
**DRAFT COMPREHENSIVE CONSERVATION PLAN
AND ENVIRONMENTAL ASSESSMENT**

CHICKASAW NATIONAL WILDLIFE REFUGE
Lauderdale County, Tennessee

**U.S. Department of the Interior
Fish and Wildlife Service
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I. Background

INTRODUCTION

The U.S. Fish and Wildlife Service (Service) has prepared this Draft Comprehensive Conservation Plan to guide the management actions and direction of Chickasaw National Wildlife Refuge over the next 15 years. When fully implemented, this plan would strive to achieve the vision, goals, and objectives of the refuge. The plan's overriding considerations are that fish and wildlife conservation is the first priority in refuge management, and that wildlife-dependent recreational uses are allowed and encouraged as long as they are compatible with, or do not detract from, the mission of the National Wildlife Refuge System and the purposes for which the refuge was established.

In conjunction with comprehensive conservation planning in west Tennessee, a collaborative planning process was performed simultaneously with the State of Tennessee. The area for this joint planning study includes all of west Tennessee from the Mississippi River to the Tennessee River, and from border to border between the states of Kentucky and Mississippi. This area encompasses approximately six million acres of private, state, and federal lands, including national wildlife refuge lands (Figure 1). This cooperative planning effort is described more fully in subsequent sections of this chapter, and in Chapter II, The Planning Process.

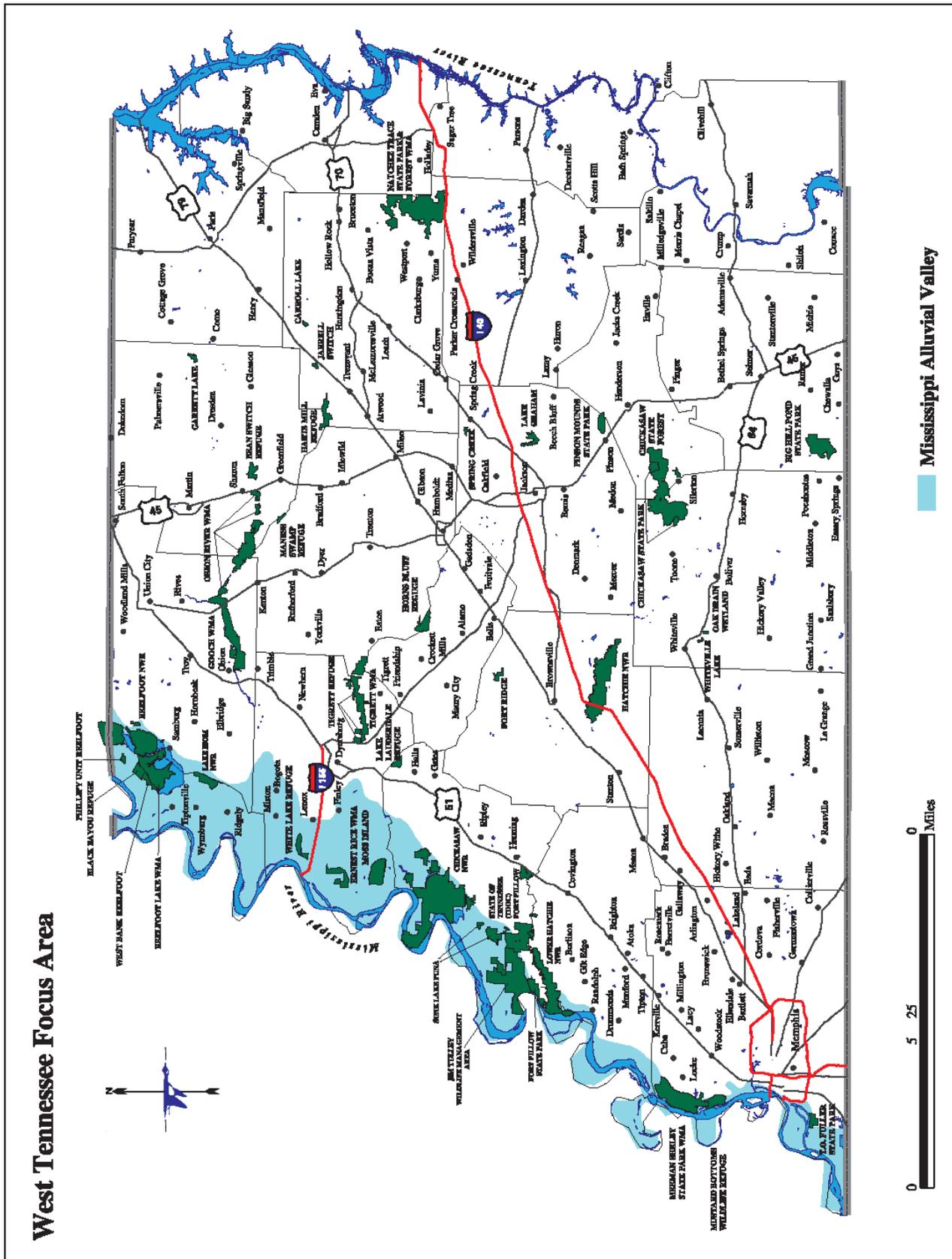
During the planning process, a range of four management alternatives was developed for Chickasaw National Wildlife Refuge in an effort to determine how best to manage the refuge for the next 15 years. The alternatives covered a broad spectrum of comments from the refuge staff, the general public, and others during the public scoping process. After reviewing the refuge's management needs, the priorities of regional and national resource management plans, and comments from the staff and public, the four alternatives were evaluated and a proposed action was then selected. The proposed action is described in Chapter V, Plan Implementation. The other alternatives considered during the planning process are addressed in the Draft Environmental Assessment (Section B).

PURPOSE AND NEED FOR THE PLAN

The purpose of the plan is to identify the role the refuge would play in support of the National Wildlife Refuge System and to provide guidance in refuge management activities. The plan is needed to

- provide a clear statement of direction for the future management of the refuge;
- ensure that management of the refuge is in keeping with the purposes for which the refuge was established;
- provide refuge neighbors, visitors, and government officials with an understanding of the Service's management actions on and in partnerships around the refuge;
- ensure that the Service's management actions, including land protection and recreation/education programs, are consistent with the mandates of the National Wildlife Refuge System, including the National Wildlife Refuge System Improvement Act of 1997;
- ensure that the management of the refuge is consistent with federal, state, and county plans; and
- provide a basis for the refuge's operational, maintenance, and capital improvement needs.

Figure 1. Focus area for west Tennessee planning effort



To better accomplish the mission of the National Wildlife Refuge System, the Service continues to seek cooperative working relationships with numerous agencies, organizations, and businesses. In keeping with this partnering concept, this draft comprehensive conservation plan supports other significant regional, national, and international resource management plans. These include the North American Waterfowl Management Plan; the Lower Mississippi River Joint Venture Project; the Lower Mississippi Valley Migratory Bird Wetlands Conservation Initiative; the National Wetlands Priority Conservation Plan; the Partners in Flight Initiative; the Western Hemisphere Shorebird Reserve Network; the Lower Mississippi River Ecosystem Plan; the Southeast Region Fisheries Strategic Plan (2004-2008); the Tennessee Wildlife Resources Agency–Scientific Ecology Group Plan; and the West Tennessee Wildlife Resources Conservation Plan.

U.S. FISH AND WILDLIFE SERVICE

The U.S. Fish and Wildlife Service is the primary federal agency responsible for conserving, protecting, and enhancing the Nation’s fish and wildlife populations and their habitats. The Service also has specific trustee responsibilities for migratory birds, threatened and endangered species, anadromous fish, and certain marine mammals, as well as for lands and waters administered by the Service for the management and protection of these resources. For further information regarding migratory birds, see the Service website at <http://birds.fws.gov/>. The Service also shares some conservation responsibilities with other federal, state, tribal, local, and private entities.

As part of its mission, the Service manages 545 national wildlife refuges covering a total of more than 96 million acres. These areas comprise the National Wildlife Refuge System, the world’s largest collection of lands and waters dedicated to fish and wildlife conservation. About 77 million acres are in Alaska; the remaining acres are spread across the other 49 states and several island territories.

NATIONAL WILDLIFE REFUGE SYSTEM

The mission of the National Wildlife 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 legislative mission of wildlife conservation for the National Wildlife Refuge System. Activities were initiated in 1997 to complement the direction of this new legislation, including an effort to complete comprehensive conservation plans for all refuges. These plans, which are prepared with extensive public involvement, help guide the future management of the refuges by establishing natural resources and recreation/education programs. The Act states that each refuge shall be managed to

- fulfill the individual purpose for which it was established;
- fulfill the mission of the National Wildlife Refuge System;
- consider the needs of wildlife first;
- fulfill the requirements of comprehensive conservation plans that are prepared for each unit of the Refuge System;
- maintain the biological integrity, diversity, and environmental health of the National Wildlife 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
- allow refuge managers the authority to determine compatible public uses.

Approximately 37.5 million people visited national wildlife refuges in 1998, most to observe wildlife in their natural habitats. As this visitation grows, the economic benefits to local communities will continue to increase. Nearly 40 percent of the country's adults spent \$101 billion on wildlife-related pursuits in 1996, according to *Banking on Nature: The Economic Benefits to Local Communities of National Wildlife Refuge Visitation* (U.S. Fish and Wildlife Service 1997a). An updated version of this 1997 report (U.S. Fish and Wildlife Service 2003) found that in 2002, more than 35.5 million visits to national wildlife refuges fueled more than \$809 million in sales of recreation equipment, food, lodging, transportation, and other expenditures. In addition, volunteers continue to be a major contributor to the success of the Refuge System. In 1998, volunteers contributed more than 1.5 million hours on the refuges nationwide, a service valued at more than \$20.6 million.

The wildlife and habitat vision for national wildlife refuges stresses that wildlife comes first; that ecosystems, biodiversity, and wilderness are vital concepts in refuge management; that refuges must be healthy; that the growth of refuges must be strategic; and that the Refuge System serves as a model for habitat management with broad participation from others.

LEGAL POLICY CONTEXT

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

Guidance and direction can also be found in the following:

- National Wildlife Refuge System Administration Act of 1966
- Refuge Recreation Act of 1962
- Title 50 of the Code of Federal Regulations
- Fish and Wildlife Service Manual
- National Wildlife Refuge System Improvement Act of 1997

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

- contribute to ecosystem goals, as well as to the refuge's 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 WITH STATE WILDLIFE AGENCY

A provision of the National Wildlife Refuge System Improvement Act of 1997, and subsequent agency 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. State wildlife management areas, state wildlife refuges, and national wildlife refuges together provide the foundation for the protection of species and biological diversity, and contribute to the overall health and conservation of fish and wildlife in Tennessee.

The Tennessee Wildlife Resources Agency (<http://www.state.tn.us/twra>) is charged with game enforcement responsibilities and management of the state's natural resources. The TWRA manages approximately 1.35 million acres of state wildlife management areas and state wildlife refuges; coordinates the state's wildlife conservation program; and provides public recreation opportunities, including an extensive hunting and fishing program on state wildlife management areas.

An important part of the comprehensive conservation planning process is the integration of common mission objectives where appropriate. The TWRA's participation and contribution throughout this comprehensive planning process provide for ongoing opportunities and open dialogue to improve the management of fish and wildlife resources in Tennessee.

As previously mentioned, a joint interagency planning process was performed simultaneously with the TWRA, in collaboration with the Service's comprehensive conservation planning in west Tennessee. This joint planning study area encompassed approximately ten thousand square miles of private, state, and federal lands, including national wildlife refuge lands (Figure 1). It was determined that this cooperative planning effort would develop comprehensive plans for state, private, and federal lands.

In order to perform this joint planning effort, the cooperating agencies had to consider differences in their mandates and requirements. Whereas the Service is required in all significant management actions to satisfy the mandates of the National Environmental Policy Act of 1969 (NEPA) (including opportunities for public comment and participation, and required documentation), state agencies are not required to satisfy NEPA. In essence, certain regulations that dictate federal planning requirements do not apply to the Tennessee Wildlife Resources Agency. So the two agencies sought to combine their planning to the extent possible, while still providing the necessary autonomy within the process for each agency to accomplish its desired objectives.

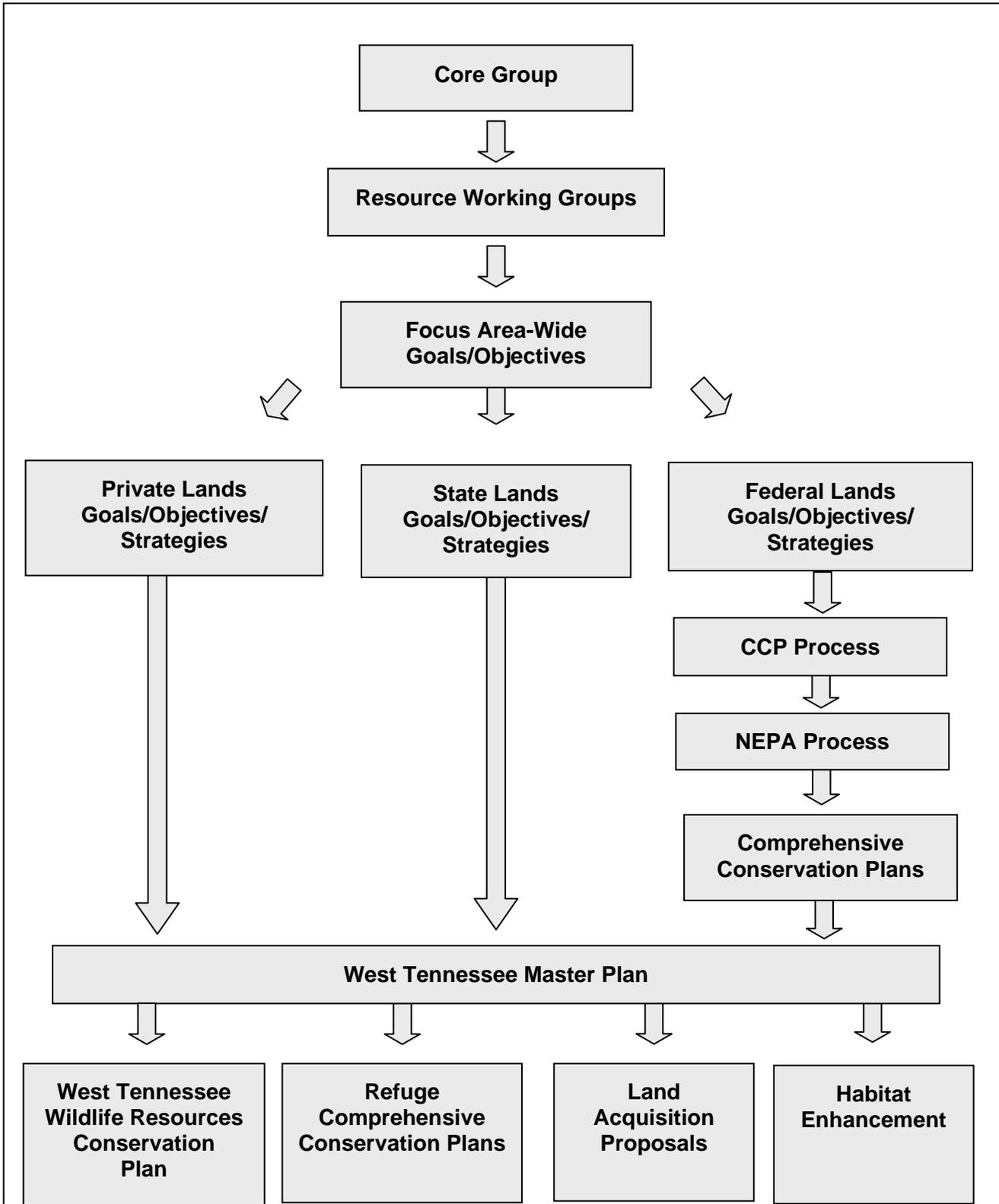
A planning process outline was developed (Figure 2) to allow both agencies to accomplish their planning objectives in a cooperative fashion. This process will produce joint objectives for west Tennessee lands, and will allow the Service to plan according to its NEPA requirements, while providing the TWRA the freedom to accomplish its planning objectives without NEPA provisions.

A core group was formed to oversee the planning process. This group consists of TWRA and Service project leaders, planners, and biologists who serve to guide the overall effort. Under the leadership of the core group, nine resource working groups were recruited and developed to study specific resource categories, including waterfowl; shorebirds; songbirds; big game; farm game; mammals; reptiles; amphibians; aquatic resources; and public use. Each group was composed of experts from various agencies, organizations, and universities, as well as private sector individuals with expertise

in particular resources. The groups gathered information on species, critical habitats, and opportunities, and developed management strategies for the west Tennessee resource groups.

These resource working groups developed a set of focus area-wide goals and objectives, which were then translated into a series of map overlays that rank the areas of specific interest and provide a simple means for interrelating the various types of resource information included in each map. In addition, each working group developed a text describing the goals, objectives, and strategies for implementing the desired goals and objectives for each specific resource category.

Figure 2. West Tennessee planning process



The map overlays and accompanying texts were interpreted into goals, objectives, and strategies for private, state, and federal lands, and then incorporated into the West Tennessee Wildlife Resources Conservation Plan (TWRA and USFWS 2002). The goals, objectives, and strategies developed for federal lands were used by the Service as the biological foundation for its refuge comprehensive conservation planning process. Based on these biological foundations for west Tennessee lands, the planning process will produce a comprehensive conservation plan (CCP) for each national wildlife refuge in west Tennessee, including Reelfoot; Lake Isom; Chickasaw; Lower Hatchie; and Hatchie.

Once finalized, the refuge CCPs will be combined with the map overlays and texts of the West Tennessee Wildlife Resources Conservation Plan to form the master document for the entire west Tennessee planning effort, called the West Tennessee Master Plan. This final product is expected to be compiled in 2005. It will serve as a valuable resource for state and federal managers alike, especially from a standpoint of cooperative interagency management and administration of west Tennessee resources.

ECOSYSTEM CONTEXT

OVERVIEW

On a national level, the Service has adopted an ecosystem approach to resource management and has identified 52 ecosystems in the United States. Chickasaw National Wildlife Refuge is located within the Lower Mississippi River Ecosystem (Figure 3).

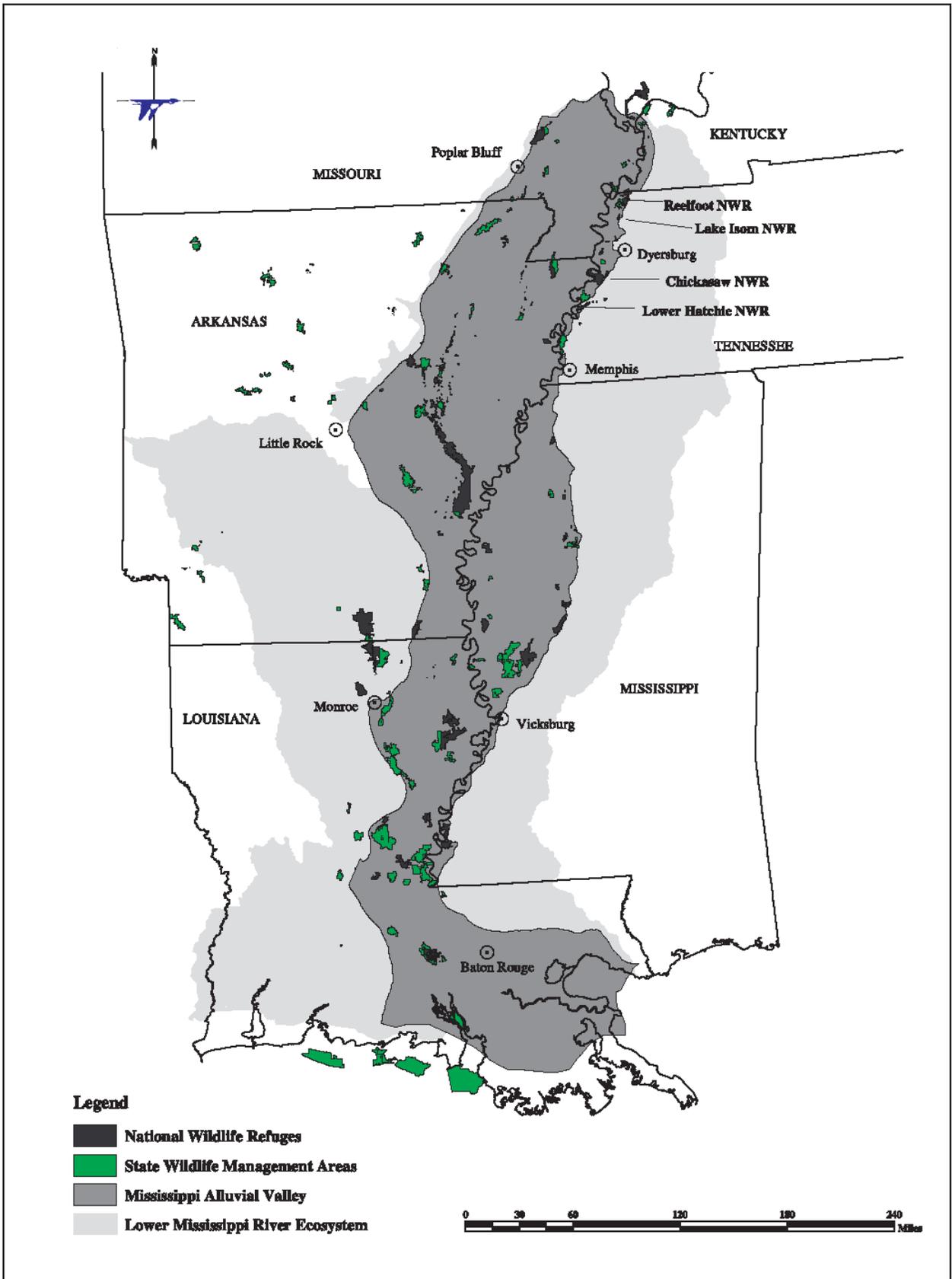
The Service's resource priorities for the Lower Mississippi River Ecosystem are as follows:

- Conserve, enhance, protect, and monitor migratory bird populations and their habitats in the Lower Mississippi River Ecosystem.
- Protect, restore, and manage the wetlands of the Lower Mississippi River Ecosystem.
- Protect and/or restore imperiled habitats and viable populations of all endangered, threatened, and candidate species and species of concern in the Lower Mississippi River Ecosystem.
- Protect, restore, and manage the fisheries and other aquatic resources historically associated with the wetlands and waters of the Lower Mississippi River Ecosystem.
- Restore, manage, and protect national wildlife refuges and national fish hatcheries (U.S. Fish and Wildlife Service Ecosystem Plan 2000).

The Lower Mississippi Valley (which is a geographic subset of the Lower Mississippi River Ecosystem) once supported a vast complex of bottomland hardwood forests that extended along the Mississippi River from Illinois to Louisiana. Today, less than 20 percent of this bottomland hardwood forest remains. Most of it is fragmented or remains in scattered patches throughout the region (Figure 4). Floodwaters once recharged the valley's wildlife habitats and created rich, dynamic systems that supported a diverse abundance of fish and wildlife species. Today, the Lower Mississippi Valley is fragmented by levees, and its water flows are restricted by flood control projects and agricultural diversions. Its water quality is heavily impacted by agricultural and industrial runoff. The rivers and water bodies throughout are highly turbid and laden with pesticides, and they support a small fraction of the once-abundant aquatic resources.

Recovery and protection of habitats and wildlife species require the joint efforts of private landowners, local communities, and state and federal agencies. The Service continues to focus its efforts on adopting collaborative resource partnerships in order to reduce the declining trend of fish and wildlife populations and biological diversity; establish conservation priorities; clarify goals; and solve common

Figure 3. Lower Mississippi River Ecosystem



threats and problems associated with fish and wildlife resources. The biological objectives targeted in this plan reflect the common interests of numerous state and federal agencies, local governments, nongovernmental organizations, and private interests, and are supportive of numerous regionally, nationally, and internationally significant plans, as listed previously.

THREATS AND PROBLEMS

The Lower Mississippi Valley is among the most heavily modified areas in the southeastern United States, and has the dubious distinction of being one of the most deforested of all southeastern physiographic areas (Twedt et al. 1999). Clearing and fragmentation of forests have resulted in irreplaceable losses of wildlife habitats, species, and biological diversity. The national wildlife refuges in the Lower Mississippi Valley serve as a critical safety net for preservation and management of the remaining wildlife resources.

Threats and problems affecting biological diversity in the Lower Mississippi Valley include

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

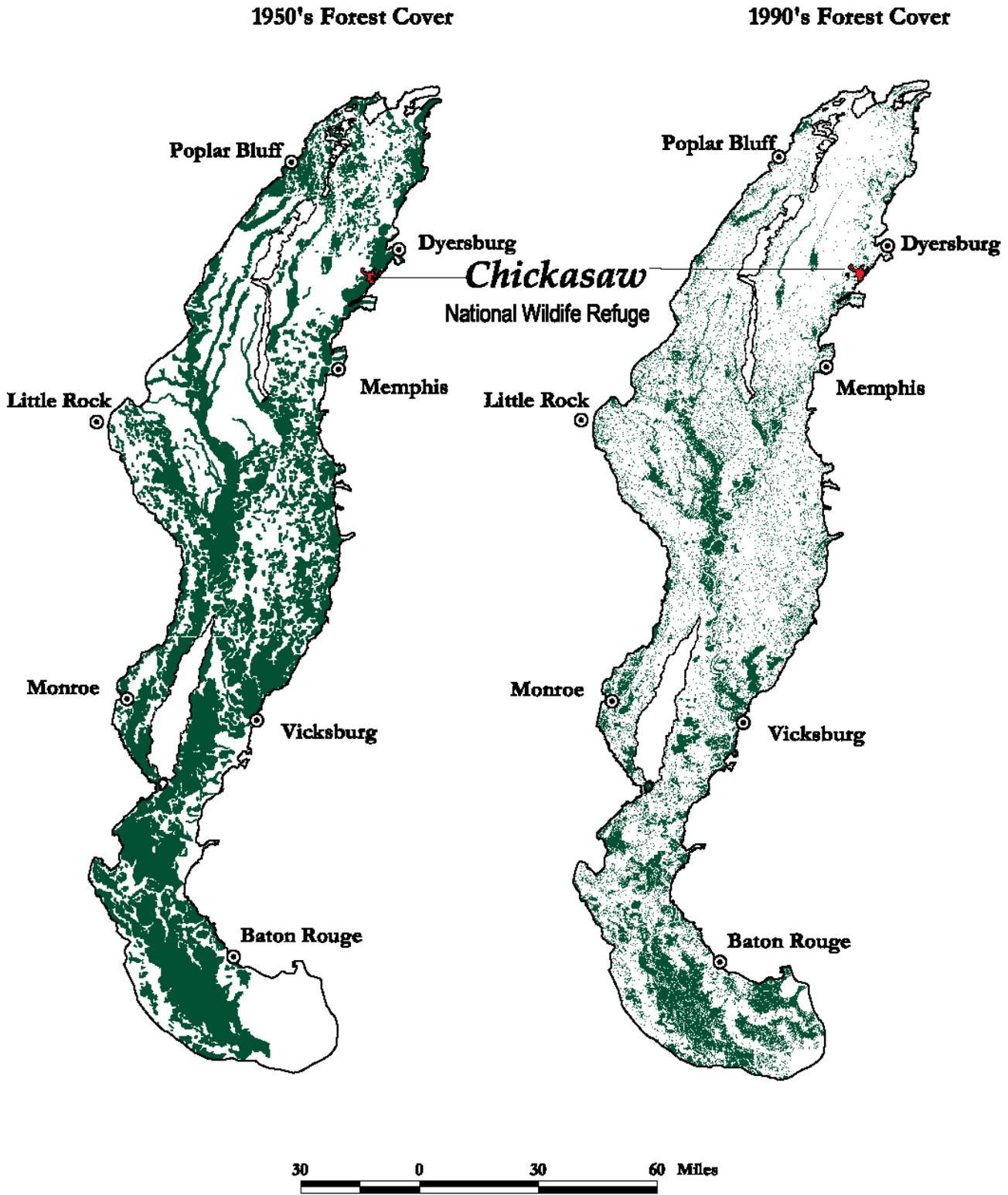
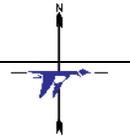
As a result of these large-scale impacts, many species endemic to the Lower Mississippi Valley have become extinct, threatened, or endangered. The red wolf and Florida panther are no longer found in the Lower Mississippi Valley; the ivory-billed woodpecker and Bachman's warbler, once known to occur in the area, are considered critically endangered, if not extinct.

Habitat loss and fragmentation and hydrologic alterations in the Mississippi Alluvial Valley have resulted in population declines in both overwintering waterfowl and migratory forest birds (Bonney et al. 2000). Populations of dabbling ducks have also decreased in the past several decades, and the availability of foraging habitat (or lack thereof) has had the greatest influence on the abundance, distribution, and body condition of waterfowl in the Mississippi Alluvial Valley (Loesch et al. 1994).

The species most adversely affected by deforestation and fragmentation are those that are area-sensitive or dependent on special habitat requirements, such as large, mature blocks of forest that offer secure nesting habitat and a particular food source. At least 107 species of birds nest regularly in the Mississippi Alluvial Valley, excluding wading birds and colonial nesting waterbirds, with at least 70 species occurring in bottomland hardwoods as a primary habitat (Twedt et al. 1999). Less than one percent of the remaining forest patches are large enough to support source populations of area-sensitive species, such as cerulean warblers, Swainson's warblers, and swallow-tailed kites (Bonney et al. 2000).

Modifications to the historic floodplains have caused major declines in fisheries and aquatic resource productivity. Despite efforts by the Service and others to conserve fish and other aquatic resources, a growing number are declining at alarming rates. On a national level, almost 400 aquatic species either have needed, or presently need, special protection in some part of their natural or historic range (Williams et al. 1989; Moyle and Leidy 1992). The number of aquatic species listed in 2002 as

Figure 4. Forest cover changes in the Lower Mississippi River Valley



threatened or endangered under the Endangered Species Act has increased to 19 amphibian species, 21 crustacean species, 70 mussel species, and 115 fish species. The reasons for these declines are linked largely to habitat loss and alteration (including flow changes, watershed modifications, sedimentation, and pollution) and the impacts of harmful exotic or transplanted species (U.S. Fish and Wildlife Service 2002).

CONSERVATION PRIORITIES AND INITIATIVES

Conservation priorities for national wildlife refuges in the Lower Mississippi Valley focus on threatened and endangered species, trust species, and species of area concern. By working with others, the Service is more effective in achieving its overall mission and management goals. Bottomland hardwood forests are ranked as a high priority of the Fish and Wildlife Service and other agencies on which to focus conservation and management efforts. A combination of land protection and habitat management methods is used by the Service and others to compensate for bottomland hardwood habitat loss and to meet shared or common long-term goals established for this area.

The goals of the North American Waterfowl Management Plan and its associated Lower Mississippi Valley Joint Venture Plan have also been considered in the development of this comprehensive conservation plan. The Lower Mississippi Valley serves as the primary wintering habitat for midcontinental waterfowl populations. The goal of the North American Waterfowl Management Plan (North American Waterfowl Management Plan Committee 1998) is to develop partnerships between private and governmental organizations to address the maintenance and management of continental waterfowl populations, and to reverse the persistent loss of wetland habitats in North America. In addition, the Lower Mississippi Valley Joint Venture Plan encompasses a regional approach with the same objectives: to reduce or eliminate habitat losses for wetland-dependent migratory birds. The joint venture has initiated cooperative efforts among public and private conservation groups to restore lands that provide maximum benefits to migratory waterfowl and songbirds, and has identified conservation areas on which to focus future land protection and restoration efforts.

One of the Lower Mississippi Valley Joint Venture's long-term goals is to provide "forest islands" for migratory bird conservation in the Lower Mississippi Valley, ranging in size from 10,000 to more than 100,000 acres. In addition, Partners in Flight has developed a Mississippi Valley Bird Conservation Plan that establishes habitat objectives for the Mississippi Alluvial Valley (Twedt et al. 1998). In order to meet population objectives for migratory land birds, this plan has identified 87 bird conservation areas (BCAs), broken down into blocks of 10,000 to 20,000 acres, 20,000 to 100,000 acres, and more than 100,000 acres of forested wetlands. These targeted land bases, which serve as priority areas for forest restoration, will someday serve as important "anchors" for biological diversity.

In Tennessee, forested wetland objectives include the acquisition and protection of one each of the following blocks: 10,000 to 20,000 acres, 20,000 to 100,000 acres, and more than 100,000 acres. Three Tennessee bird conservation areas in the Mississippi Alluvial Valley (MAV) were identified by Ford (1998) and are delineated in Figure 5. The three Tennessee BCAs are further delineated as the Upper, Middle, and Lower Implementation Zones. Chickasaw National Wildlife Refuge is included within the Middle Implementation Zone, which totals approximately 165,472 acres (TWRA and USFWS 2002). The refuge's current approved land acquisition program would contribute toward achieving these BCA goals.

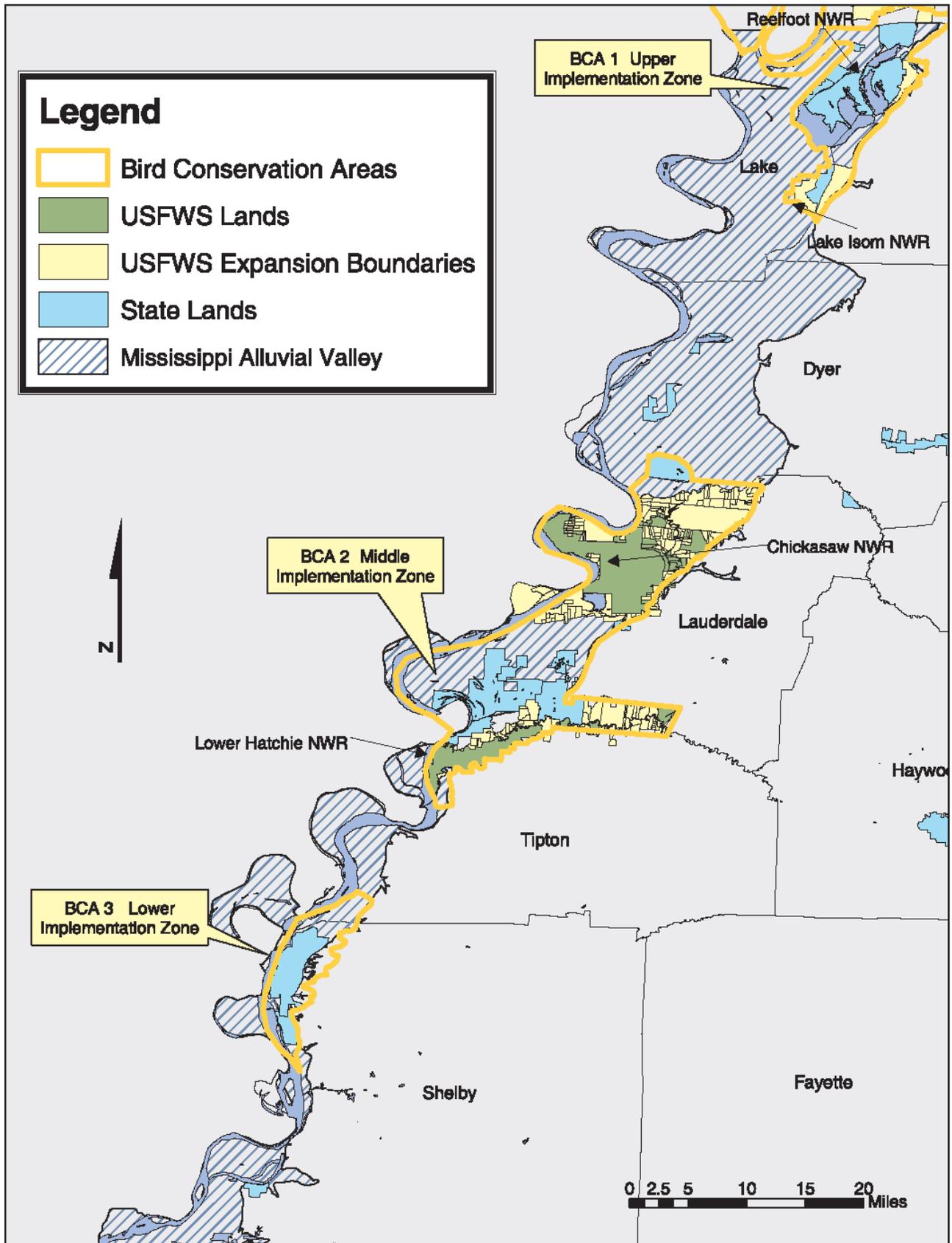
Restoration of migratory songbird breeding and migration habitat is a high priority of the Partners in Flight Plan (Twedt et al. 1999), a national and regional planning effort developed to emphasize land bird species as a priority for conservation. Habitat loss, land bird population trends, and vulnerability of species and habitats to threats are all factors used in the priority ranking of migratory songbird species (Bonney et al.

1999). Furthermore, biologists are identifying focal species for each habitat type from which population and habitat objectives and conservation actions can be determined. This list of focal species, objectives, and conservation actions will aid migratory bird management on the refuge.

The Service's Lower Mississippi River Ecosystem Plan (U.S. Fish and Wildlife Service 2000b) has established five resource ecosystem goals, which have also been considered in the development of this comprehensive conservation plan. These goals involve the protection, enhancement, and management of migratory bird populations and habitats; wetlands; habitats and populations of endangered, threatened, and candidate species; fisheries and aquatic resources; and national wildlife refuges and national fish hatcheries.

Conservation management on private lands is extremely important to the future conservation of fish and wildlife resources. To achieve conservation priorities on private lands and in conjunction with public lands, the synergy of federal, state, tribal, and private organizations working together will ensure that the Service not only protects the more important areas, but also helps to reduce redundancy and overlap in the management efforts of various agencies and private organizations.

Figure 5. West Tennessee MAV Bird Conservation Areas



II. The Planning Process

OVERVIEW

The west Tennessee planning effort includes the preparation of four comprehensive conservation plans (CCPs) for five national wildlife refuges: Reelfoot and Lake Isom; Lower Hatchie; Chickasaw; and Hatchie. It also includes the cooperative, interagency West Tennessee Wildlife Resources Conservation Plan, which identifies the resources and management goals for approximately 10,000 square miles of federal, state, and private lands in west Tennessee, with an emphasis on migratory birds. In addition to serving as a guide for resource management efforts in the western third of the state, the West Tennessee Wildlife Resources (WTWR) Conservation Plan provides the main biological foundation for the four national wildlife refuge CCPs.

In the Mississippi Alluvial Valley (in which four of the five west Tennessee national wildlife refuges are located), migratory bird habitat requirements and desired acreages were developed prior to the comprehensive conservation planning process (Ford and Wathen 2001; TWRA and USFWS 2002; Twedt et al. 1999). Given these prior MAV recommendations, it was clear going into the comprehensive planning effort that sufficient habitat to meet these habitat objectives could not be provided on the national wildlife refuges alone. Therefore, in order to achieve the habitat goals that had already been established, the west Tennessee planning effort looked beyond the respective national wildlife refuge boundaries and incorporated any public and private lands that might be available. This cooperative planning effort between the Service and the Tennessee Wildlife Resources Agency produced a broad overview of present and future resource management needs for west Tennessee, and incorporated over 6 million acres of land.

The final product of this west Tennessee planning effort will be a West Tennessee Master Plan that will incorporate the basic recommendations of the WTWR Conservation Plan within the context of the four refuge CCPs. The primary objective of the Master Plan is to provide a means of cooperatively protecting, restoring, and managing a sufficient amount and diversity of habitats to meet the requirements of migratory birds and resident wildlife that use federal, state, and private land habitats in the western third of the State of Tennessee.

The planning process began in January, 2000, with initial core group meetings in which the Service and TWRA began efforts to produce the WTWR Conservation Plan. The core group selected nine resource working groups, which then began the process of developing goals, objectives, and strategies for specific resource categories on federal, state, and private lands within the west Tennessee planning area (Figure 1).

Preplanning for the Chickasaw Refuge's draft comprehensive conservation plan and environmental assessment also began during early 2000. The identification of issues is a major factor in determining the management goals and objectives for comprehensive conservation plans. To ensure that future refuge management is responsive to all relevant issues and concerns, a series of meetings and interviews was conducted to guide the identification of issues for the planning effort.

In September 2000, the Chickasaw CCP Technical Team (comprised of staff from Chickasaw National Wildlife Refuge and the West Tennessee National Wildlife Refuges Complex) began meeting to discuss the refuge's issues and management opportunities. On November 2, 2000, a public scoping meeting was held in Ripley, Tennessee. At the meeting, the public was given the opportunity to comment orally or in writing regarding their perceived issues and opportunities for management of the refuge. The scoping meeting was advertised locally and by mailings, with additional comments

received by mail, telephone, and e-mail. The planning staff of the West Tennessee National Wildlife Refuges Complex then developed a comprehensive list of issues to be considered in the development of management alternatives in the draft environmental assessment.

Coordination with federal, state, and local agencies, as well as nongovernmental organizations and the surrounding communities, is also essential to ensure support for the plan and the projects identified for the refuge. In April 2001, an initial meeting was held with the Chickasaw Planning Review Group, in which refuge neighbors, organizations, educators, government agencies, and local officials were invited to attend and share their thoughts in a focus group meeting. The Chickasaw Planning Review Group included representatives from the Tennessee Wildlife Resources Agency; Anderson-Tully Company; Friends of West Tennessee National Wildlife Refuges; Ducks Unlimited; Dyersburg State Community College; and the U.S. Department of Agriculture, well as local sportsmen, farmers, landowners, businessmen, and county officials. This group provided oversight during the planning process, and solicited suggestions from professional counterparts as well as local individuals and private interests. Draft versions of the comprehensive conservation plan were routed to the Planning Review Group members periodically for review, and their comments were considered in plan revisions.

The nine resource working groups began meeting in early 2000. In January, 2002, the WTWR Conservation Plan was completed and became available as the primary biological foundation for much of the Chickasaw CCP planning process. Based on this biological foundation, as well as other relevant documents, the input received from the public, and the refuge staff's professional judgment, the Chickasaw Technical Team evaluated the refuge's issues and resource needs and developed various management alternatives which were then considered in the Draft Environmental Assessment (Section B). The alternatives address four different management scenarios, in which each relevant issue and concern is considered in the context of at least one of the alternatives. The environmental assessment constitutes the documentation and process by which the proposed action is selected.

Once the proposed action was selected, the Chickasaw Technical Team developed a set of proposed goals, objectives, and strategies for accomplishing the preferred management scenario over the next 15 years. The proposed goals, objectives, and strategies are described in Chapter IV, Management Direction.

A second public meeting will be held to solicit public review and comments on this Draft Comprehensive Conservation Plan. A third public meeting will then be held to present the Service's Final Comprehensive Conservation Plan for Chickasaw National Wildlife Refuge.

ISSUES

The identification of issues provides the basis for initiating the development of management objectives and strategies. The identified issues play a role in determining the refuge's future conditions and will be considered in the long-term comprehensive conservation plan. The issues and concerns described in the following pages were generated by the public, the Planning Review Group, and Service staff. An initial list of approximately 31 issues was consolidated into a list of 19 issue categories concerning Chickasaw National Wildlife Refuge. The 19 issues were grouped according to five broad management categories: (1) fish and wildlife population issues; (2) habitat issues; (3) visitor services and environmental education issues; (4) refuge administration and operation issues; and (5) land protection and conservation issues. Appendix VII provides a summary of the comments received during the public scoping process.

Waterfowl Populations

Because the refuge was established specifically as an “inviolable sanctuary for migratory birds” (see the “Refuge Purpose” section in Chapter III), all operations and management are considered in light of their impact on migratory birds, of which waterfowl are the most numerous. The refuge staff monitors the refuge’s waterfowl populations, and works to provide sufficient high quality habitat to fulfill the population objectives set for the Mississippi Alluvial Valley, as established in Ford and Wathen (2001) and the WTWR Conservation Plan (TWRA and USFWS 2002). Portions of the refuge are dedicated to providing seasonally flooded croplands, moist soil impoundments, and forested wetlands to meet the feeding, resting, and breeding needs of migratory and resident waterfowl (please refer to the following “Habitat Issues” section). In order to meet its waterfowl objectives, the refuge must maintain enough cropland and moist soil areas to meet the habitat needs of waterfowl and provide sufficient sanctuary areas for undisturbed resting and feeding.

Songbird Populations

Nearly every study examining the population trends of North America’s Neotropical migratory birds has reported declines in at least some species (Askins et al. 1990). The Mississippi Alluvial Valley has been identified as experiencing some of the most widespread and pronounced declines (Hamel et al. 1994). Partners in Flight has developed conservation plans for the Mississippi Alluvial Valley (Twedt et al. 1998) and the East Gulf Coastal Plain (Woodrey et al. 1998) to address priority species and bird conservation issues. Since 1994, Chickasaw National Wildlife Refuge has cooperated with the U.S. Department of Agriculture’s Southern Hardwoods Research Station to assess and monitor the populations, habitats, and status of cerulean warblers on the refuge. The refuge continues to monitor its migratory and resident songbirds, and works to address the habitat issues that affect resident and Neotropical migrant populations, in keeping with its goals and establishing purposes.

Threatened and Endangered Species

A key function of Chickasaw National Wildlife Refuge is to enhance the survival of threatened and endangered species. Three federally listed threatened or endangered animals are known to use or populate lands within or in close proximity to the refuge: the bald eagle, pallid sturgeon, and interior least tern. As many as 16 bald eagles are known to winter annually on the Chickasaw Refuge, and three known active nests are documented on refuge lands. The refuge’s habitat restoration and protection activities continue to provide suitable habitat for nesting eagles.

The pallid sturgeon is not known to inhabit refuge waters. However, it is present in the Mississippi River, which is immediately adjacent to the refuge. The refuge can support pallid sturgeon recovery efforts by providing technical assistance to other Service divisions or resource management agencies, and by supporting efforts to restore riverine habitats.

Interior least terns nest on Mississippi River sandbars in close proximity to the refuge, and are regularly observed feeding on refuge lands. The refuge’s protection of lands immediately adjacent to the Mississippi River provides protection to the sandbars, which are used by least tern nesting colonies during the summer months.

