in facilities and habitat improvement. This unstaffed refuge is a research site for the Mississippi Forestry Division and a "mitigation bank," having thousands of acres recently reforested. However, this newer refuge was never initially staff nor funded. This project will enable important restoration work to be continued and critical habitat and wildlife surveys to be conducted.

Tallahatchie NWR – Provide for a refuge operations specialist/assistant refuge manager

Objective 1-1

Estimated cost: \$139,000

Provide a refuge operations specialist/assistant refuge manager to manage existing refuge farm lands for the continuing benefit of wintering migratory waterfowl and other wildlife species. Approximately 65,000 ducks and geese utilize the refuge annually on 3,000 acres that are presently being farmed through private partners. However, due to lack of staffing at this unstaffed refuge, the farmers are not adequately supervised to ensure maximum program benefit and policy compliance. This position will also ensure more effective operations of other habitat management programs, as well as maintenance and public use programs.

Tallahatchie NWR – Provide for a refuge manager

Multiple objectives under all goals and Objective 8-2

Estimated cost: \$152,000

Tallahatchie Refuge, which encompasses 4,199 acres and boasts progressive partnerships with the Mississippi Division of Forestry and Department of Transportation, and private partners in a large forest restoration program, contains numerous roads, levees, water control structures, and wetland impoundments. The refuge also has a large contingent of hunters, anglers, and other outdoor enthusiasts who regularly visit the area. Despite all of this, this newer refuge has never been staffed. Maintenance, public use coordination, habitat management, and other management activities that are essential for effective refuge operations are not being adequately implemented, due primarily to lack of staffing. This project will provide for a refuge manager to lead, coordinate, and enhance the overall effectiveness of refuge management programs.

Appendix D contains a full list of unfunded refuge projects and operational needs on the Complex (RONS). This information will be updated annually along with the Maintenance Management System (MMS). These two databases are used to track and manage refuge operations and maintenance budgeting each year. These changes will focus on “means” adjustments, while major changes to the desired future condition will be documented in future CCP revisions. Some adjustments to the means of getting to the defined future conditions may also occur when step-down plans, such as Visitor Services and Forest Management Plans, are prepared and a greater level of detail is developed.

FUTURE STAFFING REQUIREMENTS

Implementing the vision set forth in this CCP will require changes in the organizational structure of the Complex and each of the refuges. Existing staff will direct their time and energy in new directions and new staff members will be added to assist these efforts. Many of the Tier 1 RONS items above involved obtaining new staff to carry out expanded responsibilities. The following table (Table 16) and organizational chart identifies the additional positions and future structure of the Complex. A total of 18.0 FTEs would be needed to fully implement the CCP.

Table 16. Additional staff identified to implement the Comprehensive Conservation Plan for the North Mississippi National Wildlife Refuge Complex

Position	Full-time Equivalent (FTEs)	Station Assigned
Refuge Manager	3.0	Coldwater River (1), Dahomey (1), Tallahatchie (1)
Assistant Refuge Mgr.	1.0	Dahomey (1)
Asst. Refuge Mgr./ Refuge Ops. Spec.	1.0	Tallahatchie (1)
Law Enforcement Officer	2.0	Dahomey (1), Tallahatchie (1)
Forester	1.0	Dahomey (1)
Public Outreach Spec.	1.0	Complex (1)
Maintenance Worker	3.0	Coldwater River (1), Dahomey (1), Tallahatchie (1)
Wildlife Biologist	3.0	Complex HQ(1), Dahomey (1), Tallahatchie (1)
Biological Technician	1.0	Tallahatchie (1)
Secretary/Clerk	3.0	Complex HQ (1), Dahomey (1), Tallahatchie (1)
TOTAL FTEs	19.0	Complex HQ (3), Coldwater River (2), Dahomey (7), Tallahatchie (7)

Figure 9 is shows a staffing chart for the Complex at present and Figure 10 shows the proposed staffing chart, which includes the above positions.

Figure 9. North Mississippi National Wildlife Refuge Complex current staffing chart

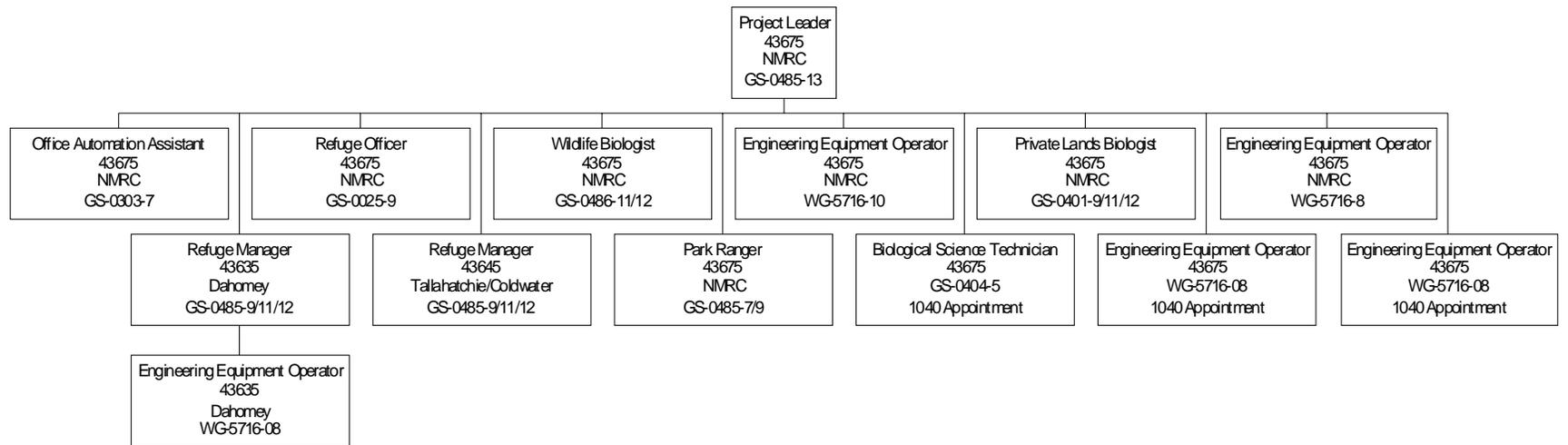
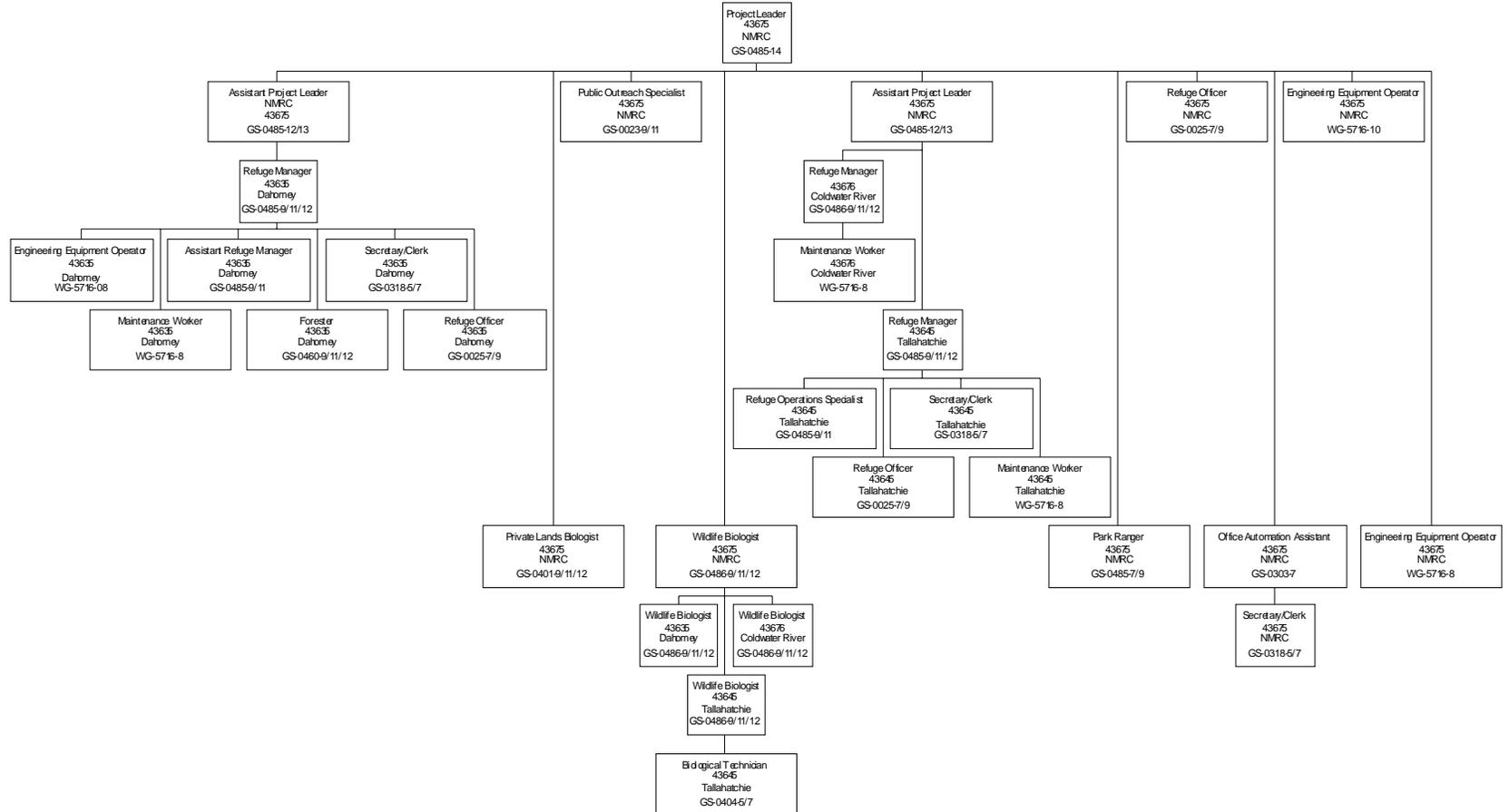


Figure 10. North Mississippi National Wildlife Refuge Complex proposed staffing chart



STEP-DOWN MANAGEMENT PLANS

Several step-down management plans describe specific actions that support the accomplishment of Refuge objectives. The management plans identified in Table 17 will be reviewed and revised as necessary to achieve the results anticipated in this CCP.

Table 17. Step-down Management Plans

Plan	Date Completed	Anticipated Revision
Forest Habitat Management Plan	2002	2012
Biological Inventory/Monitoring Plan	2005	2015
Integrated Pest Management Plan	2006	2016
Strategic Plan for Private Lands	2005	2010
Cultural Resources Management Plan	2007	2016
Visitor Services Plan	2007	2016
Hunt Plan	1992/97	2005
Habitat Management Plan	2004	2014

MONITORING AND EVALUATION

The direction set forth in this CCP plus specifically identified strategies and projects will be monitored throughout the life of this plan. On a periodic basis, the Regional Office will assemble a station review team whose purpose will be to visit the North Mississippi National Wildlife Refuge Complex and evaluate current Complex and refuge activities in light of this plan. The team will review all aspects of Complex and refuge management, including direction, accomplishments and funding. The goals and objectives presented in this CCP will provide the baseline from which this field station will be evaluated.

PLAN REVIEW AND REVISION

The CCP for the North Mississippi National Wildlife Refuge Complex is meant to provide guidance to Complex and refuge managers and staff over the next 10-15 years. However, the CCP is also a dynamic and flexible document and several of the strategies contained herein are subject to such things as drought, floods, windstorms and other uncontrollable events. Likewise, many of the strategies are dependent upon Service funding for staff and projects. Because of all these factors, the recommendations in the CCP will be reviewed periodically and, if necessary, revised to meet new circumstances.

PARTNERSHIP OPPORTUNITIES

Partnerships are an essential element for the successful accomplishment of Complex goals, objectives, and strategies. Indeed, the Complex cooperates with a number of organizations and individuals at present, including other agencies like the USDA Natural Resources Conservation Service, the Army Corps of Engineers, and the Mississippi Department of Wildlife, Fisheries and Parks; the Chamber of Commerce in Grenada; non-profit conservation groups like the Audubon Society and Ducks Unlimited; broad conservation initiatives like the Lower Mississippi Valley Joint Venture Area and Partners In Flight; and last but not least, many private individuals.

The objectives outlined in this CCP need the support and the partnerships of federal, state and local agencies, non-governmental organizations and private citizens. This broad-based approach to managing fish and wildlife resources extends beyond social and political boundaries and requires a foundation of support from many. The Complex will continue to seek creative partnership opportunities to achieve its vision for the future.

Many national wildlife refuges have partner non-profit organizations, often called Friends groups, which serve as advocates for the refuge. These associations have the ability to reach out to the community for support and assistance for refuge projects and conservation issues. Due to the relative newness of each refuge in the Complex, no Friends groups have yet formed to support Coldwater River or Tallahatchie refuges. A "Friends of Dahomey NWR" group was recently established. Refuge staff welcomes the assistance from a Friends group or association and encourages supportive local citizens to form such a group or to join the existing group.

SECTION B: DRAFT ENVIRONMENTAL ASSESSMENT

I. Background

PURPOSE AND NEED FOR ACTION

The purpose of the proposed action is to specify a management direction for the North Mississippi National Wildlife Refuge Complex (Complex) for the next 15 years. This management direction is described in detail through a vision statement and a set of Complex-wide goals, objectives, and strategies in the attached Comprehensive Conservation Plan (CCP).

The action is needed because adequate, long-term management direction does not exist for the Complex. Management is currently guided by a combination of general policies, specific step-down plans, and broad wildlife management principles that are in need of revision based on new laws, policies, and the mission of the National Wildlife Refuge System. Also, the action is needed to address current management issues and to satisfy the legislative mandates of the National Wildlife Refuge System Improvement Act of 1997, which requires the preparation of a CCP for all national wildlife refuges by 2012.

The purposes for the Complex refuges – Coldwater River, Dahomey and Tallahatchie – were established by Congress. While the refuges do have overlapping purposes, each refuge was established individually and added to the Complex. Table 18 summarizes the establishing dates and authorities of each refuge.

This Environmental Assessment (EA) and a list of issues were developed using guidelines of the National Environmental Policy Act of 1969 (NEPA). NEPA requires the Service to examine the effects of proposed actions on the natural and human environment. The NEPA analysis assists the Service in determining if it will need to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI) for the CCP. An EIS is generally a more exhaustive and time-consuming analysis than an EA, and must be prepared if there is a strong indication that a proposed action may entail one or more potentially significant environmental impacts.

In the following sections, four alternatives are described for future Complex management, the environmental consequences of each alternative, and the Service's preferred management direction. Each alternative was designed as a reasonable mix of fish and wildlife habitat prescriptions and wildlife-dependent recreational opportunities. The preferred alternative was selected – which becomes the CCP – based on the environmental consequences, the ability to achieve the Complex purposes, and the ability to achieve identified goals. These goals may also be considered the primary need for action. Goals for the Complex were developed by the staff of Coldwater River, Dahomey, and Tallahatchie NWRs and the CCP planning team; they encompass all aspects of Complex management including public use, habitat management, and maintenance operations.

Table 18. Establishment date, legislation, and purpose for each refuge within the North Mississippi National Wildlife Refuge Complex

Refuge	Year Established	Establishment Legislation	Refuge Purpose
Coldwater River	1991 (Black Bayou unit of Tallahatchie) 2000 (as "stand-alone" refuge)	Migratory Bird Conservation Act (1929), Consolidated Farm and Rural Development Act (1961)	"...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds..." "...for conservation purposes..."
Dahomey	1992	Migratory Bird Conservation Act (1929), Fish and Wildlife Act (1956), Emergency Wetlands Resources Act (1986)	"...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds..." "...for the development, advancement, management, conservation, and protection of fish and wildlife resources..." "...for the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions."
Tallahatchie	1991	Migratory Bird Conservation Act (1929), Consolidated Farm and Rural Development Act (1961)	"... for use as an inviolate sanctuary, or for any other management purpose, for migratory birds..." "...for conservation purposes..."

Following are the goals for the Complex in the attached CCP:

Migratory Birds: *Promote the conservation and management of migratory birds and other trust species within Northern Mississippi in a manner that supports treaties and national and international plans and initiatives.*

Other Fish and Wildlife: *Implement a program of science-based stewardship of the fish and wildlife resources associated with the North Mississippi National Wildlife Refuge Complex.*

Threatened and Endangered Species: *Protect and restore habitat for federal and state threatened and endangered species found in the Lower Mississippi River Ecosystem.*

Ecological Integrity: *Maintain and/or restore natural ecological systems within the Mississippi Alluvial Valley and Central Gulf Ecosystems which mimic historical conditions.*

Land Protection: *Increase the land base and enhance the integrity of the lands within the authorized Refuge acquisition boundaries of the Complex and contribute to the protection and restoration of fish and wildlife resources found within Northern Mississippi.*

Cultural Resources: *Identify and protect cultural resources on the Complex in accordance with federal and state historic preservation laws and regulations.*

Public Use: *Increase the public understanding, use, and enjoyment of the natural resources of the North Mississippi National Wildlife Refuge Complex, consistent with state regulations and the principle that wildlife comes first on National Wildlife Refuges.*

Administration: *Provide personnel, funding, and facilities needed to ensure that the goals and objectives identified in this CCP can be achieved.*

DECISION FRAMEWORK

The Service will need to make two decisions based on this EA: (1) select an alternative and (2) determine if the selected alternative is a major Federal action significantly affecting the quality of the human environment, thus requiring preparation of an Environmental Impact Statement. The planning team has recommended Alternative D as the preferred alternative. The recommendation was based on evaluation of the purposes for which each refuge was established, the mission of the Service and the National Wildlife Refuge System, and other legal mandates and pertinent plans. The Draft CCP was developed for implementation based on this recommendation. Assuming that no significant impacts are found, implementation of the plan will begin, and the plan will be monitored on an annual basis and revised when necessary, typically every five years. This plan will guide the Complex for the next 15 years and serve as the foundation for all future planning efforts.

PLANNING STUDY AREA

The planning study area for this environmental assessment includes the entire 26-county work area of the Complex that encompasses the northern third of Mississippi. However, most of the CCP's goals, objectives and strategies apply to lands currently owned by the three refuges proper, additional acreage within the refuges' approved acquisition boundaries, and widely dispersed FmHA tracts owned by the Service. The Fish and Wildlife Service currently owns and manages 16,264 acres (34%) of the 47,816 acres lying within the acquisition boundaries of Coldwater River, Dahomey and Tallahatchie NWR's. The Service will seek to acquire, from willing sellers, the remaining 31,552 acres. In addition, the Complex owns 17,212 acres in 128 FmHA properties in a number of northern Mississippi counties. For the most part, the FmHA properties are assigned to the nearest refuge station and managed with the other refuge lands based on their habitat types and size. This EA will identify management on refuge lands, as well as those lands within the approved acquisition boundary that have yet to be acquired by the Service.

AUTHORITY, LEGAL COMPLIANCE, AND COMPATIBILITY

The National Wildlife Refuge System includes federal lands managed primarily to provide habitat for a diversity of fish, wildlife, and plant species. National wildlife refuges are established under many different authorities and funding sources for a variety of purposes. The purposes for each refuge in the North Mississippi National Wildlife Refuge Complex were established by specific legislation and are listed in Table 1. Additional authority delegated by Congress, federal regulations, executive orders and several management plans guide the operation of the Complex. Appendix F of the Draft CCP contains a complete list of the key laws, orders, and regulations that provide a framework for the proposed action.

Lands within the National Wildlife Refuge System are closed to public uses unless specifically and legally opened. All programs and uses must be evaluated based on mandates set forth in the National Wildlife Refuge Improvement Act of 1997. Those mandates are:

- 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 benefiting 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.

THE PLANNING PROCESS AND ASSOCIATED ISSUES

In preparation for developing the CCP, the Complex conducted a biological review and a public use review in the summer of 2002. Initial CCP planning began in September 2003 with a meeting of planning team members. Early in the process of developing this draft plan, the planning team identified a list of issues and concerns that were likely to be associated with the conservation and management of the North Mississippi National Wildlife Refuge Complex. Formal public involvement began with the scoping process in November 2003, through which interested stakeholders were able to register their concerns, thereby ensuring that these would be considered in developing the CCP.

Planning team members reviewed the results of this internal and external scoping and used them, along with supporting goals, objectives and strategies, to develop four different management alternatives for the Complex. The four alternatives were evaluated in this EA, and the preferred alternative forms the basis of the CCP itself. The Draft CCP and Draft EA are being released to the public for their review and comment. The Service will examine all comments and suggestions received and decide whether revisions to the plan are in order.

ISSUES AND CONCERNS

An array of issues, concerns and opportunities were addressed during the planning process. Discussions among citizens, resource specialists, and Complex planning staff brought to light several recurring themes. In general, themes centered on creating a balanced public use program, migratory bird management, water quality including watershed activities, pest and invasive species, hunting and fishing, restoring interior forest habitat, and lack of staff and facilities. Some of the issues raised during internal and public scoping included:

- Making the refuges accessible and visitor-friendly, including for the disabled
- Providing a quality hunting experience, including disabled and youth hunting opportunities
- Control of exotic/invasive species
- ATV use for wildlife dependent recreation (especially hunting)
- Forest management taking hunters into consideration
- Expanding hunting and fishing opportunities, including muzzle-loader and rifle
- Providing wildlife observation and photography opportunities (e.g. bird watching, photography stands)
- Developing a balanced wildlife-dependent recreation program
- Value of Partners for Wildlife and the Conservation Reserve Program (CRP) to the surrounding farming community
- Economic value of visitation to the refuges to the surrounding communities
- Controlling sedimentation and contamination affecting refuge lands
- Beaver control to protect bottomland hardwoods
- Managing reforested lands
- Providing habitat for upland game birds
- Croplands for waterfowl
- Water level and moist soil management for waterfowl and shorebirds
- Technical assistance to private landowners
- Bottomland hardwoods research

A complete listing and further discussion of these issues and concerns can be found in Chapter II of the CCP and Chapter III of this EA.

II. Affected Environment

The North Mississippi National Wildlife Refuge Complex is comprised of three refuges all located within northwestern Mississippi, and 128 FmHA properties scattered in a number of counties throughout the northern third of the state. Table 3 describes the location of each of the refuges. More detailed descriptions of the refuges and affected environment are found in Chapter II of the CCP.

Table 19. North Mississippi National Wildlife Refuge Complex Units

Unit	Size (owned)	County(ies)	Location
Coldwater River NWR	2,374 acres	Quitman/ Tallahatchie	five miles south of Crowder, MS on Dummy Line Road
Dahomey NWR	9,691 acres	Bolivar	ten miles southwest of Cleveland, MS and 22 miles northeast of Greenville
Tallahatchie NWR	4,199 acres	Grenada/ Tallahatchie	nine miles west of Holcomb, MS on U.S. Highway 8
128 FmHA tracts	17,212 acres	various	
All Complex administered properties	33,476 acres	various	

COLDWATER RIVER NATIONAL WILDLIFE REFUGE

Coldwater River NWR, formerly the Black Bayou Unit of the Tallahatchie NWR, consists of 2,374 acres of fee title lands. Over half of this acreage is abandoned old fields of poorly drained soils that flood most winters. A good portion of the refuge is under water from November to April, making management and access difficult.

A 495-acre portion of Coldwater River NWR contains 25 ponds that were previously managed as a commercial catfish operation. These ponds range in size from nine to 21 acres, and are now managed for shorebirds, migratory waterfowl, and marsh birds. A Water Management Plan guides the active management on the 16 ponds with wells and water control structures. Coldwater River's unique mix of habitats and proximity to the migration corridors of the Little Tallahatchie River and the Panola-Quitman Floodway attract a high diversity of migrant waterbirds all year round.

About 300 acres of old-field habitat on the west side of the refuge is managed for grassland birds. A natural sump of 250 to 300 acres along the east side and a similar area in the west central portion of the refuge have been reforested with hardwoods, but due to the wetness, *Baccharis*, willow and button bush thickets now dominate many acres. This area holds thousands of mallards during annual winter flooding. Another approximately 750 acres have been reforested with native hardwoods with varying degrees of success. No cooperative farming is used on Coldwater River NWR.

DAHOMY NATIONAL WILDLIFE REFUGE

Dahomey NWR is located in Bolivar County in the western part of the Complex near the Mississippi River. Dahomey's 8,126 acres of woodlands is the largest contiguous tract of bottomland hardwood habitat occurring outside the Mississippi River main line levee in northwest Mississippi. Dahomey's forestland is a relic of a habitat type that once predominated throughout the Lower Mississippi Delta. Unfortunately, stream channelization and levee construction activities in the vicinity of the refuge have reduced historical flooding regimes to the point that a significant portion of the habitat within Dahomey is no longer subject to periods of seasonal inundation.

In 1994, the Complex installed levees, pipes, and water control structures in two streams occurring within the refuge, creating an approximately 600-acre greentree reservoir. During 1999, the Complex converted an 85-acre agricultural field into four moist soil impoundments. In 2001, Ducks Unlimited constructed two levees on the southern portion of the refuge to create two moist soil units totaling 223 acres.

Dahomey consists of 8,126 acres of mature bottomland hardwood forest (596 of which are occupied by the greentree reservoir), 104 acres of fallow fields, 197 acres of moist soil units, 407 acres of agricultural fields, 849 acres of early successional reforestation areas, and 7 acres of permanent water (in a lake and numerous drainage ditches). The moist soil units are managed primarily for wintering waterfowl.

TALLAHATCHIE NATIONAL WILDLIFE REFUGE

Until 2000, Tallahatchie consisted of the Bear Lake and Black Bayou Units. In 2000, the latter became a separate refuge – Coldwater River NWR. The Bear Lake unit retained the name Tallahatchie. Today the refuge is a 4,199-acre patchwork of cultivated farmlands, old fields, reforested lands, and small, scattered plots of bottomland hardwood forest bisected by the meandering Tippe Bayou, its centerpiece. The refuge is located in Grenada and Tallahatchie counties (see Figure 2-2). Its lands, like those of Coldwater River and Dahomey NWRs, lie within the Mississippi River Alluvial Valley, referred to locally as the "Delta," where topography is flat and much of the soil is of the heavy clay, hydric variety that has been subject to extensive clearing and drainage efforts. The old oxbows and low-lying fields along Tippe Bayou are permitted to flood each winter and hold large concentrations of waterfowl. Most of the agricultural land (599 acres) on the refuge is devoted to corn, soybeans and rice. This represents about 15% of the refuge land use. Twenty-five percent of the crops produced are left on the ground for wildlife through the Service's Cooperative farming program. Most of the remainder of the refuge has been reforested through planting efforts by Complex staff.

LOWER MISSISSIPPI RIVER ALLUVIAL VALLEY

North Mississippi National Wildlife Refuge Complex lies within a physiographic region known as the Lower Mississippi River Alluvial Valley (LMRV; Figure 1-1 in CCP). The LMRV was once a 25-million-acre complex of forested wetlands that extended along both sides of the Mississippi River from Illinois to Louisiana. Historically, the extent and duration of seasonal flooding from the Mississippi River fluctuated annually, recharging the LMRV's aquatic systems and creating a rich diversity of dynamic habitats that supported a vast array of fish and wildlife resources.

THREATENED AND ENDANGERED SPECIES

Several federally listed threatened and endangered animals may occur on the Complex. Numbers of the threatened bald eagle (*Haliaeetus leucocephalus*) are on the rise locally and this large raptor is more frequently sighted throughout the Complex than it used to be. Nesting has been documented at nearby lakes. The endangered least tern (*Sterna antillarum*) is an occasional visitor to managed moist soil units and open water wetlands in search of foraging habitat mostly during summer months. The interior population of the least tern breeds in isolated areas along the Missouri, Mississippi, Ohio, Red, and Rio Grande river systems. From late April to August, terns use barren to sparsely vegetated sandbars along rivers, sand and gravel pits, or lake and reservoir shorelines. Dams, reservoirs, channelization, and other changes to river systems have eliminated most historic least tern habitat. The endangered wood stork (*Mycteria americana*) is provided excellent habitat for foraging at the Complex. Shallow water areas found on the Complex during late summer and fall provide long-legged wading birds with critical foraging opportunities.

The paddlefish (*Polyodon spathula*) can reach nearly seven feet in length and 200 pounds. It is a former candidate species for federal listing and is still considered a species of management concern. It was once abundant in the Mississippi, Missouri and Gulf Coast drainages, so much so that it was commercially harvested as a source of eggs for caviar. There is evidence that Tippo Bayou is a staging ground for spawning by the paddlefish. To date, however, spawning has not been documented.

The black bear was once distributed throughout Mississippi. However, because of excessive harvest and habitat loss, black bear populations have been severely reduced. The Complex is located entirely within the historic range of the state listed endangered American black bear (*Ursus a. americanus*). It also borders, to the south, the range of the federally listed threatened Louisiana black bear (*Ursus a. luteolus*). Though no breeding population has been documented in Mississippi, several individual bears, including females with cubs, have been sighted on the Complex, most notably along the Mississippi River in Bolivar County.

Efforts by the Black Bear Conservation Committee and its member agencies are currently underway to restore bears to their historic range, with current focus on the Louisiana black bear within the state of Louisiana. However, bear sightings in the lower Mississippi Delta have increased dramatically over the last few years, suggesting a possible expansion of these bears across the Mississippi River from existing natural and repatriated bear populations in Louisiana.

Also, a breeding population of black bears currently exists in the White River National Wildlife Refuge (NWR) in southeast Arkansas, to the west and across the Mississippi River from the Complex. Individual bears have been documented crossing the river into Mississippi. Consequently, there is a possibility that more White River NWR bears could immigrate into the Complex. It should be noted that the subspecific status of the White River NWR bear population is unresolved.

The endangered pondberry (*Lindera melissifolia*) is a rarely seen deciduous shrub that grows in seasonally flooded wetlands and on the edges of sinks and ponds. Much of the lands where pondberry was historically found have been ditched and converted to agricultural fields. The drainage and flooding of wetlands, cattle grazing, domestic hog foraging, and timber cutting have also adversely affected pondberry abundance. While no specimens have been documented on the traditional refuges yet, it has been found on Service property in Bolivar County.

