Tensas River National Wildlife Refuge

Comprehensive Conservation Plan

U.S. Department of the Interior
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Southeast Region

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COMPREHENSIVE CONSERVATION PLAN

TENSAS RIVER NATIONAL WILDLIFE REFUGE

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U.S. Department of the Interior
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I. Background

INTRODUCTION

This Comprehensive Conservation Plan (CCP) for Tensas River National Wildlife Refuge (NWR), Tallulah, Louisiana, (Figure 1) was prepared to guide management actions and direction for the refuge. Fish and wildlife conservation will receive first priority in refuge management. Wildlife-dependent recreation will be allowed and encouraged as long as it is compatible with, and does not detract from, the mission of the refuge or the purposes for which it was established.

A planning team developed goals and objectives of the refuge that could be implemented within the 15-year planning period. This CCP was made available to federal and state agencies, conservation partners, and the general public for review and comment. Comments from each entity have been considered in the development of this CCP.

PURPOSE AND NEED FOR THE PLAN

The purpose of the CCP is to develop an action that best achieves the refuge purpose; attains the vision and goals developed for the refuge; contributes to National Wildlife Refuge System (Refuge System) mission; addresses key problems, issues, and relevant mandates; and is consistent with sound principles of fish and wildlife management.

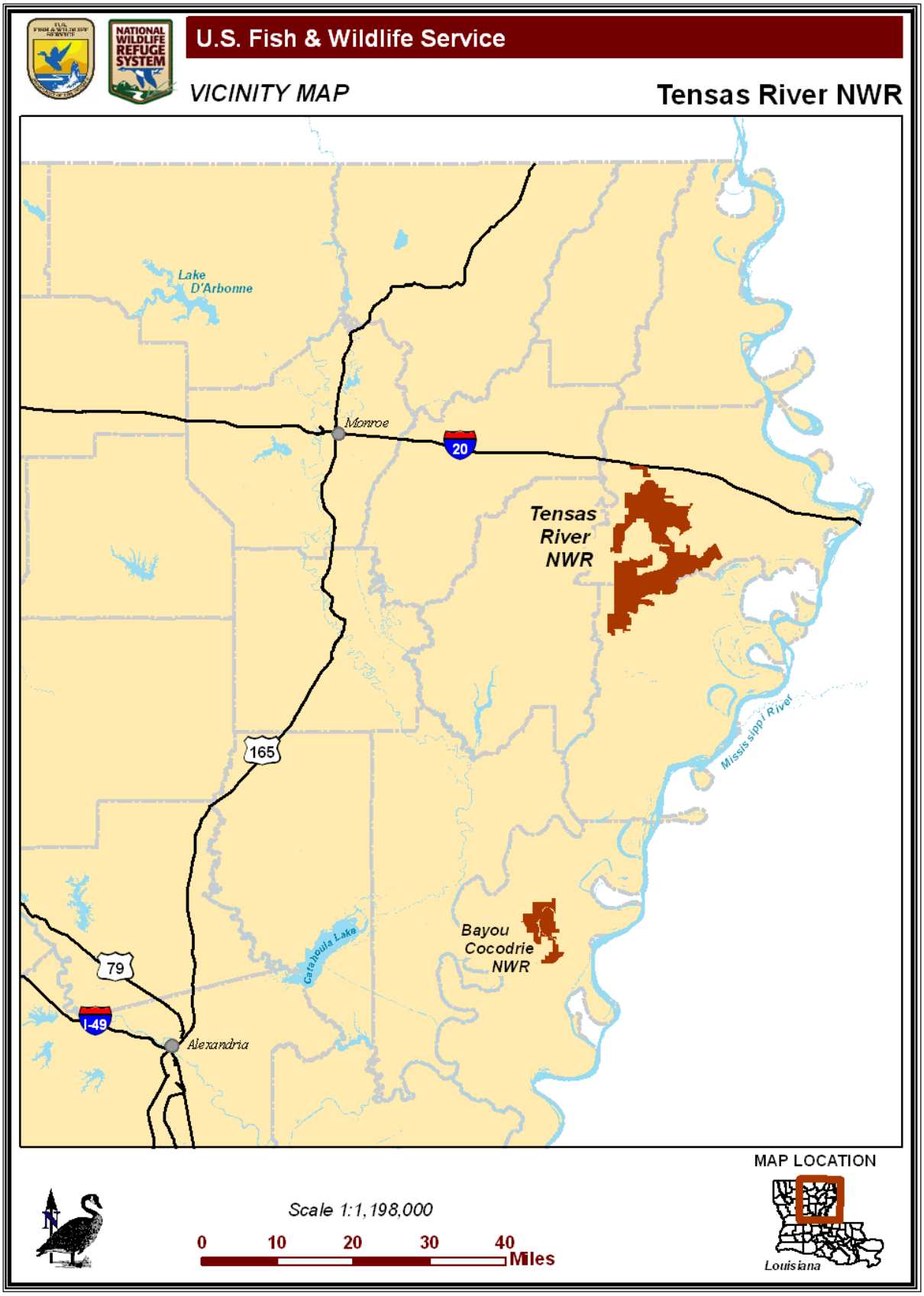
Specifically, the plan:

- Provides a clear statement of refuge management direction;
- Provides refuge neighbors, visitors, and government officials with an understanding of Service management actions on and around the refuge;
- Ensures that Service management actions, including land protection and recreation/education programs, are consistent with the mandates of the Refuge System; and
- Provides a basis for the development of budget requests for operations, maintenance, and capital improvement needs.

This CCP also addresses the purposes for which the refuge was established; and these are:

- Conserve and develop the environmental resource;
- Conserve the diversity of fish and wildlife and their habitat;
- Conserve and develop wildlife and natural resources;
- Develop outdoor recreation opportunities;
- Develop interpretive education; and
- Conserve fish and wildlife that are listed as endangered species or threatened species.

Figure 1. Tensas River NWR, Tallulah, Louisiana



FISH AND WILDLIFE SERVICE

The Service traces its roots to 1871 and to the establishment of the Commission of Fisheries involved with research and fish culture. The once independent commission was renamed the Bureau of Fisheries and placed in the Department of Commerce and Labor in 1903.

The Service also traces its roots to 1886 and to the establishment of a Division of Economic Ornithology and Mammalogy in the Department of Agriculture. Research on the relationship of birds and mammals to agriculture shifted to delineation of the range of plants and animals, so the name was changed to the Division of the Biological Survey in 1896.

On June 30, 1940, the Bureau of Fisheries and Bureau of Biological Survey combined to create the Fish and Wildlife Service under the Department of the Interior. The name was changed to the Bureau of Sport Fisheries and Wildlife in 1956, and finally to the U.S. Fish and Wildlife Service in 1974.

The Service is responsible for conserving, enhancing, and protecting fish and wildlife and their habitats for the continuing benefit of people through federal programs relating to wild birds, endangered species, certain marine mammals, inland sport fisheries, and specific fishery and wildlife research activities.

As part of its mission, the Service manages more than 540 national wildlife refuges covering over 95 million acres. These areas comprise the National Wildlife Refuge System, the world's largest collection of lands set aside specifically for fish and wildlife. The majority of these lands, 77 million acres, is in Alaska. The remaining acres are spread across the other 49 states and several United States territories. In addition to refuges, the Service manages thousands of small wetlands, national fish hatcheries, 64 fishery resource offices, and 78 ecological services field stations. The Service enforces federal wildlife laws; administers the Endangered Species Act; manages migratory bird populations; restores nationally significant fisheries; conserves and restores wildlife habitat; and helps foreign governments with their conservation efforts. It also oversees the Federal Aid program that distributes hundreds of millions of dollars in excise taxes on fishing and hunting equipment to state fish and wildlife agencies.

NATIONAL WILDLIFE REFUGE SYSTEM

The mission of the Refuge System, as defined by the National Wildlife Refuge System Improvement Act of 1997 (Improvement Act) 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 Improvement Act established, for the first time, a clear legislative mission of wildlife conservation for the Refuge System. Actions were initiated in 1997 to comply with the direction of this new legislation including an effort to complete CCPs for all refuges. These CCPs, which are completed with full public involvement, help guide the future management of refuges by establishing natural resources and recreation/education programs. Consistent with the Improvement Act, approved CCPs will serve as the guidelines for refuge management for the next 15 years. The Improvement Act states that each refuge shall be managed to:

- Fulfill the mission of the Refuge System;
- Fulfill the individual purposes of each refuge;
- Consider the needs of wildlife first;

- Fulfill requirements of CCPs that are prepared for each unit of the Refuge System;
- Maintain the biological integrity, diversity, and environmental health of the Refuge System;
- Recognize that wildlife-dependent recreation activities including hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation are legitimate and priority public uses; and
- Allow refuge managers the authority to determine compatible public uses.

The following are just a few examples of your national network of conservation lands. Pelican Island NWR, the first refuge, was established in 1903 for the protection of colonial nesting birds in Florida such as the snowy egret and the brown pelican. Western refuges were established for American bison (1906), elk (1912), prong-horned antelope (1931), and desert bighorn sheep (1936) after over-hunting, competition with cattle, and natural disasters decimated once-abundant herds. The drought conditions of the 1930s severely depleted breeding populations of ducks and geese. Refuges established during the Great Depression focused on waterfowl production areas, i.e., protection of prairie wetlands in America's heartland. The emphasis on waterfowl continues today but also includes protection of wintering habitat in response to a dramatic loss of bottomland hardwoods. By 1973, the Service began to focus on establishing refuges for endangered species.

In Fiscal Year 2006, 34.8 million people visited refuges, most to observe wildlife in their natural habitats (Caudell and Carver 2007). Their spending generated almost $1.7 billion in sales in regional economies. As this spending flowed through the economy, nearly 27,000 people were employed, and $542.8 million in employment income was generated. About 82 percent of total expenditures are generated by non-consumptive activities on refuges. Fishing accounted for 12 percent and hunting 6 percent. Local residents accounted for 13 percent of expenditures while visitors coming from outside the local area accounted for 87 percent (Caudell and Carver 2007). The above results include refuge visitation in the contiguous United States. Spending and employment by the refuges themselves, payments in lieu of taxes, commercial activities on refuges, and many other economic effects of refuges on local economies were not considered in this analysis.

Volunteers continue to be a major contributor to the success of the Refuge System. In 2002, volunteers contributed more than 1.5 million hours on refuges nationwide, a service valued at more than $22 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 and growth must be strategic; and that the Refuge System serves as a model for habitat management with broad participation from others.

The Improvement Act stipulates that CCPs be prepared in consultation with adjoining federal, state, and private landowners and that Service develop and implement a process to ensure an opportunity for active public involvement in the preparation and revision (every 15 years) of the CCPs.

All lands of the Refuge System will be managed in accordance with an approved CCP that will guide management decisions and set forth strategies for achieving the refuge unit purposes. The CCP will be consistent with sound resource management principles, practices, and legal mandates including Service compatibility standards and other Service policies, guidelines, and planning documents.

LEGAL AND POLICY CONTEXT

LEGAL MANDATES, ADMINISTRATIVE AND POLICY GUIDELINES, AND OTHER SPECIAL CONSIDERATIONS

The administration of national wildlife refuges is guided by the mission and goals of the Refuge System, congressional legislation, presidential executive orders, and international treaties. Policies for management options of refuges are further refined by administrative guidelines established by the Secretary of the Interior and by policy guidelines established by the Director of the Fish and Wildlife Service. Select legal summaries of treaties and laws relevant to administration of the Refuge System and management of the Tensas River NWR are provided in Appendix C.

Treaties, laws, administrative guidelines, and policy guidelines assist the refuge manager in making decisions pertaining to soil, water, air, flora, fauna, and other natural resources; historical and cultural resources; research and recreation on refuge lands; and provide a framework for cooperation between Tensas River NWR and other partners. Examples of partners include the Louisiana Department of Wildlife and Fisheries (LDWF), The Nature Conservancy, Ducks Unlimited, Tensas River NWR Friends Association, and private landowners.

Lands within the Refuge System are closed to public use unless specifically and legally opened. No refuge use may be allowed unless it is determined to be compatible. A compatible use is a use that, in the sound professional judgment of the refuge manager, will not materially interfere with or detract from the fulfillment of the mission of the Refuge System or the purposes of the refuge. All programs and uses must be evaluated based on mandates set forth in the Improvement Act. Those mandates are to:

- Contribute to ecosystem goals, as well as refuge purposes and goals;
- Conserve, manage, and restore fish, wildlife, and plant resources and their habitats;
- Monitor the trends of fish, wildlife, and plants;
- Manage and ensure appropriate visitor uses as those uses benefit the conservation of fish and wildlife resources and contribute to the enjoyment of the public; and
- Ensure that visitor activities are compatible with refuge purposes.

The Improvement Act further identifies six priority wildlife-dependent recreational uses: hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation. As priority public uses of the Refuge System, they receive priority consideration over other public uses in planning and management.

BIOLOGICAL INTEGRITY, DIVERSITY, AND ENVIRONMENTAL HEALTH POLICY

The Improvement Act directs the Service to ensure that the biological integrity, diversity, and environmental health of the Refuge System are "…maintained for the benefit of present and future generations of Americans…" The policy is an additional directive for refuge managers to follow while achieving refuge purpose(s) and Refuge System mission. It provides for the consideration and protection of the broad spectrum of fish, wildlife, and habitat resources found on refuges and associated ecosystems. When evaluating the appropriate management direction for refuges, refuge managers will use sound professional judgment to determine their refuges' contribution to biological integrity, diversity, and environmental health at multiple landscape scales. Sound professional judgment incorporates field experience, knowledge of refuge resources, refuge role within an ecosystem, applicable laws, and best available science including consultation with others both inside and outside the Service.

NATIONAL AND INTERNATIONAL CONSERVATION PLANS AND INITIATIVES

Multiple partnerships have been developed among government and private entities to address the environmental problems affecting regions. There is a large amount of conservation and protection information that defines the role of the refuge at the local, national, international, and ecosystem levels. Conservation initiatives include broad-scale planning and cooperation between affected parties to address declining trends of natural, physical, social, and economic environments. The conservation guidance described below, along with issues, problems, and trends, was reviewed and integrated where appropriate into this CCP.

This CCP supports, among others, the North American Bird Conservation Initiative, the North American Waterfowl Management Plan, and the Partners in Flight Plan, the U.S. Shorebird Conservation Plan, and the Northern American Waterbird Conservation Plan.

North American Bird Conservation Initiative. Started in 1999, the North American Bird Conservation Initiative is a coalition of government agencies, private organizations, academic institutions, and private industry leaders in the United States, Canada, and Mexico working to ensure the long-term health of North America's native bird populations by fostering an integrated approach to bird conservation to benefit all birds in all habitats. The four international and national bird initiatives include the North American Waterfowl Management Plan, Partners in Flight, the U.S. Shorebird Conservation Plan, and the Northern American Waterbird Conservation Plan.

North American Waterfowl Management Plan. The North American Waterfowl Management Plan (NAWMP) is an international action plan to conserve migratory birds throughout the continent. NAWMP's goal is to return waterfowl populations to their 1970s levels by conserving wetland and upland habitat. Canada and the United States signed the NAWMP in 1986 in reaction to critically low numbers of waterfowl. Mexico joined in 1994 making it a truly continental effort. The NAWMP is a partnership of federal, provincial/state, and municipal governments; non-governmental organizations; private companies; and many individuals all working towards achieving better wetland habitat for the benefit of migratory birds, other wetland-associated species, and people. NAWMP's projects are international in scope but implemented at regional levels. These projects contribute to the protection of habitat and wildlife species across the North American landscape. The Mississippi Alluvial Valley (MAV) is a critical ecoregion for migrating and wintering ducks and geese in North America. Tensas River NWR provides important foraging and resting (sanctuary) habitats within the MAV for these waterfowl and serves an integral role in a large, cooperative planning and habitat management effort of the NAWMP.

Partners in Flight Bird Conservation Plan. Managed as part of the Partners in Flight (PIF) Plan, the East Gulf Coastal Plain physiographic area represents a scientifically based landbird conservation planning effort that ensures long-term maintenance of healthy populations of native landbirds, primarily non-game landbirds. Non-game landbirds have been vastly under-represented in conservation efforts, and many are exhibiting significant declines. This PIF Plan is voluntary and non-regulatory and focuses on relatively common species in areas where conservation actions can be most effective rather than the frequent local emphasis on rare and peripheral populations.

The PIF Plan formed Bird Conservation Plans by Bird Conservation Regions that set conservation priorities and habitat and population objectives. Habitats found on Tensas River NWR and associated bird species that are considered a priority in the MAV (BCR 05) include (Twedt et al., 1999):

1. Bottomland hardwood forest: ivory-billed woodpecker, swallow-tailed kite, Swainson's warbler, cerulean warbler, prothonotary warbler, and northern parula,
2. Secondary growth: painted bunting and Bell's vireo, and
3. Moist cleared land: shorebirds and waterfowl.

U.S. Shorebird Conservation Plan. The U.S. Shorebird Conservation Plan is a partnership effort throughout the United States to ensure that stable and self-sustaining populations of shorebird species are restored and protected. The plan was developed by a wide range of agencies, organizations, and shorebird experts for separate regions of the country and identifies conservation goals, critical habitat conservation needs, key research needs, and proposed education and outreach programs to increase awareness of shorebirds and the threats they face.

Tensas River NWR is included in the Lower Mississippi/Western Gulf Coast Shorebird Planning Region. This plan recommends that public lands provide as much fall shorebird habitat as possible to meet the goal of 520 hectare of fall habitat in Louisiana (Helmers 1992). The following species are considered high priority for the region: piping plover, American golden-plover, marbled godwit, ruddy turnstone, red knot, sanderling, buff-breasted sandpiper, American woodcock, and Wilson's phalarope (Wilson 2000).

Northern American Waterbird Conservation Plan. This plan provides a framework for the conservation and management of 210 species of waterbirds in 29 nations. Threats to waterbird populations include destruction of inland and coastal wetlands; introduced predators and invasive species; pollutants; mortality from fisheries and industries; disturbance; and conflicts arising from abundant species. Particularly important habitats of the southeast region include pelagic areas, marshes, forested wetlands, and barrier and sea island complexes. Fifteen species of waterbirds are federally listed including breeding populations of wood storks, Mississippi sandhill cranes, whooping cranes, interior least terns, and gulf coast populations of brown pelicans (Hunter and Golder, In prep). A key objective of this plan is the standardization of data collection efforts to better recommend effective conservation measures.

RELATIONSHIP TO STATE WILDLIFE AGENCY

A provision of the Improvement Act, and subsequent agency policy, is that the Service shall ensure timely and effective cooperation and collaboration with other state fish and game agencies and tribal governments during the course of acquiring and managing refuges. State wildlife management areas and national wildlife refuges provide the foundation for the protection of species and contribute to the overall health and sustainment of fish and wildlife species in the State of Louisiana.

The Louisiana Department of Wildlife and Fisheries (LDWF) is a state-partnering agency with the Service. The LDWF is charged with enforcement responsibilities relating to migratory birds and endangered species, as well as managing state natural resources and approximately 1.4 million acres of coastal marshes and wildlife management areas. LDWF coordinates the state wildlife conservation program and provides public recreation opportunities on state wildlife management areas. The state's participation and contribution throughout this CCP planning process provides for ongoing opportunities and open dialogue to improve the ecological health and diversity of fish and wildlife in the State of Louisiana. A vital part of the CCP's process is integrating common mission objectives where appropriate.

In 2005, LDWF published a Comprehensive Wildlife Conservation Strategy (CWCS) (Lester 2005). The components or steps of the CWCS are:

1. Assess the distribution and abundance of wildlife species including rare and declining species that are indicative of the diversity and health of the State's wildlife.

2. Describe the location and relative condition of key habitats and community types essential to conservation of these species.

3. Identify problems that adversely affect these species and habitats as well as research and survey efforts needed to address these problems.

4. Identify conservation actions needed to conserve these species and habitats and priorities for implementing these actions.

5. Develop plans for monitoring these species and habitats, monitoring the effectiveness of conservation actions, and adapting conservation actions to respond to new information or changing conditions.

6. Develop procedures to review the conservation strategy at intervals not to exceed ten years.

7. Coordinate plan development and implementation with federal, state, and local governments and other organizations that manage significant areas of the state or administer wildlife conservation programs.

8. Encourage public participation in the development, revision, and implementation of the conservation strategy.

The CCP for Tensas River NWR was developed with the cooperation of LDWF and incorporates many elements of the Louisiana CWCS.

II. Refuge Overview

INTRODUCTION

National wildlife refuges provide important habitat for native plants and many species of mammals, birds, fish, insects, amphibians, and reptiles. They also play a vital role in conserving endangered and threatened species. Refuges offer a wide variety of wildlife-dependent recreational opportunities, and many have visitor centers, wildlife trails, and environmental education programs.

REFUGE HISTORY AND PURPOSE

When the first European settlers arrived in the Mississippi Delta, over 25 million acres of seasonally flooded bottomland hardwood forests carpeted the Mississippi Valley. Now less than 5 million acres remain in many scattered areas. In an effort to conserve the largest privately owned tract of bottomland hardwoods remaining in the Mississippi Delta, Congress authorized the Secretary of the Interior to establish the Tensas River NWR by Public Law 96-285 on June 28, 1980. Tensas River NWR was established for various purposes:

"For the preservation and development of the environmental resources ... to conserve the diversity of fish and wildlife and their habitat ... for the conservation and development of wildlife and natural resources, the development of outdoor recreation opportunities, and interpretative education," and "to give special consideration to management of the timber on the refuge to insure continued commercial production and harvest compatible with the purposes for which the refuge is established and the needs of fish and wildlife which depend upon the dynamic and diversified hardwood forest" (94 Stat. 595, dated June 28, 1980);

"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)];

"For conservation purposes" [7 U.S.C. 2002 (Consolidated Farm and Rural Development Act)]; and

"To conserve (A) fish or wildlife which are listed as endangered species or threatened species .... or (B) plants" [16 U.S.C. 1534 (Endangered Species Act of 1973)].

Tensas River NWR consists of 74,622 acres in fee title and 195 acres in easement. It is located in the Tensas River Basin in northeast Louisiana approximately 60 miles southeast of Monroe, Louisiana, and 25 miles southwest of Vicksburg, Mississippi. The refuge area encompasses portions of Madison, Tensas, and Franklin Parishes. The office/visitor center and maintenance facilities on the refuge are located approximately 12 miles southwest of Tallulah, Louisiana (see Figure 1).

Most of the refuge lands were acquired from Chicago Mill and Lumber Company holdings. The main purchase area, locally referred to as the Singer Tract, was used as a source for the wood in old Singer sewing machines and framing for the cars of the 1920s and 1930s.

The refuge was acquired through a joint effort of the Service and the U.S. Army Corps of Engineers (Corps) to mitigate the loss of fish and wildlife resources associated with six flood control projects under construction or being planned in this portion of the state. The Fish and Wildlife Coordination Act that calls for the wildlife resource to be considered along with other values associated with water resource development projects recommended the mitigation lands.

SPECIAL DESIGNATIONS

Designation and management of natural areas is delegated to the Director of the Fish and Wildlife Service by the National Wildlife Refuge System Administration Act of October 15, 1966. Research natural areas and public use natural areas are administratively designated, modified, or abrogated by the Director

Public use natural areas exemplify relatively undisturbed ecosystems that are available for public use with certain restrictions for protecting the integrity and significance of the areas. Such an area must possess exceptional value or quality in illustrating or interpreting an element of the natural heritage of the nation. Only the Refuge System fosters this designation. There are two objectives for public use natural areas. These are (1) to assure the preservation of a variety of significant natural areas for public use, which, when considered together, illustrate the diversity of the Refuge System's natural environments; and (2) to preserve for the future valuable environments that are essentially unmodified by man.

While the refuge promotes, where possible and compatible, public use and enjoyment of the natural resources available on the refuge, there are areas that are closed to the public. The Greenlea Bend is such an area. This area consists of agricultural fields interspersed with moist-soil areas. They are closed to the public in order to provide sanctuary for neotropical migratory birds, migratory waterfowl, deer, the threatened Louisiana black bear, and other wildlife.

The Greenlea Bend "Closed Area" was initiated by the public when it was determined that the entire unit would be managed for crops and moist soil in order to provide a sanctuary for waterfowl. At the time, it supported large flocks of wintering waterfowl. As a waterfowl sanctuary, it performed in that function spectacularly. Its role as sanctuary for the other species is questionable. Since its heyday, a variety of factors has led to a drastic decline in waterfowl use of the refuge. One factor was a desire to fulfill large-scale habitat needs and reduce forest fragmentation for the benefit of forest-dependent neotropical songbirds. In order to reduce this fragmentation, much of the Greenlea Bend agricultural area was replanted with bottomland hardwoods. This reforestation program reduced the desirability of the habitat for many waterfowl species.

When the Stutz Field was an agricultural waterfowl sanctuary, it was closed to the public. Later, it was reforested but remained closed to public access. In 2005-06, it was opened to all access except waterfowl hunting and deer hunting with modern firearms. Deer hunting was allowed as a management tool to reduce the size of the deer herd in this area due to overbrowsing of the replanted trees and the excessive rubbing damage to young trees by rutting bucks.

OIL AND GAS ACTIVITIES

Mineral rights were not actively obtained when the refuge was acquired. Since private interests hold most subsurface mineral rights within the refuge, mineral exploration and production activities can most likely occur anywhere on the refuge; however, most of the oil and gas exploration on Tensas River NWR occurred prior to its inception in 1980. Currently, only seven of the original 96 wells drilled are in production (Figure 2). Most (82) of the wells that were drilled have been properly plugged and abandoned. Twenty-eight of these were productive wells that were properly dismantled after their oil reserves were exhausted, and 54 were dry holes (determined not productive at time of

drilling). Four of the remaining wells are listed in the "shut-in" status. A shut-in well is not producing and either has mechanical problems down hole or is not economically feasible to produce hydrocarbons. Most of the shut-in wells on Tensas River NWR have been shut-in for many years. Shut-in wells can be a problem because wells that have received no attention after long periods of time can become potential environmental threats. Pressure can build up down hole, and if not released, the pressure can cause blowouts. These blowouts can have major negative environmental implications because hydrocarbons and highly saline water can be released into the surrounding environment. Two additional wells are actively used for saltwater disposal. Well #183567 formerly operated by D. G. Hamilton has been abandoned and is listed by the State of Louisiana as orphaned. An additional five wells were permitted but never drilled.

Tensas River NWR currently has one transmission pipeline owned by Ashland Pipeline Company. The transmission line crosses approximately two miles of refuge land and moves products off the refuge. The refuge also has 12 flow lines that transport products from wells to production facilities across approximately ten miles of refuge land.

As the surface owner, Tensas River NWR has the right to require any old, out-of-use equipment and wells that are not in production to be removed so that sites can be returned to wildlife habitat and the threat of environmental contamination minimized.

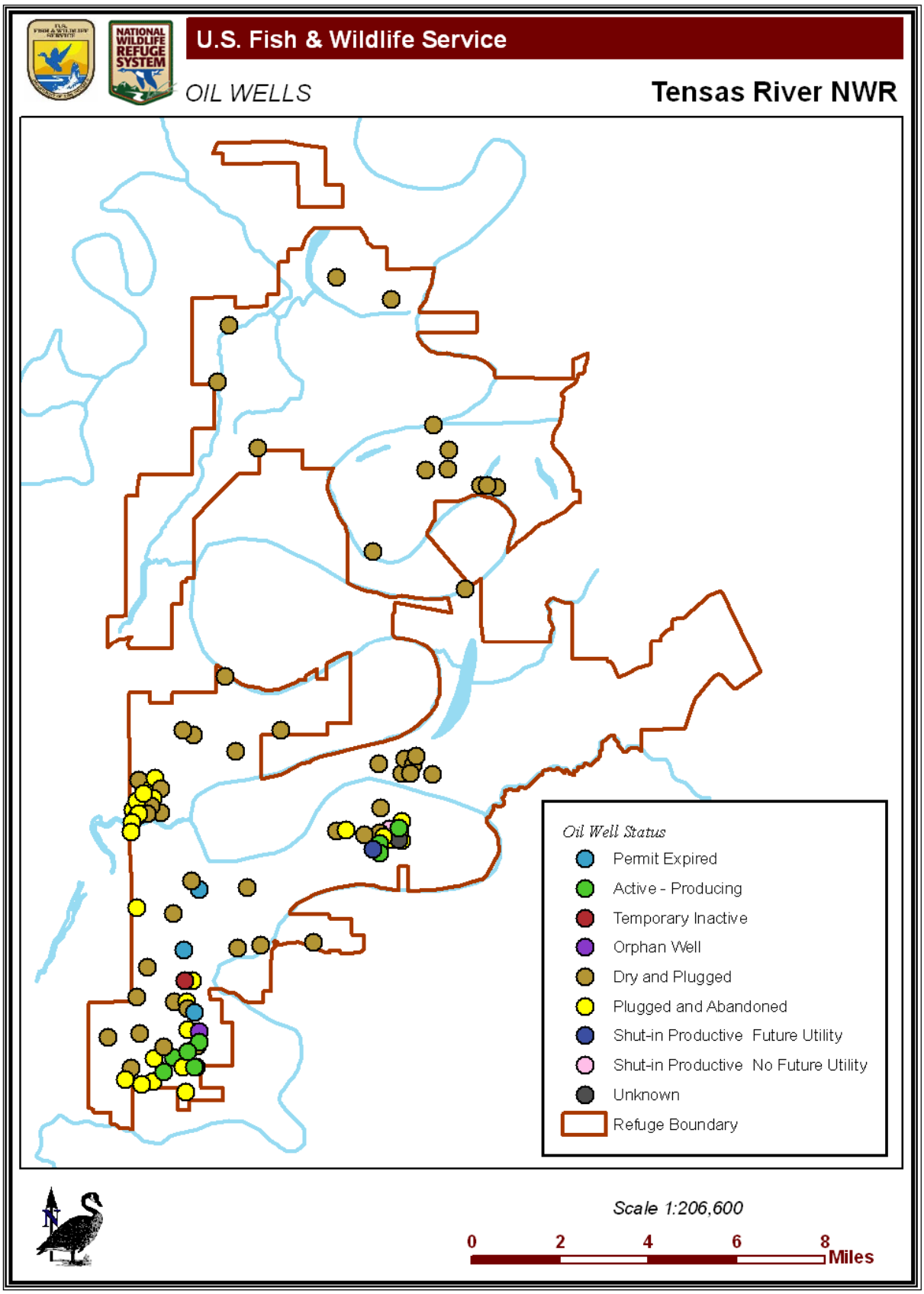
Tensas River NWR requires all spills of any quantity be reported to the refuge, so proper cleanup can be accomplished. It is imperative that documentation of any release onto refuge property be maintained in case it is relevant in the future. In some cases, once a mineral lessee is aware of a landowner's concerns, problems will be addressed. In other cases, it may take persistence and perseverance to have the refuge's surface returned to use as habitat. Good communication with the mineral lessee is the key to working toward site restoration.

There have been some recent requests to perform exploratory drilling on the refuge. Natural gas exploration and production activities involve a number of operations, including, but not restricted to, seismic testing; surveying; site clearing; well drilling; road and pipeline construction; maintenance of wells, pipelines, and other above-ground facilities; periodic meter reading and inspections; and well-plugging operations. Any drilling activity will require refuge approval as will any extraction processes that require surface alteration such as pipelines.

ECOSYSTEM CONTEXT

The refuge lies within a physiographic region known as the MAV (Figure 3). The MAV consists of approximately 25 million acres of alluvial floodplain south of the Mississippi River’s confluence with the Ohio River. Prior to European settlement, this was the greatest bottomland hardwood forest on Earth and was subject to massive annual flood events from the Mississippi River and its tributaries. These forested wetlands were the main wintering area for mid-continent mallards, wood ducks, and other waterfowl species. Flood control and deforestation for agriculture began more than 100 years ago. Today, less than 25 percent of the region remains forested, and flooding has been reduced by about 90 percent. Despite these changes, the region still winters large numbers of waterfowl, estimated at about nine percent of the continental duck population.

Figure 2. Mineral extraction and activities on Tensas River NWR



The Tensas River NWR is a part of a larger system of national wildlife refuges (D'Arbonne, Upper Ouachita, Black Bayou Lake, and Handy Brake) and state wildlife management areas in north Louisiana that are focused on conservation, enhancement, and restoration of bottomland hardwoods. Together with a number of properties under easement/contract through the Wetland Reserve Program, Conservation Reserve Program, and other reforestation activities, the refuge is part of a 125,000-acre block of bottomland hardwood forest. There are only five or six other forest blocks exceeding 100,000 acres in the MAV, which makes this an important and unique area, particularly for forest breeding birds and other species requiring large forest blocks to meet their habitat needs. Along with the national conservation plans noted in Chapter I above, Tensas River NWR has the opportunity to contribute to several regional plans. Some regional plans include the Lower Mississippi River Ecosystem Plan, the Mississippi Alluvial Valley Bird Conservation Plan, the Louisiana Black Bear Recovery Plan, the American Woodcock Management Plan, the Northern Bobwhite Conservation Initiative, and the Louisiana Comprehensive Wildlife Conservation Strategy. These ecosystem-wide efforts guide Service and state efforts in such areas as wetland forest management, endangered species management, and compatible wildlife-dependent recreation in order to enhance, restore, and conserve the natural functional processes and habitat types associated with bottomland hardwoods.

REGIONAL CONSERVATION PLANS AND INITIATIVES

Lower Mississippi River Ecosystem (LMRE) Plan. The LMRE includes the alluvial plain in the Mississippi River downstream of its confluence with the Ohio River and the delta plain and associated marshes and swamps created by the meanderings of the Mississippi River and its tributaries. The drainage basin and tributaries of the Tensas River, which include Tensas River NWR, are a part of the West Gulf Coastal Plain upland section of the LMRE. The LMRE serves as a primary wintering habitat for mid-continent waterfowl populations as well as breeding and migration habitat for migratory songbirds. The expansive floodplain forests of the past are now fragmented bottomland hardwood patches due to flood control projects and conversion to agriculture.

Each unit, including the LMRE, is represented by an ecosystem team, which has developed its own biologically based strategy. The ecosystem team for this unit consists of representatives from all of the Service's field units (national wildlife refuges, national fish hatcheries, law enforcement, Ecological Services offices, and Fishery Resources offices). The team developed eight goals that this CCP considers and promotes when establishing refuge goals and objectives to ensure that the refuge continues its contribution to ecosystem conservation and integrity. These goals are:

- Conserve, enhance, protect, and monitor migratory bird populations and their habitats in the LMRE;
- Protect, restore, and manage the wetlands of the LMRE;
- Protect and/or restore imperiled habitats and viable populations of all threatened, endangered, and candidate species and species of concern in the LMRE;
- Protect, restore, and manage the fisheries and other aquatic resources historically associated with the wetlands and waters of the LMRE;
- Restore, manage, and protect national wildlife refuges and national fish hatcheries;
- Increase public awareness and support for LMRE resources and their management;
- Enforce natural resource laws; and
- Protect, restore, and enhance water and air quality throughout the LMRE.

Mississippi Alluvial Valley Bird Conservation Plan. The Mississippi Alluvial Valley Bird Conservation Plan is a subset of the Partners in Flight Bird Conservation Plan. Because this physiographic area was historically a nearly contiguous bottomland hardwood forest and because the majority of the bird species of highest concern are dependent on forested wetlands, bottomland hardwood forest is the habitat of greatest concern in the MAV. One of the goals of this plan is to increase the size of contiguous blocks of bottomland hardwood forest in order to improve the breeding success of many wetland forest dependent species of concern.

Louisiana Black Bear Recovery Plan. The Louisiana black bear is a "listed" species considered "Threatened" in its range. Recovery plans are prepared by the Service to delineate reasonable actions that are believed to aid in efforts to recover and/or protect listed species. The objective of the Service's recovery plan is the delisting of the Louisiana black bear. The criteria for achieving delisting are: (1) at least two viable subpopulations, one each in the Tensas and Atchafalaya River Basins; (2) establishment of immigration and emigration corridors between the two subpopulations; and, (3) protection of the habitat and interconnecting cooridors that support each of the two viable subpopulations used as justification for delisting. The Tensas River NWR bear population is vital to this species recovery.

Black Bear Conservation Committee Restoration Plan. This plan is used in conjunction with the Service's Louisiana Black Bear Recovery Plan. The goal of this plan is to restore the Louisiana black bear to suitable habitat within its historical range. The priorities of this plan are to put the resource first, to find common ground for building coalitions while avoiding confrontations, to replace emotion with credible science, and to have a strong commitment to black bear restoration and management.

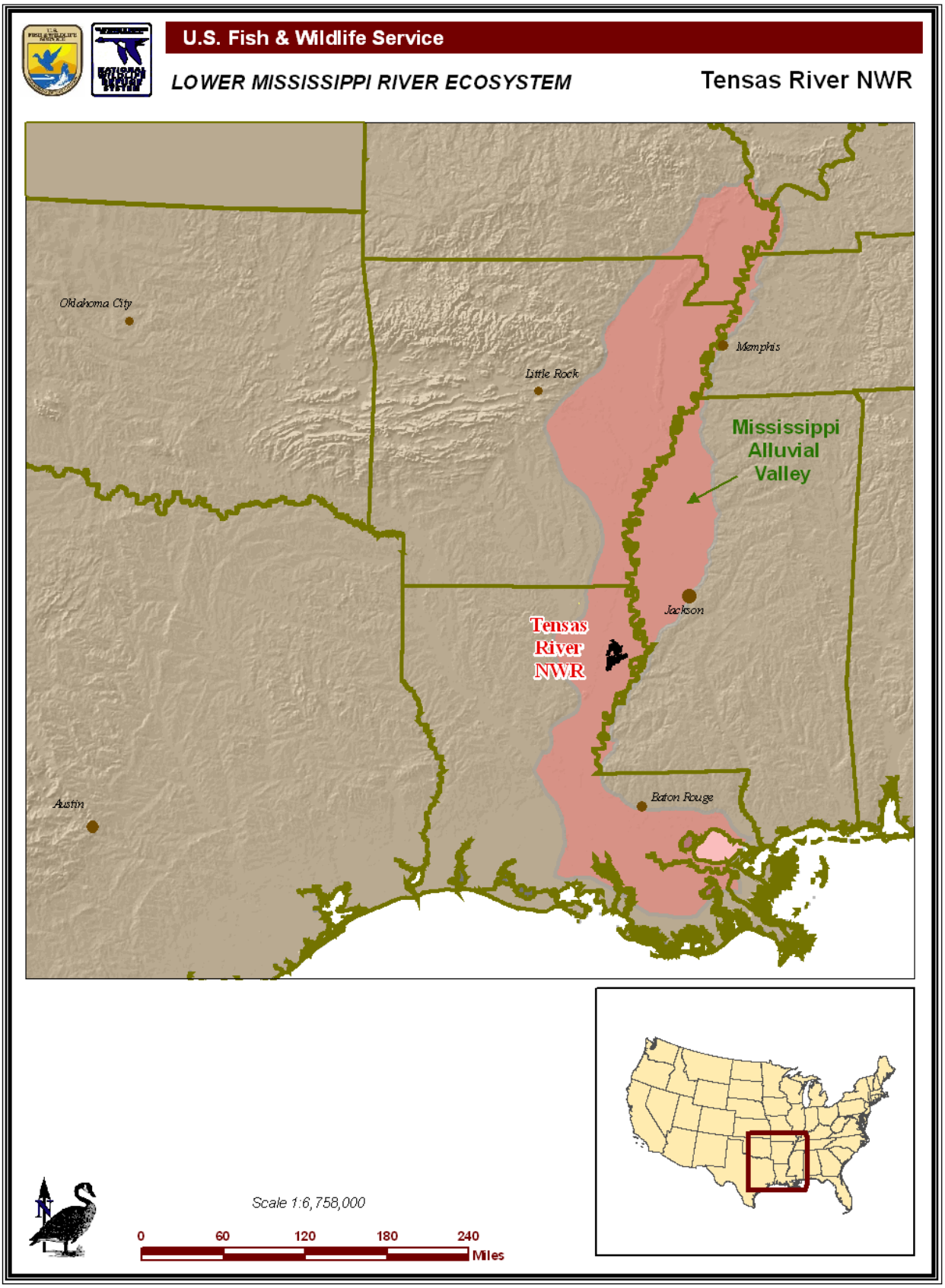
American Woodcock Management Plan. Woodcock trends in the United States have been declining annually for the last 15 years in spite of actions taken to ensure that hunting does not substantially promote declines, such as reduced bag limits and limited season lengths. An American Woodcock Management Plan initiated in the 1990s points out the need for improved breeding, migration, and wintering habitat to enhance population growth and survival (USFWS 1990). Much of the decline is thought to be a result of land use changes and the maturing of forest habitats resulting in fewer early successional scrub-shrub habitats preferred by woodcock.

Northern Bobwhite Conservation Initiative. The initiative's goal is to restore northern bobwhite populations, range-wide, to an average density equivalent to that which existed on improvable acres in 1980. The population objective for the West Gulf Coastal Plain Bird Conservation Region is to add 131,033 new coveys, 21,833 of these in Louisiana. Habitat management is the primary vehicle for accomplishing this goal with two special objectives, which the refuge considered during the development of this CCP:

- Increase the amount and enhance the quality of agricultural lands for nesting, brood rearing, and roosting by bobwhites and other grassland species by adding native warm season grasses and other conservation plantings, such as shrubs and forbs; and

- Conserve and enhance the quality of rangelands by utilizing vegetation management practices and grazing regimes that favor the retention and improvement of native plant communities beneficial to bobwhites and other wildlife.

Figure 3. Lower Mississippi River Ecosystem



Louisiana Comprehensive Wildlife Conservation Strategy. This program will direct the overall effort by the LDWF over the next ten years in assessing the status of and managing, where appropriate, the varied habitats and wildlife species in Louisiana. Conservation actions have been developed for each ecoregion in the state in order to address threats to the habitats of these areas. The state will work with a variety of partners in carrying out these recommended conservation actions. The state considers the Service an important partner in this process and the Tensas River NWR an important part of actions to be taken in Tensas River Watershed ecoregion.

ECOLOGICAL THREATS AND PROBLEMS

In order to prepare a CCP that will establish goals and objectives on how to manage this refuge over the next 15 years, a number of planning steps were followed. One of those steps was an internal review of known ecological threats and problems that may hinder the ability of refuge personnel to fulfill the objectives of the refuge. That review developed the following list of concerns:

- Loss of bottomland hardwoods and fragmentation;
- Encroachment of invasives; and
- Altered hydrology.

LOSS OF BOTTOMLAND HARDWOODS AND FRAGMENTATION

The entire 25-million-acre MAV was once a floodplain forest of primarily oak-gum-cypress cover types. It has been estimated that 20 million acres of these bottomland hardwood forests have now been lost, and the remaining forests are in thousands of fragments throughout a changed landscape. The greatest changes to the landscape have been in the form of land clearing for agricultural and flood control purposes.

Although these changes have allowed people to settle and earn a living in the area, they have had a tremendous effect on biological diversity and integrity and the environmental health of the MAV. Vast areas of bottomland hardwood forests have been reduced to forest fragments ranging in size from very small tracts of limited functional value to a few large areas that have maintained many of the original functions and values of forested wetlands. This process, which is known as forest fragmentation, has reduced the size and connectivity of forest habitat patches. Species endemic to the MAV that have become extinct, threatened, or endangered include the red wolf, Florida panther, ivory-billed woodpecker, Bachman's warbler, and Louisiana black bear.

This unique, though highly fragmented, ecosystem is important to hundreds of wildlife species and native plant communities. Bottomland hardwoods and associated wetlands support substantial wintering populations of a number of waterfowl species and are a primary migration corridor for significant numbers of dabbling ducks. Bottomland hardwoods are also a high priority for nesting habitat for neotropical migratory birds, breeding habitat for area-sensitive birds (dependent on large contiguous blocks of hardwood forest), and necessary habitat for spring migratory birds upon completion of their Gulf of Mexico crossing.

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

Due to fragmentation, the forest edge and the brown-headed cowbird (a seed-eating bird common in agricultural areas) are now closer to the natural nesting sites of many forest interior-nesting birds. The brown-headed cowbird is a parasitic nester that lays eggs in the nests of other birds rather than building a nest of its own. Because the cowbirds are typically larger and more aggressive, nestling cowbirds often out-compete host species nestlings. This results in poor reproductive success and declining populations of forest interior nesting species. Increasing the size of contiguous forest core areas is an important goal in supporting the breeding success of forest interior nesting species.

Fragmentation of bottomland hardwood forests has left many of the remaining forest tracts surrounded by agricultural lands – such is the case with the Tensas River NWR. Intensive agriculture has removed most of the forested corridors along sloughs that formerly connected the forest patches. The loss of connectivity between the remaining forested tracts hinders the movement of wildlife between tracts and reduces the functional values of many remaining smaller forest tracts. These lost connections also result in a loss of gene flow. Restoring the connections to allow gene flow and reestablishing travel corridors is particularly important for some wide-ranging species such as the threatened Louisiana black bear.

ENCROACHMENT OF INVASIVES

Non-native or invasive plants can alter the function of ecosystems by degrading wildlife habitat, displacing native species, and changing carrying capacity by reducing native forage production, lowering plant diversity, and increasing soil erosion and soil sedimentation.

Two specific invasive and nuisance plant species are of concern in varying degrees throughout the refuge because of their potential negative impacts to resource management:

- Chinese tallow (*Triadica sebifera*) and
- Trifoliate orange (*Poncirus trifoliate*).

Chinese tallow: Chinese tallow grows in abandoned fields, pastures, waste areas, and forests. It grows in a wide range of environmental conditions from wet to dry and shade to full sun. It reproduces by seeds only, but one plant can produce hundreds of seeds, which have a tremendous ability to germinate under adverse conditions. It is a fast-growing tree, hence its popularity as a shade tree ornamental. To horticulturalists, this sounds like a dream tree, but to ecologists and land managers, it can be a nightmare, especially when it invades an area and displaces native vegetation.

Over the last 30 years, Chinese tallow has become a common tree in old fields and bottomland forests in Louisiana. Several studies at the U.S. Geological Survey's National Wetlands Research Center in Lafayette are aimed at understanding the factors that contribute to Chinese tallow growth, spread, and management. When tallow invades, it eventually monopolizes an area, creating a forest without native animal or plant species. This tree exhibits the classic traits of most non-native invaders: it is attractive so people want to distribute it; it grows quickly and in a variety of soils; it has incredible resiliency; and it resists pests. Chinese tallow reproduces and grows quickly and can cause large-scale ecosystem modification. For example, where it completely replaces native vegetation, it has a negative effect on birds by degrading the habitat. It can also be potentially harmful to animals and humans, because its berries and plant sap contain toxins.

Trifoliate orange: This hardy invasive shrub also comes from China. It is a popular ornamental because of the colorful flowers and small bitter fruit. It is becoming a problem in many parts of the refuge were it out-competes with native species that are more beneficial to wildlife. It spreads easily

and develops into thick masses of plants. Like Chinese tallow, this tree exhibits the classic traits of most non-native invaders: it is attractive so people want to distribute it; it grows quickly and in a variety of soils; it has incredible resiliency; and it resists pests.

Along with the two specific invasive species noted above, there is another refuge concern regarding a number of invasive aquatic species. Static water levels caused by the lack of annual flooding and reduced water depths resulting from excessive sedimentation have created conditions favorable for the establishment and proliferation of several species of invasive aquatic plants. Additionally, the introduction of invasive (non-native) vegetation capable of aggressive growth is further threatening the viability of aquatic systems. These invasive aquatic species threaten the natural aquatic vegetation important to aquatic systems and choke waterways to a degree that often prevents recreational use.

There are two invasive and nuisance wildlife species that are of concern in varying degrees throughout the refuge because of their potential negative impacts to resource management:

- Feral Hogs (*Sus scrofa*) and
- Beaver (*Castor canadensis*).

Feral Hogs: Many believe the first introduction of feral hogs was by Spaniards in the southeast United States in the early 16th century (Nowak 1991). Others suggest Christopher Columbus released eight animals in the West Indies. Hernando de Soto later released progeny of these into Florida in 1539 (Towne and Wentworth 1950). Regardless of when and who introduced feral hogs into the United States, their distribution has expanded to include 23 states. Mackey (1992) suggested a minimum population estimate of 2 million animals in 1992. In addition to range expansion by feral hogs from early introductions, Louisiana was one of many states that allowed livestock free-range practices. We can safely assume that many of Louisiana's feral hogs are descendants of free-range animals.

Feral hogs have been implicated in damaging a wide variety of natural resources and private property. Feral hogs' damage to sensitive plant communities, wildlife, water quality, livestock predation, forestry, spread of disease, agricultural crops, Louisiana black bear, and competition for available food with other native wildlife species is well documented (Miller 1993).

Although Tensas River NWR currently does not have a damage problem due to feral hogs, it would benefit the refuge to have a management plan available to eliminate or reduce damage as it occurs. Feral hogs have expanded their range to include several other refuges, management areas, forests, and private lands in Louisiana. It is a reasonable assumption that the refuge will experience problems in the near future, and if not properly managed, this invasive species has the potential of causing extensive damage to native wildlife, habitat, and agricultural resources.

There are both positive and negative aspects to this feral hog population. The hog's Russian boar phenotype is considered by some to be a trophy game animal with an edible carcass. Many landowners manage their feral hog populations as they do their white-tailed deer herds. The presence of feral hogs on a hunting lease is considered more of an added selling feature than a problem.

However, it may be shortsighted to consider only the positive aspects of this multi-faceted animal. There are numerous reports of severe problems with feral hog activities occurring in parks, recreational areas, national seashores, refuges, wildlife management areas, and forest districts across the United States. Land and wildlife management agencies are finding that the feral hog is an aggressive and difficult invader species that threatens their natural resources and habitat. Hogs can cause resource management problems in a number of areas

- Feral hog populations cause damage to field crops. The varieties of field crop resources damaged by hogs include corn, milo, rice, watermelon, peanuts, hay, turf, wheat, and other grains. Hog-caused damage to field crops results both from feeding and from feeding related activities (i.e., trampling and rooting). Feral hogs prey on fawns and ground-nesting birds. Feral hogs have an acute sense of smell, are omnivorous and opportunistic, and can be efficient predators.

- Feral hog populations compete with resident deer, Louisiana black bear, and turkey populations for limited resources. Feral hogs are omnivorous and feed on a wide variety of items, many of which are staples for native fauna. One of the more important seasonal food item types for feral hogs is a fruit/nut crop, especially oak mast. Oak mast is also an important food source for deer and turkey. When feral hogs actively compete for mast food, resident deer and turkey may enter the winter with deficient fat reserves.

- A feral hog population is a potential reservoir for numerous diseases and parasites that threaten livestock and deer. Because feral hogs tend to occupy the same areas as deer and livestock, disease and parasite spread is possible. One of the most probable points of contact is communal watering holes. Due to its inability to thermoregulate (control its own body temperature when it is hot), the hog is attracted to watering areas to wallow. In areas where water is plentiful, other animals may avoid a wallowed-out watering hole. However, during times of drought and in areas where water is limited, all animals are often obliged to use the water from wallowed-out watering holes. Infected pigs can spread parasites and diseases through both direct contact and by contaminating drinking water.