Resident Species Populations

The refuge's resident wildlife include game species such as white-tailed deer, wild turkey, squirrels, rabbits, and furbearers, as well as numerous species of nongame mammals, reptiles, and amphibians. The refuge monitors some resident wildlife populations through surveys such as the turkey survey and amphibian monitoring. Species groups that lend themselves to management (deer, turkey, etc.) are managed at levels consistent with habitat availability, refuge management goals, and refuge purposes. Other species are observed and monitored for potential management issues. The benefits to resident wildlife are one of the factors considered when opportunities arise for land acquisitions within the refuge's current approved acquisition boundary.

Shorebird Populations

Because of the abundance of agricultural land with water control capabilities, along with frequent inundation of fields by floodwaters, the Mississippi Alluvial Valley has significant potential for providing shorebird habitat (Elliott and McKnight 2000). The refuge's waterfowl management activities offer concurrent opportunities to provide shorebird habitat, especially in conjunction with the management of impoundments and moist soil units. The staff monitors shorebird use on the refuge and looks for opportunities to support the priorities of the WTWR Conservation Plan (TWRA and USFWS 2002) for migratory and resident shorebird populations.

HABITAT ISSUES

Waterfowl Habitat

Providing habitat for migratory birds, the most numerous of which are waterfowl, was the purpose for which the refuge was established. Thus, the refuge's management priorities must be directed toward providing quality wetland areas that are attractive to migratory birds, including dabbling ducks, diving ducks, and geese. Each management unit provides a unique set of resources that are necessary for each group to complete its life cycle. A portion of the refuge is dedicated to providing seasonally flooded croplands, moist soil impoundments, and forested wetlands to meet the feeding, resting, and breeding needs of migratory and resident waterfowl. In order to meet the refuge's objectives for waterfowl, the refuge must maintain enough cropland and moist soil areas to meet waterfowl habitat needs, and provide sufficient sanctuary areas for undisturbed resting and feeding.

Songbird Habitat

As stated in the previous section concerning waterfowl habitat, the refuge's priorities include providing quality habitat for migratory birds, including Neotropical migrant songbirds. The refuge's land and forest management practices will continue to take into account the value of such practices to songbirds. The songbird research being conducted on the refuge by the U.S. Department of Agriculture since 1994 continues to provide valuable information in regard to habitat suitability for cerulean warblers. The refuge will continue to monitor migratory and resident songbirds and to address habitat issues that affect resident and Neotropical migrant bird populations.

Forest Habitat Management

The refuge protects more than 20,293 acres of bottomland hardwood habitat and over 503 acres of upland forests. These bottomland hardwood and upland forests provide invaluable habitat for a wide range of wildlife species and are critical to their preservation and perpetuation. The bottomland hardwood forests, in particular, are important to migratory and wintering waterfowl, especially

mallards and wood ducks. The forested tracts provide crucial food resources such as hard mast, soft mast, and invertebrates for mallards during flood events in the fall and early spring. The refuge will complete its forest habitat and other habitat management plans, and management decisions will be made for vegetation management and control based on resource goals and refuge purposes, with due consideration for all other environmental factors.

Cooperative Farming

Agricultural crops play an important role in the overall scheme of migratory bird management, as they provide a source of high-energy carbohydrates needed during periods of cold weather. Typically, the refuge grows corn and soybean crops that are rotated with moist soil units or are produced on the higher elevations to ensure a readily available source of food for wildlife, and to meet refuge objectives set forth in the WTWR Conservation Plan. The Chickasaw Refuge's cropland operation includes an impoundment system and occupies approximately 1,186 acres. Under a cooperative farming agreement, this acreage is divided by a 75-to-25 percent farmer-to-refuge ratio, with the refuge usually receiving its portion of the crops on the lower and wetter fields.

Another farming option being used on the refuge is force-account farming, in which refuge personnel and equipment are used to plant agricultural crops. This practice is a key component in the overall management program, as it ensures that agricultural crops will exist on at least a portion of the refuge. Force-account farming is more expensive than cooperative farming, in that the Service must bear all of the production costs, including personnel, equipment, seed, fertilizer, and chemicals. Alternatively, cooperative farming programs require the cooperative farmer to bear the cost of production and leave a designated share of crops in the field as payment for renting the property. Thus, force-account farming has the disadvantage of greater expense but the advantage of greater flexibility and retains one hundred percent of the production. Cooperative farming has little or no expense to the Service, but offers less flexibility and a substantial reduction in the total amount of agricultural products left in the field for use by wildlife.

Most crop fields that are planted for the refuge can be flooded for waterfowl use. This, coupled with subsequent acquisitions, sets the stage for the refuge to make substantial contributions to the migratory bird objectives of the Mississippi Flyway. The refuge's farming program will continue to address habitat issues that affect migratory bird populations.

Moist Soil Habitat

Moist soil habitats are an integral part of managing public wetlands for waterfowl, as these food resources are provided in large part only on state and federal lands. Chickasaw National Wildlife Refuge and the associated river floodplain are capable of supplying moist soil foods such as barnyard grass, sprangletop, smartweeds, rice cut-grass, and a host of other beneficial herbaceous plants. The refuge provides 835 acres of these early successional habitats and plays a key role in the migration patterns of midcontinental waterfowl and other migratory birds. The refuge's present and future will in large part be influenced by resource management practices that actively benefit waterfowl, including moist soil habitats. The management of the refuge's moist soil units will continue to address habitat issues that affect migratory bird populations.

VISITOR SERVICES AND ENVIRONMENTAL EDUCATION ISSUES

Hunting and Fishing Access and Opportunities

The National Wildlife Refuge System Improvement Act of 1997 states that hunting and fishing are two

consumptive priority public uses on national wildlife refuges. In addition, hunting and fishing are integral parts of the lifestyle and culture of west Tennessee. Due to this fact and the limited amount of public land, it is not surprising that there is considerable interest in expanding the refuge's hunting and fishing opportunities. Any additional hunting opportunities will be dependent on providing safe, quality experiences that are compatible with refuge purposes. However, the refuge's hunting opportunities could be expanded through additional land acquisitions from willing sellers within the current approved acquisition boundary. The refuge will examine opportunities to increase and/or enhance its hunting and fishing opportunities, in keeping with its other resource needs and establishing purposes.

Nonconsumptive Recreational Opportunities

The National Wildlife Refuge System Improvement Act of 1997 states that wildlife observation, wildlife photography, and environmental education and interpretation are four nonconsumptive priority public uses on national wildlife refuges. In accordance with this legislation, the refuge will seek to increase opportunities for these priority public uses. Currently, hunting and fishing are the major public uses on Chickasaw National Wildlife Refuge. The refuge currently does not have the staff or facilities needed to provide programming for important environmental education, interpretive, or nonconsumptive wildlife-dependent activities. More exposure resulting from expanded nonconsumptive recreational uses and programs would increase public awareness and have a positive effect on other refuge programs. The refuge is located in Lauderdale County (population 27,101) within 10 miles of Ripley, Tennessee (population 7,844), and approximately 60 miles from Memphis, Tennessee (population 873,000) (U.S. Census Bureau, 2000). Better-developed visitor facilities in association with a Chickasaw National Wildlife Refuge visitor center annex would provide a level of wildlife-dependent environmental education, interpretation, and recreational opportunities currently not available in Lauderdale County. The refuge will examine opportunities to increase and enhance nonconsumptive recreational opportunities on the refuge, in keeping with its other resource needs and establishing purposes.

Public Access

Chickasaw National Wildlife Refuge is a frequently visited refuge with a high degree of public interest in the opportunities it offers for the enjoyment of natural resources. The National Wildlife Refuge System Improvement Act of 1997 requires the refuges to provide, when compatible with refuge purposes, opportunities for the "big six" wildlife-dependent types of public recreation. The "big six" are hunting, fishing, environmental education, interpretation, wildlife observation, and photography. Therefore, attention must be given to providing the appropriate amount and forms of visitor access on the refuge. Issues regarding the increasing or limiting of public access should be considered with respect to the refuge's overall resource management goals and purposes.

REFUGE ADMINISTRATION AND OPERATION ISSUES

Maintenance and Operations

Funding for national wildlife refuges is limited because the available funds must be prioritized and divided among the 545 individual refuges that comprise the National Wildlife Refuge System. Operating within a fixed budget requires the prioritizing of programs and projects that compete for funding and staffing. The Service's Refuge Operation Needs System (RONS) and Maintenance Management System (MMS) are the processes used for the refuges to submit their budgetary requests. The Chickasaw Refuge's management priorities include managing aquatic and forest habitats; fish and wildlife populations; endangered species; cultural resources; public use; and law

enforcement, as well as facilities maintenance. Funds are assigned to the refuge's maintenance needs, in light of its priority resource needs and budget constraints. Consideration should be given to providing comprehensive maintenance of the refuge's facilities, within the constraints of available funding and management priorities. Management decisions would continue to address the refuge's priority operational needs, and budgetary requests would be made in keeping with goals and purposes for which the refuge was established.

Law Enforcement

Large tracts of public lands may provide unique opportunities for public use, and unfortunately in some cases, misuse; so the continual involvement of law enforcement personnel is necessary in order to protect the resources as well as the public. However, staff limitations preclude intensive law enforcement on refuge lands. As with other issues, refuge priorities must be established which compete for available funding and staffing. Enforcement issues should be considered and ways to improve law enforcement capabilities examined, in keeping with the refuge's goals and purposes.

LAND PROTECTION AND CONSERVATION ISSUES

Land Acquisition

The refuge's land acquisitions provide additional protection for land and resources as well as additional wildlife-dependent recreational opportunities for the public. Chickasaw National Wildlife Refuge has a current approved acquisition boundary of 60,240 acres. As of July 1, 2004, the Service had acquired a total of 25,006 acres within this approved acquisition boundary (Figure 6).

Public perception of federal land acquisitions is often clouded by historical instances in which eminent domain was exercised and private lands were "taken" from unwilling landowners. It is the Service's policy to acquire land only from willing sellers, and every effort should be made to provide effective information to the public in order to promote full understanding of the refuge acquisition process. Management decisions must include acquisition priorities as well as future management of acquired tracts in light of the refuge's goals, objectives, and establishing purposes.

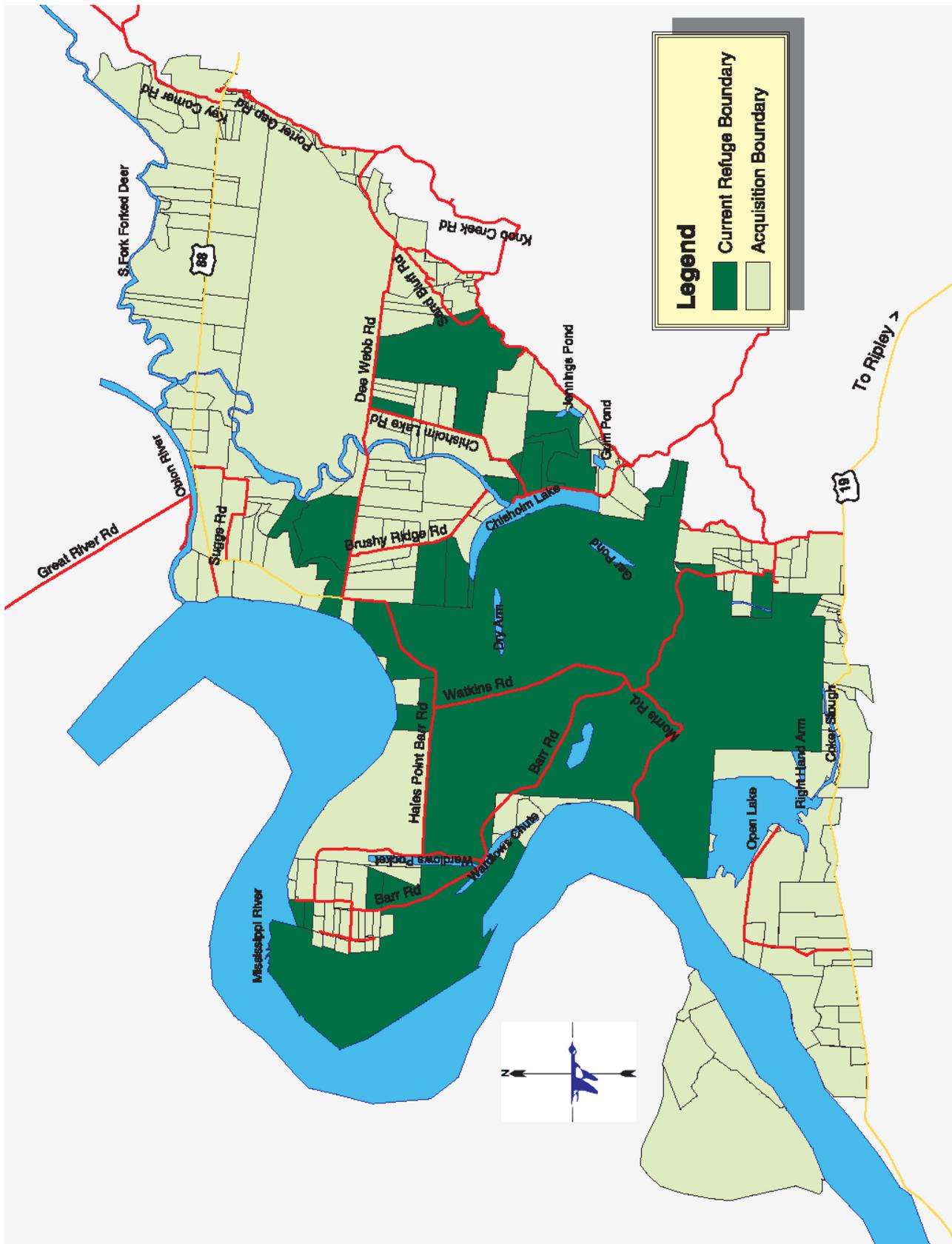
Water Level Management

Water level management has the potential to affect the resources on the refuge and its immediate vicinity. Numerous hydrological issues exist in regard to agricultural drainage, beaver flooding, and natural flooding induced by the Forked Deer, Obion, and Mississippi river systems. Impacts from refuge water management can include flooding, altered drainage patterns, and sedimentation. The comprehensive planning process would attempt to address the individual water level issues on a case-by-case basis, while keeping management decisions in line with the refuge's management goals and purposes, as well as potential water level impacts on neighboring lands.

Protection of Unique Areas

At least ten cultural resource sites are documented on Chickasaw National Wildlife Refuge. These sites were discovered during an archaeological investigation conducted in a 1,100-acre area at the site of proposed waterfowl impoundments (Anderson 1995). Numerous other archaeological investigations have been conducted throughout the nearby portions of west Tennessee. These west Tennessee archaeological surveys document an area rich in prehistoric and historic cultural

Figure 6. Approved acquisition boundary, Chickasaw National Wildlife Refuge



resources, dating back as far as 12,000 B.C. While only one archaeological survey has been conducted on the refuge, past history indicates that many more cultural sites are likely to exist on refuge lands. Refuge management should include efforts to identify and protect these unique areas, in keeping with the refuge's goals, objectives, and establishing purposes.

Protection from Excessive Siltation

Excessive silt enters the refuge from Cold Creek and has changed the hydrology on certain refuge lands. Refuge management should consider alternatives for protecting refuge lands from this siltation. Efforts of partnering agencies such as Natural Resources Conservation Service and Tennessee Department of Environment and Conservation to monitor and reduce siltation in the Cold Creek watershed should be supported, in keeping with refuge goals and establishing purposes.

All of the above issues are further addressed in the "Summary of Management Alternatives" section of Chapter IV, Environmental Consequences, in the Draft Environmental Assessment (Section B). In that section, the issues are analyzed within the context of the four different management alternatives that were considered and evaluated during the planning process.

III. Refuge Description

LAND ACQUISITION

Chickasaw National Wildlife Refuge is located in rural western Tennessee, approximately 15 miles southwest of the city of Dyersburg (Figure 7). The refuge gets its name from the Chickasaw Indians, who historically occupied portions of west Tennessee, including Lauderdale County in which the refuge is located. Prior to federal acquisition, most of the lands that make up the Chickasaw Refuge were owned by the Anderson-Tully Timber Company of Memphis, Tennessee. In 1956, the Tennessee Wildlife Resources Agency leased the tract and managed it as a wildlife management area. The refuge was approved by the Migratory Bird Conservation Commission on May 14, 1985, to protect approximately 37,500 acres of bottomland hardwoods and adjacent habitats for migratory waterfowl. This approval included two acquisition areas: a 23,600-acre upper area that is now Chickasaw National Wildlife Refuge and a 13,900-acre lower area that today is owned and managed by the Tennessee Wildlife Resources Agency.

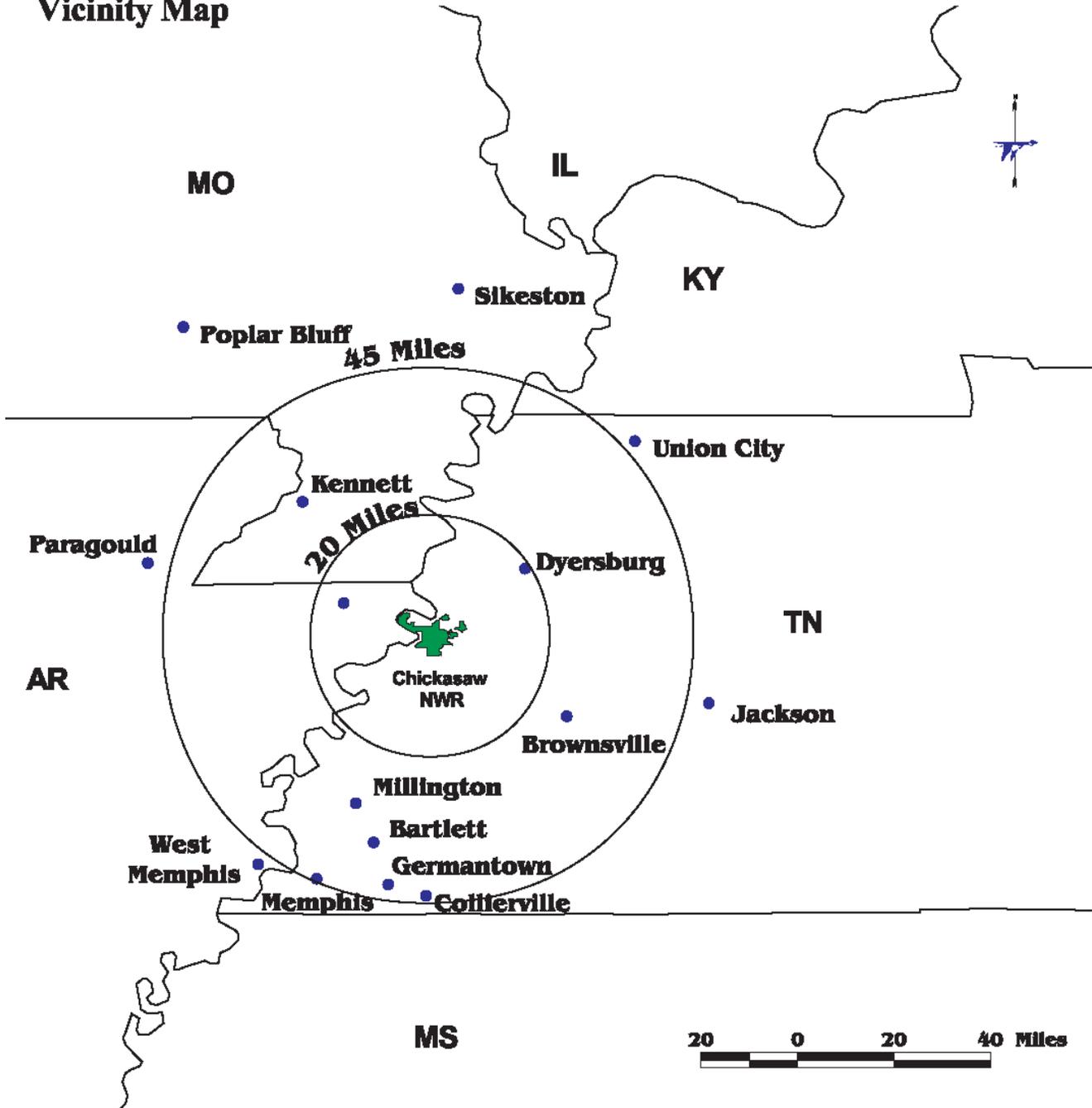
From 1985 to 1990, 14,934 acres of the upper unit were purchased by The Nature Conservancy for resale to the Service. In addition to these lands, a 190-acre tract at the west end of Chisholm Lake and a 1,428-acre block comprised of three contiguous tracts lying several miles east of the main body of the refuge were purchased by the Service from landowners in 1987. This latter area is primarily agricultural and is being developed as feeding and resting areas for waterfowl and shorebirds. In 1997, a 437-acre tract known as the Marley Lease was purchased from the Trust for Public Land, with funds from the Migratory Bird Conservation Account. These purchases comprised the entirety of the 16,989 acres originally under Service fee title ownership at Chickasaw National Wildlife Refuge. In addition to the fee title lands, the Chickasaw Refuge includes 4,847 acres of contiguous and 540 acres of noncontiguous lands managed under a no-fee lease from the Tennessee Wildlife Resources Agency, bringing the total refuge acreage to 22,376 acres as of 1998.

In addition to lands within the original refuge boundary, an expansion of the refuge acquisition boundary was approved in 1999. This expanded boundary covers approximately 35,221 additional acres in Lauderdale County, adjacent to the existing refuge boundary (U.S. Fish and Wildlife Service 2000a). The Service proposes to acquire these lands through conservation easements, cooperative agreements, or fee title purchases from willing sellers. The project lands involve about 127 ownerships that vary in size from less than one acre to 6,000 acres. The proposed acquisitions, when complete, would increase the refuge's total size to 60,227 acres. Since the approval of the current acquisition boundary in 1999, several tracts have been acquired from willing sellers, bringing the refuge to a current total of 25,006 acres (as of April 1, 2004).

The U.S. Fish and Wildlife Service acquires lands and waters in a manner consistent with legislation, other congressional guidelines, and executive orders for the conservation, management, and where appropriate, restoration of ecosystems, fish, wildlife, plants, and related habitat, and to provide for compatible, wildlife-oriented public use for educational and recreational purposes. These lands include national wildlife refuges, national fish hatcheries, waterfowl production areas, and other areas. The Service acquires land and water interests including, but not limited to, fee title, easements, leases, and other interests. Donations of desired lands or interests are encouraged. Funding for land acquisitions comes from receipts, such as Federal Duck Stamp sales, entrance fees to certain national wildlife refuges, import taxes on arms and ammunition, and appropriations under the Land and Water Conservation Fund Act (U.S. Fish and Wildlife Service 2001).

Figure 7. Chickasaw National Wildlife Refuge Vicinity map

Chickasaw National Wildlife Refuge Vicinity Map



It is anticipated that funding for future land acquisitions will be provided through the Migratory Bird Conservation Fund and the Land and Water Conservation Fund. The authorities for the use of these funds for land acquisition are the Migratory Bird Conservation Act (16 U.S.C. Sec. 715d) and the Refuge Recreation Act (16 U.S.C. Sec. 460k-1).

REFUGE PURPOSE

Chickasaw National Wildlife Refuge was authorized by the Migratory Bird Conservation Act of 1929 (16 U.S.C. 715d) for "... use as an inviolate sanctuary, or for any other management purpose, for migratory birds." The Fish and Wildlife Act of 1956 established additional refuge purposes to be "... 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 or servitude ..." (16 U.S.C. 742 (b) (1)). Later, the Refuge Recreation Act of 1962 (16 U.S.C. 460(k)(1)) declared the refuge to be "suitable for (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, and (3) the conservation of endangered species or threatened species"

The Fish and Wildlife Act of 1956, as amended (16 U.S.C. 742f (a) (4) (5)), is the specific law that grants authority for acquiring lands for national wildlife refuges. Under this Act, the Secretary of the Interior is authorized to take steps as may be required for the development, advancement, management, conservation, and protection of fish and wildlife resources, including but not limited to research, development of existing facilities, and acquisition by purchase or exchange of land and water or interests therein. The Act also authorizes the Fish and Wildlife Service to accept gifts of real or personal property for its benefit and use in performing its activities and services.

The Land Acquisition Planning Report (U.S. Fish and Wildlife Service 1985b) that proposed the initial land acquisitions for Chickasaw National Wildlife Refuge stated the purpose of the acquisition proposal: "to protect habitat of significant value to migratory waterfowl and other wildlife, with special emphasis on migrating Canada goose populations."

Expanding on these purposes, the refuge's objectives were further defined in the Service's Final Environmental Assessment and Land Protection Plan (U.S. Fish and Wildlife Service 2000a). The following management objectives were identified for the proposed expansion at Chickasaw National Wildlife Refuge:

- Preserve and protect a diverse, threatened wetland ecosystem and its associated fish and wildlife values.
- Preserve, protect, reestablish, and manage habitat for endangered and threatened species.
- Manage for migratory birds, with emphasis on providing optimum habitat for wintering waterfowl and enhancing nesting and brood habitat for wood ducks.
- Manage for native wildlife species and their associated habitats.
- Provide opportunities for environmental education, interpretation, and wildlife-dependent recreation.

The proposed project would also help support the priorities established by the Service's Lower Mississippi River Valley Ecosystem Team. These priorities involve migratory bird populations and their habitats; wetlands; threatened and endangered species and their habitats; fisheries and aquatic resources; and national wildlife refuges and national fish hatcheries (U.S. Fish and Wildlife Service 2000b).

REFUGE ENVIRONMENT

TOPOGRAPHY AND CLIMATE

Chickasaw National Wildlife Refuge lies in the Lower Mississippi River floodplain with eight miles of the refuge's western boundary adjoining the Mississippi River. The refuge extends east two to six miles to the edge of the heavily dissected Chickasaw Bluff. The dominant land forms of the Lower Mississippi River Ecosystem are the alluvial plain of the Mississippi River downstream of its confluence with the Ohio River, and the deltaic plain and associated marshes and swamps created by the meanderings of the Mississippi River and its tributaries.

Due to the lack of a mainline Mississippi River levee in Lauderdale County, the entire refuge is subject to inundation from high river stages, typically in late winter and early spring. During high river stages, water depths can reach 30 feet in the lower-lying portions of the refuge. In addition, headwater flooding from the Mississippi River has been virtually eliminated by upstream levees adjacent to the river. As a result, the frequency and duration of backwater flooding have increased in all non-leveed areas, including the Chickasaw Refuge and adjacent lands. The natural patterns of erosion and sedimentation have been altered due to channelization and other human disturbances. Erosion rates have increased on both upland and alluvial soils. Sedimentation has increased in the swamps, brakes, oxbow lakes, and other low-lying areas. Sediment loading in streams and rivers has also increased, disrupting the natural patterns of aggradation and degradation.

The altered hydrology and sedimentation have disrupted natural geomorphic processes. Land and lake formation associated with Mississippi River meandering is no longer occurring or is occurring on a very limited basis, restricting the formation of new oxbow lakes and sloughs.

Topographically, the refuge is slightly undulating due to past influences of the Forked Deer and Mississippi rivers, with most drainage to the west along the Middle Fork of the Forked Deer River. The topography of these bottomlands is characteristically flat, but slight variations in elevation are associated with considerable differences in soils, drainage conditions, and forest species composition (Barrett 1980). A number of small open-water areas are present within the floodplain, some within old sloughs. Two of these, Open Lake and Chisholm Lake, were reportedly formed by the New Madrid earthquake, the latter apparently within an old oxbow channel of the Mississippi.

The main portion of the refuge has elevations ranging from 220 to 260 feet above mean sea level (msl), with the highest elevations occurring along existing or old channels of the Mississippi and its larger tributaries. The elevations along the eastern portion of the refuge, adjacent to the eroded lower slopes of the loess bluffs, range from 250 to 300 msl.

The eastern two-thirds of Lauderdale County consist of nearly level to steep, well drained to poorly drained, silty soils on loess uplands. The western one-third of the county consists of nearly level, well drained to poorly drained, clayey to sandy soils on the Mississippi River floodplain (Monteith 1990). The soils on the refuge consist of deep loess on the eastern margin and alluvial sediments in the floodplain. Within the floodplain, loamy soils are more common along the present or former natural levees. The soils in the flats or depressions of the lower-lying areas within the floodplain are dominated by clays. As a result of the extensive drainage efforts that have occurred from the early twentieth century to the present day, the drainage patterns have been altered appreciably in some areas. In addition, the ongoing sedimentation is gradually filling in many aquatic features on the refuge.

The refuge climate is characterized by mild winters; hot, humid summers; and abundant rainfall. For the period from 1962 to 1980, the average annual temperature was 59 degrees Fahrenheit, with

average daily temperatures ranging from 35.2 degrees in January to 79.9 degrees in July. The total annual precipitation during the period of observation has averaged 51.2 inches, with the highest average rainfall occurring during the months of March through May. Summer and early fall are the driest periods, with the lowest rainfall occurring from July through October. In the summer, most rain falls in brief yet intense thunderstorms, which occur on about 53 days each year. The average annual snowfall is nine inches. The freeze-free period, or growing season, ranges from 203 to 233 days, from late March to early November (Monteith 1990).

DEMOGRAPHY

The rural setting and sparse population of the refuge vicinity are characteristic of west Tennessee. The immediate area surrounding the refuge is even less populated than most of west Tennessee, due to its location adjacent to the Forked Deer, Obion, and Mississippi rivers and their floodplains. According to the 2000 census, Lauderdale County had a population of 27,101 people, which is an increase of 15.4 percent since the 1990 census (Tennessee County Profiles: Lauderdale County, <http://cls.coe.utk.edu/counties/lauderdale.html>).

The per capita income recorded for Tennessee as of 2000 was \$19,339. Lauderdale County's per capita income was \$13,682. Agriculture and related service companies are the main economic bases. Several small to medium manufacturing companies are located in the county, with some of the major private employers including Wal-Mart, Marvin Windows of Tennessee, Tennessee Electroplating, and S & R of Tennessee. Other major employers include the Lauderdale County Schools, Forked Deer Electric Cooperative, and Baptist Memorial Hospital.

THREATENED AND ENDANGERED SPECIES

Part of the Service's mission is to protect, enhance, and manage habitats for threatened and endangered species, in keeping with the enforcement of the Endangered Species Act. Three federally listed species, including the endangered interior least tern, the endangered pallid sturgeon, and the threatened bald eagle, are all found on or near Chickasaw National Wildlife Refuge.

The interior least tern is known to nest on Mississippi River sandbars adjacent to the refuge and to feed on refuge lands. The pallid sturgeon is known to occur within the Mississippi River. It is possible that pallid sturgeons could enter the refuge's lakes during high river stages; however, this has never been documented and is unlikely due to their small numbers.

As many as 16 bald eagles winter annually on the refuge, with at least three known active nests documented on refuge lands. No federally listed flora are known on the refuge. A Section 7 Intra-Service Biological Evaluation addressing those species is provided in Appendix V.

AVIAN SPECIES

Birds are important wildlife resources, with more than 250 species known to occur on nearby Reelfoot National Wildlife Refuge (U.S. Fish and Wildlife Service 1989). Appendix IV contains a list of the avian species known to occur on the refuge and their residence status. The bottomland hardwood forests serve as important habitat for breeding birds and migrants in the spring and fall, and migratory birds occur in substantial numbers seasonally. For migratory forest-breeding songbirds and shorebirds, the ecological and biological significance is transcontinental, with the refuge providing breeding and migration habitat for Gulf of Mexico migrants returning from their wintering grounds in Central and South America.

Recent studies indicate significant population declines in some species of Neotropical migrant birds (Askins et al. 1990), while current knowledge concerning management practices for most Neotropical migratory species is seriously lacking. The status of one of the most rapidly declining species, the cerulean warbler, prompted population monitoring on the refuge during 1985-87 and 1991. Additional research began in 1992 and is ongoing to assess the habitats and responses of cerulean warblers in the Mississippi Alluvial Valley (Hamel et al. 1994). Neotropical migratory birds that regularly occur on the Chickasaw Refuge include the cerulean warbler, prothonotary warbler, and Swainson's warbler.

Approximately 32 species of shorebirds (TWRA and USFWS 2002) are commonly found in west Tennessee, with the highest populations occurring during migration periods that typically peak from August through October and from April to mid-May (Elliott and McKnight 2000). Shorebird species common to west Tennessee include the killdeer; pectoral sandpiper; solitary sandpiper; greater yellowlegs; lesser yellowlegs; common snipe; and American woodcock. Refuge lands that provide shorebird habitat include riverine mudbars; oxbows; flooded agricultural fields; the margins of reservoirs; and managed impoundments. Presently, the Chickasaw Refuge manages approximately 1,186 acres of impoundments as shorebird habitat. Shorebird habitat is provided within the impoundments each spring (target 100 acres) and fall (target 30 acres).

The Lower Mississippi Valley serves as the primary wintering ground for midcontinental waterfowl populations that breed in the prairies and parklands of Canada and the United States. Chickasaw National Wildlife Refuge and its adjacent lands are known to be an important wintering and stopover area for mallards using the Mississippi Flyway. Under optimum conditions, waterfowl population numbers may exceed 150,000. The value of the Chickasaw Refuge as a waterfowl wintering area is enhanced by its proximity to other refuges. It lies within 125 miles of numerous national wildlife refuges, including Big Lake and Wapanocca to the west; White River and Lower Hatchie to the south; Hatchie and Tennessee to the east; and Reelfoot, Crab Orchard, and Mingo to the north. Other species of waterfowl known to use the areas include the black duck; gadwall; pintail; green-winged teal; blue-winged teal; widgeon; wood duck; ring-necked duck; and hooded merganser. Wood ducks are year-round residents and depend on refuge habitats for nesting and brood-rearing.

Approximately 1,186 total acres are currently managed on the refuge as a waterfowl sanctuary. These are moist soil or agricultural habitats. The fields are managed at an average ratio of 50 percent moist soil to 50 percent agricultural; the ratio varies year to year due to river stages and other environmental factors. Approximately 30 acres of the sanctuary are managed for shorebird habitat. Agricultural crops are raised by a cooperative farming agreement; the refuge's share of the crops is 25 percent (unharvested), with 75 percent (harvested) going to the farmer. The waterfowl objectives for the refuge are 500,000 goose-use days and 13.5 million duck-use days. These objectives are supported by the moist soil units, impoundments, flooded sloughs and brakes, as well as the entire refuge forest, much of which is subject to inundation during high river stages. These objectives are currently being evaluated in light of the refuge expansions and the North American Waterfowl Management Plan.

Wild turkeys are also present on the refuge, although spring flooding impacts nesting success on a regular basis. Flocks consisting of up to 50 turkeys are observed during high water periods, in which the birds congregate on higher ground. Mourning doves and bobwhite quail are common on the open lands within and adjacent to the refuge. Common raptors include the red-tailed hawk, red-shouldered hawk, northern harrier, barred owl, and turkey and black vultures. Kestrels and broad-winged hawks are also present but occur less frequently.

MAMMALS

Chickasaw National Wildlife Refuge contains a diversity of mammals representing seven taxonomic orders, including pouched mammals (opossums); insect-eaters (shrews and moles); bats; flesh-eaters (raccoons); gnawing mammals (squirrels and mice); rabbits; and even-toed hoofed mammals (white-tailed deer).

The diverse habitat types on the refuge are very productive for a wide variety of game and nongame mammals. Mammalian game species hunted on the refuge include white-tailed deer, raccoon, gray and fox squirrels, coyote, and swamp and cottontail rabbits. Furbearers include raccoon, beaver, opossum, river otter, muskrat, nutria, striped skunk, coyote, bobcat, gray and red fox, and mink. Nongame species include shrews, moles, bats, and numerous rodents, such as mice, rats, chipmunks, and flying squirrels.

Providing a diversity of habitats on the refuge contributes to healthy populations of numerous mammalian species, as well as other resident animals. Habitat management practices that focus on providing habitat for migratory birds would also benefit many resident mammals. Forest thinning and regeneration cuts would provide browse for deer, and ultimately larger mast-bearing trees with a greater potential for cavities for squirrels and raccoons. Managing for a diversity of forest habitats would better meet the needs of all resident mammals that are dependent on forested habitats.

Appendix IV provides a list of the mammalian species known to occur on the refuge.

AMPHIBIANS AND REPTILES

A diverse group of amphibians is found on the refuge, including salamanders, toads, and frogs. Most are well adapted to the refuge's aquatic and terrestrial environments, with moisture being typically important for their survival. Numerous species of reptiles, including turtles, snakes, lizards, and skinks, are common as well.

Reptiles and amphibians are abundant and functionally important in most of the refuge's freshwater and terrestrial habitats, and are major components of the Lower Mississippi River ecosystem. Many species of herpetofauna are wide-ranging and may serve as key indicator species in evaluating the environmental health of an ecosystem. Comprehensive inventories will be performed to establish baseline information on the occurrence and habitat use of amphibian and reptilian species on the refuge, as funding and staff become available. Knowledge of which species occur on Chickasaw National Wildlife Refuge is fundamental to an understanding of the biological diversity of the area.

A troubling indicator for the health of ecosystems worldwide is that many amphibian populations are declining. Loss and degradation of habitat are the main known causes of declines in reptile and amphibian populations in Tennessee, with the loss of wetlands and bottomland hardwood forests having the greatest negative impact on these species. Habitat fragmentation, hydrologic alterations, and excessive sedimentation are environmental problems common to west Tennessee which negatively affect populations. The refuge's land protection and management efforts serve these populations by protecting their existing habitats, as well as by restoring degraded habitats.

The reptiles and amphibians known to exist on the refuge and their status in west Tennessee are listed in Appendix IV.

AQUATIC SPECIES

The sloughs, rivers, and lakes within Chickasaw National Wildlife Refuge support a diversity of game fish, including largemouth bass; black crappie; white crappie; spotted bass; redear sunfish; bluegill; and channel catfish. Nongame species such as carp, buffalo, and drum are also present. Appendix IV provides a comprehensive listing of fish likely to occur in the Mississippi River proper and the directly westward-flowing tributaries in western Tennessee, including the rivers on the Chickasaw Refuge (TWRA and USFWS 2001).

The dynamic nature of the flooding regimes between the Forked Deer, Obion, and Mississippi rivers and their associated wetland habitats on the refuge provide a constant and renewable fishery. When flooding occurs in the spring, these areas provide good nurseries for juvenile fish. Although decades of hydrologic alteration and sedimentation have impacted the aquatic resources of the refuge and surrounding vicinity, land protection and habitat restoration result in positive benefits to aquatic habitats and species. The Service should emphasize projects that reduce the effects of channelization and poor land use practices through programs such as the Partners for Fish and Wildlife; the Wetlands Reserve Program; the Cropland Reserve Program; Forest Legacy; and The Nature Conservancy's Conservation Plan for the Hatchie River.

MUSSELS

A comprehensive mussel survey has not been completed for the refuge, and few published surveys are available on the mussels of the Mississippi River and its major tributaries in west Tennessee. However, a survey by A.E. Ortmann (1926) reported seven species of mussels from Reelfoot Lake and 12 species from the Obion River. Pilsbry and Rhoads (1896, as cited in Ortmann 1926) listed 12 species of mussels from Reelfoot Lake and five species from the Wolf River in Shelby County. Don Manning (1989) later reported 33 species of mussels in the nearby Hatchie River. It is estimated that approximately 20 to 25 species of mussels are likely to exist in the vicinity of Chickasaw National Wildlife Refuge. Mussel species known to exist in the Obion and Forked Deer rivers are listed in Appendix IV.

As stated in the above Aquatic Resources section, hydrologic alterations and sedimentation have impacted the area's aquatic resources, including mussels. Similarly, the refuge's land protection and habitat restoration efforts result in positive benefits to aquatic habitats and mussel species. The Service should emphasize projects that reduce the effects of channelization and poor land use practices. In addition, a comprehensive survey of mussel populations should be conducted on the waters of the refuge and surrounding vicinity, when funding and opportunities become available.

NOXIOUS INVASIVE SPECIES

Noxious and/or invasive species known to present problems on the refuge include a hybrid cocklebur, hemp sesbania, and the kudzu vine. The refuge vicinity has become home to a hybrid cocklebur that is resistant to flooding and wet soil conditions. The species is prolific and will outcompete native moist soil vegetation in moist soil units. Hemp sesbania also invades the moist soil units and will also outcompete the preferred moist soil plants.

Kudzu occurs along field and forest edges and forest openings where direct sunlight can penetrate the forest floor. This exotic vine is a native of Asia and was introduced into the United States at the Philadelphia Centennial Exposition in 1876. By 1900, kudzu was being sold through mail order suppliers as an inexpensive livestock forage. The Soil Erosion Service distributed approximately 85

million seedlings starting in 1933 in an effort to control agricultural erosion. The U.S. Department of Agriculture removed kudzu from its list of cover plants and listed it as a common weed in 1970 (Shurtleff and Aoyagi 1977; Miller and Boyd 1983).

Kudzu is an aggressive vine that can grow up to 60 feet per year, forming a continuous blanket of foliage. The dense foliage often chokes out native plants and trees, alters native biotic communities, and drastically decreases biodiversity. Today, an estimated seven million acres in the southeast are covered in kudzu. While kudzu is not known to currently exist on the refuge, heavy infestations on adjacent lands require continual monitoring.

The Chickasaw Refuge's Draft Habitat Management Plan includes plans and preferred methods for control and eradication of these nuisance and invasive species, which presently occur on or in close proximity to the refuge.

HABITATS

Chickasaw National Wildlife Refuge provides a variety of habitat types for a diversity of wildlife species. The habitats on the refuge consist of approximately 94 acres of open administrative land; 1,186 acres of agriculture and moist soil open lands (the agricultural/moist soil breakdown varies from year to year); 1,874 acres of bald cypress/tupelo forest; 18,419 acres of mixed bottomland hardwood forest; 966 acres of open water; 1,018 acres of sandbars; 515 acres of osage orange savanna; 431 acres of scrub-shrub; and 503 acres of upland forest. The total current deeded acreage being managed as Chickasaw National Wildlife Refuge is 25,006 acres (July 1, 2004). Figure 8 shows the existing habitat types on the refuge.

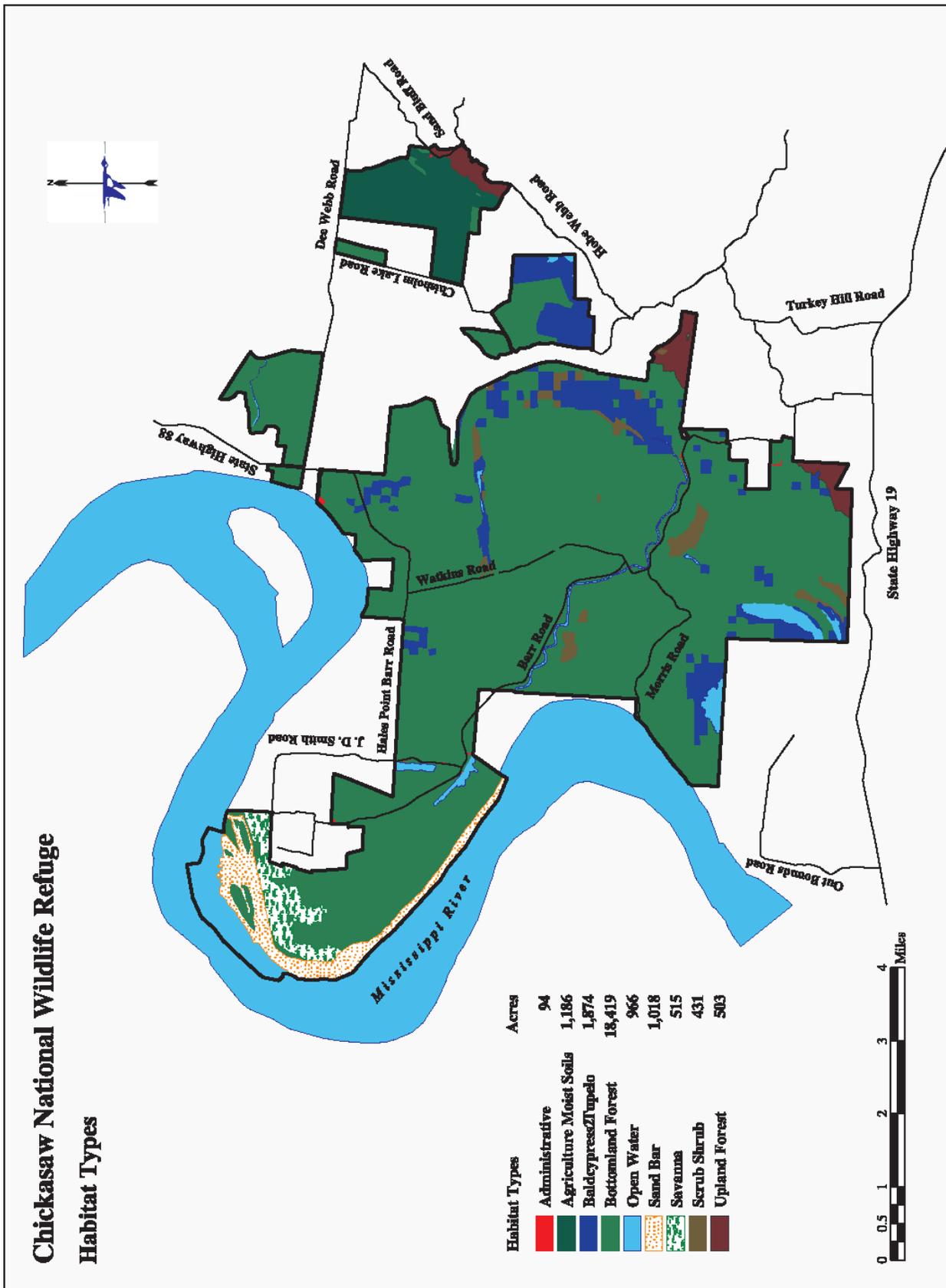
The refuge's 18,419 acres of mixed bottomland hardwoods consist of black willow, eastern cottonwood, overcup oak, cherrybark oak, willow oak, water oak, Nuttall oak, sugarberry, bald cypress, sweet pecan, bitter pecan, sweetgum, and green ash. Forest management practices are used in these areas to maintain an optimal diversity of forest habitat for wildlife. Mast production in the bottomland hardwood habitats provides an important food source for a wide variety of wildlife, including migratory waterfowl, deer, squirrel, and turkey. During the winter and spring months, backwaters typically flood thousands of acres of bottomland hardwoods, providing valuable waterfowl habitat.