ARCHEOLOGICAL AND CULTURAL VALUES

The lower Mississippi River is noted for its prehistoric earthen mounds, erected by the area's indigenous inhabitants. Although the first people entered what is now Mississippi about 12,000 years ago, the earliest major phase of earthen mound construction in this area did not begin until some 2,100 years ago. Mounds continued to be built sporadically for another 1,800 years. Of the mounds that remain today, some of the earliest were built to bury important members of local tribal groups. These mounds were usually rounded, dome-shapes. Later mounds were rectangular, flat-topped earthen platforms upon which temples or residences of chiefs were erected.

Eight hundred years ago, the lower Mississippi Delta was home to highly organized societies. There were roads, commerce, and cultural centers anchored by large and impressive earthen monuments. Wonders of geometric precision, these earthworks were the centers of human life. However, mound construction was already in a period of decline in the 1500s, when the first Europeans arrived in the region and brought with them epidemic diseases that decimated native populations across the Southeast. As a result, by the time sustained contact with European colonists began about 1700, the long tradition of mound building was reaching its end. Surviving mounds are protected because they are owned by state or federal agencies committed by law to their preservation. Most of the mounds in Mississippi, however, are on privately owned land. As a result, many mounds have been irreparably damaged or completely destroyed by modern development and looting. Indian mounds, therefore, are critically endangered cultural sites. The Complex includes at least one documented mound on the Pennington FmHA property.

The Complex follows procedures from Section 106 of the National Historic Preservation Act to protect the public's interest in preserving its cultural/historic legacy that may potentially occur on the Complex. Whenever construction work is undertaken that involves any excavation with heavy earth-moving equipment like tractors, graders and bulldozers, such as for the development of moist soil units, the Complex contracts with a qualified archaeologist/cultural resources expert to conduct an archaeological survey of the subject property. If cultural resources are actually encountered during construction activities, the Complex is to notify the State Historic Preservation Office (SHPO) immediately. To date, no properties on the Complex have been determined to be eligible for the National Register of Historic Places (NRHP).

III. Description of the Alternatives

FORMULATION OF ALTERNATIVES

Alternatives are different approaches or combinations of management objectives and strategies designed to achieve the refuge purpose, vision, and the goals identified for the CCP; the priorities and goals of the Lower Mississippi Valley Ecosystem Team; the goals of the National Wildlife Refuge System; and the mission on the Fish and Wildlife Service. Four management alternatives were developed by the planning team based on issues, concerns and opportunities presented during the CCP scoping process. The issues that are discussed came from individuals, cooperating agencies, conservation organizations, Complex staff, and the planning team. A summary of the four alternatives is provided in Table 2. Although many alternatives were presented for discussion by individuals, the alternatives that were evaluated in detail were those that would support the aforementioned vision, purposes, goals and mission.

The four management alternatives were developed to address most of the issues, concerns and opportunities identified during the CCP planning process. Specific impacts of implementing each alternative will be examined in eight broad issue categories:

Migratory Birds: How will we provide the complex of habitats needed to maintain the current diversity of bird species while providing for other more imperiled migrants? How will we meet the habitat objectives identified in support of national and regional plans? How will we monitor population responses to habitat programs?

Habitat: What level of habitat restoration and maintenance is appropriate given desired future conditions? What diversity and quantity of habitats is needed to meet our objectives in support of national and regional plans?

Other Fish, Wildlife, and Plants: How will we provide for the critical habitat needs of the wildlife dependent on the Complex resources? Will the proposed management scenario benefit natural biodiversity? How do we provide for the needs of the migratory bird species utilizing the Complex?

Recreation and Visitor Services: What is the appropriate level of recreational activities on the Complex? Does the Complex adequately meet the mandate to provide quality wildlife-dependent recreation? How do we create a more balanced program accommodating all six public priority uses, as appropriate? How will we ensure that all our visitors are aware of the purposes and mission of the Complex and the National Wildlife Refuge System?

Resource Threats: What aspects of surrounding land uses threaten the integrity of ecological processes on the Complex? What can the Complex do to control or reduce negative impacts?

Land Protection: Can the Complex play a larger role in resource conservation in the Lower Mississippi River Ecosystem?

Refuge Administration: What level of staff and funding and facilities will be needed to meet the objectives?

Other Human Dimensions: What will be the gains or losses to local communities by implementing proposed management programs?

DESCRIPTION OF ALTERNATIVES

ALTERNATIVE A - NO ACTION (CURRENT MANAGEMENT DIRECTION)

Existing Complex management and public outreach practices would be favored under this alternative. All Refuge management actions would be directed towards achieving the Complex's primary purposes, including (1) preserving wintering waterfowl habitat, (2) providing production habitat for wood ducks, (3) meeting the habitat conservation goals of national and international plans, (4) and preserving wetlands, all while contributing to other national, regional, and state goals to protect and restore migratory birds, threatened and endangered species, and resident species. Refuge management programs would continue to be developed and implemented with limited baseline biological information. Active habitat management would be implemented through water level manipulations, and moist soil, cropland and forest management, designed to provide a diverse complex of habitats that meets the foraging, resting, and breeding requirements for a variety of species. A summary of the current acreages by habitat type can be found in Chapter II of the CCP. Complex staff would continue to restore and maintain existing wetland, open water, moist soil, and bottomland forest habitats. Land would be acquired from willing sellers within the current 47,816-acre acquisition boundaries.

Hunting and fishing would continue to be the major focus for the Complex public use program, with no expansion of current opportunities. Current restrictions or prohibitions would remain. Environmental education, wildlife observation and photography would be accommodated at present levels. If funding becomes available, a visitor center and headquarters office would be constructed on Highway 82 at the Povall Tract.

The current Complex program portion within Chapter II of the CCP contains more detail about the current environment and management direction of the complex.

ALTERNATIVE B – PUBLIC USE EMPHASIS

This alternative would emphasize significantly more public recreational uses while maintaining current habitat management. Any additional staff, emphasis, and resources would be directed to allow for more public activities. Current moist soil, cropland, forest, and wetland management would continue. Hunting and fishing opportunities would be increased as funding and personnel allow.

Auto tours, canoe trails, foot trails, interpretive trail(s), observation towers and blinds would be added for environmental education, photography, and watchable wildlife programs. Additional staff would be used for developing and presenting both on and off-site environmental education and interpretation programs. An outreach coordinator would be hired for the Complex.

A visitor center and headquarters office would be constructed on Highway 82 at the Povall Tract and jointly with the Pvt. John Allen National Fish Hatchery. New sub-headquarters and visitor contact stations would be constructed at Coldwater River, Dahomey, and Tallahatchie NWRs.

Land acquisition within the current acquisition boundaries would continue with emphasis on those lands that can provide additional public use opportunities. Any additional expansions, up to 10% of the current acquisition boundaries, would focus on public use opportunities.

ALTERNATIVE C – WILDLIFE MANAGEMENT EMPHASIS

Under this alternative, refuge lands on the Complex would be intensively managed to provide high quality habitat for wildlife, particularly migratory birds. Any area on the Refuges with pumping capability (wells) and a water control structure would be managed for moist soil vegetation or force-account farmed (with 100% of crops left standing) to benefit migratory waterfowl. Cooperative farming fields would be farmed in rice, milo, corn, or soybeans (in order of preference) and flooded during the late fall and winter.

The wood duck nest box program would be expanded on all three Refuges and would extend onto FmHA tracts with suitable brood habitat. On sites with permanent water, wood duck brood habitat would be developed to promote brood survival. Boxes would be cleaned and maintained regularly to allow two and three broods per box per year.

Primary emphasis would be placed on meeting objectives of various step-down plans, providing habitat for waterfowl and shorebirds. These habitats and their use would be monitored on the Refuges to ensure that goals and objectives were met. Population and habitat surveys would be conducted throughout the Refuges to develop baseline data to determine initial population levels and habitat conditions. Staff would monitor changes over time.

Wildlife-dependent recreation activities would be allowed, but only where and when they did not detract from or conflict with wildlife management activities and objectives. Infrastructure on the Refuges (trails, blinds, etc.) would be developed primarily to conduct wildlife management activities. A visitor center and headquarters office would be constructed on Highway 82 at the Povall Tract.

Under this alternative, the Complex would continue to seek acquisition of all willing seller inholdings within the present acquisition boundary. Highest priority would be given to those lands adjacent to existing Refuge tracts and those lands supporting unique habitats. Additionally, the Complex would concentrate all future off-Refuge partnerships on promoting more intensive wildlife management on privately owned lands. Personnel priorities would include hiring a biologist and/or technician for each Refuge in the Complex as well as for the FmHA properties (considered together) in addition to a forester to conduct forest management activities at Dahomey.

ALTERNATIVE D – ENHANCED WILDLIFE MANAGEMENT AND PUBLIC USE PROGRAM (PREFERRED ALTERNATIVE)

The Service planning team has identified Alternative D as the preferred alternative. This alternative was developed based on public input and the best professional judgment of the planning team. The objectives and strategies presented in the Draft CCP were developed as a direct result of the selection of Alternative B.

Alternative D represents a combination and/or compromise between Alternative B (Public Use Emphasis) and Alternative C (Wildlife Management Emphasis). Whereas these two alternatives seek to maximize either expanded public use or expanded wildlife management opportunities, Alternative D seeks to optimize the benefits of the Complex to wildlife and people, recognizing that tradeoffs may preclude maximizing benefits to both simultaneously. In other words, Alternative D seeks the “best of both” Alternatives B and C.

Under Alternative D, Refuge lands would be more intensively managed than at present to provide high quality habitat for wildlife, particularly migratory birds. Additional areas on the Refuges with pumping capability (wells) and a water control structure would be managed for moist soil vegetation or force-account farmed (with 100% of crops left standing) to benefit migratory waterfowl. Cooperative farming fields would be farmed in rice, milo, corn, or soybeans (in order of preference) and flooded during the late fall and winter.

The wood duck nest box program would be expanded on all three Refuges and may extend onto some FmHA tracts that have suitable brood habitat. Boxes would be cleaned and maintained regularly to allow two and three broods per box per year.

Increased emphasis would be placed on meeting objectives of various step-down plans, providing habitat for waterfowl and shorebirds. These habitats and their use would be monitored on the Refuges to ensure that goals and objectives were met. Population and habitat surveys would be conducted throughout the Refuges to develop baseline data to determine initial population levels and habitat conditions. Staff would monitor changes over time.

This alternative would encourage more public recreational uses even while intensifying current habitat management. Additional staff, emphasis, and resources would be more or less evenly divided between enhancing public use opportunities and wildlife/habitat management. Hunting and fishing opportunities would be increased as funding and personnel allow. Moist soil, cropland, forest, and wetland management would also intensify, to the extent permitted by funding and staffing limits.

One auto tour, one canoe trail, one or more foot trail(s) and/or interpretive trail(s), one observation tower and one or more blinds would be added for environmental education, photography, and watchable wildlife programs. Staff may be added for developing and presenting both on and off-site environmental education and interpretation programs.

Under Alternative D, the Complex would continue to seek acquisition of all willing seller inholdings within the present acquisition boundaries, expanding Complex acreage by up to an additional 10% of the current acquisition boundaries. Highest priority would be given to those lands adjacent to existing Refuge tracts and those lands supporting unique habitats or offering compatible public use opportunities. Additionally, the Complex would concentrate future off-Refuge partnerships on promoting more intensive wildlife management on privately owned lands.

Personnel priorities would include hiring additional law enforcement officers, an outreach coordinator for the Complex as a whole, a biologist and/or technician for each Refuge in the Complex as well as for the FmHA properties (considered together), and a forester to conduct forest management activities at Dahomey.

A visitor center and headquarters office would be constructed on Highway 82 at the Povall Tract and jointly with the Pvt. John Allen National Fish Hatchery. New sub-headquarters and visitor contact stations would be constructed at Dahomey, Tallahatchie and Coldwater River NWRs.

Table 20. Comparison of Management Alternatives for the North Mississippi National Wildlife Refuge Complex

Goals and Objectives	Alternative A (Current Management)	Alternative B (Public Use Emphasis)	Alternative C (Wildlife Management Emphasis)	Alternative D (Preferred Alternative)
Goal 1 – Migratory Birds: Promote the conservation and management of migratory birds within Northern Mississippi in a manner that supports treaties and national and international plans and initiatives.				
Objective 1-1: Migratory Waterfowl	Provide habitat to meet the current objectives for migrating and wintering waterfowl as shown in Table 4-1 of the CCP.	Provide habitat to meet the current objectives for migrating and wintering waterfowl as shown in Table 4-1 of the CCP.	Over the next 15 years, provide habitat to increase current objectives for migrating and wintering waterfowl as shown in Table 4-1 in the CCP. Annually monitor waterfowl response to management actions.	Over the next 15 years, provide habitat to increase current objectives for migrating and wintering waterfowl as shown in Table 4-1 in the CCP. Annually monitor waterfowl response to management actions.
Objective 1-2: Wood Duck Nest Boxes	Provide year round habitat and maintain a program of 75 well-maintained nest boxes throughout the Complex necessary to enhance wood duck populations.	Provide year round habitat and maintain a program of 75 well-maintained nest boxes throughout the Complex necessary to enhance wood duck populations.	Provide year round habitat and maintain a program of 600 well-maintained nest boxes throughout the Complex necessary to enhance wood duck populations.	Provide year round habitat and maintain a program of 600 well-maintained nest boxes throughout the Complex necessary to enhance wood duck populations.

Goals and Objectives	Alternative A (Current Management)	Alternative B (Public Use Emphasis)	Alternative C (Wildlife Management Emphasis)	Alternative D (Preferred Alternative)
Objective 1-3: Wood Duck banding	Meet or exceed the preseason (July-September 15) flyway and state banding goal, with increased emphasis on the entire Complex contributing to this data.	Meet or exceed the preseason (July-September 15) flyway and state banding goal, with increased emphasis on the entire Complex contributing to this data.	Increase the preseason (July-September 15) flyway and state banding objective by eight times (corresponding to the increase in nest boxes), with increased emphasis on the entire Complex contributing to these data.	Increase the preseason (July-September 15) flyway and state banding objective by eight times (corresponding to the increase in nest boxes), with increased emphasis on the entire Complex contributing to these data.
Objective 1-4: Marsh and Wading Birds	Record incidental observations of marsh and wading birds.	Record incidental observations of marsh and wading birds.	Within three years of the plan's approval, determine marsh and wading bird use of wetland habitats, with special emphasis on the black rail, yellow rail, king rail, American bittern, least bittern, and wood stork. Annually conduct management activities that will enhance marsh bird populations.	Within three years of the plan's approval, determine marsh and wading bird use of wetland habitats, with special emphasis on the black rail, yellow rail, king rail, American bittern, least bittern, and wood stork. Annually conduct management activities that will enhance marsh bird populations.

Goals and Objectives	Alternative A (Current Management)	Alternative B (Public Use Emphasis)	Alternative C (Wildlife Management Emphasis)	Alternative D (Preferred Alternative)
Objective 1-5: Colonial Waterbirds	Record and protect locations of existing colonial waterbird rookeries. Monitor annual use and provide information to the state coordinator.	Record and protect locations of existing colonial waterbird rookeries. Monitor annual use and provide information to the state coordinator.	Within two years of the plan's approval, identify, map, and develop monitoring protocol for colonial waterbird rookeries and provide foraging habitat.	Within two years of the plan's approval, identify, map, and develop monitoring protocol for colonial waterbird rookeries and provide foraging habitat.
Objective 1-6: Shorebirds (including woodcock)	Provide 225 acres of fall migration habitat for shorebirds. Annually monitor shorebird population numbers and habitat use over the seasons of use.	Provide 225 acres of fall migration habitat for shorebirds. Annually monitor shorebird population numbers and habitat use over the seasons of use.	By 2014, provide 653 acres of high quality migration habitat for shorebirds, including woodcock. Annually monitor shorebird use and contribute data to the International Shorebird Survey.	By 2014, provide 653 acres of high quality migration habitat for shorebirds, including woodcock. Annually monitor shorebird use and contribute data to the International Shorebird Survey.

Goals and Objectives	Alternative A (Current Management)	Alternative B (Public Use Emphasis)	Alternative C (Wildlife Management Emphasis)	Alternative D (Preferred Alternative)
Objective 1-7: Forest Birds	Record incidental observations of forest birds.	Record incidental observations of forest birds.	Within two years of the plan's approval, survey forest breeding birds with point counts tied to spatially discrete, georeferenced, habitat specific locations to assess the preferred habitat, presence/absence, and relative abundance of all forest breeding species.	Within two years of the plan's approval, survey forest breeding birds with point counts tied to spatially discrete, georeferenced, habitat specific locations to assess the preferred habitat, presence/absence, and relative abundance of all forest breeding species.
Objective 1-8: Scrub-shrub Birds	Record incidental observations of scrub-shrub birds.	Record incidental observations of scrub-shrub birds.	Maintain existing early successional habitats along buffer strips and within two years after the plan's approval convert up to 10% of acquired agricultural lands throughout the Complex to scrub-shrub, supporting priority scrub-shrub breeding species.	Maintain existing early successional habitats along buffer strips and within two years after the plan's approval convert up to 10% of acquired agricultural lands throughout the Complex to scrub-shrub, supporting priority scrub-shrub breeding species.

Goals and Objectives	Alternative A (Current Management)	Alternative B (Public Use Emphasis)	Alternative C (Wildlife Management Emphasis)	Alternative D (Preferred Alternative)
Objective 1-9: Grassland Birds	Record incidental observations of grassland birds.	Record incidental observations of grassland birds.	Maintain existing acres of open grassy-herbaceous dominated ground conditions (“grasslands”) and within five years of the plan’s approval convert up to 10% of acquired agricultural lands throughout the Complex to grasslands to support priority grassland bird species. Conduct baseline information surveys and continue to monitor bird responses to management and habitat alterations.	Maintain existing acres of open grassy-herbaceous dominated ground conditions (“grasslands”) and within five years of the plan’s approval convert up to 10% of acquired agricultural lands throughout the Complex to grasslands to support priority grassland bird species. Conduct baseline information surveys and continue to monitor bird responses to management and habitat alterations.
Objective 1-10: Raptors	Record incidental observations of raptors.	Record incidental observations of raptors.	Within two years of the plan’s approval, determine the extent and evaluate the use of refuge habitats by raptors at a Complex-wide scale.	Within two years of the plan’s approval, determine the extent and evaluate the use of refuge habitats by raptors at a Complex-wide scale.

Goals and Objectives	Alternative A (Current Management)	Alternative B (Public Use Emphasis)	Alternative C (Wildlife Management Emphasis)	Alternative D (Preferred Alternative)
Goal 2 – Other Fish and Wildlife: Implement a program of science-based stewardship of the fish and wildlife resources associated with the North Mississippi National Wildlife Refuge Complex.				
Objective 2-1: Game Species	Monitor harvest and population of game species. Monitor health of deer populations.	Manage game populations to maximize quality hunting opportunities.	For the duration of the plan, manage game populations to maximize quality hunting opportunities while maintaining habitat for federal trust resources.	For the duration of the plan, manage game populations to maximize quality hunting opportunities while maintaining habitat for federal trust resources.
Objective 2-2: Non-game Species	Record presence of non-game species occurring on refuges.	Record presence of non-game species occurring on refuges.	Within 10 years of the plan's approval, reestablish historical hydrological and habitat regimes to increase Refuge biodiversity to the maximum extent feasible. Biannually monitor non-game species response to restoration activities.	Within 10 years of the plan's approval, reestablish historical hydrological and habitat regimes to increase Refuge biodiversity to the maximum extent feasible. Biannually monitor non-game species response to restoration activities.

Goals and Objectives	Alternative A (Current Management)	Alternative B (Public Use Emphasis)	Alternative C (Wildlife Management Emphasis)	Alternative D (Preferred Alternative)
Objective 2-3: Fishes	Record presence of fish species occurring on Refuges.	Manage fisheries to increase fishing opportunities.	For the duration of the plan, continue to enhance spawning habitats and improve water quality at Coldwater River, Dahomey and Tallahatchie NWRs to maintain healthy, sustainable fish populations.	For the duration of the plan, continue to enhance spawning habitats and improve water quality at Coldwater River, Dahomey and Tallahatchie NWRs to maintain healthy, sustainable fish populations.
Goal 3 – Threatened and Endangered Species: Protect and restore habitat for federal and state threatened and endangered species found in the Lower Mississippi River Ecosystem.				
Objective 3-1: Inventory	By 2009, inventory the distribution and habitat use of all threatened and endangered species on the Complex and contribute to their recovery.	By 2009, inventory the distribution and habitat use of all threatened and endangered species on the Complex and contribute to their recovery.	By 2009, inventory the distribution and habitat use of all threatened and endangered species on the Complex and contribute to their recovery.	By 2009, inventory the distribution and habitat use of all threatened and endangered species on the Complex and contribute to their recovery.
Objective 3-2: Habitat Development and Management for Black Bears	By 2015, ensure the forest management plan is compatible with habitat management for black bears.	By 2015, ensure the forest management plan is compatible with habitat management for black bears	By 2015, ensure the forest management plan is compatible with habitat management for black bears	By 2015, ensure the forest management plan is compatible with habitat management for black bears

Goals and Objectives	Alternative A (Current Management)	Alternative B (Public Use Emphasis)	Alternative C (Wildlife Management Emphasis)	Alternative D (Preferred Alternative)
<p>Goal 4 – Ecosystem Management: Maintain and/or restore natural ecological systems within the Mississippi Alluvial Valley and Central Gulf Ecosystems which mimic historical conditions.</p>				
<p>Objective 4-1: Moist Soil</p>	<p>Manage a minimum of 4,360 acres (1,360 acres on refuges, 3,000 acres on FmHA Tracts) of shallow impounded wetlands within the current working area of the Complex for optimum production of moist-soil plants, invertebrates, or hard mast for a variety of wetland dependent migratory birds while meeting the objectives established for dabbling ducks by the Lower Mississippi Valley Joint Venture (LMRVJV).</p>	<p>Manage a minimum of 4,360 acres (1,360 acres on refuges, 3,000 acres on FmHA Tracts) of shallow impounded wetlands within the current working area of the Complex for optimum production of moist-soil plants, invertebrates, or hard mast for a variety of wetland dependent migratory birds while meeting the objectives established for dabbling ducks by the Lower Mississippi Valley Joint Venture (LMRVJV).</p>	<p>Manage a minimum of 6,689 acres of shallow impounded wetlands (see Table 4-1 of the CCP) on the 3 traditional refuges for optimum production of moist-soil plants, invertebrates, or hard mast for a variety of wetland dependent migratory birds while meeting the objectives established for dabbling ducks by the Lower Mississippi Valley Joint Venture (LMRVJV).</p>	<p>Manage a minimum of 6,689 acres of shallow impounded wetlands (see Table 4-1 of the CCP) on the 3 traditional refuges for optimum production of moist-soil plants, invertebrates, or hard mast for a variety of wetland dependent migratory birds while meeting the objectives established for dabbling ducks by the Lower Mississippi Valley Joint Venture (LMRVJV).</p>

Goals and Objectives	Alternative A (Current Management)	Alternative B (Public Use Emphasis)	Alternative C (Wildlife Management Emphasis)	Alternative D (Preferred Alternative)
Objective 4-2: Forest Management	Manage existing forest areas according to the existing forest management plan for the Complex.	Manage existing forest areas according to the existing forest management plan for the Complex.	Manage existing forest areas according to the existing forest management plan for the Complex. Reforest additional acquisitions where appropriate.	Manage existing forest areas according to the existing forest management plan for the Complex. Reforest additional acquisitions where appropriate.
Objective 4-3: Invasive and Pest Management	For the duration of the plan, inventory, monitor, and control where possible invasive plant and animal populations to minimize or eliminate negative effects on native flora and fauna.	For the duration of the plan, inventory, monitor, and control where possible invasive plant and animal populations to minimize or eliminate negative effects on native flora and fauna.	For the duration of the plan, inventory, monitor, and control where possible invasive plant and animal populations to minimize or eliminate negative effects on native flora and fauna.	For the duration of the plan, inventory, monitor, and control where possible invasive plant and animal populations to minimize or eliminate negative effects on native flora and fauna.

Goals and Objectives	Alternative A (Current Management)	Alternative B (Public Use Emphasis)	Alternative C (Wildlife Management Emphasis)	Alternative D (Preferred Alternative)
<p>Goal 5 – Land Protection: Increase the land base and enhance the integrity of the lands within the authorized Refuge acquisition boundaries of the Complex and contribute to the protection and restoration of fish and wildlife resources found within Northern Mississippi.</p>				
<p>Objective 5-1: Land Acquisition</p>	<p>Continue to acquire the remaining 31,552 acres of land within the current Refuge acquisition boundaries, with special emphasis on those areas that would (1) improve access, (2) contribute to national and regional objectives, (3) reduce impacts to refuge resources, or (4) provide additional wildlife-dependent recreational opportunities.</p>	<p>Continue to acquire the remaining 31,552 acres of land within the current Refuge acquisition boundaries, with special emphasis on those areas that would (1) improve access, (2) contribute to national and regional objectives, (3) reduce impacts to refuge resources, or (4) provide additional wildlife-dependent recreational opportunities.</p>	<p>Continue to acquire the remaining 31,552 acres of land within the current Refuge acquisition boundaries, with special emphasis on those areas that would (1) improve access, (2) contribute to national and regional objectives, (3) reduce impacts to refuge resources, or (4) provide additional wildlife-dependent recreational opportunities.</p>	<p>Continue to acquire the remaining 31,552 acres of land within the current Refuge acquisition boundaries, with special emphasis on those areas that would (1) improve access, (2) contribute to national and regional objectives, (3) reduce impacts to refuge resources, or (4) provide additional wildlife-dependent recreational opportunities.</p>

Goals and Objectives	Alternative A (Current Management)	Alternative B (Public Use Emphasis)	Alternative C (Wildlife Management Emphasis)	Alternative D (Preferred Alternative)
Objective 5-2: Private Lands	Provide assistance to private landowners within our 26-county Complex work area. This assistance will be directed towards restoring habitats for wintering waterfowl and forested wetlands to achieve objectives of national and regional plans for the LMRV and Central Gulf Ecosystems.	Provide assistance to private landowners within our 26-county Complex work area. This assistance will be directed towards restoring habitats for wintering waterfowl and forested wetlands to achieve objectives of national and regional plans for the LMRV and Central Gulf Ecosystems.	Provide assistance to private landowners within our 26-county Complex work area. This assistance will be directed towards restoring habitats for wintering waterfowl and forested wetlands to achieve objectives of national and regional plans for the LMRV and Central Gulf Ecosystems.	Provide assistance to private landowners within our 26-county Complex work area. This assistance will be directed towards restoring habitats for wintering waterfowl and forested wetlands to achieve objectives of national and regional plans for the LMRV and Central Gulf Ecosystems.
Objective 5-3: Focus Areas	Use conservation tools such as conservation easements, partnership agreements, and technical assistance to protect, restore, and manage the highest priority habitats within this area.	Use conservation tools such as conservation easements, partnership agreements, and technical assistance to protect, restore, and manage the highest priority habitats within this area.	Use conservation tools such as conservation easements, partnership agreements, and technical assistance to protect, restore, and manage the highest priority habitats within this area.	Use conservation tools such as conservation easements, partnership agreements, and technical assistance to protect, restore, and manage the highest priority habitats within this area.

Goals and Objectives	Alternative A (Current Management)	Alternative B (Public Use Emphasis)	Alternative C (Wildlife Management Emphasis)	Alternative D (Preferred Alternative)
Objective 5-4: Contaminants and Siltation	Continue to monitor contaminants concentrations in fish, wildlife, and waterbodies of the refuges while reducing siltation.	Continue to monitor contaminants concentrations in fish, wildlife, and waterbodies of the refuges while reducing siltation.	Continue to monitor contaminants concentrations in fish, wildlife, and waterbodies of the refuges while reducing siltation.	Continue to monitor contaminants concentrations in fish, wildlife, and waterbodies of the refuges while reducing siltation.
Goal 6 – Cultural Resources: Identify and protect cultural resources on the Complex in accordance with federal and state historic preservation laws and regulations.				
Objective 6-1: Cultural Resources	By 2010, identify, evaluate the importance of, and seek the appropriate protective designation of cultural resources throughout the Complex, in accordance with existing legal requirements, regulations, and professional standards.	By 2010, identify, evaluate the importance of, and seek the appropriate protective designation of cultural resources throughout the Complex, in accordance with existing legal requirements, regulations, and professional standards. Where significant cultural resources exist, provide public outreach opportunities where appropriate.	By 2010, identify, evaluate the importance of, and seek the appropriate protective designation of cultural resources throughout the Complex, in accordance with existing legal requirements, regulations, and professional standards.	By 2010, identify, evaluate the importance of, and seek the appropriate protective designation of cultural resources throughout the Complex, in accordance with existing legal requirements, regulations, and professional standards. Where significant cultural resources exist, provide public outreach opportunities where appropriate.

Goals and Objectives	Alternative A (Current Management)	Alternative B (Public Use Emphasis)	Alternative C (Wildlife Management Emphasis)	Alternative D (Preferred Alternative)
Goal 7 – Recreation and Visitor Services: Increase the public understanding, use, and enjoyment of the natural resources of the North Mississippi National Wildlife Refuge Complex, consistent with the principle that wildlife comes first on National Wildlife Refuges.				
Objective 7-1: Visitor Services Plan	By 2009, develop a Visitor Services Plan.	By 2009, develop a Visitor Services Plan.	By 2009, develop a Visitor Services Plan.	By 2009, develop a Visitor Services Plan.
Objective 7-2: Visitor Centers	By 2014, develop a Visitor Center on Highway 82 at the Povall FmHA Tract.	By 2014, develop visitor centers on Highway 82 at the Povall FmHA Tract and jointly with the Pvt. John Allen Fish Hatchery.	By 2014, develop a Visitor Center on Highway 82 at the Povall FmHA Tract.	By 2014, develop visitor centers on Highway 82 at the Povall FmHA Tract and jointly with the Pvt. John Allen Fish Hatchery.
Objective 7-3: Visitor Contact / Administration Stations	By 2014, develop Visitor Contact/Administration Stations at all 3 traditional refuges in the Complex.	By 2014, develop Visitor Contact/Administration Stations at all 3 traditional refuges in the Complex.	By 2014, develop Visitor Contact/Administration Stations at all 3 traditional refuges in the Complex.	By 2014, develop Visitor Contact/Administration Stations at all 3 traditional refuges in the Complex.