- The feral hog's rooting and wallowing activities damage pastures, spoil watering holes, and generally deteriorate riparian habitat. Feral hogs are persistent in their rooting behavior. They methodically work an area until they have depleted the food item of interest. Given optimum conditions (i.e., pliable soils), hogs can do considerable damage.

Hogs are too large, prolific, destructive, and widely spread throughout the area to be ignored. This introduced animal must be recognized as an invasive species that requires proper management to ensure the well-being of native plants and wildlife species on the refuge.

Beavers: As long as beavers occur where there is no negative impact on a significant cultural, natural resource, or refuge development, typically few problems occur. Refuge management will act to protect beavers just as it would any other natural resource, according to Refuge System policies and regulations. However, beaver numbers need to be kept in check through active refuge management.

Beavers typically become a problem when their tree cutting or pond construction activities adversely affect significant resources or developments inside or outside of the refuge. Some examples of the kinds of adverse impacts, which either have occurred or could occur, are (Novak 1987):

- Flooding that erodes, weakens, or makes impassible roads, trails, and railroads;
- Flooding that damages or prevents access to structures, facilities, or agricultural lands;
- Flooding that damages economically valuable habitat or protected (threatened or endangered) plants;
- Damming of drainage structures such as culverts, bridges, spillways, and ditches that protect facilities and developments;
- Redirection of normal water flow into new areas where erosion can occur; and
- Tree cutting near roads, parking lots, or other facilities that damage or threaten property, or creates a safety hazard.

The presence of private lands and public roads within and contiguous to refuge boundaries aggravates many of these problems. The location and geography of the refuge provide an environment with a large potential for beaver-related problems. A concentrated and complex network, including roads, trails, and highways, is imposed on the natural drainage system of the Tensas River Basin with its numerous tributaries. Hundreds of drainage structures must be maintained to preserve cultural features, to protect facilities, and to provide safe transportation for the public. At the same time, natural features and processes and the benefits accruing to the refuge from increased beaver activity must be conserved and protected. Balancing these complicated and sometimes competing concerns will be a difficult but necessary task for refuge management.

ALTERED HYDROLOGY

In addition to the loss of vast amounts of bottomland hardwood forested wetlands, there have been significant alterations in the regions hydrology due to urban development, river channel modification, flood control levees, reservoirs, and deforestation as well as degradation to aquatic systems from excessive sedimentation and contaminants (Figure 4).

The natural hydrology of a region is directly responsible for the connectedness of forested wetlands and indirectly responsible for the complexity and diversity of habitats through its effects on topography and soils. Natural resource managers recognize the importance of dynamic hydrology to forested wetlands and waterfowl-habitat relationships (Manga and Kirchner 2000).

Tensas River NWR was subject to the annual overflow of the Mississippi River and its tributaries prior to the construction of levees after the flood of 1927. That portion of the Tensas River that passes through the refuge was cleared and snagged as part of a Corps project in the mid-1900s. While it is heavily contaminated by agricultural wastes in the form of silt and pesticides, this portion of the Tensas River has never been straightened or channelized. These large scale, man-made hydrological alterations have changed the natural spatial and temporal patterns of flooding throughout the entire MAV. In addition, these alterations have reduced both the extent and the duration of annual seasonal flooding. The loss of this annual flooding regime has had a tremendous effect on the forested wetlands and their associated wetland-dependent species.

In view of the hydrologic changes, it is difficult to fully emulate and reconstruct the structure and functions of a natural forested wetland in the MAV. Restoration of wetland functions is especially difficult since wetlands depend on a dynamic interface of hydrologic regimes to maintain water, vegetation, and animal complexes and processes (Gregory et al., 2003).

Another outcome of the above-cited hydrologic alteration is the siltation of aquatic ecosystems. Aquatic systems, including lakes, rivers, sloughs, and bayous, have been degraded as a result of deforestation and hydrologic alteration. The clearing of bottomland hardwood forests has led to an accelerated accumulation of sediments and contaminants in all aquatic systems. Many water bodies are now filled with sediments, which greatly reduce their surface area and depth. Concurrently, the non-point source runoff of excess nutrients and contaminants is threatening the area's remaining aquatic resources.

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

PHYSICAL RESOURCES

CLIMATE

Northeast Louisiana is in a subtropical, transitional climatic region that is affected alternately by cold, dry air flowing southward and by warm, moist air flowing northward. Changes in direction of flow frequently bring significant, and sometimes abrupt, weather changes. Temperatures recorded at Tallulah, Louisiana, show extremes of -12°F to 113 °F. The average annual temperature is around 65 °F. Annual mean humidity is about 72 percent.

Wind speed is usually less than 10 miles per hour, but gusts may exceed 40 miles per hour during thunderstorms.

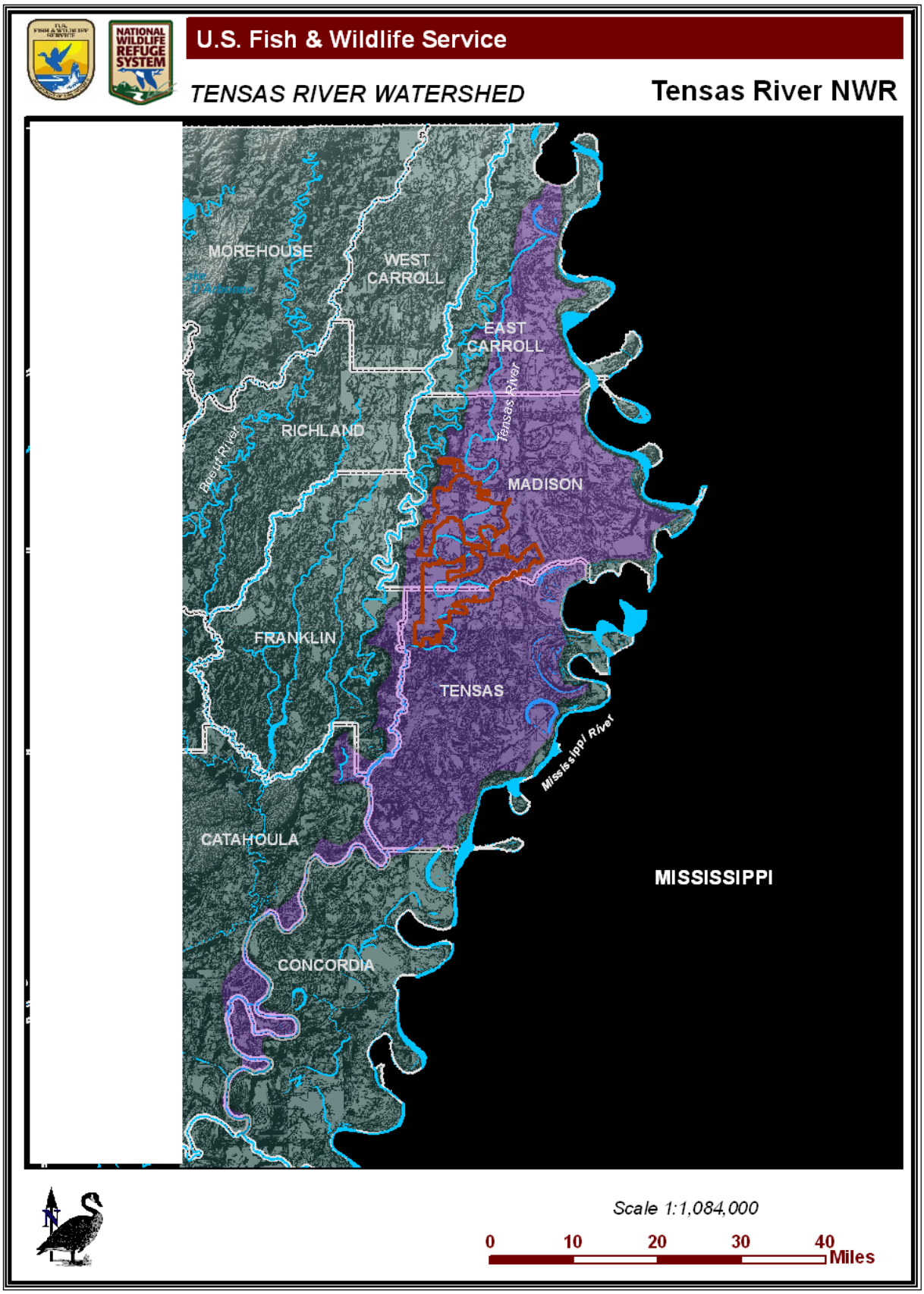
Precipitation occurs on average about two days out of seven on an annual basis. Annual precipitation averages about 51 inches of rain per year. Snowfall is relatively rare but may occasionally occur and accumulate several inches.

GEOLOGY AND TOPOGRAPHY

As the climate changed on the Earth, marine and deltaic sediments have been deposited in altering cycles in Louisiana. Geologists have determined from studying these deposits that a major river system, corresponding to the modern Mississippi River, has persisted here at least since the Gulf of Mexico began to form (Saucier 1994).

The Tertiary period, which extended from 65 to 1.8 million years ago, began with a warming trend where the sea covered almost the entire Tensas River Basin. In the early Eocene epoch, which began about 54 million years ago, the land began to build up again as the continental ice sheets advanced. However, this trend was reversed during the late Eocene when a second advancement of the sea occurred. With the sea as far inland as Tensas Parish, the last cycle began in the early Oligocene Epoch (38 to 23 million years ago). In Miocene time (23 to 5 million years ago), the sea level dropped and sedimentation began to extend the land toward the Gulf of Mexico.

Figure 4. Tensas River watershed



The topography of this refuge generally varies from 75 feet to 55 feet above mean sea level. The greatest variation in elevation occurs along the Tensas River where the elevation can range from a high of 75 feet at the top bank to a low of 55 feet in the associated depressional slough. The Tensas River gradients range from 0.7 foot/mile in the north to 0.2 foot/mile near the mouth. The alluvial flood plain of the Tensas River Basin forms the backdrop for all the physical and biological processes that shape the watershed (Figure 4). Topography of the area is typical of the MAV, with channel meanders and natural levees, lakes, swamps, and bayous providing slight local relief. These landforms create a diverse physical and ecological region.

SOILS

Most of the soils in the area are clayey in nature and are poorly drained; however, these soils are high in natural fertility and are well-suited to row crops, pasture, and hardwood forests. The soil, primarily Sharkey and Tensas-Sharkey associations, shrinks and cracks severely when dry and swells when rewetted.

HYDROLOGY

The dynamic and changing character of the Mississippi River dictated much of the hydrologic character of the Tensas River Basin (Figure 4). The youngest pre-modern course of the Mississippi River can be traced along the Tensas River southward to Black River. Tensas River and Black River unite and drain southeastward through a crevasse channel. However, backwater areas adjacent to the rivers will tend to flow north. The Red River enters this meander belt and continues to the Atchafalaya River, which is a major distributary of the Mississippi River.

The Tensas River Basin is unique in that natural levees along the riparian zone lie in the highest ground in the Basin. This causes drainage water to run parallel to streams for many miles or into backwaters before actually entering the stream and river water channels. Wetlands and back swamps then become the vegetation filtering areas for pollutants and nutrients. Bayous, channels, streams, and rivers direct the flow of water across the landscape and are dominant features in the Tensas River Basin (Townsley 1996).

The refuge contains several lakes, bayous, and intermittent streams and is seasonally flooded over a considerable acreage by rainfall and overflow. The smallest lake is less than an acre, and the largest lake is approximately 200 acres. Water levels fluctuate annually with high water generally occurring in the spring and winter. Low water generally occurs during summer and fall. Much of the refuge is shallowly inundated during the wet season, particularly after extended heavy rains. A water control structure formerly used to impound water in the Judd Brake Unit of the refuge is now inoperable and the dam is cut down to a very low level.

AIR QUALITY

Air quality receives protection under several provisions of the Clean Air Act, including the National Ambient Air Quality Standards and the Prevention ofOf Significant Deterioration Program. Particulate matter, including dust, is a measure of tiny liquid or solid particles in the air that can be breathed into the lungs. In areas of the refuge, dust associated with dirt from roadways, fields, construction sites, paper industry, utilities, and other combustion sources as well as soot from open burning may all contribute to particulate matter.

The U.S. Environmental Protection Agency (EPA) has set standards for particulate matter along with other possible air contaminants such as ozone. Louisiana has built upon these federal air quality standards and now has ambient air quality standards that are more stringent and comprehensive than 47 other states. Air quality in Louisiana has improved over the last 20 years. The state maintains a statewide air-monitoring network to determine if an area's ambient air quality is within criteria pollutant standards (i.e., in attainment) or if it exceeds any of the state's standards (i.e., in non-attainment). There was only one 5-parish non-attainment area in 2004 as opposed to 20 in 1984. The parishes encompassing the Tensas River NWR (Franklin, Madison, and Tensas) have always achieved attainment.

WATER QUALITY AND QUANTITY

The Tensas River has an approximate drainage area of 309 mi^2 at the USGS gauging station near Tendal, Louisiana. The river can vary substantially in discharge with monthly averages ranging from 10 to over 2000 ft^3/s. Average monthly flows tend to be at its lowest in August and September with higher flows occurring during the winter months.

The Tensas River Basin is a target watershed of several EPA environmental studies including the Nonpoint Source Management Program, EPA Region 6, and Gulf of Mexico Program. The Nonpoint Source Management Program has identified the Tensas River Basin as an impaired watershed due to nutrient loading from agricultural practices. Due to the unique hydrology of the basin described above, the wetlands and backswamps have become the vegetation filtering areas for pollutants and nutrients.

The Tensas River is thought to be one of several remnant channels of the Mississippi River (Saucier 1994). This theory is supported by the fact that the meander belt width is much larger than would be expected for a river with its current discharge. The decreased discharge associated with the changed course of the Mississippi River suggests that the Tensas River has been slowly aggrading over time. Whether the stream had reached stable dimensions prior to deforestation in the region is not known and is beyond the scope of this document, but the fact that smaller meanders have not yet developed suggest that some natural aggradations may still be occurring. This is further supported by the lack of symptoms associated with normal channel migration or degradation including mass wasting or hydraulic erosion of stream banks, exposed fine roots of trees, and development of mid-channel bars.

The aquatic habitats of the Tensas River Basin have been heavily impacted by sediment and agrochemical runoff due to intense drainage, extensive clearing of bottomland hardwoods, and agricultural production. Contaminant surveys in the Tensas River Basin have documented elevated levels of organochlorine pesticides, particularly DDT and toxaphene, in fishes and sediments. Those pesticides were used in soybean and cotton farming throughout the basin from the 1940s to the 1970s. DDT and toxaphene have been consistently present in fishes collected from main stem and backwater areas, including the Tensas River NWR.

Despite its ban in 1973, levels of DDT and its derivatives in the Tensas River Basin have not decreased in the time frame they have been studied. Exposure to contaminated sediment from continual inputs of contaminated soil and point source discharges are likely a major factor contributing to elevated levels of organochlorine pesticides in the fishes of the Tensas River. By contrast, fishes in the lakes on and adjacent to the refuge that are only periodically exposed to Tensas River overflow exhibit consistently lower levels of organochlorine residues in their tissues than those found in fishes that inhabit the main stem (Schultz 1991).

Ware and Roan (1970), Parr and Smith (1976), and Gambrell and Patrick (1985) indicated that anaerobic bacteria could degrade significant amounts of DDT and toxaphene in wet soils and sediments by means of reductive dechlorination. This is believed to occur in the Tensas River, as evidenced by equal average amounts of products resulting from the degradation of DDT (Landry and Killebrew 1983).

Edwards (1966) suggested that the average time for concentrations of DDT to be reduced by 95 percent was 10 years. Beyer and Krynitsky (1989) found that, after treating experimental plots with DDT, DDE levels increased until the third year and then decreased with a calculated half-life of 5.7 years. Gambrell and Patrick (1985) suggested that levels of DDT and its derivatives in agricultural soils of the Lake Providence watershed should decline to about 30 to 40 percent of then current levels within ten years. If the degradation occurred at the suggested rates and no further contamination is entered the system, fish tissue levels should have been well below those found in later studies. However, levels found in fish did not decline significantly during the 19-year period fish were studied after DDT was banned in1973, which is probably due to further inputs from contaminated soils.

DDT possesses known carcinogenic, teratogenic, xenotoxic, and mutagenic properties, and is very persistent in the environment (McCabe and Sandretto 1985). DDT acts as a synthetic estrogen by binding to and activating estrogen receptors (McLachlan et al., 1992; Colburn and Clement 1992). Pesticides that function as endocrine system disrupters, such as DDT and toxaphene, cause thyroid dysfunction in birds and fishes; reduced fertility in vertebrates; decreased hatching and birth defects in turtles, birds, and mammals; metabolic abnormalities and male emasculation/feminization in fishes, birds, and mammals; and defeminization/masculinization in female fishes and birds (Colburn and Cement 1992).

A potential point source that may be contributing to the elevated levels of toxaphene and DDT in the Tensas River is the East Carroll Parish Prison Farm, located adjacent to the headwaters of the Tensas River. Beginning in July 1984, highly contaminated soils (ranging up to 3,930 ppm toxaphene and 4,560 ppm DDT) were excavated from Byerley Airport and the adjacent recreation area and hauled to the East Carroll Prison Farm (Gambrell and Patrick, 1985). On the prison farm, the contaminated soils were disked three times to a depth of 20 cm. Anecdotal information indicates that the area south of the East Carroll Prison Farm was used as a solid waste landfill for disposal of empty/used agricultural pesticide containers.

Of pesticides currently permitted, atrazine may be the most widely used herbicide in corn and sorghum production. Atrazine has recently been recognized as causing deformities in amphibians. The use of atrazine is widespread within the drainage area of Tensas River NWR. The refuge should monitor its levels in the watershed and its impacts to the environment.

The pesticide naled is used extensively to control mosquitoes suspected of transmitting the West Nile virus. Naled is toxic to aquatic life and is suspected to be harmful to birds. Little is known about this pesticide, and tests for its harmful effects are technically complex and expensive. Since West Nile virus is not just limited to birds and horses, but now includes humans, naled and possibly other pesticides may be brought into use in the interest of human health and at the cost of ecological impacts under the rules of the current public health emergency.

Mercury is a common topic in fish contamination. Long-lived piscivorous fishes are typically the targets of concern. Fish cannot purge their body burdens of mercury like birds and mammals, so they bioaccumulate the mercury in their organs and flesh, especially the fillets (muscle tissue) typically consumed by man. Most mercury contamination is from atmospheric depositions. Some depositions

are naturally occurring, and some are from man-caused sources like coal burning power plants and incinerators. Mercury is also associated with meters used to monitor gas production prior to the 1970s. Often the mercury was handled carelessly, and significant amounts could be found in the soil below the meters. Reportedly, wells on Tensas River NWR were primarily oil wells, not gas wells, and did not use these types of meters. However, contamination from off-refuge sites is possible.

Runoff from upstream landowners not only contains contaminates but also contributes to siltation of the Tensas River, its tributaries, and other bodies of water. Implementation of agricultural best management practices and precision farming techniques in the Tensas River Basin could help reduce siltation as well as nutrient and pesticide loading. Surrounding upstream landowners and farmers should be encouraged to use filter strips to limit agricultural runoff. The recent reforestation efforts, both on and off the refuge, will help improve water quality, especially in tributaries like Lick Bayou, but cooperation from upstream farms and landowners will be essential if the Tensas River is to one day run clear again.

BIOLOGICAL RESOURCES

HABITAT

Tensas River NWR currently provides a mix of various habitat types including bottomland hardwood forests, hardwood reforestation areas, open field-moist-soil areas, and open field-cropland (Table 1).

Table 1. Tensas River NWR habitat types

Habitat Type	Coverage (acres)*
Established Bottomland Hardwood Forest	58,855
Bottomland Hardwood Reforestation areas	11,000
Open Field – Cropland	475
Open Field – Moist-Soil areas	907
Open Water Wetlands	500
Roads	145

* Approximate acreages depicted. Additional surveys needed for exact amounts.

Bottomland Hardwood Forests

There are approximately 11,000 acres of forest less than 30 years old (Figure 5), 6,000 acres of 30-60-year old timber, and 53,000 acres of 60-plus-year old timber. Eighty percent (56,000 acres) of the refuge is composed of the sweetgum/willow oak/Nuttall oak forest type, 20 percent sugarberry/American elm/green ash (12,600 acres), and minor amounts of overcup oak/bitter pecan and cypress brake timber types. The majority of the refuge is in a closed-canopy condition.

The bottomland hardwood forests here can be classified into three primary habitat types:

1. Sweetgum (*Liquidambar styraciflua*) - Willow Oak (*Quercus phellos*)
2. Sugarberry (*Celtis laevigata*) - American Elm (*Ulmus Americana*) - Green Ash (*Fraxinus pennsylvanica*)
3. Overcup Oak (*Quercus lyrata*) - Water Hickory (*Carya aquatica*)

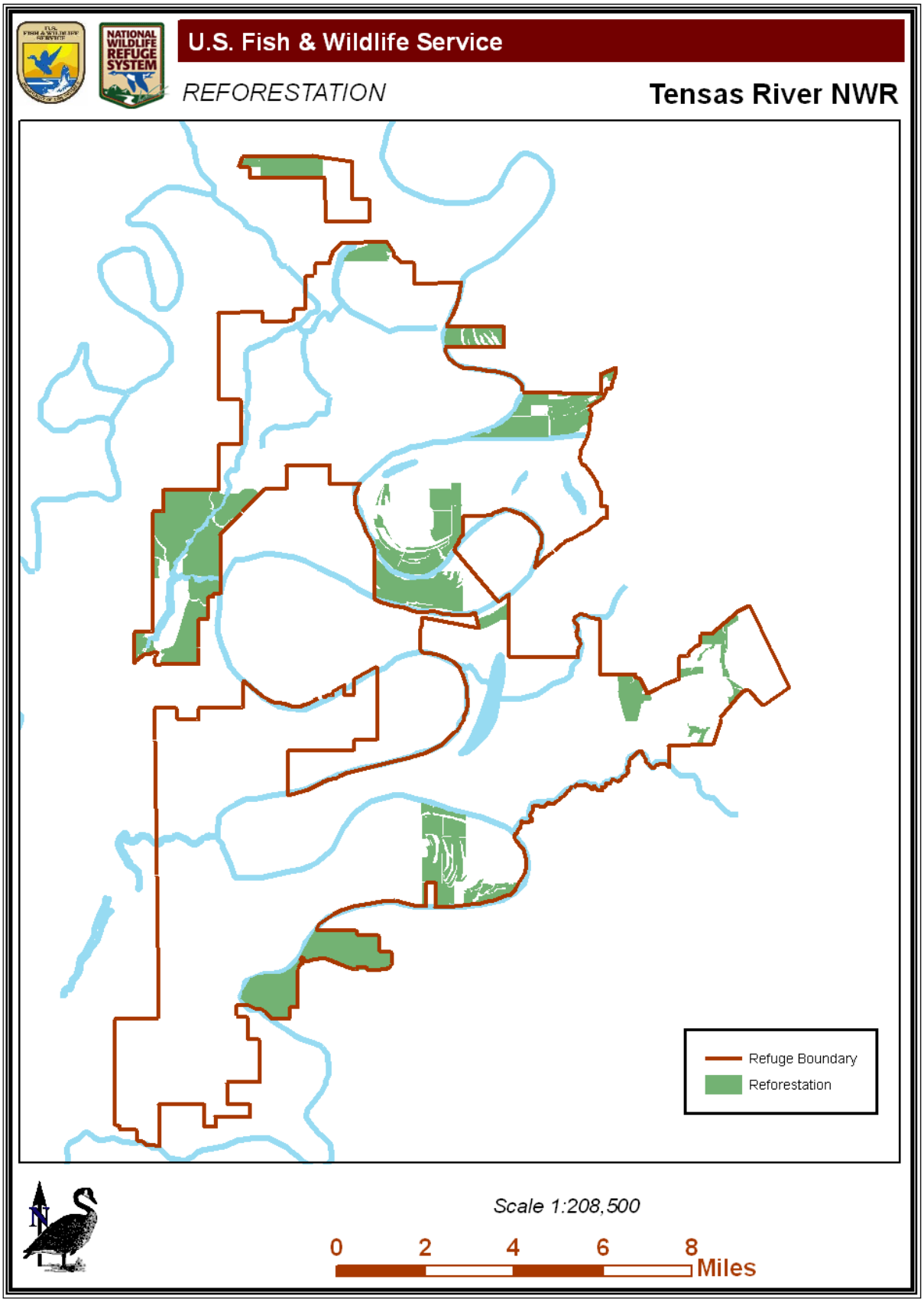
Sweetgum - Willow Oak: The low ridges in the broad slackwater areas of the first bottom are typically occupied by this forest type. Willow oak and sweetgum comprise the largest proportion of the stocking in stands of this type. A major associate on higher clay ridges and flats is Nuttall oak. Other trees associated with this forest type are sugarberry (*Celtis laevigata*), green ash, overcup oak, water oak (*Quercus nigra*), water hickory, cedar elm, persimmon, and sometimes bald cypress. Common shrubs include swamp privet, American snowbell (*Styrax americana*), possumhaw (*Viburnum nudum*), hawthorn (*Crataegus douglasii*), and dull-leaf indigo (*Amorpha fruticosa*). Woody vines occasionally present are greenbrier, peppervine, and redvine.

Forest openings within the above forest types provide early successional and forest-edge habitat for wildlife ranging from the Louisiana black bear to the indigo bunting. Such habitat is utilized for foraging, nesting, escape, and various other wildlife requirements. Currently about 4 percent of the refuge's forested areas can be described as open. Road rights-of-way and administrative areas presently account for the majority of these openings with the remainder generally being abandoned oil well sites or logging landings averaging 1.5 acres in size.

Sugarberry – American Elm – Green Ash: The type species sugarberry, American elm, and green ash together constitute a plurality of the stocking. Hackberry replaces sugarberry in the northern part of the range. Major associates include water hickory; Nuttall, willlow, water, and overcup oaks; sweetgum; and boxelder. Other associated species are cedar and winged elm, blackgum, persimmon, honeylocust, waterlocust, red and silver maple, American sycamore, and eastern cottonwood. The type is found throughout the southern forests from east Texas to the Atlantic, from the Gulf Coast to southern Illinois. It is found within the floodplains of the major rivers. The type is usually located in transitional areas between the sweetgum-willow oak type, which occupies higher elevations, and the overcup oak--water hickory type, which occurs at the lower elevations. It occupies low ridges, flats, and sloughs in first bottoms; terrace flats and sloughs; and occasionally new lands or fronts. Rarely does it occur on maltreated terrace ridges. It may be found on clay or silt loam soils, and it tends to be long term in the successional scale. The type species are all shade tolerant when small and reproduce readily. All three, but especially green ash, sprout prolifically.

Overcup Oak – Water Hickory: This type usually occurs in low, poorly drained flats and sloughs with tight clay or silty clay soils. These sites are the lowest within the first bottoms and are subject to late spring inundations. Overcup oak and water hickory together constitute the majority. Associates include willow oak, Nuttall oak (*Quercus nutallii*), cedar elm (*Ulmus crassifolia*), green ash, and water locust. Minor associates include black willow, persimmon, and sweetgum. Common shrub species often associated include redvine, peppervine (*Ampelopsis brevipedunculata*), trumpet-creeper (*Campsis radicans*), dewberry (*Rubus caesius*), and possibly greenbier (*Smilax* spp.). Panicum (*Panicum* spp.), asters, annual grasses, and cocklebur (*Xanthium strumarium*) may occur in openings within the stand.

Figure 5. Reforestation on Tensas River NWR



Open Fields (Cropland and Moist-Soil Management Areas)

At one time, the refuge was cooperatively farming over 1,000 acres, leaving about 25 percent of the crop in the field for wildlife, mostly waterfowl, and actively managing about 1,100 acres of moist-soil units (Figure 6; Table 2). Peak waterfowl populations reportedly reached 250,000 ducks and commonly exceeded 100,000 ducks (excluding wood ducks) and 10-15,000 geese. In recent years waterfowl populations have peaked at about 10,000 ducks (excluding wood ducks) and very few geese.

The refuge contains two farming units – Greenlea Bend and McLemore's. Greenlea Bend is located in the northern part of Judd Brake Unit of the refuge and McLemore's is located in the southern part of Fool River Unit. The original total farmable acreage for both areas was much greater than they are today. The farmable acres for both units have been drastically reduced by a combination of reforestation and/or the creation of moist-soil areas.

Both units were farmed intensively prior to purchase of the refuge. Either cotton or corn was grown on the ridge areas with soybeans being grown in the lower, more marginal areas. Drainage ditches were dug throughout both units with little or no soil conservation practices in place. Immediately following fall harvest, the ground was disked and prepared for spring planting. No winter cover crops were planted.

Currently, both fields are actively managed to provide a diversity of habitat, primarily for waterfowl, through a combination of grain crops and moist-soil management areas. The ridge and swale topography of the farmed areas lends itself to moist-soil management, and a number of water control structures are now in place to take advantage of this fact.

Open Water Wetlands

The backwater sloughs, lakes, and bayous of the refuge provide habitat for a great diversity of aquatic life including fish, reptiles, amphibians, and mollusks. Although water quality in the Tensas River has been degraded by agricultural drainage, the meandering character of the river has been preserved. The Tensas River is the only major stream in the Louisiana Delta that has not been extensively altered by channelization. It meanders snake-like throughout much of its watershed with river bends almost coming together in places. Some of the tributary streams have been ditched in sections to provide drainage for agricultural areas.

The ridge and swale topographies of the Greenlea, Stuttz, Ezell, and Chapman areas lend themselves to moist-soil management. Water control structures for these areas are the flashboard riser type, allowing independent water control of each of the above-cited units. Water management on these moist-soil units allows for good production of preferred waterfowl foods. The units are disked on a rotational basis to control *Sesbania* and promote beneficial wetland plants. Flooding of a portion of the moist-soil units in the summer assists shorebird migration. Several moist areas in each unit provide water throughout the summer to provide habitat for shorebirds, marsh and wading birds, as well as wood duck broods.

Figure 6. Moist-soil and wildlife cropland units on Tensas River NWR

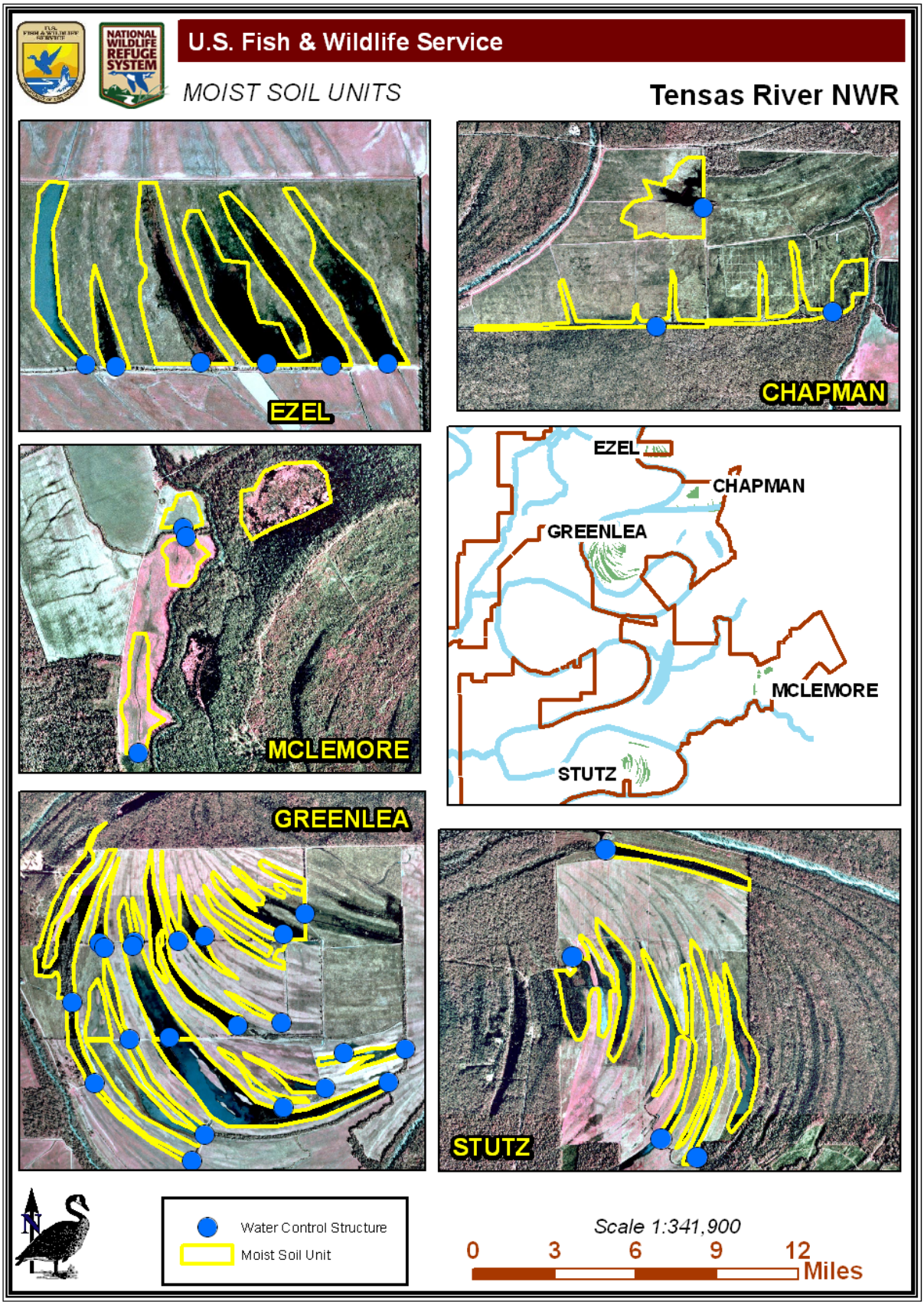


Table 2. Water management units at Tensas River NWR

Common Name	Water Containment	Habitat Type	Cover Type	Acres	Hectares	Year Created	Comments
Chapman #1	Partial	Moist-Soil	Moist-Soil	96.2	38.9	1991	Partly reforested
Chapman #4	Partial	Moist-Soil	Moist-Soil	22.5	9.1	1992	Projected for natural reforestation
Ezell #1	Partial	Moist-Soil	Moist-Soil	19.7	8.0	1988	
Ezell #2 & #3	Complete	Moist-Soil	Moist-Soil	39.1	15.8	1988	
Ezell #4	Complete	Moist-Soil	Moist-Soil	30.0	12.1	1988	
Ezell #5	Partial	Moist-Soil	Moist-Soil	11.1	4.5	1988	
Greenlea #1	Complete	Moist-Soil	Moist-Soil	27.2	11.0	1985	
Greenlea #2	Complete	Moist-Soil	Moist-Soil	15.6	6.3	1985	
Greenlea #4	Partial	Moist-Soil	Moist-Soil	92.1	37.3	1986	25% of habitat mix of willow and buttonbush
Greenlea #5	Partial	Moist-Soil	Moist-Soil	17.9	7.2	1988	
Greenlea #7	Complete	Moist-Soil	Moist-Soil	16.8	6.8	1986	
Greenlea #8	Complete	Moist-Soil	Moist-Soil	25.5	10.3	1984	10% of habitat is buttonbush
Greenlea #9	Complete	Open Aquatic	Open Aquatic	70.4	28.5	1987	Lotus choked, needs permanent pool boundary
Greenlea #10	Complete	Moist-Soil	Moist-Soil	96.5	39.0	1987	Upper end open aquatic

Common Name	Water Containment	Habitat Type	Cover Type	Acres	Hectares	Year Created	Comments
Greenlea #11	Complete	Moist-Soil	Moist-Soil	16.4	6.6	1986	
Greenlea #12	Partial	Moist-Soil	Moist-Soil	48.7	19.7	1984	
Greenlea #13	Complete	Moist-Soil	Moist-Soil	12.3	5.0	1984	
Greenlea #14	Partial	Moist-Soil	Moist-Soil	8.2	3.3	1986	
Greenlea #16	Complete	Moist-Soil	Moist-Soil	12.0	4.9	1985	
Greenlea #18	Complete	Moist-Soil	Moist-Soil	27.4	11.1	1985	
Greenlea #19	Complete	Moist-Soil	Moist-Soil	7.9	3.2	1985	
McLemore 2	Partial	Moist-Soil	Moist-Soil	12.2	4.9	1999	
McLemore 3	Partial	Cropland	Corn	18.2	7.4	1999	
Stutz #1	Complete	Moist-Soil	Moist-Soil	82.1	33.2	1986	
Stutz #2	Partial	Moist-Soil	Moist-Soil	48.4	19.6	1986	
Stutz # 3	Partial	Moist-soil	Moist-soil	52.7	21.3	1986	Cropland habitat
Stutz #4	Partial	Moist-Soil	Moist-Soil	39.9	16.2	1986	
Stutz #5	Partial	Moist-Soil	Moist-Soil	26.7	10.8	1986	Willow less than 15%
Total				**993.6**			

Forested Units							
Chapman #2	Partial	Woody Vegetation	Reforested	34.9	14.1	1992	Direct seeded in 1991.
Chapman #3	Partial	Woody Vegetation	Reforested	23.3	9.4	1992	Planted in 1991 with cypress seedlings and direct seeded with oaks.
Greenlea #15	Partial	Woody Vegetation	Reforested	62.3	25.2	1985	Direct seeded in 1987.
Greenlea #17	Complete	Woody Vegetation	Hardwoods	17.6	7.1	1985	Cypress/willow along ditch.
McLemore 1	Partial	Woody Vegetation	Reforested	6.0	2.4	1999	
Geenlea #20	Partial	Moist-Soil	Moist-Soil	17.0	6.9	1995	
Greenlea #3	Complete	Moist-Soil	Moist-Soil	11.6	4.7	1985	Spoil bank lined with hardwoods
Total				**172.6**			
Partial Units							
Ezell #6	Partial	Woody Vegetation	Reforested	19.1	7.8	1988	Direct seeded in 1992.
Greenlea #6	Complete	Woody Vegetation	Forested Swamp	71.1	28.8	1986	
Total				**90.3**			

Invasives and Pest Control

Until recently, invasive plants have not been a large problem on the refuge. As a routine part of general forest management practices, foresters eliminated scattered clumps of such invasives as Chinese privet, mimosa, and tree-of-heaven. Two species that are beginning to move into the area are on the radar as potentially becoming a refuge problem: Chinese tallow and trifoliate orange. Both species are rapidly increasing and unless controlled may pose a threat to wetland and upland habitats. These species can cause large-scale ecosystem disruption by replacing native vegetation. This reduces native species diversity, which in turn has a negative impact on wildlife. They can quickly become the dominant plant in disturbed areas and invade bottomland forests.

Fire Regime

Fire is a natural phenomenon that has played a critical role in the ecosystem dynamics of the natural communities within North Louisiana. Before wildfire suppression strategies were implemented, naturally caused and anthropogenic fires likely burned thousands of acres of mostly upland habitat in northern Louisiana each year. Low intensity fires occurred on average in 3- to 5-year intervals. With differences in elevation and moisture gradients, these frequent fires maintained a mosaic of vigorous and diverse plant communities in various stages of post-fire succession and provided a wide variety of habitat types and conditions for wildlife.

Higher elevations of the bottomland hardwood forests on the refuge have experienced some low-intensity fire events during extended drought conditions. These occurrences were probably rare and played little, if any, long-term role in affecting plant species composition. In general, fire is viewed as detrimental to hardwood forest communities.

Special Designation Areas

The Greenlea Bend is closed to the public. This area consists of agricultural fields interspersed with moist-soil areas. It provides a sanctuary for neotropical migratory birds, migratory waterfowl, deer, the threatened Louisiana black bear, and other wildlife.

WILDLIFE

Species of Special Concern

Extinct or endangered species formerly of the area include the red wolf, Florida panther, and ivory-billed woodpecker. Prior to recent reported sightings in Arkansas, the last confirmed sightings of the ivory-billed woodpecker were in forests now included in Tensas River NWR and is the area where the noted biologist James T. Tanner studied and wrote accounts of the species. Panthers are occasionally reported, but their existence has not been verified. The Louisiana black bear, which was listed as a threatened species on January 7, 1992, ranges throughout Tensas River NWR. The Bachman warbler may be a rare transient or possibly uses the refuge during its breeding season. Other species of concern that may occur on the refuge are the alligator snapping turtle, the Ouachita map turtle, and two species of bats (Rafinesque's big-eared and southeastern myotis), and, as a group, freshwater mussels.

<u>Bald eagle</u>: The bald eagle has officially been removed from the List of Threatened and Endangered Species as of August 8, 2007. Bald eagles nest in Louisiana from October through mid-May. Bald eagles typically nest in mature trees (e.g., bald cypress, sycamore, and willow) near fresh to

intermediate marshes or open water in the southeastern parishes. Bald eagles also winter and infrequently nest in mature pine trees near large lakes in central and northern Louisiana.
Major threats to this species include habitat alteration, human disturbance, and environmental contaminants (*i.e.*, organochlorine pesticides and lead). Although the bald eagle has been removed from the threatened and endangered species list, it continues to be protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act (BGEPA). The Service developed the National Bald Eagle Management (NBEM) Guidelines to provide landowners, land managers, and others with information and recommendations regarding how to minimize potential project impacts to bald eagles, particularly where such impacts may constitute "disturbance," which is prohibited by the BGEPA. A copy of the NBEM Guidelines is available at http://www.fws.gov/migratorybirds/issues/BaldEagle/NationalBaldEagleManagementGuidelines.pdf.

Louisiana black bear:

Life History

The Louisiana black bear is one of 16 subspecies of the American black bear. The black bear is a large, bulky mammal with long black hair and a short, well-haired tail. The facial profile is blunt, the eyes are small, and the nose pad is broad with large nostrils. The muzzle is yellowish brown with a white patch sometimes present on the lower throat and chest. Although weight varies considerably throughout their range, adult males generally weigh from 300-500 pounds and adult females generally weigh from 150-300 pounds.

Human encroachment on bear range, dwindling bottomland hardwood habitat, and the lack of available biological information for bear management were factors that prompted a petition to list the Louisiana black bear (*Ursus americanus luteolus*) as an endangered subspecies. Bears once occurred throughout southern Mississippi, Louisiana, and eastern Texas. Habitat modification, particularly clearing for agriculture, has fragmented and reduced suitable habitat by more than 80 percent in the MAV. The Service initiated a research project in late November 1987 to determine the status of the black bear in the Tensas River Basin. This information contributed to the Louisiana black bear being listed as threatened in 1992.

The Louisiana black bear was listed as threatened in the *Federal Register* on January 7, 1992 (57 FR 568), due to the reduction in population size resulting from extensive habitat loss (U.S. Fish and Wildlife Service 1995). Simultaneously, other free-living black bears within the historic range of the Louisiana black bear were listed as threatened due to their similarity of appearance to the Louisiana black bear. The Service proposed to designate critical habitat for the Louisiana black bear on December 2, 1993, *Federal Register* (58 FR 63560); however, on May 6, 2008, the Service withdrew its 1993 critical habitat proposal and published a new proposal in the *Federal Register*, which is currently in the review process. Proposed critical habitat included forested habitat within the Tensas River Basin, the Atchafalaya River Basin, and the Lower Iberia-St. Mary Parish area.

Though classified as a carnivore by taxonomists, black bears are not active predators and only prey on vertebrates when the opportunity arises. Most meat eaten by black bears is consumed as carrion. Bears are best described as opportunistic feeders, as they eat almost anything that is available; thus, they are typically omnivorous. Their diet varies seasonally and includes primarily succulent vegetation during spring, fruits and grains in summer, and hard mast such as acorns and pecans during fall. Bears utilize all levels of forest for feeding. They can gather foods from treetops and vines but also grub in fallen logs for insects. The growth rate, maximum size, breeding age, litter size, and cub survival of black bears are all correlated with nutrition.

The use of agricultural crops by bears to supplement foods available within forested habitats can greatly reduce the size of an adult female bear's home range. For example, the diets of bears within the Deltic area have been found to consist of 49 percent agricultural crops (Anderson 1997) and average home range size for adult females (1,764 acres) is half that of adult female home ranges within the Coastal subpopulation (i.e., the smallest size among the remaining 3 subpopulations).

Black bear population densities of 10 southeastern populations range between 0.26 and 15 bears per square mile. Bear densities are specifically influenced by age and sex, season of the year, food, cover, and security quality within the habitat (Pelton 2000).

Black bears do not truly hibernate but go through a dormancy period termed "carnivoran lethargy" a period of torpor that helps them survive food shortages and severe weather during the winter. In warmer climates, such as in Louisiana, bears can remain active all winter (Taylor 1971). Bears may enter dens between October and early January depending on latitude, available food, sex and age, and local weather conditions (Pelton 1982). Adult females generally enter the den first, followed by subadults and adult males. Females with cubs generally are the last to leave the den.

Female black bears become sexually mature at three to five years of age. Breeding occurs in summer and the gestation period for black bears is seven to eight months. Delayed implantation occurs in the black bear; blastocysts float free in the uterus and do not implant until late November or early December (Pelton 1982). Cubs are born in winter dens at the end of January or the beginning of February. Although litter sizes of three to four cubs do occur, the normal litter size is two. Cubs stay with the sow through summer and fall and den with them the second winter. The young disperse in spring or summer, prior to the female's period of estrus (Pelton 1982). Estrus starts when the female becomes physiologically capable of reproducing again. However, not all females produce cubs every other winter; reproduction is related to the bears' physiological condition (i.e., female bears that do not reach an optimal weight or fat level do not reproduce).

Average age at first reproduction varies widely across black bear studies; however, most reports involve bears between 3 years and 5 years of age. Estimates of the average age at first reproduction are not available for Louisiana bear populations. However, individuals birthing at three years of age have been recorded in Upper Atchafalaya and Coastal subpopulations, Weaver (1999) reported that all adult females (greater than or equal to four years old) in the Tensas River Basin subpopulations (i.e., Tensas and Deltic) had evidence of previous lactation or were with cubs. Estimates of the interval between births are not currently available for the Louisiana bear subpopulations and are assumed to be two years. However, observational data from bears within Deltic tracts suggest the interval between successive births may be greater than that expected (Anderson 1997).

Louisiana black bears use a variety of den types, including ground nests, hollow trees, and brush piles. Generally, adult males and subadults use ground dens with greater frequencies than adult females. Tree dens may be an important component for female reproductive success in areas subject to flooding (Hellgren and Vaughan 1989). Den trees located in cypress swamps would appear to increase the security (e.g., decrease the disturbance) of bears utilizing these dens compared to ground dens. However, the availability of den trees does not appear to be a limiting factor (Weaver and Pelton 1994). Trees large enough and sufficiently mature to contain usable cavities are almost always found in places inaccessible to logging (Marchinton 1995) or are left standing due to their low economic value. Brushpile nests and open nests were located in thick vegetation, usually in areas logged within the past one to five years. Brushpile dens are created by felled tops and other logging slash. Open ground nests and nests under brushpiles are scooped out depressions that are bare or lined with vegetation bitten off around the nest (Weaver et al., 1990).

Corridors providing cover may facilitate the movement of bears through agricultural lands in the Tensas River Basin, particularly when bears reside in fragmented tracts of forest (Weaver et al., 1990). According to Marchinton (1995), telemetry locations and visual observations indicated that wooded drainages were important travel corridors for movement between forested tracts.

Remoteness is an important spatial feature of black bear habitat. In the southeastern United States, remoteness is relative to forest tract size and the presence of roads. Examples of remoteness important for suitable black bear habitat include a tract of timberland 0.5 mile from well-maintained roads and development (Rudis 1986) and a forested tract of more than 2,500 acres (Rudis 1986). Forest tract size and the number of roads reflect the likelihood of human disturbances, which can limit habitat suitability and use (Brody and Pelton 1989).

High-quality cover for bedding, denning, and escape is of great importance as forests become smaller and more fragmented, and as human encroachment and disturbance in bear habitat increases (Pelton 1986). Black bears are adaptable and opportunistic, and can survive in close proximity to humans if afforded areas of retreat that ensure little chance of close contact or visual encounters. The thick understory found in bottomland hardwood forests provides high-quality escape cover. Escape cover is considered especially critical because fragmented habitats put the bear populations in closer proximity to humans.

Black bears will forage close to human establishments for garbage; pet and livestock feed; and human foods, especially during times of low availability of natural food sources (Rogers 1976). Bears, particularly habituated bears, searching for food may destroy property or even enter houses or storage areas. Foraging for human food sources is most likely to occur soon after bears emerge from their dens in the spring because of the stress of the winter dormant period and the lack of natural foods. Nuisance activity is correlated to the availability of natural food sources. During years of hard mast failure, nuisance activity may be more pronounced. Once a bear has become habituated to human food, particularly garbage, it becomes difficult, if not impossible, to control the nuisance behavior. The most effective mechanism to reduce nuisance behavior and human/bear conflicts is to eliminate attractants. In the long-term, this is also the most cost-effective approach.

Bear mortality has been attributed to natural and human causes. Natural causes include disease, cannibalism, drowning, poor maternal care, and climbing accidents. Human-induced mortality includes hunting, trapping, poaching, vehicle collisions, electrocution, depredation/nuisance kills, disturbance (causing den abandonment), and accidents associated with research activity. Road access can increase the chances of people or dogs disturbing maternal dens in winter (Rogers and Allen 1987). Cubs are dependent on the sow for warmth and food; human disturbance of denning females has resulted in cub mortality from abandonment (Elowe and Dodge 1989).

Pace et al., (2000) evaluated known black bear mortality in Louisiana between 1992 and 2000. Vehicular collisions were the most common cause of mortality, accounting for 45 percent of verified losses. Poaching was the second most common cause of death, with at least 12 bears illegally shot. Sixty-five percent of known mortalities occurred in the coastal subpopulation (the majority of which were adult females), 24 percent from Tensas River Basin subpopulations (the majority of which were males) and 11 percent from the Upper Atchafalaya Basin subpopulation. Pace et al., (2000) concluded that anthropogenic causes of mortality are taking a relatively large toll on the coastal subpopulation in terms of absolute numbers and because adult females represent a high proportion of that mortality. Similarly, female losses in the Upper Atchafalaya Basin are very high, relative to estimated population size.

Bear activity revolves mainly around the search for food, water, cover, and mates during the breeding season. Home ranges of bears, particularly females, appear to be closely linked to forest cover (Marchinton 1995). Beausoleil (1999) estimated maximum home range for Deltic bears to be 1,729 and 1,038 acres for males and females, respectively. Maximum home range estimates for Tensas River NWR bears were 81,396 and 13,072 acres for males and females, respectively (Weaver 1999).

Status and distribution

The Louisiana black bear originally inhabited the forests of Louisiana, southern Mississippi, and eastern Texas, but extensive land clearing primarily for agricultural purposes has reduced its habitat by more than 80 percent. The species is now restricted to three core populations: (1) the Tensas River Basin population, consisting of two subpopulations one (Tensas) located on Tensas River NWR and surrounding lands south of I-20, and another (Deltic) on four small disjunct forested tracts owned by the Murphy family (formerly known as the Deltic Timber Corporation) north of I-20; (2) the Inland or Upper Atchafalaya River Basin (Upper Atchafalaya Basin) subpopulation, in the upper Atchafalaya River Basin, primarily within the Morganza Floodway and the upper reaches of the Atchafalaya Floodway in Pointe Coupee Parish; and (3) the Coastal subpopulation, located primarily south of U.S. Highway 90 and west of the lower Atchafalaya River and Delta in St. Mary and Iberia Parishes. In general, this subspecies is believed to be stable to increasing.