There are approximately 1,186 acres of agriculture/moist soil open lands on the refuge. In any given year, approximately 50 percent of these lands are managed for agricultural production and 50 percent are managed for moist soil, although the ratio varies from year to year due to river flooding and other factors. The croplands are managed under cooperative agreements with local farmers, who grow corn, soybeans, and winter wheat in rotation. The 25 percent refuge share is usually planted in corn, which is left in the field for waterfowl consumption.

The refuge currently contains approximately 1,874 acres of wooded swamp habitat, which is dominated by bald cypress and swamp tupelo in the overstory and buttonbush in the understory. Buttonbush is also abundant in the 431 acres of scrub-shrub habitat found on the refuge. In the 966 acres of open water habitat found on the refuge, dominant vegetation includes submerged aquatics such as elodea, curlyleaf pondweed, bladderwort, and coontail, as well as emergents such as American lotus, cowlily, duckweed, waterfern, and yellow pond-lily.

Approximately 1,018 acres of sandbar habitat are found on the refuge, primarily adjacent to the Mississippi River along the refuge's western boundary. Vegetation is essentially lacking as these sandbars are intermittently submerged. Adjacent to the sandbar habitat is a unique savanna habitat

Figure 8. Existing habitat types on Chickasaw National Wildlife Refuge



dominated by osage orange, which comprises about 515 acres. The approximately 503 acres of upland hardwood forest habitat is found primarily along the Chickasaw bluff on the eastern edge of the refuge and in a large tract in the western portion of the refuge. These upland forests consist primarily of southern red oak, sweetgum, yellow poplar, post oak, white oak, various hickories, and American beech.

EDUCATION AND VISITOR SERVICES

Since the passage of the National Wildlife Refuge System Improvement Act of 1997, the refuge has adopted hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation as the six priority general public uses. These uses, as such, are management's primary focuses for public use, and over time programs will be developed to increase visitor awareness and appreciation of the refuge's fish and wildlife resources.

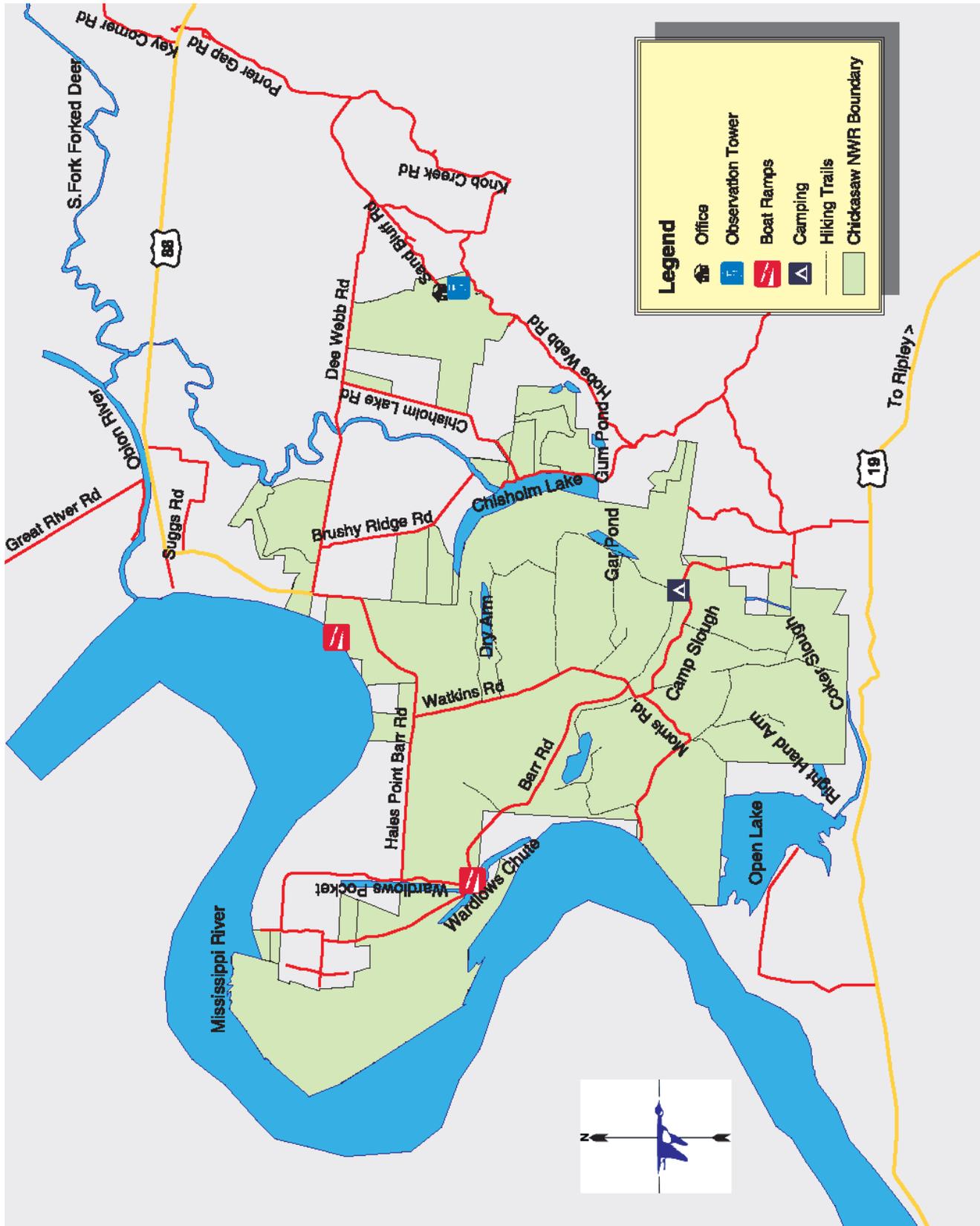
Wildlife-dependent recreation activities currently available on the refuge include wildlife observation (by hiking, boating, or driving on established roads), hunting, fishing, and photography. Hunting and fishing have been the primary uses on the refuge since its inception, and encompass the majority of public use. The refuge staff also provides environmental education and interpretative programs when requested by local civic and school groups. Currently, there are no interpretive facilities on the refuge. In many years, prolonged seasonal flooding from the high stages of the Mississippi River, especially during the spring months, poses a unique challenge in providing visitor services. The seasonal floodwaters can reach as much as 30 feet deep in some areas of the refuge.

In fiscal year 2000, the refuge received about 115,764 visitors, although visitor use data is limited. The refuge is open during most of the state hunting seasons, with some exceptions and certain restrictions which apply to certain hunts. Fishing is permitted all year according to state regulations, but certain restrictions apply. By law, national wildlife refuges are closed to public use activities unless expressly permitted. Hunting, fishing, and wildlife observation and photography are permitted on most areas of the refuge. All public access is prohibited on the 1,186-acre Waterfowl Rest Area from November 15 through March 15. About eleven miles of trails, primarily old logging roads, are maintained for foot hunting access, wildlife observation, photography, and hiking. Figure 9 shows the existing public use facilities on Chickasaw National Wildlife Refuge.

Numerous other public lands within commuting distance offer wildlife-dependent recreation experiences. Five other national wildlife refuges, including Reelfoot (10,428 acres); Lake Isom (1,850 acres); Lower Hatchie (9,451 acres); Sunk Lake (1,876 acres); and Hatchie (11,556 acres) are located within a two-hour drive of the Chickasaw Refuge. Reelfoot National Wildlife Refuge offers a diverse interpretive and environmental education program, including tours to observe concentrations of up to 200 bald eagles, as well as concentrations of ducks and geese that winter in the Reelfoot Lake area. Hatchie National Wildlife Refuge provides excellent birding opportunities within the scenic Hatchie River bottoms. The Hatchie River, which traverses through both the Hatchie and Lower Hatchie refuges, is a state-designated scenic river and is the only unchannelized river remaining in west Tennessee.

Fishing opportunities are found at each national wildlife refuge, with facilities including fishing piers, boat ramps, and bank fishing areas. Reelfoot and Hatchie offer universally accessible fishing areas. Waterfowl hunting, as well as big and small game hunting, is offered on each west Tennessee national wildlife refuge.

Figure 9. Public use facilities at Chickasaw National Wildlife refuge



The Tennessee Wildlife Resources Agency manages approximately 250,000 acres of state wildlife management areas and state wildlife refuges in Tennessee. All of these TWRA lands offer some fishing, hunting, and wildlife observation opportunities. Nearby state wildlife management areas include Anderson-Tully (12,000 acres); Moss Island (3,400 acres); and Tigrett (7,000 acres). The State of Tennessee allows the use of both modern and primitive weapons for deer hunting. During the 2002-3 season, the state offered in west Tennessee a total of 43 days of modern gun deer hunting; 53 days of muzzleloader deer hunting; and 105 days of archery deer hunting. Most of west Tennessee's wildlife management areas are also open to waterfowl and small game hunting.

REFUGE ADMINISTRATION

Refuge administration refers to the operation and maintenance of refuge programs and facilities, including new construction. The refuge staff currently consists of five permanent employees. The staff's efforts are primarily focused on protection and restoration of critical habitats, especially bottomland hardwood forests, through land acquisition and forest management. The refuge's Draft Habitat Management Plan provides an inventory of existing forest resources and long-term plans for management of these resources to maximize their value as habitat for a diversity of wildlife. Of particular concern under management activities is providing quality habitats for migratory birds.

The staff also coordinates extensively with landowners, conservation organizations, local agencies, and civic groups, attending meetings and providing presentations as needed to local groups. The staff's current public information efforts concentrate on land acquisition efforts and keeping the public informed regarding public use opportunities and refuge activities.

The staff maintains one administrative site, the main headquarters located on Sand Bluff Road. The administrative site contains an office in a trailer, a large enclosed shop and storage barn, and two open pole barns.

Much of Chickasaw National Wildlife Refuge is accessible through a county-maintained road system (Figure 9). The refuge can be accessed from the north via State Highway 88 and from the south via State Highway 19. Barr Road and Watkins Road are the main refuge arteries.

In addition to the road system, other refuge facilities include two boat ramps and one seasonal campground used primarily by hunters. The Ed Jones boat ramp on the northwest end of the refuge provides direct access to the Mississippi River. This boat ramp consists of a large concrete ramp and large gravel parking area, which was developed in partnership with the State of Tennessee. The second ramp, which can be used by visitors with smaller boats, is located off of Barr Road at Wardlows Pocket, a permanent backwater area that connects to the Mississippi River during high flow periods.

In addition to the refuge's normal road maintenance activities, the 1998 Transportation Equity Act for the 21st Century (TEA-21) provides funding for National Wildlife Refuge System roads under the Federal Lands Highway program. The Chickasaw National Wildlife Refuge staff is coordinating with Federal Highway Administration officials to assess refuge roads for possible enhancements or improvements with TEA-21 funding. Congress requires that the projects must be compatible with comprehensive management plans and must minimize impacts on refuge operations. The Federal Highway Administration is available to assist the Service in planning, design, and contract administration. Projects proposed for immediate work (2005 to 2010) under the TEA-21 grant funding process include the rehabilitation of Wardlows Pocket Parking Area; Camp Slough Road north; Rush Slough Road east; River Road; Rush Slough Road west; Loop Road; and Dry Arm Road. In addition, the refuge staff is working with the county to secure possible additional TEA-21 funding for county roads that pass through the refuge, including Dee Webb Road.

ARCHAEOLOGICAL OR HISTORIC RESOURCES

During the early historic period, the Chickasaw Indians occupied the portion of western Tennessee that now includes Chickasaw National Wildlife Refuge. Initial European explorations included visits by the Spanish explorer De Soto in 1540 and the French explorer La Salle, who made contact with the Chickasaw Indians in the vicinity of current Fort Pillow State Park in 1682 (Anderson 1995). After the American Revolution, the lands occupied by the Chickasaw were ceded to the new United States government, which made peace with the Chickasaw in 1786. In 1818, the Chickasaw Nation ceded all claim to lands in Tennessee, and in 1837, all remaining Chickasaw east of the Mississippi were removed to the West.

Archaeological investigations that have been conducted on Chickasaw National Wildlife Refuge lands consist of survey activities conducted in a 1,100-acre area at the site of proposed waterfowl impoundments (Anderson 1995). These investigations discovered ten archaeological sites, indicating Woodland period use. Mississippian pottery was observed at one site, and archaic projectile points were observed at several locations. The survey recommended that certain sites be tested and evaluated for their eligibility for inclusion on the National Register of Historic Places. The locations of all discovered cultural resources were mapped, and it was determined that these sites and areas should be avoided by all heavy earthmoving equipment.

Numerous other archaeological investigations have been conducted in nearby portions of west Tennessee. Significant surveys performed in west Tennessee include Mainfort (1994), in which archaeological investigations were made within the nearby Obion River drainage; and Dickson and Campbell (1979), which surveyed cultural resources on the Reelfoot and Lake Isom national wildlife refuges. These reports document an area rich in prehistoric and historic cultural resources, dating back as far as 12,000 B.C. Numerous other smaller archaeological resource studies have been conducted in west Tennessee in conjunction with various federal development projects.

Prior to refuge ownership, levee and road construction, as well as agricultural activities, may have adversely impacted archaeological deposits associated with many sites on the refuge. However, it is likely that numerous other undisturbed sites exist on the refuge, because the refuge was formerly owned by a timber company (Anderson-Tully Company), and was in private ownership prior to that time. The survey recommended that the Service develop a cultural resource management plan for the entire refuge to assist in future project management. In addition, oral history interviews and documentary research could provide a wealth of information regarding the refuge and the county.

LAND PROTECTION AND CONSERVATION

Of the total area of 60,240 acres within the refuge's current approved acquisition boundary, the Service had acquired 25,006 acres as of April 1, 2004, leaving a balance of 35,234 acres in private ownership. The refuge staff is focusing on land acquisition within the refuge's approved acquisition boundary. The land protection goals set for the refuge would support strategic growth in areas where there is greatest concern, mainly lands identified for migratory waterfowl and songbirds.

All tracts acquired by the Service are removed from the local real estate rolls because federal government agencies are not required to pay state or local taxes. However, the Service makes annual payments to Lauderdale County in lieu of real estate taxes, as required by the Refuge Revenue Sharing Act (Public Law 95-469). Payments for acquired land are computed on whichever of the following formulas yields the greatest result: (1) three-fourths of one percent of the fair market value of the lands acquired in fee title; (2) 25 percent of the net refuge receipts collected; or (3) 75 cents per acre of the lands acquired in fee title within the county.

Of the 324,570 acres in Lauderdale County, 192,010 acres consist of cultivated crop lands, and 92,600 acres are forests. There are approximately 505 farms in Lauderdale County with an average size of 380 acres (U.S. Department of Agriculture website: www.usda.gov.nass/). The lands immediately adjacent to the refuge are privately owned and managed as farmlands and hunting clubs. The surrounding farmlands are cultivated primarily for soybeans, cotton, wheat, corn, and milo. Farm commodity prices, in general, have decreased since the mid-1980s, and more dramatically since the passage of the 1996 Farm Bill. Poor farm production, droughts, and low commodity prices in recent years have encouraged many producers to sell their farms or enroll them in some kind of conservation program.

Private lands enrolled in conservation programs contribute significantly to wildlife conservation. In 2000-2001, Lauderdale County claimed 11,593.4 acres in the Conservation Reserve Program (Donna Neal, pers. comm., Lauderdale County Farm Service Administration, Ripley, Tennessee). As of 2003, Lauderdale County claimed 239.9 acres in the Wetlands Reserve Program (Dwayne Johnston, pers. comm., Natural Resources Conservation Service, Ripley, Tennessee). The Fish and Wildlife Service has an active partnership with several agencies and organizations to enroll private lands in these programs. Private land enrollment in conservation programs would continue to be encouraged to augment the Service's program and mission requirements.

A study of contaminants occurring on 26 national wildlife refuges in the Lower Mississippi River Ecosystem was conducted by North Carolina State University (Shea et al. 2001). Samples of water, sediment, and fish were collected, and sampling devices that accumulate persistent organic chemicals were employed. Organochlorine pesticides (OCPs) (including DDTs, toxaphene, mirex, endrin, dieldrin, and numerous other pesticides) were detected at every refuge. However, on Chickasaw National Wildlife Refuge, the total levels of DDT and toxaphene were well below published levels for the protection of fish or wildlife in both predator and benthic fish species.

Mixtures of multiple pesticides were often detected in the Lower Mississippi River Ecosystem refuges, and their detection frequency was clearly associated with their use and persistence. Total polychlorinated biphenyls (PCBs) values in sampled predator and benthic fish and in sampled sediment and water were well below published levels for the protection of fish. Total polycyclic aromatic hydrocarbons (PAHs) in sediment and water samples were low throughout the region, except near oil and gas production facilities, which do not occur on or near the Chickasaw Refuge. Mercury levels in sediment and predator and benthic fish samples were well below threshold levels for fish-eating mammals and birds. Current use pesticides (CUPs) (including the herbicides 2,4-D, atrazine, and numerous others; and the insecticides diazinon, malathion, and numerous others) were detected at every refuge, but at only one-half the frequency as they were at nearby off-refuge areas. On the Chickasaw Refuge, water samples indicated the presence of five CUPs. On nearby lands outside the refuge, three CUPs were found at levels that exceeded the aquatic life criteria. According to the Shea study, hazards associated with CUPs are uncertain due to limitations of sampling techniques. Additional data are probably necessary to perform a quantitative risk assessment (Shea et al. 2001). In summary, the tests at Chickasaw indicated no likely hazard in regard to OCPs, PCBs, or PAHs, but further testing is needed to accurately determine the possible risks associated with current-use pesticides.

REFUGE-RELATED PROBLEMS

Bottomland hardwood forests within the Mississippi Alluvial Valley (MAV) provide habitat for a rich diversity of wildlife species. Of 24 million acres of forested wetlands originally in the MAV, only about 5 million acres remained forested by 1978 (MacDonald et al. 1979). Today, over 80 percent of the MAV lands are in agricultural production (Twedt et al. 1999). The remaining forested lands are typically isolated patches surrounded by agriculture. More than 35,000 forest patches exist in the

Mississippi Alluvial Valley; of these, the average size is less than 100 acres, and less than one percent are greater than 10,000 acres. Agricultural practices in the vicinity of Chickasaw National Wildlife Refuge have resulted in large-scale clearing and fragmentation of bottomland hardwood forests, which equates to significant losses and degradation of valuable wildlife habitat.

Chickasaw National Wildlife Refuge was formerly owned by the Anderson-Tully Timber Company, and the forest was logged on a reserve harvest basis (logging continued for five years after purchase) as part of the purchase agreement with the Service. This logging was completed in 1995. As a result of this harvest, approximately one-half of the existing sawtimber volume was removed, and a third of the sawtimber stems were removed, resulting in fewer, smaller trees. These timber practices by the former owner resulted in an overstory dominated by species that are less productive for wildlife, such as elm and sugarberry. It also produced a significant reduction in the proportion of red oaks, which produce valuable mast for waterfowl and numerous other wildlife species.

A forest habitat inventory is being compiled in a Draft Habitat Management Plan, and inventories of vertebrate species for the refuge are provided in Appendix IV. The relative newness of the refuge, as well as the limited operation and maintenance funds available to date, have played a role in the lack of inventory information thus far. More comprehensive surveys of refuge fauna should be completed as funding and opportunities become available.

Massive navigation and flood-control works have severely impacted the natural processes of the rivers within and adjacent to the refuge. As a result, the physical and biological interaction between the rivers and floodplain has been impeded, and much of the natural hydrologic functioning of the system has been hindered significantly. Lauderdale County is one of the few remaining areas along the Mississippi River where the main line levee is incomplete, which allows high river stages to inundate much of the refuge lands on a regular basis. While this seasonal inundation is beneficial, the hydrology has been altered by agricultural and flood control interests, and so the natural hydrology is severely impacted nonetheless.

Two heavily impacted systems that affect the refuge include Cold Creek and the Old Bed of the Forked Deer River. Cold Creek, which flows from the Chickasaw bluffs into the southeastern portion of the refuge, historically flowed directly into Chisholm Lake. The creation of levees and an agricultural field at the mouth of Cold Creek in recent history has changed the natural course of Cold Creek and caused it to flow across refuge woodlands and eventually into the Middle Fork of the Forked Deer River. As a result, tons of silt and sand are deposited just south of Chisholm Lake and onto refuge lands, and the area's natural hydrology has been significantly impacted.

The Old Bed of the Forked Deer River formerly connected the Obion River to Chisholm Lake. The construction of a dirt and concrete dam north of Chisholm Lake by private interests now restricts the low-water flows within the system, and has further disrupted its natural hydrology.

CONSERVATION PRIORITIES

The conservation priorities identified for Chickasaw National Wildlife Refuge include continued emphasis on habitat for migratory waterfowl and bottomland hardwood forests, and an increased emphasis on habitat for migratory songbirds.

The importance of the Lower Mississippi Valley as the primary wintering ground for midcontinental waterfowl populations serves to reinforce the value of the refuge for migrating waterfowl. The refuge and adjacent lands are known to be an important wintering and stopover area for mallards using the Mississippi Flyway. The refuge's value as a waterfowl wintering area is enhanced by its proximity to

other refuges. The Chickasaw Refuge was authorized by the Migratory Bird Conservation Act of 1929 for "...use as an inviolate sanctuary or for other management purposes, for migratory birds." Management of impoundments, agricultural lands, moist soil units, and bottomland hardwood forests would be carried out with an emphasis on providing habitat for migrating waterfowl.

The vast amount of clearing and forest fragmentation in the Mississippi Alluvial Valley underscores the importance of Chickasaw National Wildlife Refuge as the largest contiguous block of bottomland hardwood forest remaining in west Tennessee. A priority is placed on protection and maintenance of the refuge's bottomland hardwood forests, as well as the reforestation of most of the newly acquired open lands. Refuge management is working to maintain and increase the red oak component of the forest and develop a forest structure that provides a diversity of habitats for numerous species of wildlife.

Significant declines in populations of many Neotropical migratory songbirds serve to emphasize the importance of forest habitats for species that migrate through the Lower Mississippi Valley. Emphasis would continue to be placed on the study and management of the refuge's forests for these species. Management efforts to enhance existing forests for songbirds would continue to be a refuge priority. The refuge's focal species include the swallow-tailed kite, cerulean warbler, and Swainson's warbler.

Focal wildlife species would continue to be managed in support of the goals and objectives developed for the Lower Mississippi River Ecosystem (U.S. Fish and Wildlife Service 2000b). The resource goals and objectives developed cooperatively with the State of Tennessee (TWRA and USFWS 2002) would continue to be a priority in the future planning and management of refuge lands. The Service would continue to work with partners and landowners to achieve common goals and form conservation partnerships. One such partnership involves the Natural Resources Conservation Service. Landowner participation in the Wetlands Reserve Program and Cropland Reserve Program would assist the Fish and Wildlife Service in meeting its wildlife objectives through the restoration of thousands of acres in the vicinity of the refuge.

WILDERNESS REVIEW

Refuge planning policy requires a wilderness review as part of the comprehensive conservation planning process. The Wilderness Act of 1964 defines a wilderness area as an area of federal land that retains its primeval character and influence, without permanent improvements or human inhabitation, and is managed so as to preserve its natural conditions and which

1. generally appears to have been influenced primarily by the forces of nature, with the imprint of man's work substantially unnoticeable;
2. has outstanding opportunities for solitude or primitive and unconfined types of recreation;
3. has at least 5,000 contiguous roadless acres or is of sufficient size to make practicable its preservation and use in an unimpeded condition; or is a roadless island, regardless of size;
4. does not substantially exhibit the effects of logging, farming, grazing, or other extensive development or alteration of the landscape, or its wilderness character could be restored through appropriate management at the time of review; and
5. may contain ecological, geological, or other features of scientific, educational, scenic, or historic value.

The lands within Chickasaw National Wildlife Refuge were reviewed for their suitability in meeting the criteria for wilderness, as defined by the Wilderness Act of 1964. No lands in the refuge were found to meet these criteria. Therefore, the suitability of refuge lands for wilderness designation is not further analyzed in this plan.

IV. Management Direction

INTRODUCTION

The Service endeavors to manage fish and wildlife and their habitats, while considering the needs of the complete spectrum of natural resources in the decision-making process. But first and foremost, fish and wildlife conservation assumes priority in refuge management. A requirement of the National Wildlife Refuge System Improvement Act is for the Service to maintain the ecological health, diversity, and integrity of national wildlife refuges. The refuges in the Lower Mississippi Valley include managed bottomland hardwood forests and moist soil areas, and are vital links in the overall function of the ecosystem. To offset the historic and continuing loss of these habitats within the ecosystem, the refuge and other public lands provide the biological “safety net” for migratory nongame birds and waterfowl, threatened and endangered species, and resident species.

REFUGE VISION

The wildlife and biological communities found on the refuge form the basis for the future management of refuge lands. The following vision statement, developed collaboratively by the planning team with input from the refuge staff and the public, describes the desired future conditions and management emphasis for Chickasaw National Wildlife Refuge:

With a continued emphasis on wintering waterfowl and other migratory birds, in accordance with the purpose for which the refuge was established, to provide habitat for fish and wildlife; to protect, restore, enhance, and manage an outstanding example of the bottomland hardwood forest that once covered most of the Mississippi Alluvial Valley; and to promote the enjoyment of this unique biological system for present and future generations.

REFUGE GOALS

The following nine goals were developed in keeping with the vision for the refuge and the purposes for which it was established:

Goal 1 – Waterfowl: Provide a complex of managed wintering and migration habitats for waterfowl that support the population goals and objectives established in the North American Waterfowl Management Plan, the Lower Mississippi Valley Joint Venture Plan, and the West Tennessee Wildlife Resources Conservation Plan.

Goal 2 – Endangered and Threatened Species: Protect, manage, and enhance refuge habitats in a manner that will sustain or increase species populations.

Goal 3 – Migratory Land Birds: Provide a complex of habitats which meet the breeding, migration, and wintering needs of the species of management concern as identified in the goals and objectives of the Partners in Flight Plan and the West Tennessee Wildlife Resources Conservation Plan.

Goal 4 – Shorebirds and Waterbirds: Provide a complex of managed habitats for shorebirds and waterbirds during critical periods throughout the year to increase bird use on the refuge and develop a traditional use site.

Goal 5 – Aquatic Resources: Maintain or improve aquatic habitat quantity, quality, and diversity to sustain or increase population levels of aquatic resources on the refuge in accordance with the West Tennessee Wildlife Resources Conservation Plan and other Service aquatic resource plans.

Goal 6 – Resident Wildlife: Provide a complex of habitats suitable for a wide range of resident (endemic) wildlife species, including mammalian, avian, amphibian, and reptilian species, while achieving habitat management objectives and biological integrity with other native flora and fauna.

Goal 7 – Public Use: Enhance public use of the refuge through development of an appropriate and compatible program of wildlife-dependent recreation and education/interpretation that is consistent with the National Wildlife Refuge System Improvement Act of 1997 and that will promote an understanding of the Lower Mississippi River Valley ecosystem.

Goal 8 – Administration and Operation: Ensure that present and future operational, administrative and personnel objectives are achieved in order that goals and objectives for refuge habitats, fish and wildlife populations, land conservation, and visitor services will be achieved.

Goal 9 – Land Protection and Conservation: Protect natural and cultural resources through partnerships and land acquisitions and in accordance with federal and state historic preservation legislation and regulations.

COMPREHENSIVE CONSERVATION PLAN – SUMMARY STATEMENT

This proposed management plan was derived from Alternative D of the Draft Environmental Assessment (Section B). The refuge would be managed using an ecosystem management approach that preserves the environmental health and diversity of natural resources on the refuge. At the same time, opportunities would be examined to allow greater access for hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation.

During the planning process, oral and written comments received conveyed both a desire for increased public access and recreation and a desire to preserve the diverse flora and fauna of the refuge. The decisions to allow or prohibit certain uses were dependent upon the compatibility of those uses with resource protection (whether the proposed uses would have an adverse effect on the natural resources of the refuge), the establishing purposes for the refuge, and the professional judgment of the refuge staff and planning team.

This management plan outlines how wildlife and habitats would be managed and enhanced by the refuge over the next 15 years. The goals, objectives, and strategies acknowledge that the refuge is a portion of the much larger Lower Mississippi River Ecosystem. The actions considered and taken in implementing this plan would affect the remaining Lower Mississippi River Ecosystem, natural areas that surround the refuge, and nearby municipalities and landowners.

Crucial elements of this plan include managing wintering and migration habitats for wintering waterfowl and other migratory birds. Management of moist soil units, croplands, and bottomland hardwood forests, as well as acquisition and management of additional lands, would ensure that the refuge supports the population goals and objectives established in numerous regional plans, including the North American Waterfowl Management Plan; the Lower Mississippi River Joint Venture Plan; and the West Tennessee Wildlife Resources (WTWR) Conservation Plan. Waterfowl impoundments, including moist soil units and flooded fields, would be managed to provide seasonal habitat for migratory shorebirds in support of the WTWR Conservation Plan and the Shorebird Management Manual.

Protection and management of refuge forests and grasslands would support target populations of migratory land birds and support population goals and objectives established in the Partners in Flight Plan and the WTWR Conservation Plan. Refuge land acquisitions and cooperative efforts with other agencies and nongovernmental organizations would work to assemble a 100,000-acre block of contiguous bottomland hardwood forest within the Mid-Tennessee Bird Conservation Area boundary.

Active forest management would maximize the ability of the refuge's forest lands to benefit all resident and migratory species. Protection of aquatic resources would promote self-sustaining fish populations and aquatic habitats necessary for resting, foraging, and breeding habitats for resident and migratory wetland-dependent wildlife species. Inventory and monitoring of threatened and endangered species would continue, and resource protection and management would contribute to their recovery.

The refuge's environmental education and outreach program would be enhanced to showcase the Lower Mississippi River Ecosystem, and a wide range of partnering opportunities would be actively pursued and fostered to share in the protection of natural and cultural resources. Public use facilities, including a visitor center, boat ramps, observation platforms, kiosks, and trails would be developed to enhance public access and appropriate and compatible wildlife-dependent recreation.

GOALS, OBJECTIVES, AND STRATEGIES

The goals, objectives, and strategies presented below are the Service's response to the issues and concerns expressed by the planning team, and by the public at open meetings and in written comments. All issues discussed during the public scoping process are listed in Appendix VII. The Service's responses to relevant comments received during the public review of this Draft Comprehensive Conservation Plan will be addressed in the Final CCP. Following each goal is a list of objectives, and under each objective is a listing of strategies. Chapter V, Plan Implementation shows the support projects for the goals in priority order.

The goals developed in this plan reflect the Service's commitment to achieving the mandates of the National Wildlife Refuge System Improvement Act and the mission of the National Wildlife Refuge System. The objectives and strategies in this plan are designed to contribute to the population goals and objectives established in regionally, nationally, and internationally significant management plans, including the North American Waterfowl Management Plan; Lower Mississippi Valley Joint Venture Plan; Partners in Flight Plan; Shorebird Management Manual; Lower Mississippi River Ecosystem Plan; WTWR Conservation Plan; and other plans relevant to the Lower Mississippi River Valley.

With adequate staffing and funding as outlined in Chapter V Plan Implementation, the Service intends to accomplish these goals, objectives, and strategies during the next 15 years.

GOAL 1 – WATERFOWL

Provide a complex of managed wintering and migration habitats for waterfowl that support the population goals and objectives established in the North American Waterfowl Management Plan, the Lower Mississippi Valley Joint Venture Plan, and the WTWR Conservation Plan.

Objective 1.1: On an annual basis, through the management of existing refuge lands and resources, as well as the acquisition from willing sellers, development, and management of additional lands identified in the current approved acquisition boundary, provide migration and wintering habitats to support 13.5 million duck-use days and 500,000 goose-use days based on a 110-day wintering period, in addition to year-round habitat for resident wood ducks.

Guidelines for minimum duck-use days were set by the use of a series of step-down plans, starting with population objectives developed in the North American Waterfowl Management Plan. These values were stepped down to the Lower Mississippi Valley Joint Venture, which in turn determined minimum foraging requirements that needed to be met to support the established goals of the North American Waterfowl Management Plan; and these foraging requirements were then allocated to each state within the Joint Venture. Within each state, coordination meetings were held to determine who could provide the needed habitat requirements, and where among management units and between public and private lands the needed habitat could best be provided. Taking into account sanctuary and foraging requirements, public land managers determined what potential existed on various managed lands to meet the state objectives. For Chickasaw National Wildlife Refuge, these potential objectives were adjusted based on multi-species duck life history requirements, goose life history requirements, and refuge purposes and capabilities.

Strategy 1.1.1: Maintain the current core waterfowl management area (1,410 acres) as an inviolate sanctuary for waterfowl and other migratory birds where few if any disturbance factors are allowed during the critical winter period (November to March).

Strategy 1.1.2: Manage 1,186 acres of moist soil/agricultural areas through water manipulation, as well as mechanical and chemical treatments, to provide quality moist soil habitat and high-energy food resources for waterfowl.

Strategy 1.1.3: Manage refuge forests to increase the red oak component on suitable sites in the red oak and potential red oak management units to 60 percent of the basal area.

Strategy 1.1.4: Continue reforestation efforts and establish red oak and other mast species on newly acquired lands that are not scheduled for water management development.

Strategy 1.1.5: In cooperation with private, state, and federal partners, establish a contiguous block of forest within the approved acquisition boundary that contains 52,698 acres and connects to other conservation lands under the designated 100,000-acre MAV Bird Conservation Area.

GOAL 2 – ENDANGERED AND THREATENED SPECIES

Protect, manage, and enhance refuge habitats in a manner that will sustain or increase species populations.

Objective 2.1: Enhance, restore, protect, and manage imperiled species' habitat using appropriate conservation tools, including habitat management on 25,006 acres of existing refuge lands.

Part of the Service's mission is to protect, enhance, and manage habitat for threatened and endangered species, in compliance with the Endangered Species Act. Refuge resource management emphasizes the protection of threatened and endangered species and efforts to protect and manage these habitats will be conducted.

Strategy 2.1.1: Provide habitat to support the recovery of the threatened bald eagle through approved land acquisitions and resource management actions.

Strategy 2.1.2: Provide feeding sites on refuge lands for interior least terns and cooperate with other resource agencies in minimizing disturbance to nesting colonies on Mississippi River sandbars adjacent to the refuge.

Strategy 2.1.3: Provide technical assistance to other Service divisions or resource agencies concerning efforts to restore or enhance Mississippi River or tributary river habitats which may provide habitat requirements for pallid sturgeon.

Strategy 2.1.4: Enhance, restore, protect, and manage imperiled species' habitat using all available conservation tools, including habitat management on existing lands (federal, state, and private), conservation easements, partnership agreements, conservation agreements, and land acquisition from willing sellers.

GOAL 3 – MIGRATORY LAND BIRDS

Provide a complex of habitats which meet the breeding, migration, and wintering needs of the species of management concern as identified in the goals and objectives of the Partners in Flight Plan and the WTWR Conservation Plan.

Objective 3.1: Through acquisition and management of up to 60,240 acres of refuge lands, provide sufficient habitat to support species of management concern, and work with partners toward the assemblage of a 100,000-acre block of forested land in west Tennessee within the next 15 years.

To support the establishment of sustainable populations of priority forest interior-nesting migratory songbirds, Partners in Flight and their cooperating partners have mapped blocks of forest that could provide appropriate habitat. The MAV Migratory Bird Conservation Plan has identified 101 patches that, with varying amounts of reforestation, could provide forest patches of 10,000, 20,000, or 100,000 acres. Resource professionals believe that forest patches in these categories are the minimum sizes suitable to support breeding populations of various Neotropical songbirds. In some cases, even larger forest patches may be needed to support breeding Neotropical songbird populations, where the shape and/or isolation of a particular forest patch may dictate the need for even larger forest acreage. Chickasaw National Wildlife Refuge is located in one of only thirteen 100,000-acre forest blocks designated by Partners in Flight within the Lower Mississippi River Alluvial Plain. According to Partners in Flight research, a typical 100,000-acre block contains 84,000 acres of core habitat capable of supporting the species most dependent upon large forest blocks, including swallow-tailed kites, red-shouldered hawks, broad-winged hawks, pileated woodpeckers, and Cooper's hawks (Mueller et al. 1999). These large forest blocks also are expected to support other less area sensitive forest-nesting migrants as well. Figure 5 shows the Mid-Tennessee Bird Conservation Area, as designated by Partners in Flight.

Strategy 3.1.1: In cooperation with private, local, state, and federal partners, establish a contiguous block of forest within the approved acquisition boundary that contains 60,240 acres and connects to other conservation lands under the designated 100,000-acre forest block.

Strategy 3.1.2: Develop and maintain a diversity of bottomland forest structure through sound silvicultural management.

Strategy 3.1.3: Manage upland forests to provide quality habitat for migratory birds.

Strategy 3.1.4: Manage 51 acres of grasslands and 515 acres of savanna to provide quality habitat for migratory land birds.

GOAL 4 – SHOREBIRDS AND WATERBIRDS

Provide a complex of managed habitats for shorebirds and waterbirds during critical periods throughout the year to increase bird use on the refuge and develop a traditional use site.

Objective 4.1: Provide a minimum of 100 acres of shorebird habitat during spring migration and 30 acres during fall migration, and a minimum of 40 acres of waterbird habitat during summer in managed impounded wetlands within three years of the plan's approval.

Shorebirds annually migrate through the Lower Mississippi River Valley (LMRV) from the southernmost parts of South America to the northernmost parts of North America. Foraging habitat (mudflats and shallow water areas) objectives were recommended for fall migrating shorebirds by the U.S. Shorebird Working Group and a smaller group of shorebird experts working in the LMRV (Elliott et al. 2000). These ecosystem objectives were then stepped down to private and public lands.

Foraging habitat is not considered limiting during the spring migration, when river stages are typically falling and mudflats are common throughout the LMRV, but can be critical in the fall due to the lack of available sheet water along the Mississippi Flyway. The WTWR Conservation Plan identified 30 acres of fall shorebird habitat for Chickasaw National Wildlife Refuge.

Strategy 4.1.1: Time drawdowns of impounded wetlands to provide a minimum of 100 acres of shallowly flooded mudflat habitats with less than 25 percent vegetative cover and varying water levels (up to 8 inches in depth) to support shorebirds during spring migration (March to early June).

Strategy 4.1.2: Provide a minimum of 30 acres of shallowly flooded mudflat habitats with less than 25 percent vegetative cover and varying water levels (up to 8 inches in depth) during fall migration (late June to October).

Strategy 4.1.3: Identify a minimum of 20 acres of impounded wetlands in management unit 8 (Map 3) to provide shallow-water feeding areas for wading birds and marsh birds during summer.

Strategy 4.1.4: Provide a minimum of 20 acres of emergent marsh habitat.

GOAL 5 – AQUATIC RESOURCES

Maintain or improve aquatic habitat quantity, quality, and diversity to sustain or increase population levels of aquatic resources on the refuge in accordance with the WTWR Conservation Plan and other Service aquatic resource plans.

Objective 5.1: Conserve, restore, and manage 966 acres of open-water wetlands (lakes, sloughs, side channels, etc.) and 20,293 acres of seasonally flooded bottomland hardwood forest to provide resting, foraging, and breeding habitats for resident and migratory wetland-dependent wildlife species, including native fish and invertebrates; and provide opportunities for recreational harvest of selected fish species on the refuge.

Most of the refuge lies within the floodplain of the Mississippi River, in conjunction with two of its tributaries, the Obion River and the Middle Fork of the Forked Deer River, which regularly flow through the refuge when the rivers reach flood stage. The dynamic nature of this flooding regime and the associated wetland habitats provide diverse and renewable resources within the numerous aquatic features on the refuge. The creeks, sloughs, oxbows, lakes, and chutes within the project areas support a diversity of game and nongame fishes. When flooding occurs in the spring, these

areas provide good nurseries for juvenile fish, as well as breeding areas for frogs and toads, and feeding areas for reptiles. Through conservation, restoration, and management of lands and aquatic resources on the refuge, critical habitats are made available for resting, foraging, and breeding for resident and migratory wetland-dependent species as well as aquatic wildlife species.

Strategy 5.1.1: Restore and maintain natural secondary channels, oxbows, natural banks, sloughs, and backwater areas that connect to the Mississippi, Forked Deer, and Obion rivers on the refuge.

Strategy 5.1.2: Improve water quality and reduce annual flood damage by restoring floodplain hydrology on newly acquired lands where agricultural drainage is no longer needed.

Strategy 5.1.3: Promote the enhancement and protection of riparian corridors.

Strategy 5.1.4: Manage for sustainable harvest of recreational fish species.

GOAL 6 – RESIDENT WILDLIFE

Provide a complex of habitats suitable for a wide range of resident (endemic) wildlife species, including mammalian, avian, amphibian, and reptilian species, while achieving habitat management objectives and biological integrity with other native flora and fauna.

Objective 6.1: Conserve, restore, and manage up to 25,006 acres of refuge lands to support resident wildlife species and population levels identified in the WTWR Conservation Plan.

In keeping with refuge management objectives and establishing purposes, sound biological principles are used in the assessment of, and when feasible, management for resident species. In some resident species groups, little specifically targeted resource management is performed other than monitoring, protection, and awareness of any species of special concern that may exist on the refuge. However, management for priority habitat conditions often results in good management for a host of resident species. Resident game species lend themselves to active management in the form of hunt management, check station information collection, and biological assessment of harvested individuals. Targeted management efforts directed at resident species focus on maintaining viable populations rather than favoring certain species, age classes, or sexes.

Strategy 6.1.1: Manage resident wildlife populations to achieve habitat management objectives and biological integrity with other priority species and species groups.

GOAL 7 – PUBLIC USE

Enhance public use of the refuge through development of an appropriate and compatible program of wildlife-dependent recreation and education/interpretation that is consistent with the National Wildlife Refuge System Improvement Act, benefiting visitors and promoting an understanding of the Lower Mississippi River Valley ecosystem.

The National Wildlife Refuge System Improvement Act of 1997 identifies six high priority, wildlife-dependent public use activities for national wildlife refuges: hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation. Fundamental to the provision of these uses are viable and diverse fish and wildlife populations and the habitats upon which they depend. These priority uses, along with all other proposed uses, must be compatible with the refuge's establishing purposes and the mission of the National Wildlife Refuge System, and will receive enhanced consideration over other general public uses.

If determined appropriate, recreation fees and concessions are tools available to assist in managing these uses. Refuge management will permit other uses only when it has been 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 FW1, Appropriate Refuge Uses.

Objective 7.1: Manage up to 25,006 acres of refuge lands to provide compatible opportunities for wildlife-dependent public use activities, including the six designated as high priority for national wildlife refuges: hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation.

Strategy 7.1.1: Provide appropriate and compatible fishing opportunities at Chickasaw National Wildlife Refuge, consistent with sound biological principles, by maintaining existing access and facilities, and by evaluating refuge resources for possible additional fishing opportunities.

Strategy 7.1.2: Provide appropriate and compatible hunting opportunities at Chickasaw National Wildlife Refuge by maintaining existing access and facilities and by evaluating refuge resources for possible additional hunting opportunities and access.

Strategy 7.1.3: Provide quality, appropriate, and compatible wildlife observation and photography opportunities at Chickasaw NWR by maintaining existing access and facilities and by evaluating refuge resources for additional opportunities and facilities.

Strategy 7.1.4: Provide quality, appropriate, and compatible environmental education and interpretation programs at Chickasaw National Wildlife Refuge by maintaining existing programs and facilities and by evaluating opportunities for additional programs and resources.

Strategy 7.1.5: Develop an effective program of public outreach and awareness that provides an understanding and appreciation of the refuge and the Lower Mississippi River Ecosystem, the refuge's ecology, and the human influence on ecosystems of west Tennessee.

Strategy 7.1.6: Examine existing methods of orienting visitors to the refuge, and develop more effective methods and facilities to accomplish refuge information dissemination and visitor orientation.

Strategy 7.1.7: Evaluate and improve existing partnerships, and pursue opportunities for refuge support groups and other partnerships, including a refuge volunteer program.

GOAL 8 – ADMINISTRATION AND OPERATION

Ensure that present and future operational, administrative, and personnel objectives are achieved in order that goals and objectives for refuge habitats, fish and wildlife populations, land conservation, and visitor services will be achieved.

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

Office space is needed at Chickasaw National Wildlife Refuge for staff in five existing positions, including a refuge operations specialist, a forester, a forestry technician, a maintenance worker, and an engineering equipment operator. In addition, six new positions are proposed, including a secretary, two maintenance workers, a refuge manager, a forester, and a law enforcement position. Extra space is also needed for occasional refuge workers, including other law enforcement personnel, interns, or volunteers. The current office is located in a single-wide trailer with limited office space available for only three personnel. Existing maintenance facilities include an enclosed shop and storage barn, and two open pole barns.

Objective 8.1: Provide adequate facilities, personnel, training, and equipment necessary to accomplish a comprehensive refuge management program, as proposed in this plan, by 2009.

Strategy 8.1.1: Develop appropriate maintenance facilities and a new small office/visitor center, to ensure safe and efficient refuge operations, by 2007.

Strategy 8.1.2: Develop staff resources, including personnel, equipment, and training, adequate to accomplish a comprehensive refuge management program, as proposed in this plan.

Strategy 8.1.3: Maintain highly trained and effective law enforcement personnel to ensure trust resource protection, visitor safety, and enforcement of all refuge-related acts and regulations.

GOAL 9 – LAND PROTECTION AND CONSERVATION

Conserve natural and cultural resources through partnerships, protection, and land acquisition.

To further conserve and protect natural and cultural resources on and in the vicinity of the refuge, the refuge staff would seek to develop and enhance partnerships with state and county natural resource agencies, conservation organizations, and neighboring landowners, and to protect additional lands and resources. Among critical issues to be addressed are water quality, erosion and sedimentation, and cultural resource protection. 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 Service would work toward improving resource protection through offering technical advice, evaluating potential land acquisition opportunities from willing sellers, and identifying and protecting cultural and historic resources on refuge lands.