Goals and Objectives	Alternative A (Current Management)	Alternative B (Public Use Emphasis)	Alternative C (Wildlife Management Emphasis)	Alternative D (Preferred Alternative)
Objective 7-4: Hunting	Continue current hunting program throughout the Complex, providing the user a quality and safe outdoor experience.	Expand current hunting program throughout the Complex so that it provides the user a quality and safe outdoor experience. As lands are acquired, increase acreage available for hunting proportionately.	Continue current hunting program throughout the Complex, providing the user a quality and safe outdoor experience.	Expand current hunting program throughout the Complex so that it provides the user a quality and safe outdoor experience. As lands are acquired, increase acreage available for hunting proportionately.
Objective 7-5: Fishing	Provide high quality fishing opportunities consistent with sound biological principles while meeting the Complex purposes and objectives.	Work closely with Pvt. John Allen Fish Hatchery to expand current fishing opportunities over the next 10 years as outlined in the Biological Review.	Provide high quality fishing opportunities consistent with sound biological principles while meeting the Complex purposes and objectives.	Work closely with Pvt. John Allen Fish Hatchery to expand current fishing opportunities over the next 10 years as outlined in the Biological Review.
Objective 7-6: Environmental Education	Maintain existing level of environmental education activities.	Within three years of the plan's approval, the Complex will receive five teacher-led class visits per year.	Maintain existing level of environmental education activities.	Within three years of the plan's approval, the Complex will receive five teacher-led class visits per year.

Goals and Objectives	Alternative A (Current Management)	Alternative B (Public Use Emphasis)	Alternative C (Wildlife Management Emphasis)	Alternative D (Preferred Alternative)
Objective 7-7: Wildlife Interpretation	Maintain existing level of wildlife interpretation activities.	Within five years of the plan's approval, at least 75% of visitors will understand the Complex's contribution to protection and restoration of the Lower Mississippi Ecosystem.	Maintain existing level of wildlife interpretation activities.	Within five years of the plan's approval, at least 75% of visitors will understand the Complex's contribution to protection and restoration of the Lower Mississippi Ecosystem.
Objective 7-8: Wildlife Observation and Photography	Maintain existing level of wildlife observation and photography opportunities.	Within two years of plan approval, develop one new trail at each refuge and one observation site/deck each at Coldwater River and Tallahatchie refuges.	Maintain existing level of wildlife observation and photography opportunities.	Within two years of plan approval, develop one new trail at each refuge and one observation site/deck each at Coldwater River and Tallahatchie refuges.

Goals and Objectives	Alternative A (Current Management)	Alternative B (Public Use Emphasis)	Alternative C (Wildlife Management Emphasis)	Alternative D (Preferred Alternative)
Goal 8 – Administration: Provide personnel, funding, and facilities needed to ensure that the goals and objectives identified in this CCP can be achieved.				
Objective 8-1: Facilities	Develop appropriate office space and maintenance facilities to enable the expansion of refuge programs and ensure safe and efficient operations commensurate with the expansion of the refuge land base.	By 2014, develop 25% more office space and maintenance facilities both at the Complex headquarters and at each refuge to enable the expansion of refuge programs and ensure safe and efficient operations – consistent with Service and federal standards – and commensurate with the expansion of the refuge land base.	By 2014, develop 25% more office space and maintenance facilities both at the Complex headquarters and at each refuge to enable the expansion of refuge programs and ensure safe and efficient operations – consistent with Service and federal standards – and commensurate with the expansion of the refuge land base.	By 2014, develop 25% more office space and maintenance facilities both at the Complex headquarters and at each refuge to enable the expansion of refuge programs and ensure safe and efficient operations – consistent with Service and federal standards – and commensurate with the expansion of the refuge land base.

Goals and Objectives	Alternative A (Current Management)	Alternative B (Public Use Emphasis)	Alternative C (Wildlife Management Emphasis)	Alternative D (Preferred Alternative)
Objective 8-2: Personnel	Obtain staff and resources needed to accomplish the comprehensive management programs as outlined in this document commensurate with the expansion of the refuge land base.	Obtain staff and resources needed to accomplish the comprehensive management programs as outlined in this document commensurate with the expansion of the refuge land base.	Obtain staff and resources needed to accomplish the comprehensive management programs as outlined in this document commensurate with the expansion of the refuge land base.	By 2019, obtain additional staff (18 FTE's) and resources needed to accomplish the comprehensive management programs as outlined in this document commensurate with the expansion of the refuge land base.
Objective 8-3: Law Enforcement	Improve Complex law enforcement program with 1.5 additional FTE's, proper training, and partnerships.	Improve Complex law enforcement program with 1.5 additional FTE's, proper training, and partnerships.	Improve Complex law enforcement program with 1.5 additional FTE's, proper training, and partnerships.	Improve Complex law enforcement program with 1.5 additional FTE's, proper training, and partnerships.

Goals and Objectives	Alternative A (Current Management)	Alternative B (Public Use Emphasis)	Alternative C (Wildlife Management Emphasis)	Alternative D (Preferred Alternative)
Objective 8-4: Friends Group, Volunteer, Partners, and Intern Programs	Maintain existing levels of volunteer and intern activities. Establish a Friends group at Dahomey NWR.	Provide a highly visible and dynamic volunteer and intern workforce and establish one or more Friends Groups to assist and support all aspects of Complex operations including environmental education, wildlife interpretation, habitat improvement, visitor facilities maintenance, funding needs, etc.	Maintain existing levels of volunteer and intern activities. Establish a Friends group at Dahomey NWR.	Provide a highly visible and dynamic volunteer and intern workforce and establish one or more Friends Groups to assist and support all aspects of Complex operations including environmental education, wildlife interpretation, habitat improvement, visitor facilities maintenance, funding needs, etc.

IV. Environmental Consequences

This section analyzes and discusses the potential environmental effects or consequences that can be reasonably expected by the implementation of each of the four management alternatives described in Section III of this environmental assessment. These topics were chosen based on the important issues and concerns raised at the public scoping meetings and the planning team meetings.

However, a few potential effects will be the same under each alternative and are summarized below:

EFFECTS COMMON TO ALL ALTERNATIVES

COMPATIBLE USES

The National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997, states that national wildlife refuges must be protected from incompatible or harmful human activities to ensure that Americans can enjoy Refuge System lands and waters. Before activities or uses are allowed on a national wildlife refuge, the uses must be found to be compatible. A compatible use "...will not materially interfere with or detract from the fulfillment of the mission of the Refuge System or the purposes of the refuge." "Wildlife-dependent recreational uses may be authorized on a refuge when they are compatible and not inconsistent with public safety."

An interim compatibility determination is a document that assesses the compatibility of an activity during the period of time the Service first acquires a parcel of land to the time a formal, long-term management plan for that parcel is prepared and adopted. The Service has completed an interim compatibility determination for the six priority general public uses of the Refuge System, as listed in the National Wildlife Refuge System Improvement Act. These uses are hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation.

ENVIRONMENTAL JUSTICE

Executive Order 12898 "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" was signed by President Clinton on February 11, 1994, to focus Federal attention on the environmental and human health conditions of minority and low-income populations with the goal of achieving environmental protection for all communities. The Order directed Federal agencies to develop environmental justice strategies to aid in identifying and addressing disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. The Order is also intended to promote nondiscrimination in Federal programs substantially affecting human health and the environment, and to provide minority and low-income communities access to public information and participation in matters relating to human health or the environment.

None of the management alternatives described in this EA will disproportionately place any adverse environmental, economic, social, or health impacts on minority and low-income populations. Implementation of any action alternative that includes public use and environmental education will actually provide a benefit to the residents of all races, ethnic groups, and income levels residing in the surrounding communities.

CLIMATE CHANGE IMPACTS

The U.S. Department of the Interior issued an order in January 2001 requiring federal agencies under its direction that have land management responsibilities to consider potential climate change impacts as part of long range planning endeavors.

The increase of carbon within the earth's atmosphere has been linked to the gradual rise in surface temperature commonly referred to as global warming. In relation to comprehensive planning for national wildlife refuges, carbon sequestration constitutes the primary climate-related impact to be considered in planning. The U.S. Department of Energy's *Carbon Sequestration Research and Development*: (U.S. DOE, 1999) defines carbon sequestration as "...the capture and secure storage of carbon that would otherwise be emitted to or remain in the atmosphere."

The land is a tremendous force in carbon sequestration. Terrestrial biomes of all sorts—grasslands, forests, wetlands, tundra, perpetual ice, and desert—are effective both in preventing carbon emission and acting as a biological "scrubber" of atmospheric carbon monoxide. The Department of Energy report's conclusions noted that ecosystem protection is important to carbon sequestration and may reduce or prevent loss of carbon currently stored in the terrestrial biosphere.

Preserving natural habitat for wildlife is the heart of any long range plan for national wildlife refuges. The actions proposed in this CCP would preserve or restore land and water, and would thus enhance carbon sequestration. This in turn contributes positively to efforts to mitigate human-induced global climate changes.

OTHER MANAGEMENT

All management activities that could affect natural resources, including subsurface mineral reservations, utility lines and easements, soil, water and air, and historical and archaeological resources would be managed to comply with all laws and regulations.

CULTURAL RESOURCES

The U.S. Fish and Wildlife Service is responsible for managing archeological and historic sites found on federal land. While the refuges in the Complex have not yet had any cultural resources identified that have been determined to be eligible for the National Register of Historic Places, this remains a distinct possibility, because only a fraction of the refuges have been surveyed, and the area in general is known to contain prehistoric and historic cultural resources like earthen mounds. Prior to all habitat and facility maintenance activities, appropriate efforts will be made to identify known and possible cultural resources with the area of potential impact. Avoidance of cultural resources would be the preferred treatment and mitigation of any impacts would be undertaken if impacts cannot be avoided.

LAND ACQUISITION

Funding for land acquisition from willing sellers within the acquisition boundary of Coldwater River, Dahomey and Tallahatchie Refuges would come from the Land and Water Conservation Fund, Migratory Bird Conservation Fund, Corps of Engineers mitigation programs, Mississippi Department of Transportation mitigation programs, or donations from conservation and private organizations. Conservation easements and leases can be used to obtain minimum interests necessary to satisfy refuge objectives if the refuge staff can adequately manage uses of the areas for the benefit of wildlife. The Service can negotiate management agreements with local, state and federal agencies, and accept conservation easements. Some tracts within the proposed refuge acquisition boundaries may be owned by other public or private conservation organizations. The Service would work with interested organizations to identify additional areas needing protection and provide technical assistance if needed. The acquisition of private lands is entirely contingent on landowners and their willingness to participate.

REFUGE REVENUE-SHARING

Annual refuge revenue-sharing payments to Bolivar, Grenada, Leflore, Marshall, Quitman, Sunflower, Tallahatchie, and Union counties would continue at similar rates under each alternative. If lands are acquired and added to the refuges, the payments would increase accordingly.

EXPANSION OF VISITOR SERVICES

As the Complex's visitor services programs are developed, the staff would continue to assess the programs and their potential impacts on the Complex's resources. Changes in the programs would be implemented as needed to address any impacts identified and to respond to anticipated wildlife population increases. To ensure a quality wildlife-dependent recreation experience while achieving the "wildlife first" mandate, the number of users and conflicts among users may be limited by the following: (1) limited permits; (2) designating roads, trails, and sites for specific kinds of wildlife-dependent recreational use; and (3) permitting uses at certain times of the year.

There are a number of situations where future refuge closures or restrictions on access may be warranted. Examples of these situations include, but are not limited to, the following: protection of endangered species; protection of nesting birds; restriction of recreation activities to achieve specific wildlife population objectives; improve the quality of hunting experiences; minimization of conflicts with other refuge management programs; and limitations from inadequate funds and/or staff to administer use.

REFUGE ADMINISTRATION

The maintenance and operation of the refuges' administrative facilities would continue, regardless of the alternative selected. Periodic updating of facilities is necessary for safety and accessibility and to support staff and management needs. Funding needs have been identified for several projects, including providing additional facilities and equipment to support refuge operation and maintenance.

OTHER EFFECTS

Each of the alternatives would have similar effects or minimal to negligible effects on soils, water quality and quantity, noise, transportation, human health and safety, children, hazardous materials, waste management, aesthetics, and utilities and public services.

SUMMARY OF EFFECTS BY ALTERNATIVE

This section describes the environmental consequences of adopting each refuge management alternative. Table 4 addresses the likely outcomes for specific issues and is organized by broad issues categories.

ALTERNATIVE A - NO ACTION (CURRENT MANAGEMENT DIRECTION)

Current Complex management and public outreach practices continue under Alternative A. All refuge management actions would be oriented to achieving the Complex's primary purposes, namely (1) preserving wintering waterfowl habitat, (2) providing breeding habitat for wood ducks, (3) meeting the habitat conservation goals of national and international plans, and (4) preserving wetlands, all while contributing to other national, regional, and state goals to protect and restore migratory birds, threatened and endangered species, and resident species.

Current programs would meet with limited success in achieving Complex goals and objectives with regard to habitat and wildlife populations, primarily because of limited ability to actively manage habitats. Moist soil units, croplands, and other wetlands would remain essentially unchanged as would the wildlife benefits they confer.

Alternative A would not enable the Complex to meet its migrating and wintering waterfowl habitat objectives as established by the Lower Mississippi Valley Joint Venture (LMRVJV) for forested wetlands, moist soil, and unharvested croplands. Forest succession would continue to increase the acreage of mature interior forest habitat, to the benefit of a number of migratory and breeding bird species dependent on it. Still, Coldwater River and Dahomey refuges would maintain a deficit of forest core areas for forest-dependent birds such as warblers, vireos, woodpeckers and many other species, as established by the LMRVJV's Bird Conservation Areas.

Hunting and fishing would continue to be the major focus for the Complex public use program, with no expansion of current opportunities, which are adequate, but not as expansive as they might be. Current restrictions or prohibitions, such as on the use of ORVs, would remain. Environmental education, wildlife observation and photography would continue at present relatively low levels. The visitor center and headquarters office, to be constructed on Highway 82 at the Povall Tract, would provide increased educational opportunities and likely account for a greater quantity and quality of visitation to the Complex.

ALTERNATIVE B – PUBLIC USE EMPHASIS

Alternative B's emphasis is on greater public recreational uses while maintaining current habitat management. Any additional staff, emphasis, and resources would be directed to allow for more public activities. Current moist soil, cropland, forest, and wetland management would continue. Forest succession would continue to advance as in Alternative A, leading to an increase in the acreage of relatively mature, interior forest habitat, which would benefit those species of migratory and breeding birds dependent on it. There would be no anticipated changes in the quality or quantity of moist soil, cropland, and wetland habitats, and thus no expected effects on wildlife populations and diversity.

Thus, under Alternative B, as in the case of Alternative A, the Complex would not meet objectives established by the LMRVJV for migrating and wintering waterfowl and forest-dependent birds.

To the extent funding and personnel allow for it, hunting and fishing opportunities would increase, which would be a benefit of Alternative B. Game and sport fish populations on the Complex appear to be able to support some increase in consumptive use. Auto tours, canoe trails, foot trails, interpretive trail(s), observation towers and blinds would all be added. New staff would be used to develop and present both on and off-site environmental education and interpretation programs. An outreach coordinator would significantly expand Complex capabilities in these areas.

Construction of a visitor center and headquarters office on Highway 82 at the Povall Tract and another visitor center jointly with the Pvt. John Allen National Fish Hatchery would vastly expand opportunities for visitors to the Complex. New sub-headquarters and visitor contact stations at all three refuges would similarly improve and expand the visitor experience.

Land acquisition within the current acquisition boundaries would continue with emphasis on those lands that can provide additional public use opportunities. Any additional expansions, up to 10% of the current acquisition boundaries, would also focus on public use opportunities. Thus, the expanded benefits from Alternative B would primarily accrue to the human users of the Complex rather than to wildlife and their habitats.

ALTERNATIVE C – WILDLIFE MANAGEMENT EMPHASIS

Under this alternative, refuge lands on the Complex would be intensively managed to provide high quality habitat for wildlife, particularly migratory birds. Any area on the three refuges with pumping capability (wells) and a water control structure would be managed for moist soil vegetation or force-account farmed (with 100% of crops left standing) to benefit migratory waterfowl. Cooperative farming fields would be farmed in rice, milo, corn, or soybeans (in order of preference) and flooded during the late fall and winter. These actions would have beneficial effects on wintering migratory waterfowl. It is likely that under Alternative C, the Complex would meet and perhaps exceed its obligations or objectives for habitat for migrating and wintering waterfowl. Increased forest acreage and more intensive, wildlife-friendly forest management would also serve to meet or exceed acreage targets of forest core areas (Bird Conservation Areas), also set by the LMRV Joint Venture.

The Complex's wood duck nest box program would be expanded on all three refuges and would extend onto FmHA tracts with suitable brood habitat. On sites with permanent water, wood duck brood habitat would be developed to promote brood survival. Boxes would be cleaned and maintained regularly to allow two and three broods per box per year. If successful, this program would boost production of wood ducks by at least five-fold over present.

Wildlife-dependent recreation activities would be allowed, but only where and when they did not detract from or conflict with wildlife management activities and objectives. Thus, opportunities for wildlife-dependent recreation would either see no increase or perhaps a slight decline from their current levels. There would be no increase in facilities or infrastructure on the refuges (trails, blinds, etc.) dedicated to hunting, wildlife observation and photography. Construction of a visitor center and headquarters office on Highway 82 at the Povall Tract would improve the Complex's educational and interpretative opportunities for the visiting public over what they are today. Nevertheless, under this alternative, public use of the Complex would not increase or improve nearly as much as under Alternative B, and may actually be less than Alternative A.

The Complex would continue to seek acquisition of all willing seller inholdings within the present acquisition boundary only. Since the highest priority would be given to those lands adjacent to existing Refuge tracts and those lands supporting unique habitats, it can be expected that wildlife, rather than public use, would be the major beneficiary of any such acquisitions. Additionally, since the Complex would concentrate all future off-Refuge partnerships on promoting more intensive wildlife management on privately owned lands, it is anticipated that both habitat quantity and quality and wildlife populations would benefit.

*ALTERNATIVE D – ENHANCED WILDLIFE MANAGEMENT AND PUBLIC USE PROGRAM
(PREFERRED ALTERNATIVE)*

Alternative D represents a combination and/or compromise between Alternative B (Public Use Emphasis) and Alternative C (Wildlife Management Emphasis). Under Alternative D, Complex lands would be more intensively managed than at present to provide high quality habitat for wildlife, particularly migratory birds. Additional areas on the Refuges with pumping capability (wells) and a water control structure would be managed for moist soil vegetation or force-account farmed (with 100% of crops left standing) to benefit migratory waterfowl. Cooperative farming fields would be farmed in rice, milo, corn, or soybeans (in order of preference) and flooded during the late fall and winter.

These actions would have beneficial effects on wintering migratory waterfowl. It is likely that under Alternative D, as with Alternative C, the Complex would meet and perhaps exceed its habitat objectives for migrating and wintering waterfowl. In addition, increased forest acreage and more intensive, wildlife-friendly forest management would also serve to meet or exceed acreage targets set by the LMRV Joint Venture for forest core areas (Bird Conservation Areas).

The wood duck nest box program would be expanded on all three refuges and may extend onto some FmHA tracts that have suitable brood habitat. Boxes would be cleaned and maintained regularly to allow two and three broods per box per year. If successful, this program would boost production of wood ducks by at least five-fold over present.

Increased emphasis would be placed on meeting objectives of various step-down plans, providing habitat for waterfowl and shorebirds. These habitats and their use would be monitored on the refuges to ensure that goals and objectives were met. Shorebirds, wading birds, and colonial nesting birds would be beneficiaries of these efforts.

Alternative D would encourage more public recreational uses even while intensifying current habitat management. Hunting and fishing opportunities would be augmented as funding and personnel allow. Moist soil, cropland, forest, and wetland management would also intensify.

One auto tour, one canoe trail, one or more foot trail(s) and/or interpretive trail(s), one observation tower and one or more blinds would be added for environmental education, photography, and watchable wildlife programs. In addition, both on and off-site environmental education and interpretation programs would be expanded.

Under Alternative D, the Complex would continue to seek acquisition of all willing seller inholdings within the present acquisition boundaries, expanding Complex acreage by up to an additional 10% of the current acquisition boundaries. Highest priority would be given to those lands adjacent to existing Refuge tracts and those lands supporting unique habitats or offering outstanding wildlife-dependent public use. Additionally, the Complex would concentrate future off-refuge partnerships on promoting more intensive wildlife management on privately owned lands.

Educational and interpretive opportunities for the public would be expanded by the construction of one visitor center and headquarters office on Highway 82 at the Povall Tract and another visitor center with the Pvt. John Allen National Fish Hatchery. The proposed new sub-headquarters and visitor contact stations to be constructed at Coldwater River, Dahomey, and Tallahatchie NWRs would also benefit the public.

Table 21. Summary of Environmental Effects by Alternative

Issues	Alternative A (Current Management)	Alternative B (Public Use Emphasis)	Alternative C (Wildlife Management Emphasis)	Alternative D (Preferred Alternative)
<i>Migratory Birds</i>				
Waterfowl	Waterfowl populations would not change substantially and would fall short of meeting LMRVJV objectives	Waterfowl populations would not change substantially and would fall short of meeting LMRVJV objectives	Waterfowl populations would likely increase in response to increases in habitat quantity and quality; LMRVJV habitat objectives for waterfowl would be met	Waterfowl populations would likely increase in response to increases in habitat quantity and quality; LMRVJV habitat objectives for waterfowl would be met
Shorebirds	Population of shorebirds expected to remain stable	Population of shorebirds expected to remain stable	Shorebird populations expected to increase	Shorebird populations expected to increase
Waterbirds (including marsh and colonial birds)	Waterbird populations expected to remain stable	Waterbird populations expected to remain stable	Waterbird populations expected to increase	Waterbird populations expected to increase
Forest interior birds and songbirds	Populations will probably increase as forest succession advances	Populations will probably increase as forest succession advances	Populations expected to increase more than with Alts. A & B due to expanded forest area	Populations expected to increase more than with Alts. A & B due to expanded forest area
Raptors	Populations likely to remain stable	Populations likely to remain stable	Possible increases in populations of some raptor (forest dependent) while other populations remain constant	Possible increases in populations of some raptor (forest dependent) while other populations remain constant

Issues	Alternative A (Current Management)	Alternative B (Public Use Emphasis)	Alternative C (Wildlife Management Emphasis)	Alternative D (Preferred Alternative)
Woodcock	Populations stable at first but decline as forest matures	Populations stable at first but decline as forest matures	Populations stable at first but decline as forest matures	Populations stable at first but decline as forest matures
<i>Habitats</i>				
Moist Soil	Gradual increase as refuges expand in size within acquisition boundaries	No change in area of moist soil units	Increased area of moist soils units from expansion within acquisition boundaries and more intensive management	Increased area of moist soils units from expansion within acquisition boundaries and more intensive management
Bottomland hardwood forest	Slight increase in area due to expansion of refuges within authorized acquisition boundaries; improved quality due maturing forest stands	Slight increase in area due to expansion of refuges within authorized acquisition boundaries; improved quality due maturing forest stands	Larger increase in area and better habitat for wildlife in general due to forest management, placement of small clearings, and other measures	Larger increase in area and better habitat for wildlife in general due to forest management, placement of small clearings, and other measures
Interior forest	Slight expansion in area of interior forest possible	Slight expansion in area of interior forest possible	Larger expansion in area of interior forest probable due to more aggressive efforts	Larger expansion in area of interior forest probable due to more aggressive efforts
Scrub-shrub	Decreases in area as reforested habitat grows up and closes in	Decreases in area as reforested habitat grows up and closes in	Decreases in area as reforested habitat grows up and closes in	Decreases in area as reforested habitat grows up and closes in
Grasslands	Stable or decreasing area of grasslands	Stable or decreasing area of grasslands	Stable or decreasing area of grasslands	Stable or decreasing area of grasslands

Issues	Alternative A (Current Management)	Alternative B (Public Use Emphasis)	Alternative C (Wildlife Management Emphasis)	Alternative D (Preferred Alternative)
Croplands for waterfowl	Maintained; continued soil erosion and siltation of wetlands	Maintained; continued soil erosion and siltation of wetlands	Maintained; possible reduction in soil erosion and siltation of wetlands due to increased soil conservation measures	Maintained; possible reduction in soil erosion and siltation of wetlands due to increased soil conservation measures
Open water	Current acres maintained	Current acres maintained	Current acres maintained	Current acres maintained
<i>Other Fish, Wildlife, and Plants</i>				
Invasive species	Increase; some invasive species and rate of spread unknown	Increase; some invasive species and rate of spread unknown	Greater efforts at control of invasive species results in somewhat less infestation	Greater efforts at control of invasive species results in somewhat less infestation
Threatened and Endangered (T&E) Species (Federal)	No changes likely in occurrence or abundance of listed species that may occur on Complex	No changes likely in occurrence or abundance of listed species that may occur on Complex	Greater efforts at inventory of T&E species and possible increases in occurrence and abundance	Greater efforts at inventory of T&E species and possible increases in occurrence and abundance
White-tailed deer	Maintained and managed for a quality herd for hunting	Maintained and managed for a quality herd for hunting; hunting opportunities increase somewhat	Maintained and managed for a quality herd for hunting	Maintained and managed for a quality herd for hunting; hunting opportunities increase somewhat
Upland game birds	Population levels unpredictable; no active management; some hunting opportunities	Population increases likely with additional opportunities for hunting	Population increases likely with possible additional opportunities for hunting	Population increases likely with additional opportunities for hunting

Issues	Alternative A (Current Management)	Alternative B (Public Use Emphasis)	Alternative C (Wildlife Management Emphasis)	Alternative D (Preferred Alternative)
Amphibians & Reptiles	Species unknown; populations likely stable; perhaps increases of forest-dwelling herps	Species unknown; populations likely stable; perhaps increases of forest-dwelling herps	Greater efforts to inventory and document presence; perhaps increases in populations of forest-dwelling herps	Greater efforts to inventory and document presence; perhaps increases in populations of forest-dwelling herps
Fisheries	Populations and species diversity either remain stable or decrease as contaminants and siltation continue to impact waterways	Populations and species diversity either remain stable or decrease as contaminants and siltation continue to impact waterways	Enhanced spawning habitats and improved water quality lead to healthier, more sustainable fish populations	Enhanced spawning habitats and improved water quality lead to healthier, more sustainable fish populations

Public Use

Hunting	Hunting opportunities maintained at current levels	Increased opportunities for deer, upland game bird hunting, youth, seniors, and disabled hunts (including designated areas)	Hunting opportunities maintained at current levels	Increased opportunities for deer, upland game bird hunting, youth, seniors, and disabled hunts (including designated areas)
Fishing	Maintained at present relatively low levels	Increased; integrated more thoroughly into habitat management	Maintained at current relatively low levels	Increased; integrated more thoroughly into habitat management
Environmental Education	Continue at current relatively low level due to lack of staffing	Increased emphasis on interpretation; greater opportunities for visitors	Continue at current relatively low level due to lack of staffing	Increased emphasis on interpretation; greater opportunities for visitors
Wildlife Observation and Photography	Maintained at current level	Increased opportunities for wildlife observation and photography	Maintained at current level	Increased opportunities for wildlife observation and photography

Issues	Alternative A (Current Management)	Alternative B (Public Use Emphasis)	Alternative C (Wildlife Management Emphasis)	Alternative D (Preferred Alternative)
Lack of public awareness of the purpose and mission of the Complex and the National Wildlife Refuge System (Interpretation)	Current level of awareness maintained	Awareness and understanding increased with new facilities, exhibits, trails and other opportunities	Current level of awareness maintained	Awareness and understanding increased with new facilities, exhibits, trails and other opportunities
<i>Resource Threats</i>				
Contaminants (in water, sediments, fish)	Will likely stay the same or increase	Will likely stay the same or increase	Will likely stay the same or increase	Will likely stay the same or increase
Siltation	Will likely stay the same or increase	Will likely stay the same or increase	May decrease due to increase in soil conservation measures	May decrease due to increase in soil conservation measures
<i>Land Protection</i>				
Acquisitions	Continue to purchase inholdings within approved acquisition boundaries of all 3 refuges	Continue to purchase inholdings within approved acquisition boundaries of all 3 refuges – emphasis on tracts with high value for public use	Continue to purchase inholdings within approved acquisition boundaries of all 3 refuges – emphasis on tracts with high habitat value for wildlife	Continue to purchase inholdings within approved acquisition boundaries of all 3 refuges – emphasis on tracts with high habitat/wildlife/public use value
FmHA properties	Continue to manage 128 tracts for habitat, game and non-game species	Continue to manage 128 tracts for habitat, game and non-game species	Continue to manage 128 tracts for habitat, game and non-game species	Continue to manage 128 tracts for habitat, game and non-game species

Issues	Alternative A (Current Management)	Alternative B (Public Use Emphasis)	Alternative C (Wildlife Management Emphasis)	Alternative D (Preferred Alternative)
Partners, Volunteers, Interns	Maintain and increase as approached by interested partners	Greater cooperation with partners and use of volunteers related to increasing public use of refuges	Greater cooperation with partners and use of volunteers related to intensified habitat and wildlife management	Greater cooperation with partners and use of volunteers related to intensified habitat and wildlife management
Private Lands	Maintain current level of assistance with continued restoration and protection of private lands	Maintain current level of assistance with continued restoration and protection of private lands	Increased level of private lands habitat restoration increases wildlife benefits	Increased level of private lands habitat restoration increases wildlife benefits

Refuge Administration

Facilities	Maintain current facilities and level of protection and enhancement; add 1 visitor center	Increase and improve facilities, increase visitor safety, provide economic benefits to local communities	Facilities and infrastructure related to wildlife and habitat management are increased, but maintain the same for public use; add 1 visitor center	Increase and improve facilities, increase visitor safety, provide economic benefits to local communities
Staff	Maintain current program and staffing levels with little baseline data and continued eroding of habitats	Increase staff by adding outreach and public use coordinators	Increase staff by adding forester and wildlife biologists	Increase staff by adding forester, wildlife biologists, and outreach and public use coordinators
Law Enforcement	Maintain current program/staffing while other management programs are neglected during hunting seasons.	Increase protection of refuge resources and visitor safety with little to no impact on resource management and maintenance programs	Maintain current program/staffing while other management programs are neglected during hunting seasons.	Increase protection of refuge resources and visitor safety with little to no impact on resource management and maintenance programs

Issues	Alternative A (Current Management)	Alternative B (Public Use Emphasis)	Alternative C (Wildlife Management Emphasis)	Alternative D (Preferred Alternative)
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Other Human Dimensions

Human health	Continued impacts to water quality through siltation and contamination due to agricultural production; advisories on fish consumption	Continued impacts to water quality through siltation and contamination due to agricultural production; advisories on fish consumption	Continued impacts to water quality through siltation and contamination due to agricultural production; advisories on fish consumption	Continued impacts to water quality through siltation and contamination due to agricultural production; advisories on fish consumption
Socioeconomic	Continue to have modest positive socioeconomic impacts on surrounding communities and counties from spending, incomes, taxes, cooperative farming, and visitation/tourism, as well as assistance to local farmers for habitat restoration	Increased benefits to local economy due to added staff living in communities, greater wildlife diversity and public use opportunities and associated increase in Complex visitation, as well as new visitor services programs and facilities	Continue to have modest positive socio-economic impacts on surrounding communities and counties from spending, incomes, taxes, cooperative farming, and visitation/ tourism, as well as assistance to local farmers for habitat restoration	Increased benefits to local economy due to added staff living in communities, greater wildlife diversity and public use opportunities and associated increase in Complex visitation, as well as new visitor services programs and facilities

V. Consultation and Coordination with the Public and Others

The North Mississippi National Wildlife Refuge Complex Comprehensive Conservation Plan and Environmental Assessment has been written with the participation and assistance of Service staff, Mangi Environmental Group, Complex users and the local community. The CCP planning process began in September 2003 with the formation of a Complex planning team. Earlier in 2002, in preparation for the CCP planning process, a team of biologists and public use specialists from the state, non-profit conservation organizations, other federal agencies, and universities conducted a comprehensive biological review and a public use review for the Complex. Their recommendations provided valuable information for the authors of this plan. Subsequently, the Complex hosted two public scoping meetings and began an outreach campaign through various media to collect ideas and concerns from all stakeholders. Please see Chapter III of the CCP for more information on the public scoping process.