Louisiana black bears were assigned subspecies status by Merriam (1893) based on skull morphometrics taken from five samples collected in Morehouse Parish in northeastern Louisiana. Nowak (1986) concurred with Merriam's designation after examining skulls collected in Louisiana, Mississippi, and the Big Thicket area of northeastern Texas. The historic range of the Louisiana black bear is believed to include all of Louisiana, eastern Texas, southern Arkansas, and the southern half of Mississippi (Hall 1981). All three extant subpopulations in Louisiana fall within the historic range of the Louisiana black bear. Surveys around the mid-1900s indicated that 80 to 120 bears remained in Louisiana divided equally between a population along the Tensas River and another in the Atachafalaya Basin region (Nowak 1986).

During the period 1964 to 1967, the LDWF released 163 American black bears (*Ursus americanus americanus*) from Cook County, Minnesota (Cook County bears). One hundred thirty-two bears were released into the Morganza Floodway, and 31 bears were released into Tensas and Madison Parishes in northeastern Louisiana. The releases were in the areas currently occupied by the Upper Atchafalaya Basin and Tensas River Basin subpopulations. It is believed that, at the time of the release, native bears had long since disappeared from the Upper Atchafalaya Basin, but that native bears occupied the Tensas River Basin (Nowack 1986). Novak (1986) speculated that few of the bears released in northeastern Louisiana remained within the vicinity of release and survived, and the introduction was considered unsuccessful. The introduction in the Upper Atchafalaya Basin, however, achieved limited success. This is possibly because of the much larger number of animals released and because no native bears were established in the area (Nowak 1986). The coastal subpopulation was not included in the restocking effort and appears to have suffered genetically from a recent bottleneck (Triant 2001).

The Tensas River NWR has always supported a population of this species. At the time of listing, the refuge and the adjacent state-owned Big Lake Wildlife Management Area comprised about 80 percent of the contiguous bottomland hardwood system within the Tensas River Basin (Weaver et al., 1990). Another subpopulation of bears exists on the privately owned Deltic (or Murphy) properties, located within the Tensas River Basin north of the refuge on four primary bottomland hardwood tracts

and several smaller forested tracts scattered throughout the area. The Deltic and refuge subpopulations are commonly referred to as the Tensas River subpopulation. In the early 1990s, there was not believed to be any interchange between these two subpopulations which are separated by I-20 and agricultural lands.

Habitat restoration efforts since listing now provide a habitat connection between these two subpopulations, and there is indirect evidence that exchange is occurring. The refuge has been a focus of bear research since listing. An outgrowth of that research has been the development of refuge management practices that have been successful in increasing the population of black bear on the refuge and for bear habitat in general (Weaver et al., 1992). That research also supported the inclusion of a special rule at the time of listing that exempted normal forest management activities that supported a sustained yield of timber products and wildlife habitats from the take provisions of the Endangered Species Act. That research demonstrated that normal forest management activities were compatible with Louisiana black bear needs and were not considered a threat to the species. As restoration efforts progress, bear populations, and consequently the number of complaints involving bears, will increase. It is essential that the public's concerns regarding nuisance bears be addressed in a timely and professional manner. Prompt responses to problem bear complaints and public education will foster support for recovery of the Louisiana black bear.

Several population estimates have been presented for the different populations of the Louisiana black bear. Currently, there are two research projects whose primary objectives are to estimate Louisiana black bear populations in the Tensas/Deltic tracts and Pointe Coupee Parish, Louisiana. Final results from these studies are expected to produce the most current and precise population estimates for these two bear populations. Field data collection will be complete in summer of 2008 and 2009 for the Tensas/Deltic and Pointe Coupee projects, respectively.

Recently completed surveys of dietary patterns of bears on Tensas and the Deltic tracts indicate that bears on Tensas feed on relatively few prey items annually compared to bears on Deltic. During summer and fall, diets were substantially more diverse on Deltic. Blackberries, acorns, corn, and palmetto fruit were the most important food items represented in bear diets on Tensas. Notably, more than 70 percent of the volume found in 96 scats recovered on Tensas during fall was comprised of corn, acorns, and palmetto fruits. On Deltic, this equivalent volume was distributed among six prey items, including important soft mast species such as French mulberry (*Callicarpa americana*) and muscadine (*Vitis* spp.). Benson (2005) reported that occurrence of deer in bear diets on Tensas was always less than 9 percent frequency of occurrence (total occurrences of a prey item relative to occurrences of other prey) during 2003-2005. The major occurrences were corn, acorn, palmetto, and beetles, which indicated they were the most frequently preyed upon items. Although concerns may exist from hunters that bears are negatively affecting deer populations on Tensas, these results suggest that depredation of deer by bears is infrequent and deer are not an important prey of bears on Tensas.

Benson (2005) reported that female bears on Deltic maintain substantially smaller home ranges than females on Tensas. This is not surprising given the fragmented nature of the Deltic tracts. Bears by default must maintain relatively small home ranges if they inhabit the Deltic tracts consistently. Mean annual home range size (12 km^2) on Tensas fell well within the range reported in the literature for other southeastern black bear populations. Notably, females with newborn cubs maintained similar spring home ranges on Tensas and Deltic, which indicates the lack of plasticity in space use for females with maternal responsibilities during early spring. From the standpoint of habitat selection, female bears on Tensas selected swamps and regenerating forests at multiple spatial scales, whereas females on Deltic selected higher sites (not subjected to annual or persistent flooding) within the forest. The strong

selection for regenerating habitats on Tensas is likely a function of relatively limited availability of early successional forest patches on Tensas, which is attributable to very limited forest management during the past decade. Parturient females on both Tensas and Deltic used tree dens more frequently than ground dens, whereas non-parturient females used both den types with equal frequency.

A number of potential implications to black bear behavior (movements, space use, habitat and den selection, diet) are discussed in Benson (2005). To summarize the most salient points, it is clear that black bears in the Tensas River Basin exhibit a relatively high degree of plasticity in behavior, as evidenced by the numerous ecological differences in bear behavior noted between Tensas and Deltic. This bodes well for continued, long-term viability of bears in the region. However, a number of conservation concerns and priorities is evident. Past forest management, or lack thereof, on the refuge has resulted in a closed-canopy forest condition lacking important mid- and under-story components and the quality foraging resources found in those components. This is substantiated by the lack of diversity in diets on Tensas and the strong selection for regenerating habitats that are present in the area. Future forest management strategies that create more diverse forests, increase the availability of understory vegetation, and maintain consistent availability of early successional forest communities on Tensas would benefit the bear population. However, it should be noted that mature forests and swamps were particularly important to habitat selection by bears on Tensas, which suggests that maintaining expanses of these habitats is important.

Results of den selection analyses suggest a number of potential land management scenarios that would benefit denning ecology of bears on Tensas. Benson (2005) reported a relatively high reuse of tree dens on Tensas with almost all denning attempts occurring in mature bald cypress. This suggests that tree den availability may be low, as reuse is often used as a surrogate for estimating den availability. Conserving currently suitable tree dens on Tensas should be a priority. Furthermore, 34 percent (13 of 38) of dens on Tensas during 2003-2005 were ground dens, most occurring in isolated patches of early successional habitat. This suggests that ground denning comprises a substantial portion of den attempts on Tensas, mandating efforts to manage appropriate ground denning habitat. For instance, forest harvest operations could leave logging debris piled in topographically higher areas to provide suitable ground dens. A current research project being conducted by Dr. Michael Chamberlain at Louisiana State University is more thoroughly evaluating den ecology on Tensas and will provide a model for predicting sites likely to receive greatest den use for both tree and ground denners. This model should be applied to existing land cover maps of Tensas to help guide forest management strategies over the long-term.
Although black bears will often increase space use during early and middle fall to locate suitable foraging resources, several females on Tensas exhibited movements warranting further consideration. Across females, most typically displayed fall movements that provided opportunities for using cornfields distributed throughout and around Tensas. Notably, several females essentially shifted their entire home range and vacated broad areas of Tensas to reach these concentrated foraging resources. It is likely that increasing the availability of foraging resources through improved forest management will reduce the likelihood of this scenario. Future research should assess how changing forest management affects bear behavior.

Raccoon hunting during spring has the potential to disturb black bears during the critical late denning period when females and cubs are exiting dens. Potential exists to evaluate effects of raccoon hunting on bear behavior (movements, space use) given the relatively large number of radio-marked female bears on Tensas. Using radio-telemetry to assess bear movements relative to disturbance created during nighttime raccoon hunting activities would be valuable and should be explored. Any studies such as this must consider the potential adverse effects to bears before they are begun.

Because female bears are slow to occupy new habitats, a cooperative effort began in 2001 to establish a new black bear subpopulation in Louisiana. Initial attempts for this project originated on the Refuge in 1998 when a female bear and cubs were relocated from the Deltic properties and placed in an artificial den to the southern end of the refuge. An additional female and cub were relocated from Deltic to Buckhorn Wildlife Management Area in 1999. The success of those efforts led to the long-term repatriation project that is ongoing today. Leveraging funding and personnel and pooling resources, the LDWF, Black Bear Conservation Committee, Louisiana State University, U.S. Department of Agriculture (USDA) - Wildlife Services, University of Tennessee, the Service's Louisiana Ecological Services Office, and Tensas River, Lake Ophelia, and Bayou Teche NWRs have cooperated to successfully move 36 female bears and their 82 cubs to unoccupied forests since 2001. Those relocated females have produced a total of11 litters with 31 cubs since 2005. The bear populations on Tensas and Deltic have been used for repatriation efforts since 2002 (Deltic properties used sparingly during 2001). As part of the repatriation project, 12 females have been relocated from Tensas with their newborn cubs, and released on the Lake Ophelia NWR and Three Rivers Wildlife Management Area. Results of the repatriation project to date are summarized in Benson (2005).

The recovery criteria for the federally threatened Louisiana black bear (U.S. Fish and Wildlife Service 1995) calls for two viable subpopulations linked by a corridor, with long-term protection of the habitat.

Alligator snapping turtle: Alligator snapping turtles are the largest freshwater turtles in the United States. They are protected from commercial harvest in every state. Louisiana protected them from commercial harvest starting in 2004. Commercial harvest of these turtles threatens their population because alligator snapping turtles do not breed until they are approximately 15 years old and commercial harvests target adults. Nest depredation by raccoons, skunks, opossums, and fire ants also harm the population to a significant degree. Although individual turtles have been seen on the refuge, no good estimate of the alligator snapping turtle population exists.

Ouachita map turtle: A requirement of a Corps water project is continued maintenance of flood control measures including removal of snags and standing timber from the Tensas River to improve drainage in Madison Parish. About 10 years ago, the Fifth Louisiana Levee District tried to force the affected parishes to follow through on that requirement. Madison Parish did not conduct any maintenance downstream from I-20. Ouachita map turtles and other turtles depend on snags for both basking platforms and habitat structure. This important habitat component should be protected to the fullest extent possible.

Rafinesque's big-eared bat: Rafinesque's big-eared bat is the least studied bat in the eastern United States (Harvey et al., 1999) and is federally designated a species of special management concern (USFWS 1999). The bat is associated with bottomland hardwoods, and since this habitat has decreased, many biologists are concerned about the status of the Rafinesque's big-eared bat. Many states consider them to be either threatened or endangered; however, Louisiana has no official designation for them. These bats have been found on nearby D'Arbonne NWR, roosting in stands of high density, very large, old, and hollow tupelo trees mixed with large bald cypress and some elm on the outer edges (Gooding and Langford 2004). If these bats are discovered roosting on Tensas River NWR, they will need to be considered in forest management decisions and habitat objectives, because they are sensitive to disturbance (Clark 1990).

Southeastern myotis: Southeastern myotis is also associated with riparian areas and/or bottomland hardwoods and is listed as a federal species of special management concern. They are often captured in mist-nets more than big-eared bats, but their populations are thought to be declining as well. Southeastern myotis roost in caves (Harvey 1992) in the northern part of their range, but little is known about their roosting habits where there are no caves, such as Louisiana.

Freshwater mussels: Freshwater mussels are one of the most imperiled groups of animals in North America. Currently, 70 mussel species are listed as threatened or endangered under the Endangered Species Act, and a number of others are candidates or potential candidates for protection. The Tensas River historically supported upwards of 40 species of freshwater mussels, the most diverse mussel community in the State of Louisiana. Today, the refuge continues to support dense assemblages of at least 29 species of mussels and provides an important refuge for maintaining mussel biodiversity in the streams of the Louisiana Delta (Hartfield, not published) (See Appendix I). While no threatened or endangered freshwater mussel species are currently known to inhabit the refuge, current residents may be reclassified as such. The potential also exists to introduce species in peril to suitable habitat on the refuge.

Other Resident Wildlife

Waterfowl

The MAV is a critical ecoregion for migrating and wintering ducks and geese in North America (Reinecke et al., 1989). Species that are known to utilize the refuge include northern pintail, blue-winged teal, green-winged teal, mallard, gadwall, American widgeon, and northern shoveler. Additionally, the refuge provides migratory and resident habitat for wood duck. Tensas River NWR provides important foraging and resting habitats within the MAV for these waterfowl and contributes important regional resources to an international habitat management effort known as the NAWMP, which seeks to return waterfowl population to levels observed during the 1970s. Most waterfowl use on the refuge occurs in the Greenlea Bend, Judd Brake, and Lake Nick areas.

Concern over waterfowl population declines in the 1980s resulted in establishment of the NAWMP, which focused the attention of federal, state, and private conservation groups on critical wintering and breeding areas. The Lower Mississippi Valley Joint Venture (LMVJV) was selected and organized to plan conservation efforts that would provide sufficient waterfowl habitat in the MAV to ensure adequate winter survival and body condition for spring migration and nesting. To quantify winter habitat requirements, the factors limiting waterfowl populations were identified, and the LMVJV assumed foraging habitat was most likely to limit populations in the MAV (Reinecke et al., 1989).

At one time, the refuge was cooperatively farming over 1,000 acres, leaving about 25 percent of the crop in the field for wildlife, mostly waterfowl, and actively managing about 1,100 acres of moist-soil units. Peak waterfowl populations reportedly reached 250,000 ducks and commonly exceeded 100,000 ducks (excluding wood ducks) and 10-15,000 geese. With reduced staff and high deer populations, much of the agricultural production has been lost and management of moist-soil units has been less intensive. In recent years, waterfowl populations have peaked at about 10,000 ducks (excluding wood ducks) and very few geese.

Wood ducks are year-round residents in the forestlands of the southern United States, including Tensas River NWR. Preferred habitats include forested wetlands; wooded and shrub swamps; tree-lined rivers; streams; sloughs; and beaver ponds. Wood ducks seek food in the form of acorns, other soft and hard mast, weed seeds, and invertebrates found in shallow flooded timber, shrub swamps, and along stream banks. They loaf and roost in more secluded areas and dense shrub swamps.

Wood ducks nest using available natural cavities and nest boxes throughout the refuge. Another cavity-nester, the hooded merganser, breeds on the refuge, and has been documented using wood duck nest boxes. Brood survival is higher in situations where nests are closer than one mile to water. Due to conversion of forestlands to urban sprawl and agriculture; forestry practices; and competition for nest sites

from a host of other species, natural cavities are considered to limit reproduction (Davis 2001). Nest boxes are commonly used to supplement natural cavities and increase local production of wood ducks, but box programs are not an end to all nesting problems. They require time to clean and repair at least annually. Production can be increased by more frequent checks and cleaning of boxes, but this must be weighed against other time constraints. During the review, refuge staff indicated that the boxes have not been adequately maintained, and they did not know where or how many boxes were on the refuge. Production is presumed to be relatively low. The refuge had an active program of approximately 125 nest boxes, and box utilization and wood duck production was quite high during the 1990s.

The presence and distribution of wintering waterfowl on the refuge depends primarily on water levels and mast crops. Low water levels favor dabblers. This is not only because it is attractive for feeding, but also because off-refuge areas are usually dry at that time, which cause birds to seek the permanently flooded areas and low, flooded fields on the refuge. As water levels increase and the backwater floods the uplands, mallards and other dabblers begin using the flooded timber. When open water in the open field and moist-soil areas become more deeply flooded, diving ducks are attracted to the invertebrate food source on the submergent vegetation.

Waterfowl use of the refuge during the breeding season is limited due to the southern latitude. Wood ducks nest using the many natural cavities available in bottomland hardwood forests. In addition, wood duck boxes are located throughout the refuge to provide additional nesting habitat.

Marsh and Wading Birds

During the last several decades, overall loss of freshwater emergent wetlands has been underway as development pressures increase. The king rail, in particular, is thought to have declined dramatically from inland areas and is now considered to be a species in potentially deep conservation trouble away from coastal areas. The least bittern is likely also suffering from freshwater wetland losses in recent decades. All the other priority marshbirds that could be found at Tensas River NWR require tall emergent vegetation as part of their habitat. Breeding populations of pied-billed grebe and American coot are considered of regional conservation interest. The king rail is of highest concern among marshbirds, followed by least bittern and purple gallinule.

Tensas River NWR provides excellent habitat for breeding and wintering colonial wading birds. Shallow water areas found on the refuge provide critical foraging opportunities for long-legged wading birds. Great blue herons, cattle egrets, little blue herons, great egrets, snowy egrets, yellow-crowned night herons, white ibises, black-crowned night herons, green-backed herons, and anhingas use the refuge's sloughs, bayous, flooded timber, scrub-shrub, and open fields at different times of the year depending upon the water levels. When water is coming off the refuge in late spring, wading bird concentrations are high, as they capitalize on trapped fish and crawfish. Several rookeries are active throughout the refuge.

Shorebirds, Gulls, Terns, and Allied Species

During the year, black-necked stilts, killdeer, pectoral sandpipers, common snipe, dowitchers, greater yellowlegs, lesser yellowlegs, upland sandpipers, spotted sandpipers, and several peep species have been documented utilizing moist-soil units on the refuge. The Danny Ezell Farm Services Agency (FSA) tract and the Chapman, Stutz, and Greenlea fields on the refuge provide the majority of the shorebird habitat at the Tensas River NWR. Greater yellowlegs, lesser yellowlegs, dowitchers, and killdeers are the most common of this group. Several species of sandpipers are usually observed during the spring and fall migration.

Raptors

The red-tailed hawk, red-shouldered hawk, American kestrel, northern harrier, barred owl, screech owl, great-horned owl, and Mississippi kite are common residents or visitors to the refuge. The largest raptors found on the refuge are bald and golden eagles, which are occasional winter visitors. Roger Tory Peterson found the only documented nest of a peregrine falcon in Louisiana in 1942 on what is now refuge land.

Neotropical Migratory Birds

The establishment of the Tensas River NWR can be considered significant by its contribution to the welfare of passerine birds alone. The area serves as a critical migration corridor and island in the vast Mississippi Delta sea of agriculture. Nesting mourning doves use the refuge as well as migrating birds that inhabit the agricultural fields and refuge roads within the refuge boundary. In addition, as discussed above in this CCP, forest fragmentation has had a dramatic negative impact on the breeding success of many neotropical migratory birds that need large contiguous tracts of forested land to avoid nest predation by the brown-headed cowbird (Twedt et al., 2006). Acquiring land within the acquisition boundary of the refuge and reforesting that land is a major management goal of the refuge. One of the key purposes of this acquisition and reforestation effort is aimed at increasing the core breeding area for forest-dependent neotropical migratory birds.

Louisiana State University ornithologists and refuge personnel have compiled a refuge bird checklist. This checklist is the result of extensive fieldwork by research wildlife biologist Wylie Barrow and wildlife professor Dr. Robert B. Hamilton from 1983 to 1995.

Resident Landbirds

Resident landbirds nesting on the refuge include northern cardinal, Carolina chickadee, tufted titmouse, blue jays, eastern bluebirds, Carolina wren, and American crow.

American woodcocks are migratory game birds that occur throughout the forested portions of the eastern United States. Tensas River NWR is within the Central Region used for administrative management. Woodcock populations in this region have declined 19 percent since 1968 probably due to land use changes associated with land conversion and the maturing of forest habitats.

In 1990, the *American Woodcock Management Plan* was completed. It set an objective to protect and enhance wintering and migration habitat on public lands to increase woodcock carrying capacity. The plan also set objectives to inventory and monitor woodcock habitat and develop management demonstration areas (USFWS 1990).

Woodcock are closely tied to earthworms as their major food resource and other special habitat conditions (Krementz and Jackson 1999). Wintering habitat includes moist bottomland hardwood forests with brush and understory, especially when found in close association with agricultural fields and old-field succession. These sites are typically wet thickets with a high density of plant stems but relatively open ground-story below. Typical cover includes privet, cane, and briars that result from openings in the canopy. The scrub-shrub and dense bottomland hardwood habitats created to benefit priority forest interior nesting birds (Swainson's warbler, cerulean warbler, etc.) and Louisiana black bears will also provide good daytime cover for the American woodcock.

At dusk, some portions of the woodcock population move to open or brushy fields to forage and conduct courtship activities throughout the night. These habitats include agricultural fields that were not disked in fall and sparse grasslands that may have received a low intensity fall burn to create patchy openings of exposed soil interspersed between grass clumps one to three feet in height. The grassland areas provide habitat preferred by other priority species (e.g., northern bobwhite, dickcissel, and other grassland birds).

Wild turkey declined throughout the area in the early 1900s due to over-hunting (Vangilder 1992). The Tensas River NWR was not as heavily hit by this decline. In fact, the refuge was used as a source for captured turkey in the 1980s that were released on other refuges and wildlife management units in the local area. Tensas River NWR continues to have a robust turkey population, and most refuge habitats are considered suitable for this resident game bird. With that said, turkeys are not a priority species for forest management on the refuge, and, as such, their numbers may not be consistently maintained at optimum levels. However, much of the management that occurs for non-game birds and other priority wildlife does provide benefits to turkeys as well.

The dates of the turkey season follow the state framework. From 1985 through 2002, the refuge held a 30-day season. Since 2003, the season was reduced to 16 days in an effort to maintain a consistent population of adult gobblers.

Turkey populations can fluctuate in any habitat due to a combination of factors other than the habitat itself. A disease outbreak, such as pox or blackhead, can cause as much trouble in good habitat as in bad. In fact, an infectious disease will usually do more damage in a dense turkey population than in a sparse one (Williams 1981). Weather conditions, especially during the spring nesting season, can determine reproductive success, regardless of habitat quality. Thus, weather can be a major limiting factor on turkey numbers. Wetter than normal weather during May and drier than normal summers adversely impact turkey production.

Timber management, on a selective basis, can benefit turkeys by increasing the diversity and availability of foods in the form of hard and soft mast as well as grasses, sedges, and forbs. Nesting habitat is often improved by selective timber harvests by providing more ground cover for nest concealment. Removal of more than 50 percent of the overstory degrades turkey habitat in the short-term by causing in extremely dense undergrowth that is generally avoided by turkeys. Forest management objectives for the priority wildlife species on the refuge will, in most cases, provide positive or neutral benefits to turkeys.

Mammals

Although an inventory has not been conducted, forty-four species of mammals are known or likely to occur on the refuge (Appendix I). White-tailed deer are the only big game on the refuge. Furbearers found on the refuge include Virginia opossum, raccoon, striped skunk, river otter, beaver, mink, nutria, and muskrat. Gray fox, red fox, coyote, and bobcats are also present. Both eastern cottontail and swamp rabbits inhabit the refuge. Fox and gray squirrels are found on the refuge, with fox squirrels in the more open woods and gray squirrels inhabiting the dense forests.

White-tailed Deer: Tensas River NWR's bottomland hardwood ecosystem is well known for producing some of largest white-tailed deer in Louisiana. When the refuge was first established in 1980, deer were excessively abundant. This abundance of deer led to high hunter success and gave Tensas River NWR a reputation as premier public hunting area. Members of the public remember those days well. Hunters who were familiar with the property before it was established as a refuge have complained that the refuge allows too large of a harvest, which they believe has caused the lack

of deer the public see now. Many hunters have requested that harvest be reduced to increase deer populations to their former levels. Various user groups have blamed each other of over-harvesting and have requested restrictions on available hunting days and quotas on hunts. Conflicting user groups include bow hunters verses gun hunters and local hunters verses south Louisiana hunters.

At the time the refuge was being purchased, the hardwood forest was heavily logged. This allowed plenty of sunlight to reach the forest ground, providing abundant browse for deer to eat and cover for them to hide. Additionally, adjacent lands were being cleared for agriculture, displacing deer onto the refuge. The surrounding lands were planted in agricultural crops supplementing deer forage. Policies of the hunt clubs that managed the land before the refuge acquired it prohibited the harvesting of females, keeping the total population at very high numbers. This combination of improved deer habitat on the refuge, reduced cover and supplemental food surrounding the refuge, and an unbalanced sex-ratio harvest resulted in the very high deer density for which Tensas River NWR became famous.

This decline in deer populations can be attributed to a number of causes. Public comment on the issue has ranged from habitat competition from feral hogs to impacts from a growing Louisiana black bear population. A recent cursory examination of habitat quality index for deer indicate that a reduction in the quality of preferred deer habitat is probably the primary cause for population decline.

Since the formation of the refuge, logging has been minimal. The forest canopy has been closing in, allowing less light to penetrate to the floor and limiting the amount of browse available to deer for food and cover. The high grading of timber harvest before acquisition left the refuge with fewer oaks to produce hard mast for food. Much of the land in and around the refuge has been replanted with hard mast hardwood species. While in the long run these will produce high quality food for deer and other species, they are slow growing and currently provide only cover and limited browse for deer. The reforestation of agricultural lands may have reduced the current available food for Tensas River NWR's deer herd.

From a biological perspective, herd health evaluations by the Southeastern Cooperative Wildlife Disease Study in 1983 revealed herd health problems due to high abdominal parasite count values (~1,500 to more than 4,000) and high levels of pathogenic parasites, which are indications of an overpopulated deer herd when the refuge was established. The poor health of the resident deer herd was evident in the data collected from hunter check stations. For the first three years of refuge-managed hunts, adult male deer weights averaged 154 pounds, and bucks with eight points or better antlers accounted for 23 percent of adult males harvested. In 1984, the first year of large-scale hunting, only 6 percent of year-and-a-half-old males had antlers with three or more points. Deer harvest in the refuge gun hunts was very high in the 1980s with a peak in 1987 of 2,017 deer harvested in one season.

With control of the deer population in the 1990s, average adult buck weights remained above 180 pounds and often approached 200 pounds. Check station data indicated overall herd health remained high and the population appeared stable. However, since 2000, adult buck weights have declined along with the recent decline in harvest during the gun hunt. The average weight of an adult buck harvested between 2000 and 2003 was 175 pounds.

For safety reasons, gun hunting has only been allowed on the refuge in mature forest. From 1985 to 1994, the available acreage remained at 50,000. In 1994, it increased to 55,000 with the purchase of the McLemore Unit. In contrast, the overall acreage of the refuge has been steadily increasing with the purchase of agricultural lands that are then planted with bottomland hardwood seedlings. While this land does not immediately provide ideal deer habitat, it should be considered when managing the refuge deer herd. These areas are popular with the bow hunters because the more than 5-year-old stands provide excellent cover for deer.

Despite the decline in harvest during the lottery gun hunt, the total harvest of deer on the refuge has remained moderate. The refuge has only recently operated check stations during the muzzleloader season. Since opening muzzleloader check stations, reporting of deer from muzzleloader hunts has risen dramatically. It is unclear how much of the increase of reported deer from muzzleloader hunts is due to the reporting of formerly unrecorded harvest and how much is due to increased popularity, accuracy, and efficiency of muzzleloader weapons. Poor records for muzzleloader and bow harvests in 1998 and 2000 further complicate analysis of trends.

A common misconception of hunters is that the recovery of the Louisiana black bear is responsible for the decline in the deer population on the refuge. Bears are blamed for preying on the newly born fawns. Rumors of bear scat full of fawn hooves are common and create hostile attitudes of hunters toward the restoration of bear populations. No evidence is present at this time to indicate that bears have a negative impact on the refuge deer population. Louisiana black bears, while classified as carnivores, are not active predators and rarely prey on vertebrate animals. They would be more appropriately described as omnivores or opportunistic feeders, feeding primarily on vegetation (hard and soft mast) and insects. If a bear does feed on animal matter, it is usually in the form of carrion that it has happened across. Evidence that bears are not feeding heavily on fawns can be seen in the McLemore tract, which has the densest population of bears. Here lactation rates of adult female deer were higher from 2000-2002 than the average rates across the refuge. Bear do compete with deer for similar food such as hard/soft mast, succulent vegetation, and corn crops. However, the dependence of bear on similar habitat as deer should only emphasize the need to improve such habitat on the refuge to protect the bear population from a similar decline that we are seeing in the deer population.

The primary native predators on deer were historically the red wolf and the Florida panther, both of which have been extirpated for over 50 years. Panthers are regularly reported in the vicinity of the refuge, but no credible evidence has been found of their existence. The only remaining population of the subspecies that once existed here is isolated in the southern tip of Florida.

The predators that have filled the void in the ecological niche are coyotes and bobcats. Coyotes were not found in this region previous to the extirpation of the red wolf. The removal of wolves provided an opportunity for their establishment. Coyotes are not nearly as efficient predators on deer as wolves. Bobcats are native to this area and much smaller than the once-dominant panthers. They have made a comeback in the state and are now common on the refuge.

Reptiles and Amphibians

Amphibian management and conservation are of great interest due to apparent global amphibian declines. Habitat loss, fragmentation, and degradation of habitat appear to be the primary factors in the declines. This group of animals requires quality wetland habitat for its survival, and it serves as an important indicator of overall environmental health. As a wetland habitat, Tensas River NWR is important for reptiles and amphibians. Despite the dominance of these creatures on the landscape, little is known about their populations on the refuge. Surveys of breeding anurans have been conducted by Sammy King and Susan Walls (USGS, Lafayette, Louisiana) (Lichhtenberg et al., 2004) but no comprehensive list of reptiles and amphibians has been created. In addition, because there is currently no monitoring of reptile and amphibian populations, their response to habitat management is unknown. Due to their susceptibility to environmental degradation and recent global population declines, amphibians are a priority taxa to be monitored both as indicators of environmental health and for the protection of their populations. With extensive historical and current use of pesticides known to be harmful to amphibians in the surrounding watershed, amphibians need to be monitored for health and deformities.

Currently timber harvest is used to open the forest canopy in order to allow sunlight to penetrate to forest floor and encourage the growth of understory vegetation. It is suspected that such conditions will benefit reptile and amphibian populations. However, the most important reptile and amphibian habitats lie within streamside management zones and other aquatic transition zones currently protected from timber harvest. While timber harvest restrictions may be important in protecting water bodies from erosion, habitat may suffer due to understory suppression. A combination of selectively girdling trees to create standing snags and felling trees into water bodies to create turtle basking platforms and increase aquatic habitat structure may produce the desired effects of timber management. This would enhance habitat not only for reptiles and amphibians but also all refuge resources. Further discussion and research is needed.

Alligators play an important role in the ecosystem at Tensas River NWR. As a top predator and in moderate to high densities, they contribute to limiting populations of problematic species such as beaver and raccoons in local situations, and are adapted to regulating their own populations. Larger individuals will eat smaller ones when densities become high.

Because alligators are potentially dangerous and contact between alligators and humans occurs on the refuge, it is critical that the public be informed in how to avoid problem encounters. The majority of problem alligators are created when people feed wild alligators. Alligators quickly lose their fear of humans when fed and often are unable to distinguish between the food and its provider. Signs need to be posted around public areas, especially fishing piers, warning people not to feed or harass alligators. Rules need to be enforced. In cases where alligators do lose their fear of people and act aggressively, they need to be removed for public safety. Cooperation with the state nuisance alligator program will ensure that alligators removed will be utilized to their full potential.

Fish

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

The Southeast Region Fisheries Strategic Plan (2004-2008) details specific actions and tactics that will be implemented over the next five years to meet national goals and objectives supported by the Service’s Fisheries Program Vision of the Future (2002). Other documents and/or legislation pertaining to the importance of aquatic species management and the associated role of the Service are numerous. They include the Fish and Wildlife Act of 1956; National Recreational Fisheries Policy - 1988; Action Plan for Fisheries Resources and Aquatic Ecosystems - 1994; and Recreational Fishery Resources Conservation Plan - 1996.

The Tensas River NWR has several lakes and bayous that can be accessed for fishing opportunities. Fishing is allowed year-round on the refuge and is in accordance with state regulations. Annual water intake from a natural flood regime makes it difficult to efficiently manage a sport fishery. Typically, river overflows can provide a natural stocking of the fishery through fish immigration. Sport fish, carp, buffalo, and other fishes benefit from overflows. The Baton Rouge Fish Resource Coordinators Office (FRCO) does not recommend significant expenditures on the lakes with such influences. However, Rainey Lake and a special use pond do not receive floodwaters from the river and merit some attention.

Rainey Lake is approximately 30 acres and is isolated from agricultural runoff and backwater flooding. Largemouth bass, bluegill, redear, crappie, and other species are present, but the carrying capacity of the lake is adversely affected by excessive aquatic vegetation.

Greenleaf Lake was constructed in 2000 and stocked in 2000 and 2001, and became a +/- 27-acre special use pond. It was previously managed as a moist-soil unit. However, the lake experienced a leak in 2003, and repair attempts were made that same year. Though it was speculated that the repairs failed, water levels have increased with rainfall and remained fairly stable this summer. Sometimes microbial activity and organic matter and fine sediment accumulation can seal leaks, and this may be the case here. The Baton Rouge FRCO staff does not recommend that this pond be abandoned or returned to a purely moist-soil management regime. Tensas River NWR already has approximately 900 acres of moist-soil unit management areas, and this pond contains ample shallow water shoreline areas and adjacent moist-soil for bird usage under present conditions. The pond should continue to be monitored for seepage and maintenance should be performed as necessary to ensure adequate water depths for sport fish.

An aspect of aquatic resource management where both wildlife and the public can benefit is the incorporation of crawfish production in a portion of the moist-soil management units. One of the areas visited in spring 2005 was inhabited by crawfish though the density did not appear high. If soil hardness is adequate and there are water supply and drainage structures, crawfish production is possible in moist-soil areas where water depths of 12 to 18 inches exist in portions of the units. Water regimes for both activities are quite similar (i.e., draw-down in early summer, refill in fall). Rice, sorghum, and other crops promote maximized crawfish yields but voluntary, moist-soil vegetation can provide satisfactory results. Besides feeding on growing vegetation, crawfish consume aquatic invertebrates and detritus. The Baton Rouge FRCO staff recommends the implementation of crawfish culture in approximately ten percent of the area managed for moist-soil vegetation, provided that the above criteria of water manipulation, depth, and hardness exist.

CULTURAL RESOURCES

The National Register of Historic Places, established by Congress in 1966, is the nation's official list of significant historic properties. The National Register recognizes five basic types of historic properties: historic buildings such as plantation houses, courthouses, or log cabins; historic structures such as old bridges, lighthouses, or forts; historic districts such as old residential or commercial neighborhoods; historic sites such as battlefields or Indian mounds; and historic objects such as old steamboats or fire engines. It is important to note that not every historic site or old building or neighborhood is eligible for the National Register. Properties must have some kind of significance: properties that are closely associated with an important person, event, or development; buildings that are architecturally significant because they are important examples of a particular style or type or a method of construction; and properties that are archaeologically significant because the remains yield information about the nation's history or prehistory. Generally, properties are not placed on the National Register if they are less than 50 years old; if the period of their historical significance is less than 50 years old; or if they have been significantly altered.

Each state has a historic preservation office, which is responsible for nominating buildings, sites, districts, etc., to the National Register. In Louisiana, the Division of Historic Preservation administers this program, which is part of the Office of Cultural Development, Department of Culture, Recreation and Tourism. None of the Tensas River NWR sites are known to be eligible for inclusion in the National Register of Historic Places at this time, and they will not be designated as scientific sites.

Official designation as scientific sites, as part of the planning process, also carries the risk of alerting illegal artifact collectors to the location of these sites. The Archaeological Resources Protection Act of 1979 specifically prohibits making available to the general public the location of any archaeological site if such notification may create a risk of harm to the site.

Louisiana State Historic Preservation Office records show up to 22 known archaeological/cultural sites on the refuge proper. These include prehistoric Indian sites (consisting mainly of mounds, shell lens, middens, or prehistoric artifacts) as well as historic 19th century sites, including the remains of a plantation, an old gin site, and numerous cisterns. There is one documented mound site located within the McLemore farm field unit; however, its exact location is not known because the entire area has been extensively farmed and no obvious mound sites are present.

SOCIOECONOMIC ENVIRONMENT

Table 3 shows the area economy. The area population decreased by 5.6 percent from 1995 to 2005, compared with a 2.9 percent increase for the State of Louisiana and an 11.4 percent increase for the United States as a whole. Area employment decreased by 0.5 percent from 1995 to 2005, compared with the State of Louisiana showing an 11.4 percent increase and the United States a 17.0 percent increase. Area per capita income increased by 6.3 percent over the 1995-2005 period, while the State of Louisiana declined by 2.1 percent and the United States increased by 13.2 percent.

Table 3. Tensas River NWR: Summary of Area Economy 2005
(Population and Employment in 000's; Per Capita Income in 2006 dollars)

Parish	Population		Employment		Per Capita Income	
	2005	Percent change 1995-2005	2005	Percent change 1995-2005	2005	Percent change 1995-2005
Madison LA	12.5	-7.1%	4.9	2.7%	$18,823	6.6%
Richland LA	20.4	-1.8%	8.2	-3.4%	$21,541	2.0%
Franklin LA	20.4	-6.4%	9.0	2.7%	$20,691	6.7%
Tensas LA	6.1	-11.8%	2.5	-7.1%	$21,987	10.0%
Area Total	**59.4**	**-5.6%**	**24.5**	**-0.5%**	**$20,761**	**6.3%**
Louisiana	4,507.3	2.9 %	2,461.2	11.4 %	$24,664	-2.1 %
United States	266,278.4	11.4 %	174,249.6	17.0 %	$34,471	13.2 %

Source: Caudill and Carver 2007

REFUGE ADMINISTRATION AND MANAGEMENT

LAND PROTECTION AND CONSERVATION

The refuge is still involved in an active land acquisition program. Efforts are targeted at acquiring in-holding property within the official refuge acquisition boundary in order to expand the core area of the refuge. Land acquisition efforts are intended to contribute to the goals of the NAWMP and LMVJV. Privately owned lands within the acquisition boundary of Tensas River NWR will be targeted for acquisition for incorporation into the Refuge System. Sources of federal funds for land acquisition include the Migratory Bird Conservation Fund, the Land and Water Conservation Fund, and the In-holding and Emergency Fund. Additional assistance will be sought through partnerships with non-governmental organizations (NGOs), such as The Trust for Public Land, The Nature Conservancy, and The Conservation Fund, and through partnerships with private companies involved in carbon sequestration.

The current refuge acquisition boundary encompasses 95,725 acres. To date, the Service has acquired 74,622 acres (this includes 195 acres of easements). The remaining 21,103 acres includes scattered medium-to-large ownerships (thousands of acres) and numerous smaller ownerships ranging in size from a few acres to several hundred acres. These inholdings are distributed throughout the refuge. Acquisition of these remaining inholding properties will provide significant biological benefits by increasing the size and continuity of refuge lands; and, will greatly facilitate refuge management by incorporating these properties into surrounding contiguous blocks of refuge lands. Currently, a multi-year project is underway which combines federal, non-governmental organizations (The Trust for Public Land), and corporate funding to acquire approximately 11,000 acres through a carbon sequestration partnership. Through this partnership, the lands were acquired by The Trust for Public Land over a 3-year period from 2004 through 2006. Portions of the property were then reforested under the direction of the Service with funding from corporate partners, then conveyed to the Service for incorporation into the refuge. To date, 8,225 of the 11,000 acres have been acquired, reforested, and conveyed to the Service. The remainder is expected to be reforested and conveyed to the Service in the next one to two years. This carbon sequestration project, and others, such as the GoZero program administered by The Conservation Fund, can serve as models for future land acquisition partnerships as opportunities arise in the future.

While expansion of the refuge within the approved acquisition boundary is an important consideration, cooperation with private landowners on a watershed basis is critical to any overall management strategy that hopes to truly impact, in a positive way, wildlife conservation. Most of the land in the MAV is privately owned. Thus, private lands must play an important role in the restoration and maintenance of native biodiversity in order to achieve the goals and objectives of national and regional plans, such as the NAWMP and Partners in Flight: Mississippi River Alluvial Valley Bird Conservation Plan. In an effort to address those objectives, the Service established a private lands program known as Partners for Fish and Wildlife (PFW). Through this program, the Service provides technical assistance and delivers financial assistance programs to private landowners. The Migratory Bird Field Office, co-located at Tensas River NWR, is responsible for providing technical assistance through the PFW Program in northeast Louisiana.

The Regional PFW Program limits landowners to $25,000 of financial assistance per year. In the MAV, most projects involve the restoration of hydrology and hardwood reforestation. Vegetation on up to 30 percent of the area can be manipulated to maintain successional stages other than what would be expected to come in naturally. For example, up to 30 percent of the area could be managed for moist-soil management. The program favors projects located adjacent to refuges, in priority bear zones, and within Forest Bird Conservation Areas.

The Louisiana Waterfowl Project is a partnership with other conservation organizations to provide water control structures to private landowners who traditionally will flood harvested cropland and moist-soil areas in the winter period (November 15 through February 28). The program provides significant benefits for wintering waterfowl and water quality.

Other agencies, particularly the U.S. Department of Agriculture (USDA) agencies such as the Farm Services Agency (FSA) and Natural Resources Conservation Service (NRCS), have large programs that will restore wetland habitats in the MAV. The NRCS administers the Wetland Reserve Program (WRP). This is a popular program that restores croplands to wetlands by restoring hydrology and reforestation and then protects these areas through the acquisition of 30-year and perpetual easements. There are over 200,000 acres of WRP easements in Louisiana. A significant amount of this acreage is manageable water for waterfowl. The Service and partners play an important role in developing ranking criteria, evaluating sites, and working with private landowners to manage and maximize wetland values.

The FSA administers the Conservation Reserve Program (CRP), which provides 50 percent cost share to reforest wetland and highly erosive sites in the MAV. The program is competitive and qualifying lands are placed under a 15-year contract. Various other programs are also available.

One of the highest priority recommendations from the biological review was the proposed Tensas/Big Lake Forest Core WRP Special Project Initiative developed and promoted by the Migratory Bird Field Office in Jackson, Mississippi, the LDWF, and the NRCS District Conservationist for Madison Parish, Louisiana. The area is in excess of 125,000 acres and includes Tensas River NWR (65,000 acres); Big Lake Wildlife Management Area (20,000 acres); numerous tracts restored and/or protected through the WRP and CRP; and other agricultural lands. There is within this large complex of habitats a 21,000-acre area generally dominated by agriculture that lies between the two units of Tensas River NWR and serves to fragment the area into two forest blocks. The southern half of this agricultural block is locally known as Hunter's Bend. About 3,000 acres within Hunter's Bend is being proposed for inclusion in this special project. About 7,500 acres in the Hunter's Bend area either was already forested or is being reforested through WRP and CRP. The remaining 11,000 acres of agricultural land immediately north of the proposed WRP Special Project area is being acquired from Chicago Mill and reforested. This is possible because of an agreement between The Trust for Public Lands and the Service, which allows the carbon credits associated with the reforestation efforts to be claimed by a third party. The third party finances the reforestation efforts, and then agrees to allow the Service to manage the property as a national wildlife refuge. The Trust for Public Land remains committed to the project and continues to work to find other partners.

Completion of the carbon project and the proposed WRP special project would contribute significantly to solving several ecological problems. These include defragmenting a large forested area; restoring the ecological integrity of the area; providing continuous forest cover along both banks of nearly 50 miles of the Tensas River; and developing a 125,000-acre block of forested wetlands important to a suite of forest breeding landbirds of highest conservation priority. The ivory-billed woodpecker and American swallow-tailed kite both require large, contiguous forested blocks to support viable populations. A number of other high-priority birds of continental conservation concern that require large, contiguous blocks (more than 10,000 acres) of forested wetlands to reduce nest predation and parasitism and provide habitat necessary to support viable breeding populations will also benefit significantly from reduced fragmentation of this forest complex. These species include Bachman's warbler (*Vermivora bachmanii*), cerulean warbler (*Dendroica cerulea*), prothonotary warbler (*Prothonotaria citrea*), and Swainson's warbler (*Limnothlypis swainsonii*). The threatened Louisiana black bear (*Ursus americanus luteolus*) would also benefit from the expansion of natural habitat in the area as its population continues to expand. Significant positive benefits to water quality in the Tensas River are expected.

Competition for private landowners to get into the USDA's WRP is increasing as a result of the failing farm economy and the increasing value of restored wetlands for recreational purposes. The Service and other partners, working with NRCS and private landowners, became aware that some of the landowners within the proposed special project area applied or were interested in applying to the WRP. Relatively small landowners own much of the area with potential hydrologic restoration extending across property boundaries. Because of this limitation and other factors, some of the individual tracts on these farms are not scoring high enough for those landowners to get their intentions accepted in the program.

Consequently, the best probability for ensuring the restoration and protection of a block of land in this area is through a special project. In the winter of 2005-06, Service private lands biologists (Strader and Dolan), Madison Parish Soil and Water Conservation District, The Nature Conservancy, The Trust for Public Lands, and the Louisiana Black Bear Conservation Committee coordinated with the Madison Parish District Conservationist in identifying a 3,000-acre special WRP project area. Nearly all 3,000 acres were enrolled and accepted in the program (pending appraisals, etc.) during the 2006 sign-up period.

VISITOR SERVICES

Tensas River NWR recognizes and provides the six-priority wildlife-dependent uses of hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation (Figure 7). Hunting and fishing continue to be the largest public use programs on the refuge, but non-consumptive uses, such as hiking, nature observation, and environmental education, are growing in popularity. An important next step in visitor services at the refuge is completion of paving of Quebec Road all the way from Highway 80 to the refuge headquarters. Another plan calls for access to the refuge from Interstate 20 north of the refuge by constructing an Interstate exchange at Quebec Road.

Visitor Orientation

The refuge headquarters has an adequate visitor center and serves as a point of information about the refuge. It is open weekdays from 8 A.M. to 4 P.M. Refuge brochures, state hunting and fishing regulations' pamphlets, and other Service brochures are available in the foyer.

Signs
There is a well-maintained entrance sign at some of the entry points onto the refuge. Plans include ensuring that every major entry point has a well-maintained entrance sign.

Kiosks
The refuge has acquired new kiosk panels that are more open and inviting to the public. There are brochure boxes at all major entrances to the refuge to provide visitors with a Public Use Regulations Brochure and provide a place for hunters to leave the Bag Check Cards. There are no trailhead kiosks at any of the parking areas or trails.

Boundary Signs
The refuge boundaries are properly marked. Some of the older faded signs will need to be replaced. On the Wildlife Drive, there is a confusing Closed Area sign that should be placed in a different spot.

Directional Signs
There are directional signs on Interstate 20, in Tallulah, Louisiana, and at other major intersections directing visitors to the refuge. Most of these signs, however, are green signs with white lettering and not quickly recognized as federal/state recreational signs. In addition, none of the signs have distance information on them. Visitors exiting the interstate need to know that the refuge is several miles from the interstate to allow them to decide if they have time to visit or not.

Regulatory Information
Some regulatory information (guns must be in case, fill out bag check card) is on brown signs at the entrances/exits of the refuge. There are also signs for No ATVs (all-terrain vehicles), Trail Closed, No Vehicles Beyond this Point. These signs are not posted consistently throughout the refuge. The primary method of communicating regulations is through the Public Use Regulations Brochure. All visitors are supposed to read the brochure, sign the permit on the front of the brochure, and have it in their possession while on the refuge. This is similar to the way Hunting and Fishing Permits are done on most refuges, but at Tensas River NWR, this brochure is intended for all visitors. Currently, it is not clearly communicated to all visitors that they must have a Public Use Regulations Brochure/Permit while visiting the refuge.

Roads and Parking
The main roads coming into the refuge (Quebec Road and Mill Road) are maintained on a regular basis, but because of flooding problems, there are times when both roads are impassable. The refuge does not have a consistent way of letting visitors know when the roads are impassable until the visitors have driven all the way out to the refuge. It is approximately 9 miles from Highway 80 to the refuge office on Quebec Road. Currently, about 5.5 miles are paved. This still leaves approximately 3.5 miles of the main entrance into the refuge unpaved and at times impassable. Parking areas on the refuge (except for the visitor center parking) are all gravel parking lots.

Brochures
All brochures are produced using the Service Graphic Standards. The general brochure provides information about the refuge resources, management, and visitor opportunities. It needs to be revised to better target the intended audience. The Public Use Regulations Brochure needs to be revised to address all uses. It currently looks like a hunting and fishing brochure, which can cause confusion to visitors.

Audiovisual Program
The only audiovisual program the refuge has is a copy of a program viewed on public television more than 20 years ago about the community effort to create the refuge.

Visitors to Tensas River NWR enjoy a variety of non-consumptive activities, hunting activities, and freshwater fishing (Table 4). The most popular activity was big game hunting. “Other wildlife observation” includes photography. In FY 2006, 94 percent of visits were by residents (74,206 visits).

Hunting

Hunting in the Tensas NWR continues to provide hunters with a quality hunting experience. Before the refuge was created, only members and guests of private hunting clubs were privileged to hunt the area. Today, all hunts are open to the general public. There continues to be substantial interests in all hunts. Prior to each hunting season, a meeting with the LDWF is held to establish goals and season dates.

Of the 82,000 annual visits to Tensas River NWR, approximately 90 percent of them are to hunt. Of the 74,622 acres on the refuge, all but 2,600 acres are open to public hunting, and the majority of that is hunted during the lottery guided youth and wheelchair hunts. Hunting activities allowed on the refuge include deer-archery; deer-youth; deer-modern firearms; deer primitive weapon; turkey; squirrel and rabbit; raccoon; woodcock and snipe; ducks and coots; and incidental species, including coyote, beaver, raccoon, skunk, and opossum.