Objective 9.1: Through land acquisitions from willing sellers, technical assistance to private landowners, and protection of cultural resources, protect the remaining 35,234 acres within the refuge's approved acquisition boundary, as well as neighboring lands which have potential to significantly impact the refuge's natural and cultural resources.

Strategy 9.1.1: By 2008, work with the realty specialist to update address and contact lists for all inholders and make inquiries concerning their willingness to sell identified properties.

Strategy 9.1.2: Work with partner conservation organizations such as The Nature Conservancy, The Conservation Fund, Trust for Public Land, and others to acquire land for the refuge.

Strategy 9.1.3: Acquire the remainder of the land within the 35,234-acre approved acquisition boundary as funding and willing sellers become available.

Strategy 9.1.4: Work with private landowners through the Partners for Wildlife program to improve wildlife habitat and reduce sedimentation and contaminants problems that affect the refuge.

Strategy 9.1.5: Protect cultural and historic resources from disturbance or inadvertent damage that could occur as a result of refuge activities.

Strategy 9.1.6: By 2008, assess the feasibility of conducting a refuge-wide archaeological survey.

V. Plan Implementation

BACKGROUND

Refuge lands are managed under the National Wildlife Refuge System Improvement Act of 1997, the Fish and Wildlife Service Manual, sound biological principles, and current research. Congress has distinguished a clear legislative mission of wildlife conservation for all national wildlife refuges, which, unlike other public lands, are dedicated primarily to the conservation of the Nation's fish and wildlife resources. Recreational values are accommodated where appropriate and compatible with the Congressional mandate of wildlife first. Priority projects emphasize the protection and enhancement of fish and wildlife species first and foremost, but consideration is given to balancing the needs and demands for recreation and environmental education.

To accomplish the purpose, vision, goals, and objectives contained in this plan for Chickasaw National Wildlife Refuge, this chapter identifies the proposed projects, a cost summary for those proposed projects, staffing and funding needs, step-down management plans, partnership opportunities, a monitoring and evaluation plan, and a plan for review and revision of the plan.

PROPOSED PROJECTS

The following proposed projects describe the basic needs that have been identified by Service staff, the public, and planning team members for the management of fish and wildlife populations, habitats, visitor services and environmental education, refuge administration and operation, and land protection and conservation on the refuge over the next 15 years.

For the purposes of achieving the goals and objectives developed for the refuge, the plan has grouped management strategies into specific projects. This plan describes 11 potential projects for development and management. Some of these projects include several different components, such as pieces of heavy construction equipment or staff positions, which would be needed to accomplish a particular project. Also, private lands have been identified for potential acquisition from willing sellers or possible enrollment in conservation programs offered by the Service or other partnering agencies.

A cost summary of projects proposed for the refuge is provided in Table 1. These figures would be specifically updated and adjusted annually. There are no estimates of the cost of potential land purchases, because land values vary with the time of the sale and market value at the time of purchase. There are no assurances that these projects will be either fully or partially funded. However, with the help and cooperation of conservation partners, the Service would use this plan to focus attention on funding the management, operation, and maintenance needs of the refuge.

The following proposed projects are categorized under four management categories: Fish and Wildlife Populations and Habitat Management; Visitor Services and Environmental Education; Refuge Administration and Operation; and Land Protection and Conservation. Each project description includes first-year costs, recurring annual costs (if any), and linkages of the proposed project to the specific goals and objectives developed during the course of the comprehensive planning process.

PROJECT DESCRIPTIONS

PROJECT CATEGORY 1: FISH AND WILDLIFE POPULATIONS AND HABITAT MANAGEMENT

Project 1: Waterfowl Sanctuary/Moist Soil and Agriculture Impoundment System.

Man-made hydrological alterations have all but eliminated the natural flooding regimes that once supported historical numbers of waterfowl and shorebirds in the Mississippi Alluvial Valley. Chickasaw National Wildlife Refuge is located in one of the few remaining unleveed portions of the Mississippi River floodplain. Much of the refuge is inundated annually by seasonal flooding from the Forked Deer, Obion, and Mississippi rivers. However, a managed system of levees, water control structures, and wells is critical to not only meet the needs of migratory birds, but also to provide dependable flooded habitats that correspond with the migration chronologies of migratory birds. The timing of water releases from this system is also important to the production of desirable moist soil plants and control of undesirable plants. The refuge's 1,186-acre moist soil and agricultural impoundment system is in need of funding for additional resources and equipment for proper restoration, management, and operation, as well as expansion of the system. This system is used by 150,000 wintering waterfowl and 10,000 shorebirds annually. Numerous wetland-dependent species would benefit from this project. The improved impoundments would also provide additional feeding habitat for the bald eagles that migrate through or spend the winter on the refuge. This activity would also benefit resident wildlife, and would increase public education for the approximately 115,000 annual visitors to the refuge.

Project 1A: Expand Moist Soil Impoundment System. Improve the planned expansion and management of the 1,186-acre moist soil and agriculture impoundment system through the construction of 50,000 linear feet of additional low-level levees on the Chickasaw Refuge. Gravel, seed, water control structures, and fuel will be provided to enable this project. Effective water management (the ability to move water on and off the units), which is absolutely critical for proper system function, will be greatly enhanced by this project. Numerous wetland-dependent species, especially as many as a quarter-million mallard ducks that have historically used the refuge in one of the greatest concentrations in the Mississippi Flyway, will be benefited by this project. The improved impoundments will also provide additional feeding habitat for the large bald eagle populations that migrate through or spend the winter on the refuge. The estimated first-year cost is \$111,000, with a recurring annual cost of \$10,000. (Linkages: Objectives 1.1, 2.1, 4.1, 5.1, 7.1.)

Project 1B: Farm 200 Additional Acres. Initiate farming activities on 200 additional acres to improve degraded wildlife habitats on the Chickasaw Refuge. Up to 150,000 migrating waterfowl, as well as endangered species and other wildlife, will benefit from this project. The 25,006 acres of Chickasaw Refuge, which represent the largest tract of bottomland hardwood forest in the State of Tennessee, are located within 50 miles of one million people. This project will greatly increase wildlife-viewing and other wildlife-oriented recreational opportunities. The estimated first-year cost is \$167,000, with no recurring annual cost. (Linkages: Objectives 1.1, 2.1, 6.1, 7.1.)

Project 1C: Full-time Secretary Position (1 FTE). This position would support the additional administrative workload associated with expanded fish and wildlife populations and habitat management on the refuge. Up to 150,000 migrating waterfowl, as well as endangered species and other wildlife, will benefit from this project. The 25,000 acres of Chickasaw Refuge, which represent the largest tract of bottomland hardwood forest in the State of Tennessee, are located within 50 miles of one million people. This project will greatly increase wildlife-viewing and other wildlife-oriented recreational opportunities. The estimated first-year cost is \$114,000, with a recurring annual cost of \$49,000. (Linkages: Objectives 1.1, 2.1, 3.1, 4.1, 5.1, 6.1, 7.1, 8.1, 9.1.)

Project 1D: Maintenance Worker Position (1 FTE). Provide for a maintenance worker to enhance and maintain public facilities and habitat improvement projects at the Chickasaw Refuge, which has historically been an important wintering and stopover area for a large portion of the Mississippi Flyway mallard population, attracting as many as 150,000 ducks each year. The refuge also provides valuable bald eagle wintering grounds, as well as year-round habitat for numerous declining species dependent upon forested wetlands. Public visitation has increased in conjunction with urban growth, as one million people live within 50 miles of the refuge. However, lack of funding and staffing at this 25,000-acre refuge has resulted in many habitat management projects and facilities maintenance projects not getting completed. This project will enable refuge management to provide services and management activities beneficial to wildlife and expected by the public. The estimated first-year cost is \$119,000, with a recurring annual cost of \$54,000. (Linkages: Objectives 1.1, 2.1, 3.1, 4.1, 5.1, 6.1, 7.1, 8.1.)

Project 1E: Gravel Levee System in Waterfowl Impoundment. The levee system within the waterfowl/shorebird sanctuary on the refuge has not been graveled. In addition, many of the roads on newly acquired tracts are partially graveled but mostly inaccessible to the public for recreational activities. The levee system and newly acquired roads will be graveled to provide access for water/wildlife management, farming, and visitor use. A motor grader is needed to maintain the levees and gravel roads. Waterfowl and shorebird use will increase, visitor use will increase, and maintenance and safety liabilities will be eliminated. The estimated first-year cost is \$235,000, with a recurring annual cost of \$5,000. (Linkages: Objectives 1.1, 2.1, 4.1, 5.1, 7.1.)

Project 1F: Rehabilitation of Water Management System in Moist Soil Impoundments. Rehabilitate four low-level levees and ditches used to deliver and maintain water in four impoundments in the waterfowl and shorebird sanctuary used by 150,000 ducks and 10,000 shorebirds annually. The levees and ditches associated with impoundments encompassing 1,186 acres of moist-soil and agricultural habitats are becoming overgrown with invasive species, including willows and buttonbush, limiting their ability to deliver and maintain water in the impoundments. The ability to control water levels throughout the year is critical to maintaining high quality moist-soil habitat. Without rehabilitation, this habitat will become undesirable to waterfowl and shorebirds. Approximately 4 miles of levees and 2 miles of ditches need to be rehabilitated to enable efficient water level management in the impoundment system. This will allow the staff to provide higher quality habitat by maintaining more natural moist-soil plants and fewer noxious and invasive species. Rehabilitation of the levees will also enable the staff to perform more reliable surveys of wildlife populations using the sanctuary. The estimated first-year cost is \$97,000, with no recurring annual cost. (Linkages: Objectives 1.1, 2.1, 4.1, 5.1, 7.1.)

Project 1G: Replace Crawler Tractor. Replace dilapidated 1967 D-7 crawler tractor. Repairs have become excessive and the engine needs to be overhauled. Parts are difficult to find and it is hard to find anyone who will work on it, due to the age of the machine. The tractor is required for management of a 1,186-acre moist soil impoundment system used by 150,000 ducks and 10,000 shorebirds, and for forest management. The machine would be fitted with a shearing blade to assist with forest management activities. The estimated first-year cost is \$366,000, with no recurring annual cost. (Linkages: Objectives 1.1, 2.1, 4.1, 5.1, 6.1, 7.1, 8.1.)

Project 1H: Replace Dump Truck. Replace 1972 dump truck. The brakes and electrical systems on the truck are not working so the truck is currently unusable. The truck is military surplus and parts are difficult or impossible to find. Replacing the truck is critical to most aspects of management on the refuge. The truck is necessary for the construction and maintenance of more than 12 miles of levees in the moist soil area to provide preferred habitat for the 150,000 ducks and 10,000 shorebirds that use the area. The truck is also essential for the upkeep of 10 miles of refuge roads and 4 parking areas used by 115,000 visitors annually. The estimated first-year cost is \$164,000, with no recurring annual cost. (Linkages: Objectives 1.1, 2.1, 4.1, 5.1, 7.1, 8.1.)

Project 1I: Replace 4-wheel Drive Tractor. Replace 1993 four-wheel drive tractor used for many aspects of resource management on the refuge. The tractor is required for mowing, disking, and spraying in the 1,186-acre waterfowl/shorebird sanctuary, as well as on refuge roads and in parking areas. Efficient control of invasive plants in the moist-soil impoundments is essential to maintaining preferred habitat for thousands of waterfowl and shorebirds that use the area. The tractor is also used to prepare areas for new levees. The estimated first-year cost is \$90,000, with no recurring annual cost. (Linkages: Objectives 1.1, 2.1, 4.1, 5.1, 7.1, 8.1.)

Project 1J: Replace Backhoe. Replace John Deere 710D backhoe used for many maintenance activities on the refuge. A backhoe is required to maintain water control structures to effectively manage the 1,186-acre waterfowl/shorebird sanctuary used by 150,000 ducks and 10,000 shorebirds annually. The backhoe is also used to maintain the gravel parking lots and roads used by 115,000 visitors and staff. The estimated first-year cost is \$126,000, with no recurring annual cost. (Linkages: Objectives 1.1, 2.1, 4.1, 5.1, 7.1, 8.1.)

Project 1K: Replace Excavator. Replace excavator used for management of moist-soil impoundments and forest management activities. An excavator is required to maintain ditches and water control structures in the 1,186-acre moist soil impoundment system used by 150,000 ducks and 10,000 shorebirds. It is also used to rehabilitate areas overgrown with willows, cottonwoods, and maples. The estimated first-year cost is \$211,000, with no recurring annual cost. (Linkages: Objectives 1.1, 2.1, 3.1, 4.1, 5.1, 7.1, 8.1.)

Project 1L: Replace Disk. Replace Krause 23-foot disk used for force-account farming to provide hot foods for waterfowl. Farming is a management tool that provides hot foods for waterfowl and sets back succession to promote good moist-soil habitat the following year. The production of hot foods is critical to sustain the 150,000 waterfowl that use the refuge during migration and over winter. The estimated first-year cost is \$20,000, with no recurring annual cost. (Linkages: Objectives 1.1, 2.1, 4.1, 5.1, 6.1, 7.1, 8.1.)

Project 1M: Replace Corn Planter. Replace John Deere corn planter used for force-account farming to provide hot foods for waterfowl. Farming is a management tool that provides hot foods for waterfowl and sets back succession to promote good moist-soil habitat the following year. The production of hot foods is critical to sustain the 150,000 waterfowl that use the refuge during migration and over winter. The estimated first-year cost is \$15,000, with no recurring annual cost. (Linkages: Objectives 1.1, 2.1, 4.1, 5.1, 6.1, 7.1, 8.1.)

Project 1N: Replace Dirt Pan. Replace 2001 dirt pan used to build and maintain levees. The ability to control water levels is critical to the management of moist-soil habitat in the waterfowl/shorebird sanctuary. The sanctuary provides habitat for more than 150,000 waterfowl and 10,000 shorebirds that migrate and winter in the area annually. The estimated first-year cost is \$10,000, with no recurring annual cost. (Linkages: Objectives 1.1, 2.1, 4.1, 5.1, 6.1, 7.1, 8.1.)

Project 2: Wetland Restoration.

With the approved refuge expansion of 35,234 additional acres, the refuge is in need of restoration of over 4,000 acres of wetlands, including the restoration of hydrology, as well as the reforestation of large tracts of wetlands to bottomland hardwoods. As many as 2,000 acres of new moist soil areas would be designed and developed. Hunting and fishing opportunities would increase by an estimated 50 percent and wildlife viewing and other wildlife-compatible recreation would also increase significantly.

Project 2A: Refuge Manager Position (1 FTE). Provide a refuge manager at Chickasaw National Wildlife Refuge to ensure effective habitat management and coordinate appropriate wildlife-oriented recreation. With no on-site management guidance and with five essential staff positions vacant, the challenges of pressing habitat and public use management issues overwhelm off-site managers, who have other refuges and responsibilities. This position will focus extensively on the restoration of thousands of acres of degraded wetlands such as with the Forked Deer Watershed where natural flows are impacted by private properties maintaining unnaturally high water levels nearby. One million people live within 50 miles of this refuge, the largest tract of bottomland hardwood forest in the State of Tennessee. Greater partnership building and habitat restoration activities, as well as improved public use programs and daily refuge operations, will result from this project. The estimated first-year cost is \$128,000, with a recurring annual cost of \$63,000. (Linkages: Objectives 1.1, 2.1, 3.1, 4.1, 5.1, 6.1, 7.1, 8.1, 9.1.)

Project 2B: Maintenance Position (1 FTE). A maintenance position is needed to assist the complex forester in conducting timber stand improvement projects on the refuge and to assist in reforestation programs on the refuge, as well as on the Lower Hatchie, Reelfoot, and Lake Isom refuges. The estimated first-year cost of this project is \$119,000,, with a recurring annual cost of \$54,000. (Linkages: Objectives 1.1, 2.1, 3.1, 4.1, 5.1, 6.1, 7.1, 8.1.)

Project 2C: Restoration of 1,000 Acres Bottomland Hardwoods Annually. Restoration of bottomland hardwood habitat is fundamental to the mission of Chickasaw National Wildlife Refuge. Reforestation of wetlands cleared for agricultural purposes will be accomplished by planting seedlings. Timber stand improvement and beaver control will be used to support the refuge's forest management objectives in forested areas. Most of the land was owned by a timber company prior to acquisition; and management practices on the area focused on keeping the company's sawmills supplied with lumber, resulting in poor habitat for most wildlife species. Without treatment, the oak regeneration will continue to decline. Approximately 1,000 acres will be restored annually, with the goal of creating a species composition favoring red oak. The estimated first-year cost is \$80,000, with a recurring annual cost of \$10,000. (Linkages: Objectives 2.1, 3.1, 5.1, 6.1, 7.1.)

Project 3: Forest Habitat Restoration and Management.

Prior to European settlement, the Lower Mississippi River Valley contained over 24 million acres of bottomland hardwood forest that supported a wide variety of wildlife species. Today, over 80 percent of the original forest has been lost to land clearing for agriculture, transportation, industrialization, and urbanization. The remaining 4.8 million acres of bottomland hardwoods lie in numerous isolated islands that are often surrounded by a sea of agriculture. Chickasaw National Wildlife Refuge is part of a forest complex that comprises one of the largest remaining contiguous blocks of bottomland hardwood forest in the state. In addition, pre-refuge land management included a high-grading of marketable timber, resulting in poor habitat for all wildlife species.

Reforestation of selected open lands on the refuge and on other nonforested lands surrounding the refuge would contribute to regional and national objectives for forest-dwelling birds, as well as numerous resident species. Reforested areas would be monitored for seedling survival and growth. The complex would be conducting reforestation of wetlands (seedling and acorn planting), timber stand improvement, and beaver control to support the objectives of the West Tennessee National Wildlife Refuge Complex, as well as regional and national objectives.

Project 3A: Reforestation and Timber Stand Improvement. With this project, approximately 700 acres would be restored annually with the goal of restoring a strong red oak component in the refuge's forests. The project would include timber stand improvements on over 10,000 acres within the complex. Through

recent boundary expansions, an additional 20,000 acres of wetlands could be reforested over the next 10 years. This is a joint project between Chickasaw and Lower Hatchie national wildlife refuges. The estimated first-year cost of this project is \$138,000, with a recurring cost of \$128,000 per year, to be shared between the two refuges. (Linkages: Objectives 2.1, 3.1, 6.1, 7.1.)

Project 3B: Forester Position (1 FTE). A forest habitat inventory is necessary for effective management of the refuge's 25,006 acres, as well as additional lands which may be acquired within the 35,234-acre approved acquisition boundary. This project calls for a comprehensive forest inventory and would require an additional forester position, vehicle, and all-terrain vehicle (ATV). In addition, aerial photos, a computer, and related software are needed to acquire, analyze, and maintain the data. This information is indispensable in the preparation and maintenance of the habitat management plan. This position would also support forest management efforts on nearby Lower Hatchie National Wildlife Refuge. The estimated first-year cost is \$118,000, with a recurring annual cost of \$53,000. (Linkages: Objectives 2.1, 3.1, 6.1, 7.1, 8.1.)

Project 3C: Replace Ford Explorer. Replace worn-out 1994 Ford Explorer used in forest management on three refuges. Many unsuccessful attempts have been made to repair the front end of this vehicle, which causes it to shake when driven. Forest management activities frequently require the staff to travel long distances, and reliable transportation is vital. This vehicle is essential to ensure the forested habitat on all refuges is managed to meet the needs of the 820,000 waterfowl, other migratory birds, and resident wildlife, as well as the 715,000 visitors that use the refuges in the complex annually. The estimated first-year cost is \$38,000, with no recurring annual cost. (Linkages: Objectives 2.1, 3.1, 6.1, 7.1, 8.1.)

Project 4: Fire Management.

The new Native Warm Season Grasses Restoration project would require regular prescribed burns. Prior to this project, prescribed burns were not used on the complex. Therefore, equipment is needed to restore this critical ecosystem function that benefits myriad wildlife species.

Project 4A: Replace Slip-on Fire Pumper. A 20-year-old fire pumper is used in battling wildfires throughout the complex. It is the first line of defense used by station personnel to protect 30,000 acres of habitat and facilities on the Chickasaw and Lower Hatchie refuges. These lands and facilities are crucial for the public use programs on the refuges, and their loss would affect more than 200,000 annual visitors. Additionally, the manufacturer of the current pumper is no longer in business and parts are no longer available. Breakdowns are frequent and fabricating parts is costly. The estimated first-year cost of this project is \$8,000, with no recurring annual cost. (Linkages: Objective 2.1, 3.1, 6.1, 7.1, 8.1.)

Project 5: Nuisance Plant Control.

There are three main noxious and/or invasive plants that occur on the complex: a hybrid cocklebur, hemp sesbania, and kudzu. All three are fast-growing and all outcompete native vegetation, in some cases killing the native species. This area has become home to a hybrid cocklebur that is resistant to flooding and wet soil conditions. The species is prolific and will outcompete native moist soil vegetation. Hemp sesbania also invades the moist soil units and will outcompete the moist soil vegetation. Kudzu resides in the upland habitat and is common along refuge boundaries and drainages. Kudzu is an aggressive vine that can grow up to 60 feet per year and will eventually outcompete all native vegetation. It will even cover trees, denying them sunlight.

Project 5A: Eradicate Invasive Plants through Chemical and Mechanical Means. This project calls for control of approximately 200 acres of moist soil units through chemical treatment and mechanical

means. Kudzu infestations would be treated with chemicals. This is a complex-wide project. The estimated first-year cost is \$49,000, with a recurring annual cost of \$15,000 per year, to be shared among the four refuges. (Linkages: Objectives 1.1, 3.1, 4.1, 6.1)

PROJECT CATEGORY 2: VISITOR SERVICES AND ENVIRONMENTAL EDUCATION

Project 6: Rehabilitation of Roads, Boat Ramps, and Parking Areas.

Poor access roads severely hamper public opportunities to visit and enjoy Chickasaw National Wildlife Refuge. As many as 115,000 annual visitors come to the refuge to view over 200 species of birds, including more than 150,000 migrating ducks and geese and 10,000 shorebirds. Currently, several refuge roads, boat ramps, and parking areas are in poor condition as a result of Mississippi River floodwaters. These roads have little gravel and poor drainage makes them impassable at times to all but four-wheel-drive vehicles during wet weather. This project would reconstruct these roads to minimum public use standards by raising the road beds, adding drainage culverts, and surfacing with gravel.

Project 6A: Rehabilitate Camp Slough Road. Years of weathering and daily use have rutted the road, making it impassable in some areas. This road leads from a public gravel road to Camp Slough, a popular fishing area, and serves as a hiking trail for many of the 115,000 annual visitors to the refuge. This road is also vital for daily refuge operations, including resource protection and habitat management. The estimated first-year cost is \$53,000, with no recurring annual cost. (Linkages: Objectives 2.1, 3.1, 5.1, 6.1, 7.1, 8.1.)

Project 6B: Rehabilitate Dry Arm Road. This road serves as a hiking trail for many of the refuge's 115,000 annual visitors, and has become overgrown and rutted from years of use. From this road, visitors have the opportunity to view over 200 species of birds. This road provides access to a popular fishing area and is critical for forest management activities. This road is vital for refuge staff working to meet resource protection and habitat management objectives. This road is needed to provide access for forest management activities on 3,000 acres. Beaver damage can be high in this area and access is vital to prevent habitat loss. This road also provides access for staff to perform eagle wintering and nesting surveys. The estimated first-year cost is \$161,000, with no recurring annual cost. (Linkages: Objectives 2.1, 3.1, 5.1, 6.1, 7.1, 8.1.)

Project 6C: Rehabilitate Parking Area at Wardlow's Chute Boat Ramp, FHA Route Number 901. This area provides access for many of the 115,000 annual visitors for recreational fishing and hunting on the refuge and the Mississippi River, and has become overgrown and rutted from years of heavy use. Flooding of the area washes out the gravel parking area, creating deep ruts. Flooding also deposits silt, logs, and trash, making the area inaccessible. The estimated first-year cost is \$113,000, with no recurring annual cost. (Linkages: Objectives 2.1, 3.1, 5.1, 6.1, 7.1, 8.1.)

Project 6D: Rehabilitate Ed Jones Road and Parking Area. This road and parking area provide access for many of the 115,000 annual visitors to the Mississippi River for recreational purposes, including boat launching. Potholes require filling and the eroded gravel needs replacing. Flooding washes away the gravel, creating deep ruts; and deposits silt and trash, making the road impassable. Ed Jones Road is FHA Route Number 100, Section 1. The parking area is FHA Route Number 900. The estimated first-year cost is \$268,000, with no recurring annual cost. (Linkages: Objectives 7.1, 8.1.)

Project 6E: Rehabilitate Loop Road, FHA Route Number 101, Section 1. The current substrate has become impassable and is inadequate for vehicular traffic. This road provides access for

many of the 115,000 annual visitors for hunting, fishing, and bird-watching. This road is the only access to approximately 7,500 acres for public recreation and habitat management. The estimated first-year cost is \$1,900,000, with no recurring annual cost. (Linkages: Objectives 2.1, 3.1, 5.1, 6.1, 7.1, 8.1.)

Project 6F: Rehabilitate Rush Slough Road East, FHA Route Number 102, Section 1. This road provides access for many of the 115,000 annual visitors for public use activities, as well as refuge management. It has become worn-out and overgrown. The road is in need of repair because it has been eroded extensively and has developed potholes. Beaver activity in the area has created impassable areas on this road and threatens to kill large areas of trees. The estimated first-year cost is \$1,118,000, with no recurring annual cost. (Linkages: Objectives 2.1, 3.1, 5.1, 6.1, 7.1, 8.1.)

Project 6G: Rehabilitate Camp Slough Road South, FHA Route Number 102, Section 1. This road has become overgrown and impassable. It is needed to provide access for refuge management and public use to 5,000 acres of the refuge. This is a popular hunting and fishing area used by many of the 115,000 visitors annually, with very little access currently. Access to this area for refuge staff is critical for resource management and law enforcement purposes. Private encroachment by ATVs has increased in recent years and beaver damage is high in this area. The estimated first-year cost is \$1,957,000, with no recurring annual cost. (Linkages: Objectives 2.1, 3.1, 5.1, 6.1, 7.1, 8.1.)

Project 6H: Rehabilitate Barr Road Parking Area, FHA Route Number 902. This area provides parking and access for many of the 115,000 visitors annually for hunting and fishing and has become washed-out and rutted from heavy use and flooding. Hunters and anglers use this area to access the Forked Deer River, Gar Pond, and approximately 5,000 acres of forested habitat. Flooding has eroded much of the gravel, creating deep potholes and muddy areas that have been rutted by vehicles. The estimated first-year cost is \$210,000, with no recurring annual cost. (Linkages: Objectives 2.1, 3.1, 5.1, 6.1, 7.1, 8.1.)

Project 7: Provide Increased Visitor Services at Chickasaw National Wildlife Refuge.

The refuge has more than 115,000 visits per year, a visitor contact station, and hunting and fishing programs. Improvements are needed to basic public use facilities, interpretation, and resource protection, and visitor services are needed to meet public expectations. Visitor information and safety would be enhanced. This project would help strengthen partnerships and outreach to visitors, local communities, school districts, and universities, and it would allow the refuge to meet its environmental education goals. With one million people within a one-hour drive of the refuge and the refuge actively acquiring lands, there is a great need for offices and a visitor contact station that would allow staff to effectively administrate refuge activities, as well as meet the needs of refuge visitors.

Project 7A: Construct a Visitor Center/Education Center/Administration Office. The staff assigned to the 25,006-acre refuge has an office located in a trailer. It is small and does not provide the opportunity to fully develop or meet the refuge's goals and objectives. The new office and visitor center will serve the Chickasaw and Lower Hatchie refuges as well as Sunk Lake Public Use Natural Area, which together cover more than 35,000 acres. The visitor center will include exhibits, site work, and exterior interpretive facilities. The building will incorporate the unified design approach being developed by the National Wildlife Refuge System and its engineering staffs. It is estimated that the cost of the Visitor Center will be \$1.5 million and the cost of the office space will be \$180,000, with a recurring annual cost of \$15,000. (Linkages: Objectives 1.1, 2.1, 3.1, 4.1, 5.1, 6.1, 7.1, 8.1, 9.1.)

PROJECT CATEGORY 3: REFUGE ADMINISTRATION AND OPERATION

Project 8: Replacement of Maintenance Equipment and Facility.

It is essential that the refuge maintenance equipment remain in proper working condition for effective management of the 1,186 acres of moist soil/agricultural habitat and 20,293 acres of bottomland hardwood forest habitat on the refuge. This equipment is used for habitat projects that benefit more than 150,000 migrating and wintering waterfowl and 10,000 shorebirds annually, as well as provide recreational opportunities for more than 115,000 annual visitors to the refuge.

Project 8A: Replace 15-foot Batwing Mower. The mower is used to maintain the refuge's roads, parking areas, levees, and moist soil impoundments, and is worn out. The mower is essential to maintaining the levee system to provide access for the staff to work in the impoundment system used by thousands of waterfowl and shorebirds. It is needed to help control invasive species such as willows and cocklebur. The mower is also used to provide access for 115,000 visitors annually on refuge roads. The estimated first-year cost is \$16,000, with no recurring annual cost. (Linkages: Objectives 1.1, 2.1, 3.1, 4.1, 5.1, 6.1, 7.1, 8.1.)

Project 8B: Replace 4-wheel Drive Pickup. This Chevrolet pickup is used by the staff to maintain equipment in the field. The truck is required for refueling and maintaining equipment in the field. Field work often involves long distances from the maintenance shop and fuel tanks. There may be long delays in refueling and maintaining equipment if these tasks cannot be completed in the field. The estimated first-year cost is \$22,000, with no recurring annual cost. (Linkages: Objectives 1.1, 2.1, 3.1, 4.1, 5.1, 6.1, 7.1, 8.1.)

Project 8C: Replace Maintenance Facility. The current maintenance facility and storage shed is an old barn that does not meet Service policy or OSHA standards as mentioned in a recent environmental audit. The current maintenance facility has a leaking roof, electrical problems, plumbing problems, and rodent infestations. Security of the current facility is also a problem. Due to its proximity to a public road, there is no way to enclose it within the security fence of the compound. The estimated first-year cost is \$757,000, with no recurring annual cost. (Linkages: Objectives 1.1, 2.1, 3.1, 4.1, 5.1, 6.1, 7.1, 8.1.)

PROJECT CATEGORY 4: LAND PROTECTION AND CONSERVATION

Project 9: Law Enforcement.

Increased law enforcement activities over the 30,000+ acres on the southern half of the West Tennessee National Wildlife Refuge Complex are needed to properly protect wildlife, habitats, and increasing numbers of visitors. Approximately one million people currently live within 50 miles of the refuges. The expansion of recreational uses has overwhelmed the present staff, with known violations going unenforced. Improved visitor safety and wildlife protection would be made possible by this project. As many as 150,000 ducks and numerous other wildlife species, including a growing population of bald eagles, depend on the refuges' habitats, which represent some of the largest protected areas in the State of Tennessee.

Project 9A: Replace Radio System. This project calls for replacement of the current low-band radio system in order to meet the new Service guidelines. The current radio system is inadequate and unreliable. The new high-band system would increase management efficiency over a 70-mile radius. The system would allow law enforcement personnel to be in continual contact with other law enforcement agencies and would also give other agencies the ability to contact Service personnel. This system would prove very beneficial in search and rescue operations. This is a complex-wide

project. The total cost is \$255,000, with a recurring annual cost of \$5,000, to be shared among the four refuges in the complex. (Linkages: Objectives 1.1, 2.1, 3.1, 4.1, 5.1, 6.1, 7.1, 8.1, 9.1.)

Project 9B: Full-time Law Enforcement (LE) Position (1 FTE) and LE Equipment. Increased law enforcement activities over the 30,000+ acres on the southern half of the West Tennessee National Wildlife Refuge Complex are needed to properly protect wildlife, habitats, and increasing numbers of visitors. Approximately one million people currently live within 50 miles of the refuges. The expansion of recreational uses has overwhelmed the present staff, with known violations going unenforced. Improved visitor safety and wildlife protection will be made possible by this project. As many as 150,000 ducks and numerous other wildlife species, including a growing population of bald eagles, depend on the refuges' habitats, which represent some of the largest protected areas in the State of Tennessee. The LE program would also be improved in safety and efficiency through the purchase of equipment including a safe, a shotgun, a vehicle, three public address/siren/director-strobe systems, and three mobile radios. This is a complex-wide project. The total cost is \$129,000, with a recurring annual cost of \$65,000, to be shared among the four refuges in the complex. (Linkages: Objectives 1.1, 2.1, 3.1, 4.1, 5.1, 6.1, 7.1, 8.1, 9.1.)

Project 10: Expand Chickasaw National Wildlife Refuge to include an Additional 35,234 acres.

Much of the land within the refuge's approved expansion boundary is currently farmed extensively due to the clearing of former bottomland hardwood habitat. Expansion of the refuge would preserve, protect, reestablish, and manage habitats for migratory birds and resident wildlife. Waterfowl and shorebirds will benefit from 2,000 acres of marginal cropland that will be restored and managed as moist soil habitat. Preservation and management of 9,072 additional acres of forest will provide critical habitat for migratory songbirds and resident wildlife. Reforestation of approximately 20,000 acres of marginal farmland back to bottomland hardwood forest is necessary to restore healthy ecosystem functions in the area. Restoration and management of these areas would require the following equipment: 100-hp tractor, 185-hp dozer, disk, planter, and sprayer with booms. The estimated first-year cost is \$506,000, with a recurring annual cost of \$74,000. (Linkages: Objectives 1.1, 2.1, 3.1, 4.1, 5.1, 6.1, 7.1, 8.1, 9.1.)

Project 11: Landscape Conservation Planning.

National, regional, and state conservation objectives for waterfowl, shorebirds, and forest-breeding birds are being stepped down to guide the formulation of objectives for the refuge focus area. Hence, there is a need to integrate science-based monitoring and inventory data with restoration and habitat management efforts on the refuge and surrounding landscape. In west Tennessee, the planning effort would cover five refuges and is being expanded to include state and private lands that provide habitat for migratory birds. In the Mississippi Alluvial Valley, migratory bird habitat requirements have been developed. This information is being expanded to include areas in west Tennessee outside the MAV. Given these recommendations, it is clear that sufficient habitat cannot be provided on the national wildlife refuges alone. Therefore, if we are to achieve the habitat goals that have been established, we must look beyond the respective refuge boundaries and incorporate into the comprehensive conservation plan any public or private lands that may be available. The primary objective of this plan is to provide a means of cooperatively protecting, restoring, and managing a sufficient amount and diversity of habitat to meet the requirements of migratory birds and resident wildlife that use west Tennessee habitats. This project calls for the comprehensive conservation planning effort to be completed by 2006. This is a complex-wide project. The total cost is \$105,000, with a recurring annual cost of \$100,000, to be shared among the four refuges in the complex. (Linkages: Objectives 1.1, 2.1, 3.1, 4.1, 5.1, 6.1, 7.1, 8.1, 9.1.)

STAFFING AND FUNDING

Currently, a staff of five permanent positions has been approved for the West Tennessee Refuge Complex. To complete the extensive wildlife habitat management and restoration projects and conduct the necessary inventorying, monitoring, and mapping activities, more staff is needed. Figure 10 shows the proposed staffing plan for Chickasaw National Wildlife Refuge and the West Tennessee National Wildlife Refuge Complex. The proposed staffing increases would enable the refuge to achieve its plan objectives and strategies within the next 15 years. The initial project costs (including salaries and benefits) would total \$11.7 million, with annual recurring costs of \$0.7 million (Table 1). The rate at which this refuge realizes its full potential to contribute locally, regionally, and nationally to wildlife conservation and wildlife-dependent recreation and environmental education is contingent upon receiving adequate staffing and funding.

Table 1. Cost summary of proposed projects.

Projects	Initial* Project Cost	Recurring** Base Cost
<i>Project Category 1: Fish and Wildlife Populations and Habitat Management</i>		
Project 1. Waterfowl Sanctuary		
1A. Expand Moist Soil Impoundment System	\$111,000	\$10,000
1B. Farm 200 Additional Acres	\$167,000	----
1C. Full-time Secretary Position (1 FTE)***	\$114,000	\$49,000
1D. Maintenance Worker Position (1 FTE)***	\$119,000	\$54,000
1E. Gravel Levee System	\$235,000	\$5,000
1F. Rehabilitate Water Management System	\$97,000	----
1G. Replace Crawler Tractor	\$366,000	----
1H. Replace Dump Truck	\$164,000	----
1I. Replace 4-wheel Drive Tractor	\$90,000	----
1J. Replace Backhoe	\$126,000	----
1K. Replace Excavator	\$211,000	----
1L. Replace Disk	\$20,000	----
1M. Replace Corn Planter	\$15,000	----
1N. Replace Dirt Pan	\$10,000	----
Project 2. Wetland Restoration		
2A. Refuge Manager Position (1 FTE)***	\$128,000	\$63,000
2B. Maintenance Worker Position (1 FTE)***	\$119,000	\$54,000
2C. Restore 1000 Acres of Bottomland Forest Annually	\$80,000	\$10,000

Table 1. Cost summary of proposed projects.

Projects	Initial* Project Cost	Recurring** Base Cost
Project 3. Forest Habitat Restoration and Management		
3A. Reforestation and Timber Stand Improvement	\$138,000	\$128,000
3B. Forester Position (1 FTE)***	\$118,000	\$53,000
3C. Replace Ford Explorer	\$38,000	-----
Project 4. Fire Management		
4A. Replace Fire Pumper	\$8,000	-----
Project 5. Nuisance Plant Control		
5A. Eradicate Invasive Plants	\$49,000	\$15,000
<i>Project Category 2: Visitor Services and Environmental Education</i>		
Project 6. Rehabilitation of Roads, Boat Ramps, and Parking Areas		
6A. Rehabilitate Camp Slough Road	\$53,000****	-----
6B. Rehabilitate Dry Arm Road	\$161,000****	-----
6C. Rehabilitate Wardlow's Chute Parking Area	\$113,000****	-----
6D. Rehabilitate Ed Jones Road and Parking Area	\$268,000****	-----
6E. Rehabilitate Loop Road	\$1,900,000****	-----
6F. Rehabilitate Rush Slough Road East	\$1,118,000****	-----
6G. Rehabilitate Camp Slough Road South	\$1,957,000****	-----
6H. Rehabilitate Barr Road Parking Area	\$210,000****	-----
Project 7. Provide Increased Visitor Services		
7A. Construct Visitor Center/Office	\$1,680,000	\$15,000
<i>Project Category 3: Refuge Administration and Operation</i>		
Project 8. Replace Maintenance Equipment and Facility		
8A. Replace Mower	\$16,000	-----
8B. Replace 4-wheel Drive Pickup	\$22,000	-----
8C. Replace Maintenance Facility	\$757,000	-----
<i>Project Category 4: Land Protection and Conservation</i>		
Project 9. Law Enforcement		
9A. Replace Radio System	\$255,000	\$5,000
9B. Full-time LE Position and Equipment (1 FTE)***	\$129,000	\$65,000

Table 1. Cost summary of proposed projects.

Projects	Initial* Project Cost	Recurring** Base Cost
Project 10. Expand Chickasaw NWR by 35,234 Acres	\$506,000	\$74,000
Project 11. Landscape Conservation Planning	\$105,000	\$100,000
Grand Total	\$11,773,000	\$700,000

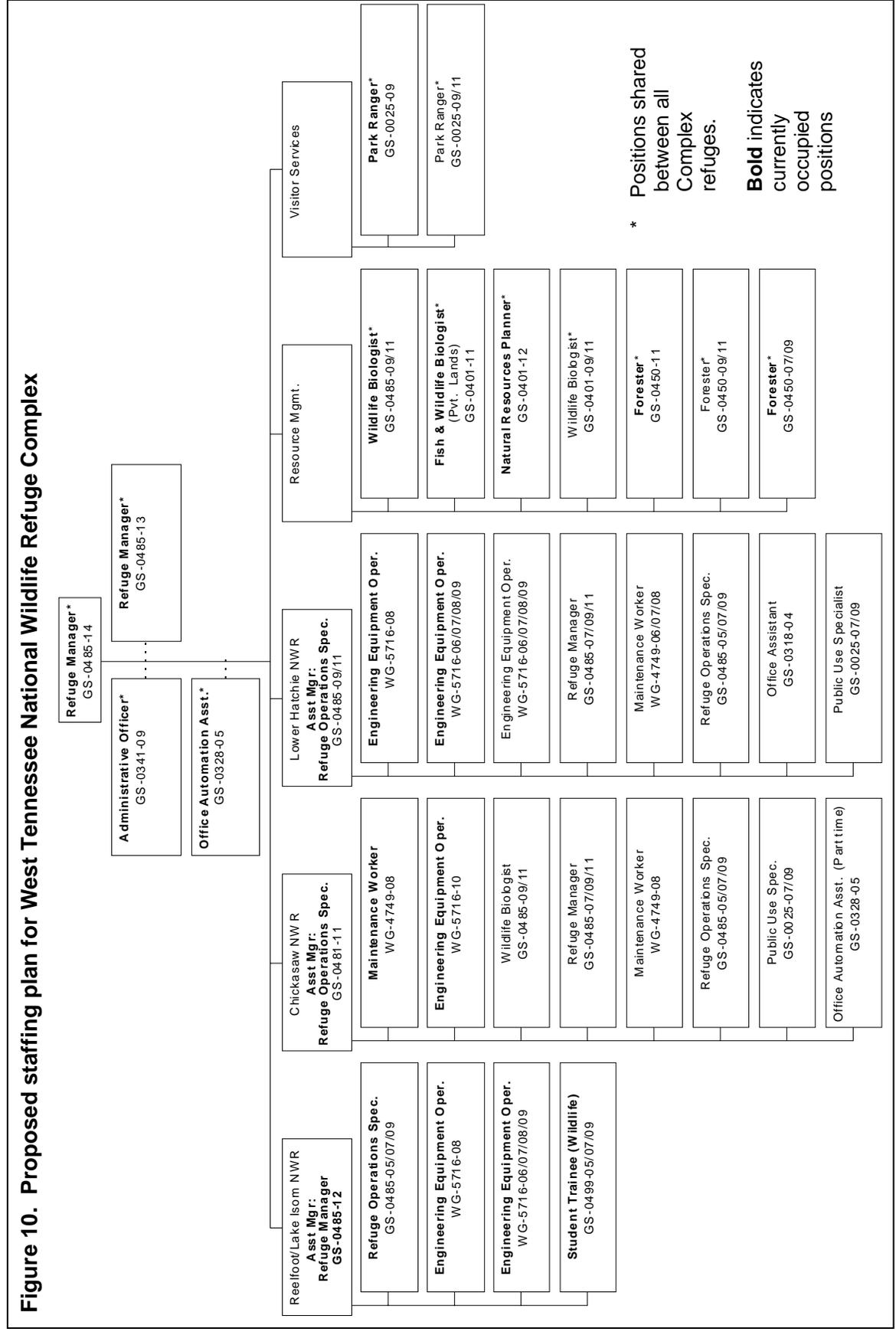
* *The Initial Project Cost is the projected sum for getting the project started the first year.*

** *The Recurring Base Cost is the amount that would be incurred each year thereafter to continue the project.*

*** *A total of 6 new FTE positions are included in the proposed projects under this draft plan.*

**** *All or part of funds would come from TEA-21 Refuge Roads funds.*

Figure 10. Proposed staffing plan for West Tennessee National Wildlife Refuge Complex



* Positions shared between all Complex refuges.
Bold indicates currently occupied positions

STEP-DOWN MANAGEMENT PLANS

This comprehensive conservation plan is a broad-scale strategic plan that guides the future direction of the refuge. In order for these strategies and projects to be implemented, detailed step-down management plans need to be prepared or updated.

Step-down plans are individual and specific plans that guide the management of particular resources on the refuge. These step-down plans outline proposed actions as well as the benefits and potential impacts of the proposed actions. Some step-down plans would be revised as a result of the planning process, while others would be more fully developed to better address the refuge's management needs. To assist in preparing and implementing the step-down plans, the refuge staff develops partnerships with local agencies and organizations, which provide comments and input during the development of the plans.

The Service prepares step-down plans in accordance with the provisions of the National Environmental Policy Act of 1969. The Act requires the identification and evaluation of alternatives and public review and involvement prior to their implementation.

The step-down plans that are currently being prepared or updated for Chickasaw National Wildlife Refuge are listed below.

Habitat Management Plan (new plan), draft completion 2005: This plan will describe the overall desired future habitat conditions needed to fulfill the refuge's purpose, goals, and objectives. Procedures, techniques, and timetables for achieving the desired future conditions will be developed into a comprehensive plan for management of refuge habitats. (This plan incorporates components of step-down plans formerly written for Forest Management, Moist Soils Management, and Cropland Management.)

Wildlife Inventory Plan (update), plan completed 2002: This plan describes inventory and monitoring techniques and time frames. Numerous species, including waterfowl, songbirds, Neotropical migrants, bald eagles, white-tailed deer, wild turkey, amphibians, and other key resident species, are inventoried and their population trends are monitored. These data are essential to guide the management of the refuge's wildlife habitats.

Sport Fishing Plan (update), draft completion 2004: This plan will address specific aspects of the refuge's fishing program. It will define season structures, areas open to fishing, legal methods of fishing, universal accessibility, facilities needed, and refuge-specific regulations.

Hunt Management Plan (update), draft completion 2004: This plan will address specific aspects of the refuge's hunting program. It will define species to be hunted, season structures, areas open to hunting, legal hunting methods, all-terrain vehicle use, universal accessibility, facilities needed, and refuge-specific hunting regulations.

Visitor Services and Education Plan (update), plan completed 2002: This plan describes the refuge's wildlife-dependent recreation, environmental education, and interpretation. Specific items or issues that will be addressed include facility needs, access, and partnerships and outreach opportunities. (The Sport Fishing Plan and Hunt Management Plans are referenced in this plan.)

Step-down plans currently being prepared or updated for the West Tennessee National Wildlife Refuge Complex (including Lower Hatchie, Reelfoot, Lake Isom, and Chickasaw) include:

Beaver Control Management Plan (update), draft completion 2004: This plan includes a description of beaver control methods and an explanation of the necessity to control excess beaver populations in order to protect refuge habitats and the species that are dependent upon those habitats.