SECTION C. APPENDICES

APPENDIX A: LIST OF PREPARERS

North Mississippi National Wildlife Refuge Complex Comprehensive Conservation Plan

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APPENDIX B: GLOSSARY

<i>Alternative</i>	A set of objectives and strategies needed to achieve refuge goals and the desired future condition.
<i>Biological Diversity</i>	The variety of life forms and its processes, including the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur.
<i>Compatible Use</i>	an allowed use that will not materially interfere with, or detract from, the purposes for which the unit was established (Service Manual 602 FW 1.4).
<i>Compatibility Determination</i>	A compatibility determination is required for a wildlife-dependant recreational use or any other public use of a refuge. A compatible use is one which, in the sound professional judgement of the Refuge Manager, will not materially interfere with or detract from fulfillment of the Refuge System Mission or refuge purpose(s).
<i>Comprehensive Conservation Plan</i>	A document that describes the desired future conditions of the refuge, and specifies management actions to achieve (CCP) refuge goals and the mission of the National Wildlife Refuge System.
<i>Community</i>	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.
<i>Ecosystem</i>	A dynamic and interrelated complex of plant and animal communities and their associated non-living environment.
<i>Ecosystem Approach</i>	A strategy or plan to protect and restore the natural function, structure, and species composition of an ecosystem, recognizing that all components are interrelated.
<i>Ecosystem Management</i>	Management of an ecosystem that includes all ecological, social and economic components that make up the whole of the system.
<i>Ecotone</i>	Edge or transition zone between two or more adjacent but different plant communities, ecosystems, or biomes.
<i>Endangered Species (Federal)</i>	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 <i>Federal Register</i> .

Endangered Species (State)	Any animal species imperiled in the state because of rarity or because of some factor(s) making it vulnerable to extirpation.
<i>Environmental Assessment (EA)</i>	A systematic analysis to determine if proposed actions would result in a significant effect on the quality of the environment.
<i>Extirpation</i>	The localized extinction of a species that is no longer found in a locality or country, but still exists elsewhere in the world.
<i>Goals</i>	Descriptive statements of desired future conditions.
<i>Issue</i>	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.
<i>National Wildlife Refuge System</i>	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.
<i>Non-consumptive, Wildlife-oriented Recreation</i>	Photographing or observing plants, fish and other wildlife.
<i>Objectives</i>	Actions to be accomplished to achieve a desired outcome or goal. Objectives are more specific, and generally more measurable, than goals.
<i>Preferred</i>	The Service's selected alternative identified in the Draft <i>Alternative Comprehensive Conservation Plan</i> .
<i>Scoping</i>	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 individuals.
<i>Species</i>	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.
<i>Strategies</i>	A general approach or specific actions to achieve objectives.

<i>Wildlife-dependent Recreational Use</i>	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.
<i>Threatened Species (Federal)</i>	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 <i>Federal Register</i> .
<i>Vegetation</i>	Plants in general, or the sum total of the plant life in an area.
<i>Vegetation Type</i>	A category of land based on potential or existing dominant plant species of a particular area.
<i>Visitor Center</i>	A permanently staffed building offering exhibits and interpretive information to the visiting public. Some visitor centers are co-located with refuge offices, other include additional facilities such as classrooms or wildlife viewing areas.
<i>Visitor Contact Station</i>	Compared to a visitor center, a contact station is a smaller facility which may not be permanently staffed.
<i>Watershed</i>	The entire land area that collects and drains water into a stream or stream system.
<i>Wetland</i>	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.
<i>Wildlife Diversity</i>	A measure of the number of wildlife species in an area and their relative abundance.

APPENDIX C: PRIORITY COMPLEX OPERATIONAL AND MAINTENANCE NEEDS

**Refuge Operating Needs System (RONS)
Tier 1 Project Description List**

Priority	Project Number	\$000	Refuge	Project Description
10	96014	123	Dahomey NWR, MS	Provide for a full-time law enforcement officer at Dahomey refuge, the largest remaining tract of bottomland hardwoods in the northern Mississippi Delta. A full-time law enforcement officer is not stationed at Dahomey to protect visitors or wildlife and their habitats on this refuge with a large hunting program and a growing "non-consumptive" constituency. Being located near Delta State University, the refuge gets extensive use by researchers, students, and school groups. This project will permit a law enforcement presence and also facilitate data collection during the long and varied hunting seasons, helping to make better informed habitat and public use management decisions. Project benefits will include a decrease in poaching and theft, and higher degree of public safety and enjoyment on the refuge.
12	00033	108	North Mississippi Refuges, MS	North Mississippi National Wildlife Refuge Complex administers three NWRs and numerous FmHA land that encompass approximately 32,000 acres in northwest Mississippi. Approximately 12,000 acres of this land consist of mature bottomland hardwood forest habitat. About 13,000 acres consist of lands that have either been recently reforested or will be reforested in the next 2-3 years. None of the mature forest lands have been completely inventoried and the overall conditions (e.g., health, diversity, age class structure, and amount of regeneration) of them have not been documented or evaluated. A monitoring program will be implemented for all areas that have been recently reforested in order to evaluate their general conditions over time. Information gained will then be used to implement appropriate management practices within all forested areas for the enhancement of wildlife resources.

Priority	Project Number	\$000	Refuge	Project Description
27	00013	125	Coldwater River NWR, MS	Provide for a maintenance worker at Coldwater River NWR, so existing facilities and resources can be managed and maintained. Coldwater River NWR contains moist soil units, service-owned roads, cooperative farmed lands, and bridges. A maintenance worker is needed to maintain service-owned roads, facilities and equipment for the benefit of visitor and employee health and safety, and to conduct critical habitat management efforts.
36	00012	152	Coldwater River NWR, MS	Provide a GS-12 Refuge Manager at Coldwater River NWR. This is a new refuge and a Refuge Manager meets staffing requirements. A Refuge Manager is needed to provide for adequate administration of all the refuge functions and operations. This project would provide for adequate administration of this refuge and fulfill public use needs that are currently not being met.
109	98002	125	Dahomey NWR, MS	Provide for a maintenance worker at Dahomey refuge, so existing facilities and resources can be managed and maintained. This refuge does not have any maintenance personnel to maintain existing facilities, equipment, and other resources. Therefore, necessary habitat management and maintenance activities are not being implemented, and investments in facilities and habitat management projects are being lost. Dahomey refuge, the largest remaining tract of bottomland hardwoods in the northern Mississippi Delta region, contains moist soil units, "greentree" reservoirs, service-owned roads, cooperatively farmed lands, visitor information stations, heavy and light duty equipment, and a headquarters facility. This project will provide for a maintenance worker, so essential management and maintenance activities can be implemented and refuge-owned roads can be maintained in a manner that is safe for public use.

Priority	Project Number	\$000	Refuge	Project Description
110	96015	123	Tallahatchie NWR, MS	The 4,000 acre Tallahatchie refuge is experiencing poaching and theft year-round. This project will provide a full-time law enforcement officer, a need that remains unmet, to better ensure visitor safety and to better protect refuge wildlife and their habitats. An estimated 65,000 migratory waterfowl are documented annually on this refuge that issues 1,600 public use permits each year. Myriad other wildlife, from deer and turkey to otter and bobcat use this new refuge that is undergoing extensive forest restoration. Resource protection and public safety are suffering without a strong law enforcement presence.
219	96002	157	Dahomey NWR, MS	Create moist soil units on Dahomey refuge for the primary benefit of resident and migratory water birds, restoring 1,000 acres of wetland habitat. This project will also provide for the establishment of "greentree" reservoirs within existing forest habitat. Channelization and drainage activities implemented prior to refuge ownership have changed natural water patterns in these wetland areas. Project will include the installation of needed water control structures and other water management features to return the area to more natural conditions, benefiting not only water birds, but numerous wetland-associated wildlife species. Located in the ecologically and culturally unique Mississippi Delta, Dahomey refuge is the largest remaining tract of bottomland hardwoods in the northern Delta.
220	00028	118	Tallahatchie NWR, MS	Project will provide for an secretary/clerk on Tallahatchie refuge, a station without any on-site administrative support. This position is necessary to provide essential administrative assistance for permit sales, clerical functions, and basic visitor services that are critical for effective refuge operations. The refuge issues 1,600 hunting permits annually, and without a secretary, the administrative requirements necessary for effective operations of the refuge cannot be met unless the refuge manager refocuses her/his energies. This diminishes the effectiveness of habitat management and other public use management programs. Public needs are presently not being fulfilled due to the lack of necessary administrative support.

Priority	Project Number	\$000	Refuge	Project Description
221	97001	139	North Mississippi Refuges, MS	Initiate comprehensive conservation planning for the entire North Mississippi National Wildlife Refuge Complex by providing for a wildlife biologist who will lead the development of, and help implement, an effective management direction for three National Wildlife Refuges and more than 100 Farmer's Home Administration lands that total over 30,000 acres. The entire refuge complex does not and has not ever had a biologist to lead inventorying, monitoring, or research or help with long-range planning to most effectively realize potential benefits for wildlife and the visiting public.
320	98028	118	Dahomey NWR, MS	Project will provide for a secretary/clerk on Dahomey refuge, a station without any on-site administrative support. This position is necessary to provide essential administrative assistance for permit sales, clerical functions, and basic visitor services that are critical for effective refuge operations. The refuge sells approximately 1,000 hunting permits annually, and without a secretary, the administrative requirements necessary for effective operations of the refuge cannot be met unless the refuge manager refocuses her/his energies. This diminishes the effectiveness of habitat management and other public use management programs. Public needs are presently not being fulfilled due to the lack of necessary administrative support.
321	96011	125	Tallahatchie NWR, MS	Tallahatchie refuge, boasting active public hunting and forest restoration programs, does not have a maintenance worker to properly maintain public facilities or help effectively manage refuge habitats to benefit a host of wildlife species. This project will provide a maintenance worker at this unstaffed refuge. Maintenance of existing roads and facilities is necessary to meet public expectations for a safe, enjoyable refuge visit.

Priority	Project Number	\$000	Refuge	Project Description
322	96010	110	North Mississippi Refuges, MS	Provide a full-time secretary/clerk to meet the requirements of the refuge fee program, contracting requirements, and other budget and administration duties/policies. Due to the large volume of work at this three-refuge, 17,000-acre, 100+ tract complex, a second administrative person is needed to meet minimum Service compliance and enable effective operation of purchasing, budget tracking, property management, filing/typing, public inquiry response, and personnel actions. We cannot presently provide the quality and quantity of services expected by the public for the many refuge programs.
403	96001	139	Dahomey NWR, MS	A newer National Wildlife Refuge that was never provided startup funding or staffing, Dahomey refuge is the largest remaining tract of bottomland hardwoods in the northern Mississippi Delta. This project will provide for a biologist to obtain and evaluate critical habitat and wildlife surveys. This refuge does not have a biologist, and biological information necessary to help make the most informed management decisions is not being obtained. Partnership potential to conduct inventorying and monitoring is great, with the refuge receiving extensive use by researchers, students, and school groups and being located near Delta State University.
404	98001	97	Tallahatchie NWR, MS	Provide a biological technician to monitor habitats and habitat restoration activities on Tallahatchie, a newer National Wildlife Refuge that was never provided startup funding or staffing. This unstaffed refuge is a research site for the Mississippi Forestry Division and a "mitigation bank" for the Mississippi Department of Transportation. Tallahatchie could serve as an outstanding example of bottomland hardwood forest restoration, yet does not have biological staff to obtain, interpret, and share critical habitat and wildlife survey data. Without any biological staff, information necessary to help make the most informed management decisions is not being obtained.

Priority	Project Number	\$000	Refuge	Project Description
405	96008	72	North Mississippi Refuges, MS	Provide a public outreach specialist to create a quality public outreach program for the three-refuge, 17,000-acre, 100+ tract North Mississippi National Wildlife Refuge Complex, some of the largest tracts of remaining bottomland hardwood forest left in the ecologically and culturally unique Mississippi Delta region. Currently the refuge complex does not have any outreach personnel or the necessary staff to establish close partnerships with many potential community support groups, school groups, and other wildlife-oriented organizations who can provide tremendous volunteer assistance and issues advocacy support. This position will also lead all efforts related to exhibits, news releases, festivals, newsletter, brochures, and public inquiries.
491	96004	107	Dahomey NWR, MS	Provide an assistant refuge manager to oversee field operations and help direct overall management programs at Dahomey refuge. Because the refuge is understaffed, there is a 1,000 acre cooperative farming program that does not receive adequate supervision to properly maximize the program's great potential benefit to wildlife. This project would provided the needed staff to also assist with other refuge activities such as public hunting, outreach, education, and the forthcoming, extensive Comprehensive Conservation Planning process.
492	96005	139	Dahomey NWR, MS	Provide a forester to more effectively manage the largest tract of bottomland hardwood forest in the northern Mississippi Delta, Dahomey refuge. Important to a wide variety of wildlife species, the refuge has tremendous potential for forest restoration through the planting of trees, appropriate thinning of the existing stand, and the proper management of water levels. However, there are only a refuge manager and a biological science technician stationed at this 9,600 acre refuge, and many parts of the forests are dying due to lack of care. This project will enable forest resources of this refuge to be more properly managed to their fullest potential to provide the fish and wildlife values and recreational benefits expected by the public.

Priority	Project Number	\$000	Refuge	Project Description
493	96007	152	Dahomey NWR, MS	Provide a refuge manager at Dahomey refuge to ensure effective habitat management and provide appropriate wildlife-oriented recreation expected by the public. This 10,000 acre refuge, the largest tract of bottomland hardwood forest in the northern Mississippi Delta, was established in 1992 and has only recently been staffed by a refuge operations specialist and biological technician. A refuge manager on this popular refuge is needed to provide for adequate leadership and administration of all the required management programs, including the care of 40 outlying properties in addition to the core 10,000 acre refuge. Being located near Delta State University and having a strong constituency of area residents, potential refuge improvement projects abound, but are not being met due to lack of attention.
494	96013	139	Tallahatchie NWR, MS	Provide a wildlife biologist to conduct critical wildlife surveys and manage habitat development projects on Tallahatchie refuge. The refuge, Mississippi Department of Transportation, and private partners such as Ducks Unlimited have invested hundreds of thousands of dollars in facilities and habitat improvement. This unstaffed refuge is a research site for the Mississippi Forestry Division and a "mitigation bank," having thousands of acres either reforested or planned for reforestation. However, this newer refuge was never initially staff nor funded. This project will enable important restoration work to be continued and critical habitat and wildlife surveys to be conducted.
495	96012	139	Tallahatchie NWR, MS	Provide a refuge operations specialist/assistant refuge manager to manage existing refuge farm lands for the continuing benefit of wintering migratory waterfowl and other wildlife species. Approximately 65,000 ducks and geese utilize the refuge annually on 3,000 acres that are presently being farmed through private partners. However, do to lack of staffing at this unstaffed refuge, the farmers are not adequately supervised to ensure maximum program benefit and policy compliance. This position will also ensure more effective operations of other habitat management programs, as well as maintenance and public use programs.

Priority	Project Number	\$000	Refuge	Project Description
496	98026	152	Tallahatchie NWR, MS	<p>Tallahatchie refuge, which encompasses 8,000 acres and boasts progressive partnerships with the Mississippi Division of Forestry, MS Department of Transportation, and private partners in a large forest restoration program, contains numerous roads, levees, water control structures, and wetland impoundments. The refuge also has a large contingent of hunters, fishers, and other outdoor enthusiasts who regularly visit the area. Despite all of this, this newer refuge has never been staffed. Maintenance, public use coordination, habitat management, and other management activities that are essential for effective refuge operations are not being adequately implemented, due primarily to lack of staffing. This project will provide for a refuge manager to lead, coordinate, and enhance the overall effectiveness of refuge management programs.</p>

Refuge Operating Needs System

Project Number	Org Code	Station	Project Title	Cost Estimate (Thousands)	Station Rank	Region Rank
<u>98010</u>	43635	Dahomey NWR	Acquire a transport truck and trailer for hauling heavy equipment at Dahomey NWR	\$190K	11	999
<u>98018</u>	43635	Dahomey NWR	Acquire a low-boy transport for transporting heavy equipment at Dahomey NWR	\$150K	12	999
<u>98008</u>	43635	Dahomey NWR	Acquire excavator trackhoe for the management and maintenance of wetland habitats on Dahomey NWR	\$150K	13	999
<u>98006</u>	43635	Dahomey NWR	Acquire a large bulldozer for the management and maintenance of wetland impoundments at Dahomey NWR	\$160K	14	999
<u>98011</u>	43635	Dahomey NWR	Acquire a backhoe for wetland enhancement and development	\$90K	015	999
<u>98004</u>	43635	Dahomey NWR	Acquire a road grader for the maintenance of Service roads at Dahomey NWR	\$150K	17	999
<u>98020</u>	43635	Dahomey NWR	High pressure wash facility	\$30K	18	999
<u>98003</u>	43635	Dahomey NWR	Acquire two ATV's for Dahomey NWR	\$20K	19	999
<u>98013</u>	43635	Dahomey NWR	Acquire fuel storage tanks for Dahomey NWR	\$50K	20	999
<u>00035</u>	43675	North Mississippi Refuges	Establishment of an environmental education program for North Mississippi National Wildlife Refuge Complex	\$35K	1	54
<u>98023</u>	43675	North Mississippi Refuges	Conduct aerial waterfowl surveys.	\$25K	2	166
<u>98025</u>	43675	North Mississippi Refuges	Improve bottomland hardwood management capabilities.	\$140K	3	999
<u>98030</u>	43675	North Mississippi Refuges	Improve transportation capabilities of fire dozer and plow.	\$150K	4	999
<u>96003</u>	43675	North Mississippi Refuges	Provide a forestry technician to implement bottomland hardwood forest restoration.	\$124K	5	999

Project Number	Org Code	Station	Project Title	Cost Estimate (Thousands)	Station Rank	Region Rank
<u>96009</u>	43675	North Mississippi Refuges	Improve wildfire suppression capabilities.	\$50K	6	999
<u>98027</u>	43675	North Mississippi Refuges	Improve wetland management and road maintenance capabilities.	\$20K	8	999
<u>02001</u>	43675	North Mississippi Refuges	Improve Safety, Environmental Compliance, and Asset Management (Assistant Manager - Facilities)	\$134K	999	118
<u>98024</u>	43645	Tallahatchie NWR	Provide a bush-hog mower to facilitate mission critical activities of refuge management and public use.	\$20K	2	204
<u>00034</u>	43645	Tallahatchie NWR	Provide a two-ton truck and transport needed to transport equipment to sites occurring on and off refuge.	\$150K	3	999
<u>98019</u>	43645	Tallahatchie NWR	Provide an excavator for Tallahatchie NWR for wetland management purposes.	\$150K	4	999
<u>98017</u>	43645	Tallahatchie NWR	Provide Tallahatchie NWR with a D4 bull dozer.	\$95K	5	999
<u>98016</u>	43645	Tallahatchie NWR	Provide a bulldozer, essential for achievement of mission critical goals on 8000 refuge acres.	\$150K	7	999
<u>98022</u>	43645	Tallahatchie NWR	Provide enough ATVs to fulfill mission critical duties at Tallahatchie NWR	\$25K	8	999
<u>00030</u>	43645	Tallahatchie NWR	Create moist soil units at Tallahatchie NWR for the benefit of resident and migratory water birds.	\$150K	9	999

APPENDIX D: COMPATIBILITY DETERMINATIONS

Introduction

The Fish and Wildlife Service reviewed several uses for compatibility during the comprehensive conservation planning process for the North Mississippi National Wildlife Refuge Complex. Descriptions and anticipated impacts of each of these uses are addressed separately by refuge. The Refuge Name through the National Wildlife Refuge System Mission sections, as well as the Approval of Compatibility Determination section, apply to each described use, however, for brevity, are only listed once for each refuge. If one of these uses is considered outside of the Comprehensive Conservation Plan for the North Mississippi National Wildlife Refuge Complex, then those sections become part of that compatibility determination.

Refuge Name: Coldwater River National Wildlife Refuge

Uses: Several uses were evaluated to determine their compatibility with the Refuge System and mission and purposes of the refuge: 1) environmental education and interpretation; 2) recreational fishing; 3) hunting; 4) off-road vehicles; 5) resource research studies; and 6) wildlife observation and photography.

Location: Tallahatchie and Quitman Counties, Mississippi

Establishing and Acquisition Authority: Fish and Wildlife Act of 1956

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

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: *Environmental Education and Interpretation*

Environmental education and interpretation would consist primarily of teacher workshops, visitor education, teaching students, and interpretation.

Those activities seek to increase the public's knowledge and understanding of wildlife and contribute to the conservation of such wildlife. Activities would include traditional environmental education such as teacher or staff-led on-site field trips, off-site programs in classrooms, nature study such as teacher and student workshops, and interpretation of wildlife resources on the refuge.

Environmental education and interpretation have been identified in the National Wildlife Refuge System Improvement Act of 1997 as priority public uses provided they are compatible with the purpose for which the refuge was established.

Environmental education and interpretation could occur in the core area of Coldwater River NWR, an area of approximately 2,000 contiguous acres located approximately 4 miles south of Crowder, Mississippi; the "Warwick Tract," an approximately 300-acre tract bordering the Corps levee on the south beginning approximately ¼ miles south of the Paducah Wells Road and continuing south for approximately 2 miles to the County bridge across Black Bayou; and the "Schiele Tract," a 40-acre tract approximately 3 miles south of Crowder boarding the east side of the county line road.

These are year-round activities, conducted on an as requested basis. Although the activities do not require special use permits, they are most often closely coordinated with the refuge manager.

The refuge will serve as an outdoor classroom for a variety of audiences with an interest in wildlife conservation and management. Typically, teachers, students, and other groups will learn from hands-on demonstrations, projects, and activities delivered by refuge staff. Activities will be conducted on-site utilizing existing refuge facilities. Group size will typically be limited to ensure effective presentation of desired materials which may be specifically tailored to meet the educational needs of the group.

Environmental education and interpretation are utilized to encourage understanding in citizens of all ages to develop land ethics, foster public support, increase visibility, and improve the image of the Service.

Availability of Resources: Funding for these activities is borne by annual operation and maintenance funds which support activities involving the public such as outdoor recreation, wildlife photography, and refuge hunting and fishing programs. The cost of operating and maintaining the present environmental education and interpretation program would be approximately \$6,000 annually within the annual North Mississippi National Wildlife Refuge Complex budget of approximately \$750,000. Therefore, the program is in compliance with specific funding requirements of the Refuge Recreation Act.

Special equipment, facilities, or improvements necessary to support the use: \$1,000

Maintenance costs: \$4,000

Monitoring costs: \$1,000

Offsetting revenues: None

Anticipated Impacts of the Use:

Short-term impacts:

The use of on-site, hands-on, action-oriented activities by groups of teachers/students to accomplish environmental education objectives may impose a low level impact on those sites used for these activities. Impacts may include trampling of vegetation and temporary disturbance to wildlife species in the immediate vicinity during the activities. Since most activities would take place on existing roads, trails and at other facilities, impacts would be minimal.

Long-term impacts:

Current utilization of these uses is incidental to overall refuge programs and no long-term adverse impacts have been experienced. Long-term beneficial impacts include the furthering of the refuge mission through the education of the general public.

Cumulative impacts:

No adverse cumulative impacts are anticipated.

Public Review and Comment: The period of public review and comment began September 9, 2004 and ended October 21, 2004. The following methods were used to solicit public review and comment:

- Posted notice at refuge headquarters
- Public notice in newspapers with wide local distribution
- Public meeting(s)

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

Determination (check one below):

Compatible with the following stipulations

Not Compatible

Stipulations Necessary to Ensure Compatibility: On-site activities should be held where minimal impact would occur. Evaluations of sites and programs should be conducted periodically to assess if objectives are being met and that the natural resources are not being degraded. If evidence of unacceptable adverse impacts begins to appear, it may be necessary to change the location of the outdoor activities.

Justification: Environmental education and interpretation are used to encourage understanding in citizens of all ages in order to act responsibly in protecting a healthy ecosystem. They are tools to use in building land ethic, developing political support, and decreasing wildlife violations. They constitute one method of increasing visibility in the community and improving the image of the Service.

Environmental education at the refuge is incidental to other programs since there is no full-time staff to conduct these activities. However, the program is important and provides visitors with an awareness of refuge-specific issues such as wetland ecology, migratory bird management, and issues relating to the entire Refuge System. Environmental education and interpretation activities are expected to increase while ensuring compatibility with the purpose for which the refuge was established.

At the present time, however, public entry to include visitors involved in environmental education and interpretation is not permitted on the core area of Coldwater River NWR, or on the Schiele Tract, except by special use permit. Environmental education and interpretation are permitted on the Warwick Tract.

The core area of the refuge is intensively managed for migratory waterfowl, shorebirds, and wading birds. Management efforts are successful with large numbers of migratory waterfowl using the refuge from October to March. Extensive shorebird use of the refuge occurs in March and April and again from July through October. Large numbers of wading birds use the refuge for foraging and roosting beginning in May and lasting through September. Experience has shown that birds using the refuge are very susceptible to disturbance.

The core area of the refuge and the Warwick Tract experience extensive flooding annually from January through April or May. The only improved road on the core area of the refuge extends for 1 ½ miles and is normally under water and impassable from January to May. Periods of intensive rainfall frequently result in this road becoming impassable numerous times during the June to December timeframe. Except for this 1 ½ mile road, there are no additional roads, either improved or unimproved, on the core area of the refuge. Due to the flooding regime and prohibitive construction costs, no additional roads are envisioned. There are no roads, either improved or unimproved, on the Warwick or Schiele Tracts.

Depending on flooding conditions, groups interested in environmental education and interpretation activities can view the refuge from the public roads along the north side of the Warwick Tract, the west side of the Schiele Tract, and along both the east and west sides of the core area. The public road along the east side of the core area, and along the north side of the Warwick Tract, offers excellent viewing opportunities.

Areas which are closed to all public entry are clearly marked with appropriate signs.

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

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

Mandatory 10- or 15-Year Re-evaluation Date: _____

Description of Use: *Recreational Fishing*

Fishing was a traditional recreational use of Coldwater River NWR prior to its inclusion in the National Wildlife Refuge System and continues to be a recreational pursuit with the public. The refuge provides additional public fishing opportunities in an area that is lacking sufficient amounts of fishing open to the public. Fish populations currently support a sustainable harvest under a regulated fishing program.

Fishing, a wildlife-dependent recreational pursuit, has been identified in the National Wildlife Refuge System Improvement Act of 1997 as a priority public use provided it is compatible with the purpose for which the refuge was established.

Fishing is permitted in the borrow pits at the foot of the Army Corps of Engineers' Panola Quitman Floodway Levee beginning at the southeast corner of the refuge and continuing north along the Corps levee for approximate ¾ mile. Fishing is also permitted on the Warwick Tract of Coldwater River NWR. The area open to fishing on the Warwick Tract consists of the borrow pits at the foot of the Corps levee beginning approximately ¼-mile south of Paducah Wells Road and continuing south for approximately 2 miles to the county bridge across Black Bayou.

The use is conducted year-round from sunrise to sunset. Fishing is conducted subject to regulations established by the Mississippi Department of Wildlife, Fisheries, and Parks. Fishing is further restricted on the refuge by regulations which prohibit commercial fishing on the refuge, prohibit the use of certain fishing methods, and prohibit access after dark. The purchase of an annual hunting and fishing permit is required to fish on the refuge.

This use is being proposed to provide fishable waters to the public in an area where public fishing opportunities are limited and to utilize a sustainable natural resource.

Availability of Resources: Funding for the fishing program is borne by annual operation and maintenance funds which support activities involving the public such as recreation, interpretation, environmental education, and refuge hunting and fishing programs. The North Mississippi National Wildlife Refuge Complex spends approximately \$8,000 of a budget of approximately \$750,000 in direct support of the fishing program on the refuge. Therefore, the program is in compliance with specific funding requirements of the Refuge Recreation Act.

Special equipment, facilities, or improvements necessary to support the use: None

Maintenance costs: \$5,000

Monitoring costs: \$3,000

Offsetting revenues: \$200

Anticipated Impacts of the Use:

Short-term impacts:

Minor impacts such as litter and gasoline contamination could occur but not at a level that would cause great concern.

Long-term impacts:

Since the number of persons fishing on the refuge is small and the activity occurs primarily during high-water periods in the spring, no long-term impacts are expected.

Cumulative impacts:

No cumulative impacts are known to occur.