Figure 7. Current public use on Tensas River NWR

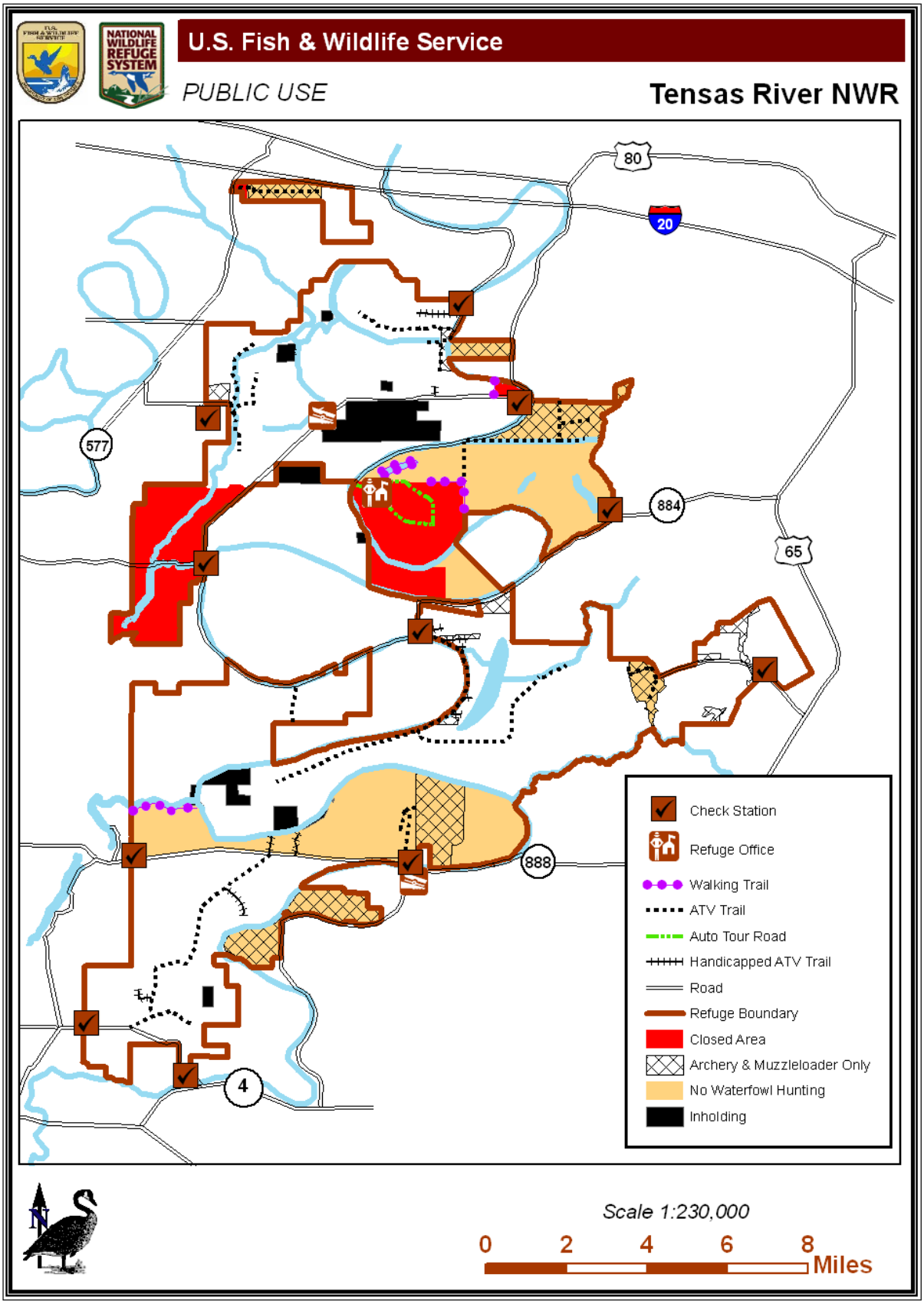


Table 4. Tensas River NWR: 2006 Recreation Visits

Activity	Non-Residents	Residents	Total
Non-Consumptive:			
Nature Trails	90	1,410	1,500
Observation Platforms	30	970	1,000
Birding	650	12,350	13,000
Other Wildlife Observation	750	14,250	15,000
Beach/Water Use	0	0	0
Other Recreation	0	0	0
Hunting:			
Big Game	1,750	33,250	35,000
Small Game	900	8,100	9,000
Migratory Birds	240	1,760	2,000
Fishing:			
Freshwater	184	2,116	2,300
Saltwater	0	0	0
Total Visitation	***4,594***	***74,206***	***78,800***

Table 5 shows recreational visits to Tensas River NWR resulted in nearly $2.7 million in visitor recreation expenditures in FY 2006. Hunting and non-consumptive activities generated the majority of expenditures, while freshwater fishing resulted in just two percent.

Table 5. Tensas River NWR: Visitor Recreation Expenditures

(in 2006 $,000)

Activity	Non-Residents	Residents	Total
Non-Consumptive:			
Birding	$8.2	$779.3	$787.5
Other Non-Consumptive	$5.3	$499.7	$504.9
Total Non-Consumptive	$13.5	$1,279.0	$1,292.5
Hunting:			
Big Game	$18.3	$870.8	$889.1
Small Game	$5.0	$365.4	$370.4
Migratory Birds	$2.7	$45.1	$47.8
Total Hunting	$26.0	$1,281.4	$1,307.4
Fishing:			
Freshwater	$1.8	$61.7	$63.4
Saltwater	—	—	—
Total Fishing	$1.8	$61.7	$63.4
Total Expenditures	***$41.2***	***$2,622.1***	***$2,663.3***

Table 6 summarizes the total economic impacts associated with refuge visitor spending. Total final demand associated with recreational visitor spending was $3.6 million. This is the total monetary value of economic activity generated in the local county area by recreational visitors. In turn, this final demand generated 51 jobs, $1.0 million in employment income, and $481,100 in total tax revenue for Louisiana and the United States.

Table 6. Tensas River NWR: Local Economic Effects Associated with Recreation Visits

(in 2006 $,000)

	Non- Residents	Residents	Total
Final Demand	$279.6	$3,285.4	$3,565.0
Jobs	4	47	51
Job Income	$76.5	$947.3	$1,023.8
Total Tax Revenue	$34.4	$446.7	$481.1

Table 7 shows total economic effects (total recreation expenditures plus net economic value) compared with the refuge budget for 2006. For an individual, net economic value is that person's total willingness to pay for a particular recreation activity minus his or her actual expenditures for that activity. The figure for economic value is derived by multiplying net economic values for hunting, fishing, and non-consumptive recreation use (on a per-day basis) by estimated refuge visitor days for that activity. This figure is combined with the estimate of total expenditures and divided by the refuge budget for 2006. The $1.59 means that for every $1 of budget expenditures, $1.59 of total economic effects are associated with these budget expenditures. This ratio is provided only for the purpose of broadly comparing the magnitude of economic effects resulting from refuge visitation to budget expenditures and should not be interpreted as a benefit-cost ratio.

Table 7. Tensas River NWR: Summary of Local Economic Effects of Recreation Visits

(in 2006 $)

	FY 2006 Budget	Expenditures	Net Economic Value	Total Economic Effects Per $1 Budget Expenditure
Tensas River NWR	$2,893.6	$2,663.3	$1,939.3	$1.59

The deer-modern firearms hunt is a quota hunt. Hunters must send in an application for one of the two hunts and if selected purchase a $12.50 permit. In recent years, the number of applications has dropped from highs of over 10,000 to less than 4,000. It is believed that the main reason there has been a decrease in interest is that hunters are not seeing the number of deer they have in the past, and this may be because the habitat on the refuge is changing.

For the youth deer hunt, the refuge provides stands and guides for the youth. Hunters under 16 years of age must possess proof of completion of an approved hunter safety course and be accompanied at all times by an adult 21 years of age or older.

ATVs are allowed on designated trails during hunting season. An ATV user permit is required, and the permit must be permanently affixed to the ATV used on the refuge. The permit may be purchased at the visitor center or by mail for $10. The refuge does have several trails for ATVs for hunters with disabilities. Hunters with disabilities must have a Physically Challenged Hunter Program Permit issued by the LDWF or be 60 years of age or older to operate an ATV on one of these specially designated trails. Currently, in the way the regulations are stated, there is no accommodation for hunters with disabilities once they ride the ATV down the trail. The regulations state that "Hunting within 150 feet of any public road, designated refuge road, or trails…. is prohibited." The team discussed the need to have a plan in place to accommodate hunters with disabilities that will allow them to legally get to an appropriate hunting spot.

The refuge does allow night hunts for raccoons. Horses and mules are allowed during this hunt. The refuge also issues special use permits to raccoon hunting dog field trials. These are currently allowed at times other than the regular raccoon season.

All visitors to the refuge (including hunters and anglers) are required to have a signed public use regulations brochure with them. These are available at the main entry points.

Lost Brake and Lake Nick continue to be the most popular waterfowl hunting areas with interest growing at the McLemore tract primarily due to its easily accessible sloughs.

Fishing

Sport fishing is open throughout the refuge year-round except in the closed area (Greenlea Bend). Though fishing participation is light, fishing for bream, crappie, and bass is excellent. Disabled fishermen have access to fishing at Rainey Lake due to a wheelchair accessible fishing pier.

Wildlife Observation

The refuge does have an auto tour route starting within sight of the office/visitor center. The tour route passes the entrance to Rainey Lake Trail and is marked with directional signs. However, there are no interpretive signs other than one stating that an area had been re-forested in 1987. Wildlife is skittish when vehicles drive by, as there is little cover or screening from the road. It does offer a representative sample of the refuge's habitats. The road is wide enough for safely passing vehicles.

There are two observation towers accessible by the Hollow Cypress Trail (boardwalk) behind the visitor center. One is handicapped accessible, and the other is not. The taller one – not handicapped accessible – has a handicapped accessible binocular telescope and a tall mounted binocular telescope. Both have interpretive panels mounted off the sides. Both look out onto the wildlife drive area and Rainey Lake. The boardwalk leading to these overlooks does have a few interpretive signs in Plexiglas-covered frames mounted on posts. One more overlook is located off the Rainey Lake

walking trail called the Cypress Overlook. A fishing pier also along the Rainey Lake Trail offers a great view of the lake. The Rainey Lake Trail does have several signs both interpretive (a few interpretive signs in Plexiglas-covered frames mounted on posts) and directional with distances noted. There is no trailhead sign, total mileage sign, or map of the trail.

There is one old boardwalk west of the crossroads on Mill Road that leads out to a handicapped duck-hunting blind open on one side and boarded with viewing/shooting ports on the other. It is no longer used and is falling into disrepair.

Wildlife Photography

Visitors have many opportunities to take quality photographs while visiting Tensas River NWR. Currently, several piers, overlooks, and observation platforms are provided to serve as aids to photography. Visitors can photograph wildlife anywhere on the refuge.

Wildlife Interpretation/Education

The refuge headquarters/visitor center has a wildlife display and diorama that offer an opportunity for environmental education. Signage and kiosks throughout the refuge offer wildlife interpretation to visitors. Observation opportunities on the refuge are located at Hollow Cypress Wildlife Trail, the Rainey Lake Pier, and along the Tensas River near the refuge headquarters.

Refuge staff continues to work with the USDA Cooperative Extension Service, The Nature Conservancy, LDWF, LDEQ, EPA, and several other partners to implement a summer environmental education program entitled Wild Woods Wanderings. This program has received national attention, and several states are considering using it as a model for similar programs.

Environmental education at the Tensas River NWR continues to be a high priority. An Environmental Education Center designed to house the refuge's Environmental Education Program has been added to the Master Projects list and now awaits funding.

PERSONNEL, OPERATIONS, AND MAINTENANCE

Staffing

The refuge currently has 12 assigned staff positions:
Refuge Manager
Assistant Manager
Office Assistant
Law Enforcement
Maintenance (3)
Biologist Technician
Biologist
Forester
Park Ranger
Forestry Technician

A volunteer program also exists at the refuge. Currently, there is a number of individuals that serve as regular volunteers, assisting refuge staff in a variety of efforts. The refuge also has an organized Friend's group, named the Tensas River Refuge Association.

Funding

Tensas River NWR was allotted $1,030,000 in Fiscal Year 2005-2006.

Facilities

The refuge headquarters and visitor center is located on the refuge. This facility was built in 1987 and provides accommodations for the current staff. Office space and storage space needs to be addressed in the future. The refuge has one shop compound that stores and maintains vehicles and equipment for the refuge.

Refuge Revenue Sharing Act

By law, the refuge is exempt from paying property tax and instead makes in lieu of payments to Franklin, Madison, and Tensas Parishes through the Revenue Sharing Act established by Congress. This program provides a method of collecting monetary receipts from revenue generating activities on refuges throughout the nation, pooling them together, and paying them out to counties (parishes) containing refuge lands. Payment for acquired land is computed on whichever of the following formulas is greatest: (1) three-fourths of one percent of the fair market value of the lands acquired in fee title; (2) 25 percent of the net refuge receipt collected; or (3) 75 cents per acre of the lands acquired in fee title within the parish (county).

The refuge provided the following amounts to the parishes in the 2005 – 2006 fiscal year:

- Franklin Parish - $1,714
- Madison Parish - $158,546
- Tensas Parish - $62,277

III. Plan Development

SUMMARY OF ISSUES, CONCERNS, AND OPPORTUNITIES

The planning team identified a number of issues, concerns, and opportunities related to fish and wildlife protection; habitat restoration; management of threatened and endangered species; refuge administration; public use; and environmental education. Additionally, the planning team considered federal and state mandates as well as applicable local ordinances, regulations, and plans. The team also directed the process of obtaining public input through public scoping meetings, comment packets, and personal contacts. All public and advisory team comments were considered; however, some issues important to the public fall outside the scope of the decision to be made within this planning process. The team has considered all issues raised through this planning process and has developed a plan that attempts to balance the competing opinions regarding important issues. The team identified those issues that, in the team's best professional judgment, are most significant to the refuge. A summary of the significant issues follows.

HABITAT MANAGEMENT

Forest Resources: About 80 percent of the forestlands in the MAV have been cleared and converted to other land uses, leaving only remnant-forested tracts. Fish and wildlife resources have been similarly impacted. This left remnant population that must be managed to meet the refuge purpose and to achieve its maximum potential as it relates to landscape level planning.

The refuge was established in 1980 to conserve one of the largest remaining privately owned bottomland hardwood tract in the MAV. Initial acreage purchased from Chicago Mill and Lumber Company was 9,000 acres. Their objectives were lumber and box manufacturing, and a selective harvest system was used, which tended to high grade the forestry resources.

Current forest management techniques used on the refuge include a combination of even-aged regeneration methods (clear-cutting, seed-tree, shelterwood) and uneven-aged regeneration methods (selection, group selection, patch cuts less than 5 acres) in conjunction with thinnings between regeneration areas. Management actions roughly follow the bottomland hardwood forest management recommendations being developed by the LMVJV Forest Resources Conservation Working Group that were developed for the WRP program for the benefit of migratory birds (ivory-billed woodpeckers, songbirds, and waterfowl) and the threatened Louisiana black bear.

Aquatic Resources: Tensas River NWR is located within the Tensas River Basin. The river is heavily contaminated by agricultural runoff (silt and pesticides). The Tensas River meanders through the refuge and can cause overflow into a few lakes depending upon water stages. Annual water intake from a natural flood regime makes it difficult to efficiently manage a sport fishery. The LDWF does not recommend significant expenditures on lakes with such influences. However, although Rainey Lake does not receive floodwaters from the river, it does merit some attention.

Tensas River NWR has several lakes and bayous that can be accessed for fishing opportunities. Typically, river overflows can provide a natural stocking of the fishery through fish immigration. Sport fish, carp, buffalo, and other fishes benefit from overflows. Fishing is allowed all year on the refuge and is in accordance with state regulations.

FISH AND WILDLIFE POPULATION MANAGEMENT

Threatened and Endangered Species: The protection and recovery of threatened and endangered species is an important responsibility of the Service and the Service's national wildlife refuges. The one species of concern, known to occur on the refuge, is the Louisiana black bear. Boersen (2001) estimated there were approximately 115 bears on the refuge. Assessing the current population abundance of bears is needed to develop and implement effective land management scenarios to benefit bears and other local wildlife species on Tensas River NWR. The refuge needs to continue recovery efforts to delist the Louisiana black bear.

Tensas River NWR encompasses much of the former Singer Tract, which had the last documented breeding population of ivory-billed woodpeckers. Once thought extinct, the April 2005 announcement of the rediscovery of an ivory-billed woodpecker in Arkansas brings hope of some day reestablishing a population in the Tensas River Basin. Current efforts, both on and off the refuge, to reforest bottomland hardwood habitat along the MAV provide a chance for this and other wide-ranging species to reestablish themselves in their historic range.

Resident Wildlife: To better understand the biodiversity and environmental health of refuge lands, baseline information on wildlife and their habitats must be collected. This data will document presence or absence, monitor trends, and identify the impacts of refuge programs on species. A variety of wildlife species indigenous to the Tensas River valley inhabits the Tensas River NWR. The refuge assumes responsibility for managing resident wildlife that is dependent on refuge resources.

Since the formation of the refuge, logging has been minimal. In many areas, the forest canopy has closed, limiting sunlight penetration, and inhibiting shade intolerant plant growth and regeneration. Closed canopy reduces the amount of available browse, which, consequently, reduces carrying capacity of habitat. If allowed to occur, overbrowsing suppresses the growth of desirable species and further limits regeneration of hard mast trees. Results of a recent deer browse survey further point toward the need for active forest management. Reports from hunters indicate dissatisfaction with the number of deer present on the refuge.

Beaver and feral hogs must be controlled for proper bottomland hardwood forest management. Beaver populations on the refuge should be managed to prevent areas of prolonged flooding that could result in extensive tree mortality. Feral hogs are known to destroy habitat, which results in deleterious effects to native species

Migratory Birds: The MAV is a critical ecoregion for migrating and wintering ducks and geese in North America (Reinecke et al., 1989). Tensas River NWR provides important foraging and resting habitats within the MAV for these waterfowl and contributes important regional resources to an international habitat management effort known as the NAWMP, which seeks to return waterfowl population to levels observed during the 1970s.

Concern over waterfowl population declines in the 1980s resulted in establishment of the NAWMP, which focused the attention of federal, state, and private conservation groups on critical wintering and breeding areas. The LMVJV was organized to plan conservation efforts that would provide sufficient waterfowl habitat in the MAV to ensure adequate winter survival and body condition for spring migration and nesting. To quantify winter habitat requirements, the factors limiting waterfowl populations were identified, and the LMVJV assumed foraging habitat was most likely to limit populations in the MAV (Reinecke et al., 1989).

Neotropical migratory songbirds are a species group of special management concern. The Partners in Flight Conservation Plan is currently developing habitat objectives for the refuge for these groups of birds. Habitat needed for the most area-sensitive species (interior forest-dependent birds) has been established, and objectives are being developed.

The Tensas River NWR holds one of the last large contiguous blocks of interior forest that is critical to the survival of many of these birds. The reforestation efforts underway at the refuge will help to expand this much needed habitat. The concern for management is balancing the needs for waterfowl (which require more open habitat) with the needs of imperiled songbirds (which require forest habitat). This important issue will require input from the public.

RESOURCE PROTECTION

Land Protection within the Acquisition Boundary: Land acquisition efforts are intended to contribute to the goals of the NAWMP and LMVJV. Privately owned lands within the acquisition boundary of Tensas River NWR will be targeted for acquisition and protection. Sources of federal funds for land acquisition include the Migratory Bird Conservation Fund, the Land and Water Conservation Fund, and the Inholding and Emergency Fund. Additional assistance will be sought through partnerships with non-governmental organizations, such as The Trust for Public Land, The Nature Conservancy, and The Conservation Fund, and through partnerships with private companies involved in carbon sequestration.

The current refuge acquisition boundary encompasses 95,725 acres. To date, the Service has acquired 74,622 acres (this includes 195 acres of easements). The remaining 21,103 acres includes scattered medium to large ownerships (thousands of acres) and numerous smaller ownerships, ranging in size from a few acres to several hundred acres. These inholdings are distributed throughout the refuge. Acquisition of these remaining inholding properties will provide significant biological benefits by increasing the size and continuity of refuge lands; and, will greatly facilitate refuge management by incorporating these properties into surrounding contiguous blocks of refuge lands. Currently, a multi-year project is underway which combines federal, non-governmental organization, and corporate funding to acquire approximately 11,000 acres through a carbon sequestration partnership. Through this partnership, the lands were acquired by The Trust for Public Land over a 3-year period from 2004 through 2006. Portions of the property were then reforested under the direction of the Service with funding from corporate partners, then conveyed to the Service for incorporation into the refuge. To date, 8,225 of the 11,000 acres have been acquired, reforested and conveyed to the Service. The remainder is expected to be reforested and conveyed to the Service in the next one to two years. This carbon sequestration project, and others such as the GoZero program administered by The Conservation Fund, can serve as models for future land acquisition partnerships as opportunities arise in the future.

Mineral Extraction Activities: There are a number of oil and gas wells within the refuge boundary. Leases for resource extraction were retained with private mineral holders when refuge lands were acquired. While activity at a number of these well head sites continues, oil and gas activity must be conducted in a manner that does not degrade the natural environment of the refuge. Therefore, refuge administration must maintain oversight of oil and gas production impacts to the refuge and monitor these activities to assure compatible best management practices with oil and gas companies are utilized.

VISITOR SERVICES

The Improvement Act recognizes wildlife-dependent recreation as a legitimate use of refuges. Priority public uses, including hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation, are to receive enhanced consideration over other uses in

planning and management. The Improvement Act clearly states that these uses are to only be allowed if they are determined to not materially interfere with or detract from the fulfillment of the mission of the Refuge System or purposes of the refuge (i.e., must be compatible). Wildlife needs must come first and will override public use activities. Therefore, it is important on Tensas River NWR that any allowable public uses do not impact the sanctuary and non-disturbance requirements of migratory birds (foraging, roosting, nesting, pairing, molting, and rookeries), endangered species, and other wildlife.

Significant issues evaluated in this CCP include the need to increase outreach to local communities; to improve and increase wildlife observation, wildlife photography, environmental education, hunting, and fishing opportunities; to increase youth activities; to work with and utilize the Refuge Association; and to improve access to the refuge.

REFUGE ADMINISTRATION

Interest remains to create an exit off Interstate 20 and pave the road to the refuge. In order to meet biological and habitat management needs increased staffing is needed.

WILDERNESS REVIEW

Refuge planning policy requires a wilderness review as part of the CCP process. The results of that wilderness review are included in Appendix H.

IV. Management Direction

INTRODUCTION

The Service manages fish and wildlife habitats considering the needs of all resources in decision-making. However, first and foremost, fish and wildlife conservation assumes priority in refuge management. A requirement of the Improvement Act is for the Service to maintain the ecological health, diversity, and integrity of refuges. Public uses are allowed if they are appropriate and compatible with wildlife and habitat conservation. The Service has identified six priority wildlife-dependent public uses: hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation. These six identified priority wildlife-dependent public uses are therefore emphasized in this CCP.

Described below is the CCP for managing the refuge over the next 15 years. This management direction contains the goals, objectives, and strategies that will be used to achieve the refuge vision.

Three alternatives for managing the refuge were considered:

A. Current Management Direction (No Action Alternative)
B. Custodial Management
C. Ecosystem Management (Preferred Alternative)

Each of these alternatives is described in the Alternatives section of the Tensas River NWR Draft CCP and Environmental Assessement (2009). The Service chose Alternative C "Ecosystem Management" as the management direction. This alternative best satisfies the vision of the refuge and best addresses the goals, objectives, and strategies expressed by the planning team, the refuge staff, governmental partners, and the public.

Implementing this alternative will result in an optimization of both its biological program and visitor services' program. Recognizing that it might not be possible to equally pursue and achieve all objectives simultaneously because of budgetary and staffing constraints, this alternative stresses the principle of optimization rather than maximization of wildlife, habitat, and public use outputs. The refuge would continue to furnish benefits to resident wildlife species under Alternative C and would aim to increase the refuge's knowledge base about neotropical migratory songbirds by developing and implementing monitoring programs, while continuing to provide habitats for the benefit of waterfowl, shorebirds, marshbirds, nesting colonial waterbirds, and landbirds. The refuge would also continue to furnish benefits to "species of concern" such as the Louisiana black bear through continued research into the repatriation and recovery program for this species. The refuge will also use its resources to create and/or maintain a variety of habitats compatible with historic habitat types in the Tensas River Valley. Public use and environmental education would increase from the "No-Action" Alternative A under Alternative C. Within three years of CCP completion, the refuge would develop a Visitor Services' Plan to be used in expanding public use facilities and opportunities on the refuge. This management plan would provide overall, long-term direction and guidance in developing and running a larger public use program at Tensas River NWR.

VISION

The Tensas River National Wildlife Refuge will be managed to provide for the restoration, enhancement, and conservation of a structurally diverse and complex bottomland hardwood forest as an integral component of the Lower Mississippi Alluvial Valley. These habitat management efforts will promote healthy native populations and provide functional corridor linkages to facilitate migration, promote gene flow, and provide habitat for wide-ranging species. The desired results will balance the needs of federal trust species while promoting environmental education, interpretation, and other compatible wildlife-dependent recreation.

GOALS, OBJECTIVES, AND STRATEGIES

The goals, objectives, and strategies presented are the Service's response to the issues, concerns, and needs expressed by the planning team, the refuge staff and partners, and the public. They are presented in hierarchical format. Chapter V, Plan Implementation, identifies the projects associated with the various strategies.

These goals, objectives, and strategies reflect the Service's commitment to achieve the mandates of the Improvement Act, the mission of the Refuge System, and the purposes and vision of Tensas River NWR. With adequate staffing and funding as outlined in Chapter V, Plan Implementation, the Service intends to accomplish these goals, objectives, and strategies within the next 15 years.

Periodic reviews of the progress made towards accomplishing these goals and possible modifications should be conducted as advances are made in scientific knowledge affecting the management of fish and wildlife resources. This refuge plays a key role in a number of regional, national, and system-wide conservation plans that are referenced in this report. Fulfillment of the following goals, objectives, and strategies will contribute significantly to those plans. Some of the following recommendations will conflict with ongoing refuge work or with other recommendations. It must always be remembered that whenever a management conflict arises, the conflict shall be resolved in a manner that first protects the purpose of the refuge and, to the extent practicable, which also achieves the mission of the Refuge System.

HABITAT MANAGEMENT

Goal A. Manage, restore, enhance, and conserve a structurally diverse and complex bottomland hardwood forest and associated habitats that also provide a functional corridor linkage in the MAV.

Discussion: About 80 percent of the forestlands in the MAV have been cleared and converted to other land uses, leaving only remnant forested tracts. Fish and wildlife resources have been similarly impacted. This left remnant populations that must be managed to meet the refuge purpose and to achieve their maximum potential as it relates to landscape level planning.

The refuge was established in 1980 to conserve one of the largest remaining privately owned bottomland hardwood tracts in the MAV. Initial acreage purchased from Chicago Mill and Lumber Company was 9,000 acres, whose objectives were lumber and box manufacturing. A selective harvest system was used, which tended to high grade the forestry resources (thus removing the best specimens and species from an area). During subsequent acquisitions, 15,000 acres of the Fool River Unit was reserved for timber removal. A 16-inch diameter limit was used for timber removal associated with the timber reserve.

The current Forest Habitat Management Plan was written in late 1980s. The plan's 2000 expiration date was extended. It specifies the following goals to assist in meeting refuge goals and objectives:

- Create habitat conditions beneficial to threatened and endangered species;
- Leave more than adequate nesting cavities;
- Increase the amounts and variety of highly valued migratory waterfowl foods by manipulating timber stand densities and species composition in areas subject to flooding;
- Manage the forest to maintain habitat for resident game and non-game species;
- Provide well-planned timber harvest activities that will complement recreational and wildlife needs;
- Manage the forest resource so as not to decrease the value of any soils, bodies of water, or any natural resources already present; and
- Maintain an over-mature age class with "no cut zones" so as to provide an area for those animals that prefer this age class condition.

This Forest Habitat Management Plan has the refuge broken into 69 compartments, which average approximately 1,000 acres each. The plan calls for the inventory of three compartments each year and their treatment if deemed necessary from the inventory. It is based on a 15-year entry management cycle. There are currently 9,075 acres in administratively chosen no cut zones [McGill Bend containing 6,000 acres and Rainey Lake containing 975 acres and Streamside Management Zones (SMZs)]. The SMZs call for a 200-foot no-cut buffer along the Tensas River and other permanent water bodies. The plan also restricts harvest of any sweet pecan, cypress, or persimmon trees. Large den trees or potential den trees will be maintained and protected.

Current forest management techniques used on the refuge include a combination of even-aged regeneration methods (i.e., clear-cutting, seed-tree, and shelterwood) and uneven-aged regeneration methods (i.e., selection, group selection, and patch cuts less than 5 acres) in conjunction with thinnings between regeneration areas. Management actions roughly follow the bottomland hardwood forest management recommendations developed by the LMVJV Forest Resources Conservation Working Group that were developed for the WRP to benefit migratory birds (ivory-billed woodpeckers, other songbirds, and waterfowl) and the threatened Louisiana black bear.

Objective A.1 – Forest Habitat Management Plan: Modify current Forest Habitat Management Plan to incorporate guidelines of the LMVJV Forest Habitat Working Group.

Discussion: The current Forest Habitat Management Plan was due to expire in 2000 and has been extended. A new management plan will be needed with the completion of the CCP. It is imperative that the current plan be amended to ensure continued management using the latest knowledge until the CCP and new Forest Habitat Management Plan is complete. The forest types used in the current plan were developed from a regional perspective.

Strategies:

- Strive to manage 2,000 - 3,000 acres, according to the LMVJV Forest Habitat Guildlines, per year throughout the refuge.
- Use current research data and recommendations being developed by the LMVJV Forest Resources Conservation Working Group to guide modification of the current forest management plan.
- Restructure compartment boundaries with natural geographical boundaries rather than section lines where appropriate.

- Remove harvest restrictions on sweet pecan, cypress, and persimmon trees.
- Continue using forest types consistent with the Society of American Foresters where adequate for the refuge and recommend keeping those forest cover type designations.
- Prescribe timber treatments based on individual stand/forest type conditions from inventory data collected.
- Monitor success of habitat management and restoration activities (i.e., changes in habitat and wildlife responses).
- Continue using Continous Forest Inventory plots that have been in place since the 1960s to monitor long-term forest changes (at least every 10 years, 5 years if manpower available).
- Work at implementing a cooperative research project to compare vegetative and wildlife responses within silviculturally treated areas and areas with no treatment.
- Work to maintain roads post-treatment.

Objective A.2 – Reforestation: Modify reforestation efforts to ensure natural hydrology, topography, and diversity of tree species are utilized for priority species (e.g., songbirds, black bears, waterfowl, and deer).

Discussion: The refuge currently has approximately 11,000 reforested acres and can foresee another 8,000 acres of reforestation over the next ten years. Past efforts have included direct seeding and hand planting of seedlings with a heavy oak component. Current restoration efforts commonly use a stocking rate of 302 seedlings per acre. There is considerable interest among foresters and biologists to increase both the diversity of trees planted and the number per acre in bottomland hardwood restoration.

Strategies:

- Open reforestation fields to hunting to help alleviate herbivory problem.
- Continue to work with partners and companies interested in carbon credits. Continue to improve and establish adequate species diversity, adequate stocking and survival rates, and sound site preparation practices to ensure successful restoration.
- Follow reforestation guidelines produced by the LMVJV Forest Resources Conservation Working Group.

Objective A.3 – Invasive Plant Species Management: Identify areas and control methods to reduce non-native plants. Implement an aggressive control program to reduce/eliminate invasive vegetation with an emphasis on control and reduction of trifoliate orange and Chinese tallow.

Discussion: Some exotic species exist on the refuge and may benefit from current and future management practices. Inventories will need to be made to identify non-native plants, their relative abundance, area of occurrence, and the most efficient methods of control. Known species that potentially need control are Chinese tallow and trifoliate orange. The Louisiana State University Cooperative Extension Service can provide useful information on control methods.

Strategies:

- Apply for alternate funding sources to address invasive concerns.
- Work with adjacent landowners to encourage participation in control efforts.
- Research/monitor invasive plant responses to control programs.

Objective A.4 – Water Management Plan: Develop and implement a Water Management Plan to include flood and drawdown dates and rotations for management units sufficient to meet the step-down objectives of the LMVJV guidelines.

Discussion: Concern over waterfowl population declines in the 1980s resulted in establishment of the NAWMP, which focused the attention of federal, state, and private conservation groups on critical wintering and breeding areas. The MAV was selected as one of the wintering habitat focus areas. Consequently, the LMVJV decided to work on this focus area and its connection to the NAWMP. One of the first tasks faced by the LMVJV was to find a model or decision tool for determining how much habitat was needed and relate the habitat needs to the population goals of NAWMP. The solution was to view wintering areas as responsible for contributing to the spring breeding population goals of NAWMP proportional to the percentage of ducks historically counted in wintering areas (Loesch et al., 1994; Reinecke and Loesch 1996). To contribute ducks to spring populations, wintering areas have to provide sufficient habitat to ensure adequate winter survival. To quantify winter habitat requirements, the LMVJV had to identify limiting factors, and the LMVJV assumed foraging habitat was most likely to limit waterfowl populations in the MAV (Reinecke et al., 1989). Many of these same factors/planning procedures were applied to the West Gulf Coastal Plain as the LMVJV expanded to include this important area.

In simple terms, the objective of the LMVJV is to provide enough foraging habitat (in duck-days) for: (1) the continental duck population goal of NAWMP; (2) multiplied times the proportion of ducks typically wintering in the MAV area; (3) adjusted for ducks that die during winter but require habitat before they die; (4) multiplied by the average number of days ducks are present; and (5) multiplied by the amount of food required per day. These calculations generate the need for millions of duck-days of foraging habitat value. Research indicates that foods used by mallards, pintails, wood ducks, and other species emphasized by NAWMP generally are obtained in three primary habitats: moist-soil areas, croplands, and forested wetlands. The ability of these habitats to provide duck-days of foraging habitat has been summarized (Reinecke et al., 1989; Loesch et al., 1994; Reinecke and Loesch 1996) and are used by the LMVJV to calculate the acres of various combinations of habitat needed to satisfy population goals.

The process of relating habitat objectives for individual management areas to overall habitat objectives for the MAV involved several steps. First, habitat objectives were allocated among states relative to historic abundance of waterfowl. Then, knowledgeable managers within states determined strategies for meeting state habitat objectives by allocating percentages of the objectives to habitats with managed or naturally flooded water regimes and habitats on public or private lands. One result of this “step-down” process was to clearly define the collective habitat objectives of state and federal wildlife areas in the MAV relative to objectives of the West Gulf Coastal Plain, which, in turn, were related to the NAWMP. The collective objectives of state and federal wildlife areas then were assigned to individual management areas based on waterfowl management capabilities. The managed habitats in Louisiana are not currently meeting their objective of over 23 million duck-energy days (DEDs). The deficit, 35,000 acres, must be addressed by creating additional public and privately managed habitats, which justifies the need for both improved management capabilities on the refuge and a strengthened private lands presence.

Strategies:

- For each waterfowl impoundment (moist-soil, cropland, and forested wetlands), establish water level gauges and maintain accurate records of management actions, plant response, and waterfowl response.

- Maintain a minimum of 494 acres annually of quality moist-soil habitat (quality defined as 500 pounds per acre of preferred moist-soil seeds or at least 50 percent cover of desirable moist-soil plants).
- Provide over 930,000 DEDs of waterfowl foraging habitat.
- Strive to increase preferred moist-soil plant production by implementing good management practices including timely and slow draw-downs of water levels to maintain moist-soil conditions, deep disking, spraying herbicides, mowing, and holding flood through a growing season.
- Monitor moist-soil units at least weekly throughout the growing season and keep records of management actions, water levels, and vegetation responses by management unit.
- Use water as a management tool throughout the growing season to maintain moist-soil conditions and irrigate as necessary to promote preferred plant production and eliminate pest plants, especially cocklebur and coffeebean.
- Investigate the feasibility of installing a well on the McLemore Units to facilitate improved water and moist-soil management.
- Utilize wells on newly acquired lands to add moist-soil units to the refuge.

Objective A.5 – Cropland and Moist-soil Management: Develop a Cropland Moist-soil Management Plan using cooperative farming to manage, maintain, and establish "hot food" grain crop production on all refuge cropland in the floodable portions of wetland units, and maintain all moist-soil areas as directed to provide the complex of foods and habitats required by migrating and wintering waterfowl on the refuge.

Discussion: Habitat objectives are based on food production and acres by habitat type for the complex of habitats including harvested and unharvested cropland and moist-soil areas. Each of these habitats is required to provide an important part of the food resources (e.g., native weed seeds, small grains, and invertebrates) required by waterfowl wintering in the MAV. Agricultural grains are high in carbohydrates (i.e., hot foods) needed by waterfowl to maintain body temperature during cold periods during winter. Native weed seeds (moist-soil seeds) and invertebrates provide higher levels of protein and other nutrients used by waterfowl to complete other important functions during the winter period, such as molting and improving body condition for return migration to the breeding grounds and egg laying. A variety of both natural and agricultural foods provides a diversity of nutrients for waterfowl's changing nutritional needs. Because of the high production of agricultural crops, unharvested grain provides much higher duck-use day values per acre than natural areas. For example, unharvested rice is estimated to provide 24,025 duck-use days per acre, whereas moist-soil impoundments are predicted to provide 1,883 duck-use days per acre and bottomland hardwoods with a 40 percent red oak overstory component are predicted to provide 161 duck-use days per acre (Table 8).

Many of the foraging requirements are met on agricultural lands or former agricultural lands (i.e., moist-soil habitat) that are naturally flooded or managed specifically for waterfowl. Flooded scrub/ shrub and bottomland forests provide some foraging habitat but may serve a greater function for isolation during pair bonding and thermal protection on cold, windy days. It is critical that each segment of habitat (i.e., agricultural grains, moist-soil, and wooded swamp/bottomland forests) be provided if the wintering waterfowl habitat needs are to be met.

Strategies:

- Refuge crops should be limited to grains including rice, milo, corn, or millet.
- Soybeans are not a crop of choice because of the low energetic value to waterfowl. However, it should be recognized that unusual circumstances could make soybeans the only available choice to achieve specific management goals, and, in this case, soybeans are significantly better than no management.
- Create and maintain preferred nocturnal habitat in wet agricultural fields (not fall disked) and wet "old fields" with exposed soil and patchy cover one to three feet in height for woodcock.

Table 8. Duck-energy days per acre of selected foraging habitats

(Expressed as duck-energy days per acre of dabbling ducks wintering in the LMRJV area. These figures were used by the LMVJV in the planning process to develop waterfowl foraging habitat step-down objectives.)

Habitat Type	Carrying Capacity (duck-energy days/acre)
Moist-soil	1,883
Unharvested cropland	
Rice	24,025
Soybean	4,716
Milo	16,269
Corn	25,669
Millet	3,292
Harvested cropland	
Rice	139
Soybean	37
Milo	849
Corn	970
Bottomland Hardwoods	
30% red oak	115
40% red oak	161
50% red oak	207
70% red oak	299
90% red oak	391

Objective A.6 – Canebreaks: Utilize Forest Habitat Management Plan to enhance and create openings promoting canebrakes through patch cuts and other forest management practices.

Discussion: A decline in canebrake communities has resulted in a critically endangered ecosystem. Historical accounts suggest loss of canebrake habitat has resulted in the extirpation (and perhaps extinction) of many species. Thus, canebrake restoration is necessary for maintaining and enhancing biodiversity in the southeastern United States.

Strategies:

- Allow natural disturbance to maintain and enhance existing canebrake habitat.
- Use forest habitat management practices and techniques to provide canebrake habitat.
- Reestablish canebrakes by replanting in appropriate areas.

Objective A.7 – Scrub-shrub: Utilize Forest Habitat Management Plan to allow for early successional habitats through patch cuts and other forest management tools.

Discussion: Scrub-shrub habitats are characterized by low, multi-stemmed woody vegetation in young or stunted stages of growth. Such habitats commonly result when mature woodlands are disturbed by wind, fire, flooding, or commercial activities such as timber harvesting, farming, or maintenance of rights-of-way. The species composition, which is variable, depends on the location and length of time since disturbance, abandonment, or management. Scrub-shrub communities can be dense and impenetrable or can consist of a mosaic of low woody cover interspersed in herbaceous cover. Trees may be present but are widely spaced.

Well-managed scrub-shrub habitats are critical for birds and the Louisiana black bear. Scrub-shrub includes many flowering plants that provide nectar, seeds, and insect foods needed by breeding birds. Tall herbs and grasses growing on the edge of shrubland offer shelter and nest sites as well as hunting areas for predatory birds such as barn owls and kestrels.

Strategies:

- Allow natural disturbance to maintain and enhance existing scrub-shrub habitat.
- Utilize existing forest management to provide scrub-shrub habitat.
- Reestablish scrub-shrub by replanting in appropriate areas.

FISH AND WILDLIFE POPULATION MANAGEMENT

Goal B. Maintain healthy and diverse populations of endemic fish and wildlife, as well as provide habitat for migratory birds.

Discussion: Because Tensas River NWR is part of the LMRE, the refuge is a component of many regional and ecosystem conservation planning initiatives. The MAV is a critical ecoregion for migratory birds in North America. Tensas River NWR provides important foraging and resting habitats within the MAV for waterfowl, as well as a variety of other migratory birds such as woodcock, marshbirds, neotropical songbirds, colonial waterbirds, and wading birds. This area specifically contributes important regional resources to an international habitat management effort known as the NAWMP, which seeks to return waterfowl species populations to levels observed during the 1970s.

Objective B.1 – Migratory Waterfowl: Provide the biological framework to support the goals of the NAWMP as stepped down through the LMVJV.

Discussion: Concern over waterfowl population declines in the 1980s resulted in establishment of the NAWMP, which focused the attention of federal, state, and private conservation groups on critical wintering and breeding areas. The LMVJV was selected and organized to plan conservation efforts that would provide sufficient waterfowl habitat in the MAV and to ensure adequate winter survival and body condition for spring migration and nesting. In order to ensure the waterfowl duck-energy day objectives for Tensas River NWR are being met, biological data on duck response is needed.

Sanctuary
In general, high waterfowl harvest rates and hunting activity make sanctuary an important function of national wildlife refuges in Louisiana. However, waterfowl populations and hunting in northeast Louisiana and the purpose of this refuge make sanctuary at Tensas River NWR of less importance than other areas. Currently, portions of the refuge closed to waterfowl hunting are generally limited to areas east of the Tensas River in the Judd Brake Unit and west of the Tensas River in the Fool River Unit.

The Biological Review Team recommends that sanctuary be maintained only in the Greenlea Bend, Stutz, and McLemore Units, as well as other areas where significant effort and expense is used to produce food intended to meet objectives for waterfowl foraging habitat. However, special events, such as youth hunts, may be exceptions that are desirable to offer on a limited basis in these units.

Adaptive Management
Adaptive management is a system used to improve results by documenting management actions; measuring and documenting biological response; and adapting (modifying) management actions to improve desired conditions/outcome. It is important that all management actions taken to provide waterfowl habitat be recorded, evaluated, and modified to improve efficiency, desired habitat conditions, and waterfowl usage. Monitoring performance by estimating and recording seed production by water management units and documenting waterfowl response to management actions is an essential part of adaptive management on Tensas River NWR and is essential in determining if objectives are being met.

Strategies:

- For each waterfowl impoundment (moist-soil, cropland, and forested wetlands), establish water level gauges and maintain accurate records of management actions, plant response, and waterfowl response.
- Habitat conditions and waterfowl numbers should be correlated to the degree possible to determine preferred habitat conditions throughout the winter period.
- Because of differences in species' habitat preferences both within and among years, data should be recorded, archived, and analyzed over a period of years before management actions are taken.

Objective B.2 – Forest-Breeding Birds: Work with partners to contribute productivity, distribution, and occurrence data to support source populations of swallow-tailed kites, prothonotary warblers, Swainson's warblers, and other neotropical migratory birds that contribute to the goals of the Partners in Flight Mississippi Alluvial Valley Bird Conservation Plan.

Discussion: Within the MAV, the two greatest issues affecting forest-breeding birds are forest fragmentation and poor stand quality. Currently, Tensas River NWR harbors two somewhat disjunct forest blocks, each of which exceed 8,000 ha (20,000 acres). Additional forest restoration should forge a broader connection between these forest blocks, while focusing on higher priority restoration areas that target habitat for forest birds (Twedt et al., 1996) and corridors for black bears (Bowker et al., 1995). Additionally, restoration should be considered on lower priority areas that are adjacent to existing forest, or on higher elevation ridges and terraces; fill "holes" in existing forest cover; or connect large extant forest patches.

Within patches and without perturbation, such as disturbance caused during active silvicultural management or from natural disturbances (e.g., tornadoes), mature forests tend to develop closed overstory canopies that impede light penetration into the forest. Limited light penetration results in sparse ground, understory, and midstory vegetation. Many forest birds are dependent on dense

understory and ground vegetation for nesting, foraging, and escape cover. Thus, silvicultural harvests that increase light penetration, while maintaining an overstory canopy, are beneficial to many forest bird species of high conservation concern.

Options for silvicultural manipulation of forest structure are greater when higher value species are included with the harvest. However, in addition to limiting understory vegetation, closed overstory canopies also inhibit the regeneration of shade intolerant tree species including many high value species (e.g., red oaks). Furthermore, mast produced by many of these shade intolerant tree species is critical forage for black bears and is consumed extensively by many other species (e.g., wild turkey, blue jay, and white-tailed deer). Thus, silvicultural harvests should ensure continued recruitment of shade intolerant tree species as future canopy trees as well as increasing understory vegetation densities.

In addition to promoting understory vegetation development and ensuring recruitment of shade intolerant tree species, silvicultural harvest should, where possible (1) encourage development of emergent trees that rise above the predominant forest canopy; (2) retain large diameter class (>60 cm dbh) trees; (3) provide large (>50 cm dbh) standing, dead, or dying trees; (4) contribute coarse woody debris to the forest floor; (5) retain small diameter cavity trees (hole diameter <20 cm); and (6) retain larger diameter den trees (hole diameter >20 cm).

Forest restoration should promote rapid development of vertical forest structure through use of faster growing trees. Finally, future management options will be enhanced if planted trees are marketable. To promote quality timber development, density of tree plantings should be greater than 302 stems per acre. Direct seeding should be considered as an economical mechanism for increasing stem density.

Population data for forest dwelling birds are limited for many refuges in the MAV. As such, bird population data from Tensas River NWR is critical for establishing baseline populations that can be used to assess management actions and compare future habitat conditions. Forest breeding birds should be surveyed with point counts using the protocol in Hamel et al. (1996) as modified via the LMVJV working group. Point counts should be conducted within management units (stand, compartment) distributed throughout Tensas River NWR. Five or six point counts should be conducted within a management unit at a minimum spacing of 250 x 250 m. Approximately 30 point counts should be conducted once per year with 10-15 points visited per day during the breeding season. For one counter, 30 points should take two to three mornings (between dawn and about 10 A.M.) to complete. Counts should be conducted during May with resultant data reported to the North American Point Count Database. Rotate point counts among management units from one year to the next, revisiting units every three to five years. Not all management units need be surveyed, but surveys should represent all forest habitat types on Tensas River NWR and span the geographic extent of the refuge. Point count data should be used to derive estimates of avian density on Tensas River NWR and for comparison with established population objectives. For example, an average of 6-9 pairs of Swainson's warblers (drier end of the spectrum) or 11-19 pairs of prothonotary warblers (wetter end of the spectrum) per 40 ha (100 acres) within optimal habitat would meet breeding population objectives.

Because density may not be indicative of healthy bird populations, productivity and survival should be assessed. As monitoring nest success to assess population health is costly, productivity should be assessed indirectly though continued operation of one or more MAPS (Monitoring Avian Productivity and Survival) constant effort mist-netting stations. Annual changes in the young/adult ratio of captured birds should be monitored for changes (either abrupt or long-term trends) that may warrant additional study.

Strategies:

- Inventory populations of forest breeding birds and monitor their productivity.
- Increase existing acreage of mature forested habitat to attain 40,000 ha (100,000 acres) of forest in the landscape centered on Tensas River NWR and associated adjacent lands.
- Improve forest structure on more than or equal to1,200 ha (more than or equal to 3,000 acres) of mature forest annually in concordance with forest management guidelines being developed and maintained by the LMVJV Forest Resources Conservation Working Group.
- Restore sites in concordance with forest restoration guidelines developed and maintained by the LMVJV Forest Resources Conservation Working Group.

Objective B.3 – Louisiana Black Bear: Continue to work towards delisting the Louisiana black bear in support of the goals and objectives in the Louisiana Black Bear Recovery Plan.

Discussion: The Louisiana black bear was listed as a threatened species under the Endangered Species Act due to extensive habitat reduction and fragmentation and declining populations. Bears once occurred throughout southern Mississippi, Louisiana, and eastern Texas. Habitat modification, particularly clearing for agriculture, has fragmented and reduced suitable habitat by more than 80 percent in the MAV.

Boersen (2001) estimated there were approximately 115 bears on the refuge. Clearly, assessing population abundance of bears over time would be valuable information for developing and implementing effective land management scenarios to benefit bears and other focal wildlife species on Tensas River NWR. Developing an appropriate long-term monitoring scheme for estimating bear density would be beneficial.

A number of potential implications to black bear behavior (movements, space use, habitat and den selection, and diet) are discussed in Benson (2005). To summarize the most salient points, it is clear that black bears in the Tensas River Basin exhibit a relatively high degree of plasticity in behavior, as evidenced by the numerous ecological differences in bear behavior noted between Tensas and Deltic. This bodes well for continued, long-term viability of bears in the region. However, a number of conservation concerns and priorities are evident. Past forest management, or lack thereof, on Tensas River NWR has resulted in a closed-canopy forest condition lacking important mid- and under-story components and the quality foraging resources found in those components. This is substantiated by the lack of diversity in diets on Tensas River NWR and the strong selection for regenerating habitats that are present in the area. Future forest habitat management strategies that create more diverse forests, increase the availability of understory vegetation, and maintain consistent availability of early successional forest communities on Tensas River NWR would benefit the bear population. However, it should be noted that mature forests and swamps were particularly important to habitat selection by bears on Tensas River NWR, suggesting that maintaining expanses of these habitats is important.

Results of den selection analyses suggest a number of potential land management scenarios that would benefit denning ecology of bears on Tensas River NWR. Benson (2005) reported a relatively high reuse of tree dens on the refuge with almost all denning attempts occurring in mature baldcypress. This suggests that tree den availability may be low, as reuse is often used as a surrogate for estimating den availability. Conserving currently suitable den trees on the refuge should be a priority. Furthermore, 34 percent (13 of 38) of dens on the refuge during 2003-2005 were ground dens, most occurring in isolated patches of early successional habitat. This suggests that ground denning comprises a substantial portion of den attempts on Tensas, mandating efforts to

manage appropriate ground denning habitat. For instance, forest harvest operations could leave logging debris piled in topographically higher areas to provide suitable ground dens. Current research is more thoroughly evaluating den ecology on Tensas River NWR and will provide a model for predicting sites likely to receive greatest den use for both tree and ground denners. This model should be applied to existing land-cover maps of the refuge to help guide forest habitat management strategies over the long-term.

Although black bears will often increase space use during early and middle fall to locate suitable foraging resources, several females on the refuge exhibited movements warranting further consideration. Across females, most typically displayed fall movements that provided opportunities for using cornfields distributed throughout and around the refuge. Notably, several females essentially shifted their entire home range and vacated broad areas of Tensas River NWR to reach these concentrated foraging resources. It is likely that increasing the availability of foraging resources through improved forest management will reduce the likelihood of this scenario. Future research should assess how changing forest management affects bear behavior.