Safety/Hazcom/Pollution Prevention Plan (update), plan completed 2001: This plan identifies specific hazards in the workplaces of the West Tennessee National Wildlife Refuge Complex, and defines the staff responsibilities and procedures for providing and maintaining a safe work environment. The plan also provides guidance for staff in responding to various types of emergencies and dangerous occurrences.

Fire Management Plan (update), plan completed 2001: This plan describes the use of prescribed fire on refuges in the West Tennessee National Wildlife Refuge Complex, as well as a contingency plan in the case of wildfire activity on or in the vicinity of the refuges. Safety considerations for fire-fighting personnel are also addressed in this plan.

Law Enforcement Plan (update), draft to be completed 2006: This plan describes the basic framework and policy for law enforcement on refuge lands, and the implementation thereof, in cooperation with other local law enforcement entities.

PARTNERSHIP OPPORTUNITIES

A major objective of this comprehensive conservation plan is to establish or enhance partnerships with local volunteers, landowners, private organizations, and state and federal natural resource agencies. At regional and state levels, partnerships already exist with organizations such as the Tennessee Wildlife Resources Agency, Tennessee Department of Environment and Conservation, Natural Resources Conservation Service, and Ducks Unlimited. In the vicinity of the refuge, other opportunities exist to establish partnerships with elementary and secondary schools, private landowners, and community organizations.

The refuge's volunteer program and the other partnerships generated will be dependent to a large degree upon the number of staff positions provided at the refuge. As staff and resources are committed to the refuge, opportunities to expand the volunteer program and develop new partnerships would be enhanced.

MONITORING AND EVALUATION

Adaptive management is a flexible approach to long-term management of resources that is directed over time by the results of ongoing monitoring activities and other acquired information. More specifically, adaptive management is a process by which projects are implemented within a framework of scientifically driven experiments to test the predictions and assumptions outlined within a plan.

In order to apply adaptive management, specific inventory, survey, and monitoring methods would be adopted for the refuge which best assess the effects of ongoing refuge management. Based on the results of these inventories, surveys, and monitoring efforts, habitat management strategies would be systematically evaluated to determine the management effects on wildlife populations. This information would then be used to refine management and determine how effectively the refuge objectives are being accomplished. Evaluations would include appropriate staff and partner participation. If monitoring and evaluation indicate undesirable effects for targeted or nontargeted species and/or communities, then alterations to the management projects would be made. If appropriate, the refuge's comprehensive conservation plan would be revised.

Specific monitoring and evaluation activities would be described in the step-down management plans.

PLAN REVIEW AND REVISION

This comprehensive conservation plan will be reviewed annually to determine the need for revision. A revision will be made whenever important changes occur or pertinent information becomes available, such as a change in ecological conditions or a major refuge expansion. The final plan will be supported by detailed step-down management plans that direct on-the-ground management activities designed to accomplish specific strategies in support of the refuge's goals and objectives. Revisions to the comprehensive conservation plan and the step-down management plans will be subject to public review and NEPA compliance.

SECTION B: DRAFT ENVIRONMENTAL ASSESSMENT

I. Background

INTRODUCTION

This Draft Environmental Assessment for Chickasaw National Wildlife Refuge was prepared in compliance with the National Environmental Policy Act of 1969 (NEPA). It discusses the purpose and need for the refuge's comprehensive conservation plan and provides an analysis of the impacts that could be expected from each of the management proposals outlined in the plan. This analysis assists the U.S. Fish and Wildlife Service in determining if it will need to prepare an Environmental Impact Statement or a Finding of No Significant Impact for the refuge.

PURPOSE AND NEED FOR ACTION

The purpose of the proposed plan is to specify a management direction and long-term management guidance for refuge managers at Chickasaw National Wildlife Refuge. This management direction will be described in detail through a set of goals, objectives, and strategies in a comprehensive conservation plan. Comprehensive conservation plans are revised every 15 years or sooner.

Management of this refuge is now guided by refuge objectives developed in 1981 and revised in 1995, and implemented by specific step-down management plans. This action is needed to address current management issues, to provide long-term management direction for the refuge, and to satisfy the legislative mandates of the National Wildlife Refuge System Improvement Act of 1997, which requires the preparation of a comprehensive conservation plan for every national wildlife refuge.

The purposes for the refuge were established by Congress through the Migratory Bird Conservation Act of 1929 (16 U.S.C. 715d) for "...use as an inviolate sanctuary or for other management purposes, for migratory birds." The Fish and Wildlife Act of 1956 established additional refuge purposes: "... for the development, advancement, management, conservation, and protection of fish and wildlife resources" (16 U.S.C. 742f (a)(4)), and "... 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 or servitude ..." (16 U.S.C. 742 (b)(1)). Later, the Refuge Recreation Act of 1962 (16 U.S.C. 460K-1) identified additional purposes for which the refuge was suitable: "... (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species ..."

This Draft Environmental Assessment was prepared using guidelines established under the NEPA. The NEPA requires the Service to examine the effects of its proposed actions on the natural and human environment. In the following sections, we describe four alternatives for future refuge management, the environmental consequences of each alternative, and our preferred management direction. Each alternative was designed as a reasonable mix of fish and wildlife habitat prescriptions and wildlife-dependent recreational opportunities, with the preferred alternative recommended based on its environmental consequences and its ability to achieve the refuge's establishing purposes.

The Draft Comprehensive Conservation Plan (Section A), which is ultimately derived from this Draft Environmental Assessment, will set the management direction for the refuge for the next 15 years. As stated above, the refuge is currently guided by step-down management plans based on objectives that are at least 17 years old. This draft environmental assessment presents four management alternatives for the future of the refuge. The preferred alternative was tentatively selected based on

its ability to meet the identified goals. These goals may be considered as the primary need for action. The goals for the refuge were developed by the planning team and encompass all aspects of refuge management, including fish and wildlife population management; habitat management; visitor services and environmental education; refuge administration and operation; and land protection and conservation. Each of the four management alternatives described in this environmental assessment will, in part, strive to achieve these goals, which are described as follows:

- **Fish and Wildlife Populations Management:** Contribute to the population goals and objectives established in regionally, nationally, and internationally significant and relevant management plans, including the North American Waterfowl Management Plan; Lower Mississippi River Joint Venture Plan; Partners in Flight; Shorebird Management Manual; Lower Mississippi River Ecosystem Plan; West Tennessee Wildlife Resources Conservation Plan; and other plans relevant to west Tennessee and the Lower Mississippi River Valley.
- **Habitat Management:** Restore, enhance, and manage the various habitats found on the refuge in order to maintain the natural diversity, abundance and ecological function of communities characteristic of Lower Mississippi Valley bottomland hardwoods and associated habitat types, with an emphasis on critical habitat needs for wintering waterfowl and other migratory birds.
- **Visitor Services and Environmental Education:** Develop an appropriate and compatible program of wildlife-dependent recreation and education/interpretation that is consistent with the National Wildlife Refuge System Improvement Act of 1997 and that will benefit refuge visitors while promoting an understanding of the Lower Mississippi River Valley ecosystem.
- **Refuge Administration and Operation:** Develop and implement a comprehensive refuge management program to ensure that present and future operational, administrative, and personnel objectives will be achieved.
- **Land Protection and Conservation:** Provide for the protection and management of natural resources, including cultural resources, within or in proximity to the refuge.

DECISION FRAMEWORK

The Regional Director of the U.S. Fish and Wildlife Service, Southeast Region, will need to make two decisions based on this Draft Environmental Assessment: (1) selection of an alternative, and (2) determination if the selected alternative is a major federal action significantly affecting the quality of the human environment, thus requiring the preparation of an Environmental Impact Statement. The planning team has recommended Alternative D to the Regional Director. The Draft Comprehensive Conservation Plan (Section A) was developed for implementation based on this recommendation.

PLANNING STUDY AREA

This Draft Environmental Assessment considers four management alternatives for Chickasaw National Wildlife Refuge (described Chapter II, Alternatives), with consideration also given to lands within the refuge's approved acquisition boundary (Figure 6), as well as other lands immediately adjacent to and directly affected by the management of the refuge. This proposed plan also takes into account the proposed management actions for four other west Tennessee national wildlife refuges (as assessed in parallel comprehensive conservation plans), as well as landscape-level planning objectives developed by an interagency team in the production of the West Tennessee

Wildlife Resources Conservation Plan (TWRA and USFWS 2002) (Figure 2).

Chickasaw National Wildlife Refuge is located in rural western Tennessee, approximately 15 miles southwest of the city of Dyersburg (Figure 7). It currently includes a total of 25,006 acres (as of April 1, 2004). The refuge has an approved acquisition boundary that includes an additional 35,234 acres of land, for a potential total of 60,240 acres, adjacent to the Mississippi River in Lauderdale County.

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 this refuge were established by specific legislation and are listed in the previous section.

Additional authority delegated by Congress, federal regulations, executive orders, and several management plans guides the operation of the refuge. Appendix III provides a list of the key laws, executive orders, and regulations that provide a framework for the proposed action.

SCOPING OF THE ISSUES

The Service included the involvement of the public in its development of this draft plan. Once the planning team was assembled, a wide variety of people from the general public, other federal, state, and local government agencies, nongovernmental organizations, educational institutions, and private businesses were contacted and involved.

The planning process began in January 2000 when a core group composed of Service employees, representatives from the Tennessee Wildlife Resources Agency, and Partners in Flight met to discuss the scope of the planning effort and the issues that would likely affect the future of Chickasaw National Wildlife Refuge. The team met several times during the year to conduct a cooperative biological review with the State of Tennessee and other partners (see Chapter I, Background, in the Draft Comprehensive Conservation Plan, Section A). In November 2000, a public scoping meeting was held to solicit comments and suggestions from the general public on the management issues concerning the refuge. Additional public comments were received through focus group meetings, personal contacts, and by mailed and web page responses. Chapter II, The Planning Process (Section A) provides more details on the scoping of issues.

ISSUES AND CONCERNS

A wide range of issues, concerns, and opportunities were addressed during the planning process. Numerous discussions among citizens, focus group participants, resource specialists, and the refuge planning staff brought to light several recurring themes. In general, conservation management themes centered primarily on public access; public use facilities; hunting and fishing opportunities; waterfowl populations and habitat issues; land acquisition; and nonconsumptive recreational opportunities. Alternatives were formulated to address the following issues, which were raised during internal and public scoping:

- More and improved public access for hunting, fishing, and nonconsumptive recreational uses, including better roads and trails, and permits for horseback riding and all-terrain vehicle (ATV) use.
- Development of additional recreational use facilities, including boat ramps, footbridges, and viewing platforms.
- Better and more consistent law enforcement.

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- Improvements to waterfowl management capabilities, including water sources for impoundments, more moist soil habitat, and cropland management issues.
 - More hunting and fishing opportunities, including turkey, deer, and waterfowl issues.
 - More nonconsumptive recreational opportunities, including environmental education, wildlife observation, and photography.
 - Better maintenance of roads, trails, and drainage ditches, including those in the Right Hand Arm and Dry Arm areas.
 - Further development of cooperative management opportunities.
 - Better communication and information dissemination regarding land acquisitions.

A complete listing and further discussion of these issues and concerns can be found in Chapter II, The Planning Process, of the Draft Comprehensive Conservation Plan (Section A).

II. Alternatives

FORMULATION OF ALTERNATIVES

Four management alternatives were developed by the planning team. They are based on the issues, concerns, and opportunities that were identified by the Service and the public during the public scoping process. Management alternatives are different approaches or combinations of management actions designed to achieve the refuge's purpose and vision; the goals of the National Wildlife Refuge System; and the mission of the U.S. Fish and Wildlife Service. They describe the desired resource conditions and visitor experiences for specific geographic areas or resource types, wherever they occur on the refuge.

The four alternatives were developed with the assumption that new private resources are possible from volunteers, grant funds, etc., along with the possibility of modest funding increases for the refuge program and/or staff. Such increases should be supported by legitimate needs and purposes on the refuge, and would be subject to available funding.

In this Draft Environmental Assessment, the specific impacts of implementing each alternative are examined in five broad issue categories. Each category is listed below, followed by the types of questions that were considered during the development of the alternatives.

- **Fish and Wildlife Populations Management:** Can we meet the targeted waterfowl population objectives established for Chickasaw National Wildlife Refuge? Will the proposed management alternative support the vision and establishing purposes of the refuge? Will the proposed management scenario benefit natural biodiversity and protect threatened and endangered species that inhabit the refuge? How do we deal with wildlife populations, such as beaver, which negatively affect the refuge's vegetation and habitat management capabilities?
- **Habitat Management:** What level of habitat restoration and maintenance is appropriate given funding constraints and desired future conditions? Will the management alternative provide the proper balance of moist soil and cropland to meet the habitat needs for targeted waterfowl populations? Does the forest management plan provide a balanced approach from a standpoint of wildlife management and natural biodiversity? Does the current mix of habitat types meet the needs of all wildlife species using the refuge? Will land acquisitions continue within the refuge's approved acquisition boundary?
- **Visitor Services and Environmental Education:** What is the appropriate level of recreational activities on refuge lands? Does the refuge adequately meet the mandate to provide quality wildlife-dependent recreation? What are the appropriate nonwildlife-dependent recreational activities on refuge lands? Will the quality of environmental education, both on-site and through outreach, be improved in the future?
- **Refuge Administration and Operation:** Is available funding being used effectively to accomplish refuge priorities? What other sources of income exist and what can refuge managers do to acquire additional funding? What areas of the refuge are in need of additional maintenance? How can law enforcement efforts on the refuge be improved within budget constraints? What additional staff positions would most effectively serve to advance the goals and purposes of the refuge?

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- **Land Protection and Conservation:** What opportunities exist for new partnerships and how can existing partnerships be improved and expanded? What aspects of surrounding land uses threaten the integrity of ecological processes on the refuge? What can refuge managers do to control or reduce negative impacts to cultural and natural resources found on or in the vicinity of the refuge?

DESCRIPTION OF ALTERNATIVES

The following describes the general features of each refuge management alternative.

ALTERNATIVE A: NO ACTION (CURRENT MANAGEMENT)

Under this alternative, the refuge's current management and public outreach practices would be continued with no changes. The refuge staff would continue to restore and maintain bottomland hardwood forests and moist soil habitat on existing lands, and no additional moist soil units would be developed. The existing cropland habitat units would be maintained. Under current management, new lands would continue to be acquired within the refuge's approved acquisition boundary, as willing sellers and funding become available.

Control of exotic plants and nuisance wildlife populations, including beaver, would be kept to a reactive level. Seasons and access for hunting and fishing would continue as they currently exist, including the seasonal closure of waterfowl sanctuaries. No new visitor education facilities would be built. Limited improvements would be made to the refuge's existing environmental education exhibits and interpretive materials.

Please refer to Chapter III, Refuge Description, in the Draft Comprehensive Conservation Plan (Section A) for additional details about the refuge's current management.

ALTERNATIVE B: PUBLIC USE EMPHASIS

This alternative would emphasize recreational uses and environmental education while maintaining a low-maintenance approach to managing habitats. Additional staff and resources would be dedicated to allow for more public use activities in all areas of the refuge. Bottomland hardwood forests and moist soil habitat would be maintained on existing refuge lands, but no additional moist soil units would be developed. The cropland acreage would be reduced to accommodate increased public use programs.

New lands would continue to be acquired within the refuge's approved acquisition boundary, as willing sellers and funding become available. Priority lands for acquisition under this alternative would be those lands that provide the greatest potential for additional public use opportunities.

Control of exotic plants and nuisance wildlife populations would be kept to a minimal and reactive level. Beaver control would be conducted only where necessary to protect the properties of adjoining landowners. However, the deer herd would be controlled through public hunting, which would be expanded under this alternative. Hunting and fishing seasons and regulations would be examined to provide fewer restrictions and more opportunities.

Secondary recreational uses would be considered for compatibility on refuge lands. The environmental education program could see a visitor education facility, exhibits and interpretive materials. Additional staff and/or volunteers would be added in an effort to increase on-site public contacts, including enhanced environmental education and interpretation programs on the refuge.

ALTERNATIVE C: HABITAT MANAGEMENT EMPHASIS

Alternative C emphasizes the active and intensive management of existing fish, wildlife, and plant habitats. Additional staff and resources would be dedicated to allow for more habitat management activities in all areas of the refuge, such as tree plantings in converted bottomland forests and prescribed burning. Integrated biological controls and harvest methods would be used to control exotic plant or nuisance wildlife species. The biological research and monitoring program would also receive more attention.

The refuge staff would continue to restore and maintain existing bottomland hardwood forest and moist soil units, and additional moist soil units would be developed on existing and newly acquired lands. Cropland habitats would be managed by cooperative and force-account farming, and additional units would be developed on newly acquired lands.

New lands would continue to be acquired within the refuge's approved acquisition boundary, as willing sellers and funding become available. Under this alternative, the priority lands for acquisition would be those that provide the greatest potential for additional habitat protection or restoration opportunities.

In contrast to the expanding habitat work, new recreational opportunities for visitors would not be pursued. Environmental education and outreach programs would remain at the year 2004 level or below. Hunting and fishing seasons and access would continue, but with the possibility of more seasonal closures to protect sensitive wildlife resources. The environmental education program could see a new visitor facility but only minimal improvements in existing exhibits and interpretive materials. A slight increase in public awareness of the refuge is expected due to land protection efforts.

ALTERNATIVE D: BALANCED PUBLIC USE AND HABITAT MANAGEMENT (PROPOSED ACTION)

The preferred alternative would promote more active management of the refuge's existing fish, wildlife, and plant habitats, as well as improved recreational experiences for visitors. The refuge staff would continue to restore and maintain existing bottomland hardwood forest and moist soil units, and develop additional moist soil units on existing and newly acquired lands. Cropland habitats would be managed by cooperative and force-account farming, and additional units would be developed on newly acquired lands. Integrated biological controls and harvest methods would be used to more intensively manage wildlife populations and to control exotic plant or nuisance wildlife species.

New lands would continue to be acquired within the refuge's approved acquisition boundary as willing sellers and funding become available. The priority lands for acquisition in this alternative would be those that provide potential for additional habitat protection or restoration opportunities, as well as possible public use opportunities.

Hunting and fishing seasons and regulations would be examined to provide compatible access and opportunities. Seasonal closures of waterfowl sanctuaries would continue. The environmental education program would see a new visitor education facility as funding becomes available. Some improvements in existing exhibits and interpretive materials would also occur. New public outreach strategies would result in greater public understanding and advocacy for refuge resources. Enhanced programs would provide more opportunities for public use, including environmental education and interpretation, wildlife observation, and photography.

COMPARISON OF ALTERNATIVES

Table 2 on the following pages provides a side-by-side comparison of the four alternatives. The intent is to make the differences between alternatives readily apparent. Each alternative, if implemented, will accomplish the refuge's vision and purposes to some degree, while addressing the issues and concerns in a different way. In some cases there may be no difference or only a slight difference between the alternatives. However, it should be clear that each alternative offers a different management approach to addressing the issues and concerns.

Table 2. Comparison of management alternatives for Chickasaw National Wildlife Refuge.				
Issues	Alternative A No Action	Alternative B Public Use Emphasis	Alternative C Habitat Management Emphasis	Alternative D Balanced Public Use and Habitat Mgmt (Proposed Action)
Fish and Wildlife Populations Management				
Threatened and Endangered Species (T&E Species)	Monitoring of bald eagles and interior least tern.	Monitoring of bald eagles and interior least tern. Develop interpretive materials to supplement T&E species management.	Increase closures if needed to eliminate disturbance of bald eagles.	Same as Alternatives B and C combined.
Nuisance Wildlife and Invasive Species Control	Control beaver populations to minimize loss of trust, threatened, endangered, and resident species. Mechanical and chemical control of noxious and/or invasive plants.	Control beaver populations to minimize loss of trust, threatened, and endangered species. Reactive control only. Public education of nuisance wildlife and invasive species control.	Control beaver populations to benefit and increase trust, threatened, endangered, and resident species. Mechanical and chemical control of noxious and/or invasive plants.	Same as Alternative A. Increase public awareness of nuisance wildlife and invasive species control.

Issues	Alternative A No Action	Alternative B Public Use Emphasis	Alternative C Habitat Management Emphasis	Alternative D Balanced Public Use and Habitat Mgmt (Proposed Action)
Neotropical Migratory Songbirds	Continue long-term monitoring of existing populations and habitat.	Increase interpretive and education efforts to promote nongame bird conservation activities while providing public use access.	Develop management plans/guidelines for priority species and manage habitat essential to maintaining viable populations.	Develop management plans/guidelines for priority species and manage habitat essential to maintaining viable populations. Increase interpretive and education efforts to promote nongame bird conservation activities.
Migratory Waterfowl and Shorebirds	Limited access and maximum protection. Manage populations for Mississippi Alluvial Valley (MAV) target goals through habitat management. Seasonal closures of sanctuaries.	Enforce minimum legal protection and reduce closures to public access. Enhance public viewing opportunities.	Enhance water management capability, farming, and monitoring for target MAV population goals. Seasonal closures of sanctuaries.	Enhance habitat and water management capability, farming, and monitoring for target MAV population goals. Enhance public viewing opportunities while enforcing limited access and maximum protection. Seasonal closures of sanctuaries.

Table 2. Comparison of management alternatives for Chickasaw National Wildlife Refuge.

Issues	Alternative A No Action	Alternative B Public Use Emphasis	Alternative C Habitat Management Emphasis	Alternative D Balanced Public Use and Habitat Mgmt (Proposed Action)
Resident Wildlife	Monitor, protect, and control for healthy population levels.	Maximize public access and hunting opportunities. More public education about resident species.	Increase levels of monitoring to accomplish optimum population goals.	Increase levels of monitoring to accomplish optimum population goals. More public education about resident species.
Fisheries	Monitor and protect at current levels.	Increased public access and fishing opportunities.	Increase level of monitoring. Expand protection areas near sensitive wildlife habitats.	Increase level of monitoring. Increase public fishing opportunities.

Table 2. Comparison of management alternatives for Chickasaw National Wildlife Refuge.				
Issues	Alternative A No Action	Alternative B Public Use Emphasis	Alternative C Habitat Management Emphasis	Alternative D Balanced Public Use and Habitat Mgmt (Proposed Action)
Habitat Management				
Forests	Conduct forest management practices to achieve habitat management goals and objectives. Intensive restoration (tree planting) and natural regeneration of selected open land.	No active management. Develop interpretive and education programs regarding bottomland hardwood forests in the MAV.	Conduct forest management practices to achieve habitat management goals and objectives. Intensive restoration (tree planting) and natural regeneration of selected and newly acquired open land.	Same as Alternative A. Develop interpretive and education programs regarding bottomland hardwood forests in the MAV.

Table 2. Comparison of management alternatives for Chickasaw National Wildlife Refuge.				
Issues	Alternative A No Action	Alternative B Public Use Emphasis	Alternative C Habitat Management Emphasis	Alternative D Balanced Public Use and Habitat Mgmt (Proposed Action)
Moist Soil Units	Develop no additional units. Manage existing units using natural and artificial flooding.	Develop no additional units. Manage existing units at current levels and develop public access opportunities to showcase wildlife benefits of moist soil management.	Renovate existing units and water control structures. Develop new units and water control structures on existing and newly acquired lands. Continue using natural and artificial flooding.	Renovate existing units and water control structures. Develop new units and water control structures on existing and newly acquired lands. Continue using natural and artificial flooding. Develop public access opportunities to showcase wildlife benefits of moist soil management.
Croplands	Maintain existing units using cooperative farming management at current levels.	Reduce croplands and shift management emphasis to support increased public use activities.	Maintain and expand existing units using cooperative and force-account farming management. Develop additional units on newly acquired lands.	Maintain and expand existing units using refuge force-account farming management. Develop additional units on newly acquired lands. Increase public access opportunities.

Table 2. Comparison of management alternatives for Chickasaw National Wildlife Refuge.				
Issues	Alternative A No Action	Alternative B Public Use Emphasis	Alternative C Habitat Management Emphasis	Alternative D Balanced Public Use and Habitat Mgmt (Proposed Action)
Aquatic Resources	Monitor and protect at current levels.	Monitor and protect at current levels and provide public with information about the refuge's aquatic resources.	Enhance habitat through active habitat management and restoration projects.	Same as Alternatives B and C combined.
Visitor Services and Environmental Education				
Fishing	Maintain refuge facilities that support sport fishing at current levels. Continue seasonal closures during waterfowl hunting season.	Develop and increase facilities and access to refuge waters to support sport and commercial fishing.	Increase monitoring of fisheries and provide seasonal closures near sensitive aquatic habitat.	Increase monitoring of fisheries and improve existing facilities that support sport fishing access.

Table 2. Comparison of management alternatives for Chickasaw National Wildlife Refuge.

Issues	Alternative A No Action	Alternative B Public Use Emphasis	Alternative C Habitat Management Emphasis	Alternative D Balanced Public Use and Habitat Mgmt (Proposed Action)
Hunting	Maintain existing facilities and open areas (identified in hunt brochures) at current levels.	Examine seasons and regulations for maximum opportunities and access.	Monitor hunter impacts and use and consider increased closures to protect waterfowl and T&E species habitats and populations.	Examine seasons and regulations for compatible ways to expand hunting opportunities and access, and to enhance refuge hunting experience. Monitor consumptive use through improved data collection and increased monitoring.
Wildlife Observation and Photography	Maintain existing trails, brochures, and tours at current levels. Add kiosks and observation platforms near existing facilities.	Develop self-guided trails, brochures, and signs for wildlife observation and photography. Add kiosks and observation platforms. Open refuge to increased access year-round.	Examine appropriateness of existing trails and tours in light of optimum resource management goals. Some reductions in opportunities due to additional seasonal closures.	If appropriate, increase facilities and guided tours. Add kiosks and observation platforms.

Table 2. Comparison of management alternatives for Chickasaw National Wildlife Refuge.

Issues	Alternative A No Action	Alternative B Public Use Emphasis	Alternative C Habitat Management Emphasis	Alternative D Balanced Public Use and Habitat Mgmt (Proposed Action)
Environmental Education (EE) and Interpretation	Maintain existing visitor education facilities and interpretive materials that educate visitors about refuge programs.	Increase EE activities, interpretive materials, facilities, and staff and provide year-round experiences. Add new visitor education facility.	Possible new visitor education facility. Examine appropriateness of trails and access in light of optimum resource management goals.	Same as Alternatives B and C combined.
Outreach and Awareness	Continue partnering with the state. Maintain existing techniques and partnerships to promote public awareness of fish and wildlife conservation and federal and state programs.	Continue partnering with the state. Develop new signs, brochures, partnerships, and techniques to expand public awareness of fish and wildlife conservation and federal and state programs.	Continue partnering with the state. Examine appropriate level of level of public information sharing, in keeping with optimum resource management goals.	Same as Alternative B.

Table 2. Comparison of management alternatives for Chickasaw National Wildlife Refuge.				
Issues	Alternative A No Action	Alternative B Public Use Emphasis	Alternative C Habitat Management Emphasis	Alternative D Balanced Public Use and Habitat Mgmt (Proposed Action)
	Refuge Administration and Operation			
Maintenance	Maintain current level of facilities maintenance, based on budget limitations.	Increase maintenance efforts for public use facilities while reducing maintenance efforts for habitat management facilities.	Increase maintenance efforts for habitat management facilities while reducing maintenance efforts for public use facilities.	Increase maintenance of public use and habitat management facilities.
Law Enforcement (LE)	Maintain current staff levels to support existing refuge programs.	Increase law enforcement capability as needed to monitor increased public use.	Decrease LE for reduced public use opportunities. Possible increase in resource law enforcement capability as needed to monitor newly acquired lands.	Increase law enforcement capability to monitor increased public use and newly acquired lands and associated wildlife resources.
Staff	Maintain current staff to support existing refuge programs.	Increase staff to facilitate larger public use program.	Increase staff for habitat management on newly acquired lands while reducing staff for public use programs.	Increase staff as needed to facilitate larger public use program and for habitat management on newly acquired lands.

Table 2. Comparison of management alternatives for Chickasaw National Wildlife Refuge.				
Issues	Alternative A No Action	Alternative B Public Use Emphasis	Alternative C Habitat Management Emphasis	Alternative D Balanced Public Use and Habitat Mgmt (Proposed Action)
Operations	Maintain current operations capability to support existing refuge programs.	Increase operations capabilities for public use programs while reducing capabilities for habitat management programs.	Increase operations capabilities for habitat management programs while reducing capabilities for public use programs.	Explore possibilities for increased operations capability for both public use and habitat management programs.
Land Protection and Conservation				
Land Acquisitions *	Land acquisitions within the refuge's approved acquisition boundary would continue as willing sellers and funding become available.	Same as Alternative A, but with priority on acquiring lands with greatest potential for public use.	Same as Alternative A, but with priority on acquiring lands with greatest potential for habitat protection or restoration.	Same as Alternative A, with priority on lands that can provide both public use and habitat protection/restoration potential.
Technical Assistance	Provide current level of technical assistance to landowners, agencies, and individuals.	Decrease emphasis on lands outside Refuge as more emphasis is placed on public use of refuge lands.	Explore new techniques and programs for assisting landowners and partners. Increase staffing.	Same as Alternative C.

Table 2. Comparison of management alternatives for Chickasaw National Wildlife Refuge.				
Issues	Alternative A No Action	Alternative B Public Use Emphasis	Alternative C Habitat Management Emphasis	Alternative D Balanced Public Use and Habitat Mgmt (Proposed Action)
Resource Protection	Provide current levels of awareness and protection to cultural and natural resources. .	Focus on protection of cultural and natural resources on existing refuge lands. More efforts at public education regarding resource protection.	As public use is reduced, increase protection for cultural and natural resources on existing and newly acquired lands.	Increase levels of awareness of cultural and natural resources on existing and newly acquired lands. Maintain protection at current levels.

* Footnote: As of April 1, 2004, Chickasaw National Wildlife Refuge included a total of 25,006 acres. The refuge's approved acquisition boundary includes an additional 35,234 acres. Acquisition of the entire approved acquisition area could increase the refuge's total size to 60,240 acres.

III. Affected Environment

Please refer to Chapter III of the Draft Comprehensive Conservation Plan (Section A) for a description of the affected environment.

IV. Environmental Consequences

EFFECTS COMMON TO ALL ALTERNATIVES

The specific environmental and social impacts of implementing each alternative are evaluated in five broad issue categories: fish and wildlife populations management; habitat management; visitor services and environmental education; refuge administration and operation; and land protection and conservation. However, a few potential effects would be the same under each alternative; these are summarized below.

FISH, WILDLIFE, AND HABITAT

Each alternative would protect habitat types important to migratory birds, mammals, reptiles, amphibians, fish, and invertebrates, including threatened and endangered species. Alternative B would provide the least amount of habitat protection and management emphasis, while Alternatives C and D would provide the most protection and management. Implementation of any of the four alternatives would benefit and not likely adversely affect endangered or threatened species or habitats.

Overall foraging habitat for waterfowl and shorebirds should improve under all alternatives, because of improvements to moist soil and cropland habitats. Benefits to refuge waterfowl and shorebirds may be less as a result of less protection and increased public access in Alternative B.

At least three active bald eagle nests have been documented on the refuge. All four alternatives would ensure minimal disturbances to bald eagles and any eagle nests that may occur on refuge lands. Alternative B might result in the least protection from disturbance to bald eagles, while Alternative C would provide a greater level of protection from disturbance to bald eagles.

Deer health surveys indicate that the refuge's deer populations are currently at carrying capacity. Under all alternatives, forest and cropland management actions would result in stable or increasing deer populations, as habitat management actions increase the carrying capacity of refuge lands. Increased access and public use under Alternative B could impact deer movement and population levels, as more hunting opportunities are provided. All the alternatives include deer population control through a hunt program.

All alternatives provide additional protection to wetlands beyond the protection afforded by existing wetland regulations. Under all alternatives, the riparian areas would be protected and would provide travel corridors between the refuge and private lands adjacent to the refuge. Subject to landowner control, wildlife corridors would be restored by private landowners who enroll their lands in private lands conservation programs.

Under all four alternatives, refuge visitation for priority public uses would be expected to build over time as lands are acquired and operational funds are provided. The number of visitors would depend on the season and would grow as the land base increases and more public use programs are provided. Wildlife-dependent recreation described under Alternatives A, B, and D would support the greatest increase in economic activity. Economic benefits would result from increased visitation to the refuge and would directly improve the value of goods and services to local communities such as Ripley.

All four alternatives would decrease gross property tax revenues as additional lands are acquired; however, there would be an increase in refuge revenue-sharing payments, as well as increases to the local economy resulting from refuge visitations. The Refuge Revenue Sharing Act requires the Fish

and Wildlife Service to make payments to local taxing authorities to offset the loss in tax revenue when land is purchased for a refuge.

Recent trends demonstrate a decline in federal farm subsidies for crop production (U.S. Department of Agriculture Economic Research Service 2001). Crop prices nationwide have declined as well. As a result, real estate trends demonstrate a marked increase in farm land sales. There is a positive benefit (including tax relief to heirs) for farmers in the Lower Mississippi Valley to restore conditions of marginal farm lands and forest lands located in flood-prone areas for wildlife, and to enroll properties in conservation easements. All four alternatives advocate the Service acquiring lands in Lauderdale County to enlarge the refuge, thereby reducing the available acreage that could be developed. Lands adjacent to the refuge may increase in value, largely due to the value of those properties to private hunting clubs.

Under any of the four alternatives, there would be no significant detrimental impacts to floodplains, prime and unique farmlands, or state-owned conservation areas. Neither minority and low-income populations nor Indian trust resources would be impacted under any of the four alternatives.

AIR AND WATER QUALITY

Because of extensive reforestation, subsequent increases in biomass, and decreases in agricultural activities, air quality should improve from current levels under all alternatives. Habitat management involving prescribed burning may occur according to an approved Draft Fire Management Plan, currently being developed as part of the comprehensive planning process. Smoke management practices will be implemented during all burning events.

All alternatives would positively impact soil formation processes on lands the refuge acquires. Some disturbances to surface soils and topography would occur at those locations selected for administrative, maintenance, and visitor facilities, as well as in areas targeted for wildlife management practices. Each alternative would protect the natural hydrology of the affected areas. Each alternative would prevent substantial agricultural acreage from being developed if the Service acquired properties or provided assistance to landowners and local conservation partners. Each alternative would maintain groundwater recharge areas and natural catchments to hold and absorb surface waters, thereby minimizing flooding. Refuge management activities and visitor use should not negatively affect water quality. All alternatives would positively impact water quality in individual streams. Other positive impacts include runoff prevention, sediment retention, and minimizing nonpoint source pollution. Land acquisition in erosion-prone areas would improve water quality in the refuge vicinity.

CULTURAL RESOURCES

The U.S. Fish and Wildlife Service is responsible for managing archaeological and historic sites found on its lands. All four management alternatives afford land protection and low levels of development, thereby producing little negative effect on the cultural and historic environment. Potentially negative actions could include logging and constructing new trails, roads, or facilities. In most cases, these management actions would require review by the Service's Regional Archaeologist and consultation with the Tennessee Historic Preservation Office, as mandated by Section 106 of the National Historic Preservation Act. Cultural resources surveys on the refuge have been limited and indicate that other cultural sites likely exist. Determining whether a particular action within an alternative has the potential to affect cultural or archaeological resources is an ongoing process that would occur with the planning stages of every project. The Service's policy is to preserve these resources in the public trust, avoiding impacts whenever possible.

WILDERNESS AREAS

There is no designated wilderness area within the refuge.

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. It 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, or activities on minority or 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 Draft Environmental Assessment would disproportionately place any adverse environmental, economic, social, or health impacts on minority or low-income populations. Implementation of any action alternative that includes public use and environmental education would actually provide a benefit to citizens living in the vicinity of the refuge.

CLIMATE CHANGE IMPACTS

The U.S. Department of the Interior issued an order in January 2001 requiring its federal land management agencies to consider the potential impacts of climate change as part of their long-range planning efforts.

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 conservation 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. Department of Energy 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 deserts—are effective in both preventing carbon emission and acting as a biological “scrubber” of atmospheric carbon monoxide. The Department of Energy’s report concluded that ecosystem protection is important to carbon sequestration and may reduce or prevent the 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 the Draft Comprehensive Conservation Plan would preserve or restore land and water, and would thus enhance carbon sequestration. This in turn would contribute positively to efforts to mitigate the impacts of human-induced global climate changes.

SUMMARY OF EFFECTS BY ALTERNATIVE

This section summarizes the environmental consequences of each refuge management alternative. Table 3 provides a side-by-side comparison of the likely outcomes for the specific issues and is organized by broad use categories.

ALTERNATIVE A: NO ACTION (CURRENT MANAGEMENT)

Under this alternative, the current management and public outreach practices would be continued, with little or no significant improvements to the refuge's overall program in all five broad use categories (fish and wildlife populations management; habitat management; visitor services and environmental education; refuge administration and operation; and land protection and conservation) (see Table 3). Maintenance and enhancement of bottomland hardwood forests and moist soil habitat would continue at present levels. No additional moist soil units would be developed. The refuge would continue to maintain its existing cropland habitats to provide an important source of food for wildlife. Ongoing monitoring efforts would continue to address habitat quality and wildlife distribution and population levels. Land acquisitions from willing sellers within the refuge's approved acquisition boundary would continue at the current level.

Hunting and fishing seasons and regulations, as well as seasonal closures, would continue to be used to limit disturbances to waterfowl and other wildlife species. Improvements to existing exhibits and interpretive materials would be used to inform and educate visitors about fish and wildlife management issues. No new visitor education facility would be built.

ALTERNATIVE B: PUBLIC USE EMPHASIS

This alternative would result in greater levels of public recreational uses and environmental education while maintaining only a minimal level of habitat management. Public use opportunities would increase as staff time and resources are shifted to emphasize public use programs. An enhanced environmental education program, including a possible new visitor facility, would provide more facilities and programs with higher quality environmental education and interpretation opportunities for refuge visitors. The refuge's current management would be examined for possible additional hunting and fishing opportunities and access, as well as possible reductions in seasonal closures.

The refuge's bottomland hardwood forests and moist soil habitats would be less intensively managed as staff and resources are shifted to public use programs. Additional staff and resources would be dedicated to allow for more public use activities in all areas of the refuge. Law enforcement and monitoring of visitor activities would be increased. No new moist soil units would be developed, thus limiting the potential for additional waterfowl habitat. Cropland management would be reduced, resulting in less wildlife food production and potentially limiting the refuge's ability to attract and hold targeted waterfowl populations during the winter months. Lands within the refuge's approved acquisition boundary would be acquired as willing sellers and funding become available, providing expansions to existing refuge lands and additional public use opportunities.

Beaver populations would be controlled only on a reactive basis and may result in increased populations and potential damage to bottomland hardwood forests and waterfowl habitat. More liberal hunting and fishing seasons and regulations, and other compatible public uses, would produce additional public use opportunities. However, this increase in public use could also negatively affect waterfowl populations and other trust species.

ALTERNATIVE C: HABITAT MANAGEMENT EMPHASIS

Alternative C emphasizes the active and intensive management of existing fish, wildlife, and plant habitats. Habitat enhancements such as silvicultural treatments, tree plantings, and prescribed burning would enhance the quality of the refuge's habitats and benefit wildlife populations. Proactive control of nuisance wildlife species and the integration of biological controls and harvest methods would ensure more effective and balanced management of wildlife populations and habitat. An

increased biological research and monitoring program would enhance understanding of refuge resources and benefit future management efforts.

Continued maintenance of bottomland hardwood forest and moist soil units, and development of additional moist soil units, would provide additional waterfowl habitat. Additional cropland farming units and more intensive management by cooperative and force-account farming would significantly increase the refuge's capability to attract and hold targeted waterfowl populations during the winter months. Land acquisitions, if willing sellers and funding become available, would increase the refuge's capability to protect natural resources.

Public use opportunities would decrease, as new recreational opportunities for visitors would not be pursued under this alternative. Environmental education and outreach programs would remain at the year 2004 level or below. A new visitor education facility could be constructed, but only minor improvements would occur in existing environmental education exhibits and interpretive materials. Hunting and fishing seasons and access would continue, but the possibility of more seasonal closures to protect sensitive wildlife resources might reduce consumptive public use opportunities. A slight increase in public awareness of the refuge is expected due to land protection efforts.

ALTERNATIVE D: BALANCED PUBLIC USE AND HABITAT MANAGEMENT (PROPOSED ACTION)

The preferred alternative would promote more active management of the refuge's existing fish, wildlife, and plant habitats as well as provide higher quality recreational experiences for visitors. Continued maintenance and enhancement of bottomland hardwood forest and moist soil units, along with development of additional moist soil units, would provide additional waterfowl habitat. Additional cropland farming units and more intensive management by cooperative and force-account farming would significantly increase the refuge's capability to attract targeted waterfowl populations during the winter months. Monitoring efforts for habitat quality and wildlife distribution and population levels would be enhanced. Land acquisitions, if willing sellers and funding become available, would increase the refuge's capability to protect resources and provide additional public use opportunities.

Hunting and fishing seasons and access, as well as seasonal closures, would be used to limit disturbances to waterfowl and other wildlife species. A possible new visitor education facility and improvements for existing exhibits and interpretive materials would be used to inform and educate visitors. Public outreach strategies would be examined to provide greater public understanding and advocacy for refuge resources. Enhanced public use programs and facilities would provide more opportunities for high quality public uses, including environmental education and interpretation, wildlife observation, and photography.

CUMULATIVE EFFECTS OF THE PROPOSED ACTION

There would no significant cumulative impacts on the environment. Cumulative impacts are actions that may be generated by various entities, including other federal or state agencies, local agencies, nongovernmental organizations, and private landowners, as each of these groups undertakes actions related to land uses. The current size, condition, and configuration of the refuge's forests are due to previous commercial harvesting impacts, water development projects, and agricultural activities. Cumulatively, these actions have resulted in a lack of sufficient protected native bottomland hardwood forests and forest structures and conditions needed to support increases in forest-breeding birds or the protection and recovery of threatened and endangered species.

The forested wetland environment is heavily influenced by agriculture and water development activities, resulting in diminished quality of the waters, soils, and air. These actions are cumulative and occur throughout the Lower Mississippi Valley. Pollution sources in the Lower Mississippi Valley include animal waste; agricultural chemicals; construction; logging; hazardous materials spills; sand and gravel extractions; junk yards; landfills; litter; and debris. These pollution sources are generated by human populations and are cumulative over time. Threats to the refuge's fish and wildlife resources would primarily be from outside its boundaries through increased habitat fragmentation, nutrient loading, and erosion.

UNAVOIDABLE ADVERSE EFFECTS OF THE PROPOSED ACTION

Unavoidable adverse impacts are projected based on changes in the levels of management activities described in the Service's proposed action. The effects on the quality of the human environment are not likely to be highly controversial or involve highly uncertain, unique, or unknown environmental risks to the human environment. Alternative D would not lead to a violation of federal, state, or local laws imposed for the protection of the environment.

Some forest management practices, construction of visitor facilities, and increased visitation may affect local air and water quality, natural vegetation, and soil compaction. Increased visitation would also mean additional disturbances to both resident and migratory wildlife. Increased visitation for wildlife-dependent recreational and environmental education programs may mean fewer refuge acres for public safety purposes. Additional hunting could result in increased conflicts, with some user groups opposing such activity. Wildlife harvests through hunting and trapping would reduce the numbers of certain species, enabling other species of management concern to increase or recover. Such management actions are necessary in order for the Service to carry out its wildlife resource protection mandates. Although some unavoidable adverse impacts are expected, the benefits to wildlife and habitats outweigh these impacts.

In terms of financial impacts, the residential or industrial development potential of acquired lands would be precluded, which could result in impacts to the local economy. Also, the local government would not receive the fiscal benefits of increased property tax receipts. However, this type of impact is expected to be minor. Additionally, the Service is committed to working with willing sellers. It can be assumed that property owners who give up their development rights, by willingly selling their lands, do not expect the development potential of their lands to increase greatly, or are simply more interested in land conservation than in any monetary gains. Further, the Service makes in-lieu tax payments to the county.

Other positive financial effects include spending associated with refuge visitation. In a recent study entitled, *Banking on Nature 2002: The Economic Benefits to Local Communities of National Wildlife Refuge Visitation*, economists found that in 2002, more than 35.5 million visits to national wildlife refuges fueled more than \$809 million in the sales of recreational equipment, food, lodging, transportation, and other expenditures. That figure is more than double the \$401.1 million generated in 1995, the last time the study was conducted (U.S. Fish and Wildlife Service 2003).

SHORT-TERM USE VERSUS LONG-TERM PRODUCTIVITY OF THE PROPOSED ACTION

Short- and long-term effects describe the relationship between short-term uses of the human environment and maintenance of long-term productivity of the environment.

Short-term economic effects would occur as a result of land purchases. There would be short-term impacts on tax collections for the year in which a property is acquired. In the long term, however,

land protection would reduce municipal service costs, while providing an increased quality of life, essential habitat for wildlife, and outdoor recreation. Any loss in local taxes would be at least partially offset by the annual refuge revenue-sharing payments, as well as by the economic benefits associated with refuge visitation as stated previously.

In the long run, the local economy would be positively impacted by increased spending on environmental programs. The programs would attract visitors and impact tourism and recreation in the region. In the long term, the adverse impacts would be mitigated or offset by the positive impacts from increased open space and quality habitat for plants and animals.

All long-term impacts on biological resources are expected to be beneficial. Sites attracting threatened and endangered species would receive the highest priority for protection. Important stopover, feeding, and breeding habitat for migratory birds would be targeted for acquisition. Aquatic species, wide-ranging wildlife species, and species that require active management would benefit from the habitat improvements, restoration, and land protection actions outlined in the Draft Comprehensive Conservation Plan. Technical assistance, environmental education, Partners in Flight grants, and Challenge Cost-Share Program grants would enhance area-sensitive species on dedicated open space, privately owned lands, and refuge lands.

The development of visitor center facilities, trails, observation platforms, hunter check stations, wetland restoration projects, and forest management practices would result in both short-term and long-term physical impacts on soil and vegetation. These impacts would be localized and confined to the immediate area of the development or construction sites. The increased attention to environmental education and recreation programs would result in more audiences being involved in environmental education and recreation and would provide for a greater appreciation of the land.