Public Review and Comment: The period of public review and comment began September 9, 2004 and ended October 21, 2004. The following methods were used to solicit public review and comment:

- Posted notice at refuge headquarters
- Public notice in newspapers with wide local distribution
- Public meeting(s)

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

Determination (check one below):

- Compatible with the following stipulations
- Not Compatible

Stipulations Necessary to Ensure Compatibility: Commercial fishing and possession or use of jugs, seines, nets, hand-grab baskets, or any other similar devices are prohibited. Persons are prohibited from accessing the refuge after dark.

Justification: While the number of participants is limited, fishing has been an important activity of the refuge resulting in only very temporary disturbance to refuge habitats and wildlife populations, and has caused no noticeable impact on the abundance of species sought or other wildlife affected by angler disturbance. Current regulations limit the impacts to trust species and provide a safe and rewarding experience for the refuge visitor.

The areas of Coldwater River NWR closed to all public entry are clearly marked with appropriate signs.

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

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

Mandatory 10- or 15-Year Re-evaluation Date: _____

Description of Use: *Hunting*

Hunting consists of small game, large game, and migratory game birds. Hunting activities are permitted with a valid refuge hunt permit and appropriate state licenses.

The refuge hunt program is an excellent wildlife management and public relations tool which provides quality recreational opportunities for the public while regulating specific animal populations at desired levels. The refuge hunt plan was developed to ensure that associated public recreation and wildlife management objectives are met in a responsible and consistent manner.

Hunting, a wildlife-dependent recreational pursuit, has been identified in the National Wildlife Refuge System Improvement Act of 1997 as a priority public use provided it is compatible with the purpose for which the refuge was established.

Hunting could occur in the core area of Coldwater River NWR, an area of approximately 2,000 contiguous acres located approximately 4 miles south of Crowder, Mississippi; the "Warwick Tract," an approximately 300-acre area bordering the Corps levee on the south beginning approximately ¼-mile south of the Paducah Wells Road and continuing south for approximately 2 miles to the County bridge across Black Bayou; and the "Schiele Tract," a 40-acre tract approximately 3 miles south of Crowder bordering the east side of the county line road.

All hunting seasons are established annually through coordination with the Mississippi Department of Wildlife, Fisheries, and Parks.

- A. Squirrel season and bag limits coincide with State season and regulations except that the season is closed during the general gun deer hunts.
- B. Raccoon season dates are January 1 to February 28. Bag limits per State regulations.
- C. Rabbit season dates and bag limits coincide with State season and regulations except that the season is closed during general gun deer hunts.
- D. Quail season dates and bag limits coincide with State season and regulations except that the season is closed during general gun deer hunts.
- E. Deer season dates and bag limits for archery and primitive weapons coincide with State seasons and regulations. The general gun deer hunt is 5 days in mid-December. State bag limits and regulations apply.

- F. Migratory game bird hunting (ducks, mergansers, coots, and geese) is allowed during specified State season on Wednesdays, Saturdays, and Sundays, 30 minutes before sunrise until noon. After duck, merganser, and coot season closes, light geese may be hunted daily during the period and time defined in the Conservation Order.
- G. Turkey season is normally held during the entire month of April with bag limits that coincide with State regulations.
- H. Season dates and bag limits for youth hunts for squirrel, deer with general gun, and turkey are set within State seasons and regulations.
- I. Feral hogs can be taken with no bag limit during any open refuge season with weapons legal for that hunt.

Public hunting opportunities in the northwest delta portion of the Yazoo Basin are limited with Service-managed refuges and State-managed wildlife management areas representing virtually all the public lands open to hunting. Private lands offer hunting opportunities only to those willing and able to purchase hunting rights through long-term leases or private ownership. The demand for public hunting areas in this portion of Mississippi is increasing as the area shifts toward a more urbanized society, and refuges are expected to meet an increasing part of this demand.

Availability of Resources: Funding for the hunting program is borne by annual operation and maintenance funds, which supports activities involving the public such as fishing, photography, environmental education and interpretation, and wildlife observation. The cost of operating and maintaining the present small game, big game, turkey, and migratory waterfowl seasons would be approximately \$15,000 annually within the annual North Mississippi National Wildlife Refuge Complex budget of approximately \$750,000. Therefore, the program is in compliance with specific funding requirements of the Refuge Recreation Act.

Special equipment, facilities, or improvements necessary to support the use: \$5,000

Administration costs: \$4,000

Law enforcement costs: \$3,500

Outreach, education, and monitoring costs: \$1,500

Signs, brochures, and maintenance costs: \$1,000

Offsetting revenues: \$250

The refuge is a participant in the Recreational Fee Demonstration Project which currently returns 80 percent of fees generated from recreational activities back to the refuge. The offsetting revenues are from the sale of hunting and fishing permits.

Anticipated Impacts of the Use:

Short-term impacts:

National wildlife refuges administered by the North Mississippi National Wildlife Refuge Complex have been open to hunting since 1992, with no documented disturbance to refuge habitats and no noticeable impact on the abundance of species hunted or other associated wildlife. While managed hunting opportunities may result in localized disruption of individual animals' daily routines, no noticeable effect on populations has been noticed or documented. Restrictions within the hunting program, notably the closure of small game hunting during the general gun deer hunt, the requirement that all hunters, except those hunting turkey or waterfowl, wear fluorescent orange-colored material above the waistline, and the prohibition of hunting or shooting across any open field from ground level have been implemented due to safety concerns. These restrictions will be closely monitored for effectiveness.

Long-term impacts:

To date, there is no indication of adverse biological impacts associated with the Complex's hunting program. Should, however, it become necessary, the refuge has the latitude to adjust hunting seasons and bag limits annually, or even close the refuge entirely if safety or other concerns merit such actions. This latitude, coupled with monitoring of wildlife populations and habitat conditions by the Service and the State Department of Wildlife, Fisheries, and Parks, will ensure that long-term negative impacts to either wildlife populations and/or habitats on the refuge are unlikely.

Should hunting pressure increase on the refuge, alternatives such as quota hunts, a reduction in the number of days of hunting, or restrictions on that part of the refuge open to hunting can be utilized to limit impacts.

Cumulative impacts:

The timing and duration of the refuge's hunting program does not coincide 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 September 9, 2004 and ended October 21, 2004. The following methods were used to solicit public review and comment:

- Posted notice at refuge headquarters
- Public notice in newspapers with wide local distribution
- Public meeting(s)

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

Determination (check one below):

Compatible with the following stipulations

Not Compatible

Stipulations Necessary to Ensure Compatibility: At the present time, public entry to include hunters is not permitted on the core area of Coldwater River NWR or on the Schiele Tract. Migratory game bird hunting (ducks, mergansers, coots, and geese) is allowed on the Warwick tract during the specified State season on Wednesdays, Saturdays, and Sundays, 30 minutes before sunrise until noon. After duck, merganser, and coot season closes, light geese may be hunted daily during the period and time defined in the Conservation Order.

Hunting seasons and bag limits are established annually as agreed upon during the annual hunt coordination with State personnel. These generally fall within the State framework. The refuge can, and has, established more restrictive seasons and bag limits to prevent over-harvest of individual species or disturbance to trust species. All hunters are required to purchase and possess a refuge hunting permit while participating in refuge hunts. This permit, which augments the State hunting regulations, explains not only the general hunt regulations but the refuge-specific regulations, as well. Law enforcement patrols are frequently conducted throughout the hunting season to ensure compliance with refuge laws and regulations. The refuge has included a Refuge Operating Needs System (RONS) project for a fulltime officer to ensure compatibility long term.

Justification: The core area of the refuge is intensively managed for migratory waterfowl, shorebirds, and wading birds. Management efforts are successful with large numbers of migratory waterfowl using the refuge from October to March. Extensive shorebird use of the core area occurs in March and April and again from July through October. Large numbers of wading birds use the refuge for foraging and roosting beginning in May and lasting through September. Experience has shown that birds using the refuge are very susceptible to excessive disturbance.

From January to May, the core area of the refuge and the Warwick Tract experience extensive flooding on an annual basis. When flooding of these areas begins, resident wildlife congregate on small areas of high ground making them vulnerable to excessive harvest. Also, during periods of high water, the only access road to the core area floods, halting all vehicular traffic.

Since establishment of the core area of Coldwater River NWR, all the property surrounding the refuge for many miles in any direction has been acquired or leased for hunting migratory waterfowl. The core area thus represents the only "safe harbor" waterfowl habitat in a large geographical area. Without this "safe harbor" habitat, waterfowl in large numbers would not be present for extended periods of time in the general area of the refuge.

The Schiele Tract comprises 40 acres and with no way to regulate numbers, hunting on this small area would represent a safety issue.

The recently acquired Warwick Tract is a long and narrow ownership consisting primarily of a series of borrow pits on one side and the Panola Quitman Floodway on the other side. Flooding is frequent, oftentimes with long duration. Due to scouring associated with out-of-bank flooding and the associated sediment deposition, habitat improvements consisting of levees, water control structures, and moist-soil areas are not practicable. Natural habitat does exist--the degree and value dependent on the impact of the last flood event. An elevated and well traveled public road on top of the Corps levee borders the Warwick Tract.

Those areas of Coldwater River NWR closed to all public entry are clearly marked with appropriate signs.

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

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

Mandatory 10- or 15-Year Re-evaluation Date: _____

Description of Use: *Off-Road Vehicles*

The proposed use is to allow off-road vehicles (e.g., 4-wheel all-terrain) on refuge lands.

Off-road vehicle use is not a priority public use; however, it can occur on the refuge provided it is compatible with the purpose for which the refuge was established.

The general public could participate in the use of off-road vehicles year-round from sunrise to sunset on Coldwater River National Wildlife Refuge, an area of approximately 2,300 acres south of Crowder, Mississippi. Off-road vehicles may be used on unimproved dirt roads and fire breaks by visitors who possess a valid hunting and fishing permit, and who are gaining access to interior portions of the refuge for hunting and fishing opportunities.

The use of off-road vehicles is proposed in response to questions raised during the scoping process. These questions centered on opportunities to provide visitors who possess a valid hunting and fishing permit off-road vehicle access to internal areas of the refuge for the purpose of hunting and fishing.

Availability of Resources: Funding for this program would be borne by annual operation and maintenance funds which support activities involving the public such as interpretation, environmental education, wildlife photography, and refuge hunting and fishing programs. The North Mississippi National Wildlife Refuge Complex would spend approximately \$25,000 of an annual budget of approximately \$750,000 in direct support of this program on Coldwater River National Wildlife Refuge.

Special equipment, facilities, or improvements necessary to support the use: \$7,500

Maintenance costs: \$10,000

Law enforcement costs: \$5,000

Monitoring costs: \$2,500

Offsetting revenues: \$1,000

The refuge does not have the resources to administer this use. Currently, the North Mississippi National Wildlife Refuge Complex does not have law enforcement personnel to monitor this activity. The Complex has included a Refuge Operating Needs System (RONS) package for a full-time law enforcement officer for Coldwater River NWR. Additionally, this activity would require considerable operation and maintenance funds to maintain the existing unimproved dirt roads and firebreaks. It is expected that \$1,000 of offsetting revenues would be generated by the sale of hunting and fishing permits to visitors who would not use the refuge unless they could also use off-road vehicles while accessing hunting and fishing areas.

Anticipated Impacts of the Use:

Short-term impacts:

Adverse impacts to unimproved roads and fire breaks by the repeated use of off-road vehicles are well documented and disturbance to wildlife, plants, and their habitats would occur. Such use would be limited primarily to the hunting and fishing seasons which also coincide with extended periods of heavy rainfall. As use continues, the unimproved roads and firebreaks which would be used for access become wallowed out and rainfall accumulates in the "wet" areas. Repeated use exacerbates this condition. Conflicts would occur between those hunters and anglers who use off-road vehicles and those who object to the disturbance and noise associated with the vehicles.

Long-term impacts:

Long-term impacts from the repeated use of off-road vehicles by the public would be compounded over time. Unimproved roads and fire breaks would continue to deteriorate and annual maintenance costs would increase. Additional damage to plants and habitats would be experienced as access for the heavy equipment required to maintain these access routes is developed. Conflicts between hunters who use off-road vehicles and those who object to the associated disturbance and noise would continue. Repeated disturbance to feeding and resting migratory waterfowl, shorebirds, and wading birds would result in a reduction of birds using the refuge.

Cumulative impacts:

No cumulative impacts are expected because other forms of public use are not permitted on the core area of the refuge or on the Schiele Tract. Conflicts would continue to occur between those hunters and anglers who use off-road vehicles and those who object to the disturbance and noise associated with the vehicles.

Public Review and Comment: The period of public review and comment began September 9, 2004 and ended October 21, 2004. The following methods were used to solicit public review and comment:

- Posted notice at refuge headquarters
- Public notice in newspapers with wide local distribution
- Public meeting(s)

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

Determination (check one below):

Compatible with the following stipulations

Not Compatible

Stipulations Necessary to Ensure Compatibility: None

Justification: At the present time, public entry to include off-road vehicle users is not permitted on the core area of Coldwater River NWR, an area of approximately 2,000 contiguous acres approximately 4 miles south of Crowder, Mississippi, or on the Schiele Tract, a 40-acre tract approximately 3 miles south of Crowder bordering the east side of the county line road. Migratory game bird hunting is permitted on the Warwick Tract, an approximately 300-acre area bordering the Corps levee on the south beginning approximately ¼-mile south of the Paducah Wells Road and continuing south for approximately 2 miles to the county bridge across Black Bayou. Fishing is also permitted in the borrow pits at the foot of the Corps of Engineers Panola Quitman Floodway Levee on the core area of the refuge and on the Warwick Tract. Access for fishing and migratory bird hunting is only available by use of the Army Corps of Engineers levee.

The core area of the refuge is intensively managed for migratory waterfowl, shorebirds, and wading birds. Management efforts are successful with large numbers of migratory waterfowl using the refuge from October to March. Extensive shorebird use of the core area occurs in March and April and again from July through October. Large numbers of wading birds use the refuge for foraging and roosting beginning in May and lasting through September. Experience has shown that birds using the refuge are very susceptible to disturbance.

From January to May, the core area of the refuge and the Warwick Track experience extensive flooding on an annual basis. These floodwaters inundate existing unimproved dirt roads and fire breaks on the core area and have prevented conversion of these unimproved roads to all-weather roads.

Due to the costs and the disturbance to migratory waterfowl, shorebirds, and wading birds, the Service does not anticipate construction of all-weather roads on the core area or permitting public access on the core area.

The previous owner of the Warwick Tract extensively developed the property for waterfowl hunting. A series of levees were constructed perpendicular to the Corps Levee and a levee was constructed along the top bank of the Panola Quitman Floodway. Off-road vehicle access was possible on these levees. However, out of bank flooding during the succeeding 2 years destroyed the levees on the tract. Currently, off-road vehicle access to the Warwick Tract is not possible and the Service has no plans to restore and maintain levees for this purpose.

The Schiele Tract is closed to public entry due to size and the lack of access. The Service has reforested the tract and does not anticipate construction of access roads. Use of off-road vehicles would result in extensive damage to the emerging forest.

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

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

Mandatory 10- or 15-Year Re-evaluation Date: _____

Description of Use: *Resource Research Studies*

This activity would allow university professors and their students, nongovernmental researchers, and governmental scientists access to Coldwater River NWR's natural environment to conduct both short- and long-term research projects and surveys. The outcome of this research would result in beneficial knowledge of our natural resources and improved methods to manage, monitor, and protect the refuge resources.

Resource research studies are not a priority public use within the Service, but do support the mission of the Service in gathering good scientific data to make management decisions.

These activities will 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 will vary in scope and duration to satisfy the requirements of the research project or survey. Projects may involve everything from a limited one time sampling or survey to long-term study plots.

Research projects and surveys will be conducted by universities, state and federal governmental representatives and rarely by private individuals. The refuge will act solely in a supportive role, providing minimal assistance in most cases.

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. The refuge provides secure sites for long-term evaluation of management actions, population trends, and ecological functions within the bottomland hardwood ecosystems in northwest Mississippi.

Availability of Resources: Funding for this program is borne by annual operation and maintenance funds which supports activities involving the public, such as general recreation, interpretation, environmental education, and refuge hunting and fishing programs. The North Mississippi National Wildlife Refuge Complex spends approximately \$1,000 of an annual budget of approximately \$750,000 in direct support of these programs on Coldwater River NWR. Therefore, the program is in compliance with specific funding requirements of the Refuge Recreation Act.

Special equipment, facilities or improvements necessary to support the use: None

Maintenance costs: None

Monitoring costs: \$1,000

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 activities would provide information towards improving management techniques for trust resource species. Impacts such as trampling vegetation, removal of small numbers of plants and/or animals, and temporary disturbance to wildlife could occur, but should not be significant. The small number of individual plants and animals that may be collected for further study would not have a significant effect on the refuge plant and animal populations, and would require management approval prior to collection.

Long-term impacts:

Long-term benefits associated with improved management techniques developed through research or from survey data would outweigh any negative impacts which may occur.

Cumulative impacts:

No adverse cumulative impacts are anticipated.

Public Review and Comment: The period of public review and comment began September 9, 2004 and ended October 21, 2004. The following methods were used to solicit public review and comment:

- Posted notice at refuge headquarters
- Public notice in newspapers with wide local distribution
- Public meeting(s)

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

Determination (check one below):

- Compatible with the following stipulations
- Not Compatible

Stipulations Necessary to Ensure Compatibility: Each request for use of the refuge for research or surveys would be examined on its individual merit. Questions of who, what, when, where, and why would be asked to determine if the requested proposal contributes to the refuge purposes and could be best conducted on the refuge without significantly affecting the resources. If so, the researcher would be issued a special use permit that would clearly define allowed activities. Progress would be monitored and the researcher would be required to submit annual progress reports and copies of all publications derived from the research.

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

Those areas of Coldwater River NWR closed to all public entry are clearly marked with appropriate signs.

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

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

Mandatory 10- or 15-Year Re-evaluation Date: _____

Description of Use: *Wildlife Observation and Photography*

Wildlife observation and photography have been identified in the National Wildlife Refuge System Improvement Act of 1997 as priority wildlife-dependent recreational uses provided they are compatible with the purpose for which the refuge was established.

Wildlife photography, including other image-capturing activities such as videography, has occurred on the refuge. There are no photography blinds or platforms on the refuge and none are proposed at this time. However, opportunities exist for photography on the refuge. This compatibility determination applies to personal photography only. Commercial photography or videography, if allowed, would require a special use permit by the refuge with specific restrictions.

Wildlife observation and photography could occur in the core area of Coldwater River NWR, an area of approximately 2,000 contiguous acres located approximately 4 miles south of Crowder, Mississippi; the "Warwick Tract," an approximately 300-acre tract boarding the Corps levee on the south beginning approximately ¼-mile south of the Paducah Wells Road and continuing south for approximately 2 miles to the county bridge across Black Bayou; and the "Schiele Tract," a 40-acre tract approximately 3 miles south of Crowder boarding the east side of the county line road.

Wildlife observation and photography can be accomplished while driving or walking on refuge roads open to public vehicular traffic. Also, these priority public uses can be accomplished by boating on refuge waters or walking the unimproved roads and fire breaks.

The National Wildlife Refuge System Improvement Act of 1997 identifies wildlife observation and photography as priority public uses for national wildlife refuges, along with hunting, fishing, environmental education, and interpretation. As expressed priority uses of the Refuge System, these uses take precedence over other potential public uses in refuge planning and management. The Service strives to provide priority public uses when compatible with the purposes of the refuge and the mission of the National Wildlife Refuge System.

Availability of Resources: Funding for this operation is borne by annual operation and maintenance funds which support activities involving the public such as interpretation, environmental education, hunting and fishing programs. The cost of operating and maintaining the present wildlife observation and photography programs would be approximately \$5,000 annually within the annual North Mississippi National Wildlife Refuge Complex of approximately \$750,000. Therefore, the program is in compliance with specific funding requirements of the Refuge Recreation Act.

Special equipment, facilities, or improvements necessary to support the use: \$3,000

Maintenance costs: \$1,000

Monitoring costs: \$1,000

Offsetting revenues: None

Anticipated Impacts of the Use:

Short-term impacts:

The refuge provides habitat for resident and migratory wildlife. As a result of these activities, individual animals may be disturbed by human contact to varying degrees. Examples of potential disturbance include flushing of birds from feeding, resting, or nesting areas and trampling of plants from observers and photographers wandering off designated roads in order to get closer to subjects. Disturbance to trust species are expected to be minimal. Short-term impacts to facilities such as roads and trails can be avoided by special closures due to unsafe conditions. The wildlife observation and photography programs have been designed to avoid or minimize impacts anticipated to refuge resources and visitors.

Long-term impacts:

The vast majority of the activities associated with this use would be during the fall and early winter. Due to the recovery time between periods of expected use, no long-term impacts are expected.

Cumulative impacts:

No cumulative adverse impacts are anticipated. However, programs can be modified in the future to mitigate unforeseen impacts.

Public Review and Comment: The period of public review and comment began September 9, 2004 and ended October 21, 2004. The following methods were used to solicit public review and comment:

- Posted notice at refuge headquarters
- Public notice in newspapers with wide local distribution
- Public meeting(s)

Determination (check one below):

Compatible with the following stipulations

_____Not Compatible

Stipulations Necessary to Ensure Compatibility: At the present time, public entry to include visitors involved in wildlife observation and photography is not permitted on the core area of Coldwater River NWR or on the Schiele Tract except by special use permit. Wildlife observation and photography are permitted on the Warwick Tract.

Justification: The core area of the refuge is intensively managed for migratory waterfowl, shorebirds, and wading birds. Management efforts are successful with large numbers of migratory waterfowl using the refuge from October to March. Extensive shorebird use of the refuge occurs in March and April, and again from July through October. Large numbers of wading birds use the refuge for foraging and roosting beginning in May and lasting through September. Experience has shown that birds using the refuge are very susceptible to disturbance.

From January to April or May, on an annual basis, the core area of the refuge and the Warwick Tract experience extensive flooding. The only improved road on the core area of the refuge extends for 1 ½ miles and is normally under water and impassable from January to May. Periods of intensive rainfall frequently result in the road becoming impassable numerous times during the June to December timeframe. Except for this 1 ½-mile road, there are no additional roads, either improved or unimproved, on the core area of the refuge. Due to the flooding regime and prohibitive construction costs, no additional roads are envisioned. There are no roads, either improved or unimproved, on the Warwick and Schiele Tracts.

Depending on flooding conditions, visitors can observe and photograph wildlife from public roads along the north side of the Warwick Tract, the west side of the Schiele Tract and along both the east and west sides of the core area of the refuge. Excellent opportunities for observing wildlife exist by traveling the public road, located on top of the Corps levee, along the east side of the refuge's core area and along the north side of the Warwick Tract.

Those areas of Coldwater River NWR closed to all public entry are clearly marked with appropriate signs.

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

- _____ Categorical Exclusion without Environmental Action Statement
- _____ Categorical Exclusion and Environmental Action Statement
- Environmental Assessment and Finding of No Significant Impact
- _____ Environmental Impact Statement and Record of Decision

Mandatory 10- or 15-Year Re-evaluation Date: _____

Refuge Name: Dahomey National Wildlife Refuge

Uses: Several uses were evaluated to determine their compatibility with the Refuge System and mission and purposes of the refuge: 1) Bicycling; 2) Environmental Education and Interpretation; 3) Farming Program; 4) Fishing; 5) Hunting; 6) Off-Road Vehicles; 7) Resource Research Studies; and 8) Wildlife Observation and Photography.

Location: Bolivar County, Mississippi

Establishing and Acquisition Authorities: Migratory Bird Conservation Act, Refuge Recreation Act, Fish and Wildlife Act of 1956

Refuge Purposes: "...the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions..." 16 U.S.C. § 3901(b) (Emergency Wetlands Resources Act of 1986)

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

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

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: *Bicycling*

The proposed public use is bicycling to facilitate travel for the priority public uses on Dahomey National Wildlife Refuge. Priority public uses as identified in the National Wildlife Refuge Improvement Act of 1997 include hunting, fishing, wildlife observation and photography, environmental education and interpretation.

The general public could participate in the proposed public use on Dahomey National Wildlife Refuge, an area of approximately 9,600 acres southwest of Cleveland, Mississippi.

Bicycles may be used on designated motorized vehicle access roads. Additionally, bicycles may be used on unimproved dirt roads, fire breaks, and logging roads.

To promote safety, bicycling hours are sunrise to sunset. Additionally, during the deer gun-hunting season bicycling will only be allowed to facilitate hunter's access. Cyclists during the deer gun-hunting season would need to possess a valid hunting and fishing permit. During other refuge hunting seasons, bicycle travel for non-consumptive priority public uses is allowed.

Bicycling to facilitate non-consumptive priority public uses involves observing the natural landscape from a bicycle. Riders stop to observe associated animals and plant communities. The use mainly occurs in groups with an average group size of 2-4 riders. Regarding consumptive uses, anglers can access refuge lands for fishing by bicycle travel on designated roads and trails. Hunters can do the same to access game. To promote safety with other users, prevent conflicts, and promote a quality wildlife observation environment, group size is limited to 10 bicyclists. Groups of more than 10 should contact the refuge office for a special use permit prior to using the refuge. This will help protect refuge resources and ensure that larger groups do not conflict with concurrent public uses.

Bicycle travel on the refuge is conducted in accordance with the stipulations necessary to ensure compatibility. Travel is limited to designated roads and trails.

Bicycle travel on the refuge provides increased opportunity for public participation in priority public uses. It is an alternative method of travel to view the refuge's diverse biological assets and can be less physically demanding than pedestrian travel.

Availability of Resources: Funding for this program is borne by annual operation and maintenance funds which support activities involving the public such as recreation, interpretation, environmental education, and hunting and fishing programs. The North Mississippi National Wildlife Refuge Complex spends approximately \$3,000 of an annual budget of approximately \$750,000 in direct support of this program on Dahomey NWR. Therefore, the program is in compliance with specific funding provisions of the Refuge Recreation Act.

Special equipment, facilities, or improvements necessary to support the use: \$1,000

Maintenance costs: \$1,000

Monitoring costs: \$1,000

Anticipated Impacts of the Use:

Short-term impacts:

Bicycle use can cause soil compaction, particularly when soils are wet, which can degrade plant communities. Soil compaction can diminish the soil porosity, aeration, and nutrient availability.

It is anticipated that bicycle use could alter drainage features of roads and trails through erosion and compaction. Tires may create trail incision causing increased water channeling and erosion during wet conditions. These problems will be minimized because routes designated for bicycle use are existing improved roads, logging trails, and fire breaks. Based on current level of use and condition of designated routes, changes to hydrology because of this use are likely to be insignificant.

Anticipated impacts of bicycle use on wildlife include temporal disturbances to species using habitat on the trail or directly adjacent to the trail. These disturbances are likely to be short-term and infrequent based on current level of use.

Disturbance to trust species are minimal due to the locations of the designated gravel roads and unimproved roads and fire breaks. Short-term impacts to facilities such as roads and trails can be avoided by special closures.

Long-term impacts:

No long-term impacts are anticipated.

Cumulative impacts:

No cumulative adverse impacts are anticipated. However, programs can be modified in the future to mitigate unforeseen impacts.

Public Review and Comment: The period of public review and comment began September 9, 2004 and ended October 21, 2004. The following methods were used to solicit public review and comment:

- Posted notice at refuge headquarters
- Public notice in newspapers with wide local distribution
- Public meeting(s)

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

Determination (check one below):

Compatible with the following stipulations

Not Compatible

Stipulations Necessary to Ensure Compatibility: A 160-acre tract located immediately behind and to the east of the refuge headquarters has been reserved for disabled hunters. Bicycle use in this area would not be permitted. Bicycling, except for hunting use, is not permitted during the deer gun-hunting season. Hunters are allowed to use bicycles but they must remain on designated roads and trails. Bicycle group size is limited to 10 bicyclists, to promote public safety, accommodate other users, and provide a positive wildlife viewing experience. Group size greater than 10 require a special use permit issued by the refuge manager.

Justification: Bicycling has been determined to be compatible provided the above stipulations are implemented. Bicycle use, as identified in this Compatibility Determination, is not expected to materially interfere with or detract from the mission of the National Wildlife Refuge System or the purposes for which the refuge was established. The use of bicycles to facilitate the priority public use is a reasonable mode of access on designated roads and trails. Monitoring would be conducted to ensure that this use remains compatible. If significant impacts are found, corrective actions would be taken to protect refuge resources.

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

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

Mandatory 10- or 15-Year Re-evaluation Date: _____

Description of Use: *Environmental Education and Interpretation*

Environmental education and interpretation would consist primarily of teacher workshops, visitor education, teaching students, and interpretation.

Those activities seek to increase the public's knowledge and understanding of wildlife and contribute to the conservation of such wildlife. Activities would include traditional environmental education such as teacher or staff-led on-site field trips, off-site programs in classrooms, nature study such as teacher and student workshops, and interpretation of the wildlife resources incorporated in support of facilities such as interpretive trails, kiosks, and the visitor contact stations.

Environmental education and interpretation have been identified in the National Wildlife Refuge System Improvement Act of 1997 as priority public uses provided they are compatible with the purpose for which the refuge was established.

The entire refuge has the potential to be utilized for environmental education and interpretation.

These uses are year-round activities, conducted on an as requested basis. Although the activities do not require a special use permit, they are most often closely coordinated with the refuge manager.

The refuge would serve as an outdoor classroom for a variety of audiences with an interest in wildlife conservation and management. Typically, teachers, students, and other groups would learn from hands-on demonstrations, projects, and activities delivered by refuge staff. Activities would be conducted on-site utilizing existing refuge facilities. Group size would typically be limited to ensure effective presentation of desired materials which may be specifically tailored to meet the educational needs of the group.

Environmental education and interpretation are utilized to encourage understanding in citizens of all ages to develop land ethics, foster public support, increase visibility, and improve the image of the Service.

Availability of Resources: Funding for these activities is borne by annual operation and maintenance funds which support activities involving the public such as outdoor recreation, wildlife photography, and the conduct of refuge hunting and fishing programs. The North Mississippi National Wildlife Refuge Complex spends approximately \$8,000 of an annual budget of approximately \$750,000 in direct support of these programs on Dahomey NWR. Therefore, the program is in compliance with specific funding requirements of the Refuge Recreation Act.

Currently, environmental education and interpretation activities are conducted as time and resources permit. Expanding the refuge's volunteer program would provide for further development of these activities.