Raccoon hunting during spring has the potential to disturb black bears during the critical late denning period when females and cubs are exiting dens. It is recommended that raccoon hunting not be allowed during March and April. Potential exists to evaluate effects of raccoon hunting on bear behavior (movements and space use) given the relatively large number of radio-marked female bears on the refuge. Using radio-telemetry to assess bear movements relative to disturbance created during nighttime raccoon hunting activities would be valuable and should be explored. Any studies such as this must be coordinated through the Ecological Services Field Office in Lafayette, Louisiana.

The bear populations on Tensas and Deltic have been used for repatriation efforts since 2002. (Deltic properties were used sparingly during 2001.) These efforts have been dedicated towards establishing a viable population of black bears in the east-central portion of Louisiana. As part of the repatriation project, 12 females have been relocated from Tensas River NWR with their newborn cubs and released on the Lake Ophelia NWR and Three Rivers Wildlife Management Area. Results of the repatriation project to date are summarized in Benson (2005).

Strategies:

- Use previous and current research to assist in directing timber management activities on the refuge to promote preferred target species habitat.
- Continue to coordinate bear related research and other activities throughout northeast Louisiana.
- Retain den and potential den trees for the Louisiana black bear.
- Continue support and assistance with LSU, University of Tennessee, LDWF, and the Black Bear Conservation Committee regarding repatriation efforts.
- Conduct public education and outreach on living with bears to the local community and coordinate as necessary with other agencies in these efforts.
- Continue support and assistance with USDA Wildlife Services and LDWF with nuisance bear situations.
- Coordinate with University of Tennessee researchers and the Ecological Services Field Office in Lafayette, Louisiana, for raccoon field trials (could potentially be done during gun hunts as well) in an attempt to quantify disturbances, if any, to bears associated with raccoon hunting.
- Develop and perform statistically valid population estimates (DNA/hair traps) every 5 years.
- Coordinate with Lafayette Ecological Service Field Office and Louisiana Department of Transportation and Development officials to identify potential problem areas as we recover bears.

Objective B.4 – White-tailed Deer Management: Encourage active forest habitat management that results in enhanced habitat for deer, and control deer populations such that deer herd health is maintained at a high level while providing a quality deer hunting experience.

Discussion: Since the 1990s, logging on the refuge has been minimal. In many areas, the forest canopy has become closed, limiting the amount of available browse and reducing carrying capacity of the habitat for deer. Results of a recent deer browse survey further point toward the need for active forest management. On April 19 and 20, 2005, the Service and LDWF biologists measured woody plant availability and utilization on thirty-three 5 feet wide x 100 feet long transects (Table 9 denotes the results). Broad coverage of the refuge was attempted with transects located in representative habitat types. In addition to woody browse species, herbaceous plant use was recorded, and canopy, midstory, and ground cover densities were noted. In this study, total woody browse species observed were 33, and the average number of plant species per transect was 15. In addition, the average number of plant species browsed per transect was seven, and the average number of plants browsed per transect was 22.

Table 9. Browse survey results, Tensas River NWR

Species Present	Plants Present	Plants Utilized	Percent Utilization
Rattan	183	59	32
***Celtis* sp.**	195	100	51
Swamp dogwood	16	10	63
***Crataegus* sp.**	37	14	38
Ash	63	15	24
Deciduous holly	87	34	39
Mulberry	17	5	29
Water oak	72	22	31
Willow oak	66	17	26
Nuttall oak	11	1	9
***Smilax* sp.**	372	241	65
***Ulmus* sp.**	228	89	39
***Vitis* sp.**	43	7	16

Overall, woody browse plant diversity is somewhat low. The range of woody plants that can occur generally is 30 to 50 species. Of the 33 browse plants recorded on the survey, an average of 15 per transect (45 percent) are available. This fairly low average is indicative of a closed canopy. A range of 10 to 30 plants browsed per transect is considered to be normal and indicates good utilization of available browse. An average of 22 plants browsed per transect is recommended. This index indicates the need for sustained either sex harvest. Browse pressure on indicator and especially desirable woody species was moderate to high. Of the 13 indicator species recorded, eight had more than 30 percent utilization. This index indicates the need to continue regular browse surveys to prevent increased deer browsing pressure to promote regeneration of desirable forest plant and tree species.

By continuing to implement the refuge's Forest Habitat Management Plan, particularly as it relates to providing habitat needs of priority forest-dwelling non-game birds, conditions will be enhanced for maintaining a healthy deer population as well. Such active management will provide a diversity and abundance of understory, midstory, and overstory stand components (i.e., complex forest stand structure) to meet the needs of a variety of non-game forest birds and resident wildlife, including black bear and deer.

Through the implementation of an either-sex hunting program and a liberal harvest upon refuge acquisition, check station data indicated that the deer population was reduced to a healthy, sustainable level by 1992. While the remainder of the 1990s produced a relatively high harvest of deer on the refuge, deer harvests have decreased substantially from 2000 through 2004.

The primary habitat changes include a reduction of habitat quality over much of the refuge forests due to successional changes that have resulted in a closed overstory that has reduced the availability of understory foods. Another recent development, the reforestation of fields on and adjacent to the refuge, has also reduced the availability of food. While these reforested fields, encompassing several thousand acres, provide somewhat limited quality forage for deer, they do provide ample escape and bedding cover and are undoubtedly heavily utilized by deer for these purposes. The availability of this newly established habitat for deer is probably a major factor contributing to the recent decline in deer harvests.

The refuge has historically maintained eight to ten manned check stations during quota gun hunts in an effort to obtain body indices from all deer harvested during these hunts while providing as much convenience to hunters as possible. Every effort should be made to ensure that all data obtained during refuge gun hunts is as accurate as possible.

Strategies:

- Collect, analyze, and utilize accurate biological data during annual hunts, health checks, and annual browse surveys such that deer herd health is maintained at a high level while providing a quality deer hunting experience.
- Strive to meet an annual goal of silviculturally treating at least 3,000 acres of mature refuge forests in accordance with guidelines developed by the LMVJV Forest Resources Conservation Working Group.
- Continue to monitor the availability and utilization of woody vegetation by conducting deer browse surveys at least on an annual basis.
- Open designated reforestation fields to designated hunting in an effort to increase the ability to efficiently harvest deer throughout refuge habitats.
- Reduce the number of manned check stations to a manageable level (five to six) to ensure that at least two adequately trained personnel are located at each station to ensure that all data obtained during refuge gun hunts are as accurate as possible.
- Continue to have the Southeastern Cooperative Wildlife Disease Study conduct deer herd health checks every four to five years in an effort to measure the deer population related to the refuge.

Objective B-5 – **Colonial Waterbirds and Wading Birds**: Survey and monitor for wading birds and contribute to objectives set in the North American Waterbird Conservation Plan.

Discussion: Tensas River NWR provides excellent habitat for breeding and wintering colonial wading birds. Shallow water areas found on the refuge provide critical foraging opportunities for long-legged wading birds including herons, egrets, and ibis. Included in this should be approximately 200 acres of managed water on Tensas River NWR that should be jointly managed for shorebirds and wading birds. These areas should be managed to retain water during spring and summer to provide habitat for wading birds and slowly drawn down in fall to provide mudflat edge habitat for shorebirds.

Strategies:

- All rookeries on Tensas River NWR should be kept free from disturbance and, where possible, standing water should be maintained under nest trees throughout the nesting season to reduce nest predation.
- Provide an extensive matrix of natural habitat for foraging wading birds to contribute to the objectives set in the North American Waterbird Conservation Plan.
- Provide managed habitat (~200 acres) to contribute to the objectives set in the North American Waterbird Conservation Plan.

Objective B.6 – Shorebirds (Objective B-6): Survey and monitor shorebird use during fall migration to contribute to the objectives set in the U.S. Shorebird Conservation Plan, Lower Mississippi Valley/West Gulf Coastal Plain Shorebird Management Plan and by the LMVJV.

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

Conversely, southbound migration starts in early July, peaks August through September, and ends by mid-October. Limited opportunities exist at Tensas River NWR to provide habitat for southbound migratory birds in the fall. However, approximately 200 acres of land with water management capabilities (i.e., moist-soil management units) should be managed to retain water during spring and summer to provide habitat for wading birds. They should also be slowly drawn down in fall to provide mudflat edge habitat for shorebirds. Helmers (1992) provides good information regarding the management of shorebird habitat in “Shorebird Management Manual.”

Shorebirds’ use of managed habitat should be assessed in concordance with LMVJV monitoring protocols. Monitoring shorebird responses to habitat management should focus on relating bird use to habitat conditions. Describing water depths, vegetation, and use by each identified shorebird species is recommended for making adjustments to future management.

Strategies:

- Monitor fall shorebirds response to habitat conditions and use protocols that contribute to the LMVJV and Manomet Bird Observatory data collection efforts.
- Provide approximately 200 acres of warm-season shallow water/mudflat habitat for fall (August through October) shorebird habitat that will also contribute to colonial wading birds and early migrating waterfowl.

Objective B.7 – American Woodcock: Use established protocol to survey American woodcock habitat every 3-5 years to contribute to the objectives of the American Woodcock Management Plan.

Discussion: American woodcocks are migratory game birds that occur throughout the forested portions of the eastern United States. Tensas River NWR is within the Central Region used for administrative management. Woodcock populations in this region have declined 19 percent since 1968, probably due to land use changes associated with land conversion and the maturing of forest habitats.

In 1990, the American Woodcock Management Plan was completed, setting an objective to protect and enhance winter and migration habitat on public lands to increase woodcock carrying capacity. The plan also set objectives to inventory and monitor woodcock habitat and develop management demonstration areas.

Woodcocks are closely tied to earthworms as their major food resource and other special habitat conditions (Krementz and Jackson 1999). Wintering habitat includes moist bottomland hardwood forests with brush and understory, especially when found in close association with agricultural fields and old-field succession. These sites are typically wet thickets with a high density of plant stems but relatively open groundstory below. Typical cover includes privet, cane, and briars that result from openings in the canopy. The scrub-shrub and dense bottomland hardwood habitats created to benefit priority forest interior nesting birds (such as Swainson's warbler) and Louisiana black bears will also provide good daytime cover for woodcocks.

At dusk, some portions of the woodcock population move to open or brushy fields to forage and conduct courtship activities throughout the night. These habitats include agricultural fields that were not fall disked and sparse grasslands that may have received a low intensity fall burn to create patchy openings of exposed soil interspersed between grass clumps one to three feet in height. These grassland areas also provide habitat preferred by other priority species (e.g., northern bobwhite, dickcissel, and other grassland birds).

Strategies:

- Assess and inventory suitable woodcock habitat on the refuge.
- Inventory suitable woodcock wintering habitat on the refuge and conduct evening flight counts, nighttime counts, and flush counts to assess woodcock usage of the refuge at least twice monthly from mid-November to mid-March to assess woodcock densities and response to management action.
- Develop woodcock habitat demonstration sites to serve as educational opportunities for public and private land managers, realizing that habitat management for woodcock is similar to management for other priority species.

Objective B.8 – Turkey Management: Encourage active management that results in enhanced habitat for turkeys and provides quality recreational activity.

Discussion: Tensas River NWR has a robust turkey population, and most refuge habitats are considered suitable for this resident game bird. With that said, turkeys are not a priority species for forest management on the refuge, and, as such, their numbers may not be consistently maintained at optimum levels. However, much of the management that occurs for non-game birds and other priority wildlife does provide benefits to turkeys as well.

Turkey populations can fluctuate in any habitat due to a combination of factors other than the habitat itself. A disease outbreak, such as pox or blackhead, can cause as much trouble in good habitat as in bad. In fact, an infectious disease will usually do more damage in a dense turkey population than in a sparse one (Williams 1981). Weather conditions, especially during the spring nesting season, can determine reproductive success, regardless of habitat quality. Thus, weather can be a major limiting factor on turkey numbers. Wetter than normal weather during May and drier than normal summers adversely impact turkey production.

Timber management, on a selective basis, can benefit turkeys by increasing the diversity and availability of foods in the form of hard and soft mast, as well as grasses, sedges, and forbs. Nesting habitat is often improved by selective timber harvests by providing more ground cover for nest concealment. Removal of more than 50 percent of the overstory degrades turkey habitat in the short-term by causing extremely dense undergrowth that is generally avoided by turkeys. Forest management objectives for the priority wildlife species on the refuge will, in most cases, provide positive or neutral benefits to turkeys.

One important ingredient in good turkey habitat is well-dispersed grassy openings. Turkeys use such areas for feeding, and openings are especially important to broods foraging on insects. Grassy openings are also used for nesting and courtship activities. A large percentage of the refuge's open grasslands occurs along the series of gravel roads and utility rights-of-way. The refuge currently has a cooperative agreement with the National Wild Turkey Federation to maintain food plots in some of these open areas. It is unclear how much benefit this management practice provides for the overall nutritional health of turkeys, but food plantings help provide a more diverse choice of foods over a long period and are thought to provide good brood rearing habitat (Williams 1981).

Several long-term studies estimate that adult gobbler harvest in the southeastern United States ranges from 17 to 32 percent, and annual survival in hunted populations ranges from 36 to 63 percent (Vangilder 1992). Since gobbler annual survival is generally very high in the absence of hunting, a high harvest rate reduces the number of birds available in subsequent years. The continued viability of isolated populations may be adversely impacted by high gobbler harvest rates. Models based on data from Missouri (Vangilder 1992) suggest that spring gobbler harvests of 30 percent or less will not negatively impact long-term population viability. The Missouri model assumed a fall hunting season in addition to the spring season. Since Louisiana does not have a fall season, a maximum spring harvest of 35 to 40 percent of the gobbler population is probably sustainable.

Allowing fewer gobblers to reach older age classes (3+ years) creates a situation where the harvest each year is dependent on production during the spring-summer two years prior. Such a situation is not a problem during consecutive years of good production. However, when consecutive years of poor production occur, adult gobbler populations and hunter harvest will drop to low levels. Once the gobbler population reaches low levels, it will take several years to recover, even if production is good. A preferable strategy is to allow a moderate harvest level that results in a diverse gobbler age structure so that harvest can remain relatively stable, even following years of poor production. Thus, a moderate harvest rate will help avoid a "boom or bust" harvest cycle.

Strategies:

- Implement annual gobbler and poults surveys in conjunction with LDWF.
- Continue to implement an active forest management program on the refuge.
- Continue to provide a spring turkey season on the refuge with a moderate number of days to allow adequate recreation without adversely impacting the population of adult gobblers.

Objective B.9 – Special Birds and Habitats: Monitor occurrence and record post-breeding and wintering individuals of historically abundant bird species such as roseate spoonbills, wood storks, scrub-shrub birds, grassland birds, and Bewick's wren.

Discussion: A few species of birds historically used extensive canebrakes. Although some of these species are likely extinct (e.g., Bachman's warbler), other species that favor cane-dominated habitats may be present such as the Swainson's warbler. In addition to federally listed species, breeding occurrence of swallow-tailed kites and cerulean warblers should be noted and documented. The occurrence of these species along with wood storks, roseate spoonbills, and Bewick's wrens should also be noted as post-breeding and wintering individuals occur.

Scrub-shrub (e.g., early successional) associated species are another group of vulnerable species within the southeastern United States. These species are considered a lower priority than mature forest species within the MAV, but several species will benefit from prescribed silvicultural treatments. For example, white-eyed vireo, indigo bunting, and orchard oriole birds are markedly more abundant for several years following prescribed silvicultural treatment.

Some scrub-shrub species (e.g., painted bunting, blue grosbeak) likely require larger blocks of suitable habitat (e.g., 50-100 acres but possibly as small as 25 acres). The refuge staff should consider targeting sites for this habitat condition. Generally, sites selected for long-term maintenance of scrub-shrub will require periodic disturbance. One option to consider to reduce the frequency of disturbance (to set back succession) is to plant areas with native fruit-producing, shrub species such as plums, dogwoods, devil's-walking-stick, deciduous holly, hawthorns, mulberries, crabapples, and beauty-berries. If densely stocked and at a distance from mature forest, these plantings may retain a shrubby character for an extended period. However, periodic entry may still be required to remove overstory canopy trees.

Although grassland birds are not a priority at Tensas River NWR, some breeding species (e.g., dickcissel and eastern meadowlark) and some winter species (e.g., Henslow's sparrow and sedge wren) will benefit from provision of this habitat in larger blocks (e.g., 50-100 acres but possibly as small as 25 acres).

Strategies:

- Provide a minimum of 50 acres of switch cane (*Arundinaria* spp.) dominated habitat by identifying Farm Service Agency tracts or evaluating possible existing agriculture conversion.
- Presence of threatened, endangered, and rare species should be noted and documented.

Objective B.10 – Marshbirds: Spot-check wetland habitat patches to determine use by priority marshbird species. Contribute to ongoing marshbird survey data.

Discussion: During the last several decades, overall loss of freshwater emergent wetlands has been underway as development pressures increase. King rail in particular is thought to have declined dramatically from inland areas and is now considered to be a species in potentially deep conservation trouble away from coastal areas. Least bittern is likely also suffering from freshwater wetland losses in recent decades. All the other priority marshbirds that could be found at Tensas River NWR require tall emergent vegetation as part of their habitat. Breeding populations of pied-billed grebe and American coot are considered of regional conservation interest. King rail is of highest concern among marshbirds, followed by least bittern and purple gallinule.

It is recognized that there are a number of marshbird species that require tall emergent vegetation, which with adequate staffing and funding for the necessary water management infrastructure could receive the necessary management attention to address the habitat needs of waterfowl, shorebirds, and marshbirds along with a host of other resources at Tensas River NWR. It must be recognized, however, that natural plant succession in freshwater wetlands of northeast Louisiana is to move to a forested habitat type. Maintenance of emergent marsh conditions, as with maintenance of other early successional vegetative stages, could be fairly labor intensive.

The refuge staff should identify how much habitat can be managed in at least 20-acre units and use this as a baseline for integrating the needs of breeding marshbirds with wood duck brooding habitat and other (wintering) waterfowl habitat requirements as possible.

Strategies:

- Provide for high-quality breeding marshbird habitat to manage for these species.
- Promote tall emergent vegetation to support marshbird-breeding populations.

Objective B.11 – Wood Ducks: Annually install, repair, and maintain wood duck nest boxes to provide wood duck nesting and brood rearing habitat, and conduct banding activities to support objectives of the Mississippi Flyway Council.

Discussion: Wood ducks are year-round residents in the forest lands of the southeastern United States, including Tensas River NWR. Preferred habitats include forested wetlands, wooded and shrub swamps, tree-lined rivers, streams, sloughs, and beaver ponds. Wood ducks seek food in the form of acorns; other soft and hard mast; weed seeds; and invertebrates found in shallow flooded timber, shrub swamps, and along stream banks. They loaf and roost in more secluded areas and dense shrub swamps.

Wood ducks are cavity nesters, seeking cavities in trees within a mile of water. Brood survival is higher in situations where nests are closer to water. Due to conversion of forest lands to urban sprawl and/or agriculture, as well as forestry practices, and competition for nest sites from a host of other species, natural cavities are considered to limit reproduction. Nest boxes are commonly used to supplement natural cavities and increase local production of wood ducks. Box programs are not an end to all nesting problems, they require time to clean and repair at least annually. Production can be increased by more frequent checks and cleaning of boxes, but this must be weighed with other time constraints. During the review, refuge staff indicated that the boxes have not been adequately maintained, and they did not know where or how many boxes were on the refuge. Production is presumed to be relatively low. The refuge had an active program of approximately 125 nest boxes, and box utilization and wood duck production was quite high during the 1990s. The refuge staff indicated an interest in re-establishing a wood duck nest box program.

A recent publication, *Increasing Wood Duck Productivity: Guidelines for Management and Banding* on USFWS Refuge Lands (Southeast Region) (USFWS, 2003)., provides well-documented guidelines for silvicultural practices, nest boxes, and brood habitat that should be used to guide management of wood duck production at Tensas River NWR. It is critical that nest boxes be spread out so that they are at least 100 yards apart or cannot be seen from another box. The boxes must have a functional predator guard and be checked and repaired annually; otherwise, boxes are considered traps for the hen and her clutch. Conical predator guards should be placed on all of the boxes to more effectively keep rat snakes and raccoons from climbing into the boxes. Some reports indicate that if rat snakes learn there is a meal of eggs in the nest box, it is very difficult to exclude them from the boxes, even boxes with predator guards. If boxes cannot be properly maintained, they should be boarded up until

sufficient effort can be put toward operating an effective nest box program. Cleaning the boxes after the initial peak of nesting (about mid-April) will significantly improve annual production if competition for nest sites increases. Continued monitoring of nest boxes is critical to success. If box usage and nest success does not improve, modifications to the current program should be considered. The decision to continue adding more boxes must be weighed with the available staff time to properly monitor and maintain the boxes.

Small nest boxes have been used in some areas following recommendations provided by a study conducted by Stephens et al., (1998) that reported nest success was comparable to standard boxes and provided financial savings. Subsequent studies by Hunter (2000) and Davis et al., (1999) reported lower (compared to standard boxes) or declining usage of small boxes due to high nest site competition with nesting passerine birds. If the purpose of putting up nest boxes is to increase wood duck production, it is recommended that standard nest boxes be used.

Brood survival is always a consideration, especially if broods must travel long distances to suitable habitat. McGilvrey (1968) described preferred brood habitat as 30 to 50 percent shrubs, 40 to 70 percent herbaceous emergents, and 25 percent open water. Overhead cover within one to two feet of the water surface is vital for wood duck broods. Optimum habitat should have 75 percent cover and 25 percent open water with a minimum of 1/3 cover to 2/3 open water. Placement of boxes in or adjacent to good brood cover will significantly improve duckling survival to flight age. This information has been more recently supported by Davis (2001).

Because wood ducks are secretive birds, it is extremely difficult to estimate populations and survival rates. Therefore, regional banding quotas, which are stepped down to individual states and stations to distribute banding throughout the range of the wood duck, have been established to determine harvest and survival rates. Tensas River NWR has an annual preseason-banding quota of 125 wood ducks, including 16 adult males, 27 adult females, 34 immature males, and 48 immature females. Until recent years, the refuge had a history of reaching its annual banding quota, and it is essential that reaching this banding quota continue so that this important resource can be managed.

Strategies:

- Operate a program of well-maintained nest boxes.
- Evaluate nest use and nesting success in boxes and adjust the program accordingly to add more boxes if over 50 percent of the existing boxes are used; however, do not add more nest boxes than refuge staff can properly maintain.
- All existing and any newly erected nest boxes should be mapped using global positioning satellites (GPS) and locations must be kept in the file.
- Allow some beaver ponds to develop and mature but not to exceed 5 percent of the refuge's forested land in order to provide wood duck habitat.
- Strive to meet annual preseason wood duck banding quota of 16 adult males, 27 adult females, 34 immature males, and 48 immature females.

Objective B.12 – Nuisance Wildlife and Predators: Manage nuisance native wildlife such as beaver and nutria, and eliminate, if possible, non-native wildlife populations of feral hogs to conserve wildlife habitat.

Discussion: Beaver populations were significantly reduced by subsistence hunting, commercial hunting, and trapping (Hill 1976; Woodward 1983; Novak 1987a). By the time trapping seasons were reopened, beaver trappers were scarce, and demand for shorthaired fur remains low. Consequently, little commercial beaver trapping was done. Absence of an adequate beaver harvest in conjunction

with insignificant non-human predation and an abundance of suitable habitat resulted in beaver populations reaching levels where the animals were considered pests (Woodward 1983; Woodward et al., 1985). Subsequent decline in fur prices in the early 1980s led to further increases in beaver populations with beaver damage reaching epidemic proportions in some areas.

Although beavers can provide additional beneficial wetland habitat on Tensas River NWR, it is necessary to implement some form of beaver control to reduce the negative impacts on native wildlife and fish species and forest habitats. Beaver damage is easy to recognize from the air and on the ground in the form of flooding (as a result of dam building activities) and numerous girdled and/or dead trees. When refuge staff observes damage and decides beaver activity is having a negative impact on refuge objectives, the entire beaver colony should be lethally removed by trapping and/or shooting. Beaver dams should be removed with heavy machinery, manually with hand tools, or with explosives. In some situations, it may be beneficial to refuge objectives to keep beaver pond water during some parts of the year. If this water is desirable, Clemson pond levelers should be installed.

Currently, refuge staff conducts all beaver damage management activities on Tensas River NWR. If the staff is able to maintain beaver damage at an acceptable level, this will remain the best option. If not, other options include contracting with an individual or agency that conducts beaver damage management activities. Opening a trapping season to the general public would help manage overall beaver populations but would provide very little reduction in site-specific beaver damage.

Many believe the first introductions of feral hogs by Spaniards in the southeastern United States occurred in the early 16th century (Nowak 1991). Others suggest Christopher Columbus released eight animals in the West Indies. Hernando de Soto later released progeny of these into Florida in 1539 (Towne and Wentworth 1950). Regardless of when and who introduced feral hogs into the United States, their distribution has expanded to include 23 states. A minimum population estimate of 2 million animals was suggested by Mackey (1992). In his survey, 12 states reported numerical population estimates. Eleven states, including Louisiana, did not provide a population estimate.

In addition to range expansion by feral hogs from early introductions, Louisiana was one of many states that allowed livestock free-range practices. We can safely assume that many of Louisiana's feral hogs are descendants of free-range animals. Feral hogs have been implicated in damaging a wide variety of natural resources and private property. Feral hog damage to sensitive plant communities, wildlife, agricultural crops, forestry, and water quality; livestock predation; spread of disease; and competition for available food with other native wildlife species are well documented (Miller 1993).

Although Tensas River NWR currently does not have a damage problem due to feral hogs, it will benefit the refuge to have a management plan available to eliminate or reduce damage as it occurs. Feral hogs have expanded their range to include several other refuges, management areas, forests, and private lands in Louisiana. It is a reasonable assumption that the refuge will experience problems in the near future. Refuge staff should be watchful of feral hog damage during their normal work duties. Once signs of feral hog presence have been observed, it is absolutely necessary to eliminate or reduce the population before it gets well established. Once feral hogs have established a population, it is nearly impossible to eliminate all animals.

If feral hogs are found on the refuge, several options are available to manage or eliminate the population. Methods available include shooting, trapping, and public hunting. Refuge staff, hunters, or an agency or private business specializing in such activities can do the shooting. General public hunting helps manage hog populations but may be ineffective in reducing damage. Allowing hunters that specialize in hunting hogs with trained dogs may be very effective in removing a small population. Trapping can be done with large cage traps, corral traps, and snares. Feral hogs often feed and travel

in large groups. Adult hogs trapped alive can be fitted with telemetry collars and released to rejoin the group. Using telemetry equipment, this group can be located and eliminated by shooting.

Refuge staff should monitor predator populations. If populations exceed or hinder refuge objectives, predators should be removed by hunting or trapping. A general public trapping season would be effective in managing predator species. Currently, only refuge staff is able to trap on refuge property. On an area as large as Tensas River NWR, the refuge staff would probably not be able to provide sufficient man-hours to manage predators.

Strategies:

- Continue to use refuge staff to monitor and manage site-specific beaver damage by trapping and shooting beavers and removing beaver dams.
- Contract with an individual or agency (e.g., USDA Wildlife Services) that conducts beaver damage management activities.
- Open a trapping season to the general public to help manage the overall beaver population.
- Use refuge staff to monitor for feral hogs presence.
- Open a general public hunting season for feral hogs.
- Hire a trapper if feral hog populations cannot be controlled by general public hunting.
- Use refuge staff to monitor predator populations.

Objective B.13 – Fisheries Management: Enhance existing fisheries and maintain self-sustaining sport fish and crawfish populations through management, monitoring, and law enforcement.

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

The Southeast Region Fisheries Strategic Plan (2004-2008) details specific actions and tactics that will be implemented over the next five years to meet national goals and objectives supported by the Service's Fisheries Program Vision of the Future (2002). Other documents and/or legislation pertaining to the importance of aquatic species management and the associated role of the Service are numerous. They include the Fish and Wildlife Act of 1956, National Recreational Fisheries Policy - 1988, Action Plan for Fisheries Resources and Aquatic Ecosystems – 1994, and Recreational Fishery Resources Conservation Plan - 1996.

Tensas River NWR was established in 1980. The refuge is located within the Tensas River Basin. The Tensas River meanders through the refuge and can cause overflow into a few lakes, depending upon water stages. The river is heavily contaminated by agricultural runoff (silt and pesticides). Tensas River NWR has several lakes and bayous that can be accessed for fishing opportunities. Fishing is allowed all year on the refuge and is in accordance with state regulations.

Annual water intake from a natural flood regime makes it difficult to efficiently manage a sport fishery. Typically, river overflows can provide a natural stocking of the fishery through fish immigration. Sport fish, carp, buffalo, and other fishes benefit from overflows. The LDWF does not recommend significant

expenditures on the lakes with such influences. However, Rainey Lake and the special use pond do not receive floodwaters from the river and merit some attention.

Rainey Lake is approximately 30 acres and is isolated from agricultural runoff and backwater flooding. Largemouth bass, bluegill, redear, crappie, and other species are present, but the carrying capacity of the lake is adversely affected by excessive aquatic vegetation. The use of triploid grass carp, a biological method of control, should be considered for the vegetation problems in Rainey Lake. The lake has natural barriers that would prevent fish emigration. The recommended stocking rate is four to five per vegetated acre. These fish are known to consume 40 to 300 percent of their body weight per day in plant material though feeding rates decrease with age to about 25 percent of body weight. Triploid grass carp should be 10 to 12 inches long at stocking to lessen bass predation. It can take several years to achieve weed control depending on stocking rate, plant types, and vegetation density. For maximum effectiveness, restocking may be required every five to seven years but is still substantially lower in cost compared to repeated chemical treatments.

Previously managed as a moist-soil unit, the special use pond is approximately 27 acres. It was constructed in 2000 and stocked in 2000 and 2001. However, the lake experienced a leak in 2003, and repair attempts were made that same year. Though it was speculated that the repairs failed, water levels have increased with rainfall and remained fairly stable this summer. Sometimes microbial activity and organic matter and fine sediment accumulation can seal leaks, and this perhaps is the case here. The LDWF staff does not recommend that this pond be abandoned or returned to a purely moist-soil management regime. Tensas River NWR already has approximately 1,200 acres of moist-soil unit management areas, and this pond contains ample shallow water shoreline areas and adjacent moist soil for bird usage under present conditions. The pond should continue to be monitored for seepage, and maintenance should be performed as necessary to ensure adequate water depths for sport fish.

An aspect of aquatic resource management where both wildlife and the public can benefit is the incorporation of crawfish production in a portion of the moist-soil management units. One of the areas visited in spring 2005 was inhabited by crawfish though the density did not appear high. If soil hardness is adequate and there are water supply and drainage structures, crawfish production is possible in moist-soil areas where water depths of 12 to 18 inches exist in portions of the units. Water regimes for both activities are quite similar (i.e., draw-down in early summer and refill in fall). Rice, sorghum, and other crops promote maximized crawfish yields, but voluntary, moist-soil vegetation can provide satisfactory results. Besides feeding on growing vegetation, crawfish consume aquatic invertebrates and detritus. The LDWF staff recommends the implementation of crawfish culture in approximately ten percent of the area managed for moist-soil vegetation provided that the above criteria of water manipulation, depth, and hardness exist.

Over the past 15 years, Tensas River NWR and LDWF staffs have discussed potential areas for lake construction of 50 to 100 acres. These may involve the installation of water control structures, movement of earth, and/or damming sloughs. The development of outdoor recreational opportunities is one of the listed objectives for Tensas River NWR. Thus, the construction of a lake would support this objective while also providing habitat for wildlife.

Past discussions with a former refuge manager and staff have highlighted areas on the refuge that would be conducive to lake construction. A lake of approximately 100 acres was discussed for the Cooper Tract though some earth moving would be involved. A lake of approximately 75 acres was discussed for the Hall's Bayou area by damming a slough, though again, earth moving would be required. Stutz Field was discussed as a potential site for a 20-acre lake. Of the three, the Hall's Bayou area has the best access that might rank it as the most desirable area to develop as a sport

fishery. Other areas discussed over the years were the Wilderness Field South (50-acre lake), Lake Nick (200-acre), and Ridge Lake (100-acre).

In light of the above, the following strategies for the fishery on Tensas River NWR are provided for inclusion in the biological review report and CCP.

Strategies:

- Seek approval from the LDWF for triploid grass carp usage to control aquatic vegetation in Rainey Lake.
- Maintain adequate water depths in Rainey Lake and the special-use pond for the benefit of sport fish populations.
- Monitor water seepage in the special-use pond and perform maintenance as necessary.
- Incorporate crawfish life cycle requirements, which mimic rice/moist-soil plant production water regime if it is determined as compatible.
- Provide at least 250 acres of new deep-water habitat not subject to backwater flooding.
- Conduct periodic electro-fishing surveys.
- Provide and maintain public access to existing and new lake.

Objective B.14 – Reptiles and Amphibians: Conduct a complete inventory of reptiles and amphibians, monitor populations, and protect priority species.

Discussion: As a wetland habitat, Tensas River NWR is important for reptiles and amphibians. Despite the dominance of these creatures on the landscape, little is known about their populations on the refuge. Surveys of breeding anurans have been conducted by U.S. Geological Survey (USGS), Lafayette, Louisiana (Lichhtenberg et al., 2004), but no comprehensive list of reptiles and amphibians has been created. In addition, because there is currently no monitoring of reptile and amphibian populations, their response to habitat management is unknown.

A complete survey of all habitats on the refuge is needed to determine baseline populations. Special effort should be taken to locate any species that are not initially detected but would be expected to inhabit the refuge based on range maps since their absence may signal problems with the habitat. Due to their susceptibility to environmental degradation and recent global population declines, amphibians are priority taxa to be monitored both to indicate environmental health and to protect their populations. With extensive historical and current use of pesticides known to be harmful to amphibians in the surrounding watershed, amphibians need to be monitored for health and deformities.

In addition to baseline population surveys, population monitoring should be conducted to determine reptile and amphibian response to habitat management. Timber management affects habitat components such as understory density, course woody debris, and standing snags that are important to many reptiles and amphibians. A comprehensive study of herpetofauna response to timber treatment modeled after noted biologist Dr. Twedt's research on refuge songbirds is needed to quantify habitat management impacts on reptile and amphibian populations.

Currently, timber harvest is used to open the forest canopy in order to allow sunlight to penetrate to the forest floor and encourage the growth of understory vegetation. It is suspected that such conditions will benefit reptile and amphibian populations. However, the most important reptile and amphibian habitats lie within streamside management zones and other aquatic transition zones currently protected from timber harvest. While timber harvest restrictions may be important in protecting waterbodies from erosion, habitat may suffer due to understory suppression. A

combination of selectively girdling trees to create standing snags and felling trees into water bodies to create turtle basking platforms and increase aquatic habitat structure may produce the desired effects of timber management. This would enhance habitat not only for reptiles and amphibians but also for all refuge resources. Further discussion and research is needed.

Many species of amphibians require breeding pools without fish to complete their lifecycle. The intentional stocking of predatory fish has been linked to global amphibian declines. Moist-soil impoundments provide excellent temporary ponds for breeding anurans, especially when located near a forest edge. To ensure their viability as breeding ponds, moist-soil impoundments should be allowed to dry out completely at least every 3 years. Game fish should not be stocked in potential breeding ponds unless the waterbody is specifically developed for public fishing opportunities.

Little is currently known about reptile and amphibian populations in the Tensas River. This habitat should support a different assemblage of species than are found in the surrounding bottomland hardwoods. The Tensas River is known to harbor alligator snapping turtles (*Macroclemys temminckii*) and may contain Ouachita map turtles (*Graptemys pseudogeographica ouachitensis*), both of which have been identified as a species of concern. A requirement of a Corps water project is continued maintenance of flood control measures, including removal of snags and standing timber from the Tensas River to improve drainage in Madison Parish. About 10 years ago, the Fifth Louisiana Levee District tried to force the affected parishes to follow through on that requirement. Madison Parish did not conduct any maintenance downstream from I-20. Ouachita map turtles and other turtles depend on snags for both basking platforms and habitat structure. This important habitat component should be protected to the fullest extent possible.

Alligators play an important role in the ecosystem at Tensas River NWR. As a top predator, they can contribute to limiting populations of problematic species such as beaver and raccoons in local situations. Populations will be evaluated for future management action including a possible recreational hunt.

Strategies:

- Institute a complete survey for reptiles and amphibians on Tensas River NWR.
- Institute a comprehensive study of herpetofauna response to timber treatment modeled after Dr. Twedt's research on refuge songbirds to quantify habitat management impacts on reptile and amphibian populations.
- Evaluate suitability of reforestation tracts for reptiles and amphibians.
- Moist-soil impoundments should be allowed to dry out completely at least every 3 years.
- Protect snags in the river from removal.
- Protect and monitor alligator snapping turtle and Ouachita map turtle populations on the refuge.

RESOURCE PROTECTION AND MANAGEMENT

Goal C: Work with private landowners, agencies, and other partners to restore hydrological regimes of the refuge, bottomland hardwood forests, and native wetlands, while protecting cultural resources to fulfill the refuge purposes.

Discussion: The Tensas River NWR is a part of a larger system of federal refuges (D'Arbonne, Upper Ouachita, Black Bayou Lake, Handy Brake, and Tensas River) and state wildlife management areas in north Louisiana that are focused on conservation, enhancement, and restoration of bottomland

hardwoods. Together with a number of properties under easement/contract through the Wetland Reserve Program (WRP), Conservation Reserve Program (CRP), and other reforestation activities, the refuge is part of a 125,000-acre block of bottomland hardwood forest. There are only five or six other forest blocks exceeding 100,000 acres in the MAV. This makes this area an important and somewhat unique area, particularly for forest breeding birds and other species requiring large forest blocks to meet their habitat needs. Protecting this unique resource is a vital function of refuge management.

Objective C.1 – Fluvial Geomorphology and Sediment Control: During the next 15 years, enhance and improve quality of Tensas River and all tributaries on refuge lands by minimizing turbidity and suspended solids in water bodies, and improve aquatic habitat.

Discussion: The Tensas River has an approximate drainage area of 309 mi^2 at the USGS gaging station near Tendal. The river can vary substantially in discharge with monthly averages ranging from 10 to over 2,000 ft^3/s. Average monthly flows tend to be at their lowest in August and September with higher flows occurring during the winter months.

The Tensas River is thought to be one of several remnant channels of the Mississippi River (Saucier 1994). This theory is supported by the fact that the meander belt width is much larger than would be expected for a river with its current discharge. The decreased discharge associated with the changed course of the Mississippi River suggests that the Tensas River has been slowly aggrading over time. Whether the stream had reached stable dimensions prior to deforestation in the region is not known and is beyond the scope of this document, but the fact that smaller meanders have not yet developed suggest that some natural aggradation may still be occurring. This is further supported by the lack of symptoms associated with normal channel migration or degradation, including mass wasting or hydraulic erosion of stream banks, exposed fine roots of trees, and development of mid-channel bars among others.

The Tensas River Basin has undergone substantial anthropogenic changes in the last century. Logging and conversion of land to agriculture increases the velocity and volume of water that reaches the river via tributaries. This water arrives with more sediments than normal, thereby increasing turbidity and total suspended solids (TSS) present in the water. Implementing strategies one through five under Objective A will serve to maximize the refuge's contribution to clean water in the Tensas River by addressing several significant head-cuts. It should be noted that on at least one occasion, a dam was constructed to address a head-cut. This drowned the eroding channel and created a pond for use by the fishing public. This has proven to be a viable solution, but the benefits of creating a fishing pond must be weighed against the cost of reservoir maintenance and reduced forest habitat, which is the reason for establishment of the refuge. From a technical aspect, if this approach is chosen, the engineers and construction foremen must be certain that the dam rises to the point where stream slope is low enough to avoid a head-cut beginning upstream of the reservoir.

Beavers are an important part of the ecological systems where they reside. The low, semi-permanent dams they create help slow water velocities, capture sediment, create pool habitat for fish and migratory birds, and increase habitat complexity. Beavers also stress and kill trees by girdling and drastically changing the hydroperiod, resulting in habitat for insects fed upon by ivory-billed woodpeckers. Removing beaver dams has been shown to increase stream erosion; reduce fish species, abundance, and average size; and reduce habitat value. On this refuge, native predators of the beaver have been eradicated or greatly reduced in number. Refuge staff has noted large beaver populations and dams that threaten to flood areas of timber having relatively low flood tolerance. This could have the effect of reducing the amount of forest due to rapid hydroperiod changes and flood kills in the affected area, or, as a minimum, driving species composition toward more flood-tolerant species. Population targets for beaver should be established, thereby helping determine the number of beavers that need to be removed.

Strategies:

- Stop head cutting (rapid erosion) of all tributaries on refuge lands to avoid increased siltation by following established best management practices for logging.
- Allow natural processes such as beaver dams to remain in place when practicable.
- Document the location of all culverts and water control structures on the refuge, especially those repeatedly dammed by beavers.
- Where water control structures are not necessary, replace them with rock-lined fords to maintain vehicular access, discourage dam construction by beavers, and reduce blockage of structures by debris, thereby facilitating drainage.
- Working with Natural Resources Conservation Service (NRCS) and/or the regional refuge ecologist, design and install erosion control structures in actively eroding tributaries on refuge property.
- Identify, assess, and treat areas prone to erosion prior to the development of significant channel incision, especially on recent acquisitions of previously converted farmlands.
- As appropriate, within the context of the refuge's reforestation plans, plant fast-growing, native, and flood-tolerant shrub and tree species such as common buttonbush, black willow, and red maple in the riparian corridor of previously converted farmlands and other areas prone to erosion to aid in soil stabilization.
- As appropriate within the context of the refuge's Forest Habitat Management Plan, minimize patch cuts within 100 m of any body of water, and require contractors to follow established best management practices.
- Work with NRCS and Partners for Fish and Wildlife Program biologists to establish acreage objectives for riparian zone buffers along Tensas River tributaries upstream of the refuge.
- Develop beaver population objectives on refuge lands and, as appropriate within the context of the refuge's reforestation and Forest Habitat Management Plans, allow beavers to build dams on the refuge, especially in previously converted farmlands prone to erosion where reforestation efforts are not yet underway.

Objective C.2 – Aquatic Habitat Diversity: During the life of this CCP, increase native habitat complexity in the Tensas River by increasing the volume of large woody debris in and along the stream.

Discussion: According to refuge staff, the Tensas River has been dredged one or more times to speed runoff of floodwaters and improve navigation. This channelization simplifies aquatic habitat by reducing the variability of velocities through the channel. Refuge staff also indicated that trees have been removed from the river channel to aid in navigation.

Wood is a critical structural component in low-gradient streams like the Tensas River. Trees, which are recruited into the river due to senescence or normal stream migration, provide the only structures that change flow patterns. When a tree falls into the river, water can be diverted over, under, and around it. Localized higher velocities increase turbulence and aeration, thereby raising levels of dissolved oxygen. Higher velocities also cause scouring that creates pools, while localized low velocities provide sediment depositional areas. Low velocity areas can act as refuge for fish during flood events, and the larger grained sediment that forms the bottoms of pools acts as spawning habitat. One study of wood in low gradient streams showed that the wood occupied only 2 percent of the stream volume but provided more than half of the flow resistance (Manga and Kirchner 2000). Other studies have shown that removing wood from streams decreases channel sinuosity; increases bank erosion; increases turbidity and TSS; and reduces the number of fish found in the stream reach (Gregory, Boyer, and Gurnell 2003). Increased sediment and lack of wood in streams leads to other problems, including increased water temperature, reduced dissolved oxygen, and reduced quality of

habitat for fishes, mussels, and macroinvertebrates. Clearly wood is an important component of the Tensas River and managing for it can improve the aquatic habitat for Service trust resources, even if the river itself is not refuge property.

Strategies:

- Discourage removal of wood from streams on the refuge by the Louisiana Levee District, which is part of the Corps of Engineers.
- Discourage dredging of streams on the refuge by the Louisiana Levee District.
- In coordination with the State of Louisiana Department of Natural Resources (DNR) and the regional refuge ecologist, introduce large wood in strategic locations to improve cover; increase hydraulic complexity and habitat diversity; and decrease turbidity and TSS.

Objective C.3 – Water Quality and Contaminants: Establish and implement contaminant-monitoring protocols in partnership with others to monitor and evaluate contaminant issues that could affect the refuge and the fish and wildlife resources that it supports.

Discussion: The aquatic habitats of the Tensas River Basin have been heavily impacted by sediment and agri-chemical runoff due to intense drainage, extensive clearing of bottomland hardwoods, and agricultural production. Contaminant surveys in the Tensas River Basin have documented elevated levels of organochlorine pesticides, particularly DDT and toxaphene, in fishes and sediments. Those pesticides were used in soybean and cotton farming throughout the basin from the 1940s to the 1970s. DDT and toxaphene have been consistently present in fishes collected from mainstem and backwater areas, including the Tensas River NWR.

DDT possesses known carcinogenic, teratogenic, xenotoxic, and mutagenic properties and is very persistent in the environment (McCabe and Sandretto 1985). DDT acts as a synthetic estrogen, binding to and activating estrogen receptors (McLachlan et al., 1992; Colburn and Clement 1992). Pesticides that function as endocrine system disrupters, such as DDT and toxaphene, cause thyroid dysfunction in birds and fishes; reduced fertility in vertebrates; decreased hatching and birth defects in turtles, birds, and mammals; metabolic abnormalities and male emasculation/feminization in fishes, birds, and mammals; and defeminization/masculinization in female fishes and birds (Colburn and Cement 1992).

A potential point source that may be contributing to the elevated levels of toxaphene and DDT in the Tensas River is the East Carroll Parish Prison Farm, located adjacent to the headwaters of the Tensas River. Beginning in July 1984, highly contaminated soils (ranging up to 3,930 ppm toxaphene and 4,560 ppm DDT) were excavated from Byerley Airport and the adjacent recreation area and hauled to the East Carroll Prison Farm (Gambrell and Patrick 1985). Once at the East Carroll Prison Farm, the contaminated soils were disked three times to a depth of 20 cm. Anecdotal information indicates that the area south of the East Carroll Prison Farm was used as a solid waste landfill for disposal of empty/used agricultural pesticide containers.

Runoff from upstream landowners not only contains contaminates but also contributes to siltation of the Tensas River, its tributaries, and other bodies of water. Implementation of agricultural best management practices and precision farming techniques in the Tensas River Basin could help reduce siltation, nutrient, and pesticide loading. Surrounding upstream landowners and farmers should be encouraged to use filter strips to limit agricultural runoff. The refuge needs to protect against erosion and siltation caused by its own management practices. The recent reforestation efforts, both on and off

the refuge, will help improve water quality, especially in tributaries like Lick Bayou, but cooperation from upstream farms and landowners will be essential if the Tensas River is to one day run clear again.

Strategies:

- Work with the contaminants personnel at the Ecological Services Field Office in Lafayette, Louisiana, the Louisiana Department of Environmental Quality (LDEQ), and the U.S. Environmental Protection Agency (EPA) to establish and implement sampling protocols to determine baseline and perform periodic soil, tissue, and water quality contamination monitoring.
- Work with the Service's private lands biologists, LDEQ, and NRCS to develop incentives for local farmers and landowners to encourage the use of filter strips to limit agricultural runoff.
- Work with EPA to identify and quantify the refuge's current contribution to the Total Maximum Daily Loads (TMDLs) established for the Tensas River and tributaries.
- Working with EPA, DNR, USGS, and other partners, conduct surveys every 5 years or as appropriate to document status and trends of Service aquatic resources as well as physical water quality parameters.
- Working with the LDWF and other partners, establish population objectives for fishes and mussels in the Tensas River and tributaries.

Objective C.4 – Oil and Gas Program: Develop working relationships with oil and gas operators to establish best management practices. Working within applicable state and federal laws and Service policies and regulations, provide access to minerals (e.g., oil and gas) with minimal impacts to the refuge or associated fish and wildlife resources.

Discussion: Most of the oil and gas exploration on Tensas River NWR occurred prior to its inception in 1983. Currently, only 7 of the original 96 wells drilled are in production. Most (82) of the wells that were drilled have been properly plugged and abandoned. Twenty-eight of these were productive wells that were properly dismantled after their oil reserves were exhausted, and 54 were dry holes (determined not productive at time of drilling). Four of the remaining wells are listed in the "shut-in" status. A shut-in well is not producing and either has mechanical problems down hole or is not economically feasible to produce hydrocarbons. Most of the shut-in wells on Tensas River NWR have been shut-in for many years. Shut-in wells can be a problem because wells that have received no attention after long periods of time can become potential environmental threats. Pressure can build up down hole, and if not released, the pressure can cause blowouts. These blowouts can have major negative environmental implications because production, which includes hydrocarbons and highly saline produced water, can be released into the surrounding environment. Two additional wells are actively used for saltwater disposal. Well No. 183567, formerly operated by D. G. Hamilton, has been abandoned and is listed by the State of Louisiana as orphaned. An additional 5 wells were permitted but never drilled.

Tensas River NWR currently has one transmission pipeline owned by Ashland Pipeline Company. The transmission line crosses approximately two miles of refuge land and moves products off the refuge. The refuge also has 12 flow lines that transport products from wells to production facilities across approximately 10 miles of refuge land.

As the surface owner, Tensas River NWR has the right to require any old, out-of-use equipment and wells that are not in production to be removed, so that sites can be returned to wildlife habitat and the threat of environmental contamination minimized. The refuge should actively pursue the removal and cleanup of these sites to prevent current (if any) and future environmental contamination from these activities.

Tensas River NWR should require all spills of any quantity be reported to the refuge, so proper cleanup can be accomplished. It is imperative that documentation of any release onto refuge property be maintained in case it is relevant in the future. In some cases, once a mineral lessee is aware of a landowner's concerns, problems will be addressed. In other cases, it may take persistence and perseverance to have the refuge's surface returned back to use as habitat. Good communication that occurs often with the current mineral lessee is the key to working toward site restoration.

Strategies:

- Allocate the staff time necessary to coordinate new activities and cleanup.
- Identify wells that need to be plugged and abandoned, remnant equipment that needs to be removed, and possible related contamination issues. Communicate these needs to the responsible oil and gas company.
- Develop a database to track the well status and pipeline locations along with current ownership and enter well locations into the Refuge Lands Geographic Information System (RLGIS).
- Work with partners (ES, State, and Regional Office) to develop an oil spill response plan.
- Sponsor a workshop with partners to inform refuge personnel on legal and technical issues related to oil and gas production. Include a contaminants expert to discuss the effects of oil on habitats and wildlife, how clean up occurs, how long it takes for the habitat to recover, etc.

Objective C.5 – Cultural and Historical Archaeological Resources: Within 15 years of the date of this CCP, the refuge will develop and begin to implement a Cultural Resources Management Plan (CRMP).

Discussion: Protecting the cultural and archaeological heritage of an area is important whether such resources are located in or out of the boundary of a refuge. Cultural surveys are necessary to protect such resources. If any such resources are found on the refuge, they will be protected.

Strategy:

- Until such time as the CRMP is completed and implemented, the refuge would follow standard Service protocol and procedures in conducting cultural resource surveys by qualified professionals, in consultation with the Regional Historic Preservation Office (RHPO) and the State Historic Preservation Office (SHPO), prior to commencing projects that entail extensive excavation.

Objective C.6 – Private Lands: Continue working with private landowners and other partners (e.g., NRCS) to develop and deliver programs that compliment the purpose of the refuge.