Long-term beneficial effects include the increased productivity of threatened and endangered species, songbirds, waterfowl, shorebirds, white-tailed deer, small game, and a myriad of other species dependent on refuge habitats. The public would also gain long-term opportunities for recreation and education on some refuge tracts.

Short-term use of refuge lands includes forest regeneration and prescribed restoration improvements, wetlands enhancement, exotic plant control, management for selected species, wildlife inventories, water quality monitoring, and the administration of education and visitor use programs and facilities. These activities could be implemented with a primary goal of assuring the sustained productivity of refuge resources.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES TO THE PROPOSED ACTION

Irreversible commitments of resources are those which cannot be reversed and result when an area cannot be returned to its natural condition for an extended period of time. For example, the depletion of old-growth forests is irreversible. Irretrievable commitments of resources occur when a renewable resource is allocated to a given use and cannot be recovered without significant effort.

The costs associated with land acquisition for the refuge would be irreversible. Refuge land acquisition removes the land from private ownership, as well as any potential development benefits. However, such land, once placed in public ownership under the National Wildlife Refuge System, provides a new set of uses and benefits a much broader group of people. Traditional public uses may change, since public uses on a refuge must be shown to be appropriate and compatible with the purposes for which the land is acquired. Structural improvements that are purchased with any land

may be declared surplus to government needs, and sold or demolished on site. Federal ownership may affect surrounding land use patterns, local economies, and county tax revenues. Property located adjacent to refuge lands generally increases in value, landscapes become protected, revenues to local service businesses increase, and costs to local counties for services decrease.

Management of the refuge and lands acquired would result in an irreversible and irretrievable commitment of funding for operations, administration, and management. Funding and personnel commitments by the Service to purchase and manage refuge lands and facilities render those resources unavailable for other Service programs and projects. The more public use activities and facilities provided, the greater the operating and maintenance costs involved.

Any wetland restoration project would be considered irreversible. Following restoration, the Clean Water Act would make it very difficult to reconvert wetlands on a national wildlife refuge to a drained condition. Irreversible loss of habitat, as part of the Service's proposed action, would occur at construction sites of new facilities.

Animal and plant populations are renewable in different degrees. Construction sites and some habitat management practices may irretrievably damage natural communities, at least for a period of time. These activities would be managed in such a way that the health and viability of wildlife populations would not be threatened.

Table 3. Comparison of environmental consequences of management alternatives for Chickasaw National Wildlife Refuge.

Issues	Alternative A No Action	Alternative B Public Use Emphasis	Alternative C Habitat Management Emphasis	Alternative D Balanced Public Use and Habitat Mgmt (Proposed Action)
Fish and Wildlife Populations Management				
Threatened and Endangered Species (T&E Species)	Stable. Management minimizes disturbance of bald eagles.	Possible increased disturbance of bald eagles as a result of increased public use. Increased public awareness.	Reduced disturbance of bald eagles.	Same as Alternative A. Possible increases in T&E species due to enhanced management and increased public awareness.
Nuisance Wildlife and Invasive Species Control	Stable to decreased beaver populations due to control. Reduction of noxious and/or invasive plants.	Stable to increased beaver populations due to limited and reactive control only. Increased public awareness.	Reduced beaver population and greater level of habitat protection through more beaver control.	Same as Alternative C.
Neotropical Migratory Songbirds	Stable but with increasing understanding as result of ongoing monitoring and study.	Greater public awareness but possible increased disturbance due to increased public access.	Benefits to populations as silvicultural practices enhance habitat.	Same as Alternative C. Increasing understanding as result of ongoing monitoring and study. Increased public awareness.
Migratory Waterfowl and Shorebirds	Stable through limited access and maximum protection. Target MAV population levels through habitat management.	Increased public access, resulting in increased disturbance, could have impacts upon population levels and distribution patterns.	Population increases due to enhanced management.	Population increases due to enhanced management. Increases in public viewing visitations may slightly increase disturbance.

Table 3. Comparison of environmental consequences of management alternatives for Chickasaw National Wildlife Refuge.

Issues	Alternative A No Action	Alternative B Public Use Emphasis	Alternative C Habitat Management Emphasis	Alternative D Balanced Public Use and Habitat Mgmt (Proposed Action)
Resident Wildlife	Stable with monitoring, protection, and control.	Possible increased disturbance, due to increased public use, including possible impacts on wildlife behavior, distribution, and abundance. Increased public awareness.	Stable to increasing through increased monitoring and intensive management.	Same as Alternative C.
Fisheries	Stable through current monitoring and protection.	Possible increased disturbance due to increased public access.	Positive impacts through increased monitoring and protection. Possible reduction in public use opportunities.	Positive impacts through enhanced management and increased monitoring. More public use opportunities.

Table 3. Comparison of environmental consequences of management alternatives for Chickasaw National Wildlife Refuge.

Issues	Alternative A No Action	Alternative B Public Use Emphasis	Alternative C Habitat Management Emphasis	Alternative D Balanced Public Use and Habitat Mgmt (Proposed Action)
Forests	Habitat Management			
	Benefits to forest resources through sound silvicultural practices including, but not limited to, planting and natural regeneration on selected open lands.	Reduction in benefits as a result of no active management. Possible increased disturbance through increased public access. Increased public awareness.	Benefits to forest resources through sound silvicultural practices including, but not limited to, planting and natural regeneration on selected and newly acquired open lands.	Benefits to forest resources through sound silvicultural practices including, but not limited to, planting and natural regeneration on selected and newly acquired open lands. Increased public awareness.
Moist Soil Units	Beneficial impacts through intensive management of existing units.	Stable impacts with management of existing units and no additional units developed. Increased public awareness.	Beneficial impacts through intensive management and additional units developed on existing and newly acquired lands.	Beneficial impacts through intensive management and additional units developed on existing and newly acquired lands. Increased public awareness.

Table 3. Comparison of environmental consequences of management alternatives for Chickasaw National Wildlife Refuge.

Issues	Alternative A No Action	Alternative B Public Use Emphasis	Alternative C Habitat Management Emphasis	Alternative D Balanced Public Use and Habitat Mgmt (Proposed Action)
Croplands	Stable impacts due to ongoing management and maintenance of existing units.	Reduction in wildlife benefits due to reduction in cropland management. Increased public awareness.	Beneficial impacts due to development of additional units on existing and newly acquired lands and more intensive management, including cooperative and force account farming.	Beneficial impacts due to development of additional units on existing and newly acquired lands and more intensive management, including force account farming. Increased public awareness.
Aquatic Resources	Stable impacts with monitoring and protection.	Increased public awareness.	Enhancement through land acquisitions and more intensive management	Enhancement through land acquisitions and more intensive management. Increased public awareness.

Table 3. Comparison of environmental consequences of management alternatives for Chickasaw National Wildlife Refuge.

Issues	Alternative A No Action	Alternative B Public Use Emphasis	Alternative C Habitat Management Emphasis	Alternative D Balanced Public Use and Habitat Mgmt (Proposed Action)
Visitor Services and Environmental Education				
Fishing	Stable impacts under current management.	More opportunities through improved access and facilities. Increased numbers of fishermen (requiring additional enforcement efforts).	Positive benefits from increased monitoring. Benefits to quality of fishing through additional fisheries management activities. Possible reductions in fishing opportunities due to seasonal closures.	More opportunities through improved access and facilities. Positive benefits from increased monitoring. Benefits to quality of fishing through additional fisheries management activities.
Hunting	Stable level of opportunities according to existing seasons/units.	Increased opportunities with longer seasons and reduced closures (requiring additional law enforcement efforts). Possible negative impacts to migratory bird target population objectives.	Increased quality of hunting with more intensive management. Possible reduction in opportunities due to additional seasonal closures.	Increased quality of hunting with more intensive management. Possible increased opportunities.
Wildlife Observation and Photography	Stable opportunities through current programs and existing facilities.	Significant increase in opportunities through more trails, facilities, and access.	Fewer opportunities through increased seasonal closures.	More opportunities through land acquisitions and enhanced facilities.

Table 3. Comparison of environmental consequences of management alternatives for Chickasaw National Wildlife Refuge.

Issues	Alternative A No Action	Alternative B Public Use Emphasis	Alternative C Habitat Management Emphasis	Alternative D Balanced Public Use and Habitat Mgmt (Proposed Action)
Environmental Education and Interpretation	Increase in opportunities through expanded programs and facilities.	Significant increase in opportunities through facilities, staff, access, and new visitor facility.	Some increase in opportunities due to possible new visitor education facility. Overall, reduced emphasis on program and more seasonal closures.	Same as Alternative B.
Outreach and Awareness	Stable level of public information sharing.	Increased levels through new partnering and information-sharing efforts.	Stable level of public information sharing, in keeping with optimum resource management goals.	Same as Alternative B.
Refuge Administration and Operation				
Maintenance	Current maintenance levels (funding levels inadequate to effectively maintain current programs and facilities).	Increased maintenance of public use facilities; maintenance of habitat management facilities decreases.	Maintenance of habitat management facilities increases with some reduction of maintenance of public use facilities.	Maintenance of both public use facilities and habitat management facilities increases. Budget and personnel needs increase.

Table 3. Comparison of environmental consequences of management alternatives for Chickasaw National Wildlife Refuge.

Issues	Alternative A No Action	Alternative B Public Use Emphasis	Alternative C Habitat Management Emphasis	Alternative D Balanced Public Use and Habitat Mgmt (Proposed Action)
Law Enforcement (LE)	Current levels of LE (current levels inadequate to address LE needs).	Increased LE needed due to increased public use, plus existing unmet needs referred to under Alternative A.	Reduced LE need resulting from less public use balances out increased LE needs on newly acquired lands, plus existing unmet needs referred to under Alternative A.	Increased LE needed due to newly acquired lands and increased public use and existing unmet needs referred to under Alternative A.
Staff	Existing staff maintains current programs.	Staff emphasis shifted from habitat management to public use. Possible staff increase needed for increased public use programs.	Shift staff emphasis from public use to habitat management. Possible staff increase needed due to additional land acquisitions.	Staff increases needed for both public use and habitat management programs.
Operations	Current levels of operation maintained as supported by current budget (refuge resources being adversely impacted by current budgetary shortfall).	Operations emphasis shifted from habitat management to public use programs. Increase in operations funding needs.	Operations emphasis shifts from public use programs to habitat management. Increase in operational budget needs.	Operations needs for both public use and habitat management operations increase. Budget needs increase.

Table 3. Comparison of environmental consequences of management alternatives for Chickasaw National Wildlife Refuge.

Issues	Alternative A No Action	Alternative B Public Use Emphasis	Alternative C Habitat Management Emphasis	Alternative D Balanced Public Use and Habitat Mgmt (Proposed Action)
Land Protection and Conservation				
Technical Assistance	Stable impact as current level of technical assistance is provided to landowners, agencies, and individuals.	Program emphasis decreased. Lands outside refuge negatively impacted due to less protection of soil and water, less revegetation.	Beneficial impacts to lands outside refuge as program is increased. Positive impacts to soil, water, and revegetation of cleared lands.	Same as Alternative C.
Land Acquisitions	Increased protection as lands are acquired within current approved acquisition boundary.	Increased land protection benefits as new lands are acquired within approved acquisition boundary. Acquired lands emphasis on public use.	Increased land protection benefits as new lands are acquired within approved acquisition boundary. Acquired lands emphasis on habitat management.	Increased land protection benefits as new lands are acquired within approved acquisition boundary. Acquired lands emphasis balanced between public use and habitat management.
Resource Protection	Protection of natural and cultural resources is maintained at current levels on refuge and adjacent lands.	Increased public awareness of cultural and natural resources. Some reduction in protection of natural resources due to increased public use.	Greater level of protection for cultural and natural resources on existing and newly acquired lands. Reduced public awareness.	Protection of natural and cultural resources is maintained at current levels on Refuge, adjacent lands, and newly acquired lands. Increased public awareness.

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VI. Consultation and Coordination

This Draft Comprehensive Conservation Plan and Environmental Assessment for Chickasaw National Wildlife Refuge was prepared with the participation of Service staff, refuge users, environmental resource professionals, and the local community. The comprehensive planning process began in January 2000, when a Core Group was formed to begin the biological planning for an interagency effort in west Tennessee, which incorporated approximately 10,000 square miles of private, state, and federal lands.

This effort eventually produced the West Tennessee Wildlife Resources Conservation Plan. The WTWR Conservation Plan serves as the biological foundation for the development of comprehensive conservation plans for five national wildlife refuges in west Tennessee, including this plan for Chickasaw National Wildlife Refuge. Later that same year, the Chickasaw CCP Technical Team was formed to develop the Chickasaw plan, and in November a public scoping meeting was held in Ripley, Tennessee. At the meeting, the public was given the opportunity to comment orally or in writing regarding their perceived issues, concerns, and opportunities for management of the refuge. Additional comments were received by mail, telephone, and e-mail. Presentations on the refuge's comprehensive conservation plan were also given to Rotary clubs in west Tennessee, and the plan was advertised in local newspapers and on radio. A mailing list was developed to keep interested parties informed on the progress of the comprehensive planning effort.

A Chickasaw Planning Review Group, composed of state and federal agency professionals, nongovernmental organizations, private businessmen, sportsmen, local officials, and others with specific knowledge or interest in the refuge, was developed to oversee the refuge's planning process and solicit suggestions from professional counterparts, local citizens, and private interests. The Planning Review Group also reviewed and provided comments on various drafts of the comprehensive conservation plan as it progressed. The recommendations from these working groups provided valuable information for the authors of this plan. Please see Chapter II of the Draft Comprehensive Conservation Plan for more information on the public scoping and involvement process.

Members of the above-described planning groups are listed below.

Core Group

(Please list the names of the Core Group members and their agency/institutional affiliations, city and state here.)

Chickasaw CCP Technical Team

(Please list the names of the Chickasaw CCP Technical Team and their agency/institutional affiliations, city and state here.)

Chickasaw Planning Review Group

(Please list the names of the Chickasaw Planning Review Group and their agency/institutional affiliations, city and state here.)

SECTION C. APPENDICES

Appendix I. Glossary

Adaptive Management – A process in which projects are implemented within a framework of scientifically driven experiments to test predictions and assumptions outlined within the comprehensive conservation plan. The analysis of the outcome of project implementation helps managers determine whether current management should continue as is or whether it should be modified to achieve desired conditions.

Alternative – One set of objectives and strategies that could be used to achieve refuge goals and the desired future condition.

Approved Refuge Acquisition Boundary – A refuge boundary approved by the Director of the Fish and Wildlife Service for acquisition, contingent upon completion of the planning and environmental compliance process.

Biological Diversity or Biodiversity – The variety of life and its processes, including the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur. The National Wildlife Refuge System's focus for biodiversity is on indigenous species, biotic communities, and ecological processes.

Bottomland Hardwood Forests – A community of hardwood tree species that are adapted to growing in seasonally saturated soils and may have their roots inundated for a portion of the growing season.

Canopy – A layer of foliage; generally the uppermost layer in a forest stand. Canopy can be used to refer to mid- or understory vegetation in multilayered stands. Canopy closure is an estimate of the amount of overhead tree cover (also canopy cover).

Categorical Exclusion – A classification given to federal actions that do not individually or cumulatively have a significant effect on the human environment, in compliance with the National Environmental Policy Act.

CFR – Code of Federal Regulations.

Compatible Use – A wildlife-dependent recreational use or any other use of a refuge that, in the sound professional judgment of the refuge manager, will not materially interfere with or detract from the fulfillment of the mission or the purposes of the refuge. A compatibility determination supports the selection of compatible uses for a specific refuge and identifies stipulations or limits necessary to ensure compatibility.

Comprehensive Conservation Plan – A document that describes the desired future conditions of the refuge; provides long-range guidance and management direction for the refuge manager to accomplish the purposes, goals, and objectives of the refuge; and contributes to the mission of the National Wildlife Refuge System.

Conservation Easement – A legal document that provides specific land-use rights to a secondary party. A perpetual conservation easement usually grants conservation and management rights to a party in perpetuity.

Cooperative Agreement – A simple habitat protection action in which no property rights are required. Such an agreement is usually long-term and can be modified by either partner. Lands under a cooperative agreement do not necessarily become part of the National Wildlife Refuge System.

Cooperative Farming – Farming of refuge cropland by private individuals under the terms of a cooperative agreement.

Corridor – A route that allows movement of individuals from one region or place to another.

Cover Type – The present dominant vegetation type of an area.

Cultural Resources – The remains of sites, structures, or objects used by people of the past.

Deciduous – Pertaining to perennial plants that are leafless for some time during the year.

Ecological Succession – The orderly progression of an area through time, in the absence of disturbance, from one vegetative and faunal community to another.

Ecosystem – A dynamic and interrelating complex of plant and animal communities and their associated non-living environment.

Ecosystem Approach – A strategy or plan to protect and restore the natural function, structure, and species composition of an ecosystem, recognizing that all components are interrelated.

Ecosystem Management – Management of the resources of an ecosystem, taking into account all ecological, social, and economic components that make up the whole of the system. Ecosystem management attempts to ensure that all plants and animals in the ecosystem are maintained at viable levels in native habitats and that basic ecosystem processes are perpetuated.

Emergent Growth/Revegetation – Farmland or logged timber that has been reforested (early succession) or may be naturally revegetated.

Endangered Species – A plant or animal species defined through the Endangered Species Act as being in danger of extinction throughout all or a significant portion of its range, and published in the Federal Register.

Endemic Species – Plants or animals that occur naturally in a certain region and whose distribution is relatively limited to a particular locality.

Environmental Assessment – A concise document, prepared in accordance with the National Environmental Policy Act, that briefly discusses the purpose and need for a federal action as well as alternatives to such action, and provides sufficient evidence and analysis of impacts to determine whether or not to prepare an environmental impact statement or finding of no significant impact. Preparation of the document consists of a systematic analysis to determine if proposed actions would result in a significant effect on the quality of the environment.

Even-aged Forests – Forests that are composed of trees with a time span of less than 20 years between the age of the oldest and youngest individuals.

Fauna – All of the vertebrate or invertebrate animals of an area.

Federal Trust Species – All species for which the federal government has primary jurisdiction, including federally threatened or endangered species, migratory birds, anadromous fish, and certain marine mammals.

Fee title – The acquisition of most or all of the rights to a tract of land accomplished by a transfer of property rights with the formal conveyance of a title. While a fee title acquisition involves most rights to a property, certain rights may be reserved or not purchased, including water rights, mineral rights, or a use reservation (for example, the ability to continue using the land for a specified time period, or the remainder of the owner's life).

Finding of No Significant Impact (FONSI) – A document prepared in compliance with the National Environmental Policy Act, supported by an environmental assessment, that briefly presents why a federal action will have no significant effect on the human environment and for which an environmental impact statement, therefore, will not be prepared.

Force-account Farming – Farming of refuge cropland using the refuge's staff, equipment, and materials.

Fragmentation – The process of reducing the size and connectivity of habitat patches through land clearing or other development practices, often resulting in the disruption of extensive habitats into isolated and small patches.

Goals – Descriptive, open-ended, and often broad statements of desired future conditions that convey a purpose but do not define measurable units.

Geographic Information System (GIS) – A computer system capable of storing and manipulating spatial (geographical) data; it is used widely in land resource quantification and management.

Habitat – The place where an organism lives. The existing environmental conditions required by an organism for survival and reproduction.

Indicator Species – A species of plant or animal that is assumed to be sensitive to habitat changes and represents the needs of a larger group of species.

Indigenous – Having originated in and being produced, growing, living, or occurring naturally in a particular region or environment.

Inholding – Privately owned land inside the boundary of a national wildlife refuge.

Issue – Any unsettled matter that requires a management decision. Examples could include: a threat to natural resources, a conflict in uses, or the presence of an undesirable resource condition.

Mid-successional Forest – A forest generally characterized by an even-aged structure resulting from human disturbance such as timber harvest. Mid-successional forest may contain mature trees, but the forest as a whole does not exhibit the functional or structural characteristics associated with old-growth conditions.

Migratory – Relating to the seasonal movement from one area to another and back.

Monitoring – The process of collecting information to track changes of selected parameters over time.

National Environmental Policy Act of 1969 – Legislation that requires all federal agencies, including the Service, to examine the environmental impacts of their actions and incorporate environmental information and public participation in the planning and implementation of such actions. Federal agencies must integrate this Act with other planning requirements, and prepare appropriate policy documents to facilitate better environmental decision-making.

National Wildlife Refuge – A designated area of land, water, or an interest in land or water within the National Wildlife Refuge System.

National Wildlife Refuge System – All lands, waters, and interests therein administered by the U.S. Fish and Wildlife Service as wildlife refuges, wildlife ranges, game ranges, wildlife management areas, waterfowl production areas, or other areas for the protection and conservation of fish, wildlife, and plant resources.

Native Species – Species that normally live and thrive in a particular ecosystem and are indigenous to the region.

Neotropical Migratory Bird – A bird species that breeds north of the United States/Mexican border and winters primarily south of that border, in an area that includes Mexico, the West Indies, Central America, and part of South America.

Natural Levee – Natural embankment created by soil deposited as a stream over-tops its banks. Located adjacent to a stream, a natural levee is often the highest ground in a bottomland or swamp type area.

Objective – A concise, quantitative (where possible) target statement of a desired management outcome. Objectives are derived from goals and provide the basis for determining management strategies. Objectives should be attainable and time-specific.

Old-growth Forest – Forested areas lacking frequent disturbance to vegetation, usually characterized by dominant species entered into a late successional stage and usually associated with a high diversity of species, specialization, and structural complexity.

Planning Area – A designated area encompassed by a specific planning activity. In refuge planning, a planning area may include lands outside the existing unit (refuge) boundaries that are being studied for inclusion in the unit and/or in partnership planning efforts.

Planning Team – A planning team prepares the comprehensive conservation plan. Planning teams are interdisciplinary in membership and function. A team generally consists of the planning team leader; refuge manager and staff biologists; staff specialists or other representatives of Service programs, ecosystems, or regional offices; and state partnering wildlife agencies, as appropriate.

Preferred Alternative – This is the Service's selected management alternative as identified in the draft comprehensive conservation plan. This is the alternative determined by the decision-maker to best achieve the refuge's purpose, vision, and goals; contribute to the mission of the National Wildlife Refuge System and address the significant issues; and be consistent with principles of sound fish and wildlife management.

Refuge Operating Needs System – A national database that contains the unfunded operational needs of each refuge. Projects included are those required to implement approved plans and meet goals, objectives, and legal mandates.

Refuge Purposes – These are the purposes specified in or derived from the law, proclamation, executive order, agreement, public land order, donation document, or administrative memorandum establishing, authorizing, or expanding a Refuge, Refuge unit, or Refuge subunit.

Scoping – A process for determining the scope of issues to be addressed by a comprehensive conservation plan and for identifying the significant issues to be addressed in that plan. Involved in the scoping process are federal, state, and local agencies, as well as private organizations and individuals.

Species – A distinctive kind of plant or animal having distinguishable characteristics, and that can interbreed and produce young. A category of biological classification.

Step-down Management Plans – Step-down management plans provide the details necessary for implementation of management strategies and projects identified in the comprehensive conservation plan.

Strategy – A specific action, tool, or technique or combination thereof, used to achieve unit objectives.

Threatened Species – A plant or animal species that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. Threatened species are identified and defined in accordance with the Endangered Species Act of 1973 and are published in the Federal Register.

Trust Species – Species over which the Service has legal authority or managerial responsibility, such as threatened and endangered species, anadromous fish, and migratory birds.

Understory – Any vegetation with canopy below or closer to the ground than the canopies of other plant layers.

Vegetation – Plants in general, or the sum total of the plant life in an area.

Vegetation Type – A categorical description of the existing dominant plant species in a particular area.

Watershed – The entire land area that collects and drains water into a stream or stream system. Similar in meaning to drainage area or drainage basin.

Wetland – Areas such as lakes, marshes, and streams that are inundated by surface or ground water for a long enough period of time each year to support, and that do support under natural conditions, plants and animals that require saturated or seasonally saturated soils.

Wildlife Corridor – A landscape feature that facilitates the biologically effective transport of animals between larger patches of habitat. Such corridors may facilitate several kinds of traffic, including frequent foraging movement, seasonal migration, or the once-in-a-lifetime dispersal of juvenile animals. These are transition habitats and need not contain all the habitat elements required by migrants for long-term survival or reproduction.

Wildlife-dependent Recreation – A use of a refuge involving hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation. The National Wildlife Refuge System Improvement Act of 1997 specifies that these are the six priority general public uses of the system.

Wildlife Diversity – A measure of the number of wildlife species in an area and their relative abundance.

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Appendix III. Relevant Legal Mandates

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.

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

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.

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

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.

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

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

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.

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

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 floodplains.

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 environmental assessments to state planning agencies for review.

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

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

Executive Order 13006, Locating Federal Facilities on Historic Properties in our Nation's

Central Cities: Directs federal agencies to select, utilize, and maintain historic properties and districts, especially those located in cities' central business districts, whenever operationally appropriate and economically prudent.

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.

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.

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.

Federal Records Act (1950): Directs 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.

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 the Interior to provide public fishing areas and accept donations of lands and funds.

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

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 the designation, acquisition, administration, and protection of such sites.

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.

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

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

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

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.

National Historic Preservation Act (1966), as amended: Requires the federal government to provide leadership in the preservation of the Nation's prehistoric and historic resources.

National Trails System Act: Assigns responsibility to the Secretary of the Interior and thus the Service to protect the historic and recreational values of congressionally designated national historic trail sites.

National Wildlife Refuge System Administration Act (1966) as amended by the National Wildlife Refuge System Improvement Act (1997), 16 U.S.C. 668dd-668ee (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 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; establishes the responsibilities of the Secretary of the Interior for managing and protecting the System; and requires a comprehensive conservation plan for each refuge by the year 2012. This Act amended portions of the Refuge Recreation Act and National Wildlife Refuge System Administration Act of 1966.

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

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

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.

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

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.

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.

Rivers and Harbors Act (1899) (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.

Surface Mining Control and Reclamation Act (1977), as amended (Public Law 95-87): 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.

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

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.

Wilderness Act (1964), as amended: Directs the Secretary of the Interior, within 10 years, to review every roadless area of 5,000 or more acres and every roadless island (regardless of size) within the National Wildlife Refuge 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.

Appendix IV. Refuge Biota

MAMMALS KNOWN TO OCCUR ON CHICKASAW NATIONAL WILDLIFE REFUGE

Scientific Name	Common Name
<i>Blarina carolinensis</i>	Southern Short-tailed Shrew
<i>Canis latrans</i>	Coyote
<i>Castor canadensis</i>	Beaver
<i>Corynorhinus rafinescruui</i>	Rafinesque's Big-eared Bat
<i>Cryptotis parva</i>	Least Shrew
<i>Dasypus novemcinctus</i>	Nine-banded Armadillo
<i>Didelphis marsupialis</i>	Opossum
<i>Eptesicus fuscus</i>	Big Brown Bat
<i>Felis rufus</i>	Bobcat
<i>Glaucomys volans</i>	Southern Flying Squirrel
<i>Lasionycteris noctivagans</i>	Silver-haired Bat
<i>Lasiurus borealis</i>	Red Bat
<i>Lasiurus cinereus</i>	Hoary Bat
<i>Lasiurus seminolus</i>	Seminole Bat
<i>Lutra canadensis</i>	River Otter
<i>Marmota monax</i>	Woodchuck
<i>Mephitis mephitis</i>	Striped Skunk
<i>Microtus ochrogaster</i>	Prairie Vole
<i>Microtus pinetorum</i>	Pine Vole
<i>Mus musculus</i>	House Mouse
<i>Mustela frenata</i>	Longtail Weasel
<i>Mustela vison</i>	Mink
<i>Myotis austroriparius</i>	Southeastern Myotis
<i>Myotis lucifugus</i>	Little Brown Bat
<i>Neotoma floridana</i>	Eastern Woodrat
<i>Nycticeius humeralis</i>	Evening Bat
<i>Ochrotomys nuttallii</i>	Golden Mouse
<i>Odocoileus virginianus</i>	White-tailed Deer
<i>Ondatra zibethicus</i>	Muskrat

Scientific Name	Common Name
<i>Oryzomys palustris</i>	Marsh Rice Rat
<i>Peromyscus gossypinus</i>	Cotton Mouse
<i>Peromyscus leucopus</i>	White-footed Mouse
<i>Peromyscus maniculatus</i>	Deer Mouse
<i>Pipistrellus subflavus</i>	Eastern Pipistrelle
<i>Procyon lotor</i>	Raccoon
<i>Rattus norvegicus</i>	Norway Rat
<i>Reithrodontomys humulis</i>	Eastern Harvest Mouse
<i>Reithrodontomys megalotis</i>	Western Harvest Mouse
<i>Scalopus aquaticus</i>	Eastern Mole
<i>Sciurus carolinensis</i>	Eastern Gray Squirrel
<i>Sciurus niger</i>	Eastern Fox Squirrel
<i>Sigmodon hispidus</i>	Hispid Cotton Rat
<i>Sorex longirostris</i>	Southeastern Shrew
<i>Spilogale putoris</i>	Spotted Skunk
<i>Sylvilagus aquaticus</i>	Swamp Rabbit
<i>Sylvilagus floridanus</i>	Eastern Cottontail
<i>Synaptomys pinetorum</i>	Southern Bog Lemming
<i>Tamias striatus</i>	Eastern Chipmunk
<i>Urocyon cinereoargenteus</i>	Gray Fox
<i>Vulpes fulva</i>	Red Fox
<i>Zapus hudsonius</i>	Meadow Jumping Mouse

Source: TWRA and USFWS, 2002.

AMPHIBIANS KNOWN TO OCCUR ON CHICKASAW NATIONAL WILDLIFE REFUGE

Scientific Name	Common Name	Current Status*
Frogs and Toads:		
<i>Acris crepitans crepitans</i>	Northern Cricket Frog	A
<i>Acris gryllus gryllus</i>	Southern Cricket Frog	LC
<i>Bufo americanus charlessmithi</i>	Dwarf American Toad	C
<i>Bufo woodhousii fowleri</i>	Fowler's Toad	SA
<i>Gastrophryne carolinensis</i>	Eastern Narrow-mouthed Toad	A
<i>Hyla avivoca</i>	Bird-voiced Treefrog	LC
<i>Hyla chrysoscelis versicolor</i>	Gray Treefrog	SA
<i>Hyla cinerea</i>	Green Treefrog	LC
<i>Pseudacris crucifer crucifer</i>	Northern Spring Peeper	A
<i>Pseudacris triseriata feriarum</i>	Upland Chorus Frog	A
<i>Rana areolata circulosa</i>	Northern Crawfish Frog	U
<i>Rana catesbieana</i>	Bullfrog	A
<i>Rana clamitans clamitans or melanota</i>	Greenfrog	A
<i>Rana palustris</i>	Pickerel Frog	U
<i>Rana utricularia</i>	Southern Leopard Frog	A
<i>Scaphiopus holbrooki holbrooki</i>	Eastern Spadefoot Toad	LC
Salamanders:		
<i>Ambystoma maculatum</i>	Spotted Salamander	LC
<i>Ambystoma opacum</i>	Marble Salamander	LC
<i>Ambystoma talpoideum</i>	Mole Salamander	U
<i>Ambystoma texanum</i>	Small-mouthed Salamander	C
<i>Ambystoma tigrinum tigrinum</i>	Eastern Tiger Salamander	R
<i>Amphiuma tridactylum</i>	Three-toed Amphiuma	C
<i>Desmognathus fusus conanti</i>	Spotted Dusky Salamander	LC
<i>Eurycea cirrigera</i>	Southern Two-lined Salamander	A
<i>Eurycea longicauda</i>	Long-tailed Salamander	SU
<i>Necturus maculosus maculosus</i>	Mudpuppy	U
<i>Notophthalmus viridescens louisianensis</i>	Central Newt	LC
<i>Plethedon mississippii</i>	Mississippi Slimy Salamander	C
<i>Pseudotriton ruber vioscai</i>	Southern Red Salamander	A
<i>Siren intermedia nettingi</i>	Western Lesser Siren	LC

* Current Status = Indicates current status of species in west Tennessee.

Key: SA – Super-abundant; A – Abundant; C – Common; LC – Locally Common; U – Uncommon; R – Rare; SU – Status Unknown.

Source: TWRA and USFWS 2002.

REPTILES KNOWN TO OCCUR ON CHICKASAW NATIONAL WILDLIFE REFUGE AND THEIR RESIDENCE STATUS

Scientific Name	Common Name	Current Status*
Lizards:		
<i>Cnemidophorus sexlineatus sexlineatus</i>	Six-lined Racerunner	U
<i>Eumeces fasciatus</i>	Five-lined Skink	A
<i>Eumeces laticeps</i>	Broad-head Skink	A
<i>Ophisaurus attenuatus longicaudus</i>	Eastern Slender Glass Lizard	U
<i>Sceloporus undulatus hyacinthinus</i>	Northern Fence Lizard	A
<i>Scincella lateralis</i>	Ground Skink	SA
Snakes:		
<i>Agkistrodon contortrix contortrix</i> or <i>mokasen</i>	Southern or Northern Copperhead	C
<i>Agkistrodon piscivorus leucostoma</i>	Western Cottonmouth Snake	LC
<i>Carphophis amoenus helenae</i>	Midwest Worm Snake	U
<i>Cemophora coccinea copei</i>	Northern Scarlet Snake	R
<i>Coluber constrictor priapus</i> or <i>latrunculus</i>	Southern Black Racer	A
<i>Crotalus horridus atricaudatus</i>	Canebrake Rattlesnake	U
<i>Diadophis punctatus strictogenys</i>	Mississippi Ringneck Snake	A
<i>Elaphe obsoleta spiloides</i>	Gray Rat Snake	A
<i>Faracura abacura reinwardtii</i>	Western Mud Snake	R
<i>Heterodon platyrhinus</i>	Eastern Hognose Snake	U
<i>Lampropeltis caligaster caligaster</i> or <i>rhombomaculata</i>	Prairie King Snake	U
<i>Lampropeltis getula nigra</i> or <i>holbrooki</i>	Speckled King Snake	C
<i>Lampropeltis triangulum sypila</i> or <i>elapsoides</i>	Red Milk Snake	U
<i>Nerodia cyclopion</i>	Green Water Snake	U
<i>Nerodia erythrogaster flavigaster</i>	Yellow-bellied Water Snake	C
<i>Nerodia fasciata confluens</i>	Broad-banded Water Snake	C
<i>Nerodia rhombifer</i>	Diamondback Water Snake	C
<i>Nerodia sipedon pleuralis</i>	Midland Water Snake	C
<i>Opheodrys aestivus</i>	Rough Green Snake	C
<i>Storeiria decayi wrightorum</i>	Midland Brown Snake	C
<i>Storeiria occipitmaculata occipitmaculata</i> or <i>obscura</i>	Northern or Florida Red-bellied Snake	U
<i>Tantilla coronata</i>	Southeastern Crowned Snake	U
<i>Thamnophis proximus proximus</i>	Western Ribbon Snake	U

* Current Status - Indicates current status of species in west Tennessee. Key: SA - Super-abundant; A – Abundant; C – Common; LC - Locally Common; U – Uncommon; R – Rare; SU - Status Unknown.

Scientific Name	Common Name	Current Status*
<i>Thamnophis sauritus sauritus</i>	Eastern Ribbon Snake	C
<i>Thamnophis sirtalis sirtalis</i>	Eastern Garter Snake	SA
<i>Virginia valeriae elegans</i>	Western Smooth Earth Snake	U
Turtles:		
<i>Apalone mutica mutica</i>	Smooth Softshell Turtle	U
<i>Apalone spinifera spinifera</i>	Eastern Spiny Softshell	C
<i>Chelydra serpentina</i>	Common Snapping Turtle	A
<i>Chrysemys picta dorsalis</i>	Southern Painted Turtle	U
<i>Graptemys kohnii</i>	Mississippi Map Turtle	U
<i>Graptemys pseudogeographica ouachitensis</i>	Ouachita Map Turtle	C
<i>Kinosternon subrubrum subrubrum</i> or <i>hippocrepis</i>	Eastern or Mississippi Mud Turtle	U
<i>Macrolemys temminckii</i>	Alligator Snapping Turtle	R
<i>Pseudemys cocinna hieroglyphica</i> or <i>metteri</i>	Missouri River Cooter	A
<i>Sternotherus odoratus</i>	Stinkpot Turtle	SU
<i>Terrapene carolina carolina</i>	Eastern Box Turtle	C
<i>Trachemys scripta carolina</i>	Red-eared Slider	SA

* Current Status = Indicates current status of species in west Tennessee. Key: SA – Super-abundant; A – Abundant; C – Common; LC – Locally Common; U – Uncommon; R – Rare; SU – Status Unknown.

Source: TWRA and USFWS 2002.

BIRDS KNOWN TO OCCUR ON CHICKASAW NATIONAL WILDLIFE REFUGE AND THEIR RESIDENCE STATUS

Scientific Name	Common Name	Residence	Status
<i>Accipiter cooperii</i>	Cooper's Hawk	Permanent resident	State Thr.
<i>Accipiter striatus</i>	Sharp-shinned Hawk	Migrant	State Thr.
<i>Actitis macularia</i>	Spotted Sandpiper	Migrant	
<i>Agelaius phoeniceus</i>	Red-winged Blackbird	Permanent resident	
<i>Aix sponsa</i>	Wood Duck	Breeds	
<i>Ammodramus leconteii</i>	LeConte's Sparrow	Migrant	
<i>Ammodramus savannarum</i>	Grasshopper Sparrow	Breeds	State Thr
<i>Ammospiza caudacuta nelsoni</i>	Nelson's Sharp-tailed Sparrow	Migrant	
<i>Anas acuta</i>	Northern Pintail	Migrant	
<i>Anas americana</i>	American Widgeon	Migrant	
<i>Anas clypeata</i>	Northern Shoveler	Migrant	
<i>Anas crecca</i>	Green-winged Teal	Migrant	
<i>Anas discors</i>	Blue-winged Teal	Migrant	
<i>Anas platyrhynchos</i>	Mallard	Breeds	
<i>Anas rubripes</i>	American Black Duck	Migrant	
<i>Anas strepera</i>	Gadwall	Migrant	
<i>Anhinga anhinga</i>	Anhinga	Migrant	
<i>Anser albifrons</i>	Greater White-fronted Goose	Migrant	
<i>Anthus spinoletta</i>	American Pipit	Migrant	
<i>Aquila chrysaetos</i>	Golden Eagle	Migrant	State End.
<i>Archilochus colubris</i>	Ruby-throated Hummingbird	Breeds	
<i>Ardea herodias</i>	Great Blue Heron	Permanent resident	
<i>Asio flammeus</i>	Short-eared Owl	Migrant	
<i>Aythya affinis</i>	Lesser Scaup	Migrant	
<i>Aythya collaris</i>	Ring-necked Duck	Migrant	
<i>Aythya marila</i>	Greater Scaup	Migrant	
<i>Aythya mericana</i>	Redhead	Migrant	
<i>Aythya valisineria</i>	Canvasback	Migrant	
<i>Batramia longicauda</i>	Upland Sandpiper	Migrant	
<i>Bombycilla cedrorum</i>	Cedar Waxwing	Migrant	

Scientific Name	Common Name	Residence	Status
<i>Botaurus lentiginosus</i>	American Bittern	Migrant	
<i>Branta canadensis</i>	Canada Goose	Resident/migrant	
<i>Bubo virginianus</i>	Great Horned Owl	Permanent resident	
<i>Bubulcus ibis</i>	Cattle Egret	Summer resident	
<i>Bucephala albeola</i>	Bufflehead	Migrant	
<i>Bucephala clangula</i>	Common Goldeneye	Migrant	
<i>Buteo jamaicensis</i>	Red-tailed Hawk	Permanent resident	
<i>Buteo lagopus</i>	Rough-legged Hawk	Migrant	
<i>Buteo lineatus</i>	Red-shouldered Hawk	Permanent resident	
<i>Buteo platypterus</i>	Broad-winged Hawk	Summer resident	
<i>Butorides striatus</i>	Green Heron	Breeds	
<i>Calcarius lapponicus</i>	Lapland Longspur	Migrant	
<i>Calidris himantopus</i>	Stilt Sandpiper	Migrant	
<i>Calidris mauri</i>	Western Sandpiper	Migrant	
<i>Calidris melanotos</i>	Pectoral Sandpiper	Migrant	
<i>Calidris minutilla</i>	Least Sandpiper	Migrant	
<i>Calidris pusilla</i>	Semipalmated Sandpiper	Migrant	
<i>Caprimulgus carolinensis</i>	Chuck-will's-widow	Migrant	
<i>Caprimulgus vociferus</i>	Whip-poor-will	Migrant	
<i>Cardinalis cardinalis</i>	Northern Cardinal	Permanent resident	
<i>Carduelis pinus</i>	Pine Siskin	Migrant	
<i>Carduelis tristis</i>	American Goldfinch	Permanent resident	
<i>Carpodacus mexicanus</i>	House Finch	Breeds	
<i>Carpodacus purpureus</i>	Purple Finch	Migrant	
<i>Casmerodius albus</i>	Great Egret	Summer resident	
<i>Cathartes aura</i>	Turkey Vulture	Permanent resident	
<i>Catharus fuscescens</i>	Veery	Migrant	
<i>Catharus guttatus</i>	Hermit Thrush	Migrant	
<i>Catharus minimus</i>	Gray-cheeked Thrush	Migrant	
<i>Catharus ustulatus</i>	Swainson's Thrush	Migrant	
<i>Catoptrophorus semipalmatus</i>	Willet	Migrant	

Scientific Name	Common Name	Residence	Status
<i>Certhia americana</i>	Brown Creeper	Migrant	
<i>Ceryle alcyon</i>	Belted Kingfisher	Permanent resident	
<i>Chaetura pelagica</i>	Chimney Swift	Summer resident	
<i>Charadrius melodus</i>	Piping Plover	Migrant	
<i>Charadrius semipalmatus</i>	Semipalmated Plover	Migrant	
<i>Charadrius vociferus</i>	Killdeer	Permanent resident	
<i>Chen caerulescens</i>	Snow Goose	Migrant	
<i>Chen rossii</i>	Ross' Goose	Migrant	
<i>Chlidonias niger</i>	Black Tern	Migrant	
<i>Chondestes grammacus</i>	Lark Sparrow	Migrant	
<i>Chordeiles minor</i>	Common Nighthawk	Summer resident	
<i>Circus cyaneus</i>	Northern Harrier	Migrant	State Thr
<i>Cistothorus platensis</i>	Sedge Wren	Migrant	
<i>Cistothorus plaustris</i>	Marsh Wren	Migrant	
<i>Coccothraustes vespertinus</i>	Evening Grosbeak	Accidental	
<i>Coccyzus americanus</i>	Yellow-billed Cuckoo	Migrant/Breed	
<i>Colaptes auratus</i>	Northern Flicker	Permanent resident	
<i>Colinus virginianus</i>	Northern Bobwhite	Permanent resident	
<i>Columba livia</i>	Rock Dove	Permanent resident	
<i>Colymbus auritus</i>	Horned Grebe	Migrant	
<i>Contopus borealis</i>	Olive-sided Flycatcher	Breeds	
<i>Contopus virens</i>	Eastern Wood Pewee	Breeds	
<i>Coragyps atratus</i>	Black Vulture	Permanent resident	
<i>Corvus brachyrhynchos</i>	American Crow	Permanent resident	
<i>Corvus ossifragus</i>	Fish Crow	Permanent resident	
<i>Cyanocitta cristata</i>	Blue Jay	Permanent resident	
<i>Cygnus columbianus</i>	Tundra Swan	Migrant	
<i>Dendroica castanea</i>	Bay-breasted Warbler	Migrant	
<i>Dendroica cemlea</i>	Cerulean Warbler	Breeds	
<i>Dendroica coronata</i>	Yellow-rumped Warbler	Migrant	

Scientific Name	Common Name	Residence	Status
<i>Dendroica discolor</i>	Prairie Warbler	Migrant	
<i>Dendroica dominica</i>	Yellow-throated Warbler	Breeds	
<i>Dendroica fusca</i>	Blackburnian Warbler	Migrant	
<i>Dendroica magnolia</i>	Magnolia Warbler	Migrant	
<i>Dendroica pensylvanica</i>	Chestnut-sided Warbler	Migrant	
<i>Dendroica petechia</i>	Yellow Warbler	Breeds	
<i>Dendroica pinus</i>	Pine Warbler	Migrant	
<i>Dendroica striata</i>	Black-poll Warbler	Migrant	
<i>Dendroica tigrina</i>	Cape May Warbler	Migrant	
<i>Dendroica virens</i>	Black-throated Green Warbler	Migrant	
<i>Dolichonyx oryzivorus</i>	Bobolink	Permanent resident	
<i>Dryocopus pileatus</i>	Pileated Woodpecker	Permanent resident	
<i>Dumetella carolinensis</i>	Gray Catbird	Breeds	
<i>Egretta caerulea</i>	Little Blue Heron	Summer Resident	
<i>Egretta thula</i>	Snowy Egret	Summer Resident	
<i>Empidonax minimus</i>	Least Flycatcher	Migrant	
<i>Empidonax traillii</i>	Willow Flycatcher	Breeds	
<i>Empidonax virescens</i>	Acadian Flycatcher	Breeds	
<i>Eremophila alpestris</i>	Horned Lark	Permanent resident	
<i>Eudocimus albus</i>	White Ibis	Migrant	
<i>Euphagus carolinus</i>	Rusty Blackbird	Migrant	
<i>Euphagus cyanocephalus</i>	Brewer's Blackbird	Migrant	
<i>Falco peregrinus</i>	Peregrine Falcon		
<i>Falco sparverius</i>	American Kestrel	Permanent resident	
<i>Fulica americana</i>	American Coot	Migrant	
<i>Gallinago gallinago</i>	Common Snipe	Migrant	
<i>Gallinula chloropus</i>	Common Moorhen	Migrant	
<i>Gavia immer</i>	Common Loon	Migrant	