Facilities (including kiosks, interpretive signs and brochures, visitor contact stations): \$2,000

On-site activities: \$2,000

Maintenance costs: \$2,000

Monitoring costs: \$2,000

Offsetting revenues: None

Anticipated Impacts of the Use:

Short-term impacts:

The use of on-site, hands-on, action-oriented activities by groups of teachers/students to accomplish environmental education objectives may impose a low level impact on those sites used for these activities. Impacts may include trampling of vegetation and temporary disturbance to wildlife species in the immediate vicinity during the activities. Since most activities would take place on existing roads, trails, and at other facilities, impacts would be minimal.

Long-term impacts:

Current utilization of this use is incidental to overall refuge programs and no long-term adverse impacts have been experienced. Long-term beneficial impacts include the furthering of the refuge mission through the education of the general public.

Cumulative impacts:

No adverse cumulative impacts are anticipated.

Public Review and Comment: The period of public review and comment began September 9, 2004 and ended October 21, 2004. The following methods were used to solicit public review and comment:

- Posted notice at refuge headquarters
- Public notice in newspapers with wide local distribution
- Public meeting(s)

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

Determination (check one below):

- Compatible with the following stipulations
- Not Compatible

Stipulations Necessary to Ensure Compatibility: On-site activities should be held where minimal impact would occur. Evaluations of sites and programs should be conducted periodically to assess if objectives are being met and that the natural resources are not being degraded. If evidence of unacceptable adverse impacts begin to appear, it may be necessary to change the location of the outdoor activities.

Justification: Environmental education and interpretation are used to encourage understanding in citizens of all ages in order to act responsibly in protecting a healthy ecosystem. They are tools to use in building land ethic, developing political support, and decreasing wildlife violations. They constitute a method of increasing visibility in the community and improving the image of the Service.

Environmental education at the refuge is incidental to other programs since there is no full-time staff to conduct activities. However, the program is important and provides visitors with an awareness of refuge specific issues such as wetland ecology, migratory bird management, and issues relating to the entire Refuge System. Environmental education and interpretation activities are expected to increase while ensuring compatibility with the purpose for which the refuge was established.

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

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

Mandatory 10- or 15-Year Re-evaluation Date: _____

Description of Use: *Farming Program*

Cooperative farming has been a management tool on Dahomey NWR since 1992. Primarily serving as a supplement to natural food resources, this program is designed to assist the refuge in meeting wintering waterfowl goals. Cooperative agreements with farmers are entered into annually prior to the planting season. These agreements describe the location and amount of acreage to be planted during the coming year. The agreement is then signed by the cooperative farmer and the Service representative (refuge manager). Shares are acreage based with a 75 percent cooperator's share and a 25 percent refuge share. The cooperator assumes responsibility for all associated costs for the crops raised. Modifications to the original contract may occur throughout the farming season with amendments agreed upon and signed by all parties involved. Currently, cooperative farming occurs on 531 acres.

In addition to providing winter food resources, this program may be utilized to maintain a newly acquired tract of land in an open condition until decisions are made concerning the tract's ultimate vegetative community.

Farming is used to complement natural food production on the refuge and assist in meeting the minimum waterfowl maintenance objectives as determined in cooperation with the Lower Mississippi Valley Joint Venture Office of the North American Waterfowl and Wetlands Plan. Providing wintering and migrating habitat can be achieved in part through a successful cropland program. By incorporating a system of impoundments with the cropland program, the waterfowl maintenance objectives can be more easily met. Preferred waterfowl crops include corn, milo, rice, millet, soybeans, and natural (moist-soil) foods. By planting crops such as rice and milo in the impoundment areas and using wells to flood the areas during the wintering season, food availability for waterfowl is enhanced.

Farming is not a priority public use within the Service.

Cooperative farming is confined to those agricultural fields acquired as part of the refuge that have not been reforested or maintained in other vegetative communities. Tracts acquired in the future that include agricultural fields may also be farmed prior to determining ultimate vegetative communities.

Cooperative farming agreements are entered into annually, usually prior to April 15th and extend until the end of the harvest season.

Cooperative farming is conducted through a cooperative agreement wherein the cooperator provides all materials, equipment and labor to fulfill the requirements of the contract. Facilities such as roads, gates, and access points are maintained by the refuge staff.

This use is necessary to fulfill refuge obligations to provide for the wintering needs of migratory waterfowl. While agricultural lands are abundant off the refuge, they do not provide a secure habitat for wintering waterfowl.

Availability of Resources: The North Mississippi National Wildlife Refuge Complex currently spends approximately \$3,600 of an annual budget of approximately \$750,000 in the administration of the refuge cooperative farming program. In order for the refuge to conduct the farming program in-house, specialized equipment would have to be acquired and maintained. It is estimated that utilizing refuge staff and equipment would cost approximately \$52,000 per year.

Special equipment, facilities, or improvements necessary to support the use: None

Maintenance of roads, gates, and access points for cooperative farmers: \$2,600

Monitoring cooperative contracts and cooperator activities: \$1,000

Offsetting revenues: None

Anticipated Impacts of the Use:

Short-term impacts:

Soil disturbance is likely to occur when the areas are disked during the spring planting season. These impacts are lessened by the implementation of no-till and conservation tillage farming methods. Buffer strips adjacent to water bodies and other sensitive areas help trap sediments and hold agricultural run-off.

The application of pesticides is controlled by the Service and only used after Pesticide Use Proposals submitted by the refuge manager are approved. Pesticide amounts, kind, and method of application are controlled by the Service. Impacts are unknown but would be short-term.

Monotypic stands of agricultural crop reduce the diversity and suitability of refuge lands for some species of migratory and resident wildlife species.

Long-term impacts:

None

Cumulative impacts:

The cumulative impacts should be minimal due to limits on the use and kinds of pesticides, no-till and conservation tillage farming practices and the use of buffer strips adjacent to water bodies and other sensitive areas.

Public Review and Comment: The period of public review and comment began September 9, 2004 and ended October 21, 2004. The following methods were used to solicit public review and comment:

- Posted notice at refuge headquarters
- Public notice in newspapers with wide local distribution
- Public meeting(s)

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

Determination (check one below):

Compatible with the following stipulations

Not Compatible

Stipulations Necessary to Ensure Compatibility: Cooperators must meet conditions outlined in a Cooperative Farming Agreement, which is a contractual agreement between the refuge and the local farmer. Additionally, cooperators must follow conditions outlined under integrated pest management and within the Service's Pesticide Use Proposal process. Cooperators are subject to dismissal for not meeting these conditions.

Justification: Section 6 RM 4.1 of the National Wildlife Refuge System Refuge Manual states, “Service policy is to use the most natural means available to meet wildlife objectives. In situations where objectives cannot be met through maintenance of natural ecosystems, the artificial and intensive method of cropland management may be employed. The acreage devoted to croplands will be that required to meet minimum habitat objectives.” The specific objective is as follows:

Using food as an index to carrying capacity, to provide wintering waterfowl habitat for:

Ducks - 0.5 million duck use days
Geese - 0.5 million duck use days

Since establishment in 1992, the acreage of agricultural lands at Dahomey NWR has been reduced from 1,595 acres to 531 acres. Most of the 1,064 acres of former agricultural fields have been reforested. Complete water management through the use of wells is available on the remaining 531 acres of agricultural lands. Augmented with 200 acres of moist-soil areas, the existing agricultural lands fail to meet the food requirements for duck use days as specified in the North American Waterfowl and Wetland Plan.

Although cropland management will be directed primarily to satisfy certain habitat and life requirements of wintering waterfowl, other bird and mammal species will also benefit. The production of crops is essential for waterfowl management to meet the primary objectives for which the refuge was established. Farming is an essential management tool for providing “hot” foods for migratory birds.

The annual Cooperative Farming Agreement addresses the management of the refuge farm fields. These fields are farmed by a cooperator under a contractual agreement with the refuge. Under this agreement, the refuge receives a 25 percent share of each cooperative farmer’s allotment where one acre out of four is planted for waterfowl food production. For their share, 75 percent, the cooperative farmer plants rice, corn, soybeans, or milo.

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

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

Mandatory 10- or 15-Year Re-evaluation Date: _____

Description of Use: *Fishing*

Fishing was a traditional recreational use of Dahomey NWR prior to its inclusion to the National Wildlife Refuge System and continues to be a popular recreational pursuit. The refuge provides additional public fishing opportunities in an area that is lacking sufficient amounts of acreage open to the public. Currently, fish populations support a sustainable harvest under a regulated fishing program.

Fishing is limited to one natural lake, one lake constructed by the refuge, and one natural stream course. Catfish, bluegill, crappie, and largemouth bass comprise the most sought after fish species on the refuge. Happy Hollow Lake, an unnamed lake south of Sawmill Road, and the stream course north of this unnamed lake are the water bodies on the refuge that provide fishing opportunities.

Fishing, a wildlife-dependent recreational pursuit, has been identified in the National Wildlife Refuge System Improvement Act of 1997 as a priority public use provided it is compatible with the purpose for which the refuge was established.

The three described water bodies, comprising perhaps 12 acres, provide the only sustainable fisheries on the refuge.

Fishing occurs year-round from sunrise to sunset, and is conducted subject to regulations established by the Mississippi Department of Wildlife, Fisheries, and Parks. Fishing is further restricted on the refuge by regulations which prohibit commercial fishing on the refuge, prohibit the use of certain fishing methods, and prohibit access after dark. The purchase of an annual hunting and fishing permit is required to fish on the refuge.

Availability of Resources: Funding for the fishing program is borne by annual operation and maintenance funds which support activities involving the public such as recreation, interpretation, environmental education, and refuge hunting and fishing programs. The refuge spends approximately \$8,000 of an annual North Mississippi National Wildlife Refuge Complex budget of approximately \$750,000 in direct support of the fishing program on the refuge. Therefore, the program is in compliance with specific funding requirements of the Refuge Recreation Act.

Special equipment, facilities, or improvements necessary to support the use: None

Maintenance costs: \$6,000

Monitoring costs: \$2,000

Offsetting revenues: \$200

Anticipated Impacts of the Use:

Short-term impacts:

Minor impacts such as litter and gasoline contamination could occur but not at a level that would cause great concern.

Long-term impacts:

Since the number of persons fishing on the refuge is small and the activity occurs primarily in the spring, no long-term impacts are expected.

Cumulative impacts:

No cumulative impacts are known to occur.

Public Review and Comment: The period of public review and comment began September 9, 2004 and ended October 21, 2004. The following methods were used to solicit public review and comment:

- Posted notice at refuge headquarters
- Public notice in newspapers with wide local distribution
- Public meeting(s)

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

Determination (check one below):

Compatible with the following stipulations

Not Compatible

Stipulations Necessary to Ensure Compatibility: Commercial fishing and possession or use of jugs, seines, nets, hand-grab baskets, or any other similar devices are prohibited. Persons are prohibited from accessing the refuge after dark.

Justification: While the number of participants is limited, fishing has been an important activity on the refuge resulting in only very temporary disturbance to refuge habitats and wildlife populations, and has caused no noticeable impact on the abundance of species sought or other wildlife affected by angler disturbance. Current regulations limit the impacts to trust species and provide a safe and rewarding experience for the refuge visitor.

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

Categorical Exclusion without Environmental Action Statement

Categorical Exclusion and Environmental Action Statement

Environmental Assessment and Finding of No Significant Impact

Environmental Impact Statement and Record of Decision

Mandatory 10- or 15-Year Re-evaluation Date: _____

Description of Use: *Hunting*

Hunting has been permitted as a compatible public use activity on Dahomey NWR since acquisition. The original hunting plan was completed, reviewed by the public, and approved in 1994. Refuge hunting seasons generally coincide with the State's hunting seasons and require only minor changes annually. Portions of the refuge are closed annually to all uses except those for disabled hunters. Due to overlapping hunting seasons, hunting of one type of game may be closed for the duration of hunting of a different type of game. All hunting activities are permitted with a valid refuge hunt permit and appropriate State licenses.

The refuge hunts are excellent wildlife management and public relations tools that provide quality recreational opportunities for the general public while regulating specific animal populations at desired levels. The refuge hunting plan was developed to ensure the associated public recreation and wildlife management objectives are met in a responsible and consistent manner.

Hunting, a wildlife-dependent recreational pursuit, has been identified in the National Wildlife Refuge System Improvement Act of 1997 as a priority public use provided it is compatible with the purpose for which the refuge was established.

The entire 9,691-acre refuge is open to public hunting. Note, however, a 160-acre tract immediately north and east of the refuge headquarters is only open to disabled hunters.

All hunting seasons are established annually through coordination with the Mississippi Department of Wildlife, Fisheries, and Parks.

Public hunting opportunities in the northwest delta portion of the Yazoo Basin are limited with Service managed refuges and State managed wildlife management areas representing virtually all the public lands open to hunting. Private lands offer hunting opportunities only to those willing and able to purchase hunting rights through long-term leases or private ownership. The demand for public hunting areas in this portion of Mississippi is increasing as we shift towards a more urbanized society, and refuges are expected to meet an increasing part of this demand.

Availability of Resources: Funding for the hunting program is borne by annual operation and maintenance funds, which support activities involving the public such as fishing, photography, environmental education and interpretation, and wildlife observation. The cost of operating and maintaining the present small game, big game, turkey, and migratory waterfowl seasons would be approximately \$17,500 annually within the annual North Mississippi National Wildlife Refuge Complex budget of approximately \$750,000. Therefore, the program is in compliance with specific funding requirements of the Refuge Recreation Act.

Special equipment, facilities, or improvements necessary to support the use: \$5,000

Maintenance costs: \$1,500

Permit sales: \$1,000

Law enforcement costs: \$8,500

Monitoring costs: \$1,500

Offsetting revenues: \$7,500

The refuge is a participant in the Recreational Fee Demonstration Project which currently returns 80 percent of fees generated from recreational activities back to the refuge. The offsetting revenues are from the sale of hunting and fishing permits.

Anticipated Impacts of the Use:

Short-term impacts:

Dahomey NWR has been open to hunting since its establishment in 1991 with no documented disturbance to refuge habitats and no noticeable impact on the abundance of species hunted or other associated wildlife. While managed hunting opportunities may result in localized disruption of individual animals' daily routines, no noticeable effect on populations has been noticed or documented. Restrictions within the hunting program, notably the closure of small game hunting during the general gun deer hunt, the requirement that all hunters, except those hunting turkey or waterfowl, wear fluorescent orange-colored material above the waistline while actually hunting, and the prohibition of hunting or shooting across any open field from ground level have been implemented due to safety concerns. These restrictions will be closely monitored for effectiveness.

Long-term impacts:

Prior to Service ownership of Dahomey NWR, the forested wetland that constitutes the refuge was a private hunting club with a large membership. Discussions with members of this hunting club indicate that deer and turkeys were the game most heavily hunted. While deer and turkey along with squirrel are still the game most heavily hunted, there is no indication of adverse biological impacts associated with the activities. Should, however, it become necessary, the refuge has the latitude to adjust hunting seasons and bag limits annually, or even close the refuge entirely if safety or habitat concerns merit such actions. This latitude coupled with monitoring of wildlife populations and habitat conditions by the Service and the Mississippi Department of Wildlife, Fisheries, and Parks will ensure that long-term negative impacts to either wildlife populations and/or habitats on the refuge are unlikely.

Should hunting pressure continue to increase on the refuge, alternatives such as quota hunts, a reduction in the number of days of hunting, or restrictions on that part of the refuge open to hunting can be utilized to limit impacts.

Cumulative impacts:

The timing and duration of the refuge's hunting program does not coincide with most other public 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 September 9, 2004 and ended October 21, 2004. The following methods were used to solicit public review and comment:

- Posted notice at refuge headquarters
- Public notice in newspapers with wide local distribution
- Public meeting(s)

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

Determination (check one below):

Compatible with the following stipulations

Not Compatible

Stipulations Necessary to Ensure Compatibility: Hunting seasons and bag limits are established annually as agreed upon during the annual hunt coordination with State personnel. These generally fall within the State framework. The refuge can, and has, established more restrictive seasons and bag limits to prevent over-harvest of individual species on the refuge. All hunters are required to purchase and possess a refuge hunting permit while participating in refuge hunts. This permit, which augments the State hunting regulations, explains not only the general hunt regulations but the refuge specific regulations as well. Law enforcement patrols are frequently conducted throughout the hunting season to ensure compliance with refuge laws and regulations. The refuge has included a Refuge Operating Needs System (RONS) project for a fulltime officer to ensure compatibility long term.

Justification: Hunting has shown to be a viable management tool for controlling wildlife populations. Allowing these uses to continue is consistent with the refuge's establishing purpose, management objectives, and follows current Service policy.

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

Categorical Exclusion without Environmental Action Statement

Categorical Exclusion and Environmental Action Statement

Environmental Assessment and Finding of No Significant Impact

Environmental Impact Statement and Record of Decision

Mandatory 10- or 15-Year Re-evaluation Date: _____

Description of Use: *Off-Road Vehicles*

Off-road vehicle (4-wheel all-terrain) use is not a priority public use; however, it can occur on the refuge provided it is compatible with the purpose for which the refuge was established.

The general public could participate in the proposed use of off-road vehicles year-round from sunrise to sunset on Dahomey National Wildlife Refuge, an area of approximately 9,600 acres southwest of Cleveland, Mississippi.

Off-road vehicles may be used on unimproved dirt roads, fire breaks, and logging roads by visitors who possess a valid hunting and fishing permit and who are gaining access to interior portions of the refuge for hunting and fishing opportunities.

The use of off-road vehicles is proposed in response to questions raised during the scoping process. These questions centered on opportunities to provide visitors who possess a valid hunting and fishing permit off-road vehicle access to internal areas of the refuge for the purpose of hunting and fishing.

Availability of Resources: Funding for this program would be borne by annual operation and maintenance funds which support activities involving the public such as interpretation, environmental education, wildlife photography, and refuge hunting and fishing programs. The North Mississippi National Wildlife Refuge Complex would spend approximately \$37,500 of an annual budget of approximately \$750,000 in direct support of this program on Dahomey National Wildlife Refuge.

Special equipment, facilities, or improvements to support the use: \$10,000

Maintenance costs: \$20,000

Law enforcement costs: \$12,500

Monitoring costs: \$2,500

Offsetting revenues: \$2,000

The refuge does not have the resources to administer this use. Currently, the North Mississippi National Wildlife Refuge Complex does not have law enforcement personnel to monitor this activity. The Complex has included a Refuge Operating Needs System (RONS) package for a fulltime law enforcement officer for Dahomey NWR. Additionally, this activity would require considerable operation and maintenance funds to maintain the existing unimproved dirt roads, fire breaks, and logging roads. It is expected that \$2,000 of offsetting revenues would be generated by the sale of hunting and fishing permits to visitors who would not use the refuge unless they could also use off-road vehicles while accessing hunting and fishing areas.

Anticipated Impacts of the Use:

Short-term impacts:

Adverse impacts to unimproved roads, fire breaks, and logging roads by the repeated use of off-road vehicles are well documented and disturbance to wildlife, plants, and their habitats would occur. Such use would be limited to the hunting and fishing seasons which also coincide with extended periods of heavy rainfall. As use continues, the unimproved roads, fire breaks, and logging roads used for access become wallowed out and rainfall would accumulate in these "wet" areas. Repeated use exacerbates this condition. Conflicts would occur between those hunters and anglers who use off-road vehicles and those who object to the disturbance and noise associated with the vehicles.

Long-term impacts:

Long-term impacts from the repeated use of off-road vehicles by the public would be compounded over time. Unimproved roads, fire breaks, and logging roads would continue to deteriorate and annual maintenance costs would increase. Additional damage to plants and habitats would be experienced as access for the heavy equipment required to maintain these access routes is developed. Conflicts between hunters who use off-road vehicles and those who object to the associated disturbance and noise would continue.

Cumulative impacts:

No cumulative impacts are expected because other forms of public use on the unimproved roads, fire breaks, and logging roads would be limited to persons bicycling or walking. The "footprint" left by these other forms of use is very minimal. As the facilities and road networks at the refuge are improved, general outdoor recreation would likely increase. With this increase in use, conflicts would also increase between hunters who use off-road vehicles and those visitors using the refuge who object to disturbance and noise.

Public Review and Comment: The period of public review and comment began September 9, 2004 and ended October 21, 2004. The following methods were used to solicit public review and comment:

- Posted notice at refuge headquarters
- Public notice in newspapers with wide local distribution
- Public meeting(s)

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

Determination (check one below):

Compatible with the following stipulations

Not Compatible

Stipulations Necessary to Ensure Compatibility: None

Justification: To provide hunter access, a series of all weather roads have been constructed. Additional all weather roads are planned. In addition, approximately 23 miles of fire breaks and old logging roads are maintained obstruction free to facilitate the use of hand held carts, bicycles, wagons, etc., for the purpose of retrieving deer. Additional obstruction free unimproved dirt roads also occur on the refuge. These facilities eliminate the need for the average hunter to use off-road vehicles on the refuge and prevent the inevitable habitat destruction that accompanies this type of usage. Off-road vehicle usage is an activity which is not compatible with refuge objectives.

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

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

Mandatory 10- or 15-Year Re-evaluation Date: _____

Description of Use: *Resource Research Studies*

This activity would allow university professors and their students, nongovernmental researchers, and governmental scientists access to Dahomey NWR's natural environment to conduct both short- and long-term research projects and surveys. 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.

Resource research studies are not a priority public use within the Service, but do support the mission of the Service in gathering good scientific data to make management decisions.

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 vary 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 plots.

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.

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 effective management. The refuge provides secure sites for long-term evaluation of management actions, population trends, and ecological functions within the bottomland hardwood ecosystems in northwest Mississippi.

Availability of Resources: This program is borne by annual operation and maintenance funds which support activities involving the public such as recreation, interpretation, environmental education, and refuge hunting and fishing programs. The North Mississippi National Wildlife Refuge Complex spends approximately \$3,600 of an annual budget of approximately \$750,000 in direct support of these programs on Dahomey NWR. Therefore, the program is in compliance with specific funding provisions of the Refuge Recreation Act.

Special equipment, facilities or improvement necessary to support the use: None

Maintenance costs: \$1,000

Monitoring costs: \$2,600

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 trampling vegetation, removal of small numbers of plants and/or animals, and temporary disturbance to wildlife could occur, but should not be significant. The small number of individual plants and animals that may be collected for further study would not have a significant effect on the refuge plant and animal populations, and would require management approval prior to collection.

Long-term impacts:

Long-term benefits associated with improved management techniques developed through research or surveys would far outweigh any negative impacts which may occur.

Cumulative impacts:

No adverse cumulative effects are anticipated.

Public Review and Comment: The period of public review and comment began September 9, 2004 and ended October 21, 2004. The following methods were used to solicit public review and comment:

- Posted notice at refuge headquarters
- Public notice in newspapers with wide local distribution
- Public meeting(s)

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

Determination (check one below):

Compatible with the following stipulations

Not Compatible

Stipulations Necessary to Ensure Compatibility: Each request for use of the refuge for research or survey would be examined on its individual merit. Questions of who, what, when, where, and why, would be asked to determine if the requested research could contribute to the refuge purposes and could best be conducted on the refuge without significantly affecting the resources. If so, the researcher would be issued a Special Use Permit that would clearly define allowed activities. Progress would be monitored and the researcher would be required to submit annual progress reports and copies of all publications derived from the research.

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

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

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

Mandatory 10- or 15-Year Re-evaluation Date: _____

Description of Use: *Wildlife Observation and Photography*

Wildlife observation and photography have been identified in the National Wildlife Refuge System Improvement Act of 1997 as priority wildlife-dependent recreational uses provided they are compatible with the purpose for which the refuge was established.

Wildlife photography, including other image-capturing activities such as videography, has occurred on the refuge. There are no photography blinds or platforms on the refuge and none are proposed at this time. However, opportunities exist for photography on the refuge. This compatibility determination applies to personal photography only. Commercial photography or videography, if allowed, would require a special use permit by the refuge and would include specific restrictions.

The general public could participate in wildlife observation and photography year-round from sunrise to sunset on Dahomey National Wildlife Refuge, an area approximately 9,600 acres west of Cleveland, Mississippi,

Wildlife observation and photography could be accomplished while driving or walking on refuge roads open to public vehicular traffic. Also, these priority public uses could be accomplished by walking the 23 miles of old trails/logging roads or boating on refuge waters.

The National Wildlife Refuge System Improvement Act of 1997 identifies wildlife observation and photography as priority public uses for national wildlife refuges, along with hunting, fishing, environmental education, and interpretation. As expressed priority uses of the Refuge System, these uses take precedence over other potential public uses in refuge planning and management. The Service strives to provide priority public uses when compatible with the purposes of the refuge and the mission of the National Wildlife Refuge System.

Availability of Resources: Funding for this operation is borne by annual operation and maintenance funds which supports activities involving the public such as outdoor recreation, interpretation, environmental education, and the conduct of refuge hunting and fishing programs. The North Mississippi National Wildlife Refuge Complex spends approximately \$8,000 of an annual budget of approximately \$750,000 in direct support of these programs on Dahomey NWR. Therefore, the program is in compliance with specific funding requirements of the Refuge Recreation Act.

Special equipment, facilities, or improvements necessary to support the use: \$4,000

Maintenance costs: \$3,000

Monitoring costs: \$1,000

Anticipated Impacts of the Use:

Short-term impacts:

The refuge provides habitat for resident and migratory wildlife. As a result of these activities, individual animals may be disturbed by human contact to varying degrees. Examples of potential disturbance could include flushing of birds from feeding, resting, or nesting areas, and trampling of plants from observers and photographers wandering off designated roads in order to get closer to subjects. Disturbance to trust species is expected to be minimal. Short-term impacts to facilities such as roads and trails could be avoided by special closures due to unsafe conditions. The wildlife observation and photography programs have been designed to avoid or minimize impacts on refuge resources and visitors.

Long-term impacts:

The vast majority of the activities associated with this use would be during the fall and early winter. Due to the recovery time between periods of expected use, no long-term impacts are expected.

Cumulative impacts:

No cumulative adverse impacts are anticipated. However, programs could be modified in the future to mitigate unforeseen impacts.

Public Review and Comment: The period of public review and comment began September 9, 2004 and ended October 21, 2004. The following methods were used to solicit public review and comment:

- Posted notice at refuge headquarters
- Public notice in newspapers with wide local distribution
- Public meeting(s)

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

Determination (check one below):

Compatible with the following stipulations

Not Compatible

Stipulations Necessary to Ensure Compatibility: The 160-acre tract located northeast of the refuge headquarters is only open to disabled persons. Two hunting blinds are located on this 160-acre tract. Although established as barrier free hunting blinds for disabled hunters, these blinds provide an excellent opportunity for disabled persons to participate in wildlife observation and photography.

Justification: These wildlife-dependent uses are priority public uses of the National Wildlife Refuge System. Providing opportunities for wildlife observation and photography would contribute toward fulfilling provisions of the National Wildlife Refuge System Administration Act, as amended in 1997. Wildlife observation and photography would provide an excellent forum for allowing public access and increasing understanding of refuge resources. The stipulations outlined above should minimize potential impacts relative to wildlife/human interactions. These wildlife dependent uses would not conflict with the national policy to maintain the biological diversity, integrity, and environmental health of the refuge.

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

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

Mandatory 10- or 15-Year Re-evaluation Date: _____

Refuge Name: Tallahatchie National Wildlife Refuge

Uses: Several uses were evaluated to determine their compatibility with the Refuge System and mission and purposes of the refuge: 1) Bicycling; 2) Environmental Education and Interpretation; 3) Farming; 4) Fishing; 5) Hunting; 6) Off-Road Vehicle Use; 7) Resource Research Studies; and 8) Wildlife Observation and Photography.

Location: Grenada and Tallahatchie Counties, Mississippi

Establishing and Acquisition Authorities: Migratory Bird Conservation Act, Consolidated Farm and Rural Development Act

Refuge Purposes: "...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." 16 U.S.C. § 751d (Migratory Bird Conservation Act)

"...for conservation purposes..." 7 U.S.C. § 2002 (Consolidated Farm and Rural Development 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: *Bicycling*

The use is bicycling to facilitate travel for the priority public uses on Tallahatchie National Wildlife Refuge. Priority public uses as identified in the National Wildlife Refuge Improvement Act of 1997 include hunting, fishing, wildlife observation and photography, environmental education and interpretation.

The general public could participate in the proposed public use on Tallahatchie National Wildlife Refuge, an area of approximately 4,000 acres west of Holcomb, Mississippi.

Bicycles may be used on designated motorized vehicle access roads. Additionally, bicycles may be used on unimproved dirt roads, fire breaks, and logging roads.

To promote safety, bicycling would be permitted from sunrise to sunset. Additionally, during the deer gun-hunting season bicycling would only be allowed to facilitate hunter's access. During the deer gun-hunting season, bicyclists would need to possess a valid hunting and fishing permit. During other refuge hunting seasons, bicycle travel for non-consumptive priority public uses would be allowed.

Bicycling to facilitate non-consumptive priority public uses would involve observing the natural landscape from a bicycle. Riders would stop to observe associated animals and plant communities. The use would mainly occur in groups with an average size of 2-4 riders. Regarding consumptive uses, anglers could access refuge lands for fishing by bicycle travel on designated roads and trails. Hunters could do the same to access game. To promote safety with other users, prevent conflicts, and promote a quality wildlife observation environment, group size would be limited to 10 bicyclists. Groups of more than 10 would have to contact the refuge office for a special use permit prior to using the refuge. This would help protect refuge resources and ensure that larger groups would not conflict with concurrent public uses.

Bicycle travel on the refuge would be conducted in accordance with the stipulations necessary to ensure compatibility. Travel would be limited to designated roads and trails.

Bicycle travel on the refuge would provide increased opportunity for public participation in priority public uses. It is an alternative method of travel to view the refuge's diverse biological assets and could be less physically demanding than pedestrian travel.

Availability of Resources: Funding for these programs is borne by annual operation and maintenance funds which support activities involving the public such as recreation, interpretation, environmental education, and hunting and fishing programs. The North Mississippi National Wildlife Refuge Complex spends approximately \$3,000 of an annual budget of approximately \$750,000 in direct support of these programs on Tallahatchie NWR. Therefore, the program is in compliance with specific funding provisions of the Refuge Recreation Act.