Discussion: Most of the land in the MAV is privately owned. Thus, private lands must play an important role in the restoration and maintenance of native biodiversity in order to achieve the goals and objectives of national and regional plans, such as the NAWMP and Partners in Flight: Mississippi River Alluvial Valley Bird Conservation Plan. In an effort to address those objectives, the Service established a private lands program known as Partners for Fish and Wildlife (PFW). Through this program, the Service provides technical assistance and delivers financial assistance programs to private landowners. The Migratory Bird Field Office, co-located at Tensas River NWR, is responsible for providing technical assistance through the PFW Program in northeast Louisiana.

The Regional PFW Program limits landowners to $25,000 of financial assistance per year. In the MAV, most projects involve the restoration of hydrology and hardwood reforestation. Vegetation on up to 30 percent of the area can be manipulated to maintain successional stages other than what would be expected to come in naturally. For example, up to 30 percent of the area could be managed for moist-soil management. The program favors projects located adjacent to refuges, in priority bear zones, and within Forest Bird Conservation Areas.

The Louisiana Waterfowl Project is a partnership with other conservation organizations to provide water control structures to private landowners who traditionally will flood harvested cropland and moist-soil areas in the winter period (November 15 through February 28). The program provides significant benefits for wintering waterfowl and water quality.

Other agencies, particularly the USDA agencies such as the Farm Services Agency and Natural Resources Conservation Service, have large programs that will restore wetland habitats in the MAV. The NRCS administers the Wetland Reserve Program (WRP), which is a popular program that restores croplands to wetlands by restoring hydrology and reforestation and protects these areas through the acquisition of 30-year and perpetual easements. There are over 200,000 acres of WRP easements in Louisiana. A significant amount of this acreage is manageable water for waterfowl. The Service plays an important role in developing ranking criteria, evaluating sites, and working with private landowners to manage and maximize wetland values.

The Farm Service Agency administers the Conservation Reserve Program (CRP), which provides 50 percent cost share to reforest wetland and highly erosive sites in the MAV. The program is competitive and qualifying lands are placed under a 15-year contract. Various other programs are also available.

One of the highest priority recommendations from the biological review was the proposed Tensas/Big Lake Forest Core WRP Special Project Initiative developed and promoted by the Migratory Bird Field Office in Jackson, Mississippi, and the Natural Resources Conservation Service's district conservationist for Madison Parish, Louisiana. The area is in excess of 125,000 acres and includes Tensas River NWR (65,000 acres); Big Lake Wildlife Management Area (20,000 acres); numerous tracts restored and/or protected through the WRP and CRP; and other agricultural lands. There is within this large complex of habitats a 21,000-acre area generally dominated by agriculture that lies between the two units of Tensas River NWR and serves to fragment the area into two forest blocks. The southern half of this agricultural block is locally known as Hunter's Bend. About 3,000 acres within Hunter's Bend is being proposed for inclusion in this special project (Figure 8). About 7,500 acres in the Hunter's Bend area either were already forested or are being reforested through WRP and CRP. The remaining 11,000 acres of agricultural land immediately north of the proposed WRP Special Project area are being acquired from Chicago Mill and restored to forested wetlands for carbon sequestration through an agreement between The Trust for Public Lands (TPL), Entergy, and the Service (Figure 8). The carbon project is in its third year of restoration work. Due to infrastructure impacts and unusual repair costs associated with Hurricane Katrina, Entergy, Inc., the original project funding partner, has fallen behind in their support of the project. TPL remains committed to the project and is working to find other partners.

Completion of the carbon project and the proposed WRP special project would contribute significantly to solving several ecological problems. These include defragmenting a large forested area; restoring the ecological integrity of the area; providing continuous forest cover along both banks of nearly 50 miles of the Tensas River; and developing a 125,000-acre block of forested wetlands important to a suite of forest breeding landbirds of highest conservation priority. The ivory-billed woodpecker and American swallow-tailed kite both require large, contiguous forested blocks to support viable

populations. A number of other high-priority birds of continental conservation concern that require large, contiguous blocks (more than 10,000 acres) of forested wetlands to reduce nest predation and parasitism and provide habitat necessary to support viable breeding populations will also benefit significantly from reduced fragmentation of this forest complex. These species include Bachman's warbler (*Vermivora bachmanii*), cerulean warbler (*Dendroica cerulea*), prothonotary warbler (*Prothonotaria citrea*), and Swainson's warbler (*Limnothlypis swainsonii*). The threatened Louisiana black bear would also benefit from the expansion of natural habitat in the area as its population continues to expand. Significant positive benefits to water quality in the Tensas River are expected.

Competition for private landowners to get into the USDA's WRP is increasing as a result of the failing farm economy and the increasing value of restored wetlands for recreational purposes. The Service, working with NRCS and private landowners, became aware that some of the landowners within the proposed special project area applied or were interested in applying to the WRP. Relatively small tract landowners own much of the area with potential hydrologic restoration extending across property boundaries. Because of this limitation and other factors, some of the individual tracts on these farms are not scoring high enough for those landowners to get their intentions accepted into the program.

Consequently, the best probability for ensuring the restoration and protection of a block of land in this area is through a special project. In the winter of 2005-06, the Service's private lands biologists, and representatives from the Madison Parish Soil and Water Conservation District, The Nature Conservancy, The Trust for Public Lands, and the Louisiana Black Bear Conservation Committee coordinated with the Madison Parish's district conservationist in identifying a 3,000-acre special WRP project area. Nearly all 3,000 acres were enrolled and accepted in the program (pending appraisals, etc.) during the 2006 sign-up period.

Strategies:

- Work through a variety of programs to provide technical and financial assistance necessary to promote corridors and core habitat for the threatened Louisiana black bear and to provide additional migratory bird habitat to benefit refuge and regional objectives.
- Work with the NRCS, FSA, private landowners, and other partners to designate conservation priority areas to provide additional incentives that will encourage landowners to implement practices that will benefit trust resources (e.g., Louisiana black bear and migratory birds), refuge purposes, and MAV ecosystem goals.
- Specifically, work with partners to develop a special WRP project area in the Hunter's Bend area of the refuge to increase the forest block size and improve water quality in the area of Tensas River NWR.

Objective C.7 – Land Acquisition: Work with willing sellers to acquire privately owned lands within the established acquisition boundary of the refuge.

Discussion: Land acquisition efforts are intended to contribute to the goals of the NAWMP and LMVJV. Privately owned lands within the acquisition boundary of Tensas River NWR will be targeted for acquisition for incorporation into the Refuge System. Sources of federal funds for land acquisition include the Migratory Bird Conservation Fund, the Land and Water Conservation Fund, and the Inholding and Emergency Fund. Additional assistance will be sought through partnerships with non-governmental organizations, such as The Trust for Public Land, The Nature Conservancy, and The Conservation Fund, and through partnerships with private companies involved in carbon sequestration.

The current refuge acquisition boundary encompasses 95,725 acres. To date, the Service has acquired 74,622 acres (this includes 195 acres of easements). The remaining 21,103 acres includes scattered medium to large ownerships (1,000s of acres) and numerous smaller ownerships, ranging in size from a few acres to several hundred acres. These inholdings are distributed throughout the refuge. Acquisition of these remaining inholding properties will provide significant biological benefits by increasing the size and continuity of refuge lands; and, will greatly facilitate refuge management by incorporating these properties into surrounding contiguous blocks of refuge lands. Currently, a multi-year project is underway which combines federal, non-governmental organizations, and corporate funding to acquire approximately 11,000 acres through a carbon sequestration partnership. Through this partnership, the lands were acquired by The Trust for Public Land over a 3-year period from 2004 through 2006. Portions of the property were then reforested under the direction of the Service with funding from corporate partners, then conveyed to the Service for incorporation into the refuge. To date, 8,225 of the 11,000 acres have been acquired, reforested, and conveyed to the Service. The remainder is expected to be reforested and conveyed to the Service in the next 1 to 2 years. This carbon sequestration project, and others such as the GoZero program administered by The Conservation Fund, can serve as models for future land acquisition partnerships as opportunities arise in the future.

Strategy:

- Work with willing sellers and partners where appropriate to acquire privately owned in-holding properties for addition to refuge.

Objective C.8 – Law Enforcement: Enhance the refuge Law Enforcement Program to provide sufficient resource protection and visitor safety.

Discussion: Protecting the natural resources of the refuge and ensuring the safety of refuge visitors are fundamental responsibilities of the Refuge System. As crime continues to increase in rural America, the refuges face a larger and more complicated enforcement problem. In addition to more than 10,000 natural resource violations, many other serious crimes are occurring on America's refuges each year.

Strategies:

- Provide up-to-date training and equipment to all full-time and dual function officers.
- Develop memorandums of understanding with state and parish law enforcement agencies to facilitate cooperation and assistance in law enforcement activities.
- Provide education and outreach programs in the local community as part of a preventive law enforcement effort.

VISITOR SERVICES

Goal D: Develop and implement a quality, compatible wildlife-dependent public use program that leads to a greater understanding and appreciation of the natural resources found in the Tensas River Basin.

Objective D.1 General Public Use Program: Develop a Visitor Services Plan that will set goals, determine measurable objectives, identify strategies, and establish evaluation criteria for all visitor services.

Discussion: The Improvement Act recognizes wildlife-dependent recreation as a legitimate use of refuges. Priority public uses including hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation are to receive enhanced consideration over other uses in planning and management. The Improvement Act also clearly states that these uses are to only be allowed if they are determined to not materially interfere with or detract from the fulfillment of the mission of the Refuge System or purposes of the refuge (i.e., must be compatible). Wildlife needs must come first and will override public use activities. Therefore, it is important on Tensas River NWR that any allowable public uses do not impact the sanctuary and non-disturbance requirements of migratory birds (e.g., foraging, roosting, nesting, pairing, molting, and rookeries), endangered species, and other wildlife.

Strategy:

- Develop an up-to-date Visitor Services' Plan that reflects current legislation, director's orders, initiatives, policy, and the mission of the refuge, the Refuge System, and the Service.

Objective D.2 – Welcome and Visitor Orientation: Provide visitors with clear information, so they can easily determine where they can go, what they can do, and how to safely and ethically engage in recreational and educational activities.

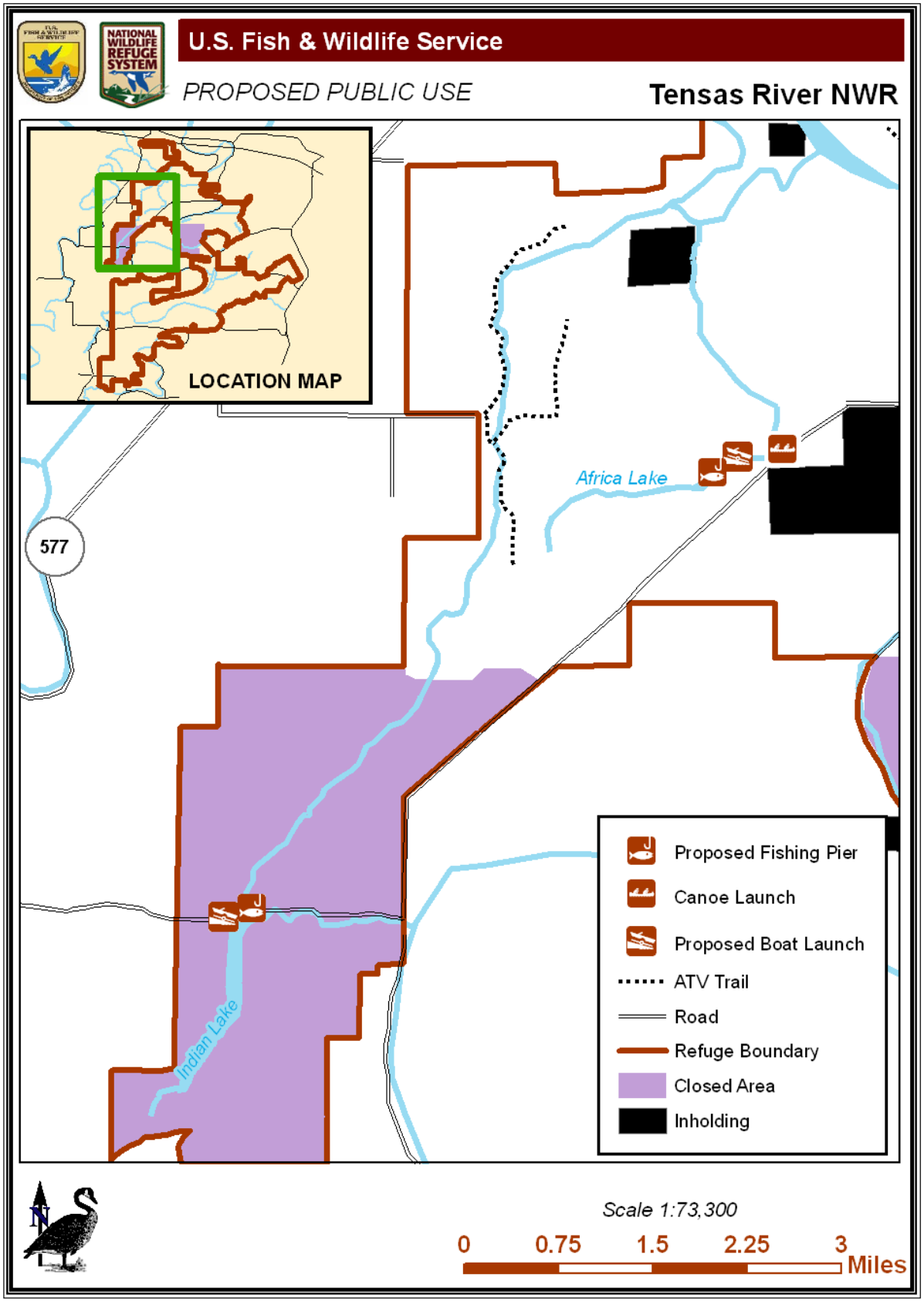
Discussion: Careful planning provides the visiting public with opportunities to enjoy and appreciate fish, wildlife, plants, and other resources. Clear directions to the refuge, ready access to refuge information, and courteous treatment of visitors will all add to public enjoyment of their refuge experience (Figure 8).

Strategies:

- Facilities will be clean, well-maintained, and accessible. We will treat visitors with courtesy and in a professional manner.
- Provide well-maintained entrance sign at each major entry point onto the refuge. Provide signs on I-20 directing visitors to the refuge. Explore possible I-20 offramp for refuge access.
- Work with Madison Parish to Improve Hunter's Bend Road.
- Provide kiosks at all entry points and have one standard panel kiosk with basic information such as You Are Here Map, Permit Required for All Visitors, and brochure box with permits.
- Revise the Public Use Regulations Brochure to address all uses. It currently looks like a hunting and fishing brochure, which can cause confusion to visitors.
- Update the audiovisual program for the refuge.
- Develop a consistent way of letting visitors know when the roads are impassable until the visitors have driven all the way out to the refuge.
- Work with Madison Parish to allow the refuge to pave Quebec Road for better access.

Objective D.3 – Hunting Opportunities: Conduct a quality hunting program in a safe and cost-effective manner, and to the extent practicable, carried out in accordance with state regulations.

Figure 8. Proposed visitor services on Tensas River NWR



Discussion: Of the 82,000 annual visits to Tensas River NWR, approximately 90 percent of them are to hunt. Of the 74,622 acres on the refuge, all but 2,600 are open to some form of hunting. Hunting activities allowed on the refuge include deer-archery, deer-youth, deer-modern firearms, deer primitive weapon, turkey, squirrel and rabbit, raccoon, woodcock and snipe, ducks and coots, and incidental species, including coyote, beaver, raccoon, skunk, and opossum.

The deer-modern firearms hunt is a quota hunt. Hunters must send in an application for one of the two hunts and if selected purchase a $12.50 permit. In recent years, the number of applications has dropped from highs of over 10,000 to less than 4,000. One reason for this drop in applications may be because the habitat on the refuge is changing.

For the modern firearm and primitive weapon hunts, the refuge runs deer check stations staffed by refuge personnel and volunteers to collect biological data. For all hunts, the hunter is required to report harvest information to a manned check station or as specified at a self-clearing check station at main exit points.

For the special youth lottery deer hunt, the refuge provides stands and guides for the youth. Hunters under 16 years of age must possess proof of completion of an approved Hunter Safety Course and be accompanied at all times by an adult 21 years of age or older.

All-terrain vehicles (ATVs) are allowed on designated trails during hunting season. An ATV user permit is required, and the permit must be permanently affixed to the ATVs used on the refuge. The permit may be purchased at the visitor center or by mail for $10.

The refuge does have several trails for ATV use by hunters with disabilities. Hunters with disabilities must have a Physically Challenged Hunter Program Permit issued by LDWF or be 60 years of age or older to operate an ATV on one of these specially designated trails. Currently, in the way the regulations are stated, there is no accommodation for hunters with disabilities once they ride the ATV down the trail. The regulations state “Hunting within 150 feet of any public road, designated refuge road, or trails….is prohibited.” The team discussed the need to have a plan in place to accommodate hunters with disabilities that will allow them to legally get to an appropriate hunting spot.

The refuge does allow night hunts for raccoons. Horses and mules are allowed during this hunt. The refuge also issues special use permits to coon dog field trials. These are currently allowed at times other than the regular raccoon season.

All visitors to the refuge (including hunters and people fishing) are required to have a signed Public Use Regulations brochure with them. These are available at the main entry points.

Strategies:

- Evaluate the need for continued check stations/bag limit cards. Consider eliminating one or both if they are not providing needed information.
- Put the Game Check Card and Recreation Brochure in standard brochure box and then have a locked drop box for hunters to put the completed Game Check Cards into.
- Continue to support youth hunts.
- The need for a continued quota hunt will be evaluated but is currently necessary for public safety and use as a management tool.
- Continue to work with various user groups to develop accessible opportunties for a quality hunt.
- Consider opening a recreational alligator hunt.

- Establish youth hunt on refuge as appropriate and feasible.
- Evaluate and improve survey methodologies to achieve better compliance and gather usable information from the hunting public.

Objective D.4 – Fishing Opportunities: Conduct a quality fishing program in a safe and cost-effective manner that is carried out in accordance with state regulations.

Discussion: In the opinion of the Biological Review Team, fishing opportunities are somewhat limited at Tensas River NWR. Few locations on the refuge provided quality fishing destinations, and water quality and pesticides could be an issue. There may be better opportunities for fishing in the surrounding area. As a result, the refuge has made the appropriate decision not to develop an extensive fishing program.

Fishing regulations are printed in the Refuge Public Use Regulations. State creel limits and regulations apply. A special use permit is required for commercial fishing and trot-lines must be attended once each day.

The refuge has capitalized on some of the better fishing sites in developing fishing facilities to support this priority activity. They have developed a fishing pier on Rainey Lake and have one developed boat launch at Ben Lily Bridge that provides access to the Tensas River.

The refuge provides several special fishing events annually for senior citizens, youth groups, and individuals with disabilities.

Strategies:

- Evaluate the quality of fishing on the refuge and determine how much emphasis to put on developing additional fishing opportunities.
- Use existing fishing opportunities, and do not put resources into developing additional lakes, ponds, or borrow pits for fishing.
- In Rainy Lake, control vegetation around the fishing pier.
- In Africa Lake, put in boat launch at new site with a possible fishing pier.
- In Indian Lake, put boat launch and possibly a fishing pier at the campsite on Spur 577 on the east side of Indian Lake.
- In Cooper Tract, evaluate bank fishing opportunity at existing pond.

Objective D.5 – Wildlife Observation and Wildlife Photography Opportunities: Promote wildlife observation and wildlife photography, when compatible, to visitors of all ages and abilities.

Discussion: The refuge does have an auto tour route starting within sight of the office/visitor center. The tour route goes by Rainey Lake and is marked with directional signs, but there are no interpretive signs other than one stating that an area had been re-forested in 1987. Wildlife is skittish when vehicles drive by as there is little cover or screening from the road. It does offer a representative sample of the refuge's habitats. The road is wide enough for vehicles to safely pass.

There are two observation towers accessible by the Hollow Cypress Trail (boardwalk) behind the visitor center. One is handicapped accessible and the other is not. The taller one – not handicapped accessible – has a handicapped accessible binocular telescope and a tall mounted binocular telescope. Both have interpretive panels mounted off the sides. Both look out onto the wildlife drive area and Rainey Lake. The boardwalk leading to these overlooks does have a few interpretive signs

in Plexiglas covered frames mounted on posts. One more overlook is located off the Rainey Lake walking trail called the Cypress Overlook. A fishing pier also along the Rainey Lake Trail offers a great view of the lake. The Rainey Lake Trail does have several signs both interpretive (a few interpretive signs in Plexiglas covered frames mounted on posts) and directional with distances noted. There is no trailhead sign, total mileage sign, or map of the trail.

All the refuge brochures that are available comply with the Service Graphics Standards. There is a current bird list updated in 2005. A general brochure and "Public Use Regulations" brochure are available at the visitor center. The "Public Use Regulations" brochure is a required permit for all refuge uses and is available at most entrances and all game-check-in stations. Even though the universal symbols on the cover are only for hunting and fishing, this brochure also contains the refuge map and all public use regulations. Hiking areas, wildlife viewing areas, and photographic opportunities are not designated on the map or mentioned in the required brochure.

The visitor center has exhibits that are relevant and good quality, but some of the content is dated. They have just been cleaned. The video the refuge currently uses is not a video made for visitor center viewing but is an informative video of how the refuge was established.

The refuge holds a National Hunting and Fishing Day event where they draw for their quota youth hunts. Exhibitors, music, bb shooting contests, clay pigeon shooting, casting contest, and food bring in over 2,000 visitors annually.

The refuge has plantings and food plots they call "wildlife viewing areas," but they are not marked or signed as such. Some do offer the possibility of wildlife viewing from the roads or trails. Conflicts between wildlife and the public could become an issue with increased visitation/road traffic and some of the food plots along the roads.

Strategies:

- Place trailhead kiosk at beginning of all trails with information such as map of trail, trail conditions, what to see, safety information, and length of trail.
- Place temporary signs at trail entrances to alert hikers when hunting is taking place.
- Replace End of Trail signs with No ATV Beyond This Point.
- On Greenlea Wildlife Drive, place one-way signs where the road becomes one way.
- On Rainey Lake Trail, develop a trailhead kiosk with basic information for both entrances.
- Around Rainey Lake Observatory place information sign on the boardwalk about "quiet area" and the importance of staying quiet for the benefit of the birds.
- Conduct plantings in front of Hollow Cypress Trail Observation Tower to bring wildlife closer to the tower.
- Develop canoeing opportunities on the river and partner with canoe clubs to keep it clean and maintained.

Objective D.6 – Environmental Education: Coordinate Environmental Education program with federal and state education standards, emphasizing public awareness of wildlife issues and concerns on and off refuge lands.

Discussion: Education programs have been handled on a case-by-case basis, developing a program to fit the needs of the school. Refuge staff have developed and now lead school tours. These tours number about eight programs each year and include trail walks, wildlife viewing tours, time in the visitor center, and some specialized activities.

The refuge also had a program involving high school students called Instructor Core. This was a cascade mentoring style program that taught students to teach other students. This program was eliminated due to staff time limitations.

One area teacher is also a volunteer and does some innovative activities including water quality testing and amphibian studies.

Strategies:

- Work with schools to develop an in-service to provide training for local teachers.
- Continue to be involved in Boy Scout Venturing Crew, 4-H, school groups, wild woods, church, and civic organizations.
- Contact LDEQ about partnering on a water-monitoring program with one of the local schools.
- Contract or partner with local teacher(s) to develop a revised instructor corps program.

Objective D.7 – Environmental Interpretation: Develop interpretive displays and standard talks on interpretive themes such as: reforestation, black bears, forest management, and bottomland hardwood forests.

Discussion: The focus of the current interpretive program is the visitor center. This facility is 16 years old. The exhibits explain the management of the refuge in one area and the history in another and the bulk of the exhibitory is mounted specimens in diorama cases. The visitor center has adequate parking although the lot and sidewalks are slated for maintenance. There is a roofed kiosk in the parking area that is also planned to be replaced.

Near the visitor center is a driving tour and two short walking trails that make up the majority of interpretation on the refuge. The Rainey Lake Trail has a few wayside signs on it, a blind that is in need of repair, a fishing pier, and an overlook. The Hollow Cypress Trail and Overlook offers a vantage of the wildlife viewing area and has a few interpretive panels and scopes on the overlook.

Most activities in these areas are self-guided.

Strategies:

- Provide interpretive information in such places as pullouts along the wildlife drive, the visitor center, and observation platforms/piers/blinds.
- Provide new environmental education sites such as an outdoor classroom.
- Create self-interpreted brochures that coincide with various refuge trails, boardwalks, and drives.
- Update interpretive panels along all refuge trails, boardwalks, and drives.

Objective D.8 – Public Outreach: Ensure public is aware of refuge existence and strategies such as living with black bears, forest management, and management programs associated with all wildlife species.

Discussion: Effective outreach depends on open and continuing communication between the refuge staff and the public. This communication involves determining and understanding the issues, identifying audiences, crafting messages, selecting the most effective delivery techniques, and evaluating effectiveness. Achieved results will further the mission of the Refuge System and

purpose(s) of the refuge. The target audiences include Tensas, Madison, and Richland Parishes, as well as surrounding parishes throughout Louisiana.

The refuge staff currently conducts programs off-site to local organizations, including the Lions and Elks clubs, upon request, which usually are five or six per year. Outside of news releases for the up-coming hunting and fishing seasons or for the National Hunting and Fishing event, held the fourth weekend in September, there is not any outreach through the media. A weekly column was submitted to the local paper in Tallulah when there was a visitor services specialist on the staff.

The refuge staff does not participate in any local or surrounding area events in an outreach capacity. The refuge is not a member of any local Chambers of Commerce.

Strategies:

- Develop/maintain contacts at media outlets.
- Develop email or fax list of media contacts.
- Select some key events (opening of hunting, Hunt/Fishing Day, etc.) and provide news releases for this.
- Re-establish a monthly "Refuge Updates" section for the Tallulah paper.
- If it still exists, re-establish the relationship with the local radio station.
- Develop two to four talks that can be presented to local groups as requested.
- Make sure that all outreach materials (talks, presentations, etc.) emphasize the purpose and objectives of the refuge.
- Develop a quarterly refuge newsletter to send to contacts in the community.
- The refuge should be a member of the local chamber of commerce.

Objective D.9 – Volunteer and Refuge Support Programs: Build volunteer programs and partnerships with refuge support groups to help with directed refuge activities.

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

Over the life of the refuge, about 100 volunteers have signed up, but most are not active currently. When active, these individuals build wood duck boxes and assist with numerous maintenance projects such as repairing boardwalks and assisting with woodworking projects. The refuge also utilizes volunteers to help staff special events such as the Hunting and Fishing Day events. Volunteers also are used to staff hunter check stations during the lottery gun hunts.

The Tensas River Refuge Association was established in 1998. Over its history, membership has ebbed and flowed. When it was most active, the association had up to 30 members, and at its lowest number, the membership has dwindled to six. The current Board of Directors has been in place for several years. The association meets monthly on the second Sunday of the month. The association

maintains a modest sales area in the Visitor Center, and the revenue generated helps fund social events and other refuge projects.

Strategies:

- Ensure volunteers are monitored through the volunteer coordinator.
- Volunteer coordinator will refresh in Volunteer Training.
- Develop a volunteer plan to identify volunteer opportunities (both ongoing and project based), develop volunteer job descriptions, recruit volunteers, and assign who will supervise each volunteer.
- Develop a volunteer orientation packet.
- Maintain the bunkhouse to provide housing for volunteers/interns/detailees.
- Work to develop the Tensas River Refuge Association to its full potential.
- Develop partnerships with organizations such as Rosenwald Jones Institue (RJI), sporting clubs, elementary and secondary schools, universities, community groups, and others to enhance visitor and community experiences.

REFUGE ADMINISTRATION

Goal E. Secure and enhance staffing, funding, and facilities to manage the integrity of habitats and wildlife resources in Tensas River NWR and fulfill the purposes for which the refuge was established.

Objective E.1 – Staffing: Work with Regional Office to provide sufficient staffing and budget needs to meet specific goals and objectives outlined in CCP.

Discussion: The managers at Tensas River NWR face a series of challenges in managing a cooperative farming program and enhancing and maintaining productivity of moist-soil impoundments. It is recommended that the refuge have at least one employee (biotech/equipment operator) plus other staff assistance at least on a seasonal basis to properly manage the desired habitat complex (i.e., 400-550 acres of moist-soil, 150-300 acres of unharvested (forced account) row crops, and 200 acres of shallow-flooded/mud flat habitats for shorebirds and wading birds).

Strategy:

- Provide a full-time law enforcement officer, an equipment operator, a maintenance worker, and a wildlife technician.

Objective E.2 – Facilities: Work with Regional Office to prioritize and fund for improvements, updates, renovations, and construction of visitor and refuge management support facilities within the next 15 years where needed.

Discussion: Additional staff and equipment are needed if the refuge is expected to meet waterfowl objectives. Required equipment includes a 200 hp tractor and a seed drill, heavy plow, cultivator, planter, and mower.

Strategy:

- Provide equipment and facilities, as necessary, to support the mission and vision of the refuge.

V. Plan Implementation

INTRODUCTION

Refuge lands are managed as defined under the Improvement Act. Congress has distinguished a clear legislative mission of wildlife conservation for all national wildlife refuges. National wildlife refuges, unlike other public lands, are dedicated to the conservation of the Nation's fish and wildlife resources and wildlife-dependent recreational uses. Priority projects emphasize the protection and enhancement of fish and wildlife species first and foremost, but considerable emphasis is placed on balancing the needs and demands for wildlife-dependent recreation and environmental education.

To accomplish the purpose, vision, goals, and objectives contained in this CCP for Tensas River NWR, this section identifies projects; funding and personnel needs; volunteers; partnerships opportunities; step-down management plans; a monitoring and adaptive management plan; and plan review and revision.

PROJECTS

Listed below are the project summaries and their associated costs for fish and wildlife population management, habitat management, resource protection, visitor services, and refuge administration over the next 15 years. This project list reflects the priority needs identified by the public, planning team, and refuge staff based upon available information. These projects were generated for the purpose of achieving the refuge's objectives and strategies. The primary linkages of these projects to those planning elements are identified in each summary.

Annual funding requests for new projects or personnel that are needed to implement the goals, objectives, and strategies outlined in this CCP will be included in the Refuge Operating Needs System (RONS), which is a national database that contains unfunded operational needs for each refuge. Projects requiring new equipment, road projects, required maintenance, and other refuge management needs will be included in the Service Asset Maintenance Management System (SAMMS) Database, which is a computerized database and management tool used for planning and budgeting maintenance, capital improvements, and equipment replacement.

Substantial changes in habitat management may be needed over time, as new information becomes available, new lands are acquired, and habitat conditions evolve. These changes will be included in CCP revisions. Step-down plans will be developed in conjunction with future plans such as visitor services program plans and forest habitat management plans.

HABITAT MANAGEMENT

1. **Enhance Active Forest Management to Improve the Health and Expand the Population of Deer, Turkey, and Forest Breeding Birds**

Since the formation of the refuge, logging has been minimal. In many areas, the forest canopy has become closed, limiting the amount of available browse and reducing the carrying capacity of the habitat for deer. By continuing to implement the refuge's Forest Habitat Management Plan, particularly as it relates to providing habitat needs of priority forest-dwelling non-game birds, conditions will be enhanced for maintaining a healthy deer population as well. Such active management will provide a diversity and

abundance of understory, midstory, and overstory stand components (i.e., complex forest stand structure) to meet the needs of a variety of non-game forest birds and resident wildlife, including turkey and deer. *(Linkages: Goal A, Objectives A.1-A.3; Goal B, Objectives B.2 -B.8)*

Recurring Costs: $68,000 Special Project Cost: $133,000

2. **Bottomland Hardwood Forest Restoration**

Prior to European settlement, the Tensas River Valley was almost completely covered with a mature bottomland hardwood forest ecosystem. Today, almost all of that original forest type has been lost to land clearing for agriculture, transportation, industrialization, and urbanization. Tensas River NWR is one of the remaining bottomland hardwood forests (isolated islands) surrounded by a sea of agriculture. One of the primary goals of the refuge is to expand this habitat in large integral tracts in order to support interior bottomland hardwood forest function where possible. Continue to work with non-profit organizations such as The Nature Conservancy, Trust for Public Land, Ducks Unlimited, and the Service's Realty Office to acquire lands from willing sellers within in the acquisition boundary. Acquisition of the tracts with the acquisition boundary will enable Tensas River NWR to become a contiguous tract. *(Linkages: Goal A; Goal E, Objectives E.1 and E.2)*

Recurring Costs: Cost dependent on fair market value Special Project Cost: To be Determined

3. **Control of Invasive Plants**

The refuge's biological integrity is threatened by a variety of invasive plant species. This project will develop and implement an integrated pest management program (IPM) to control invasive plants. Invasive plant occurrence will be mapped and quantified. Appropriate IPM strategies will be used to control Chinese tallow and trifoliate orange in reforestation areas, woody succession in moist-soil units and impoundments, and sub-aquatic vegetation in Rainey Lake. Strategies will include chemical, mechanical, and biological control techniques. *(Linkages: Goal A; Goal E, Objectives E.1-2)*

Recurring Costs:	Special Project Cost:
$10,000	$42,000
8,000	23,000
7,000	29,000

4. **Control Nuisance Animal Populations to Protect Bottomland Hardwood Reforestation Efforts**

Refuge lands contain extensive wetland acreage with varying sources and duration of hydrology that can be impacted by beaver activity. Beavers have constructed dams that hold water and kill trees. Although beaver ponds do provide habitat for some waterfowl and aquatic species (wading birds, reptiles, amphibians), forest losses can be substantial if not controlled. Beaver suppression will be required in many areas throughout the refuge. Feral hogs historically have been found on Tensas River NWR; recently the population has been contained. All efforts need to be taken to keep the number of feral hogs as low as possible if not at all. This project considers the addition of a wildlife technician (GS-486-05/07). *(Linkages: Goals A, B, and E)*

Recurring Costs: 45,000 Special Project Cost: $60,000

FISH AND WILDLIFE POPULATION MANAGEMENT

5. **Science-based Inventorying and Monitoring of Wildlife Populations**

Science-based inventorying and monitoring of wildlife populations are critical to ensuring the biological integrity of the refuge. Information collected will serve as baseline flora and fauna data for developing habitat management plans and will influence all refuge management activities. A systematic inventorying and monitoring program will enable the refuge to make informed management decisions and valuable long-term contributions to national and regional objectives for waterfowl, shorebirds, forest breeding birds, wintering forest, scrub-shrub birds, and others.

Standardized census and survey techniques will be employed, and all baseline data compiled into databases, including global information system (GIS), for spatial analysis. This information is critical to formulating management actions and evaluating bottomland hardwood reforestation, moist-soil unit manipulation, and other refuge programs. All data will be shared with appropriate state and federal partners in an effort to further ecosystem management. *(Linkages: Goal B)*

Recurring Costs: $68,000 Special Project Cost: $138,000
65,000

6. **Determine Population Status and Management Needs of Refuge Reptiles and Amphibians**

Although the prospective herpetofauna on the refuge is large, the presence of relatively few of the species have been confirmed and associated with their habitats. When confronted with a lack of knowledge concerning the species actually residing on the refuge, the first step in conserving them is learning of their presence, and to the extent possible, associating their presence with particular habitats and how forest management activities are impacting their populations. The refuge will cooperate with universities or organizations to design and implement a project and collaborate with the U.S. Geological Survey on the possibility of funding through the Amphibian and Reptile Monitoring Initiative. *(Linkages: Goal B, Objectives B.14)*

Recurring Costs: $81,000 Special Project Cost: $146,000

7. **Continue Active Participation in the Louisiana Black Bear Recovery Activities**

The Louisiana black bear was listed as a threatened species under the Endangered Species Act due to extensive habitat reduction and fragmentation and declining populations. Bears once occurred throughout southern Mississippi, Louisiana, and eastern Texas. Habitat modification, particularly clearing for agriculture, has fragmented and reduced suitable habitat by more than 80 percent in the Lower Mississippi Valley. Refuge efforts for participating in these activities will include (1) coordination of bear related research and other activities throughout northeast Louisiana; (2) continued support and assistance with Louisiana State University, LDWF, and Black Bear Conservation Committee with repatriation efforts; (3) provide support and assistance with USDA Wildlife Services and LDWF with nuisance bear situations; (4) conduct public education and outreach on living with bears to the local community and coordinate with other agencies as necessary in this outreach; and, (5) conduct forest habitat management. *(Linkages: Goal A; Goal B, Objectives B.3)*

Recurring Costs: $20,000 Special Project Cost: $50,000

RESOURCE PROTECTION

8. **Archaeological Survey**

A comprehensive archaeological survey of the refuge will be conducted. This project is essential to meet federal cultural resource mandates and will provide the baseline information needed for the protection of existing resources and resource/public use development activities. *(Linkages: Goal C, Objective C.5)*

Recurring Costs: N/A Special Project Cost: $160,000

VISITOR SERVICES

9. **Improve Public Access and Use Opportunities**

Access to the refuge and visitor activity would be greatly improved by paving access to the refuge from Highway 80 and providing an off-ramp from I-20 near that refuge access point. Another need to improve public awareness of the refuge is directional and interpretive signs at major visitor access points. Public use and wildlife interpretation opportunities will be enhanced through better access signage. This project includes multiple boat launches, interpretive signs, kiosks, fishing piers, and outdoor education facilities. Other improvements are to include paving and construction of the off-ramp. This project will also include a maintenance worker (WG-4749-9) and Engineering Equipment Operator (WG-5716-10) *(Linkages: Goal D; Goal E)*

Recurring Costs: Cost unknown at this time Special Project Cost: Cost unknown at this time.

10. **Improve Refuge Headquarters and Visitor Center**

The present headquarters was built in 1991 and has many deficiencies such as improper plumbing, reduced office space, rotten windows and siding, and no room for storage of refuge supplies. Current staff have to share office space. Several of the exhibits are functional but need to be updated with new technology to bring the refuge up-to-date with current trends. An environmental classroom added to the new visitor center would greatly enhance the ability to teach young people about the aspects of natural resources. *(Linkages: Goal D; Goal E)*

Recurring Costs: $150,000 Special Project Cost: $3.8 million

REFUGE ADMINISTRATION

11. **Administrative Support**

Increase base budgeting for Tensas River NWR to cover salaries with cost of living increases and to provide adequate training and equipment for personnel. Park Ranger (Law Enforcement, GL-0025-7; $80,000). New equipment needed includes an excavator ($174,000), road grader ($312,000), and boat and motor ($10,000). *(Linkages: Goal A through E)*

Recurring Costs: $90,000 Special Project Cost: $600,000

FUNDING AND PERSONNEL

Table 10. Summary of projects

Project Title	First Year Cost ($)	Recurring Annual Cost ($)	Staff (FTE's)
1. Enhance Active Forest Management to Improve the Health and Expand the Population of Deer, Turkey, and Forest Breeding Birds	133,000	68,000	1
2. Bottomland Hardwood Forest Restoration	*	*	
3. Control of Invasive Plants	94,000	25,000	
4. Control Nuisance Animal Populations to Protect Bottomland Hardwood Reforestation Efforts	60,000	45,000	1
5. Science-based Inventorying and Monitoring of Wildlife Populations	68,000	203,000	
6. Determine Population Status and Management Needs of Refuge Reptiles and Amphibians	81,000	146,000	
7. Continue Active Participation in the Louisiana Black Bear Recovery Activities	20,000	50,000	
8. Archaeological Survey	N/A	160,000	
9. Improve Public Access and Use Opportunities	*	*	1
10. Improve Refuge Headquarters and Visitor Center	150,000	3.8 Million	
11. Administrative Support	90,000	600,000	1

PARTNERSHIP AND VOLUNTEERS OPPORTUNITIES

VOLUNTEERS

The refuge currently has a good relationship with the volunteer group "Tensas River Refuge Association" and will use this as a model for other partnerships. This group of volunteers is involved in helping make the refuge a part of the surrounding community. The refuge will continue to use this group of volunteers as well as recruit others to assist in activities such as wood duck box management, migratory songbird point count surveys, amphibian and reptile surveys, and grounds maintenance.

PARTNERSHIP OPPORTUNITIES

A major objective of this CCP is to establish partnerships with local volunteers, landowners, private organizations, and state and federal natural resource agencies. In the immediate vicinity of the refuge, opportunities exist to establish partnerships with sporting clubs, elementary and secondary schools, universities, and community organizations. At the regional and state level, partnerships might be established with organizations such as the LDWF, Ducks Unlimited, The Nature Conservancy, and Audubon Society.

The refuge volunteer program and other partnerships generated will depend upon the number of staff positions the Service provides the refuge. As staff and resources are committed to the refuge, opportunities to expand the volunteer program and develop partnerships will be enhanced.

If staff can be expanded to allow time for additional outreach to local communities, there may be opportunities to expand existing volunteer opportunities on the refuge. The refuge already has an active and growing volunteer program, managed by the refuge manager. Properly supervised and directed, these volunteers could make better contributions to the refuge by assisting staff with any number of activities, including projects to monitor habitat and wildlife populations and environmental education both on and off the refuge.

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

STEP-DOWN MANAGEMENT PLANS

A CCP is a strategic plan that guides the future direction of the refuge. A step-down management plan provides specific guidance on activities, such as habitat, fire, and visitor services' management. These plans (Table 11) are also developed in accordance with the National Environmental Policy Act, which requires the identification and evaluation of alternatives and public review and involvement prior to their implementation.

Table 11. Tensas River NWR step-down management plans

Step-down Plan	Completion Date
Forest Management Plan	2012
Water Management Plan	2014
Cropland Moist-Soil Management Plan	2014
Visitors Services' Plan	2012
Integrated Pest Management Plan	2016
Nuisance Animal Control Plan	2013
Cultural Resources Management Plan	2017

MONITORING AND ADAPTIVE MANAGEMENT

Adaptive management is a flexible approach to long-term management of biotic resources that is directed over time by the results of ongoing monitoring activities and other 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.

To apply adaptive management, specific surveying, inventorying, and monitoring protocols will be adopted for the refuge. The habitat management strategies will be systematically evaluated to determine management effects on wildlife populations. This information will be used to refine approaches and determine how effectively the objectives are being accomplished. Evaluations will include ecosystem team and other appropriate partner participation. If monitoring and evaluation indicate undesirable effects for target and non-target species and/or communities, then alterations to the management projects will be made. Subsequently, the refuge's CCP will be revised. Specific monitoring and evaluation activities will be described in the step-down management plans.

PLAN REVIEW AND REVISION

This CCP will be reviewed annually in development of the refuge's annual work plans and budget. It will also be reviewed to determine the need for revision. A revision will occur if and when conditions change or significant information becomes available, such as a change in ecological conditions or a major refuge expansion. The final CCP will be augmented by detailed step-down management plans to address the completion of specific strategies in support of the refuge's goals and objectives. Revisions to the CCP and the step-down management plans will be subject to public review and NEPA compliance.

Appendix A. Glossary

Adaptive Management: Refers to a process in which policy decisions are implemented within a framework of scientifically driven experiments to test predictions and assumptions inherent in management plan. Analysis of results help managers determine whether current management should continue as is or whether it should be modified to achieve desired conditions.

Alluvial: Sediment transported and deposited in a delta or riverbed by flowing water.

Aggradation To fill and raise the level of (the bed of a stream) by deposition of sediment.

Alternative: 1. A reasonable way to fix the identified problem or satisfy the stated need (40 CFR 1500.2). 2. Alternatives are different sets of objectives and strategies or means of achieving refuge purposes and goals, helping fulfill the National Wildlife Refuge System mission, and resolving issues (Service Manual 602 FW 1.6B).

Anadromous: Migratory fishes that spend most of their lives in the sea and migrate to fresh water to breed.

Anurans: Frogs and Toads.

Avian: Of or pertaining to birds.

Bioaccumulate: A general term for the accumulation of substances, such as pesticides (DDT is an example), methylmercury, or other organic chemicals in body tissue especially fatty tissue.

Biological Diversity: 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 (USFWS Manual 052 FW 1. 12B). The System's focus is on indigenous species, biotic communities, and ecological processes. Also referred to as biodiversity.

Carrying Capacity: The maximum population of a species able to be supported by a habitat or area.

Categorical Exclusion (CE,CX, CATEX, CATX): A category of actions that do not individually or cumulatively have a significant effect on the human environment and have been found to have no such effect in procedures adopted by a Federal agency pursuant to the National Environmental Policy Act (40 CFR 1508.4).

Compatible Use:	A proposed or existing wildlife-dependent recreational use or any other use of a national wildlife refuge that, based on sound professional judgment, will not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purpose(s) of the national wildlife refuge (50 CFR 25.12 (a)). A compatibility determination supports the selection of compatible uses and identifies stipulations or limits necessary to ensure compatibility.
Comprehensive Conservation Plan (CCP):	A document that describes the desired future conditions of a refuge or planning unit and provides long-range guidance and management direction to achieve the purposes of the refuge; helps fulfill the mission of the National Wildlife Refuge System; maintains and, where appropriate, restores the ecological integrity of each refuge and the National Wildlife Refuge System; helps achieve the goals of the National Wilderness Preservation System; and meets other mandates (Service Manual 602 FW 1.6 E).
Concern:	See Issue.
Cover Type:	The present vegetation of an area.
Cultural Resources:	The remains of sites, structures, or objects used by people in the past.
Diorama:	A three-dimensional model, usually enclosed in a glass showcase for a museum.
Disturbance:	Significant alteration of habitat structure or composition. May be natural (e.g., fire) or human-caused events (e.g., aircraft overflight).
Ecosystem:	A dynamic and interrelating complex of plant and animal communities and their associated non-living environment.
Ecosystem Management:	Management of natural resources using system-wide concepts to ensure that all plants and animals in ecosystems are maintained at viable levels in native habitats and basic ecosystem processes are perpetuated indefinitely.
Endangered Species (Federal):	A plant or animal species listed under the Endangered Species Act that is in danger of extinction throughout all or a significant portion of its range.
Endangered Species (State):	A plant or animal species in danger of becoming extinct or extirpated in the state within the near future if factors contributing to its decline continue. Populations of these species are at critically low levels or their habitats have been degraded or depleted to a significant degree.
Endemic:	Exclusively native to a place or biota.

Environmental Assessment (EA):	A concise public document, prepared in compliance with the National Environmental Policy Act, that briefly discusses the purpose and need for an action, alternatives to such action, and provides sufficient evidence and analysis of impacts to determine whether to prepare an environmental impact statement or finding of no significant impact (40 CFR 1508.9).
Environmental Impact Statement (EIS):	A detailed written statement required by section 102(2) (C) of the National Environmental Policy Act, analyzing the environmental impacts of a proposed action, adverse effects of the project that cannot be avoided, alternative courses of action, short-term uses of the environment versus the maintenance and enhancement of long-term productivity, and any irreversible and irretrievable commitment of resources (40 CFR 1508.11).
Extirpation:	The act of extirpating or rooting out, or the state of being extirpated; eradication; excision; total destruction; as, the extirpation of a species from land.
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 (40 CFR 1508.13).
Goal:	Descriptive, open-ended, and often broad statement of desired future conditions that conveys a purpose but does not define measurable units (Service Manual 620 FW 1.6J).
Habitat:	Suite of existing environmental conditions required by an organism for survival and reproduction. The place where an organism typically lives.
Habitat Restoration:	Management emphasis designed to move ecosystems to desired conditions and processes, and/or to healthy ecosystems.
Habitat Type:	See Vegetation Type.
Herpetofauna:	Reptiles and amphibians.
Improvement Act:	The National Wildlife Refuge System Improvement Act of 1997.
Issue:	Any unsettled matter that requires a management decision, e.g., an initiative, opportunity, resource management problem, threat to the resources of the unit, conflict in uses, public concern, or other presence of an undesirable resource condition (Service Manual 602 FW 1.6K).
Management Alternative:	See Alternative.

Management Concern:	See Issue.
Migration:	The seasonal movement from one area to another and back.
Mission Statement:	Succinct statement of the unit's purpose and reason for being.
Monitoring:	The process of collecting information to track changes of selected parameters over time.
National Environmental Policy Act of 1969 (NEPA):	Requires all agencies, including the Service, to examine the environmental impacts of their actions, incorporate environmental information, and use public participation in the planning and implementation of all actions. Federal agencies must integrate NEPA with other planning requirements, and prepare appropriate NEPA documents to facilitate better environmental decision making (40 CFR 1500).
National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57):	Under the Refuge Improvement Act, the U.S. Fish and Wildlife Service is required to develop 15-year Comprehensive Conservation Plans for all national wildlife refuges outside Alaska. The Act also describes the six public uses given priority status within the NWRS (i.e., hunting, fishing, wildlife observation, wildlife photography, environmental education, and interpretation).
National Wildlife Refuge System Mission:	The mission 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.
National Wildlife Refuge System:	Various categories of areas administered by the Secretary of the Interior for the conservation of fish and wildlife, including species threatened with extinction; all lands, waters, and interests therein administered by the Secretary as wildlife refuges; areas for the protection and conservation of fish and wildlife that are threatened with extinction; wildlife ranges; games ranges; wildlife management areas; or waterfowl production areas.
National Wildlife Refuge:	A designated area of land, water, or an interest in land or water within the System.
Native Species:	Species that normally live and thrive in a particular ecosystem.
Notice of Intent (NOI):	A notice that an environmental impact statement will be prepared and considered (40 CFR 1508.22). It is published in the Federal Register.

Objective:	A concise statement of what we want to achieve, how much we want to achieve, when and where we want to achieve it, and who is responsible for the work. Objectives derive from goals and provide the basis for determining strategies, monitoring refuge accomplishments, and evaluating the success of strategies. Making objectives attainable, time-specific, and measurable (Service Manual 602 FW 1.6N).
Preferred Alternative:	This is the alternative determined [by the decision maker] to best achieve the Refuge purpose, vision, and goals; contributes to the National Wildlife Refuge System mission, addresses the significant issues; and is consistent with principles of sound fish and wildlife management.
Prescribed Fire:	The application of fire to wildland fuels to achieve identified land use objectives (Service Manual 621 FW 1.7). May be from natural ignition or intentional ignition.
Priority Species:	Fish and wildlife species that the Service believes require protective measures and/or management guidelines to ensure their perpetuation. Priority species include the following: (1) State-listed and candidate species; (2) species or groups of animals susceptible to significant population declines within a specific area or statewide by virtue of their inclination to aggregate (e.g., seabird colonies); and (3) species of recreation, commercial, and/or tribal importance.
Public Involvement Plan:	Broad long-term guidance for involving the public in the comprehensive planning process.
Public Involvement:	A process that offers impacted and interested individuals and organizations an opportunity to become informed about, and to express their opinions on Service actions and policies. In the process, these views are studied thoroughly and thoughtful consideration of public views is given in shaping decisions for refuge management.
Public:	Individuals, organizations, and groups; officials of Federal, State, and local government agencies; Indian tribes; and foreign nations. It may include anyone outside the core planning team. It includes those who may or may not have indicated an interest in service issues and those who do or do not realize that Service decisions may affect them.
Purposes of the Refuge:	"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 sub-unit." For refuges that encompass Congressionally designated wilderness, the purposes of the Wilderness Act are additional purposes of the refuge (Service Manual 602 FW 106 S).