Scientific Name	Common Name	Residence	Status
* Introduced			
<i>Geothlypis trichas</i>	Common Yellowthroat	Breeds	
<i>Guiraca caerulea</i>	Blue Grosbeak	Breeds	
<i>Haliaeetus leucocephalus</i>	Bald Eagle	Migrant/Breeds	Fed. Thr.
<i>Helmitheros vermivorus</i>	Worm-eating Warbler	Migrant	
<i>Himantopus mexicanus</i>	Black-necked Stilt	Migrant	
<i>Hirundo pyrrhonota</i>	Cliff Swallow	Breeds	
<i>Hirundo rustica</i>	Barn Swallow	Breeds	
<i>Hydranassa tricolor ruficollis</i>	Tri-colored Heron	Summer occasional	
<i>Hylocichla mustelina</i>	Wood Thrush	Breeds	
<i>Icteria virens</i>	Yellow-breasted Chat	Breeds	
<i>Icterus galbula</i>	Northern Oriole	Breeds	
<i>Icterus spurius</i>	Orchard Oriole	Breeds	
<i>Ictinia mississippiensis</i>	Mississippi Kite	Migrant/Breeds	State End.
<i>Ictinia mississippiensis</i>	Mississippi Kite	Migrant/Breeds	State End.
<i>Ixobrychus exilis</i>	Least Bittern	Migrant	
<i>Junco hyemalis</i>	Dark-eyed Junco	Migrant	
<i>Lanius ludovicianus</i>	Loggerhead Shrike	Permanent resident	
<i>Larus argentatus</i>	Herring Gull	Migrant	
<i>Larus delawarensis</i>	Ringed-billed Gull	Migrant	
<i>Larus philadelphia</i>	Bonaparte's Gull	Migrant	
<i>Limnodromus griseus scolopaceus</i>	Long-billed Dowitcher	Migrant	
<i>Limnodromus griseus</i>	Short-billed Dowitcher	Migrant	
<i>Limnothlypis swainsonii</i>	Swainson's Warbler	Breeds	
<i>Lophodytes cucullatus</i>	Hooded Merganser	Permanent resident	
<i>Melanerpes carolinus</i>	Red-bellied Woodpecker	Permanent resident	
<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker	Permanent resident	
<i>Meleagris gallopavo</i>	Wild Turkey	Permanent resident	
<i>Melospiza georgiana</i>	Swamp Sparrow	Migrant	
<i>Melospiza lincolnii</i>	Lincoln's Sparrow	Migrant	
<i>Melospiza melodia</i>	Song Sparrow	Permanent	

Scientific Name	Common Name	Residence	Status
		resident	
<i>Mergus merganser</i>	Common Merganser	Migrant	
<i>Mergus serrator</i>	Red-breasted Merganser	Migrant	
<i>Mimus polyglottos</i>	Northern Mockingbird	Permanent resident	
<i>Mniotilta varia</i>	Black and White Warbler	Migrant	
<i>Molothrus ater</i>	Brown-headed Cowbird	Permanent resident	
<i>Myiarchus crinitus</i>	Great Crested Flycatcher	Breeds	
<i>Nycticorax nycticorax</i>	Black-crowned Night-Heron	Permanent resident	
<i>Nycticorax violaceus</i>	Yellow-crowned Night-Heron	Summer Resident	
<i>Oporomis formosus</i>	Kentucky Warbler	Breeds	
<i>Otus asio</i>	Eastern Screech Owl	Permanent resident	
<i>Oxyura jamaicensis</i>	Ruddy Duck	Migrant	
<i>Pandion haliaetus</i>	Osprey	Migrant	State End.
<i>Parula Americana</i>	Northern Parula	Breeds	
<i>Parus bicolor</i>	Tufted Titmouse	Permanent resident	
<i>Parus carolinensis</i>	Carolina Chickadee	Permanent resident	
<i>Passer domesticus</i>	House Sparrow*	Permanent resident	
<i>Passerculus sandwichensis</i>	Savannah Sparrow	Migrant	
<i>Passerella iliaca</i>	Fox Sparrow	Migrant	
<i>Passerina cyanea</i>	Indigo Bunting	Breeds	
<i>Pelecanus erythrorhynchos</i>	American White Pelican	Year-round	
<i>Pelidna alpina sakhalina</i>	Dunlin	Migrant	
<i>Phalacrocorax auritus</i>	Double-crested Cormorant	Migrant	
<i>Phalaropus fulicarius</i>	Red-necked Phalarope	Migrant	
<i>Pheucticus ludovicianus</i>	Rose-breasted Grosbeak	Migrant	

Scientific Name	Common Name	Residence	Status
<i>Picoides pubescens</i>	Downy Woodpecker	Permanent resident	
<i>Picoides villosus</i>	Hairy Woodpecker	Permanent resident	
<i>Pipilo erythrophthalmus</i>	Rufous-sided Towhee	Breeds	
<i>Piranga olivacea</i>	Scarlet Tanager	Migrant	
<i>Piranga rubra</i>	Summer Tanager	Breeds	
<i>Pisobia bairdi</i>	Baird's Sandpiper	Migrant	
<i>Pisobia fuscicollis</i>	White-rumped Sandpiper	Migrant	
<i>Pluvialis dominica</i>	Lesser Golden Plover	Migrant	
<i>Podilymbus podiceps</i>	Pied-billed Grebe	Migrant/Breed	
<i>Polioptila caerulea</i>	Blue-gray Gnatcatcher	Breeds	
<i>Poocetes gramineus</i>	Vesper Sparrow	Migrant	
<i>Porzana carolina</i>	Sora	Migrant	
<i>Progne subis</i>	Purple Martin	Breeds	
<i>Protonotaria citrea</i>	Prothonotary Warbler	Breeds	
<i>Quiscalus quiscula</i>	Common Grackle	Permanent resident	
<i>Rallus elegans elegans</i>	King Rail	Breeds	
<i>Rallus limicola</i>	Virginia Rail	Migrant	
<i>Recurvirostra americana</i>	American Avocet	Migrant	
<i>Regulus calendula</i>	Ruby-crowned Kinglet	Migrant	
<i>Regulus satrapa</i>	Golden-crowned Kinglet	Migrant	
<i>Riparia riparia</i>	Bank Swallow	Breeds	
<i>Sayornis phoebe</i>	Eastern Phoebe	Breeds	
<i>Scolopax minor</i>	American Woodcock	Breeds	
<i>Seiurus aurocapillus</i>	Ovenbird	Migrant	
<i>Seiurus motacilla</i>	Louisiana Waterthrush	Migrant	
<i>Seiurus noveboracensis</i>	Northern Waterthrush	Migrant	
<i>Setophaga ruticilla</i>	American Redstart	Breeds	
<i>Sialia sialis</i>	Eastern Bluebird	Permanent resident	
<i>Sitta canadensis</i>	Red-breasted Nuthatch	Migrant	
<i>Sitta carolinensis</i>	White-breasted Nuthatch	Permanent resident	
<i>Sphyrapicus varius</i>	Yellow-bellied	Migrant	

Scientific Name	Common Name	Residence	Status
	Sapsucker		
<i>Spiza americana</i>	Dickcissel	Breeds	
<i>Spizella passerina</i>	Chipping Sparrow	Breeds	
<i>Spizella pusilla</i>	Field Sparrow	Permanent resident	
<i>Squatarola squatarola</i>	Black-bellied Plover	Migrant	
<i>Steganopus tricolor</i>	Wilson's Phalarope	Migrant	
<i>Stelgidopteryx serripennis</i>	Northern Rough-winged Swallow	Breeds	
<i>Sterna antillarum</i>	Least Tern	Summer resident	
<i>Sterna caspia</i>	Caspian Tern	Migrant	
<i>Sterna forsteri</i>	Forster's Tern	Migrant	
<i>Sterna hirundo</i>	Common Tern	Migrant	
<i>Streptopelia decaocto</i>	Eurasian Collared-Dove*	Permanent resident	
<i>Strix varia</i>	Barred Owl	Permanent resident	
<i>Sturnella magna</i>	Eastern Meadowlark	Permanent resident	
<i>Sturnus vulgaris</i>	European Starling *	Permanent resident	
<i>Tachycineta bicolor</i>	Tree Swallow	Breeds	
<i>Thryothorus ludovicianus</i>	Carolina Wren	Permanent resident	
<i>Toxostoma rufum</i>	Brown Thrasher	Breeds	
<i>Tringa flavipes</i>	Lesser Yellowlegs	Migrant	
<i>Tringa melanoleuca</i>	Greater Yellowlegs	Migrant	
<i>Tringa solitaria</i>	Solitary Sandpiper	Migrant	
<i>Troglodytes aedon</i>	House Wren	Migrant	
<i>Troglodytes troglodytes</i>	Winter Wren	Migrant	
<i>Tryngites subruficollis</i>	Buff-breasted Sandpiper	Migrant	
<i>Turdus migratorius</i>	American Robin	Permanent resident	
<i>Tyrannus tyrannus</i>	Eastern Kingbird	Breeds	
<i>Tyto alba</i>	Common Barn Owl	Permanent resident	
<i>Vermivora celata</i>	Orange-crowned Warbler	Accidental	

Scientific Name	Common Name	Residence	Status
<i>Vermivora chrysoptera</i>	Golden-winged Warbler	Migrant	
<i>Vermivora peregrina</i>	Tennessee Warbler	Migrant	
<i>Vermivora pinus</i>	Blue-winged Warbler	Migrant	
<i>Vermivora ruficapilla ruficapila</i>	Nashville Warbler	Migrant	
<i>Vireo bellii</i>	Bell's Vireo	Accidental	
<i>Vireo flavifrons</i>	Yellow-throated	Vireo Breeds	
<i>Vireo gilvus</i>	Warbling Vireo	Breeds	
<i>Vireo griseus</i>	White-eyed Vireo	Breeds	
<i>Vireo olivaceus</i>	Red-eyed Vireo	Breeds	
<i>Vireo philadelphicus</i>	Philadelphia Vireo	Migrant	
<i>Vireo solitarius</i>	Blue-headed Vireo	Migrant	
<i>Wilsonia canadensis</i>	Canada Warbler	Migrant	
<i>Wilsonia citrina</i>	Hooded Warbler	Breeds	
<i>Wilsonia pusilla</i>	Wilson's Warbler	Migrant	
<i>Zenaida macroura</i>	Mourning Dove	Permanent resident	
<i>Zonotrichia leucophrys</i>	White-crowned Sparrow	Migrant	

Sources: Hamel 1992; Nicholson 1997; and Robinson 1990.

FISH LIKELY TO OCCUR IN THE MISSISSIPPI RIVER PROPER AND ITS DIRECTLY WETWARD-FLOWING TRIBUTARIES IN WESTERN TENNESSEE (HATCHIE, OBION, AND FORKED DEER SYSTEMS)

Common Name	Scientific Name
Chestnut Lamprey	<i>Ichthyomyzon castaneus</i>
Least Brook Lamprey	<i>Lamptera aepyptera</i>
Pallid Sturgeon	<i>Scaphirhynchus albus</i>
Paddlefish	<i>Polyodon spathula</i>
Alligator gar	<i>Atractosteus spatula</i>
Spotted Gar	<i>Lepisosteus oculatus</i>
Longnose Gar	<i>Lepisosteus osseus</i>
Shortnose Gar	<i>Lepisosteus platostomus</i>
Bowfin	<i>Amia calva</i>
Goldeye	<i>Hiodon alosoides</i>
Mooneye	<i>Hiodon tergisus</i>
Skipjack herring	<i>Alosa chrysochloris</i>
Gizzard Shad	<i>Dorosoma cepedianum</i>
Threadfin Shad	<i>Dorosoma petenense</i>
Goldfish*	<i>Carassius auratus</i>
Grass Carp*	<i>Ctenopharyngodon idella</i>
Bluntnose Shiner	<i>Cyprinella camura</i>
Red Shiner	<i>Cyprinella lutrensis</i>
Blacktail Shiner	<i>Cyprinella venusta</i>
Common Carp*	<i>Cyprinus carpio</i>
Cypress (Silver) Minnow	<i>Hybognathus hayi</i>
Mississippi Silvery Minnow	<i>Hybognathus nuchalis</i>
Pallid Shiner	<i>Hybopsis amnis</i>
Striped Shiner	<i>Luxilus chrysocephalus</i>
Ribbon Shiner	<i>Lythrurus fumeus</i>
Redfin Shiner	<i>Lythrurus umbratilis</i>
Speckled Chub	<i>Machrybopsis aestivalis</i>
Sturgeon Chub	<i>Machrybopsis gelida</i>
Silver Chub	<i>Machrybopsis storeriana</i>
Golden Shiner	<i>Notemigonus crysoleucas</i>
Orangefin Shiner	<i>Notropis ammophilus</i>
Emerald Shiner	<i>Notropis atherinoides</i>
River Shiner	<i>Notropis blennioides</i>
Taillight Shiner	<i>Notropis maculatus</i>

Common Name	Scientific Name
Silverband Shiner	<i>Notropis shumardi</i>
Mimic Shiner	<i>Notropis volucellus</i>
Pugnose Minnow	<i>Opsopoeodus emiliae</i>
Bluntnose Minnow	<i>Pimephales notatus</i>
Bullhead Minnow	<i>Pimephales vigilax</i>
Creek Chub	<i>Semotilus atromaculatus</i>
River Carpsucker	<i>Carpionodes carpio</i>
Quillback	<i>Carpionodes cyprinus</i>
Blue Sucker	<i>Cycleptus elongatus</i>
Creek Chubsucker	<i>Erimyzon oblongus</i>
Northern Hogsucker	<i>Hypentelium nigricans</i>
Smallmouth Buffalo	<i>Ictiobus bubalus</i>
Black Buffalo	<i>Ictiobus niger</i>
Spotted Sucker	<i>Minytrema melanops</i>
Golden Redhorse	<i>Moxostoma erythrurum</i>
Blacktail Redhorse	<i>Moxostoma poecilurum</i>
Black Bullhead	<i>Ameiurus melas</i>
Yellow Bullhead	<i>Ameiurus natalis</i>
Blue Catfish	<i>Ictalurus furcatus</i>
Channel Catfish	<i>Ictalurus punctatus</i>
Tadpole Madtom	<i>Noturus gyrinus</i>
Least Madtom	<i>Noturus hildebrandi</i>
Brindled Madtom	<i>Noturus miurus</i>
Freckled Madtom	<i>Noturus nocturnus</i>
Brown Madtom	<i>Noturus phaeus</i>
Northern Madtom	<i>Noturus stigmosus</i>
Flathead Catfish	<i>Pylodictis olivaris</i>
Grass Pickerel	<i>Esox americanus</i>
Chain Pickerel	<i>Esox niger</i>
Pirate Perch	<i>Aphredoderus sayanus</i>
Northern Starhead Topminnow	<i>Fundulus dispar</i>
Blackstripe Topminnow	<i>Fundulus notatus</i>
Blackspotted Topminnow	<i>Fundulus olivaceus</i>
Western Mosquitofish	<i>Gambusia affinis</i>
Brook Silverside	<i>Labidesthes sicculus</i>
White Bass	<i>Morone chrysops</i>
Banded Pygmy Sunfish	<i>Elassoma zonatum</i>

Common Name	Scientific Name
Flier	<i>Centrarchus macropterus</i>
Green Sunfish	<i>Lepomis cyanellus</i>
Warmouth	<i>Lepomis gulosus</i>
Orange Spotted Sunfish	<i>Lepomis humilis</i>
Bluegill	<i>Lepomis macrochirus</i>
Dollar Sunfish	<i>Lepomis marginatus</i>
Longear Sunfish	<i>Lepomis megalotis</i>
Redear Sunfish	<i>Lepomis microlophus</i>
Spotted Sunfish	<i>Lepomis punctatus</i>
Bantam Sunfish	<i>Lepomis symmetricus</i>
Spotted Bass	<i>Micropterus punctulatus</i>
Largemouth Bass	<i>Micropterus salmoides</i>
White Crappie	<i>Pomoxis annularis</i>
Black Crappie	<i>Pomoxis nigromaculatus</i>
Naked Sand Darter	<i>Ammocrypta beani</i>
Scaly Sand Darter	<i>Ammocrypta vivax</i>
Mud Darter	<i>Etheostoma asprigene</i>
Bluntnose Darter	<i>Etheostoma chlorosomum</i>
Swamp Darter	<i>Etheostoma fusiforme</i>
Slough Darter	<i>Etheostoma gracile</i>
Harlequin Darter	<i>Etheostoma histrio</i>
Brighteye Darter	<i>Etheostoma lynceum</i>
Goldstripe Darter	<i>Etheostoma parvipinne</i>
Cypress Darter	<i>Etheostoma proeliare</i>
Speckled Darter	<i>Etheostoma stigmaeum</i>
Gulf Darter	<i>Etheostoma swaini</i>
Bandfin Darter	<i>Etheostoma zonistium</i>
Blackside Darter	<i>Percina maculata</i>
Dusky Darter	<i>Percina sciera</i>
River Darter	<i>Percina shumardi</i>
Saddleback Darter	<i>Percina vigil</i>
Sauger	<i>Stizostedion canadense</i>
Freshwater Drum	<i>Aplodinotus grunniens</i>

* = Introduced.

Sources: Etnier and Starnes 1993; and personal communication with Alex Wyss, The Nature Conservancy, 2001.

MUSSELS KNOWN TO OCCUR IN THE OBION AND FORKED DEER RIVERS

Scientific Name	Common Name	Obion River	Forked Deer River	Status*
<i>Anadonta suborbicula</i>	Flat Floater	X	X	CS
<i>Arcidens confragosa</i>	Rock Pocketbook	X		CS
<i>Fusconaia flava</i>	Wabash Pigtoe	X		CS
<i>Lampsilis cardium</i>	Plain Pocketbook	X		SC
<i>Lampsilis teres</i>	Yellow Sandshell	X		CS
<i>Lasmigonia complanata</i>	White Heelsplitter	X		CS
<i>Leptodea fragilis</i>	Fragile Papershell	X		CS
<i>Megaloniaias nervosa</i>	Washboard	X		CS
<i>Plectomerus dombeyanus</i>	Bankclimber	X		CS
<i>Pyganodon grandis</i>	Giant floater		X	CS
<i>Quadrula pustulosa</i>	Pimpleback	X		CS
<i>Quadrula quadrula</i>	Mapleleaf	X		CS
<i>Tritogonia verrucosa</i>	Pistolgrip	X		CS
<i>Truncilia truncate</i>	Deertoe	X		CS
<i>Unio merus tetralasmus</i>	Pondhorn		X	CS
<i>Utterbackei imbecilis</i>	Paper Pondshell		X	CS
<i>Villosa lineosa</i>	Little Spectaclecase	X		CS

* Status: CS – Currently Stable SC – Special Concern
 X indicates that the species is present; a blank space, that it is not.

Source: Parmalee and Bogan 1998.

FOREST TREES AND SHRUBS KNOWN TO OCCUR ON CHICKASAW NATIONAL WILDLIFE REFUGE

Scientific Name	Common Name
<i>Acer barbatum</i>	Florida Maple
<i>Acer negundo</i>	Boxelder
<i>Acer rubrum</i>	Red Maple
<i>Asimina triloba</i>	Pawpaw
<i>Carya aquatica</i>	Bitter Pecan (Water Hickory)
<i>Carya illinoensis</i>	Sweet Pecan
<i>Carya laciniosa</i>	Shellbark Hickory
<i>Carya ovata</i>	Shagbark Hickory
<i>Carya tomentosa</i>	Mockernut Hickory
<i>Celtis laevigata</i>	Sugarberry
<i>Celtis occidentalis</i>	Hackberry
<i>Cephalanthus occidentalis</i>	Buttonbush
<i>Cercis canadensis</i>	Redbud
<i>Cornus drummondii</i>	Roughleaf Dogwood
<i>Cornus florida</i>	Flowering Dogwood
<i>Diospyros virginiana</i>	Persimmon
<i>Fagus grandifolia</i>	American Beech
<i>Forestiera acuminata</i>	Swamp Privet
<i>Fraxinus pennsylvanica</i>	Green Ash
<i>Gleditsia triacanthos</i>	Honey Locust
<i>Gymnocladus dioica</i>	Coffeetree
<i>Ilex decidua</i>	Possum Haw (Deciduous Holly)
<i>Juglans nigra</i>	Black Walnut
<i>Juniperus virginiana</i>	Eastern Red Cedar
<i>Liquidambar styraciflua</i>	Sweetgum
<i>Liriodendron tulipifera</i>	Yellow Poplar
<i>Maclura pomifera</i>	Osage Orange (Bois D'arc)
<i>Morus rubra</i>	Red Mulberry
<i>Nyssa aquatica</i>	Tupelo
<i>Nyssa sylvatica</i>	Black Gum
<i>Planera aquatica</i>	Water Elm
<i>Platanus occidentalis</i>	Sycamore
<i>Populus deltoides</i>	Eastern Cottonwood
<i>Quercus alba</i>	White Oak
<i>Quercus falcata</i>	Southern Red Oak

Scientific Name	Common Name
<i>Quercus falcata</i> var. <i>pagodaefolia</i>	Cherrybark Oak
<i>Quercus lyrata</i>	Overcup Oak
<i>Quercus michauxii</i>	Swamp Chestnut Oak
<i>Quercus nigra</i>	Water Oak
<i>Quercus nuttallii</i>	Nuttall Oak
<i>Quercus palustris</i>	Pin Oak
<i>Quercus phellos</i>	Willow Oak
<i>Quercus shumardii</i>	Shumard Oak
<i>Quercus stellata</i>	Post Oak
<i>Salix nigra</i>	Black Willow
<i>Sassafras albidum</i>	Sassafras
<i>Taxodium distichum</i>	Baldcypress
<i>Ulmus americana</i>	American Elm

Source: Forestry Records, Chickasaw National Wildlife Refuge.

HERBACEOUS PLANTS KNOWN TO OCCUR ON CHICKASAW NATIONAL WILDLIFE REFUGE

Scientific Name	Common name
<i>Amaranthus retroflexus</i>	Pigweed
<i>Ambrosia artemisiifolia</i>	Common ragweed
<i>Ambrosia trifida</i>	Giant ragweed
<i>Andropogon gerardii</i>	Big bluestem
<i>Andropogon virginicus</i>	Broomsedge
<i>Ammania coccinea</i>	Toothcup
<i>Aster spp.</i>	Aster
<i>Azolla caroliniana</i>	Waterfern
<i>Bidens spp</i>	Beggartick
<i>Chamaecrista fasciculata</i>	Partridge pea
<i>Cyperus erythrorhizos</i>	Red rooted sedge
<i>Cyperus esculentus</i>	Chufa
<i>Cyperus spp.</i>	Flatsedge
<i>Ceratophyllum demersum</i>	Coon's tail
<i>Digitaria didactyla</i>	Crabgrass
<i>Echinochloa colona</i>	Jungle rice
<i>Echinochloa crusgalli</i>	Barnyard Grass
<i>Echinochloa muricata</i>	Wild millet
<i>Eleocharis obtusa</i>	Blunt spikerush
<i>Elodea canadensis</i>	Elodea
<i>Hibiscus moscheutos</i>	Swamp rosemallow
<i>Ipomoea purpurea</i>	Common morning glory
<i>Iva frutescens</i>	Marsh elder
<i>Leersia oryzoides</i>	Rice cut-grass
<i>Lemna spp.</i>	Duckweeds
<i>Leptachloa filiformis</i>	Sprangletop
<i>Nelumbo lutea</i>	American lotus
<i>Nymphaea advena</i>	Yellow pond-lily
<i>Panicum dichotomiflorum</i>	Fall panicum
<i>Panicum virgatum</i>	Switchgrass
<i>Polygonum lapathifolium</i>	Lady's thumb
<i>Polygonum pennsylvanicum</i>	Pennsylvania smartweed
<i>Potamogeton crispus</i>	Curlyleaf pondweed
<i>Pueraria montana</i>	Kudzu
<i>Rhynchospora corniculata</i>	Horned beaked-rush
<i>Sagittaria platyphylla</i>	Delta arrow-head

Scientific Name	Common name
<i>Saururus cernuus</i>	Lizard's tail
<i>Schizachyrium scoparium</i>	Little bluestem
<i>Sesbania cannabina</i>	Sesbania
<i>Solidago altissima</i>	Goldenrod
<i>Sorghastrum nutans</i>	Indiangrass
<i>Sorghum bicolor</i>	Grain sorghum
<i>Utricularia spp.</i>	Bladderwort
<i>Xanthium strumarium</i>	Cocklebur

Source: Draft Habitat Management Plan, Chickasaw National Wildlife Refuge.

Appendix V. Decisions and Approvals

INTRA-SERVICE SECTION 7 BIOLOGICAL EVALUATION

Originating Person: Randy Cook, Refuge Manager

Telephone Number: 731-287-0650 **E-Mail:** Randy_Cook@fws.gov

Date: _____

PROJECT NAME: Chickasaw National Wildlife Refuge Comprehensive Conservation Plan

I. Service Program:

- Ecological Services
- Federal Aid
- Clean Vessel Act
 - Coastal Wetlands
 - Endangered Species Section 6
 - Partners for Fish and Wildlife
 - Sport Fish Restoration
 - Wildlife Restoration
- Fisheries
- Refuges/Wildlife

II. State/Agency: Tennessee/U.S. Fish and Wildlife Service

III. Station Names: Chickasaw National Wildlife Refuge

IV. Description of Proposed Action (attach additional pages as needed): Implementation of the Comprehensive Conservation Plan for Chickasaw NWR by adopting the preferred alternative of Balanced Public Use and Habitat Management which will provide guidance, management direction, and operation plans for the next 15 years.

V. Pertinent Species and Habitat:

A. Include species/habitat occurrence map:

As many as 16 bald eagles are known to winter in the vicinity of Chickasaw NWR, with 3 active nests known to exist currently on Refuge lands.

There are 3 active nesting colonies of Interior least tern known to exist on Mississippi River sand bars immediately adjacent to the western boundary of Chickasaw NWR, and one other active colony approximately 1 mile north of the Refuge. Interior least terns feed regularly on sand bars and in drainage canals within the Refuge boundary.

Pallid sturgeon are known to occur within the Mississippi River. It is possible that pallid sturgeon could enter waterways on Chickasaw NWR during high river stages, however this has never been documented and is unlikely due to their small numbers.

B. Complete the following table:

SPECIES/CRITICAL HABITAT	STATUS ¹
Bald Eagle	T
Interior Least Tern	E
Pallid Sturgeon	E

¹STATUS: E=endangered, T=threatened, PE=proposed endangered, PT=proposed threatened, CH=critical habitat, PCH=proposed critical habitat, C=candidate species

VI. Location (attach map):

- A. Ecoregion Number and Name:** No. 27, Lower Mississippi River
- B. County and State:** Lauderdale, Tennessee
- C. Latitude and longitude:**
Approximate center of Refuge: 89.66 W 35.83 N
- D. Distance (miles) and direction to nearest town:** Approximately 8 miles SSE to Ripley, TN.
- E. Species/habitat occurrence:**

Bald eagles occur on the Refuge during winter months. At least 3 active nests are known to currently exist on Refuge lands.

Interior least terns have active nesting colonies on Mississippi River sandbars immediately adjacent to Chickasaw NWR and occasionally feed on Refuge lands.

Pallid sturgeon are known to occur in the Mississippi River in Dyer County (adjacent to Lauderdale County) and are likely to occur within the Mississippi River in close proximity the Refuge.

VII. Determination of Effects:

A. Explanation of effects of the action on species and critical habitats in item V. B (attach additional pages as needed):

SPECIES/ CRITICAL HABITAT	IMPACTS TO SPECIES/CRITICAL HABITAT
Bald Eagle	No negative impacts foreseen; more protection.
Interior Least Tern	No negative impacts foreseen; more protection.
Pallid Sturgeon	No negative impacts foreseen; more protection.

B. Explanation of actions to be implemented to reduce adverse effects:

SPECIES/ CRITICAL HABITAT	ACTIONS TO MITIGATE/MINIMIZE IMPACTS
Bald Eagle	Maintain and expand potential nesting and feeding habitat.
Interior Least Tern	Cooperate with COE to monitor occurrence and protection.
Pallid Sturgeon	Continue to monitor for possible occurrence in Mississippi River.

VIII. Effect Determination and Response Requested:

SPECIES/ CRITICAL HABITAT	DETERMINATION ¹			RESPONSE ¹ REQUESTED
	NE	NA	AA	
Bald Eagle		X		Concurrence
Interior Least Tern		X		Concurrence
Pallid Sturgeon		X		Concurrence

¹DETERMINATION/RESPONSE REQUESTED:

NE = no effect. This determination is appropriate when the proposed action will not directly, indirectly, or cumulatively impact, either positively or negatively, any listed, proposed, candidate species or designated/proposed critical habitat. Response Requested is optional but a "Concurrence" is recommended for a complete Administrative Record.

NA = not likely to adversely affect. This determination is appropriate when the proposed action is not likely to adversely impact any listed, proposed, candidate species or designated/proposed critical habitat or there may be beneficial effects to these resources. Response Requested is a "Concurrence".

AA = likely to adversely affect. This determination is appropriate when the proposed action is likely to adversely impact any listed, proposed, candidate species or designated/proposed critical habitat. Response Requested for listed species is "Formal Consultation". Response Requested for proposed or candidate species is "Conference".

signature (originating station)

date

title

IX. Reviewing Ecological Services Office Evaluation:

A. Concurrence _____ Nonconcurrence _____

B. Formal consultation required _____

C. Conference required _____

D. Informal conference required _____

E. Remarks (attach additional pages as needed):

signature

date

title

office

COMPATIBILITY DETERMINATIONS

Refuge Name: Chickasaw National Wildlife Refuge

Location: Lauderdale County, Tennessee

Establishing and Acquisition Authority(ies): Refuge Recreation Act, Migratory Bird Conservation Act, Fish and Wildlife Act 1956

Refuge Purpose(s):

“... for use as an inviolate sanctuary, or for any other management purpose, for migratory birds.”
16 U.S.C. § 715d (Migratory Bird Conservation Act)

“... suitable for— (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species ...” 16 U.S.C. § 460k-1 “ . . . the Secretary ... may accept and use ... real ... property. Such acceptance may be accomplished under the terms and conditions of restrictive covenants imposed by donors . . .” 16 U.S.C. § 460k-2 (Refuge Recreation Act (16 U.S.C. § 460k-460k-4), as amended).

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

Description of Use: Hunting

Hunting has been permitted as a compatible public use activity on the Chickasaw National Wildlife Refuge since acquisition. The original hunting plan was completed, reviewed by the public, and approved in 1986. A revised hunt plan (2003) supersedes the original document and subsequent revisions. Hunting is a priority public use. Refuge hunting seasons generally coincide with Tennessee state hunting seasons and require only minor changes annually. Portions of the refuge are closed annually to all activity, including hunting to protect migratory waterfowl wintering on the refuge, and overlapping hunting seasons may be limited to reduce conflicts, and/or prevent safety hazards. Turkey hunting, due to limited populations and extensive interest, is permitted only through limited "quota" drawings. All other hunting activities are permitted with a valid refuge hunt permit and appropriate state licenses.

The refuge hunts have been a useful wildlife management and public relations tool by providing quality recreational opportunities for the general public while maintaining specific animal populations at desired levels. The refuge hunting plan was developed to insure the associated public recreation and wildlife management objectives are met in a responsible and consistent manner by means that

are compatible with the purpose for which the refuge was established.

Service policy concerning hunting on National Wildlife Refuges, as recorded in the National Wildlife Refuges Manual section 8 RM 5.1, states: "The Secretary of the Interior is authorized by the National Wildlife Refuge System Administration Act of 1966, as amended, and the Refuge Recreation Act of 1962 to permit hunting on any refuge within the Refuge System upon a determination that hunting is compatible with the major purposes for which such areas were established.

Camping is permitted only at the Barr Rd. Campground only during the small game and deer hunts. Camping is authorized through a lease agreement between TWRA and the Service.

Chickasaw National Wildlife Refuge is located in the western most portion of Tennessee between the Chickasaw Bluff and the Mississippi River. Bottomland hardwood forests dominate the refuge and are interspersed with managed moist soil impoundments and agricultural fields. The entire refuge is open to hunting activities during all or part of the hunting seasons, with the exception of administrative sites. Portions of the refuge area are closed seasonally to all public access to provide sanctuary for wintering migratory birds.

All hunting seasons are established annually through coordination with the Tennessee Wildlife Resources Agency.

- A. Squirrel season dates and bag limits coincide with state seasons and regulations, except the season is closed during open firearms and muzzleloader deer hunts. There is no spring squirrel season on the refuge.
- B. Raccoon Season dates and bag limits coincide with state season and regulations.
- C. Quail Season dates and bag limits coincide with state season and regulations, except the season is closed during open firearms and muzzleloader deer hunts.
- D. Rabbit Season dates and bag limits coincide with state season and regulations, except the season is closed during open firearms and muzzleloader deer hunts.
- E. Opossum Season dates and bag limits coincide with state season and regulations.
- F. Deer hunting on the refuge runs concurrently with Tennessee state seasons and bag limits. The deer hunts are conducted to maximize hunter utilization and minimize disturbance to wintering waterfowl. All deer harvested on Chickasaw NWR count toward the Unit A bag limit established by the Tennessee Wildlife Resources Agency.
- H. Turkey seasons consist of two or three quota hunts in April of each year. Hunter numbers will be adjusted annually based upon the level of the turkey population. The bag limit will be one male turkey per hunter.
- I. Waterfowl Season dates and bag limits coincide with state seasons, except legal shooting hours are 30 minutes before sunrise to 12:00 noon.

All hunting activities on the refuge are subject to refuge specific regulations published annually in the Federal Register and in the refuge public use brochure/permit, as well as regulations published by the state of Tennessee. Where these regulations differ, the refuge regulations shall supersede those published by the Tennessee Wildlife Resources Agency.

Public hunting opportunities in west Tennessee are limited, with FWS-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 is increasing at an alarming rate, as we shift toward a more urbanized society, and refuges are expected to meet an ever increasingly important 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 recreation, interpretation, environmental education, hunting, and fishing. The cost of operating and maintaining the present upland game and big game hunts and a wild turkey season will be approximately \$8,000.00 annually. Within the annual refuge budget of approximately \$300,000.00, the necessary funds are available for administration of the hunting program. Therefore, the program is in compliance with specific funding portions of the Refuge Recreation Act.

Special equipment, facilities, or improvements necessary to support the use: None.

Maintenance costs:

Trail Maintenance - \$500.00

Kiosks - \$100.00

Parking areas and boat ramps - \$1,000.00

Signs - \$250.00

Monitoring costs: \$1,000

Offsetting revenues: The refuge is a participant in the Recreational Fee Demonstration Project which currently returns 80% of fees generated from recreational activities back to the refuge. At current levels this provides approximately \$500.00 to the refuge to provide hunting opportunities.

Anticipated Impacts of the Use:

Long-term impacts:

There has been substantial historical use of this forested wetland area for hunting. Based on available information, there is no indication of adverse biological impacts associated with these activities.

The refuge has the latitude to adjust hunting seasons and bag limits annually, or even close the refuge entirely due to safety or concerns about habitat conditions. This latitude coupled with monitoring of wildlife populations and associated habitat conditions by both the state Wildlife Resources Agency and the Fish and Wildlife Service ensures that a long term impacts to either wildlife populations and/or habitats on the refuge are unlikely.

As hunting pressure increases on the refuge, alternatives such as limited quota hunts can be utilized to limit impacts, as well as expanded sanctuaries to provide additional critical habitats for trust species and/or threatened and endangered species.

Cumulative impacts:

Timing and duration of the refuge's hunting program does not coincide with other popular programs on the refuge and would not result in cumulative impacts to refuge resources.

Determination (check one below):

Hunting (big game)	Compatible with the following stipulations.
Hunting (other migratory birds)	Compatible with the following stipulations.
Hunting (upland game)	Compatible with the following stipulations.
Hunting (waterfowl)	Compatible with the following stipulations.
Camping	Compatible with the following stipulations.

Stipulations Necessary to Ensure Compatibility: Hunting seasons and bag limits are established annually and generally fall within the state framework for Tennessee as agreed upon during annual hunt coordination meetings with state personnel. The refuge has the ability to establish more restrictive seasons and bag limits to prevent over harvest of individual species on the refuge. All hunters are required to possess a free refuge hunting brochure/permit or quota permit while participating in refuge hunts. Steel shot is required for all persons using shotguns while hunting on the refuge.

All other refuge regulations apply. Law Enforcement patrols are conducted throughout the hunt seasons to ensure compliance with refuge laws and regulations. Waterfowl hunting is limited to 1/2 day. No hunting or access is allowed in the waterfowl sanctuary areas from November 15 to March 15.

Justification: A primary objective for which the refuge was established is to provide the public with wildlife-dependent recreation. Hunting which adheres to the refuge regulations is an activity which is compatible with this purpose. Hunting is a viable management tool for controlling populations, especially deer and raccoons. Allowing these uses to continue is consistent with the refuge's establishing purpose, management objectives, and follows current Service policy.

Camping is allowed through a lease agreement with the TWRA.

Description of Use: Firewood Cutting (Personal)

Collection and removal of residual wood (limbs, tree tops, logs) left as a result of reserve timber harvest and stand thinnings by private individuals for personal home heating, and recreational camping. This is a secondary use of resources not suited for commercial harvest as prescribed by the habitat management for timber stand improvements. This use is directly linked to management actions on the refuge, and reserve harvests within limited blocks of timber on the refuge, and is expected to be very limited, due to availability of resources outside the refuge. As future development diminishes resources outside the refuge the demand for utilization of refuge resources is expected to increase. This is not an economic use, rather an alternative to refuge funded cleanup following timber management activities.

Firewood cutting would be conducted in hardwood forests throughout the refuge following commercial harvest or thinning operations as designated by the habitat management plan and annual habitat management plan.

This activity would take place only when ground conditions which would limit disturbance and damage exist.

Individuals would apply for a special use permit for the collection of a limited amount of firewood for personal use to be harvested from selected areas on the refuge. Individual is responsible for his/her equipment, safety, and all aspects of the removal of firewood from the refuge.

Firewood cutting is a management tool to remove slash to reduce fuel loads associated with timber harvest and accelerate the growth of shade-intolerant oak seedlings for which the management is directed in the habitat management plan. While this opportunity exists outside the refuge, it is seen as an alternative to refuge funded cleanup following approved timber sales.

Availability of Resources: Administration and management are discussed in the habitat management plan. Administrative costs are expected to be less than those associated with refuge cleanup on treatment areas, and are outlined in the habitat management plan.

Permit application and issuance: \$25.00

Special equipment, facilities, or improvements necessary to support the use: None

Maintenance costs:

Signing designated access routes, and harvest areas: \$200.00/unit

Signs: \$125.00 (these signs would be utilized on multiple units for several years, and considered a one time cost)

Monitoring costs:

As this is considered to be an accompanying use to commercial timber harvest activities on the refuge, all monitoring activities would be attributable to those commercial activities, as covered in the habitat management plan.

Offsetting revenues: None

Anticipated Impacts of the Use:

Short-term impacts:

No negative short term impacts are expected. Firewood cutting occurs immediately after contractor has vacated a harvest compartment so no new disturbance of plants or wildlife will occur. Removal of debris and trees accelerates opening of the forest floor for oak regeneration, as well as reducing potential fuel loads within the harvest compartment. Permits set specific conditions and locations to minimize impacts.

Long-term impacts:

This activity will potentially provide positive long term impacts through the accelerated release of hardwood species, thus creating diverse vertical structure within the management unit, as well as reducing ground litter and debris often associated with managed timber harvest.

Cumulative impacts:

No cumulative impacts are anticipated.

Determination (check one below):

Firewood Cutting

Compatible with the following stipulations.

Stipulations Necessary to Ensure Compatibility: Firewood cutting is administered by refuge personnel through special use permits and is allowed in designated areas only. Failure to meet the conditions of the SUP constitutes a violation of the Refuge Administration Act whereby the permittee is subject to termination of the permit and issuance of a Notice of Violation.

Justification: Personal firewood cutting is compatible with the purposes for which the refuge was established. It is an effective way to remove slash left by timber cutting operations and accelerates the growth of shade intolerant oak seedlings for which the management is directed in the habitat management plan.

Description of Use: Off-road Vehicles (for use by visitors with disabilities only)

Use of off-road vehicles (ORVs) or four-wheel all-terrain vehicles (ATVs) by disabled hunters is essential in providing adequate hunting opportunities for these individuals. The difficult and often swampy terrain on the refuge makes individual use of ATVs the most cost effective method of providing access for disabled hunters. Use is restricted to transportation to and from designated hunting locations, including the transport of personal gear and game taken by the handicapped hunter. Carrying another person or their game is not permitted.

This use would be allowed in designated areas open to hunting on the refuge.

Use is only allowed during established refuge hunting seasons.

Access by disabled hunters is allowed on a case by case basis, with applicants providing necessary documentation of disability, request for areas to be accessed, and species sought. Currently the refuge receives 3–5 requests annually from disabled hunters primarily seeking access for deer hunting. The hunters are responsible for providing all equipment, and associated assistance during their hunt. This permit grants no other privileges other than access by ATV on designated trails on the refuge, and permittee must comply with all other refuge and state hunting regulations.

Disabled hunters routinely apply for a special use permit to participate in hunting programs currently offered on the refuge. While these opportunities currently exist on private lands and state WMAs, we still have an obligation to provide access to disabled hunters wishing to utilize the refuge.

Availability of Resources: Resources involved in the administration and management of the use:

Review and issuance of special use permits: \$50.00/permit

Special equipment, facilities, or improvements necessary to support the use: None

Maintenance costs:

Several existing trails will be utilized by disabled hunters, as these trails are currently maintained to support other recreational activities; no additional costs would be attributable to this program.

Monitoring costs:

All monitoring of this use would be conducted in conjunction with the refuge hunting program, and no additional costs would be attributed to this program.

Offsetting revenues: None

Anticipated Impacts of the Use:

Short-term impacts:

Impacts to wildlife, plants, and habitat by the use of ORVs are well documented and some disturbance to wildlife, plants and their habitats is expected to occur. The impact to the refuge however, this minor impact is acceptable in providing suitable access to disabled hunters who use ATV's to access hunting opportunities on the refuge.

Long-term impacts:

No long term impacts are expected, due to the short duration, and limited scope of anticipated use.

Cumulative impacts:

No cumulative impacts are anticipated with this use.

Determination (check one below):

Off-road vehicles (other)

Use is compatible with the following stipulations.

Stipulations Necessary to Ensure Compatibility: The refuge has established a policy for the level of disability that necessitates the use of ORVs for hunting. Persons applying for disabled hunter status must possess written proof of disability from their physician, which is reviewed prior to issuance of a special use permit. All other refuge regulations apply.

Justification: A primary objective for which the refuge was established is to provide the public with wildlife-oriented recreation. Allowing handicapped hunters to use off-road vehicles to pursue their sport provides this group with no more opportunity that which is afforded to the general public. Provided this activity adheres to the refuge regulations, it is an activity which is compatible with refuge objectives.

Description of Use: Recreational Fishing

Fishing was a traditional recreational use of the refuge prior to its inclusion to the National Wildlife Refuge System and continues to be a popular recreational pursuit with the public. Fishing is a priority public use. Refuge fishing will continue to provide additional public fishing opportunities in a region that is lacking sufficient amounts of acreage open to the public, and current fish populations will continue to support a sustainable harvest under a regulated fishing program.

Fishermen regularly visit the refuge to fish in the river cutoffs and sloughs, or access the Mississippi River via boat ramps located at Wardlow's Chute and the Ed Jones boat ramp.

Chickasaw NWR is located 10 miles west of Ripley, Tennessee, and covers more than 25,000 acres adjacent to the Mississippi River. The refuge is dominated by bottomland hardwoods, river oxbows and wooded sloughs, and the most common fish include bluegill, crappie, largemouth bass, channel catfish, carp, buffalo, and gar. The portion of the refuge that borders the Mississippi River consists of a series of sandbars and islands that provide habitat for big river fish such as flathead catfish, blue catfish, and pallid sturgeons.

Fishing is open year round, with the exception of the waterfowl sanctuary, which is closed to all public access from November 15 - March 15.

Fishing is conducted on Chickasaw NWR subject to seasons and regulations established by the Tennessee Wildlife Resources Agency. Fishing is further restricted on the refuge by special refuge regulations which limit access to established boat ramps, prohibit access after dark, prohibit certain fishing methods, prohibit the taking of frogs and turtles, and provide seasonal closures to benefit wintering waterfowl and other trust species.

While ample fishing opportunities exist in west Tennessee, the refuge affords visitors unique access to undisturbed oxbow lakes, meandering sloughs, and a large stretch of the Mississippi River.

Availability of Resources: Funding for the fishing program is borne by annual operation and maintenance funds, which include activities involving the public such as recreation, interpretation, environmental education, and conduct of the refuge hunting and fishing programs. The refuge spends approximately \$5,000.00 of an annual budget of approximately \$300,000.00 in direct support of the fishing program on Chickasaw. Therefore, the program is in compliance with specific funding portions of the Refuge Recreation Act.

Special equipment, facilities, or improvements necessary to support the use: None

Maintenance costs:

Annual maintenance of existing boat ramps - \$200.00

Annual maintenance of existing parking areas - \$250.00

Annual maintenance of existing roads and trails - \$1,000.00

Monitoring costs: Monitoring - \$1,000

Offsetting revenues: None

Anticipated Impacts of the Use:

Short-term impacts:

Minor impacts such as littering and gasoline contamination will occur but not at a level that would cause great concern.

Historically, fishing has been one of the most prominent activities on the refuge, resulting in only temporary disturbance to refuge habitats and wildlife populations and causing no noticeable impact on the abundance of species sought or other associated wildlife. Seasonal closure of sanctuary areas virtually eliminates any impacts of sport fishing during critical periods on wintering trust species.

Long-term impacts:

No long term impacts are expected.

Cumulative impacts:

No known cumulative impacts are known to occur.

Determination (check one below):

Recreational Fishing

Use is compatible with the following stipulations.

Stipulations Necessary to Ensure Compatibility: Refuge fishing seasons are set within the constraints permitted by the State of Tennessee and participants must comply with state fishing and boating regulations. Law Enforcement efforts will be directed at ensuring compliance with state and refuge regulations. Boat launching is allowed at ramps located at Wardlow's Chute and Ed Jones Rd.