Special equipment, facilities, or improvements necessary to support the use: \$1,000

Maintenance costs: \$1,000

Monitoring costs: \$1,000

Anticipated Impacts of the Use:

Short-term impacts:

Bicycle use can cause soil compaction, particularly when soils are wet, which can degrade plant communities. Soil compaction can diminish the soil porosity, aeration, and nutrient availability.

It is anticipated that bicycle use could alter drainage features of roads and trails through erosion and compaction. Tires may create trail incision causing increased water channeling and erosion during wet conditions. These problems would be minimized because routes designated for bicycle use are existing improved roads, logging trails, and fire breaks. Based on current levels of use and conditions of designated routes, changes to hydrology because of this use are likely to be insignificant.

Anticipated impacts of bicycle use on wildlife include temporal disturbances to species using habitat on the trail or directly adjacent to the trail. These disturbances are likely to be short-term and infrequent based on current level of use.

Disturbances to trust species are minimal due to the locations of the designated gravel roads and unimproved roads and fire breaks. Short-term impacts to facilities such as roads and trails can be avoided by special closures.

Long-term impacts:

No long-term impacts are anticipated.

Cumulative impacts:

No cumulative adverse impacts are anticipated. However, programs could be modified in the future to mitigate unforeseen impacts.

Public Review and Comment: The period of public review and comment began September 9, 2004 and ended October 21, 2004. The following methods were used to solicit public review and comment:

- Posted notice at refuge headquarters
- Public notice in newspapers with wide local distribution
- Public meeting(s)

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

Determination (check one below):

Compatible with the following stipulations

Not Compatible

Stipulations Necessary to Ensure Compatibility: At the present time, public entry to include visitors involved in bicycling is not permitted on that part of the refuge located north of Highway 8 except by special use permit. Bicycling, except for hunting use, is not permitted during the deer gun-hunting season. Hunters are allowed to use bicycles but they must remain on designated roads and trails. Bicycle group size is limited to 10 bicyclists, to promote public safety, accommodate other users, and provide a positive wildlife viewing experience. Group size greater than 10 requires a special use permit issued by the refuge manager.

Justification: That part of Tallahatchie National Wildlife Refuge located north of Highway 8 is divided by the Tippo Bayou. There is no legal access for general public use of the northeast section of the refuge. The remaining refuge lands north of Highway 8 are enrolled in the cooperative farming program or established as waterfowl management units. Management efforts are successful with large numbers of migratory waterfowl using the refuge from October to March. Experience has shown that birds using the refuge are susceptible to disturbance.

Bicycling has been determined to be compatible provided the above stipulations are implemented. Bicycle use, as identified in this compatibility determination, is not expected to materially interfere with, or detract from, the mission of the National Wildlife Refuge System or the purposes for which the refuge was established. The use of bicycles to facilitate the priority public use is a reasonable mode of access on designated roads and trails. Monitoring would be conducted to ensure this use remains compatible. If significant impacts are found, corrective actions would be taken to protect refuge resources.

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

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

Mandatory 10- or 15-Year Re-evaluation Date: _____

Description of Use: *Environmental Education and Interpretation*

Environmental education and interpretation would consist primarily of teacher workshops, visitor education, teaching students, and interpretation.

Those activities seek to increase the public's knowledge and understanding of wildlife and contribute to the conservation of such wildlife. Activities would include traditional environmental education such as teacher or staff-led on-site field trips, off-site programs in classrooms, nature study such as teacher and student workshops, and interpretation of the wildlife resources incorporated in support of facilities such as interpretive trails, kiosks, and visitor contact stations.

Environmental education and interpretation have been identified in the National Wildlife Refuge System Improvement Act of 1997 as priority public uses provided they are compatible with the purpose for which the refuge was established.

All that portion of the refuge south of Highway 8 has the potential to be utilized for environmental education and interpretation.

Environmental education and interpretation are year-round activities, conducted on an as requested basis. Although these activities do not require a special use permit, they are most often closely coordinated with the refuge manager.

The refuge would serve as an outdoor classroom for a variety of audiences with an interest in wildlife conservation and management. Typically, teachers, students, and other groups would learn from hands-on demonstrations, projects, and activities delivered by refuge staff. Activities would be conducted on-site utilizing existing refuge facilities. Group size would typically be limited to ensure effective presentation of desired materials which may be specifically tailored to meet the educational needs of the group.

Environmental education and interpretation are utilized to encourage understanding in citizens of all ages to develop land ethics, foster public support, increase visibility, and improve the image of the Service.

Availability of Resources: Funding for these activities is borne by annual operation and maintenance funds which support activities involving the public such as outdoor recreation, wildlife photography, and the refuge hunting and fishing programs. The North Mississippi National Wildlife Refuge Complex spends approximately \$3,600 of an annual budget of approximately \$750,000 in direct support of these programs on Tallahatchie NWR. Therefore, the program is in compliance with specific funding provisions of the Refuge Recreation Act.

Currently, these activities are conducted as time and resources permit. Developing a volunteer organization for the refuge would provide for the future of these programs by providing additional personnel to deliver the programs.

Facilities (including kiosks, interpretive signs and brochures): \$2000

On-site activities: \$1000

Maintenance costs: \$2000

Monitoring costs: \$1,000

Offsetting revenues: None

Anticipated Impacts of the Use:

Short-term impacts:

The use of on-site, hands-on, action-oriented activities by groups of teachers/students to accomplish environmental education objectives may impose a low level impact on those sites used for these activities. Impacts may include trampling of vegetation and temporary disturbance to wildlife species in the immediate vicinity during the activities. Since most activities would take place on existing roads, trails, and at other facilities, impacts would be minimal.

Long-term impacts:

Current utilization of these uses is incidental to overall refuge programs and no long-term adverse impacts have been experienced. Long-term beneficial impacts include the furthering of the refuge mission through the education of the general public.

Cumulative impacts:

No adverse cumulative impacts are anticipated.

Public Review and Comment: The period of public review and comment began September 9, 2004 and ended October 21, 2004. The following methods were used to solicit public review and comment:

Posted notice at refuge headquarters

Public notice in newspapers with wide local distribution
Public meeting(s)

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

Determination (check one below):

Compatible with the following stipulations

Not Compatible

Stipulations Necessary to Ensure Compatibility: On-site activities should be held where minimal impact would occur. Evaluations of sites and programs should be conducted periodically to assess if objectives are being met and that natural resources are not being degraded. If evidence of unacceptable adverse impacts begin to appear, it may be necessary to change the location of the outdoor activities.

Justification: Environmental education and interpretation are used to encourage an understanding in citizens of all ages to act responsibly in protecting a healthy ecosystem. They are tools to use in building land ethic, developing support of the refuge, and decreasing wildlife violations. Environmental education and interpretation are methods of increasing visibility in the community and improving the image of the Service.

Environmental education at the refuge is incidental to other programs since there is no full-time staff to conduct these activities. However, the program is important and provides visitors with an awareness of refuge specific issues such as wetland ecology, migratory bird management, and issues relating to the entire Refuge System. Environmental education and interpretation activities are expected to increase while ensuring compatibility with the purpose for which the refuge was established.

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

Categorical Exclusion without Environmental Action Statement

Categorical Exclusion and Environmental Action Statement

Environmental Assessment and Finding of No Significant Impact

Environmental Impact Statement and Record of Decision

Mandatory 10- or 15-Year Re-evaluation Date: _____

Description of Use: *Farming*

Cooperative farming has been a management tool on Tallahatchie NWR since 1991. Primarily serving as a supplement to natural food resources, this program is designed to assist the refuge in meeting wintering waterfowl goals. Cooperative agreements with farmers are entered into annually prior to the planting season. These agreements describe the location and amount of acreage to be planted during the coming year. The agreement is then signed by the cooperative farmer and the Service representative (refuge manager). Shares are acreage based with a 75 percent cooperators share and a 25 percent refuge share. The cooperator assumes responsibility for all associated costs for the crops raised. Modifications to the original contract may occur throughout the farming season with amendments agreed upon and signed by all parties involved. Currently, cooperative farming occurs on 721 acres.

In addition to providing winter food resources, this program may be utilized to maintain a newly acquired tract of land in an open condition until decisions are made concerning the tract's ultimate vegetative community.

Farming is used to complement natural food production on the refuge and assist in meeting the minimum waterfowl maintenance objectives, as determined in cooperation with the Lower Mississippi Valley Joint Venture Office of the North American Waterfowl and Wetlands Plan. Providing wintering and migrating habitat can be achieved, in part, through a successful cropland program. By incorporating a system of impoundments with the cropland program, the waterfowl maintenance objectives can be more easily met. Preferred waterfowl crops include corn, milo, rice, millet, soybeans, and natural (moist-soil) foods. By planting crops such as rice and milo in the impoundment areas and using wells to flood the areas during the wintering season, food availability for waterfowl is enhanced.

Farming is not a priority public use within the Service.

Cooperative farming is confined to those agricultural fields north of Highway 8 that were acquired as part of the refuge and have not been reforested or maintained in other vegetative communities. Tracts acquired in the future that include agricultural fields may also be farmed prior to determining ultimate vegetative communities.

Cooperative farming agreements are entered into annually, usually prior to April 15th and extend until the end of the harvest season.

Cooperative farming is conducted through a cooperative agreement wherein the cooperator provides all materials, equipment, and labor to fulfill the requirements of the contract. Facilities such as roads, gates, and access points are maintained by the refuge staff.

This use is necessary to fulfill refuge obligations to provide for the wintering needs of migratory waterfowl. While agricultural lands are abundant off the refuge, they do not provide a secure habitat for wintering waterfowl.

Availability of Resources: The North Mississippi National Wildlife Refuge Complex currently spends approximately \$3,600 of an annual budget of approximately \$750,000 in the administration of the refuge cooperative farming program. In order for the refuge to conduct the farming program in-house, specialized equipment would have to be acquired and maintained. It is estimated that utilizing refuge staff and equipment would cost approximately \$73,000 per year.

Special equipment, facilities, or improvements necessary to support the use: None

Maintenance of roads, gates, and access points for cooperative farmers: \$2,600

Monitoring costs: \$1,000

Offsetting revenues: None

Anticipated Impacts of the Use:

Short-term impacts:

Soil disturbance is likely to occur when the areas are disked during the spring planting season. These impacts are lessened by the implementation of no-till and conservation tillage farming methods. Buffer strips adjacent to water bodies and other sensitive areas help trap sediments and hold agricultural run-off.

The application of pesticides is controlled by the Service and only used after Pesticide Use Proposals submitted by the refuge manager are approved. Pesticide amounts, kinds, and methods of application are controlled by the Service. Impacts are unknown but would be short term.

Monotypic stands of agricultural crop reduce the diversity and suitability of refuge lands for a variety of migratory and resident wildlife species.

Long-term impacts:

None

Cumulative impacts:

The cumulative impacts should be minimal due to limits on the use and kinds of pesticides, no-till and conservation tillage farming practices and the use of buffer strips adjacent to water bodies and other sensitive areas.

Public Review and Comment: The period of public review and comment began September 9, 2004 and ended October 21, 2004. The following methods were used to solicit public review and comment:

- Posted notice at refuge headquarters
- Public notice in newspapers with wide local distribution
- Public meeting(s)

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

Determination (check one below):

Compatible with the following stipulations

Not Compatible

Stipulations Necessary to Ensure Compatibility: Cooperators must meet conditions outlined in the Cooperative Farming Agreements, which are contractual agreements between the refuge and local farmers. Additionally, cooperators must follow conditions outlined under integrated pest management and within the Service's Pesticide Use Proposal process. Cooperators are subject to dismissal for not meeting these conditions.

Justification: Section 6 RM 4.1 of the National Wildlife Refuge System Refuge Manual states, "Service policy is to use the most natural means available to meet wildlife objectives. In situations where objectives cannot be met through maintenance of natural ecosystems, the artificial and intensive method of cropland management may be employed. The acreage devoted to croplands will be that required to meet minimum habitat objectives." The specific objective is as follows:

Using food as an index to carrying capacity, provide wintering waterfowl habitat for:

- Ducks -1.2 million duck use days
- Geese – 0.35 million duck use days

Since establishment in 1991, the acreage of agricultural lands at Tallahatchie NWR has been reduced from 1,980 acres to 600 acres. Most of the 1,680 acres of former agricultural fields have been reforested. Complete water management through the use of wells is available on the remaining 600 acres of agricultural lands. Augmented with 718 acres of moist-soil areas, the existing agricultural lands fail to meet the food requirements for duck use days as specified in the North American Waterfowl and Wetland Plan.

Although cropland management will be directed primarily to satisfy certain habitat and life requirements of wintering waterfowl, other bird and mammal species will also benefit. The production of crops is essential for waterfowl management to meet the primary objectives for which the refuge was established. Farming is an essential management tool for providing "hot" foods for migratory birds.

The annual Cooperative Farming agreement addresses the management of the refuge farm fields. These fields are farmed by a cooperator under an agreement with the refuge. Under this agreement, the refuge receives a 25 percent share of each cooperative farmer's allotment where 1 acre out of 4 is planted for waterfowl food production. For their 75 percent share, the cooperative farmer plants rice, soybeans, corn, or milo.

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

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

Mandatory 10- or 15-Year Re-evaluation Date: _____

Description of Use: *Fishing*

Fishing was a traditional recreational use of Tallahatchie NWR prior to its inclusion in the National Wildlife Refuge System and continues to be a popular recreational pursuit. The refuge provides additional public fishing opportunities in an area that is lacking sufficient amounts of natural stream fishing open to the public, and current fish populations currently support a sustainable harvest under a regulated fishing program.

Fishing is permitted on that part of Tippo Bayou south of Highway 8 that basically forms the eastern boundary of the refuge for about 4 miles, and on Long Lake, an old channel of Tippo Bayou that is about 2 miles long and totally within the refuge. The refuge maintains a boat ramp on each of these water bodies that is open to the public with the purchase of an annual hunting and fishing permit. During high water periods in the late winter and spring, catfish, bluegill, and crappie are present in numbers to attract local anglers. However, during late summer and early fall, water levels and dissolved oxygen levels are sufficiently low that fish sampling has shown fish populations are dominated by shad, carp, and gar. Few anglers fish on the refuge during these time periods.

Fishing, a wildlife-dependent recreational pursuit, has been identified in the National Wildlife Refuge System Improvement Act of 1997 as a priority public use provided it is compatible with the purpose for which the refuge was established.

Fishing is permitted, year-round from sunrise to sunset, on that portion of Tippo Bayou south of Highway 8 that forms the eastern boundary of the refuge, and on about 2 miles of Long Lake, an old channel of Tippo Bayou that is entirely within the refuge.

Fishing is conducted on the refuge subject to regulations established by the Mississippi Department of Wildlife, Fisheries, and Parks. Fishing is further restricted by regulations which prohibit commercial fishing on the refuge, prohibit the use of certain fishing methods, and prohibit access after dark. The purchase of an annual hunting and fishing permit is required to fish on the refuge.

Fishing is conducted to provide fishable waters to the public in an area where public fishing opportunities in natural stream habitats are limited and to utilize a sustainable natural resource.

Availability of Resources: Funding for the fishing program is borne by annual operation and maintenance funds which support activities involving the public such as recreation, interpretation, environmental education, and refuge hunting and fishing programs. The North Mississippi National Wildlife Refuge Complex spends approximately \$7,000 of a budget of approximately \$750,000 in direct support of the fishing program on the refuge. Therefore, the program is in compliance with specific funding requirements of the Refuge Recreation Act.

Special equipment, facilities, or improvements necessary to support the use: None

Maintenance costs: \$5,000

Monitoring costs: \$2,000

Offsetting revenues: \$200

Anticipated Impacts of the Use:

Short-term impacts:

Minor impacts such as litter and gasoline contamination could occur but not at a level that would cause great concern.

Long-term impacts:

Since the number of persons fishing on the refuge is small and the activity occurs primarily during high water periods in the spring, no long-term impacts are expected.

Cumulative impacts:

No cumulative impacts are known to occur.

Public Review and Comment: The period of public review and comment began September 9, 2004 and ended October 21, 2004. The following methods were used to solicit public review and comment:

- Posted notice at refuge headquarters
- Public notice in newspapers with wide local distribution
- Public meeting(s)

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

Determination (check one below):

Compatible with the following stipulations

Not Compatible

Stipulations Necessary to Ensure Compatibility: Commercial fishing and possession or use of jugs, seines, nets, hand-grab baskets, or any other similar devices are prohibited. Persons are prohibited from accessing the refuge after dark.

Justification: While the number of participants is limited, fishing has been an important activity on the refuge resulting in only very temporary disturbance to refuge habitats and wildlife populations, and has caused no noticeable impact on the abundance of species sought or other wildlife affected by angler disturbance. Current regulations limit the impacts to trust species and provide a safe and rewarding experience for the refuge visitor.

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

Categorical Exclusion without Environmental Action Statement

Categorical Exclusion and Environmental Action Statement

Environmental Assessment and Finding of No Significant Impact

Environmental Impact Statement and Record of Decision

Mandatory 10- or 15-Year Re-evaluation Date: _____

Description of Use: *Hunting*

Hunting has been permitted as a compatible public use activity on Tallahatchie NWR since acquisition. The original hunting plan was completed, reviewed by the public, and approved in 1994. Refuge hunting seasons generally coincide with Mississippi state hunting seasons and require only minor changes annually. Only that part of the refuge south of Highway 8 is open to public hunting. Due to overlapping hunting seasons, hunting of one type of game may be closed for the duration of hunting of a different type of game. All hunting activities are permitted with a valid refuge hunt permit and appropriate State licenses.

The refuge hunting program is an excellent wildlife management and public relations tool that provides quality recreational opportunities for the general public while regulating specific animal populations at desired levels. The refuge hunting plan was developed to ensure that associated public recreation and wildlife management objectives are met in a responsible and consistent manner.

Hunting, a wildlife-dependent recreational pursuit, has been identified in the National Wildlife Refuge System Improvement Act of 1997 as a priority public use provided it is compatible with the purpose for which the refuge was established.

The general public can participate in hunting on Tallahatchie National Wildlife Refuge, an area of approximately 4,000 acres west of Holcomb, Mississippi.

All hunting seasons are established annually through coordination with the Mississippi Department of Wildlife, Fisheries, and Parks.

Public hunting opportunities in the northwest delta portion of the Yazoo Basin are limited with Service managed refuges and State managed wildlife management areas representing virtually all the public lands open to hunting. Private lands offer hunting opportunities only to those willing and able to purchase hunting rights through long-term leases or private ownership. The demand for public hunting areas in this portion of Mississippi is increasing as there is a shift towards a more urbanized society, and refuges are expected to meet an increasing part of this demand.

Availability of Resources: Funding for the hunting program is borne by annual operation and maintenance funds, which support activities involving the public such as fishing, photography, environmental education and interpretation, and wildlife observation. The cost of operating and maintaining the present small game, big game, turkey, and migratory waterfowl seasons would be approximately \$17,500 annually within the annual North Mississippi National Wildlife Refuge Complex budget of approximately \$750,000. Therefore, the program is in compliance with specific funding requirements of the Refuge Recreation Act.

Special equipment, facilities or improvements necessary to support the use: \$5,000

Maintenance costs: \$1,500

Permit sales: \$1,000

Law enforcement costs: \$8,500

Monitoring costs: \$1,500

Offsetting revenues: \$7,500

The refuge is a participant in the Recreational Fee Demonstration Project which currently returns 80 percent of fees generated from recreational activities back to the refuge. The offsetting revenues are from the sale of hunting and fishing permits.

Anticipated Impacts of the Use:

Short-term impacts:

That part of Tallahatchie NWR south of Highway 8 has been open to hunting since its establishment in 1992, with no documented disturbance to refuge habitats and no noticeable impact on the abundance of species hunted or other associated wildlife. While managed hunting opportunities may result in localized disruption of an individual animal's daily routine, no noticeable effect on populations has been noticed or documented. Restrictions within the hunting program, notably the closure of small game hunting during the general gun deer hunt, the requirement that all hunters, except those hunting turkey or waterfowl, wear fluorescent orange-colored material above the waistline while actually hunting, and the prohibition of hunting or shooting across any open field from ground level have been implemented due to safety concerns. These restrictions will be closely monitored for effectiveness.

Long-term impacts:

Prior to Service ownership of Tallahatchie NWR, the area south of Highway 8 was in several ownerships. Hunting was an activity that occurred on each individual parcel either by the owners or by the person or persons who leased the hunting rights from the owners. Deer and migratory waterfowl were the most heavily hunted species. While deer and migratory waterfowl are still the game most heavily hunted, hunters also pursue squirrel and rabbits. To date, there is no indication of adverse biological impacts associated with the activities. Should it become necessary, the refuge has the latitude to adjust hunting seasons and bag limits annually, and to close the refuge entirely if safety or habitat issues become concerns. This latitude, coupled with monitoring of wildlife populations and habitat conditions by the Service and the State Department of Wildlife, Fisheries and Parks, will ensure that long-term negative impacts to either wildlife populations and/or habitats on the refuge are unlikely.

Should hunting pressure continue to increase on the refuge, alternatives such as quota hunts, a reduction in the number of days of hunting, or restrictions on that part of the refuge open to hunting can be utilized to limit impacts.

Cumulative impacts:

The timing and duration of the refuge's hunting program does not coincide with most other public 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 September 9, 2004 and ended October 21, 2004. The following methods were used to solicit public review and comment:

- Posted notice at refuge headquarters
- Public notice in newspapers with wide local distribution
- Public meeting(s)

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

Determination (check one below):

- Compatible with the following stipulations
- Not Compatible

Stipulations Necessary to Ensure Compatibility: At the present time, public entry to include visitors involved in hunting is not permitted on that part of the refuge located north of Highway 8 except by special use permit.

Hunting seasons and bag limits are established annually as agreed upon during the annual hunt coordination with State personnel. These generally fall within the State framework. The refuge can, and has, established more restrictive seasons and bag limits to prevent over-harvest of individual species on the refuge. All hunters are required to purchase and possess a refuge hunting permit while participating in refuge hunts. This permit, which augments the State hunting regulations, explains not only the general hunt regulations but also the refuge-specific regulations. Law enforcement patrols are frequently conducted throughout the hunting season to ensure compliance with refuge laws and regulations. The refuge has included a RONS project for a fulltime officer to ensure compatibility long term.

Justification: That part of Tallahatchie National Wildlife Refuge located north of Highway 8 is divided by the Tippo Bayou. There is no legal access for general public use to the northeast section of the refuge. The remaining refuge lands north of Highway 8 are either enrolled in the cooperative farming program or established waterfowl management units. Management efforts are successful with large numbers of migratory waterfowl using the refuge from October to March. Experience has shown that birds using the refuge are susceptible to disturbance.

Hunting has shown to be a viable management tool for controlling wildlife populations. Allowing these uses to continue is consistent with the refuge's establishing purpose and management objectives, and follows current Service policy.

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

- Categorical Exclusion without Environmental Action Statement

Categorical Exclusion and Environmental Action Statement
 Environmental Assessment and Finding of No Significant Impact
 Environmental Impact Statement and Record of Decision

Mandatory 10- or 15-Year Re-evaluation Date: _____

Description of Use: *Off-Road Vehicle Use*

Off-road vehicle (4-wheel all-terrain) use is not a priority public use; however, it can occur on the refuge provided it is compatible with the purpose for which the refuge was established. The general public could participate in the proposed use of off-road vehicles year-round from sunrise to sunset on Tallahatchie National Wildlife Refuge, an area of approximately 4,000 acres west of Holcomb, Mississippi.

Off-road vehicles could be used on unimproved dirt roads, fire breaks, and logging roads by visitors who possess a valid hunting and fishing permit and who are gaining access to interior portions of the refuge for hunting and fishing opportunities.

The use of off-road vehicles is proposed in response to questions raised during the scoping process. These questions centered on opportunities to provide visitors who possess a valid hunting and fishing permit off-road vehicle access to internal areas of the refuge for the purpose of hunting and fishing.

Availability of Resources: Funding for this program would be borne by annual operation and maintenance funds which support activities involving the public such as interpretation, environmental education, wildlife photography, and hunting and fishing programs. The North Mississippi National Wildlife Refuge Complex would spend approximately \$27,500 of an annual budget of approximately \$750,000 in direct support of this program on Tallahatchie National Wildlife Refuge.

Special equipment, facilities, or improvements necessary to support the use: \$10,000

Maintenance costs: \$10,000

Law enforcement costs: \$5,000

Monitoring costs: \$2,500

Offsetting revenues: \$1,000

The refuge does not have the resources to administer this use. Currently, the North Mississippi National Wildlife Refuge Complex does not have law enforcement personnel to monitor this activity. The Complex has included a Refuge Operating Needs System (RONS) package for a fulltime law enforcement officer for Tallahatchie NWR. Additionally, this activity would require considerable operation and maintenance funds to maintain the existing unimproved dirt roads, fire breaks, and logging roads. It is expected that \$1,000 of offsetting revenues would be generated by the sale of hunting and fishing permits to visitors who would not use the refuge unless they could also use off-road vehicles while accessing hunting and fishing areas.

Anticipated Impacts of the Use:

Short-term impacts:

Adverse impacts to unimproved roads, fire breaks, and logging roads by the repeated use of off-road vehicles are well documented and disturbance to wildlife, plants and their habitats would occur. Such use would be limited to the hunting and fishing season which also coincides with extended periods of heavy rainfall. As use continues, the unimproved roads and fire breaks used for access become wallowed out and rainfall would accumulate in these “wet” areas. Repeated use exacerbates this condition. Conflicts would occur between those hunters and anglers who use off-road vehicles and those who object to the disturbance and noise associated with the vehicles.

Long-term impacts:

Long-term impacts from the repeated use of off-road vehicles by the public would be compounded over time. Unimproved roads and fire breaks would continue to deteriorate and annual maintenance costs would increase. Additional damage to plants and habitats would be experienced as access for the heavy equipment required to maintain these access routes is developed. Conflicts between hunters who use off-road vehicles and those who object to the associated disturbance and noise would continue.

Cumulative impacts:

No cumulative impacts are expected because other forms of public use on the unimproved roads, fire breaks, and logging roads would be limited to persons bicycling or walking. The “footprint” left by these other forms of use is very minimal. As the facilities and road network at the refuge are improved, general outdoor recreation would likely increase. With this increase in use, conflicts would also increase between hunters who use off-road vehicles and those visitors using the refuge who object to disturbance and noise.

Public Review and Comment: The period of public review and comment began September 9, 2004 and ended October 21, 2004. The following methods were used to solicit public review and comment:

- Posted notice at refuge headquarters
- Public notice in newspapers with wide local distribution
- Public meeting(s)

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

Determination (check one below):

- Compatible with the following stipulations
- Not Compatible

Stipulations Necessary to Ensure Compatibility: None

Stipulations Necessary to Ensure Compatibility: None

Justification: To provide hunter access, a series of all-weather roads have been constructed. Additional all-weather roads are planned. In addition, the unimproved roads and fire breaks are maintained obstruction free to facilitate the use of hand held carts, bicycles, wagons, etc., for the purpose of retrieving deer. These facilities eliminate the need for the average hunter to use off-road vehicles on the refuge and prevent the inevitable habitat destruction that accompanies this usage type. Off-road vehicle usage is an activity which is not compatible with refuge objectives.

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

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

Mandatory 10- or 15-Year Re-evaluation Date: _____

Description of Use: *Resource Research Studies*

This activity would allow university professors and their students, nongovernmental researchers, and governmental scientists access to the Tallahatchie NWR's natural environment to conduct both short- and long-term research projects and surveys. 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.

Resource research studies are not a priority public use within the Service, but do support the mission of the Service in gathering good scientific data to make management decisions.

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 vary 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 plots.

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.

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. The refuge provides secure sites for long-term evaluation of management actions, population trends and ecological functions within the bottomland hardwood ecosystems in northwest Mississippi.

Availability of Resources: Funding for this program is borne by annual operation and maintenance funds which support activities involving the public such as recreation, interpretation, environmental education, and refuge hunting and fishing programs. The North Mississippi National Wildlife Refuge Complex spends approximately \$3,600 of an annual budget of approximately \$750,000 in direct support of these programs on Tallahatchie NWR. Therefore, the program is in compliance with specific funding requirements of the Refuge Recreation Act.

Special equipment, facilities or improvement necessary to support the use: None

Maintenance costs: \$1,000

Monitoring costs: \$2,600

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 trampling vegetation, removal of small numbers of plants and/or animals and temporary disturbance to wildlife could occur, but should not be significant. The small number of individual plants and animals that may be collected for further study would not have a significant effect on the refuge plant and animal populations, and would require management approval prior to collecting.

Long-term impacts:

Long-term benefits associated with improved management techniques developed through research or surveys would far outweigh any negative impacts which may occur.

Cumulative impacts:

No adverse cumulative effects are anticipated.

Public Review and Comment: The period of public review and comment began September 9, 2004 and ended October 21, 2004. The following methods were used to solicit public review and comment:

- Posted notice at refuge headquarters
- Public notice in newspapers with wide local distribution
- Public meeting(s)

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

Determination (check one below):

Compatible with the following stipulations

Not Compatible

Stipulations Necessary to Ensure Compatibility: Each request for use of the refuge for research or survey would be examined on its individual merit. Questions of who, what, when, where, and why, would be asked to determine if the requested research contributed to the refuge purposes and could best be conducted on the refuge without significantly affecting the resources. If so, the researcher would be issued a Special Use Permit that would clearly define allowed activities. Progress would be monitored and the researcher would be required to submit annual progress reports and copies of all publications derived from the research.

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

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

Categorical Exclusion without Environmental Action Statement

Categorical Exclusion and Environmental Action Statement

Environmental Assessment and Finding of No Significant Impact

Environmental Impact Statement and Record of Decision

Mandatory 10- or 15-Year Re-evaluation Date: _____

Description of Use: *Wildlife Observation and Photography*

Wildlife observation and photography have been identified in the National Wildlife Refuge System Improvement Act of 1997 as priority wildlife-dependent recreational uses provided they are compatible with the purpose for which the refuge was established.

Wildlife photography, including other image-capturing activities such as videography, has occurred on the refuge. There are no photography blinds or platforms on the refuge and none are proposed at this time. However, opportunities exist for photography on the refuge. This compatibility determination applies to personal photography only. Commercial photography or videography, if allowed, would require a special use permit by the refuge with specific restrictions.