Record of Decision (ROD):	A concise public record of decision prepared by the Federal agency, pursuant to NEPA, that contains a statement of the decision, identification of all alternatives considered, identification of the environmentally preferable alternative, a statement as to whether all practical means to avoid or minimize environmental harm from the alternative selected have been adopted (and if not, why they were not), and a summary of monitoring and enforcement where applicable for any mitigation (40 CFR 1505.2).
Refuge Goal:	See Goal.
Refuge Purposes:	See Purposes of the Refuge.
Songbirds: (Also Passerines)	A category of birds that are medium to small, perching landbirds. Most are territorial singers and migratory.
Step-down Management Plan:	A plan that provides specific guidance on management subjects (e.g., habitat, public use, fire, safety) or groups of related subjects. It describes strategies and implementation schedules for meeting CCP goals and objectives (Service Manual 602 FW 1.6 U).
Strategy:	A specific action, tool, technique, or combination of actions, tools, and techniques used to meet unit objectives (Service Manual 602 FW 1.6 U).
Study Area:	The area reviewed in detail for wildlife, habitat, and public use potential. For purposes of this CCP/EIS the study area includes the lands within the currently approved Refuge boundary and potential Refuge expansion areas.
Threatened Species (Federal):	Species listed under the Endangered Species Act that are likely to become endangered within the foreseeable future throughout all or a significant portion of their range.
Threatened Species (State):	A plant or animal species likely to become endangered in the state within the near future if factors contributing to population decline or habitat degradation or loss continue.
U.S. Fish and Wildlife Service Mission:	The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect, and enhance fish and wildlife and their habitats for the continuing benefit of the American people.
Vegetation Type, Habitat Type, Forest Cover Type:	A land classification system based upon the concept of distinct plant associations.

Vision Statement: A concise statement of what the planning unit should be, or what we hope to do, based primarily upon the National Wildlife Refuge System Mission and specific refuge purposes, and other mandates. We will tie the vision statement for the refuge to the mission of the Refuge System; the purpose(s) of the refuge; the maintenance or restoration of the ecological integrity of each refuge and the Refuge System; and other mandates (Service Manual 602 FW 1.6 Z).

Wilderness: See Designated Wilderness.

Wildfire: A free-burning fire requiring a suppression response; all fire other than prescribed fire that occurs on wildlands (Service Manual 621 FW 1.7).

ACRONYMS AND ABBREVIATIONS

ac	acre
ATV	all-terrain vehicle
BBCC	Black Bear Conservation Committee
BGEPA	Bald and Golden Eagle Protection Act
BLH	Bottomland Hardwood
BRT	Biological Review Team
CCP	Comprehensive Conservation Plan
CFI	Continuous Forest Inventory
CFR	Code of Federal Regulations
CRMP	Cultural Resources Management Plan
CRP	Conservation Reserve Program
CWCS	Comprehensive Wildlife Conservation Strategy
dbh	diameter at breast height
DDE	dichlorodiphenyldichloroethylene
DDT	dichlorodiphenyltrichloroethane
DED	Duck-energy Days
DNR	Department of Natural Resources
DOI	Department of the Interior
EA	Environmental Assessment
EE	environmental education
EIS	Environmental Impact Statement
ES	Ecological Services
ESA	Endangered Species Act
FmHA	Farmers Home Administration
FMHP	Forest Habitat Management Plan
FONSI	Finding of No Significant Impact
FRCO	Fish Resource Coordinators Office
FSA	Farm Services Agency
FTE	full-time equivalent
FY	fiscal year
GIS	Global Information System
GPS	Global Positioning Satellite
ha	hectare
IPM	integrated pest management program
lbs	pounds
LDEQ	Louisiana Department of Environmental Quality
LDNR	Louisiana Department of Natural Resources
LDWF	Louisiana Department of Wildlife and Fisheries
LMRE	Lower Mississippi River Ecosystem
LMVJV	Lower Mississippi Valley Joint Venture
LOF	Louisiana Department of Agriculture and Forestry, Office of Forestry
LSU	Louisiana State University
MAPS	Monitoring Avian Productivity and Survival
MAV	Mississippi Alluvial Valley
NBEM	National Bald Eagle Management
NAWMP	North American Waterfowl Management Plan
NEPA	National Environmental Policy Act
NGO	non-governmental organizations
NRCS	Natural Resource Conservation Service

NRHP	National Register of Historic Places
NWTF	National Wild Turkey Federation
NWR	National Wildlife Refuge
NWRS	National Wildlife Refuge System
PFT	Permanent Full Time
PFW	Partners for Fish and Wildlife
PIF	Partners in Flight
PL	Public Law
ppm	parts per million
psi	pounds per square inch
RHPO	Regional Historic Preservation Office
RLGIS	Refuge Lands Geographic Information System
RM	Refuge Manual
RO	Regional Office
ROD	Record of Decision
RONS	Refuge Operating Needs System
SAMMS	Service Asset Maintenance Management System
SCWDS	Southeastern Cooperative Wildlife Disease Study
Service	U.S. Fish and Wildlife Service (also, FWS)
SHPO	State Historic Preservation Office
SMZs	Streamside Management Zones
TDE	or DDD dichlorodiphenyldichloroethane
TFT	Temporary Full Time
TMDLs	Total Maximum Daily Loads
TPL	The Trust for Public Land
TSS	Total Suspended Solids
U.S. EPA	U.S. Environmental Protection Agency
USACE	U.S. Army Corps of Engineers
USC	United States Code
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
WGCP	West Gulf Coastal Plain
WMA	Wildlife Management Area
WRP	Wetland Reserve Program

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Appendix C. Relevant Legal Mandates and Executive Orders

STATUE	DESCRIPTION
Administrative Procedures Act (1946)	Outlines administrative procedures to be followed by Federal agencies with respect to identification of information to be made public; publication of material in the Federal Register; maintenance of records; attendance and notification requirements for specific meetings and hearings; issuance of licenses; and review of agency actions.
American Antiquities Act of 1906	Provides penalties for unauthorized collection, excavation, or destruction of historic or prehistoric ruins, monuments or objects of antiquity on lands owned or controlled by the United States. The Act authorizes the President to designate as national monuments objects or areas of historic or scientific interest on lands owned or controlled by the Unites States.
American Indian Religious Freedom Act of 1978	Protects the inherent right of Native Americans to believe, express, and exercise their traditional religions, including access to important sites, use and possession of sacred objects, and the freedom to worship through ceremonial and traditional rites.
Americans With Disabilities Act of 1990	Intended to prevent discrimination of and make American Society more accessible to people with disabilities. The Act requires reasonable accommodations to be made in employment, public services, public accommodations, and telecommunications for persons with disabilities.
Anadromous Fish Conservation Act of 1965, as amended	Authorizes the Secretary of the Interior and Commerce to enter into cooperative agreements with states and other non-Federal interest for conservation, development, and enhancement of anadromous fish and contribute up to 50 percent as the Federal share of the cost of carrying out such agreements. Reclamation construction programs for water resource projects needed solely for such fish are also authorized.
Archaeological Resources Protection Act of 1979, as amended.	This act strengthens and expands the protective provisions of the Antiquities Act of 1906 regarding archaeological resources. It also revised the permitting process for archaeological research.
Architectural Barriers Act of 1968	Requires that buildings and facilities designed, constructed, or altered with Federal funds, or leased by a Federal agency, must comply with standards for physical accessibility.
Bald and Golden Eagle Protection Act of 1940, as amended	Prohibits the possession, sale or transport of any bald or golden eagle, alive or dead, or part, nest, or egg except as permitted by the Secretary of the Interior for scientific or exhibition purposes, or for the religious purposes of Indians.

STATUE	DESCRIPTION
Bankhead-Jones Farm Tenant Act of 1937	Directs the Secretary of Agriculture to develop a program of land conservation and utilization in order to correct maladjustments in land use and thus assist in such things as control of soil erosion, reforestation, preservation of natural resources and protection of fish and wildlife. Some early refuges and hatcheries were established under authority of this Act.
Cave Resources Protection Act of 1988	Established requirements for the management and protection of caves and their resources on Federal lands, including allowing the land managing agencies to withhold the location of caves from the public, and requiring permits for any removal or collecting activities in caves on Federal lands.
Clean Air Act of 1970	Regulates air emissions from area, stationary, and mobile sources. This Act and its amendments charge Federal land managers with direct responsibility to protect the "air quality and related values" of land under their control. These values include fish, wildlife, and their habitats.
Clean Water Act of 1974, as amended	This Act and its amendments have as its objective the restoration and maintenance of the chemical, physical, and biological integrity of the Nation's waters. Section 401 of the Act requires that Federally permitted activities comply with the Clean Water Act standards, state water quality laws, and any other appropriate state laws. Section 404 charges the U.S. Army Corps of Engineers with regulating discharge of dredge or fill materials into waters of the United States, including wetlands.
Coastal Barrier Resources Act of 1982 (CBRA)	Identifies undeveloped coastal barriers along the Atlantic and Gulf coasts and included them in the John H. Chafee Coastal Barrier Resources System (CBRS). The objectives of the act are to minimize loss of human life, reduce wasteful Federal expenditures, and minimize the damage to natural resources by restricting most Federal expenditures that encourage development within the CBRS.
Coastal Barrier Improvement Act of 1990	Reauthorized the CBRA, expanded the CBRS to include undeveloped coastal barriers along the Great Lakes and in the Caribbean, and established "Otherwise Protected Areas (OPAs)". The Service is responsible for maintaining official maps, consulting with Federal agencies that propose spending Federal funds within the CBRS and OPAs, and making recommendations to Congress about proposed boundary revisions.
Coastal Wetlands Planning, Protection, and Restoration (1990)	Authorizes the Director of the Fish and Wildlife Service to participate in the development of a Louisiana coastal wetlands restoration program, participate in the development and oversight of a coastal wetlands conservation program, and lead in the implementation and administration of a National coastal wetlands grant program.

STATUE	DESCRIPTION
Coastal Zone Management Act of 1972, as amended	Established a voluntary national program within the Department of Commerce to encourage coastal States to develop and implement coastal zone management plans and requires that “any Federal activity within or outside of the coastal zone that affects any land or water use or natural resource of the coastal zone” shall be “consistent to the maximum extent practicable with the enforceable policies” of a State’s coastal zone management plan. The law includes an Enhancement Grants Program for protecting, restoring or enhancing existing coastal wetlands or creating new coastal wetlands. It also established the National Estuarine Reserve Research System, guidelines for estuarine research, and financial assistance for land acquisition.
Emergency Wetlands Resources Act of 1986	This Act authorized the purchase of wetlands from Land and Water Conservation Fund moneys, removing a prior prohibition on such acquisitions. The Act requires the Secretary to establish a National Wetlands Priority Conservation Plan, required the States to include wetlands in their Comprehensive Outdoor Recreation Plans, and transfers to the Migratory Bird Conservation Fund amounts equal to import duties on arms and ammunition. It also established entrance fees at National Wildlife Refuges.
Endangered Species Act of 1973, as amended	Provides for the conservation of threatened and endangered species of fish, wildlife, and plants by Federal action and by encouraging the establishment of state programs. It provides for the determination and listing of endangered and threatened species and the designation of critical habitats. Section 7 requires refuge managers to perform internal consultation before initiating projects that affect or may affect endangered species.
Environmental Education Act of 1990	This act established the Office of Environmental Education within the Environmental Protection Agency to develop and administer a Federal environmental education program in consultation with other Federal natural resource management agencies, including the Fish and Wildlife Service.
Estuary Protection Act of 1968	Authorized the Secretary of the Interior, in cooperation with other Federal agencies and the States, to study and inventory estuaries of the United States, including land and water of the Great Lakes, and to determine whether such areas should be acquired for protection. The Secretary is also required to encourage State and local governments to consider the importance of estuaries in their planning activities relates to Federal natural resource grants. In approving any state grants for acquisition of estuaries, the Secretary was required to establish conditions to ensure the permanent protection of estuaries.

STATUE	DESCRIPTION
Estuaries and Clean Waters Act of 2000	This law creates a Federal interagency council that includes the Director of the Fish and Wildlife Service, the Secretary of the Army for Civil Works, the Secretary of Agriculture, the Administrator of the Environmental Protection Agency and the Administrator for the National Oceanic and Atmospheric Administration. The Council is charged with developing a national estuary habitat restoration strategy and providing grants to entities to restore and protect estuary habitat to promote the strategy.
Food Security Act of 1985, as amended (Farm Bill)	The Act contains several provisions that contribute to wetland conservation. The Swampbuster provisions state that farmers who convert wetlands for the purpose of planting after enactment of the law are ineligible for most farmer program subsidies. It also established the Wetland Reserve Program to restore and protect wetlands through easements and restoration of the functions and values of wetlands on such easement areas.
Farmland Protection Policy Act of 1981, as amended	The purpose of this law is to minimize the extent to which Federal programs contribute to the unnecessary conversion of farmland to nonagricultural uses. Federal programs include construction projects and the management of federal lands.
Federal Advisory Committee Act (1972), as amended	Governs the establishment of and procedures for committees that provide advice to the federal government. Advisory committees may be established only if they will serve a necessary, nonduplicative function. Committees must be strictly advisory unless otherwise specified and meetings must be open to the public.
Federal Coal Leasing Amendment Act of 1976	Provided that nothing in the Mining Act, the Mineral Leasing Act, or the Mineral Leasing Act for Acquired Lands authorized mining coal on refuges.
Federal-Aid Highways Act of 1968	Established requirements for approval of Federal highways through wildlife refuges and other designated areas to preserve the natural beauty of such areas. The Secretary of Transportation is directed to consult with the Secretary of the Interior and other Federal agencies before approving any program or project requiring the use of land under their jurisdiction.
Federal Noxious Weed Act of 1990, as amended	The Secretary of Agriculture was given the authority to designate plants as noxious weeds and to cooperate with other Federal, State, and local agencies; farmers associations; and private individuals in measures to control, eradicate, prevent, or retard the spread of such weeds. The Act requires each Federal land-managing agency, including the Fish and Wildlife Service, to designate an office or person to coordinate a program to control such plants on the agency's land and implement cooperative agreements with the States, including integrated management systems to control undesirable plants.

STATUE	DESCRIPTION
Fish and Wildlife Act of 1956	Establishes a comprehensive national fish, shellfish, and wildlife resources policy with emphasis on the commercial fishing industry but also includes the inherent right of every citizen and resident to fish for pleasure, enjoyment, and betterment and to maintain and increase public opportunities for recreational use of fish and wildlife resources. Among other things, it authorizes the Secretary of the Interior to take such 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.
Fish and Wildlife Conservation Act of 1980, as amended	Requires the Service to monitor non-gamebird species, identify species of management concern, and implement conservation measures to preclude the need for listing under the Endangered Species Act.
Fish and Wildlife Coordination Act of 1958	Promotes equal consideration and coordination of wildlife conservation with other water resource development programs by requiring consultation with the Fish and Wildlife Service and the state fish and wildlife agencies where the “waters of a stream or other body of water are proposed or authorized, permitted or licensed to be impounded, diverted…or otherwise controlled or modified” by any agency under Federal permit or license.
Improvement Act of 1978	This act was passed to improve the administration of fish and wildlife programs and amends several earlier laws, including the Refuge Recreation Act, the National Wildlife Refuge Administration Act, and the Fish and Wildlife Act of 1956. It authorizes the Secretary to accept gifts and bequests of real and personal property on behalf of the United States. It also authorizes the use of volunteers on Service projects and appropriations to carry out volunteer programs.
Fish and Wildlife Programs Improvement and National Wildlife Refuge System Centennial Act of 2000	Recognizes the vital importance of the Refuge System and the fact that the System will celebrate its centennial anniversary in the year 2003. Established the National Wildlife Refuge System Centennial Commission to prepare a plan to commemorate the 100th anniversary of the System, coordinate activities to celebrate that event, and host a conference on the National Wildlife Refuge System. The commission is also responsible for developing a long-term plan to meet the priority operations; maintenance and construction needs for the System, and improve public use programs and facilities.
Fishery (Magnuson) Conservation and Management Act of 1976	Established Regional Fishery Management Councils comprised of Federal and State officials including the Fish and Wildlife Service. It provides for regulation of foreign fishing and vessel fishing permits.

STATUE	DESCRIPTION
Freedom of Information Act, 1966	Requires all Federal agencies to make available to the public for inspection and copying administrative staff manuals and staff instructions, official, published and unpublished policy statements, final orders deciding case adjudication, and other documents. Special exemptions have been reserved for nine categories of privileged material. The Act requires the party seeking the information to pay reasonable search and duplication costs.
Geothermal Steam Act of 1970, as amended	Authorizes and governs the lease of geothermal steam and related resources on public lands. Section 15 c of the Act prohibits issuing geothermal leases on virtually all Service-administrative lands.
Lacey Act of 1900, as amended	Originally designed to help states protect their native game animals and to safeguard U.S. crop production from harmful foreign species. This Act prohibits interstate and international transport and commerce of fish, wildlife or plant taken in violation of domestic or foreign laws. It regulates the introduction to America of foreign species into new locations.
Land and Water Conservation Fund Act of 1948	This act provides funding through receipts from the sale of surplus federal land, appropriations from oil and gas receipts from the outer continental shelf, and other sources for land acquisition under several authorities. Appropriations from the fund may be used for matching grants to states for outdoor recreation projects and for land acquisition by various federal agencies including the Fish and Wildlife Service.
Marine Mammal Protection Act of 1972, as amended	The 1972 Marine Mammal Protection Act established a Federal responsibility to conserve marine mammals with management vested in the Department of Interior for sea otter, walrus, polar bear, dugong, and manatee. The Department of Commerce is responsible for cetaceans and pinnipeds, other than the walrus. With certain specified exceptions, the Act establishes a moratorium on the taking and importation of marine mammals as well as products taken from them.
Migratory Bird Conservation Act of 1929	Established a Migratory Bird Conservation Commission to approve areas recommended by the Secretary of the Interior for acquisition with Migratory Bird Conservation Funds. The role of the Commission was expanded by the North American Wetland Conservation Act to include approving wetlands acquisition, restoration, and enhancement proposals recommended by the North American Wetlands Conservation Council.
Migratory Bird Hunting and Conservation Stamp Act of 1934	Also commonly referred to as the Duck Stamp Act”, requires waterfowl hunters 16 years of age or older to possess a valid Federal hunting stamp. Receipts from the sale of the stamp are deposited into the Migratory Bird Conservation Fund for the acquisition of migratory bird refuges.

STATUE	DESCRIPTION
Migratory Bird Treaty Act of 1918, as amended	This Act implements various treaties and conventions between the U.S. and Canada, Japan, Mexico and the former Soviet Union for the protection of migratory birds. Except as allowed by special regulations, this Act makes it unlawful to pursue, hunt, kill, capture, possess, buy, sell, purchase, barter, export or import any migratory bird, part, nest, egg or product.
Mineral Leasing Act for Acquired Lands (1947), as amended	Authorizes and governs mineral leasing on acquired public lands.
Minerals Leasing Act of 1920, as amended	Authorizes and governs leasing of public lands for development of deposits of coal, oil, gas and other hydrocarbons, sulphur, phosphate, potassium and sodium. Section 185 of this title contains provisions relating to granting rights-of-ways over Federal lands for pipelines.
Mining Act of 1872, as amended	Authorizes and governs prospecting and mining for the so-called “hardrock” minerals (such as gold and silver) on public lands.
National and Community Service Act of 1990	Authorizes several programs to engage citizens of the U.S. in full- and/or part-time projects designed to combat illiteracy and poverty, provide job skills, enhance educational skills, and fulfill environmental needs. Among other things, this law establishes the American Conservation and Youth Service Corps to engage young adults in approved human and natural resource projects, which will benefit the public or are carried out on Federal or Indian lands.
National Environmental Policy Act of 1969	Requires analysis, public comment, and reporting for environmental impacts of Federal actions. It stipulates the factors to be considered in environmental impact statements, and requires that Federal agencies employ an interdisciplinary approach in related decision-making and develop means to ensure that unqualified environmental values are given appropriate consideration, along with economic and technical considerations.
National Historic Preservation Act of 1966, as amended	It establishes a National Register of Historic Places and a program of matching grants for preservation of significant historical features. Federal agencies are directed to take into account the effects of their actions on items or sites listed or eligible for listing in the National Register.
National Trails System Act (1968), as amended	Established the National Trails System to protect the recreational, scenic and historic values of some important trails. National Recreation Trails may be established by the Secretaries of Interior or Agriculture on land wholly or partly within their jurisdiction, with the consent of the involved State(s), and other land managing agencies, if any. National Scenic and National Historic Trails may only be designated by an Act of Congress. Several National Trails cross units of the National Wildlife Refuge System.

STATUE	DESCRIPTION
National Wildlife Refuge System Administration Act of 1966	Prior to 1966, there was no single Federal Law that governed the administration of the various wildlife refuges that had been established. This Act defines the National Wildlife Refuge System and authorizes the Secretary of the Interior to permit any use of an area provided such use is compatible with the major purposes(s) for which the area was established.
National Wildlife Refuge System Improvement Act of 1997	This Act amends the National Wildlife Refuge System Administration Act of 1966. This Act defines the mission of the National Wildlife Refuge System, establishes the legitimacy and appropriateness of six priority 'wildlife-dependent' public uses, establishes a formal process for determining 'compatible uses' of System lands, identifies the Secretary of the Interior as responsible for managing and protecting the System, and requires the development of a comprehensive conservation plan for all refuges outside of Alaska.
Native American Graves Protection and Repatriation Act of 1990	Requires Federal agencies and museums to inventory, determine ownership of, and repatriate certain cultural items and human remains under their control or possession. The Act also addresses the repatriation of cultural items inadvertently discovered by construction activities on lands managed by the agency.
Neotropical Migratory Bird Conservation Act of 2000	Establishes a matching grants program to fund projects that promote the conservation of neotropical migratory birds in the united States, Latin America and the Caribbean.
North American Wetlands Conservation Act of 1989	Provides funding and administrative direction for implementation of the North American Waterfowl Management Plan and the Tripartite Agreement on wetlands between Canada, U.S. and Mexico. North American Wetlands Conservation Council is created to recommend projects to be funded under the Act to the Migratory Bird Conservation Commission. Available funds may be expended for up to 50 percent of the United States share cost of wetlands conservation projects in Canada, Mexico, or the United States (or 100 percent of the cost of projects on Federal lands).
Refuge Recreation Act of 1962, as amended	This Act authorizes the Secretary of the Interior to administer refuges, hatcheries, and other conservation areas for recreational use, when such uses do not interfere with the area's primary purposes. It authorizes construction and maintenance of recreational facilities and the acquisition of land for incidental fish and wildlife oriented recreational development or protection of natural resources. It also authorizes the charging fees for public uses.

STATUE	DESCRIPTION
Partnerships for Wildlife Act of 1992	Establishes a Wildlife Conservation and Appreciation Fund, to receive appropriated funds and donations from the National Fish and Wildlife Foundation and other private sources to assist the State fish and game agencies in carrying out their responsibilities for conservation of non-game species. The funding formula is no more that 1/3 Federal funds, at least 1/3 Foundation funds, and at least 1/3 State funds.
Refuge Revenue Sharing Act of 1935, as amended	Provided for payments to counties in lieu of taxes from areas administered by the Fish and Wildlife Service. Counties are required to pass payments along to other units of local government within the county, which suffer losses in tax revenues due to the establishment of Service areas.
Rehabilitation Act of 1973	Requires nondiscrimination in the employment practices of Federal agencies of the executive branch and contractors. It also requires all federally assisted programs, services, and activities to be available to people with disabilities.
Rivers and Harbors Appropriations Act of 1899, as amended	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. The Fish and Wildlife Coordination Act provides authority for the Service to review and comment on the effects on fish and wildlife activities proposed to be undertaken or permitted by the Corps of Engineers. Service concerns include contaminated sediments associated with dredge or fill projects in navigable waters.
Sikes Act (1960), as amended	Provides for the cooperation by the Department of the Interior and Defense with State agencies in planning, development, and maintenance of fish and wildlife resources and outdoor recreation facilities on military reservations throughout the U.S. It requires the Secretary of each military department to use trained professionals to manage the wildlife and fishery resource under his jurisdiction, and requires Federal and State fish and wildlife agencies be given priority in management of fish and wildlife activities on military reservations.
Transfer of Certain Real Property for Wildlife Conservation Purposes Act of 1948	This Act provides that upon determination by the Administrator of the General Services Administration, real property no longer needed by a Federal agency can be transferred, without reimbursement, to the Secretary of the Interior if the land has particular value for migratory birds, or to a State agency for other wildlife conservation purposes.
Transportation Equity Act for the 21st Century (1998)	Established the Refuge Roads Program, requires transportation planning that includes public involvement, and provides funding for approved public use roads and trails and associated parking lots, comfort stations and bicycle/pedestrian facilities.

STATUE	DESCRIPTION
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.
Water Resources Planning Act of 1965	Established Water Resources Council to be composed of Cabinet representatives including the Secretary of the Interior. The Council reviews river basin plans with respect to agricultural, urban, energy, industrial, recreational and fish and wildlife needs. The act also established a grant program to assist States in participating in the development of related comprehensive water and land use plans.
Wild and Scenic Rivers Act of 1968, as amended	This act selects certain rivers of the nation possessing remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values; preserves them in a free-flowing condition; and protects their local environments.
Wilderness Act of 1964, as amended	The Wilderness Act of 1964 directs the Secretary of the Interior to review every roadless area of 5,000 acres or more and every roadless island regardless of size within the National Wildlife Refuge System and to recommend suitability of each such area. The Act permits certain activities within designated Wilderness Areas that do not alter natural processes. Wilderness values are preserved through a “minimum tool” management approach, which requires refuge managers to use the least intrusive methods, equipment and facilities necessary for administering the areas.
Youth Conservation Corps Act of 1970	Established a permanent Youth Conservation Corps (YCC) programs within the Department of Interior and Agriculture. Within the Service, YCC participants perform many tasks on refuges, fish hatcheries, and research stations.

EXECUTIVE ORDERS	DESCRIPTIONS
EO 11593, Protection and Enhancement of the Cultural Environment (1971)	States that if the Service proposes any development activities that may affect the archaeological or historic sites, the Service will consult with Federal and State Historic Preservation Officers to comply with Section 106 of the National Historic Preservation Act of 1966, as amended.
EO 11644, Use of Off-road Vehicles on Public Land (1972)	Established policies and procedures to ensure that the use of off-road vehicles on public lands will be controlled and directed so as to protect the resources of those lands, to promote the safety of all users of those lands, and to minimize conflicts among the various uses of those lands.
EO 11988, Floodplain Management (1977)	The purpose of this Executive Order is to prevent Federal agencies from contributing to the “adverse impacts associated with occupancy and modification of floodplains” and the “direct or indirect support of floodplain development.” In the course of fulfilling their respective authorities, Federal agencies “shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains.
EO 11989 (1977), Amends Section 2 of EO 11644	Directs agencies to close areas negatively impacted by off-road vehicles.
EO 11990, Protection of Wetlands (1977)	Federal agencies are directed to provide leadership and take action to minimize the destruction, loss of degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands.
EO 12372, Intergovernmental Review of Federal Programs (1982)	Seeks to foster intergovernmental partnerships by requiring Federal agencies to use the State process to determine and address concerns of State and local elected officials with proposed Federal assistance and development programs.
EO 12898, Environmental Justice (1994)	Requires federal agencies to identify and address disproportionately high and adverse effects of its programs, policies, and activities on minority and low-income populations.

EXECUTIVE ORDERS	DESCRIPTIONS
EO 12906, Coordinating Geographical Data Acquisition and Access (1994), Amended by EO 13286 (2003). Amendment of EO's & other actions in connection w/ transfer of certain functions to Secretary of DHS.	Recommended that the executive branch develop, in cooperation with State, local, and tribal governments, and the private sector, a coordinated National Spatial Data Infrastructure to support public and private sector applications of geospatial data. Of particular importance to CCP planning is the National Vegetation Classification System (NVCS), which is adopted, standard for vegetation mapping. Using NVCT facilitates the compilation of regional and national summaries, which in turn, can provide an ecosystem context for individual refuges.
EO 12962, Recreational Fisheries (1995)	Federal agencies are directed to improve the quantity, function, sustainable productivity, and distribution of U.S. aquatic resources for increased recreational fishing opportunities in cooperation with States and Tribes.
EO 13007, Native American Religious Practices (1996)	Provides for access to, and ceremonial use of, Indian sacred sites on federal lands used by Indian religious practitioners and direction to avoid adversely affecting the physical integrity of such sites.
EO 13061, Federal Support of Community Efforts Along American Heritage Rivers (1997)	Established the American Heritage Rivers initiative for the purpose of natural resource and environmental protection, economic revitalization, and historic and cultural preservation. The Act directs Federal agencies to preserve, protect, and restore rivers and their associated resources important to our history, culture, and natural heritage.
EO 13084, Consultation and Coordination With Indian Tribal Governments (2000)	Provides a mechanism for establishing regular and meaningful consultation and collaboration with tribal officials in the development of federal policies that have tribal implications.
EO 13112, Invasive Species (1999)	Federal agencies are directed to prevent the introduction of invasive species, detect and respond rapidly to and control populations of such species in a cost effective and environmentally sound manner, accurately monitor invasive species, provide for restoration of native species and habitat conditions, conduct research to prevent introductions and to control invasive species, and promote public education on invasive species and the means to address them. This EO replaces and rescinds EO 11987, Exotic Organisms (1977).

EXECUTIVE ORDERS	DESCRIPTIONS
EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds. (2001)	Instructs federal agencies to conserve migratory birds by several means, including the incorporation of strategies and recommendations found in Partners in Flight Bird Conservation plans, the North American Waterfowl Plan, the North American Waterbird Conservation Plan, and the United States Shorebird Conservation Plan, into agency management plans and guidance documents.

Appendix D. Public Involvement

Public involvement is a very important part of the development of all Comprehensive Conservation Plans (CCPs), and every effort was made to assure that public comments were solicited throughout the development of this CCP. A notice of intent to prepare the CCP was published in the Federal Register on September 8, 2006. The public was notified in the local newspapers and media of two open house meetings to be held on September12 and 13, 2006. Since the refuge has a reputation as an important hunting area, two public scoping meetings were held at different locations to allow for the greatest possible local public input: one on September 12, at the Louisiana State Univerity Scott Research Education Center in Winnsboro, Louisiana, and another on September 13, at the Ferriday Community Center in Ferriday, Louisiana. Approximately 50 members of the public attended the public forum and scoping meetings. In addition, information packets, including a letter of notice and invitation to attend, public input questionnaire, and mailing list request form were mailed to approximately 100 different federal, state, non-governmental agencies, state congressional offices, the federal delegation, and private individuals.

Eighteen members of the public offered their comments, on record, at the public meetings. In addition, 20 questionnaires have been returned to date and two letters of comment have been received from the general public, as well as a letter of comment from the Animal Welfare Institute.

State involvement and date of initial contact: The Louisiana Department of Wildlife and Fisheries (LDWF) was contacted by the Service in September 2006, with an invitation for state involvement in the comprehensive conservation planning process. The LDWF appointed two individual to sit on the core planning team. There was also good state participation for the biological review.

MAJOR ISSUES IDENTIFIED:

Internally: With regard to wildlife and habitat management, one of the most significant issues identified internally was managing for improved white-tailed deer habitat and managing for forest-dependent migratory songbirds.

The repatriation of the Louisiana black bear is another important internal issue. The process of repatriation is moving along well, but with this success is growing concerns in the mind of the public of conflicts between bears and other refuge uses, such as improved deer herd health and community safety. Public communication and cooperation is needed to make clear the refuge mission in this regard.

Other issues identified include problems with access to the refuge from Interstate 20, handicapped access on the refuge, and public outreach.

State: The LDWF provided comments and a sincere willingness to participate in the Tensas River NWR CCP.

Tribes: Letters were provided to representatives of Tunica-Biloxi Indians of Louisiana, Coushatta Tribe of Louisiana, the Jena Band of Choctaw Indians of Louisiana, and the Chitimacha Tribe of Louisiana, requesting issues they would like to see addressed in the CCP and inviting them to participate in the process. No responses were received.

PUBLIC SCOPING COMMENTS SUMMARY:

Fish and Wildlife Population Management

- Explicitly state the current status of the Louisiana black bear on the refuge, management of the Louisiana black bear population, and effects on local community.
- Concern over the health and size of the deer herd.
- Complete an extensive biological inventory of its flora and fauna in order to better complete this CCP.
- The refuge should perform a full environmental assessment of native flora and fauna distribution, migration, abundance, and habitat before making compatibility determinations.

Habitat Management

- Improve moist-soil and agricultural wetland management for wildlife.
- Improve bottomland hardwood forest management practices for resident and migratory species, such as increasing harvest versus no forest cutting, to providing structural and species diversty.

Visitor Services

- Outreach to the local communities is paramount.
- Specific hunt program changes requested included lottery hunts, bow hunting only, increased disabled and youth hunts, squirel hunting with dogs, raccoon hunting, and hunter safety.
- Increased hunting and fishing.
- The refuge should truly focus on its mandated “wildlife first” policy and become a wildlife sanctuary and reduce all public recreational.
- Wildlife observation and photography, environmental education, hunting, and fishing opportunities need to be improved and increased.
- More youth activities are needed on the refuge.
- Work with and utilize the Refuge Association.
- Trapping of invasive species needs to be addressed.
- Other uses such as all-terrain vehicles and horseback riding need to be addressed.
- Provide improved access to the refuge.

Refuge Administration

- Access to the refuge need to be improved, an exit off I-20 needs to be created, and the road to the refuge needs to be paved all the way from the interstate.
- Increased staffing needs and housing for students/researchers.

SUMMARY OF PUBLIC DRAFT CCP COMMENTS

Public involvement in the development of the CCP for Tensas River National Wildlife Refuge, Madison, Tensas and Franklin Parishes, Louisiana, was sought throughout the planning process.

The issues and alternatives generated from the scoping meeting, coupled with the input of the planning team, are summarized in Chapters III. Within 3 years, this CCP was developed for the refuge, which will direct management over the next 15 years.

The Draft CCP/EA was made available for public review beginning February 4, 2009, and ending March 6, 2009 (74 FR 6053). A news release was sent to 21 local area media outlets. Copies of the Draft CCP/EA were posted at refuge headquarters and area locations, and over 200 copies were distributed to local landowners; the public; and local, state, and federal agencies. Two public meetings were held on the Draft CCP/EA. One meeting was held on January 27, 2009, from 6:30 p.m. to 8:30 p.m., at the Louisiana State University Agricultural Center, Scott Research Extension Education Center, 212 Macon Ridge Rd, Winnsboro, Louisiana, and another meeting was held on January 28, 2009, from 6:30 p.m. to 8:30 p.m., at the Tallulah Community Center, Beach and Neal Streets, Tallulah, Louisiana. Thirty-seven individuals attended the public meetings and offered oral comments on the Draft CCP/EA. Ten respondents consisting of the Service; the Louisiana Department of Wildlife and Fisheries; the Department of Environmental Quality, Office of Environmental Assessment and Office of Environmental Services; and local citizens submitted written comments by mail or e-mail. Comments on the Draft CCP/EA and the Service's response to those comments are summarized below.

DRAFT PLAN COMMENTS AND SERVICE RESPONSE

General

Two respondents provided general editorial comments.

Service Response: The Service will incorporate these changes where appropriate.

Habitat Management

Four respondents support the plan to do better timber management, creating better food sources and in general overall better habitat. The respondent believes doing "select" cuts also adds the element of timber edges, which deer like very much and does make better habitat than the big "block" cuts the timber companies like to employ. The respondent would like to see the Service conduct additional 4- to 5-acre clear cuts dispersed throughout the refuge. This would mimic the old "log sets" that were located all over the refuge years ago, that have now been shaded out and no longer exists. This type of area creates thickets of saw briars and high volumes of browse. Also, these areas are extremely valuable during the breeding season, creating bedding areas for does and helping to concentrate areas of interest for bucks.

One respondent believes the habitat in many areas of the refuge has become void of wildlife because of the timber crown killing out valuable wildlife habitat and browse. The respondent states that a cyclical cutting program will ensure that the habitat is kept at its optimum level for all wildlife. One respondent would like the roads the loggers use cleared of debris.

Service Response: Since the formation of the refuge, logging levels have been reduced significantly. In many areas, the forest canopy has become closed, limiting the amount of available browse and reducing the carrying capacity of the habitat for deer. By continuing to implement the refuge's Forest Habitat Management Plan, particularly as it relates to providing habitat needs of priority forest-dwelling non-game birds, conditions will be enhanced for maintaining a healthy deer population as well. Such active management will provide a diversity and abundance of understory, midstory, and overstory stand components (i.e., complex forest stand structure) to meet the needs of a variety of non-game forest birds and resident wildlife, including turkey and deer. The refuge will also work to clear roads post-treatment.

Fish and Wildlife Population Management

One respondent believes continued and careful review of black bear historic habitat data is still in order as certain sub-populations may have naturally selected to be disparate/un-connected. Three respondents went on to state that the black bear population has become a serious problem to the refuge. The respondent emphasized that it is absolutely essential that this animal be reintroduced to fearing humans. The bear on the refuge display little or no fear of humans. Human safety concerns from adjacent landowners were emphasized. Another respondent was concerned with the depredation of deer by Louisiana black bear. Another respondent believes the bear population needs to be decreased

Service Response: The Service will continue to work towards delisting the Louisiana black bear in support of the goals and objectives in the Louisiana Black Bear Recovery Plan.

One respondent believes the deer population at lowest point ever and it is affecting the level of hunter participation and economic benefits to the area. One respondent would like the refuge to raise and maintain healthy levels of deer and turkey first, and bear and small game second. Another respondent would like the Service to use sound biology and game management, not public opinion, to do this.

Service Response: Deer data from the past 15 years is currently being analyzed. The refuge is involved with a large research project to estimate the Louisiana black bear populations. These data will be used, along with other biological data available and collected, to make all biological/management decisions. An outline of fish and wildlife population management strategies is available in Goal B.

Resource Protection

One respondent believes the Service in direct coordination with others should ensure the cultural and historic resources on the south end of refuge are surveyed, protected, and interpreted. This respondent believes the area holds significant cultural resources.

Service Response: Protecting the cultural and archaeological heritage of an area is important whether such resources are located in or out of the boundary of a refuge. Cultural surveys are necessary to protect such resources. If any such resources are found on the refuge, they will be protected. The Service will work in partnership with others to ensure this protection, which is outlined in Goal C, Objective C-5.

Two respondents believe the Service needs to protect more land outside the current acquisition boundary. They also wanted an update on the land recently acquired by the Service in the Sharkey area.

Service Response: The Service may pursue the ability to expand the current acquisition boundary, but that is not included in this CCP. Tensas River NWR expanded ownership to an additional 1,500 acres in March 2009, with an additional +/- 1,000 to be added over the next year.

One respondent believes the water level at Tensas River is lower and would like the water quality to improve. He was also concerned about the water level, which as raised in Lake Nick. Another respondent would like no dredging of the river. The DEQ requests the Service obtain the proper approvals and environmental permits prior to implementing any of the projects in the CCP. DEQ provided specific instructions to follow prior to implementing a project such as:

- If your project results in a discharge to waters of the state, submittal of a Louisiana Pollutant Discharge Elimination System (LPDES) application may be necessary.

- If the project results in a discharge of wastewater to an existing wastewater treatment system, that wastewater treatment system may need to modify their LPDES permit before accepting the additional wastewater.

- LDEQ has stormwater general permits for construction areas equal to or greater than one acre. It is recommended that the Service contact Melissa Conti at (225) 219-3078 to determine if your proposed improvements require one of these permits.

- All precautions should be observed to control nonpoint source pollution from construction activities.

- If any of the proposed work is located in wetlands or other areas subject to the jurisdiction of the U.S. Army Corps of Engineers, the Service should contact the Corps to inquire about the possible necessity for permits. If a Corps permit is required, part of the application process may involve a Water Quality Certification from LDEQ.

- All precautions should be observed to protect the groundwater of the region.

- Please be advised that water softeners generate waste waters that may require special limitations, depending on local water quality considerations. Therefore, if your water system improvements include water softeners, you are advised to contact DEQ, Water Permits, to determine if special water quality based limitations will be necessary.

- Any renovation or remodeling must comply with LAC 33:III.Chapter 28.Lead-Based Paint Activities, LAC 33:III.Chapter 27.Asbestos-Containing Materials in Schools and State Buildings (includes all training and accreditation) and LAC 33:III.5151.Emission Standard for Asbestos for any renovations or demolitions.

DEQ further noted that Franklin, Madison, and Tensas Parishes are classified as attainment parishes with the National Ambient Air Quality Standards for all criteria air pollutants.

Service Response: As stated in Goal C, Objective C-3, the water quality of the Tensas River is very important to the refuge. The Service will work with all appropriate partners, including consultation with DEQ, prior to implementing any project as appropriate.

Visitor Services

One respondent would like to ban all hunting from Tensas River NWR. Most respondents supported and encouraged hunting on the refuge. Comments received specific to current hunting season changes were: to institute deer size restrictions – forked horn bucks and mature does during all gun and bow hunts; create bow hunting only sections on refuge; allow squirrel hunting with dogs only after bow season ends; shorten bow season; promote hunting on most of the refuge; deer hunting is important as management tool; hunters need to stick together to keep public hunting and unite and get along to continue hunting, because there are those who would like to do away with hunting. Two respondents urged the Service to remember hunting has a significant economic impact to the surrounding communities and would like to see the quality and quantity of deer increase.

Service Response: Hunting is one of the six priority public uses identified in the Improvement Act of 1997, and hunting has been found to be compatible with the purpose for which Tensas River NWR was established. Typically, specific hunting season changes, such as these, are addressed in detailed step-down management plans rather than within a CCP, which provides a broad overview of refuge management goals, objectives, and strategies. To assist in preparing and implementing the step-down plans, the refuge staff will develop partnerships with local agencies and organizations. These plans will also be developed in accordance with the National Environmental Policy Act, which requires the identification and evaluation of alternatives and public review and involvement prior to selection and implementation of the preferred alternative. The goal is to continue to develop the hunting opportunities for all user groups. The refuge strives to find the balance between quantity and quality of wildlife present to encourage all general public to use the refuge to its fullest potential.

One respondent would like to ban all lead shot use in the woods because it causes harm to the environment and the general public.

Service Response: The Service is moving toward a complete ban of lead shot; however, we currently only limit it waterfowl hunting on the refuge.

One respondent would like the Service to issue the hunting surveys differently, perhaps expand to other participants beyond gun hunt only. Another respondent would like to see a new system that would provide better hunter efforts and harvest data. One respondent would like the Service to post hunting data spreadsheets with all the prior years available.

Service Response: The lottery system for the modern firearm hunt for deer and the user reporting system is currently being re-vamped. The goal is to collect better information to assess public use and make good management decisions based on the information collected. There will be a public meeting held every year where biological information will be available to the public in an effort to provide transparency.

One respondent would like to see a biologist intern program started with local schools and open up more youth career opportunities.

Service Response: As money and staff are available, the refuge will continually try to build and enhance all programs for youth.

One respondent would like the Service to open youth hunts at Cooters Point.

Service Response: This suggestion is noted and will have to be researched as major access issues may prevent an open youth hunt to this area.

Refuge Administration

One respondent would like the Service to enter into a partnership agreement to enhance visitor and community experiences and awareness by assuring a clear and valid interpretation of specific eco-niches, including the long-standing and present activities of this unique eco-system. The respondent suggests that the Service and the Rosenwald Jones Institute (RJI) plan and conduct specific justification cataloging and inventorying interpretation activities between February 2009 and January 2016. The respondent also suggests this partnership will enhance the continued justification of the refuge's comprehensive resource protection and management strategy. Another respondent would like other citizens to get involved in volunteering in the refuge friends' group, Tensas River Association, in order to improve the refuge.

Service Response: As stated in Goal D, Objective D-9, the Service would like to develop partnerships with organizations such as Rosenwald Jones Institue (RJI), sporting clubs, elementary and secondary schools, universities, community groups, and others to enhance visitor and community experiences. The Service would also like to expand the friends group to its full potential and encourages public involvement.

One respondent would like an update on improving Quebec Road and access from Highway 80 to the refuge. Another respondent was interested in Indian Lake Bridge road off 577 spur – Hunters Bend Road.

Service Response: Upgrading efforts to Quebec Road are scheduled to begin during the summer of 2009. The road that connects Big Lake WMA and Louisiana Highway 577 Spur/Hunters Bend Road should be open to all traffic by November 2009.

Appendix E. Appropriate Use Determinations

Tensas River National Wildlife Refuge Appropriate Use Determinations

An appropriate use determination is the initial decision process a refuge manager follows when first considering whether or not to allow a proposed use on a refuge. The refuge manager must find a use is appropriate before undertaking a compatibility review of the use. This process clarifies and expands on the compatibility determination process by describing when refuge managers should deny a proposed use without determining compatibility. If we find a proposed use is not appropriate, we will not allow the use and will not prepare a compatibility determination.

Except for the uses noted below, the refuge manager must decide if a new or existing use is an appropriate refuge use. If an existing use is not appropriate, the refuge manager will eliminate or modify the use as expeditiously as practicable. If a new use is not appropriate, the refuge manager will deny the use without determining compatibility. Uses that have been administratively determined to be appropriate are:

- Six wildlife-dependent recreational uses - As defined by the National Wildlife Refuge System Improvement Act of 1997 (Improvement Act), the six wildlife-dependent recreational uses (hunting, fishing, wildlife observation and photography, and environmental education and interpretation) are determined to be appropriate. However, the refuge manager must still determine if these uses are compatible.

- Take of fish and wildlife under State regulations - States have regulations concerning take of wildlife that includes hunting, fishing, and trapping. We consider take of wildlife under such regulations appropriate. However, the refuge manager must determine if the activity is compatible before allowing it on a refuge.

Statutory Authorities for this policy:

National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997, 16 U.S.C. 668dd-668ee (Administration Act). This law provides the authority for establishing policies and regulations governing refuge uses, including the authority to prohibit certain harmful activities. The Administration Act does not authorize any particular use but rather authorizes the Secretary of the Interior to allow uses only when they are compatible and "under such regulations as he may prescribe." This law specifically identifies certain public uses that, when compatible, are legitimate and appropriate uses within the National Wildlife Refuge System (NWRS). The law states ". . . it is the policy of the United States that . . .compatible wildlife-dependent recreation is a legitimate and appropriate general public use of the System….compatible wildlife-dependent recreational uses are the priority general public uses of the System and shall receive priority consideration in refuge planning and management; and . . . when the Secretary determines that a proposed wildlife-dependent recreational use is a compatible use within a refuge, that activity should be facilitated . . . the Secretary shall . . . ensure that priority general public uses of the System receive enhanced consideration over other general public uses in planning and management within the System . . . ." The law also states "in administering the System, the Secretary is authorized to take the following actions: ". . . issue regulations to carry out this Act."

This policy implements the standards set in the Administration Act by providing enhanced consideration of priority general public uses and ensuring other public uses do not interfere with our ability to provide quality, wildlife-dependent recreational uses.

Refuge Recreation Act of 1962, 16 U.S.C. 460k (Recreation Act). This law authorizes the Secretary of the Interior to ". . . administer such areas [of the NWRS] or parts thereof for public recreation when in his judgment public recreation can be an appropriate incidental or secondary use." While the Recreation Act authorizes us to allow public recreation in areas of the NWRS when the use is an "appropriate incidental or secondary use," the Improvement Act provides the NWRS mission and includes specific directives and a clear hierarchy of public uses on the NWRS.

Other Statutes that Establish Refuges, including the Alaska National Interest Lands Conservation Act of 1980 (ANILCA) (16 U.S.C. 410hh - 410hh-5, 460 mm - 460mm-4, 539-539e, and 3101 - 3233; 43 U.S.C. 1631 et seq.).

Executive Orders. We must comply with Executive Order (E.O.) 11644 when allowing use of off-highway vehicles on refuges. This order requires that we designate areas as open or closed to off-highway vehicles in order to protect refuge resources, promote safety, and minimize conflict among the various refuge users; monitor the effects of these uses once they are allowed; and amend or rescind any area designation as necessary based on the information gathered. Furthermore, E.O. 11989 requires us to close areas to off-highway vehicles when we determine that the use causes or will cause considerable adverse effects on the soil, vegetation, wildlife, habitat, cultural, or historic resources. Statutes, such as ANILCA, take precedence over executive orders.

Definitions:

Appropriate Use: A proposed or existing use on a refuge that meets at least one of the following four conditions;

1) The use is a wildlife-dependent recreational use as identified in the Improvement Act.
2) The use contributes to fulfilling the refuge purpose(s), the NWRS mission, or goals or objectives described in a refuge management plan approved after October 9, 1997, the date the Improvement Act was signed into law.
3) The use involves the take of fish and wildlife under State regulations.
4) The use has been found to be appropriate.

Native American: American Indians in the conterminous United States and Alaska Natives (including Aleuts, Eskimos, and Indians) who are members of federally recognized tribes.

Priority General Public Use: A compatible wildlife-dependent recreational use of a refuge involving hunting, fishing, wildlife observation and photography, or environmental education and interpretation.

Quality: The criteria used to determine a quality recreational experience include:

- Promotes safety of participants, other visitors, and facilities.
- Promotes compliance with applicable laws and regulations and responsible behavior.
- Minimizes or eliminates conflicts with fish and wildlife population or habitat goals or objectives in a plan approved after 1997.
- Minimizes or eliminates conflicts with other compatible wildlife-dependent recreation.
- Minimizes conflicts with neighboring landowners.

- Promotes accessibility and availability to a broad spectrum of the American people.
- Promotes resource stewardship and conservation.
- Promotes public understanding and increases public appreciation of America's natural resources and our role in managing and protecting these resources.
- Provides reliable/reasonable opportunities to experience wildlife.
- Uses facilities that are accessible and blend into the natural setting.
- Uses visitor satisfaction to help define and evaluate programs.

Take: A permit may be required to harass, harm, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct with regard to a listed species.

Wildlife-dependent Recreational Use: As defined by the Improvement Act, a use of a refuge involving hunting, fishing, wildlife observation, wildlife photography, or environmental education and interpretation.

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Tensas River NWR

Use: Cooperative Farming

This form is not required for wildlife-dependent recreational uses, take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision Criteria:	YES	NO
(a) Do we have jurisdiction over the use?	x	
(b) Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?	x	
(c) Is the use consistent with applicable executive orders and Department and Service policies?	x	
(d) Is the use consistent with public safety?	x	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	x	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	x	
(g) Is the use manageable within available budget and staff?	x	
(h) Will this be manageable in the future within existing resources?	x	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	x	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?	x	

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. **Yes** x **No** ___

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:
Not Appropriate_____ **Appropriate** X

Refuge Manager: Kelly Tinkey Date: 7-29-2009

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.
If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.
If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Acting
Refuge Supervisor: _____ Date: 8/20/2009

A compatibility determination is required before the use may be allowed.