A. All public access is prohibited from November 15 to March 15 in the waterfowl sanctuary.

B. Possession or use of trot lines, limb lines, jug lines, yo-yo's, nets, and associated equipment is prohibited.

C. The taking of frogs and turtles is prohibited.

Justification: Historically, fishing has been one of the most prominent activities on these refuges resulting in only temporary disturbance to refuge habitats and wildlife populations, and has caused no noticeable impact on the abundance of species sought or other associated wildlife. Current regulations and restrictions limit the impacts to trust species and provide a safe and rewarding experience for the refuge visitor. Therefore, the fishing program is compatible with the purposes for which the refuge was established and is in compliance with the National Wildlife Refuge System Act, the Refuge Recreation Act, and the Refuge Improvement Act of 1997.

Description of Use: Forest Management

The forest management objectives for the refuge are to:

1. Maintain and enhance necessary habitat for threatened and endangered species by promoting plant communities beneficial to these species.
2. Manage timber stands to enhance waterfowl habitat by manipulating stand composition in order to produce high quality food and to provide adequate nesting areas. This will include promoting red oak and other favored tree species, and by assuring that adequate den and snag trees remain in the stands.
3. Manipulate forest stands to provide diverse plant successional stages ranging from regeneration to mature timber, which will support a variety of wildlife species.
4. Perform management actions that will compliment recreational and educational activities, by carefully planning when and where management actions should take place.
5. Utilize management techniques which do not adversely affect soils, water bodies, or any other natural resources present. These techniques should include harvesting under proper climatic conditions and placing buffer strips where necessary to protect water quality or other natural resources.

Various silvicultural treatments will be used to accomplish these forest management objectives. Silvicultural decisions will be based upon the favored wildlife species and their habitat requirements as it relates to the favored tree species as outlined in the habitat management plan. Our goal is to promote the favored trees species which will meet the wildlife habitat requirements. We must recognize the importance of these tree species and the special management considerations which they must have in order to assure that they remain a high percentage of the stand composition.

Silvicultural decisions should consider the age and vigor of the existing stands and the availability of desirable reproduction. When harvesting timber, we will be concerned with the promotion of diverse, vigorous stands of timber which benefit trust species.

An important factor to consider when making silvicultural decisions is the availability of advanced red oak regeneration. After reviewing the data collected and surveying the refuge, there is a great concern about the future of red oak species on the refuge. Much of our time will be spent implementing those silvicultural practices which enhance the reestablishment of productivity for the historical red oak component. During the initial survey of the refuge, extensive data were collected concerning reproduction. These areas will receive high priority management attention. It is crucial that this reproduction be released to promote the growth of new stands with a relatively high red oak component.

Various silvicultural treatments will be used to promote favored timber species. These treatments include intermediate cuttings, timber stand improvement, shelterwood, clearcut, and patch cuts.

Chickasaw NWR is located 10 miles west of Ripley, Tennessee, adjacent to the Mississippi River. Chickasaw NWR consists of 25,006 acres and includes one of the largest contiguous blocks of bottomland hardwood forest remaining in west Tennessee. Forest management activities will take place throughout the 20,794 acres of bottomland hardwood forest on the refuge.

Activities will be conducted during the driest months of the year, usually July through November.

Timber harvest operations will be conducted using local contractors who will bid on the timber to be harvested. Timber stand improvements will be conducted by the staff using a dozer with shearing blade or chemical injection of undesirable species.

This use is being proposed by the refuge as a management tool, designed to improve habitat conditions on the refuge for trust species.

Availability of Resources: Complex forestry staff will spend an estimated 50% of their time at Chickasaw NWR. The habitat management plan goes into sufficient detail regarding station resources needed to accomplish forest management activities.

Special equipment, facilities, or improvements necessary to support the use: None

Maintenance costs:

All maintenance activities associated with commercial timber harvest will be carried out by the contractor. While this will reduce the payment to the government for the value of the timber, no additional costs will be incurred by the refuge.

Monitoring costs:

Monitoring of timber sales is an administrative function and all costs associated with this activity are previously accounted for.

Offsetting revenues: None

Anticipated Impacts of the Use:

Short-term impacts:

Short term impacts will vary with the scope of the timber harvest technique utilized. Thinning and timber stand improvement projects will result in very limited impacts to habitats, and virtually no impacts to trust species. Clearcuts and patch cutting will have moderate impacts to localized blocks of habitats, and may temporarily displace trust species.

Long-term impacts:

Long term impacts will be beneficial for all timber harvest operations, as they are designed to improve habitat conditions over time for trust species. Benefits include, but are not limited to, increased vigor of key species, increased diversity both in structure and species composition of the forest habitats, and improved wildlife habitat.

Cumulative impacts:

No negative cumulative impacts are expected as a result of timber management. Timber management, in concert with other refuge management activities will greatly enhance the suitability of the various habitats on the refuge for a variety of wildlife species.

Determination (check one below):

Forest Management

Use is compatible with the following stipulations.

Stipulations Necessary to Ensure Compatibility: All commercial activities will be conducted under the regulations set forth by Special Use permits. These regulations will follow all guidelines outlined in the Chickasaw Habitat Management Plan. Forest management activities will follow the Tennessee Forest Best Management Practices.

Justification: The forest management program is compatible with the purposes for which the refuge was established and is in compliance with the National Wildlife Refuge System Act, the Refuge Recreation Act, and the Refuge Improvement Act of 1997. These activities also support the following plans: Partners in Flight, Lower Mississippi Joint Venture, and West Tennessee Wildlife Resources Conservation Plan.

Description of Use: Environmental Education and Interpretation

The refuge's environmental education and interpretation program seeks 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-led or staff-led onsite field trips, offsite 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 and the visitor contact station. These activities are priority uses.

The entire refuge has the potential to be utilized for environmental education and interpretation.

This is a year round activity, conducted on an as-requested basis. Although this activity does not require a special use permit, it is most often closely coordinated with the refuge manager. Opportunities for classroom activities on those portions of the refuge open to the general public, which do not violate general refuge regulations may be conducted without coordination 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 be typically limited to ensure effective presentation of desired materials which may be specifically tailored to meet the educational needs of the group.

Environmental education is 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: Currently these activities are conducted as time and resources permit. Expanding the refuge's volunteer program with additional personnel will provide for the future development of the environmental education and interpretation program.

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

Maintenance and enhancement of existing kiosks – \$1,000.00

Materials for onsite activities – \$200.00

Maintenance costs: None

Monitoring costs: None

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 the sites used for these activities. Impacts may include trampling of vegetation and temporary disturbance to wildlife species in the immediate vicinity during such activities. It is not anticipated that such impacts would be permanent.

Off-site education, such as classroom visits, would not impose any biological impacts to the resource.

Long-term impacts:

Current utilization of this use is incidental to overall refuge programs and no long-term negative impacts have been experienced. Long-term beneficial impacts include the furthering of the refuge mission through the education of the general populace.

Cumulative impacts:

No negative cumulative impacts are anticipated.

Determination (check one below):

Environmental education and interpretation Compatible with the following stipulations.

Stipulations Necessary to Ensure Compatibility: On-site activities should be held where minimal impacts will occur. Evaluation of sites and programs should be held periodically to assess if objectives are being met and the resources are not being degraded. If evidence of unacceptable adverse impacts begins to appear, it may be necessary to change the location of outdoor classroom activities.

Justification: Environmental education is used to encourage understanding in citizens of all ages to act responsibly in protecting a healthy ecosystem. It is a tool to use in building the land ethic, developing political support, and decreasing wildlife violations. It constitutes one method of increasing visibility in the community and improving the image of the Service.

Environmental education at the refuge is incidental since full-time staff to conduct activities has only recently been established. However, the program is important and provides visitors with an awareness of refuge specific issues such as wetland ecology, endangered species protection, and migratory bird management, as well as issues relating to the entire refuge system. Environmental education activities are expected to increase while ensuring compatibility with the purpose for which the refuge was established.

Description of Use: Outdoor Recreation

Outdoor recreation activities include wildlife observation, wildlife photography, non-motorized boating, hiking, jogging, walking, and bicycling.

Chickasaw NWR is open to public use year-round except for areas on the refuge that are designated as waterfowl sanctuary which are closed from November 15 through March 15. Much of the refuge is subject to flooding which may result in parts or all of the refuge being closed for safety reasons. Motorized vehicles must remain on designated gravel roads within the refuge. Bicycles are permitted only on open designated motorized vehicle routes.

The refuge is open to these activities year-round, except that portions of the refuge are closed from November 15 through March 15.

Most of the recreational activities on the refuge are centered on wildlife viewing, which is conducted on refuge roads and at the observation tower. Hiking, jogging, walking, and bicycling all occur on refuge roads and areas that are open to such activities. Non-motorized boating is permitted on all open refuge waters.

Providing the public with wildlife oriented recreation is one of the priority uses on the refuge. Outdoor recreation is a very popular activity in the surrounding area, and the refuge is one component in a complex of public lands that lie in west Tennessee.

Availability of Resources: Funding for these programs is borne by annual operations and maintenance funds which include activities involving the public such as recreation, interpretation, environmental education, and conduct of refuge hunting and fishing programs. The refuge spends approximately \$3,000.00 of an annual refuge budget of \$300,000.00 in direct support of these programs on Chickasaw NWR. Therefore, the program is in compliance with the specific funding portions of the Refuge Recreation Act.

Special equipment, facilities, or improvements necessary to support the use: None

Maintenance costs:

Maintenance costs are not directly attributable to these incidental uses on the refuge.

Monitoring costs: None

Offsetting revenues: None

Anticipated Impacts of the Use:

Short-term impacts:

Most of the impacts that could occur will involve some violation of refuge regulations such as deliberate disturbance of wildlife or plants, littering, or vandalism. Some animals are killed or injured by vehicles while crossing refuge roads. Disturbance to trust species during critical wintering periods is avoided by seasonal closure of sanctuary areas. Short term impacts to facilities such as roads and structures can be avoided by special closures due to unsafe conditions.

Long-term impacts:

No long-term negative impacts are anticipated.

Cumulative impacts:

No cumulative negative impacts are anticipated; however, programs may be modified in the future to mitigate unforeseen impacts.

Determination (check one below):

Wildlife Photography and Observation	Use is compatible w/ the following stipulations.
Jogging	Use is compatible w/ the following stipulations.
Walking	Use is compatible w/ the following stipulations.
Bicycling	Use is compatible w/ the following stipulations.
Non-motorized boating	Use is compatible w/ the following stipulations.
Hiking	Use is compatible w/ the following stipulations.

Stipulations Necessary to Ensure Compatibility: Law enforcement patrolling of public use areas should continue to minimize violations. The current regulation that prohibits entry after daylight hours will be maintained. All seasonal closures are designed to coincide with peak waterfowl use periods. Any major change in waterfowl use patterns that creates a conflict with public use will prompt further consideration of refuge regulations. Expansion of wildlife viewing opportunities beyond the current level may be explored with the acquisition of additional lands.

Justification: A primary objective for which the refuge was established is to provide the public with wildlife oriented recreational opportunities. Wildlife observation, wildlife photography, non-motorized boating, jogging, walking, hiking, backpacking, and bicycling at the refuge which adhere to the established regulations are activities that are compatible with that purpose.

Description of Use: Raccoon dog field trials

American Kennel Club-sanctioned and nonsanctioned raccoon dog field trials held by local hunters and raccoon hunting clubs will occur primarily on the forested areas of the refuge.

Hunts are conducted during the mid- to late summer months, typically two to three months prior to the raccoon season, and occur for 2–3 consecutive nights.

Availability of Resources: The refuge does not have the resources to administer this use. Currently, the refuge and Complex have no law enforcement personnel to monitor this activity.

Anticipated Impacts of the Use: Most of the impacts that could occur will involve some violation of refuge regulations such as deliberate destruction of wildlife or plants, littering, or vandalism. Wildlife disturbance is a major factor during these activities. This disturbance stresses wildlife in the area, forcing changes in behavior and movements to other areas. Some animals are killed or injured by vehicles while crossing refuge roads.

Determination (check one below):

Raccoon Field Trials

Use is not compatible.

Justification: A primary objective for which the refuge was established is to provide the public with wildlife oriented recreational opportunities. However, raccoon dog field trials can have detrimental effects on wildlife through increased disturbances. The activity also occurs at night and safety is a major concern. The refuge currently does not have the resources to administer field trials. The Complex currently has no law enforcement personnel. Also, other lands (state and private) are available for this activity.

Description of Use: Resource Research Studies

This activity would allow university students and professors, nongovernmental researchers, and governmental scientists access to the refuge's natural environment to conduct both short-term and long-term research projects. 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.

Availability of Resources:

No additional fiscal resources are needed to conduct this use. Existing staff can administer permits and monitor use as part of routine management duties.

Special equipment, facilities, or improvements necessary to support the use: None

Maintenance costs: None

Monitoring costs: None

Offsetting revenues: None

Anticipated Impacts of the Use:

Short-term impacts:

There should be no significant negative impacts from scientific research on the refuge. The knowledge gained from the research would provide information to improve management techniques and better meet the needs of trust resource species. Impacts such as trampling vegetation and temporary disturbance to wildlife would occur, but should not be significant. A small number of individual plants and animals may be collected for further study. These collections would have an insignificant effect on the refuge plant and animal populations.

Long-term impacts: None

Cumulative impacts: None

Determination (check one below):

Research

Use is compatible with the following stipulations.

Stipulations Necessary to Ensure Compatibility: Each request for use of the refuge for research would be examined on its individual merit. Questions of who, what, when, where, and why would be asked to determine if the requested research contributes 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. 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. These benefits far outweigh any short-term disturbance or loss of individual plant and animals that might occur.

Description of Use: Horseback Riding

Recreational horseback riding on established trails and roads within Chickasaw NWR, while not one of the "Big 6," is often associated with priority public uses.

Horseback riding is permitted on refuge roads open to the public for vehicle traffic.

Horseback riding will be permitted year-round during daylight hours only, on roads open to vehicular traffic. Areas closed to the general public for management or safety purposes will be closed to horseback riding as well.

Horseback riding will be a self-initiated activity on the refuge, with no amenities provided specifically for this activity. Participants in this activity will be responsible for all aspects of their visit and use of the refuge.

This is a popular activity which has historically occurred on lands which are now refuge lands within west Tennessee. Development and the paving of most of the roads in west Tennessee have significantly decreased the amount of gravel roads available for horseback riding.

Availability of Resources:

No additional administrative costs are associated with this activity.

Special equipment, facilities, or improvements necessary to support the use: None

Maintenance costs: None

Monitoring costs: None

Offsetting revenues: None

Anticipated Impacts of the Use:

Short-term impacts:

Negative impacts are expected to be severe on underdeveloped hiking trails on the refuge. These impacts include trampling of vegetation, hoof damage during wet periods, and potential browse damage adjacent to trails.

Long-term impacts:

No long-term impacts are expected. However, increased long-term maintenance costs associated with rehabilitation of damaged foot trails may be incurred.

Cumulative impacts:

No cumulative impacts are expected.

Determination (check one below):

Horseback riding

Use is compatible with the following stipulations.

Stipulations Necessary to Ensure Compatibility: Horseback riding will be limited to daylight hours only, and restricted to graveled public roads open to vehicle traffic.

Justification: Horseback riding supports wildlife observation by providing an alternative mode of travel on refuge roads.

Description of Use: Chickasaw Farming Program

Cooperative farming has been a management tool on Chickasaw NWR since 1986. Primarily serving as a supplement to natural food resources, this program is designed to assist the refuge in meeting wintering waterfowl population goals. Contracts with cooperative farmers are established annually prior to the planting season. These contracts describe the location and amount of acreage to be planted during the coming year. The contract is then signed by the cooperative farmer and the Service representative (refuge manager). Shares are acreage-based with a 75% cooperator's share and 25% 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.

In addition to providing winter food resources, this program may be utilized to maintain newly acquired tracts of land in an open condition until permanent natural habitat communities can be established.

Farming is used to compliment natural food production on the refuge and assist in meeting the minimum waterfowl maintenance objectives of 13.5 million use-days. Providing wintering and migrating habitats can be achieved in part through a successful cropland program. By incorporating a system of impoundments with the cropland program, the waterfowl maintenance objectives should be easily achieved. Preferred waterfowl crops include corn, milo, millet, wheat, buckwheat, and natural (moist soil) foods. By planting crops such as corn or millet in impoundment areas, their availability to waterfowl can be enhanced through flooding in the fall/winter.

Cooperative farming is primarily utilized within the waterfowl sanctuary to provide for the needs of wintering waterfowl species without subjecting them to hunting pressure. Newly acquired tracts outside the existing waterfowl sanctuary may be farmed in preparation for the establishment of native habitats.

Cooperative farming contracts are generally valid from March 15–November 15 annually.

This activity is a contracted activity, with the cooperator providing all materials, equipment, and labor to fulfill the requirements of the contract. Facilities such as roads and access points are maintained by refuge staff.

This use is deemed necessary to fulfill refuge obligations to provide for the wintering needs of waterfowl. While agricultural lands are abundant off the refuge, they do not provide a secure habitat for wintering waterfowl.

Availability of Resources: The refuge currently spends approximately \$8,000.00 per year in the administration of the refuge cooperative farming program. The cost of providing the same resources for waterfowl utilizing refuge staff and equipment would cost approximately \$50,000.00 per year.

Special equipment, facilities, or improvements necessary to support the use: None

Maintenance costs:

Maintenance of roads, trails, and access points for cooperative farmers – \$3,000.00 (this maintenance also benefits numerous refuge-conducted activities.)

Monitoring costs:

Monitoring cooperative contracts, and cooperator activities – \$ 2,500.00

Offsetting revenues: None

Anticipated Impacts of the Use:

Short-term impacts:

Soil disturbance is likely to occur when the areas are disked during spring planting season, but these impacts can be lessened by the implementation of no-till and conservation tillage farming methods. A buffer strip adjacent to a waterway and sensitive areas help trap sediments and hold agricultural runoff. Impacts from unapproved or improperly applied chemicals may occur.

Monotypic stands of agricultural crops 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 if integrated pest management practices and conditions within the cooperative farming agreement are followed.

Determination (check one below):

Farming Use is compatible with the following stipulations.

Stipulations Necessary to Ensure Compatibility: Cooperative farming agreements, which are contractual agreements between the refuge and local farmers, require special conditions to be met. Cooperators are subject to dismissal for not meeting those conditions. Integrated Pest Management administered by the refuge and implemented by cooperators will help to reduce the potential for chemical misuse.

See the Habitat Management Plan for the list of special conditions.

Justification: Section 6 RM 4.1 of the National Wildlife Refuge System (NWRS) 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 more natural ecosystems, the more intensive and artificial 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:

1. To provide wintering waterfowl habitat for:
Ducks – 13 million use days
Geese – 0.5 million use days

Although cropland management will be directed primarily to satisfy certain habitat and life requirements of 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 Habitat Management Plan addresses the management of the refuge farm fields. These fields are farmed by a cooperator under a contractual agreement, issued annually, with the refuge. Under this agreement, the refuge receives a 25% share of each cooperative farmer's allotment where one acre out of four is planted for waterfowl food production. For their share (75%), the cooperative farmers plant primarily soybeans.

Appendix VI. Management Methods and Procedures

PARTNERSHIPS

The Service's Partners for Fish and Wildlife program helps accomplish its mission by offering technical and financial assistance to private landowners to voluntarily restore wetlands and other fish and wildlife habitats on their land. The program emphasizes the reestablishment of native vegetation and ecological communities for the benefit of fish and wildlife in concert with the needs and desires of private landowners.

The Service also enlists the assistance of a wide variety of other partners to help restore wildlife habitat on private lands. These partners include other federal agencies, tribes, state and local governments, conservation organizations, academic institutions, industries and other businesses, school groups, and private individuals. While not a program requirement, a dollar-for-dollar cost share is usually sought on a project-by-project basis.

Since the project's inception in 1987, these partnerships have generated significant habitat restoration accomplishments on private lands, primarily focused on the restoration of wetlands, native grasslands, stream banks, riparian areas, and in-stream aquatic habitats. These restored habitats now provide important food, water, and cover for federal trust species, including migratory birds (e.g., waterfowl, shore and wading birds, songbirds, and birds of prey), anadromous fish, and threatened and endangered species, as well as other fish, wildlife, and plant species that have experienced population declines in the recent past. Many of these projects are located near existing National Wildlife Refuge System lands, or state wildlife management areas, providing increased benefits to fish and wildlife that rely on these lands for survival.

The assistance that the Service offers to private landowners may take the form of informal advice on the design and location of potential restoration projects, or it may consist of designing and funding restoration projects under a voluntary cooperative agreement with the landowner. Under the cooperative agreements, the landowner agrees to maintain the restoration project as specified in the agreement for a minimum of 10 years.

Typical restoration projects may include, but are not limited to:

- Restoring wetland hydrology by plugging drainage ditches, breaking tile drainage systems, installing water control structures, constructing levees, and reestablishing old connections with waterways.
- Installing fencing and off-stream livestock watering facilities to allow for restoration of stream and riparian areas.
- Removal of exotic plants and animals which compete with native fish and wildlife and alter their natural habitats.
- Prescribed burning as a method of removing exotic species and to restore natural disturbance regimes necessary for some species survival.
- Reconstruction of instream aquatic habitat through bioengineering techniques.

In addition to providing restoration assistance to private landowners, the Service also provides biological technical assistance to U.S. Department of Agriculture agencies implementing key

conservation programs of the Farm Bill. The Service's assistance helps the Department of Agriculture meet the technical challenges presented by these programs while maximizing benefits to fish and wildlife resources. The Service also assists in on-the-ground habitat restoration actions associated with several of these programs.

Under the Wetlands Reserve Program, conservation easements are required to protect and restore formerly degraded agricultural wetlands. The Service provides technical assistance to Department of Agriculture agencies and to private landowners on site selection, restoration planning, and compatible uses for easements offered voluntarily by interested landowners.

AVIFAUNAL ANALYSIS

Wintering Waterfowl

The North American Waterfowl Management Plan (NAWMP) identified a continental waterfowl population goal of 62 million breeding ducks, goals for specific populations of geese, and the actions needed to achieve those goals. The NAWMP identified the Lower Mississippi Valley (LMV) as one of the priority habitat areas, and a plan of action for the LMV was implemented in 1990 to achieve NAWMP goals. The goal of the LMV Plan focused on providing an adequate quantity, quality, and distribution of habitats on public and private lands to ensure that the LMV could support a wintering population of at least 8.7 million ducks and 1.4 million geese. The geographic area covered by the West Tennessee Wildlife Resources (WTWR) Conservation Plan needs to provide an adequate quantity, quality, and distribution of habitats to support a wintering population of 599,000 ducks and 61,000 Canada geese. Achieving this goal will require maintaining the current 10,600 acres managed in west Tennessee for ducks and geese and developing a minimum of 6,300 additional acres of habitat with water management capability for ducks.

The WTWR Conservation Plan identified minimum waterfowl foraging objectives for the Obion, Forked Deer, and Hatchie/Wolf river watersheds, along with strategies and actions designed to meet those needs. It should be recognized that providing adequate foraging habitats to support duck population objectives depends upon current habitat conditions and food availability which vary annually. In some years, food resources will be abundant and readily available, but much less in other years. Therefore, management efforts should focus, at a minimum, on meeting foraging needs during critical periods. It was assumed that if adequate foraging habitats are available, other habitat types needed by waterfowl will also be adequate. Other life history needs related to sanctuary, water, cover, molting, pairing, etc., will be considered throughout the planning area as well as species specific requirements such as nest and brood habitat for wood ducks.

Duck population and habitat carrying capacity goals for the WTWR Conservation Plan were stepped down from the Lower Mississippi Valley Joint Venture Plan (Loesch et al. 1994), which was developed to implement the NAWMP. Duck population goals were calculated using data from the Midwinter Waterfowl Inventory, county duck harvest estimates, and continental population goals. This method involves calculating the number of ducks that must winter in the WTWR Conservation Plan area if the NAWMP is to achieve the 62 million average continental breeding population objective. The steps involved in making these calculations were described in the Lower Mississippi River Joint Venture Evaluation Plan. Other documents that provided guidance in formulating goals and objectives for the WTWR Conservation Plan were the Tennessee Wildlife Resources Strategic Plan for 2000-2006 and the Tennessee Implementation Plan for the NAWMP.

Guidelines from the WTWR Conservation Plan used in this CCP included:

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- The average number of geese counted during the January Mid-winter Waterfowl Survey for the 1985-89 period was selected as the population goal for the WTWR Conservation Plan.
 - Procedures used to calculate waterfowl objectives in the LMV (Loesch et al. 1994) were also used for the WTWR Conservation Plan. However, since calculated foraging objectives are considered to be the minimum needed and the Tennessee Wildlife Resource Agency's (TWRA) Strategic Plan calls for a 15% increase in populations and habitat, objectives were increased by 15%.

Under existing management, Chickasaw NWR provides 1,050 acres of managed impoundments, 835 of which are flooded. In addition, 525 acres of winter wheat or corn are planted annually on agricultural lands that surround the impoundments. According to objectives and strategies developed as part of the WTWR Conservation Plan, Chickasaw NWR has target objectives of 13.5 million duck use days and 500,000 goose use days.

Transient Shorebirds

Habitat objectives (acres) derived from shorebird population estimates have been developed by the Mississippi Alluvial Valley Migratory Bird Initiative (MBI) and adopted by the U.S. Shorebird Conservation Plan (USSCP). Whereas these acre objectives are useful in shorebird management, it is generally recognized that intensive management of smaller basins likely results in consistently greater carrying capacity for shorebirds than does less intensive management on extensive areas (Short 1999; USSCP 2000). This results mainly from the fact that optimal habitat conditions for shorebirds occupy a relatively narrow band in the water depth and vegetation density continuums. Providing mudflat/shallow water (i.e. < 2 in. water) conditions with less than 25% vegetative cover over extensive areas is difficult under most management situations in west Tennessee, especially during the fall. As a result, the approach in developing the WTWR Conservation Plan is not only to identify areas potentially suitable for shorebird habitat management (i.e. acquisition, protection, etc.), but also to provide information necessary to manage effectively for shorebirds on existing and potential management areas. Note that this is in contrast to an approach of taking the existing acreage objective and stepping it down to various specific management units (WMAs, refuges, etc.).

Stopover habitat during southward migration has been identified by the U.S. Shorebird Conservation Plan as the critical factor for shorebird habitat management in the LMV region. Quality habitat for shorebirds during this portion of the annual cycle consists of shallow (0-2 in.) water with little standing vegetation (< 25% cover) from late July through October. Because this typically is a dry time of year in west Tennessee, sites that naturally hold water (i.e. low-lying sites with poorly drained, hydric soils) likely offer the most favorable conditions for effective wetland restoration and management.

Current public land habitat objectives for shorebirds in the MAV of Tennessee total 224 acres, whereas planned shorebird habitat acres total 230. In 1999, publicly managed areas within the MAV in west Tennessee provided 97 acres of habitat in the fall specifically for shorebirds (LMV Joint Venture Office, unpublished data). Shorebird habitat goals for TWRA in fall 2000 for the Eagle Lake, White Lake, and Reelfoot WMAs were 90, 120, and 80, respectively, totaling 290 acres. This would have provided well over half of the MBI objective (457 acres). However, due to excessively dry conditions, these goals were not met. If properly managed, a small percentage of the areas identified as potentially suitable for shorebird habitat management in the WTWR Conservation Plan, plus the objective acreage on existing TWRA areas, would more than satisfy the MBI shorebird habitat objective for Tennessee.

Shorebird habitat is largely compatible with waterfowl habitat. Perhaps the most substantial difference between shorebird and waterfowl habitat management is the timing of prescribed actions. Fall shorebird migration occurs earlier than migration for most waterfowl species. However, managing for early fall migrant shorebirds will provide optimal habitat for southward-migrating blue-winged teal. Basins drawn down in late summer for shorebird habitat can be reflooded in November, making seeds in the substrate available to waterfowl. Additionally, shallow water habitat during late summer/early fall is beneficial to many species of wading birds, including herons, egrets, and wood storks.

Waterfowl and shorebirds also differ somewhat in their use of water depth. Generally, dabbling ducks use a wider range of water depths than shorebirds. Hence, maintaining shallow water (< 6 inches) accommodates both shorebirds and dabbling ducks, whereas deeper water (8-12 inches) excludes most of the shorebird species common to this region. Likewise, ducks tolerate a greater density of standing vegetation than shorebirds. Fortunately, reducing standing vegetation by disking in late summer/fall enhances benthic invertebrate density, creates conditions suitable for shorebird use, and can increase seed density for waterfowl in the subsequent growing season (Gray et al. 1999). However, note that disking or mowing prior to October (as is recommended for some fall shorebird habitat scenarios) will reduce seed production by late-seeding grasses, such as millet and panic grasses, which are heavily utilized by waterfowl. Managing multiple units under a variety of regimes will ensure that such loss of potential waterfowl food occurs on only a few units (< 2) in a given year.

Under existing management on Chickasaw NWR, approximately 100 acres are managed during the spring shorebird migration period, and approximately 30 acres are provided during the fall migration period.

Forest-breeding Birds

Habitat objectives for land birds in the MAV have been established by Partners in Flight in the Mississippi Alluvial Valley Bird Conservation Plan (Twedt et al. 1998). Swallow-tailed kite restoration, stable or increasing cerulean warbler populations, and stable or increasing Swainson's warbler populations are the primary land bird goals in the MAV Bird Conservation Plan. In order to meet the population objectives for these species, the Plan has identified 87 Bird Conservation Areas, broken down into 52 10,000-to-20,000-acre blocks, 36 20,000-to-100,000-acre blocks, and 13 blocks of over 100,000 acres each, as MAV Bird Conservation Areas were identified by Ford (1998).

Bottomland hardwoods have been identified as the habitat of primary concern in the MAV, with at least 70 species of land birds occurring in this habitat type in the physiographic area (Twedt et al. 1998). The highest priority land birds species in the MAV include Swainson's warbler, cerulean warbler, and swallow-tailed kite, all of which occur in bottomland hardwood forests.

In the MAV in Tennessee, there are currently 70,475 acres of bottomland hardwoods currently under some kind of conservation protection that benefits land birds. The majority of these acres are in public ownership. An additional 6,964 acres of bottomland hardwoods are planned for future conservation actions, and an additional 89,941 acres of bottomland hardwoods are desired for future conservation action in order to attain target objectives for land birds in the MAV of Tennessee (TWRA and USFWS 2002). These conservation activities have been further refined into implementation zones.

Migratory bird habitat objectives are segregated by implementation zones, and the "Middle Implementation Zone" for the west Tennessee MAV is shown in Figure 5 of the Chickasaw Draft CCP. The Middle Implementation Zone includes Moss Island Wildlife Management Area and extends south to encompass Lower Hatchie NWR. The total acreage is 165,472 acres. Currently, 46,328 acres are under migratory bird management, with an additional 2,627 acres planned or under development. An additional 57,631 acres are necessary to meet migratory bird habitat objectives in this zone. These acreage figures

reflect actual migratory bird habitat; the total acreage is higher to include open water, buildings, and other miscellaneous land uses. The necessary future condition for migratory land birds will require bottomland hardwood forests, dry scrub/shrub, and managed grasslands.

A primary focus for the middle implementation zone should be the acquisition of core forested areas, such as the John T. Tully Wildlife Management Area (formerly the Anderson-Tully property) in Lauderdale County, acquired by Tennessee Wildlife Resources Agency in 2002. This property is comprised of 11,500 acres of mature bottomland hardwood forest, and serves as a core area for high-priority interior forest Neotropical migrants such as the cerulean warbler and Swainson's warbler. In addition to the acquisition of the Tully property, forested blocks are proposed to be increased at Moss Island Wildlife Management Area, Chickasaw NWR, and Lower Hatchie NWR. Habitat corridors, primarily on or near the bluffs, are also proposed to connect forested tracts.

Under existing management, Chickasaw NWR provides approximately 20,293 managed acres of bottomland hardwood forest for land birds, approximately 503 acres of upland forest, and 515 acres of savannah. Under WTWR Conservation Plan goals and objectives, Chickasaw NWR should target an additional 28,257 forested acres.

Threatened and Endangered Bird Species

Part of the Service mission is to protect, enhance, and manage habitat for threatened and endangered species, in keeping with the enforcement of the Endangered Species Act. Two federally listed bird species known to use the Chickasaw NWR vicinity during at least part of their life cycle include the bald eagle and the interior least tern.

The bald eagle, a threatened species that the Service plans to delist, winters in the Mississippi Alluvial Valley of Tennessee in large numbers. Nearby Reelfoot Lake has one of the largest overwintering populations in the lower 48 states. As many as 16 bald eagles have been known to occur in the Chickasaw vicinity, and three active nests are known to exist on the refuge. The refuge's continuing habitat restoration and protection activities provide suitable habitat for nesting eagles.

The interior least tern interior population is an endangered species which has a number of active nesting colonies on sandbars within the Mississippi River adjacent to Tennessee. There are active nesting colonies of interior least tern known to exist on Mississippi River sand bars immediately adjacent to the western boundary of Chickasaw NWR. Interior least terns feed regularly on sand bars and in drainage canals within the refuge boundary. The refuge's protection of lands immediately adjacent to the Mississippi River provides protection to sand bars where least tern nesting colonies exist during summer months.

A Section 7 Intra-Service Biological Evaluation addressing those species is provided in Appendix V.

ARCHAEOLOGICAL AND HISTORIC RESOURCE PROTECTION

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. Several themes are consistently present in the laws and the establishing regulations. They include: (1) each agency to systematically inventory the "historic sites" on its holdings and to scientifically assess each site's eligibility for the National Register of Historic Places; (2) consideration of impacts to cultural resources during the agency's management activities and seeking to avoid or mitigate adverse impacts; (3) protection of cultural

resources from looting and vandalism 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, to address how a project or management activity may impact specific archaeological sites and landscapes deemed important to those groups.

The objectives and strategies below outline the Service's attempt to achieve mandated historic preservation responsibilities in a manner consistent with its mission and the refuge's mission.

The Fish and Wildlife Service Regional Archaeologist coordinates a Memorandum of Understanding with pertinent federal and state agencies, such as the Tennessee Wildlife Resources Agency, to enhance law enforcement of the Archaeological Resources Protection Act, the Native American Grave Protection and Repatriation Act, and Section 50 of the Code of Federal Regulations, as well as to facilitate investigations of Archaeological Resources Protection Act violations and unpermitted artifact collection on the refuge.

A review of the state site files located at the Tennessee Department of Environment and Conservation Division of Archaeological Resources will provide preliminary information on known or potential archaeological sites and historic structures within or near the refuge. Such information will aid the Service in the development of a long-term management plan for cultural resources. A comprehensive refuge-wide archaeological survey is recommended so that the Service's management options can be fully realized in a cost-effective manner. The survey will provide a site predictive model based upon the region's cultural history, known site distribution, oral history interviews, historic documents, historic land use patterns, topography, geomorphology, soils, hydrology, and vegetative patterns.

ECOSYSTEM MANAGEMENT

Ecosystems are communities of living organisms interacting among themselves and with the physical components of their environment. Ecosystems worldwide are experiencing increasing impacts from human activities, resulting in greater challenges to effective management and conservation. In recent years, conservationists have fostered the idea that resource conservation can best be achieved by taking a holistic approach to management. The ecosystem approach to fish and wildlife conservation means protecting or restoring the function, structure, and species composition of an ecosystem while providing for its sustainable socioeconomic use. It involves recognizing that, in some way, all things within the ecosystem are interconnected. As such, the Service is working with divergent interests on ecosystem-based approaches to conserve the variety of life and its processes in the Nation's diverse ecosystems.

The Service's mission is to conserve, protect, and enhance the Nation's fish and wildlife and their habitats for the continuing benefit of the American people. Healthy habitats are necessary to sustain fish, wildlife, and plants on lands in the National Wildlife Refuge System. In the past, the administrative boundaries of refuges have often bounded the scope of planning and policy decisions. The Service's objective in ecosystem management is to implement consistent policies and procedures that will embrace the larger "management environment," considering the needs of all resources in decision making. This holistic approach to fish and wildlife conservation enables the Service to more efficiently and effectively maintain healthy ecosystems on a long-term basis and to conserve the Nation's rich biological heritage.

In the early 1990s, the Service adopted an ecosystem approach to resource management, identifying 53 separate ecosystems within the United States (USFWS 1994). Included in this group is the Lower Mississippi River Ecosystem, which includes Chickasaw National Wildlife Refuge. The Lower Mississippi River Ecosystem Team, composed of Service personnel and partners with professional expertise in the Lower Mississippi River Valley, focuses on landscape-level problems affecting fish and wildlife resources and provides specific guidance that will best serve trust species and species of concern and reduce impacts associated with forest fragmentation. The ecosystem approach emphasizes conservation and management of discrete land units, watersheds, or ecosystems and requires the identification of ecosystem goals that represent resource priorities. On a more local level, the comprehensive conservation planning team reflects the conservation strategies for national wildlife refuges within the ecosystem and identifies strategies on which to focus management efforts. The Service must work closely and consistently with external partners, public and private, who share responsibility for ecosystem health and biological diversity. This approach enables the Service to fulfill its fish and wildlife trust responsibilities with greater efficiency and effectiveness. (See Chapter I of the Draft CCP for further discussion of specific ecosystem issues).

LAND PROTECTION AND CONSERVATION

All federal agencies by law have the power of eminent domain, which allows the use of condemnation to acquire lands and interests in lands for the public good. However, it is the policy of the Service to acquire lands from willing sellers only, and only when other protective means, such as local zoning restrictions and regulations, are not appropriate, available, or effective.

The Service acquires lands and interests in lands, such as easements and management rights, through leases or cooperative agreements consistent with legislation or other Congressional guidelines and executive orders, for the conservation of fish and wildlife and to provide wildlife-oriented public use for educational and recreational purposes. These lands include national wildlife refuges, national fish hatcheries, research facilities, and other areas.

When land is needed to achieve fish and wildlife conservation objectives, the Service seeks to acquire the minimum interest necessary to reach those objectives. If fee title is required, the Service gives full consideration to extended use reservations, exchanges, or other alternatives that will lessen the impact on the owner and the community. Donations of desired lands or interests are encouraged. In all fee title acquisition cases, the Service is required by law to offer 100 percent of the property's appraised market value, as set out in an approved appraisal that meets professional standards and federal requirements.

Planning for the acquisition of land, water, or other interests is initiated with the identification of a need to meet resource objectives that require a real property base. At Chickasaw NWR, a team of biologists, planners, and realty specialists evaluated myriad factors, such as fish and wildlife resources, land use, threats to resource values, socioeconomic considerations, and cultural resources, to determine the original refuge boundary in 1985 (USFWS 1985).

In 2000, an expanded acquisition boundary was approved which could potentially increase the refuge's total size to 60,240 acres. The recommendations in the *Final Environmental Assessment and Land Protection Plan: Proposed Expansion of Chickasaw and Lower Hatchie National Wildlife Refuges* (USFWS 2000) define important and sensitive areas that could be protected and managed as part of the Refuge System. The plan was eventually forwarded to the Director of the U.S. Fish and Wildlife Service for approval. During the review of the draft plan, the public was given opportunities to comment on and respond to the proposed plan.

Once funds become available, the Service proceeds to contact all landowners within the refuge's approved acquisition boundary to determine if there are any willing sellers. If a landowner expresses an interest in selling his or her lands to the Service, a professional real estate appraiser conducts an appraisal to determine the fair market value of the property. Once the fair market value is determined, a meeting is held with the landowner and the Service presents its offer. If the landowner agrees with the offer, the purchase agreement is signed and the process of acquiring the land is set in motion.

As of July 1, 2004, land acquisitions within the approved acquisition boundary have resulted in Chickasaw NWR acreage of 25,006 acres. In acquisition considerations, lands adjacent to Service-owned lands within the existing refuge boundary and larger contiguous forested tracts (inside or outside the current approved acquisition boundary) and marginal farmland are given the highest priority.

The land acquisition methods that could be used by the Service are described as follows:

1. Leases and Cooperative Agreements

Potentially, the Service can protect and manage habitat through leases and cooperative agreements. Management control on privately owned lands can be obtained by entering into long-term renewable leases or cooperative agreements with the landowners. Short-term leases can be used to protect or manage habitat until more secure land protection can be negotiated.

2. Conservation Easements

Conservation easements give the Service the opportunity to manage lands for their fish and wildlife habitat values. Such management precludes all other uses that are incompatible with the Service's management objectives. Only land uses that would have minimal or no conflicts with the management objectives are retained by the landowner. In effect, the landowner transfers certain development rights to the Service for management purposes as specified in the easement. Easements would likely be useful when (a) most, but not all, of a private landowner's uses are compatible with the Service's management objectives, and (b) the current owner desires to retain ownership of the land and continue compatible uses under the terms set by the Service in the easement. Land uses that are normally restricted under the terms of a conservation easement include (a) development rights (agricultural, residential, etc.); (b) alteration of the area's natural topography; (c) uses adversely affecting the area's floral and faunal communities; (d) private hunting and fishing lease; (e) excessive public use and access; and (f) alteration of the natural water regime.

3. Fee Title Acquisition

A fee title interest is normally acquired when (a) the area's fish and wildlife resources require permanent protection not otherwise assured; (b) land is needed for visitor use development; (c) a pending land use could adversely impact the area's resources; or (d) it is the most practical and economical way to assemble small tracts into a manageable unit. Fee title acquisition conveys all ownership rights to the federal government and provides the best assurance of permanent resource protection. A fee title interest may be acquired by donation, exchange, transfer, or purchase.

Funds for the acquisition of lands for Chickasaw National Wildlife Refuge will likely come from the Land and Water Conservation Fund or the Migratory Bird Conservation Fund. Sources of revenue for these funds include federal Duck Stamp sales, refuge entrance fees, fish and wildlife fines, import taxes on arms and ammunition, offshore oil and gas leases, and Congressional appropriations.

Lands acquired by the Service are removed from local real estate tax rolls. To offset the fiscal impact associated with the removal of these lands from the public tax rolls, the Refuge Revenue Sharing Act of 1935, as amended in 1978, provides for payments in lieu of taxes. Revenue-sharing payments for the county would compare favorably with current tax rates. If fully funded, the revenue-sharing rate is

1% of the fair market value of a property. For lands purchased by the Service, the following formulas are used to determine the annual payment amount to the county. Payment for acquired land is computed on whichever of the formulas yields the greatest result: (1) three-fourths of 1 percent of the fair market value of the lands acquired in fee title; (2) 25 percent of the net refuge receipts collected; or (3) 75 cents per acre of the lands acquired in fee title within the county.

Lands subject to refuge revenue-sharing payments are reappraised every 5 years. The appraisals are set on the fair market value of the land, based on the highest and best use. The appraised market value of the fee title lands within the refuge, and thus the revenue-sharing payments, would change over time in relation to the changing value of non-refuge lands.

The Service's proposed action (Alternative D) could result in the acquisition of an additional 35,234 acres of wildlife habitat within the current approved acquisition boundary of Chickasaw National Wildlife Refuge, through a combination of fee title purchases and/or donations from willing sellers and less-than-fee interests (conservation easements, cooperative agreements) from willing landowners. The Service believes these are the minimum interests necessary to preserve and protect the fish and wildlife resources in the proposed area.

The private property has been prioritized for acquisition using the following criteria:

- Biological significance;
- Existing and potential threats;
- Significance of the area to refuge management and administration; and
- Existing commitments to purchase or protect land.

Appendix VII. Public Involvement

A part of the planning process is to inform the public and solicit their ideas. To accomplish this objective, a number of different means were employed and are described below.

Early in the planning process, a Notice of Intent was published in the *Federal Register*. Local publicity was provided by newspaper interviews and radio interviews prior to public scoping meetings. Presentations describing the upcoming planning process were given at West Tennessee Rotary Clubs, Friends of West Tennessee National Wildlife Refuges meetings, Planning Review Group meetings, as well as Service Ecoteam meetings. Mailings were sent to about 150 persons, media representatives, local officials, and agencies, providing information about the planning process and four upcoming open house/scoping meetings to be held in the West Tennessee area. Flyers were posted in local communities, and newspaper articles and radio interviews advertised the upcoming meetings and the comprehensive conservation planning (CCP) process. A news release went out from the Service's Regional Office which was carried by numerous other media sources.

A public open house and scoping meeting was held November 2, 2000, in Ripley, Tennessee, in which attendees were provided an opportunity to learn about the refuge's purpose, mission, and goals, as well as issues and opportunities currently facing refuge management. The comprehensive conservation planning process was described and attendees had the chance to provide oral or written comments to be considered in the development of the plan. Attendees at the scoping meeting were provided a sign-up sheet for the CCP mailing list, a written questionnaire, and opportunities to give public comments and ask questions, both in the scoping meeting as well as to managers at the open house.

All mailings, presentations, interviews, and meetings provided instructions as to how public input could be provided for the planning process. Throughout the planning process, comments were received by telephone, personal visits, e-mail, and mail.

In addition to public outreach and scoping meetings, a Planning Review Group was developed, consisting of resource professionals, local officials, and interested citizens who were willing to provide input during the planning process. The Planning Review Group for the refuge included representatives from Ducks Unlimited, Dyersburg State Community College, Tennessee Wildlife Resources Agency, Anderson Tully Company, and the U. S. Department of Agriculture, as well as local officials, businessmen, farmers, landowners, and sportsmen. This group met and was provided an overview of the planning process. Members of this group continued to provide comments during the planning process by reviewing sections of the document which were relevant to their areas of expertise. A copy of the initial draft CCP was provided to each member of this group for comments.

The comments received during the public scoping process are summarized as follows:

- Provide increased hunting opportunities.
- Provide increased fishing opportunities
- Maintain and/or provide trails and roads for improved access.
- Provide wildlife viewing and photography opportunities.
- Provide increased habitat management activities.
- Provide increased water management capabilities in the waterfowl sanctuary.
- Provide and improve access to Right Hand Arm.
- Landowner concerns regarding federal acquisitions of private lands and desire for more information provided to public about acquisitions.

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- Need for more assessment and inventory of refuge plants and animals.
 - Address “public opposition” to killing of wildlife on national wildlife refuges.
 - Develop “humane and socially acceptable” predator management strategies to protect threatened and endangered species.
 - Assess and mitigate impacts of recreational activities on plants and animals.
 - Examine the emphasis on management for particular species/groups.
 - Need for a thorough discussion of proposed refuge habitat management practices.

Additional comments are expected from public review of this Draft Comprehensive Conservation Plan and Environmental Assessment. All relevant comments received will be addressed specifically in the Final Comprehensive Conservation Plan.

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