The general public can participate in wildlife observation and photography year-round from sunrise to sunset on Tallahatchie National Wildlife Refuge, an area of approximately 4,000 acres west of Holcomb, Mississippi.

Wildlife observation and photography can be accomplished while driving or walking on refuge roads open to public vehicular traffic. Also, these priority public uses can be accomplished by boating on refuge waters or walking the unimproved roads and fire breaks.

The National Wildlife Refuge System Improvement Act of 1997 identifies wildlife observation and photography as priority public uses for national wildlife refuges, along with hunting, fishing, environmental education, and interpretation. As expressed priority uses of the Refuge System, these uses take precedence over other potential public uses in refuge planning and management. The Service strives to provide priority public uses when compatible with the purposes of the refuge and the mission of the National Wildlife Refuge System.

Availability of Resources: Funding for this operation is borne by annual operation and maintenance funds which support activities involving the public, such as environmental education, interpretation, hunting and fishing programs. The North Mississippi National Wildlife Refuge Complex spends approximately \$6,000 of an annual budget of approximately \$750,000 in direct support of these programs on Tallahatchie NWR. Therefore, the program is in compliance with specific funding requirements of the Refuge Recreation Act.

Special equipment, facilities, or improvements necessary to support the use: \$3,000

Maintenance costs: \$2,000

Monitoring costs: \$1,000

Anticipated Impacts of the Use:

Short-term impacts:

The refuge provides habitat for resident and migratory wildlife. As a result of these activities, individual animals may be disturbed by human contact to varying degrees. Examples of potential disturbance include flushing of birds from feeding, resting, or nesting areas and trampling of plants from observers and photographers wandering off designated roads in order to get closer to subjects. Disturbance to trust species are expected to be minimal. Short-term impacts to facilities such as roads and trails can be avoided by special closures due to unsafe conditions. The wildlife observation and photography programs have been designed to avoid or minimize impacts to refuge resources and visitors.

Long-term impacts:

Due to the recovery time between periods of expected use, no long-term impacts are expected.

Cumulative impacts:

No cumulative adverse impacts are anticipated. However, programs can be modified in the future to mitigate unforeseen impacts.

Public Review and Comment: The period of public review and comment began September 9, 2004 and ended October 21, 2004. The following methods were used to solicit public review and comment:

- Posted notice at refuge headquarters
- Public notice in newspapers with wide local distribution
- Public meeting(s)

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

Determination (check one below):

Compatible with the following stipulations

Not Compatible

Stipulations: At the present time, public entry to include visitors involved in wildlife observation and photography is not permitted on that part of the refuge located north of Highway 8 except by special use permit.

Justification: That part of Tallahatchie National Wildlife Refuge located north of Highway 8 is divided by the Tippo Bayou. There is no legal access for general public use to the northeast section of the refuge. The remaining refuge lands north of Highway 8 are either enrolled in the cooperative farming program or established waterfowl management units. Management efforts are successful with large numbers of migratory waterfowl using the refuge from October to March. Experience has shown that birds using the refuge are susceptible to disturbance. The northwest section of the refuge is bisected by a public county road which offers an excellent opportunity for wildlife observation and photography.

These wildlife-dependent uses are priority public uses of the National Wildlife Refuge System. Providing opportunities for wildlife observation and photography would contribute toward fulfilling provisions of the National Wildlife Refuge System Administration Act, as amended in 1997. Wildlife observation and photography would provide an excellent forum for allowing public access and increasing understanding of refuge resources. The stipulations outlined above should minimize potential impacts relative to wildlife/human interactions. In our opinion, these wildlife dependent uses will not conflict with the national policy to maintain the biological diversity, integrity, and environmental health of the refuge.

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

Categorical Exclusion without Environmental Action Statement

Categorical Exclusion and Environmental Action Statement

Environmental Assessment and Finding of No Significant Impact

Environmental Impact Statement and Record of Decision

Mandatory 10- or 15-Year Re-evaluation Date: _____

Approval of Compatibility Determinations:

The signature of approval covers all the compatibility determinations considered within the Comprehensive Conservation Plan for the North Mississippi National Wildlife Refuge Complex. If one of the descriptive uses is considered for compatibility outside of the plan, the approval signatures become part of that determination.

Signature: _____
Project Leader Date

Review: _____
Regional Compatibility Coordinator Date

Review: _____
Refuge Supervisor Date

Concurrence: _____
Regional Chief
National Wildlife Refuge System
Southeast Region Date

APPENDIX E: SPECIES LISTS

MASTER LIST OF BIRD SPECIES*

Common Name	Scientific Name
Pied-billed grebe	<i>Podilymbus podiceps</i>
Horned grebe	<i>Podiceps auritus</i>
Eared grebe	<i>Podiceps nigricollis</i>
American white pelican	<i>Pelecanus erythrorhynchus</i>
Anhinga	<i>Anhinga anhinga</i>
Double-crested cormorant	<i>Phalacrocorax auritus</i>
Least bittern	<i>Ixobrychus exilis</i>
American bittern	<i>Botarus lentiginosus</i>
Black-crowned night-heron	<i>Nycticorax nycticorax</i>
Yellow-crowned night-heron	<i>Nyctanassa violacea</i>
Green heron	<i>Butorides striatus</i>
Tricolored heron	<i>Egretta tricolor</i>
Little blue heron	<i>Egretta caerulea</i>
Cattle egret	<i>Bubulcus ibis</i>
Snowy egret	<i>Egretta thula</i>
Great egret	<i>Casmerodius albus</i>
Great blue heron	<i>Ardea herodias</i>
Wood stork	<i>Mycteria americana</i>
Glossy ibis	<i>Plegadis falcinellus</i>
White-faced ibis	<i>Plegadis chihi</i>
White ibis	<i>Eudocimus albus</i>
Roseate spoonbill	<i>Ajaia ajaja</i>
Sandhill crane	<i>Grus canadensis</i>
Greater white-fronted goose	<i>Anser albifrons</i>
Snow goose	<i>Chen caerulescens</i>
Ross' goose	<i>Chen rossii</i>
Canada goose	<i>Branta canadensis</i>
Mallard	<i>Anas platyrhynchos</i>
American black duck	<i>Anas rubripes</i>
Gadwall	<i>Anas strepera</i>
American green-winged teal	<i>Anas crecca</i>
American wigeon	<i>Anas americana</i>
Northern pintail	<i>Anas acuta</i>
Northern shoveler	<i>Anas clypeata</i>
Blue-winged teal	<i>Anas discors</i>
Ruddy duck	<i>Oxyura jamaicensis</i>
Fulvous whistling-duck	<i>Dendrocygna bicolor</i>
Wood duck	<i>Aix sponsa</i>
Canvasback	<i>Aythya valisineria</i>
Redhead	<i>Aythya americana</i>
Ring-necked duck	<i>Aythya collaris</i>
Greater scaup	<i>Aythya marila</i>
Lesser scaup	<i>Aythya affinis</i>
Oldsquaw	<i>Clangula hyemalis</i>
Common goldeneye	<i>Bucephala clangula</i>

Bufflehead	<i>Bucephala albeola</i>
Common merganser	<i>Mergus merganser</i>
Red-breasted merganser	<i>Mergus serrator</i>
Hooded merganser	<i>Lophodytes cucullatus</i>
King rail	<i>Rallus elegans</i>
Virginia rail	<i>Rallus limicola</i>
Sora	<i>Porzana carolina</i>
Yellow rail	<i>Coturnicops noveborasensis</i>
Purple gallinule	<i>Porphyryla martinica</i>
Common moorhen	<i>Gallinula chloropus</i>
American coot	<i>Fulica americana</i>
American avocet	<i>Recurvirostra americana</i>
Black-necked stilt	<i>Himantopus mexicanus</i>
Wilson's plover	<i>Charadrius wilsonia</i>
Semipalmated plover	<i>Charadrius semipalmatus</i>
Killdeer	<i>Charadrius vociferous</i>
Black-bellied plover	<i>Pluvialis squatrola</i>
American golden plover	<i>Pluvialis dominica</i>
Marbled godwit	<i>Limosa fedoa</i>
Hudsonian godwit	<i>Limosa haemastica</i>
Whimbrel	<i>Numenius phaeopus</i>
Willet	<i>Catoptrophorus semipalmatus</i>
Greater yellowlegs	<i>Tringa melanoleuca</i>
Lesser yellowlegs	<i>Tringa flavipes</i>
Solitary sandpiper	<i>Tringa solitaria</i>
Spotted sandpiper	<i>Actitis macularia</i>
Wilson's phalarope	<i>Phalaropus tricolor</i>
Red-necked phalarope	<i>Phalaropus lobatus</i>
Red phalarope	<i>Phalaropus fulicaria</i>
Short-billed dowitcher	<i>Limnodromus griseus</i>
Long-billed dowitcher	<i>Limnodromus scolopaceus</i>
Stilt sandpiper	<i>Calidris himantopus</i>
Common snipe	<i>Gallinago gallinago</i>
American woodcock	<i>Scolopax minor</i>
Ruddy turnstone	<i>Arenaria interpres</i>
Dunlin	<i>Calidris alpina</i>
Sanderling	<i>Calidris alba</i>
Semipalmated sandpiper	<i>Calidris pusilla</i>
Western sandpiper	<i>Calidris mauri</i>
Least sandpiper	<i>Calidris minutilla</i>
White-rumped sandpiper	<i>Calidris fuscicollis</i>
Baird's sandpiper	<i>Calidris bairdii</i>
Pectoral sandpiper	<i>Calidris melanotos</i>
Ruff	<i>Philomachus pugnax</i>
Upland sandpiper	<i>Bartramia longicauda</i>
Buff-breasted sandpiper	<i>Tryngites subruficollis</i>
Franklin's gull	<i>Larus pipixcan</i>
Laughing gull	<i>Larus atricilla</i>
Bonaparte's gull	<i>Larus philadelphia</i>
Ring-billed gull	<i>Larus delawarensis</i>
Herring gull	<i>Larus argentatus</i>

Common tern	<i>Sterna hirundo</i>
Forster's tern	<i>Sterna forsteri</i>
Least tern	<i>Sterna antillarum</i>
Black tern	<i>Chlidonias niger</i>
Caspian tern	<i>Sterna caspia</i>
Turkey vulture	<i>Cathartes aura</i>
Black vulture	<i>Coragyps atratus</i>
Golden eagle	<i>Aquila chrysaetos</i>
Bald eagle	<i>Haliaeetus leucocephalus</i>
Mississippi kite	<i>Ictinia mississippiensis</i>
American swallow-tailed kite	<i>Elanoides forficatus</i>
Northern harrier	<i>Circus cyaneus</i>
Sharp-shinned hawk	<i>Accipiter striatus</i>
Cooper's hawk	<i>Accipiter cooperii</i>
Red-shouldered hawk	<i>Buteo lineatus</i>
Broad-winged hawk	<i>Buteo platypterus</i>
Red-tailed hawk	<i>Buteo jamaicensis</i>
Osprey	<i>Pandion haliaetus</i>
American kestrel	<i>Falco sparverius</i>
Merlin	<i>Falco columbarius</i>
Peregrine falcon	<i>Falco peregrinus</i>
Northern bobwhite	<i>Colinus virginianus</i>
Wild turkey	<i>Meleagris gallopavo</i>
Rock dove	<i>Columba livia</i>
Mourning dove	<i>Zenaida macroura</i>
Common ground-dove	<i>Columbina passerine</i>
Yellow-billed cuckoo	<i>Coccyzus americanus</i>
Barn owl	<i>Tyto alba</i>
Short-eared owl	<i>Asio flammeus</i>
Great horned owl	<i>Bubo virginianus</i>
Barred owl	<i>Strix varia</i>
Eastern screech owl	<i>Otus asio</i>
Chuck-will's-widow	<i>Caprimulgus carolinensis</i>
Whip-poor-will	<i>Caprimulgus vociferous</i>
Common nighthawk	<i>Chordeiles minor</i>
Chimney swift	<i>Chaetura pelagica</i>
Ruby-throated hummingbird	<i>Archilochus colubris</i>
Belted kingfisher	<i>Ceryle alcyon</i>
Red-bellied woodpecker	<i>Melanerpes carolinus</i>
Northern flicker	<i>Colaptes auratus</i>
Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>
Yellow-bellied sapsucker	<i>Sphyrapicus varius</i>
Downy woodpecker	<i>Picoides pubescens</i>
Hairy woodpecker	<i>Picoides villosus</i>
Pileated woodpecker	<i>Dryocopus pileatus</i>
Eastern kingbird	<i>Tyrannus tyrannus</i>
Scissor-tailed flycatcher	<i>Tyrannus forficatus</i>
Great crested flycatcher	<i>Myiarchus crinitus</i>
Olive-sided flycatcher	<i>Contopus borealis</i>
Eastern wood-pewee	<i>Contopus virens</i>
Eastern phoebe	<i>Sayornis phoebe</i>

Acadian flycatcher	<i>Empidonax virescens</i>
Willow flycatcher	<i>Empidonax traillii</i>
Horned lark	<i>Eremophila alpestris</i>
Tree swallow	<i>Tachycineta bicolor</i>
Purple martin	<i>Progne subis</i>
Bank swallow	<i>Riparia riparia</i>
Northern rough-winged swallow	<i>Stelgidopteryx serripennis</i>
Cliff swallow	<i>Hirundo pyrrhonota</i>
Barn swallow	<i>Hirundo rustica</i>
Blue jay	<i>Cyanocitta cristata</i>
American crow	<i>Corvus brachyrhynchos</i>
Fish crow	<i>Corvus ossifragus</i>
Tufted titmouse	<i>Parus bicolor</i>
Carolina chickadee	<i>Parus carolinensis</i>
Brown creeper	<i>Certhia americana</i>
White-breasted nuthatch	<i>Sitta carolinensis</i>
Red-breasted nuthatch	<i>Sitta canadensis</i>
House wren	<i>Troglodytes aedon</i>
Winter wren	<i>Troglodytes troglodytes</i>
Carolina wren	<i>Thryothorus ludovicianus</i>
Bewick's wren	<i>Thryomanes bewickii</i>
Marsh wren	<i>Cistothorus palustris</i>
Sedge wren	<i>Cistothorus platensis</i>
Golden-crowned kinglet	<i>Regulus satrapa</i>
Ruby-crowned kinglet	<i>Regulus calendula</i>
Blue-gray gnatcatcher	<i>Polioptila caerulea</i>
Eastern bluebird	<i>Sialia sialis</i>
Wood thrush	<i>Hylocichla mustelina</i>
Veery	<i>Catharus fuscescens</i>
Swainson's thrush	<i>Catharus ustulatus</i>
Gray-cheeked thrush	<i>Catharus minimus</i>
Hermit thrush	<i>Catharus guttatus</i>
American robin	<i>Turdus migratorius</i>
Loggerhead shrike	<i>Lanius ludovicianus</i>
Gray catbird	<i>Dumetella carolinensis</i>
Northern mockingbird	<i>Mimus polyglottos</i>
Brown thrasher	<i>Toxostoma rufum</i>
American pipit	<i>Anthus rubescens</i>
Cedar waxwing	<i>Bombycilla cedrorum</i>
European starling	<i>Sturnus vulgaris</i>
White-eyed vireo	<i>Vireo griseus</i>
Yellow-throated vireo	<i>Vireo flavifrons</i>
Red-eyed vireo	<i>Vireo olivaceus</i>
Warbling vireo	<i>Vireo gilvus</i>
Philadelphia vireo	<i>Vireo philadelphicus</i>
Prothonotary warbler	<i>Protonotaria citrea</i>
Blue-winged warbler	<i>Vermivora pinus</i>
Tennessee warbler	<i>Vermivora peregrine</i>
Northern parula	<i>Parula americana</i>
Black-and-white warbler	<i>Mniotilta varia</i>
Cerulean warbler	<i>Dendroica cerulean</i>

Blackburnian warbler	<i>Dendroica fusca</i>
Magnolia warbler	<i>Dendroica magnolia</i>
Yellow-rumped warbler	<i>Dendroica coronata</i>
Black-throated green warbler	<i>Dendroica virens</i>
Yellow-throated warbler	<i>Dendroica dominica</i>
Bay-breasted warbler	<i>Dendroica castanea</i>
Blackpoll warbler	<i>Dendroica striata</i>
Pine warbler	<i>Dendroica pinus</i>
Palm warbler	<i>Dendroica palmarum</i>
Yellow warbler	<i>Dendroica petechia</i>
Canada warbler	<i>Wilsonia canadensis</i>
Willson's warbler	<i>Wilsonia pusilla</i>
Hooded warbler	<i>Wilsonia citrine</i>
Worm-eating warbler	<i>Helmitheros vermivorus</i>
Swainson's warbler	<i>Limnothlypis swainsonii</i>
Ovenbird	<i>Seiurus aurocapillus</i>
Louisiana waterthrush	<i>Seiurus motacilla</i>
Northern waterthrush	<i>Seiurus noveboracensis</i>
Common yellowthroat	<i>Geothlypis trichas</i>
Yellow-breasted chat	<i>Icteria virens</i>
American redstart	<i>Setophaga ruticilla</i>
Rose-breasted grosbeak	<i>Pheucticus ludovicianus</i>
Northern cardinal	<i>Cardinalis cardinalis</i>
Blue grosbeak	<i>Guiraca caerulea</i>
Indigo bunting	<i>Passerina cyanea</i>
Painted bunting	<i>Passerina ciris</i>
Rufous-sided towhee	<i>Pipilo erythrophthalmus</i>
Grasshopper sparrow	<i>Ammodramus savannarum</i>
Le Conte's sparrow	<i>Ammodramus leconteii</i>
Vesper sparrow	<i>Pooecetes gramineus</i>
Savannah sparrow	<i>Passerculus sandwichensis</i>
Song sparrow	<i>Melospiza melodia</i>
Field sparrow	<i>Spizella pusilla</i>
Chipping sparrow	<i>Spizella passerine</i>
Dark-eyed junco	<i>Junco hyemalis</i>
White-throated sparrow	<i>Zonotrichia albicollis</i>
White-crowned sparrow	<i>Zonotrichia leucophrys</i>
Fox sparrow	<i>Passerella iliaca</i>
Lincoln's sparrow	<i>Melospiza lincolnii</i>
Swamp sparrow	<i>Melospiza georgiana</i>
Dickcissel	<i>Spiza americana</i>
Bobolink	<i>Dolichonyx oryzivorus</i>
Eastern meadowlark	<i>Sturnella magna</i>
Yellow-headed blackbird	<i>Xanthocephalus xanthocephalus</i>
Red-winged blackbird	<i>Agelaius phoeniceus</i>
Rusty blackbird	<i>Euphagus carolinus</i>
Brewer's blackbird	<i>Euphagus cyanocephalus</i>
Brown-headed cowbird	<i>Molothrus ater</i>
Common grackle	<i>Quiscalus quiscula</i>
Orchard oriole	<i>Icterus spurius</i>
Baltimore oriole	<i>Icterus galbula</i>

Scarlet tanager	<i>Piranga olivacea</i>
Summer tanager	<i>Piranga rubra</i>
House sparrow	<i>Passer domesticus</i>
Pine siskin	<i>Carduelis pinus</i>
American goldfinch	<i>Carduelis tristis</i>
Purple finch	<i>Carpodacus purpureus</i>
House finch	<i>Carpodacus mexicanus</i>

*Birds documented on at least one of the three refuges in the Complex

MASTER LIST OF MAMMALS SPECIES*

Order Marsupialia

Family Didelphidae

Didelphis virginiana Virginia opossum

Family Soricidae

Sorex logirostris southeastern shrew
Blarina carolinensis southern short-tailed shrew
Cryptotis parva least shrew

Family Talpidae

Scalopus aquaticus eastern mole

Order Chiroptera

Family Vespertilionidae

Myotis austroriparius southeastern myotis
Myotis grisescens gray myotis
Myotis lucifugus little brown bat
Myotis septentrionalis northern myotis
Myotis sodalis Indiana myotis
Lasionycteris noctivagans silver-haired bat
Pipistrellus subflavus eastern pipistrelle
Eptesicus fuscus big brown bat
Lasiurus borealis eastern red bat
Lasiurus cinereus hoary bat
Lasiurus intermedius northern yellow bat
Lasiurus seminolus Seminole bat
Nycticeius humeralis evening bat
Plecotus rafinesquii Rafinesque's big-eared bat

Family Molossidae

Tadarida brasiliensis Brazilian free-tailed bat

Order Xenarthra

Family Dasypodidae

Dasypus novemcinctus nine-banded armadillo

Order Lagomorpha

Family Leporidae

Sylvilagus aquaticus swamp rabbit

Sylvilagus floridanus eastern cottontail

Order Rodentia

Family Sciuridae

Tamias striatus eastern chipmunk

Marmota monax woodchuck

Sciurus carolinensis gray squirrel

Sciurus niger fox squirrel

Glaucomys volans eastern flying squirrel

Family Castoridae

Castor canadensis beaver

Family Cricetidae

Oryzomys palustris marsh rice rat

Reithrodontomys fulvescens fulvous harvest mouse

Reithrodontomys humulis eastern harvest mouse

Peromyscus gossypinus cotton mouse

Peromyscus leucopus white-footed mouse

Peromyscus maniculatus deer mouse

Peromyscus polionotus oldfield mouse

Ochrotomys nuttalli golden mouse

Sigmodon hispidus hispid cotton rat

Neotoma floridana eastern woodrat

Microtus pinetorum woodland vole

Ondatra zibethicus muskrat

Family Muridae

Rattus norvegicus Norway rat

Rattus rattus roof rat

Mus musculus house mouse

Family Zapodidae

Zapus hudsonius meadow jumping mouse

Family Myocastoridae

Myocastor coypus nutria

Order Carnivora**Family Canidae**

Canis familiaris domestic dog

Canis latrans coyote

Canis rufus red wolf

Vulpes vulpes red fox

Urocyon cinereoargenteus gray fox

Family Ursidae

Ursus americanus black bear

Family Procyonidae

Procyon lotor raccoon

Family Mustelidae

Mustela frenata long-tailed weasel

Mustela vison mink

Spilogale putorius eastern spotted skunk

Mephitis mephitis striped skunk

Lutra canadensis river otter

Family Felidae

Felis catus domestic cat

Felis concolor mountain lion

Lynx rufus bobcat

Order Artiodactyla**Family Suidae**

Sus scrofa wild pig

Family Cervidae

Odocoileus virginianus white-tailed deer

* at least one refuge in the Complex is within the historic range of the species

MASTER LIST OF AMPHIBIANS AND REPTILES*

		CWR	DAH	TAL
Spadefoot toads	Pelobatidae			
Eastern spadefoot toad	<i>Scaphiopus holbrookii</i>			
Narrowmouth toads	Microhylidae			
Eastern narrowmouth toad	<i>Gastrophryne carolinensis</i>	X	X	X
Toads	Bufonidae			
American toad	<i>Bufo americanus</i>		X	X
Southern toad	<i>Bufo terrestris</i>			
Fowler's toad	<i>Bufo woodhousii fowleri</i>	X	X	X
Treefrogs	Hylidae			
Green treefrog	<i>Hyla cinerea</i>	X	X	X
Bird-voiced treefrog	<i>Hyla avivoca</i>			X
Gray treefrog	<i>Hyla versicolor</i>			
Cope's gray treefrog	<i>Hyla chrysoscelis</i>			
Gray treefrog species	<i>Hyla versicolor/chrysoscelis</i>	X	X	X
Upland chorus frog	<i>Pseudacris triseriata feriarum</i>	X		
Northern spring peeper	<i>Pseudacris crucifer</i>	X	X	
Northern cricket frog	<i>Acris crepitans</i>	X	X	X
Southern cricket frog	<i>Acris gryllus</i>	X		X
True frogs	Ranidae			
Bronze frog	<i>Rana clamitans</i>	X	X	X
Bullfrog	<i>Rana catesbeiana</i>	X	X	X
Southern leopard frog	<i>Rana utricularia</i>	X	X	X
Northern crawfish frog	<i>Rana areolata</i>			
Pickerel frog	<i>Rana palustris</i>	X		
Sirens	Sirenidae			
Western lesser siren	<i>Siren intermedia</i>		X	
Amphiumas	Amphiumidae			
Three-toed amphiuma	<i>Amphiuma tridactylum</i>			X
Newts	Salamandridae			
Central newt	<i>Notophthalmus viridescens</i>		X	
Mole salamanders	Ambystomatidae			
Mole salamander	<i>Ambystoma talpoideum</i>		X	
Smallmouth salamander	<i>Ambystoma texanum</i>			
Spotted salamander	<i>Ambystoma maculatum</i>			
Marbled salamander	<i>Ambystoma opacum</i>		X	
Lungless salamanders	Plethodontidae			
Spotted dusky salamander	<i>Desmognathus fuscus</i>			
Southern red salamander	<i>Pseudotriton ruber</i>			
Mississippi slimy salamander	<i>Plethodon glutinosus</i>	CWR	DAH	TAL

Southern two-lined salamander	<i>Eurycea cirrigera</i>			
Three-lined salamander	<i>Eurycea longicauda</i>			
Alligators	Alligatoridae			
American alligator	<i>Alligator mississippiensis</i>			X
Snapping turtles	Chelydridae			
Alligator snapping turtle	<i>Macroclmys temminckii</i>			X
Common snapping turtle	<i>Chelydra serpentina</i>	X	X	X
Musk turtles	Kinosternidae			
Common musk turtle	<i>Sternotherus odoratus</i>	X	X	X
Razorback musk turtle	<i>Sternotherus carinatus</i>			
Eastern mud turtle	<i>Kinosternon s. subrubrum</i>			
Mississippi mud turtle	<i>Kinosternon s. hippocrepis</i>	X		X
Mud turtle sp.	<i>Kinosternon subrubrum</i>	X	X	
Box and water turtles	Emydidae			
Ouachita map turtle	<i>Graptemys pseudogeographica</i>			
Mississippi map turtle	<i>Graptemys kohnii</i>			X
Southern painted turtle	<i>Chrysemys picta</i>	X		
River cooter	<i>Pseudemys concinna</i>			X
Red-eared slider	<i>Trachemys scripta</i>	X	X	X
Three-toed box turtle	<i>Terrapene carolina</i>	X	X	
Midland smooth softshell turtle	<i>Apalone mutica</i>			
Spiny softshell turtle	<i>Apalone spinifera</i>	X		X
Softshell turtle species	<i>Apalone sp.</i>	X		X
Iguanian Lizards	Iguanidae			
Green anole	<i>Anolis carolinensis</i>			
Northern fence lizard	<i>Sceloporus undulatus</i>			
Skinks	Scincidae			
Ground skink	<i>Scincella lateralis</i>		X	X
Five-lined skink	<i>Eumeces fasciatus</i>		X	X
Broadhead skink	<i>Eumeces laticeps</i>			
Southeastern five-lined skink	<i>Eumeces inexpectatus</i>			
Whiptails	Teiidae			
Six-lined racerunner	<i>Cnemidophorus sextineatus</i>			
Glass lizards	Anguidae			
Eastern glass lizard	<i>Ophisaurus attenuatus</i>			
		CWR	DAH	TAL
Colubrids	Colubridae			
Midland water snake	<i>Nerodia sipedon pleuralis</i>		X	
Broad-banded water snake	<i>Nerodia fasciata confluens</i>		X	X
Yellowbelly water snake	<i>Nerodia erythrogaster flavigaster</i>		X	X
Diamondback water snake	<i>Nerodia rhombifer</i>	X	X	X
		CWR	DAH	TAL
Mississippi green water snake	<i>Nerodia cyclopion</i>			
Graham's crayfish snake	<i>Regina grahamii</i>			

Eastern garter snake	<i>Thamnophis sirtalis</i>		X	
Eastern ribbon snake	<i>Thamnophis sauritus</i>			
Western ribbon snake	<i>Thamnophis proximus</i>	X	X	X
Midland brown snake	<i>Storeria dekayi</i>			
Rough earth snake	<i>Virginia striatula</i>			
Western smooth earth snake	<i>Virginia valeriae</i>			
Mississippi ringneck snake	<i>Diadophis punctatus</i>			
Eastern hognose snake	<i>Heterodon platirhinos</i>			
Midwest worm snake	<i>Carphophis amoenus</i>			
Northern scarlet snake	<i>Cemophora coccinea</i>			
Rough green snake	<i>Opheodrys aestivus</i>			
Western mud snake	<i>Farancia abacura</i>		X	X
Blackmask racer	<i>Coluber constrictor latrunculus</i>	X	X	
Black rat snake	<i>Elaphe o. obsoleta</i>			
Gray rat snake	<i>Elaphe o. spiloides</i>			
Rat snake sp.	<i>Elaphe obsoleta</i>		X	
Corn snake	<i>Elaphe guttata</i>			
Red milk snake	<i>Lampropeltis triangulum</i>			
Scarlet kingsnake	<i>Lampropeltis triangulum</i>			
Prairie kingsnake	<i>Lampropeltis calligaster</i>			
Mole kingsnake	<i>Lampropeltis calligaster</i>			
Speckled kingsnake	<i>Lampropeltis getula holbrooki</i>	X		X
Pit vipers		Viperidae		
Western cottonmouth	<i>Agkistrodon piscivorus</i>	X	X	X
Southern copperhead	<i>Agkistrodon contortrix</i>			
Western pigmy rattlesnake	<i>Sistrurus miliarius</i>			
Timber rattlesnake	<i>Crotalus horridus</i>		X	

Note: 'X' indicates a species has been documented at the refuge to which that column corresponds

*An 'X' in a given column means documented occurrence at the refuge indicated; CWR denotes Coldwater River, DAH denotes Dahomey, and TAL denotes Tallahatchie NWR's; when no 'X' appears, it means that the species is likely or suspected to occur on the Complex, but has not yet been observed.

APPENDIX F: COMPLIANCE REQUIREMENTS

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 non-Federal, 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 Farmers Home Administration (FmHA), but 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 National Wildlife Refuge and National Park Systems 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 land, 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 Refuge System Improvement Act clearly defines a unifying mission for the Refuge System; establishes the legitimacy and appropriateness of the six priority public uses (hunting, fishing, wildlife observation and 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 Refuge System; and requires a Comprehensive Conservation Plan for each refuge by the year 2012. The 1997 Act 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 (1977): Each Federal agency shall 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 the floodplains.

Executive Order 11990 (1977): Executive Order 11990 directs Federal agencies to (1) minimize 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 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 Refuge 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 Refuge 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 G: BIBLIOGRAPHY AND REFERENCES CITED

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