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Tensas River NWR

Use: Boating

This form is not required for wildlife-dependent recreational uses, take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision Criteria:	YES	NO
(a) Do we have jurisdiction over the use?	x	
(b) Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?	x	
(c) Is the use consistent with applicable executive orders and Department and Service policies?	x	
(d) Is the use consistent with public safety?	x	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	x	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	x	
(g) Is the use manageable within available budget and staff?	x	
(h) Will this be manageable in the future within existing resources?	x	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	x	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?	x	

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. **Yes** x **No** ___

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:
Not Appropriate_____ **Appropriate** X

Refuge Manager: Kelly Pinkney Date: 7-29-2009

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.
If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.
If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Refuge Supervisor: Acting [signature] Date: 8/20/2009

A compatibility determination is required before the use may be allowed.

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Tensas River NWR

Use: Horse/Mule Special Use

This form is not required for wildlife-dependent recreational uses, take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision Criteria:	YES	NO
(a) Do we have jurisdiction over the use?	x	
(b) Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?	x	
(c) Is the use consistent with applicable executive orders and Department and Service policies?	x	
(d) Is the use consistent with public safety?	x	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	x	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	x	
(g) Is the use manageable within available budget and staff?	x	
(h) Will this be manageable in the future within existing resources?	x	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	x	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?	x	

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. **Yes** x **No** ___

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:
Not Appropriate ___ **Appropriate** X

Refuge Manager: Kelly Pinkey Date: 7-29-2009

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.
If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.
If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Acting
Refuge Supervisor: [signature] Date: 8/20/2009

A compatibility determination is required before the use may be allowed.

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Tensas River NWR

Use: All-Terrain Vehicle Use

This form is not required for wildlife-dependent recreational uses, take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision Criteria:	YES	NO
(a) Do we have jurisdiction over the use?	x	
(b) Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?	x	
(c) Is the use consistent with applicable executive orders and Department and Service policies?	x	
(d) Is the use consistent with public safety?	x	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	x	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	x	
(g) Is the use manageable within available budget and staff?	x	
(h) Will this be manageable in the future within existing resources?	x	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	x	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?	x	

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. **Yes** x **No** ___

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:
Not Appropriate___ **Appropriate** X

Refuge Manager: Kelly Pinkney Date: 7-29-2009

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.
If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.
If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Acting
Refuge Supervisor: [illegible] Date: 8/20/2009

A compatibility determination is required before the use may be allowed.

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Tensas River NWR

Use: Field Trials

This form is not required for wildlife-dependent recreational uses, take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision Criteria:	YES	NO
(a) Do we have jurisdiction over the use?	x	
(b) Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?	x	
(c) Is the use consistent with applicable executive orders and Department and Service policies?	x	
(d) Is the use consistent with public safety?	x	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	x	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	x	
(g) Is the use manageable within available budget and staff?	x	
(h) Will this be manageable in the future within existing resources?	x	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	x	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?	x	

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. **Yes** x **No** ___

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:
Not Appropriate_____ **Appropriate** X

Refuge Manager: Kelly Pinkney Date: 7-29-2009

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.
If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.
If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Refuge Supervisor: Acting [signature] Date: 8/20/2009

A compatibility determination is required before the use may be allowed.

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Tensas River NWR

Use: Research Studies

This form is not required for wildlife-dependent recreational uses, take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision Criteria:	YES	NO
(a) Do we have jurisdiction over the use?	x	
(b) Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?	x	
(c) Is the use consistent with applicable executive orders and Department and Service policies?	x	
(d) Is the use consistent with public safety?	x	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	x	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	x	
(g) Is the use manageable within available budget and staff?	x	
(h) Will this be manageable in the future within existing resources?	x	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	x	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?	x	

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. **Yes** _x_ **No** ___

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:
Not Appropriate_____ **Appropriate** _X_

Refuge Manager: Kelly Purky Date: 7-29-2009

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.
If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.
If found to be **Appropriate** the refuge supervisor must sign concurrence.

Acting
Refuge Supervisor: _____ Date: 8/20/2009

A compatibility determination is required before the use may be allowed.

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Tensas River NWR

Use: Bottomland Hardwood Forest Management

This form is not required for wildlife-dependent recreational uses, take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision Criteria:	YES	NO
(a) Do we have jurisdiction over the use?	x	
(b) Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?	x	
(c) Is the use consistent with applicable executive orders and Department and Service policies?	x	
(d) Is the use consistent with public safety?	x	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	x	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	x	
(g) Is the use manageable within available budget and staff?	x	
(h) Will this be manageable in the future within existing resources?	x	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	x	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?	x	

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. **Yes** x **No** ___

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:
Not Appropriate_____ **Appropriate** X

Refuge Manager: Kelly Pinkney Date: 7-29-2009

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.
If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.
If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Acting
Refuge Supervisor: _____ Date: 8/20/2009

A compatibility determination is required before the use may be allowed.

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Tensas River NWR

Use: Trapping

This form is not required for wildlife-dependent recreational uses, take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision Criteria:	YES	NO
(a) Do we have jurisdiction over the use?	x	
(b) Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?	x	
(c) Is the use consistent with applicable executive orders and Department and Service policies?	x	
(d) Is the use consistent with public safety?	x	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	x	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	x	
(g) Is the use manageable within available budget and staff?	x	
(h) Will this be manageable in the future within existing resources?	x	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	x	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?	x	

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. **Yes** x **No** ___

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:
Not Appropriate_____ **Appropriate** X

Refuge Manager: Kelly Lankey Date: 7-29-2009

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.
If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.
If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Acting Refuge Supervisor: _____ Date: 8/20/2009

A compatibility determination is required before the use may be allowed.

Appendix F. Compatibility Determinations

Tensas River National Wildlife Refuge Compatibility Determination

Uses: The following uses were found to be appropriate and considered for compatibility determination reviews: Wildlife observation and photography, environmental education and interpretation, fishing, field trials, boating, bottomland hardwood forest management, trapping, all-terrain vehicle use, cooperative farming program, research studies, horse/mule special use, and fire management. A description and anticipated biological impacts for each use are addressed separately in this Compatibility Determination.

Refuge Name: Tensas River National Wildlife Refuge (NWR)

Date Established: 1980

Establishing and Acquisition Authority: Migratory Bird Conservation Act

Refuge Purpose: "For the preservation and development of the environmental resources ... to conserve the diversity of fish and wildlife and their habitat ... for the conservation and development of wildlife and natural resources, the development of outdoor recreation opportunities, and interpretative education," and "to give special consideration to the management of the timber on the refuge to ensure continued commercial production and harvest" (94 Stat. 595, dated June 28, 1980);

"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)];

"For conservation purposes" [7 U.S.C. 2002 (Consolidated Farm and Rural Development Act)]; and

"To conserve (A) fish or wildlife which are listed as endangered species or threatened species .... or (B) plants" [16 U.S.C. 1534 (Endangered Species Act of 1973)].

National Wildlife Refuge System Mission:

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.*

Other Applicable Laws, Regulations, and Policies:

Antiquities Act of 1906 (34 Stat. 225)
Migratory Bird Treaty Act of 1918 (15 U.S.C. 703-711; 40 Stat. 755)
Migratory Bird Conservation Act of 1929 (16 U.S.C. 715r; 45 Stat. 1222)
Migratory Bird Hunting Stamp Act of 1934 (16 U.S.C. 718-178h; 48 Stat. 451)
Criminal Code Provisions of 1940 (18 U.S.C. 41)
Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d; 54 Stat. 250)
Refuge Trespass Act of June 25, 1948 (18 U.S.C. 41; 62 Stat. 686)
Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j; 70 Stat.1119)
Refuge Recreation Act of 1962 (16 U.S.C. 460k-460k-4; 76 Stat. 653)
Wilderness Act (16 U.S.C. 1131; 78 Stat. 890)
Land and Water Conservation Fund Act of 1965
National Historic Preservation Act of 1966, as amended (16 U.S.C. 470, et seq.; 80 Stat. 915)
National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd, 668ee; 80 Stat. 927)
National Environmental Policy Act of 1969, NEPA (42 U.S.C. 4321, et seq; 83 Stat. 852)
Use of Off-Road Vehicles on Public Lands (Executive Order 11644, as amended by Executive Order 10989)
Endangered Species Act of 1973 (16 U.S.C. 1531 et seq; 87 Stat. 884)
Refuge Revenue Sharing Act of 1935, as amended in 1978 (16 U.S.C. 715s; 92 Stat. 1319)
National Wildlife Refuge Regulations for the Most Recent Fiscal Year (50 CFR Subchapter C; 43 CFR 3101.3-3)
Emergency Wetlands Resources Act of 1986 (S.B. 740)
North American Wetlands Conservation Act of 1990
Food Security Act (Farm Bill) of 1990 as amended (HR 2100)
The Property Clause of The U.S. Constitution Article IV 3, Clause 2
The Commerce Clause of The U.S. Constitution Article 1, Section 8
The National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57, USC668dd)
Executive Order 12996, Management and General public Use of the National Wildlife Refuge System. March 25, 1996
Title 50, Code of Federal Regulations, Parts 25-33
Archaeological Resources Protection Act of 1979
Native American Graves Protection and Repatriation Act of 1990

Compatibility determinations for each description listed were considered separately. Although for brevity, the preceding sections from “Uses” through “Other Applicable Laws, Regulations and Policies” are only written once within the CCP, they are part of each descriptive use and become part of that compatibility determination if considered outside of the CCP.

Use: Wildlife Observation and Photography

Wildlife observation and photography have been identified in the National Wildlife Refuge System Improvement Act of 1997 as priority wildlife-dependent recreational uses provided they are compatible with the purpose for which the refuge was established.

Wildlife photography, including other image-capturing activities such as videography, has occurred on the refuge since its inception. It is in anticipated that an increase in non-consumptive wildlife-dependent uses will occur over the next few years as facilities and access are provided.

Wildlife observation and photography could occur anywhere on the refuge throughout the year. These activities can be accomplished while driving, boating, or walking on the refuge according to refuge regulations.

Availability of Resources:

Resources involved in the administration and management of the use:

Minor amounts of personnel time associated with administration, management, and law enforcement.

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

Observation towers, access roads, kiosks, and brochures.

Maintenance costs:

$20,000/year

Monitoring costs:

$5,000/year

Offsetting revenues:

None

Anticipated Impacts of the Use:

Short-term impacts:

The refuge provides habitat for resident and migratory wildlife. As a result of these activities, individual animals may be disturbed by human contact to varying degrees. Examples of potential disturbance include flushing of birds from feeding, resting, or nesting areas and trampling of plants by observers and photographers. Disturbance to trust species are expected to be minimal.

Construction of foot trails, boardwalks, observation platforms, and upgrading refuge roads will alter small portions of the natural environment. Proper planning prior to construction, sediment retention, and grade stabilization features will reduce negative impacts to wetlands and species of special concern. Short-term impacts to facilities, such as roads and trails, can be avoided by special closures due to unsafe conditions.

Long-term impacts:

Current utilization of these uses is incidental to overall refuge programs and no long-term adverse impacts have been experienced.

Cumulative impacts:

No cumulative impacts are anticipated.

Public Review and Comment:

This compatibility determination was part of the Draft Comprehensive Conservation Plan and Environmental Assessment (Draft CCP/EA) for Tensas River National Wildlife Refuge, which was announced in the *Federal Register* and made available for public comment from February 4 – March 6, 2009 (74 FR 6053). Methods used to solicit public review and comment included posted notices at Refuge Headquarters and area locations, and more than 200 copies of the Draft CCP/EA were distributed to adjacent landowners; the public; and local, state, and federal agencies. Public meetings were held in Tallulah and Winnsboro, Louisiana. Individual flyers, announcing these meetings, were sent out to the entire mailing list. The dates, times, locations, and comment period were specified in the flyer. News releases, including information on the availability of the Draft CCP/EA, the comment period, and public meeting locations, were sent to more than 45 area newspapers, television studios, and local radio stations.

Determination (check one below):

_____ Use is Not Compatible

__X__ Use is Compatible with Following Stipulations

Stipulations Necessary to Ensure Compatibility:

Visitors are required to abide by all refuge regulations that limit impacts on plant and wildlife populations.

Justification:

Visitors have the opportunity to view and photograph many species of wildlife with relative ease at many places on the refuge. Opportunities exist for these activities by boat, by walking, or by driving the public roads.

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

_____Categorical Exclusion without Environmental Action Statement

_____Categorical Exclusion and Environmental Action Statement

__X___Environmental Assessment and Finding of No Significant Impact

_____Environmental Impact Statement and Record of Decision

Mandatory 15-Year Re-evaluation Date: 08/24/2024

Use: Environmental Education And Interpretation

Environmental education and interpretation activities include traditional environmental education, such as teacher or staff-led on-site field trips, off-site programs in classrooms, and interpretation of wildlife resources on the refuge. These activities are largely conducted at the Headquarters Office and are utilized to encourage understanding in citizens of all ages to develop land ethics, foster public support, increase visibility, and improve the image of the Fish and Wildlife Service. Sometimes, environmental education and interpretation activities occur on Tensas River NWR.

Environmental education and interpretation have been identified in the National Wildlife Refuge System Improvement Act of 1997 as priority public uses provided they are compatible with the purpose for which the refuge was established.

Environmental education and interpretation could occur throughout the refuge year-round as requested by the public. Although the activities do not require special use permits, they are most often closely coordinated with the refuge manager and led or supervised by the park ranger.

Availability of Resources:

Resources involved in the administration and management of the use:

Minor amounts of personnel time.

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

Kiosks, observation towers, brochures, and environmental education materials.

Maintenance costs:

$2,000/year

Monitoring costs:

None

Offsetting revenues:

None

Anticipated Impacts of the Use:

Short-term impacts:

The use of on-site, hands-on, and 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 the activities. Since most activities would take place on existing roads, trails, and other facilities, impacts would be minimal.

Long-term impacts:

Current utilization of these uses is incidental to overall refuge programs, and no long-term adverse impacts have been experienced. Long-term beneficial impacts include the furthering of the refuge mission through the education of the general public.

Cumulative impacts:

No cumulative impacts are anticipated.

Public Review and Comment:

This compatibility determination was part of the Draft Comprehensive Conservation Plan and Environmental Assessment (Draft CCP/EA) for Tensas River National Wildlife Refuge, which was announced in the *Federal Register* and made available for public comment from February 4 – March 6, 2009 (74 FR 6053). Methods used to solicit public review and comment included posted notices at Refuge Headquarters and area locations, and more than 200 copies of the Draft CCP/EA were distributed to adjacent landowners; the public; and local, state, and federal agencies. Public meetings were held in Tallulah and Winnsboro, Louisiana. Individual flyers, announcing these meetings, were sent out to the entire mailing list. The dates, times, locations, and comment period were specified in the flyer. News releases, including information on the availability of the Draft CCP/EA, the comment period, and public meeting locations, were sent to more than 45 area newspapers, television studios, and local radio stations.

Determination (check one below):

_____ Use is Not Compatible

__X__ Use is Compatible with Following Stipulations

Stipulations Necessary to Ensure Compatibility:

On-site activities should be held where minimal impact would occur. Evaluations of sites and programs should be conducted periodically to assess if objectives are being met and to ensure that the natural resources are not being degraded. If evidence of unacceptable adverse impacts begins to appear, it may be necessary to change the location of the outdoor activities.

Justification:

Environmental education and interpretation are used to encourage citizens of all ages to act responsibly in protecting a healthy ecosystem. They are tools to use in building land ethic, developing public support, and decreasing wildlife violations. They constitute one method of increasing visibility in the community and improving the image of the Service.

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

_____Categorical Exclusion without Environmental Action Statement

_____Categorical Exclusion and Environmental Action Statement

__X___Environmental Assessment and Finding of No Significant Impact

_____Environmental Impact Statement and Record of Decision

Mandatory 15-Year Re-evaluation Date: 08/24/2024

Use: Fishing

Fishing was a traditional recreational use of the area that is now Tensas River NWR prior to its inclusion in the National Wildlife Refuge System and continues to be a recreational pursuit with the public. It is one of the more popular wildlife-dependent uses on the refuge. Fish populations currently support a sustainable harvest under a regulated fishing program.

Fishing has been identified in the National Wildlife Refuge System Improvement Act of 1997 as a priority public use provided it is compatible with the purpose for which the refuge was established.

Sport fishing is open on Africa, Judd, Buck, and Rainey Lakes year-round. Fishing for bream, crappie, and bass is excellent though fishing participation is light. Disabled fishermen have access to fishing at Rainey Lake due to a wheelchair accessible fishing pier. Fishing is subject to regulations established by the Louisiana Department of Wildlife and Fisheries. Fishing is further restricted on the refuge by regulations that prohibit commercial fishing on the refuge and prohibit the use of certain fishing methods.

Availability of Resources:

Resources involved in the administration and management of the use:

Personnel time associated with administration and law enforcement

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

Boat ramps, kiosks, brochures, law enforcement equipment, and access roads

Maintenance costs:

$10,000/year

Monitoring costs:

$5,000/year

Offsetting revenues:

None

Anticipated Impacts of the Use:

Short-term impacts:

Minor impacts, such as litter and gasoline contamination, could occur but not at a level that would cause serious concern. There is some erosion from outboard wakes.

Long-term impacts:

Fishing, as regulated, should not have any long-term, negative impacts on the refuge.

Cumulative impacts:

No cumulative impacts are known to occur.

Public Review and Comment:

This compatibility determination was part of the Draft Comprehensive Conservation Plan and Environmental Assessment (Draft CCP/EA) for Tensas River National Wildlife Refuge, which was announced in the *Federal Register* and made available for public comment from February 4 – March 6, 2009 (74 FR 6053). Methods used to solicit public review and comment included posted notices at Refuge Headquarters and area locations, and more than 200 copies of the Draft CCP/EA were distributed to adjacent landowners; the public; and local, state, and federal agencies. Public meetings were held in Tallulah and Winnsboro, Louisiana. Individual flyers, announcing these meetings, were sent out to the entire mailing list. The dates, times, locations, and comment period were specified in the flyer. News releases, including information on the availability of the Draft CCP/EA, the comment period, and public meeting locations, were sent to more than 45 area newspapers, television studios, and local radio stations.

Determination (check one below):

_____ Use is Not Compatible

__X__ Use is Compatible with Following Stipulations

Stipulations Necessary to Ensure Compatibility:

Commercial fishing is prohibited. Recreational fishing using commercial gear is allowed by obtaining a special use permit from the refuge. Trotlines must have cotton line attached to the ends and they must be tended daily.

Justification:

Fishing is probably one of the most popular forms of outdoor recreation in the state, and the refuge has the opportunity to provide quality fishing to the public. Current state and refuge regulations limit impacts to fish and wildlife populations on the refuge, while providing a safe and rewarding experience for the refuge visitor.

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

_____Categorical Exclusion without Environmental Action Statement

_____Categorical Exclusion and Environmental Action Statement

__X___Environmental Assessment and Finding of No Significant Impact

_____Environmental Impact Statement and Record of Decision

Mandatory 15-Year Re-evaluation Date: 08/24/2024

Use: Field Trials

Field trials are not one of the six priority public uses of the National Wildlife Refuge System but are historical uses of the refuge covered under a previous compatibility determination completed in 1980. Raccoon or squirrel dog field trials are generally the only request. Raccoon dog trials are conducted at night and the dogs race against the clock for locating and treeing the raccoon. The raccoon is killed in the process.

Squirrel dog field trials are conducted during the open state squirrel season and follow state regulations for take of animals. Both types of field trials are very limited in number of requests. Field trials are not a priority public use but do encourage practices and techniques that enhance the tradition and quality of the hunting experience and reduce the incidence of downed but unretrieved game.

Where would the use be conducted?

Field dog trials would not be held where wildlife is concentrated or during the local breeding season. The field trials will also be contained in an area that will accommodate the trial without undue disturbance to field office operations.

When would the use be conducted?

No trials would be conducted from April 15 through August 15 for the protection of nesting and breeding wildlife. No trials would be conducted during the gun deer hunting season. Squirrel field trials would only be conducted during the state squirrel season. No trials would be conducted from December through April, which is the expected denning activity period for the Louisiana black bear. Trials would be permitted for no more than two consecutive calendar days for local trials and no more than three consecutive calendar days for regional or national trials.

How would the use be conducted?

Hunting clubs must request a special use permit. Clubs are limited to conducting one trial per calendar year or season, and only two nights per raccoon field trial. The use would only be open September and October and user is required to kill the racoon. Permission will be granted only for one trial at a time in order to avoid conflicts of time and space. These usually consist of three to four with up to six parties and with two dogs per party. Raccoon trials are conducted at night, and squirrel trials are conducted during the day.

Why is this use being proposed?

Historically, people in this area have had a strong interest in hunting with raccoon and squirrel dogs. In most cases, there are sufficient areas available off of refuge lands to conduct field trials. However, at times and in our areas sites are not available off of refuge, and a few requests are received. Therefore, the refuge must review each request as a secondary use and determine compatibility based on refuge objectives, purposes, disturbance factors, etc.

Availability of Resources:

Resources involved in the administration and management of the use:

Law enforcement activities would be needed to provide resource and visitor protection.

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

No permanent physical facilities will be constructed or located on Service lands for the support of field trial activities. Any necessary portable facilities must be removed from the field office at the end of each field trial. All costs for temporary facilities and the conduct of a trial are the responsibility of the permittee (631 FW 5).

Maintenance costs:

None

Monitoring costs:

Monitoring and compliance would be handled within existing resources, programs, and staff time.

Offsetting revenues:

None

Anticipated Impacts of the Use:

Short-term impacts:

Field trials have the potential to adversely impact wildlife with disturbance. However, disturbance of wildlife will be short-term and minimized by not conducting trials where wildlife is concentrated and not during the local breeding or denning seasons. Additional stipulations are listed below. The number of field trials is few and with such low frequency that no significant conflicts would be expected with other users.

Long-term impacts:

Impacts are expected to be minimal to negligible with the limited number of requests and limiting to one trial at a time and one trial per club per year/season. No cumulative impacts are expected.

Public Review and Comment:

This compatibility determination was part of the Draft Comprehensive Conservation Plan and Environmental Assessment (Draft CCP/EA) for Tensas River National Wildlife Refuge, which was announced in the *Federal Register* and made available for public comment from February 4 – March 6, 2009 (74 FR 6053). Methods used to solicit public review and comment included posted notices at Refuge Headquarters and area locations, and more than 200 copies of the Draft CCP/EA were distributed to adjacent landowners; the public; and local, state, and federal agencies. Public meetings were held in Tallulah and Winnsboro, Louisiana. Individual flyers, announcing these meetings, were sent out to the entire mailing list. The dates, times, locations, and comment period were specified in the flyer. News releases, including information on the availability of the Draft CCP/EA, the comment period, and public meeting locations, were sent to more than 45 area newspapers, television studios, and local radio stations.

Determination (check one below):

_____ Use is Not Compatible

__X__ Use is Compatible with Following Stipulations

Stipulations Necessary to Ensure Compatibility:

- Field trials must be conducted under a special use permit.
- A permit fee of $50 is required.
- Time and space limits will be used to avoid conflicts with non-target wildlife species and other refuge users. In addition, no hunts will be conducted from April 15 through August 15 or during any gun deer hunts.
- Each club is limited to conducting one trial per calendar year/hunting season on the refuge, and a maximum of two nights per raccoon trial.
- Firearms are required. Participants must attempt to take treed animals. Squirrel field trials are required to be held during the state squirrel season. All state regulations apply for take of raccoons and squirrels according to state regulations.
- All vehicles are restricted to designated roads. No off-road vehicles are permitted during the trials.
- Injury and/or destruction of any plant or animal life, other than target animals, is prohibited.

Justification:

Historically, people in this area have had a strong interest in hunting with raccoon and squirrel dogs. It is a means of enjoying the outdoors and hunting. These trials are used to judge a dog's performance, not the actual taking of wildlife. The trials are considered low impact activities that have no long-term or cumulative effects and can be managed within existing refuge resources. Field trials are considered wildlife-dependent recreation as listed in Part 631 of the Fish and Wildlife Service Manual. They do not materially interfere with or detract from refuge purposes or objectives. They will not adversely affect refuge biological resources or conflict with wildlife-dependent priority public uses. The objective of permitting field trials on the refuge is to encourage practices and techniques that enhance the tradition and quality of the hunting experience.

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

_____Categorical Exclusion without Environmental Action Statement

_____Categorical Exclusion and Environmental Action Statement

__X___Environmental Assessment and Finding of No Significant Impact

_____Environmental Impact Statement and Record of Decision

Mandatory 10-Year Re-evaluation Date: 08/24/2019

Use: Boating

Fishing is allowed year-round on the refuge and is in accordance with state regulations. The annual natural flood regime makes it difficult to efficiently manage a sport fishery. Typically, river overflows can provide a natural stocking of the fishery through fish immigration. Sport fish, carp, buffalo, and other fishes benefit from overflows. As a result, seasonal fishing from motorboats and non-motorized boating for wildlife observation and photography are common uses.

Where would the use be conducted?

Boating occurs in all accessible areas of the refuge. The Tensas River and many sloughs, creeks, and oxbow lakes provide a great diversity of aquatic habitat. The Tensas River NWR has several lakes and bayous that can be accessed for fishing opportunities.

When would the use be conducted?

Sport fishing is open on Africa, Judd, Buck, and Rainey Lakes year-round. Fishing for bream, crappie, and bass is excellent though fishing participation is light. Disabled fishermen have access to fishing at Rainey Lake due to a wheelchair accessible fishing pier.

How would the use be conducted?

The refuge is accessible every day. It is closed at night except for coon hunting. Entry on all or portions of individual areas may be temporarily suspended by posting upon occasions of unusual or critical conditions affecting land, water, vegetation, wildlife populations, or public safety. The variety of access points makes it difficult to monitor the amount of use actually occurring on the refuge.

Why is this use being proposed?

Providing the public with wildlife-dependent recreation is a priority use of the refuge. Boating provides access to fishing, a priority public use. Since fishing and wildlife observation are integral parts of the boating experience, it is considered a wildlife-dependent activity.

Availability of Resources:

Resources involved in the administration and management of the use:

These lands have been open to the public since the refuge was established. Therefore, access trails, parking lots, signs, and other facilities, as well as staff to enforce regulations and maintain these facilities, have already been provided by the Service.

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

None

Maintenance costs:

Every 3 to 5 years, the annual maintenance costs may increase in order to provide gravel for parking lots and roads and to replace signs.

Monitoring costs:

Costs are minimal to monitor consequences of the public having access to the refuge, such as degree of littering and vandalism. Plants and wildlife will be monitored to determine any impacts as a result of public use.

Offsetting revenues:

None

Anticipated Impacts of the Use:

Boating is restricted to the river and its tributaries and backwaters. Access is typically by a couple of individuals per boat. Some canoeing and motorboating occurs and could cause minor disturbance to wading bird colonies. Disturbance may affect nest abandonment, predation on young, or subject young birds to environmental stress. Boating activity can also disturb wildlife, especially birds, because it disrupts feeding activity and can affect large areas in a short period of time. The disturbance can result in increased energy expenditures from avoidance flights and decreased energy intake due to interference with feeding activity. This is important to survival especially with wintering waterfowl. However, there are species-specific differences in response and speed, and approach of boats can influence wildlife response. Zoning of visitor activities by time and space, clustering public use facilities, proper monitoring, educating visitors, and enforcement will ensure compatibility with the purposes of the refuge and mission of the National Wildlife Refuge System. Through periodic evaluation of boating effects on wildlife, the visitor services program will assess resource impacts. If future human impacts are determined through evaluation to be detrimental to important natural resources, actions will be taken to reduce or eliminate those impacts. Continued monitoring for significant disturbance during critical times or with large groups of birds will allow the refuge to determine if additional regulations are needed if use increases. Any unreasonable harassment would be grounds for the manager to close the area to these uses or restrict the uses to minimize harm.

Horsepower restrictions exist for motorboats, and limited human conflicts have occurred as a result of reckless boat operators. This use will be monitored for impact and future modifications could be made to regulations.

The use of motorized and human powered boats will not adversely impact refuge purposes. The biggest problem with this use is littering and will continue to be handled with law enforcement and refuge staff for cleanup.

Public Review and Comment:

This compatibility determination was part of the Draft Comprehensive Conservation Plan and Environmental Assessment (Draft CCP/EA) for Tensas River National Wildlife Refuge, which was announced in the *Federal Register* and made available for public comment from February 4 – March 6, 2009 (74 FR 6053). Methods used to solicit public review and comment included posted notices at Refuge Headquarters and area locations, and more than 200 copies of the Draft CCP/EA were distributed to adjacent landowners; the public; and local, state, and federal agencies. Public meetings were held in Tallulah and Winnsboro, Louisiana. Individual flyers, announcing these meetings, were sent out to the entire mailing list. The dates, times, locations, and comment period were specified in the flyer. News releases, including information on the availability of the Draft CCP/EA, the comment period, and public meeting locations, were sent to more than 45 area newspapers, television studios, and local radio stations.

Refuge Determination:

_____ Use is Not Compatible

__X__ Use is Compatible with Following Stipulations

Stipulations Necessary to Ensure Compatibility:

- Motorized land vehicles are to remain on designated roads only.
- Camping and fires are prohibited.
- No equipment (blinds, stands, boats, vehicles, etc.) may be left over night.
- Harassment of wildlife and excessive damage to vegetation are prohibited.
- Outboard motors not greater than 10 horsepower are allowed to be operated in all refuge lakes, streams, and bayous.
- All motorized boats must utilize navigation lights according to state regulations.
- Personal flotation devices must be worn by all occupants of motor boats that are underpower on the refuge.
- If any adverse impacts occur from any aspect of the limited public access, then further restrictions may be imposed to protect the plant and animal resources of the refuge.

Justification:

Outdoor recreational activities provide individuals with quality wildlife-dependent experiences and educational opportunities and allow them to utilize a natural environment. Motorized and human powered boating for fishing and wildlife observation is a low impact and low cost activity on Tensas River NWR. Boating provides access to fishing, a priority public use. Since fishing and wildlife observation are integral parts of the boating experience, it is considered a wildlife-dependent activity and therefore does not materially detract from or interfere with the purposes of the refuge or mission of the National Wildlife Refuge System.

NEPA Compliance for Refuge Use Decision:

_____ Categorical Exclusion without Environmental Action Statement

_____ Categorical Exclusion and Environmental Action Statement

__X__ Environmental Assessment and Finding of No Significant Impact

_____ Environmental Impact Statement and Record of Decision

Mandatory 10-Year Re-evaluation Date: 08/24/2019

Use: Bottomland Hardwood Forest Management

Forest management, per timber harvest sales, is the only realistic tool that is available to enable the refuge to achieve wildlife forest habitat objectives. The forests of the southeast require significant disturbance at a level of acreage that cannot be achieved without incorporating commercial entities. Therefore, forest management packages are offered for bid with those trees in excess of the management needs offered for harvest. The excess value of the trees in relation to the cost of the entire management package will be the amount paid to the government and placed in the general fund. Forest management is conducted to benefit wildlife and further the refuge purpose. It is not based on current or future economic gain from timber harvest.

Where would the use be conducted?

Refuge forester and refuge manager would decide where forest management is needed. Designated areas would be marked with blue paint and on a map.

When would the use be conducted?

Timber harvest sales would occur when forest management was needed, when soil conditions were appropriate for least impact, and when the bidding process was complete and a contract was awarded.

How would the use be conducted?

Active forest management consists of mechanical removal of commercial and non-commercial forest products by refuge personnel or contractors utilizing conventional logging equipment. The refuge is sub-divided into manageable-sized compartments, which are selected for forest management activities based on the greatest need for wildlife habitat improvement, and which are tempered with considerations for spatial, temporal, and area constraints stated in the Bottomland Hardwood Forest Habitat Management Guidelines (2005). Once selected, vegetative/wildlife data is collected and analyzed to determine the extent of treatment needed, which is then expressed in a document that details the specific silvicultural strategies necessary to obtain specific wildlife habitat objectives. Only those trees marked with two spots of blue paint could be cut. Stumps would be cut as low as possible to the ground as long as some portion of the paint remained visible on the stump. Special use permits, detailing specific environmental, fiscal, physical, and administrative constraints, are issued to contractors that have bid the highest for the forest products or through the negotiation process, if applicable. All state and federal permits, clearances, and consultations (such as State Historic Preservation Office cultural resource clearance, permits associated with the Clean Water Act and Intra-Service Section 7 consultation) would be obtained prior to implementing the special use permit. Timber harvest sales require a pre-entry conference between refuge forester and permittee before starting logging operations.

Why is this use being proposed?

Forest management is needed to improve general health, productivity, diversity, and quality of the bottomland and upland forests. Forest stands often need to be gradually thinned to reduce competition, to increase diversity, to lessen the chance for epidemics of damaging insects, and to remove diseased trees. Accomplishing habitat improvement targets requires heavily utilizing the commercial sale of refuge forest products (timber sales) since funding and staffing never has been, and never will be, at a level to achieve force account (refuge staff) conducted actions only.

Availability of Resources:

Resources involved in the administration and management of the use:

Forest management activities are administered by refuge staff and do not exceed the general operational costs of the refuge. Recent staff losses due to lack of resources is and will continue to impact the refuge's ability to implement habitat management actions at a level needed to maintain and improve habitat conditions. This activity is perhaps the single highest priority for the refuge due to its critical nature in achieving wildlife objectives, and staff will continue to make every effort to address forest stand improvements.

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

None

Maintenance costs:

None

Monitoring costs:

Refuge staff will conduct monitoring protocols in line with adaptive management, the Forest Habitat Management Plan (2005), and the Comprehensive Conservation Plan to determine when habitat condition objectives are met, signaling treatment and monitoring achievement of habitat condition objectives post treatment.

Offsetting revenues:

Utilizing contract loggers to achieve forest habitat management goals is the only way to achieve improvement given the lack of resources to implement force account harvest activities. Receipts generated from the sale of forest products removed from the refuge are deposited into the Refuge Revenue Sharing Account. The funds collected annually from all refuges are distributed to the counties on a prorated basis (acreage of refuge land within each county and appraised value of this land) as an "in-lieu-taxes" payment as directed by the Refuge Revenue Sharing Act.

Anticipated Impacts of the Use:

Logging activities result in some soil disturbance that results in minor soil compaction and erosion. Minor siltation and turbidity of streams may occur. Most streams on the refuge are intermittent and are mostly dry during normal logging seasons. Besides the removal of some trees on sales, minor

damage of some residual trees and other vegetation will occur. No adverse long-term impacts are anticipated. For more detailed analysis, refer to the approved Forest Habitat Management Plan and Environmental Assessment on file at the refuge.

Public Review and Comment:

This compatibility determination was part of the Draft Comprehensive Conservation Plan and Environmental Assessment (Draft CCP/EA) for Tensas River National Wildlife Refuge, which was announced in the *Federal Register* and made available for public comment from February 4 – March 6, 2009 (74 FR 6053). Methods used to solicit public review and comment included posted notices at Refuge Headquarters and area locations, and more than 200 copies of the Draft CCP/EA were distributed to adjacent landowners; the public; and local, state, and federal agencies. Public meetings were held in Tallulah and Winnsboro, Louisiana. Individual flyers, announcing these meetings, were sent out to the entire mailing list. The dates, times, locations, and comment period were specified in the flyer. News releases, including information on the availability of the Draft CCP/EA, the comment period, and public meeting locations, were sent to more than 45 area newspapers, television studios, and local radio stations.

Refuge Determination:

_____ Use is Not Compatible

__X__ Use is Compatible with Following Stipulations

Stipulations Necessary to Ensure Compatibility:

- Ensure adherence to the Forest Habitat Management Plan.
- Sale of forest products is utilized only when it is the most efficient and cost effective method of managing refuge forests.
- Harvested trees are sold under fair trade principles and in a manner in which the government will be compensated at a fair market value.
- All roads, pipelines, and ditches must be kept clear of brush and debris.
- All tops falling into rights-of-way must be immediately cleared.
- To prevent rutting on access roads, entry is prohibited during periods of wet ground conditions.
- No littering or fires.
- No firearms or archery equipment may be transported in vehicles.
- No tractors allowed.
- Unmarked trees less than three inches in diameter may be cut to provide access to marked trees.
- Personal protective equipment (glasses, gloves, chaps, etc.) is strongly recommended.
- Additional conditions will apply to sale of forest products .

Justification:

The refuge forest needs a variety of treatments to enhance habitat conditions for all migratory and native wildlife species. Bottomland forests must have openings created to keep adequate understory and midstory for a variety of songbirds and white-tailed deer habitat. Thinning bottomland forests will create better conditions for remaining trees to grow larger and create better mast crop for wood ducks and white-tailed deer. Forest management, per timber harvest, is compatible with the purposes for which the refuge was established and is the single most effective tool enabling the refuge to meet wildlife habitat objectives.

NEPA Compliance for Refuge Use Decision:

_____ Categorical Exclusion without Environmental Action Statement

_____ Categorical Exclusion and Environmental Action Statement

__X__ Environmental Assessment and Finding of No Significant Impact

_____ Environmental Impact Statement and Record of Decision

Mandatory 10-Year Re-evaluation Date: 08/24/2019

Use: Trapping

Beavers, raccoons, and feral hogs are the species upon which management activities may be directed. All species are at a sufficiently high level on the refuge to adversely affect ecosystem functions. As indicated in the Comprehensive Conservation Plan, beaver activities have caused significant deterioration and loss of bottomland hardwoods throughout the refuge, and excessive numbers of raccoons can have negative effects on the reproduction of forest breeding birds and wild turkeys. In addition to competing with native wildlife for food, feral hogs are known to destroy turkey nests, to kill deer fawns, and to damage roads and levees. Feral hogs consume both hard and soft mast, agricultural crops, and managed vegetation such as moist-soil plant species. Further, feral hogs may carry serious diseases, such as swine brucellosis and pseudo rabies, that are transmissible to domestic animals and humans as well as other wildlife.

Protection and restoration of bottomland hardwoods and improvements in game and non-game populations are central components of the Comprehensive Conservation Plan. To this end, trapping and/or hunting remain the only viable methods to reduce population levels of beavers, raccoons, and feral hogs. The Service would issue special use permits to administer a trapping program consistent with sound biology, refuge purposes, and conservation of ecosystem functions.

Availability of Resources:

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

Anticipated Impacts of the Use:

Targeted removal of beavers, raccoons, and feral hogs from portions of the refuge would reduce the negative impacts these species are having on ecosystem functions. Control of beaver populations would help ensure the protection of important bottomland hardwood forests, including reforestation areas, and minimize beaver problems associated with the operation of water control structures on the refuge. Regulated trapping of raccoon populations would reduce the nest predation this species causes to neotropical migratory birds and wild turkeys. Reducing feral hogs on Tensas River NWR will ensure that road and levee damage is minimized; forest, re-forested, and managed habitats are not negatively impacted; and native wildlife species are not adversely affected. However, no trapping program, regardless of how well it is designed, can prevent the possible take of other species. Trappers would be required to report the incidental take of other species. A negligible impact on other wildlife species is expected in both the short- and long-term. Due to the design of traps used

and trap placement, impacts due to incidental take of the Louisiana black bear is expected to be minimal. Close monitoring of trapping activities on the refuge will assure that such takes are minimal, and if problems arise, the allowance of this use will be reevaluated.

Public Review and Comment:

This compatibility determination was part of the Draft Comprehensive Conservation Plan and Environmental Assessment (Draft CCP/EA) for Tensas River National Wildlife Refuge, which was announced in the *Federal Register* and made available for public comment from February 4 – March 6, 2009 (74 FR 6053). Methods used to solicit public review and comment included posted notices at Refuge Headquarters and area locations, and more than 200 copies of the Draft CCP/EA were distributed to adjacent landowners; the public; and local, state, and federal agencies. Public meetings were held in Tallulah and Winnsboro, Louisiana. Individual flyers, announcing these meetings, were sent out to the entire mailing list. The dates, times, locations, and comment period were specified in the flyer. News releases, including information on the availability of the Draft CCP/EA, the comment period, and public meeting locations, were sent to more than 45 area newspapers, television studios, and local radio stations.

Refuge Determination:

_____ Use is Not Compatible

__X__ Use is Compatible with Following Stipulations

Stipulations Necessary to Ensure Compatibility:

As a trapping program is implemented on the refuge, it would be closely monitored to assess the potential adverse effects on other wildlife, as well as the benefits to game and non-game species and their habitats.

Modifications to the program would be implemented as needed to maintain compatibility. All trapping activities would be carried out under a refuge special use permit. Trappers would be limited by number, area, and season in order to target problem areas and minimize any negative impacts. Each trapper would be required to report the number and location of all traps and all wildlife taken. The implementation of a trapping program, under controlled conditions, provides an essential population control management tool and is compatible with the purposes of the refuge.

Justification*:*

The purposes of Tensas River NWR emphasize conservation of bottomland hardwood forests, wetlands, and migratory birds. Trapping is a wildlife population management tool used to regulate the population of certain wildlife species when those species are disrupting ecosystem functions. Beavers, raccoons, and feral hogs have been documented to cause negative impacts to forested wetlands and nesting birds. When these negative impacts become significant on the refuge, wildlife managers need trapping as a management tool to control the level of damage. Certainly, beavers and raccoons are important components of the ecosystem, but when their populations and negative impacts become significant, wildlife managers need a regulated trapping program to reduce their populations to acceptable levels.

NEPA Compliance for Refuge Use Decision:

_____ Categorical Exclusion without Environmental Action Statement

_____ Categorical Exclusion and Environmental Action Statement

__X__ Environmental Assessment and Finding of No Significant Impact

_____ Environmental Impact Statement and Record of Decision

Mandatory 10-year Re-evaluation Date: **08/24/2019**

Use: All-Terrain Vehicle Use

All-terrain vehicles (ATVs) are generally defined as 3-, 4-, or 6-wheeled vehicles that are equipped with low pressure tires designed primarily for off-road use. The use of ATVs is strictly in support of the priority public uses of hunting and fishing. The refuge has a very limited system of roads and has historically used ATVs for access to remote areas for wildlife-dependent activities. Often ATV trails were historically being used prior to refuge establishment because they were initiated over logging trails. Use of ATVs is common on the refuge but with good compliance to stipulations.

Where would the use be conducted?

All ATV use is restricted to designated marked trails. There are several miles of marked trails on the refuge.

When would the use be conducted?

ATVs are prohibited from two hours after sunset to 4:00 a.m. Trails are marked with signs and would be closed March 1 through August 31. Other restrictions may apply if it is determined that nesting and/or denning activities may be impacted by use of ATVs.

How would the use be conducted?

ATV access is by the general public for access to hunting and fishing areas. Raccoon hunters may not use ATVs. ATV tires are restricted to those no larger than 25x12 inches, with a maximum 1-inch lug height and a maximum allowable tire pressure of 7 lbs. psi., as indicated on the tire by the manufacturer. ATVs are usually trailored to trailheads and parking areas and ridden on trails to access remote areas within the refuge prior to walking to hunting or fishing areas. ATVs are not permitted off the designated trails.

Why is this use being proposed?

Access to this refuge is very limited. ATV trails are a necessity for priority public uses of hunting and fishing. The existing designated trail system is close to optimum to conduct the public use program. Minor additions/deletions, re-routing, or seasonal opening date changes may be implemented from time-to-time to address needs as they occur.

Availability of Resources:

Resources involved in the administration and management of the use:

These lands have been open to public since they were acquired. Therefore, access trails, parking lots, signs, and other facilities, as well as staff to enforce regulations and maintain these facilities, have already been provided by the Service. Law enforcement is required for regulated use of trails and ATV specifications.

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

None

Maintenance costs:

Every 3 to 5 years the annual maintenance costs may increase in order to provide gravel for parking lots and roads, to mow and flag trails, and to replace signs.

Monitoring costs:

Monitor consequences of public having access to the refuge such as degree of littering and vandalism. Plants and wildlife will be monitored to determine any impacts as a result of public use. Habitat degradation in area of trails will need to be monitored.

Offsetting revenues:

None

Anticipated Impacts of the Use:

In the early history of the refuge, trails were established for ATV use as a concession to limited access. ATVs were historically used in the area before the refuge was established. Use of ATVs does result in some minimal disturbance to wildlife as with any use. Restricting use to designated trails routed to avoid sensitive areas, such as major stream crossings or archaeological areas, and opening most trails to season use only minimizes overall potential impacts. The primary compatibility issues of concern are with disturbance to migratory waterfowl, endangered species, and habitat conservation.

The use of ATVs serves to provide increased access for the management of the deer herd via recreational harvest. ATV use also increases opportunities for quality wildlife-dependent activities (hunting, fishing, wildlife photography, and wildlife observation). ATV use has the potential for disturbance of the threatened Louisiana black bear (*Urus americanis luteolus*) as documented in the Biological Opinion of the U.S. Fish and Wildlife Service dated May 3, 1993. However, restrictive use of ATVs will reduce disturbances during certain times of the year. ATV use serves to maximize and evenly distribute the harvest of white-tailed deer thereby preventing overpopulation and the associated habitat degradation. Maintenance of habitat quality benefits the ecosystem as well as the Louisiana black bear.

Migratory waterfowl and other species of concern are not significantly impacted by ATV use. The refuge objective is to provide habitat for wintering waterfowl. Because of seasonal flooding (usually November through May), ATV trails are usually inaccessible during the winter months and during high waterfowl numbers of use.

The trails presently designated for ATV use are primitive in nature and were historically logging roads, old field roads, or rights-of-way. The terrain is relatively flat and drainage is poor. During seasonal flooding, the area is covered by several feet of water. Although the ground pressure exerted by ATVs is low, traffic eventually eliminates all vegetation within the trails and some rutting occurs when soils are saturated. Root damage to trees occurs when the soil cover has been eroded. This damage is also accompanied by disease such as butt rot. Limiting the use to trails confines and minimizes the damage to habitat. However, use of the trails during wet conditions creates ruts and mud holes, encouraging detours (which amplify the damage) at times, and management or enforcement may be needed. Generally, the impacts are temporary in that these areas tend to fill back or heal from one year to the next.

Public Review and Comment:

This compatibility determination was part of the Draft Comprehensive Conservation Plan and Environmental Assessment (Draft CCP/EA) for Tensas River National Wildlife Refuge, which was announced in the *Federal Register* and made available for public comment from February 4 – March 6, 2009 (74 FR 6053). Methods used to solicit public review and comment included posted notices at Refuge Headquarters and area locations, and more than 200 copies of the Draft CCP/EA were distributed to adjacent landowners; the public; and local, state, and federal agencies. Public meetings were held in Tallulah and Winnsboro, Louisiana. Individual flyers, announcing these meetings, were sent out to the entire mailing list. The dates, times, locations, and comment period were specified in the flyer. News releases, including information on the availability of the Draft CCP/EA, the comment period, and public meeting locations, were sent to more than 45 area newspapers, television studios, and local radio stations.

Refuge Determination:

_____ Use is Not Compatible

__X__ Use is Compatible with Following Stipulations

Stipulations Necessary to Ensure Compatibility:

- ATVs may be used only to reach areas open to wildlife-dependent activities such as hunting and fishing.
- Most ATV trails are open only from September 1 – February 28.
- ATV tires are restricted to those no larger than 25x12 inches with a maximum 1-inch lug height and a maximum allowable tire pressure of 7 lbs psi, as indicated on the tire by the manufacturer.
- Camping and fires are prohibited.
- No equipment (vehicles, ATVs, blinds, decoys, stands, etc.) may be left over night.
- Harassment of wildlife and excessive damage to vegetation are prohibited.
- If any adverse impacts occur from any aspect of the limited public access, then further restrictions may be imposed to protect the plant and animal resources of the refuge.
- ATV use is limited to designated trails only. Parking ATV trailers is restricted to parking areas and along public access roads.

Justification:

A well distributed and adequate deer harvest is essential to maintain a healthy deer herd and habitat. ATV use is an effective and practical means of distributing hunters. Hunting deer, small game, and waterfowl is a traditional and extremely popular use of the bottomland hardwood forests that comprise the Tensas River NWR. ATV use improves the quality of the experience by preventing overcrowding in easily accessible areas. There are areas available on the refuge where ATV use is not allowed. ATV use is essential for access to the refuge hunting program for those users who are mobility impaired.

NEPA Compliance for Refuge Use Decision:

_____ Categorical Exclusion without Environmental Action Statement

_____ Categorical Exclusion and Environmental Action Statement

__X__ Environmental Assessment and Finding of No Significant Impact

_____ Environmental Impact Statement and Record of Decision

Mandatory 10-year Re-evaluation Date: **08/24/2019**

Use: Cooperative Farming Program

Cooperative farming is utilized on the refuge to manage and maintain approximately 475 acres of cropland and 994 acres of waterfowl impoundment habitats that provide seasonally flooded crops and moist-soil units necessary to meet the refuge's waterfowl habitat objectives. This farming program is a critical component of the refuge's habitat management program. The refuge's cooperative farmers enter into annual cooperative farming agreements specifying what crops will be grown in specific fields for both the refuge and cooperative farmer's share. The cooperative farmer receives 80 percent of the crop planted while the refuge receives 20 percent of the crop planted. The refuge's crop share is strategically located in areas that can be flooded in the winter to provide waterfowl foraging habitat in support of North American Waterfowl Management Plan objectives for the Mississippi Alluvial Valley. At the present time, the refuge does not have the staff or equipment necessary to manage and maintain the acreage needed to meet its waterfowl foraging objectives without the assistance of the cooperative farming program. Refuge cooperative farming operations will continue under carefully regulated conditions.

Availability of Resources:

Based on a review of the refuge's budget allocated for this activity, there is adequate funding to ensure compatibility and to administer the use at its current level.

Anticipated Impacts of the Use:

Cooperative farmers grow rice, corn, and milo on the refuge under an annually updated cooperative farming agreement. Refuge crop shares are left standing in the field to provide high energy grain and forage primarily for wintering waterfowl. The cooperative farmers' harvested fields are also used extensively by snipe, shorebirds, geese, ducks, deer, bear, and other wildlife. Cooperative farming

results in some degree of soil erosion due to disking and planting operations. The impact of soil erosion on adjacent wetlands and water bodies is minimal because of maintained grass buffer strips around each field and the extensive use of flash board risers to retain and slowly release sediment-laden water. Cooperative farmers are allowed to use approved pesticides under a closely monitored pesticide use proposal system. Refuge-approved pesticides have low toxicity and fast biodegradation rates compared to other commonly used agricultural pesticides. Under approved label application rates and methods, approved pesticides should have minimal effect on the biological environment. However, the potential exists for misapplication or accidental spills of approved pesticides. During the past 10 years, there have been no known pesticide accidents or pesticide-related wildlife mortality reported on the refuge. Careful monitoring of cooperative farmer pesticide use should further reduce any potential impacts from pesticide use on the refuge.

Public Review and Comment:

This compatibility determination was part of the Draft Comprehensive Conservation Plan and Environmental Assessment (Draft CCP/EA) for Tensas River National Wildlife Refuge, which was announced in the *Federal Register* and made available for public comment from February 4 – March 6, 2009 (74 FR 6053). Methods used to solicit public review and comment included posted notices at Refuge Headquarters and area locations, and more than 200 copies of the Draft CCP/EA were distributed to adjacent landowners; the public; and local, state, and federal agencies. Public meetings were held in Tallulah and Winnsboro, Louisiana. Individual flyers, announcing these meetings, were sent out to the entire mailing list. The dates, times, locations, and comment period were specified in the flyer. News releases, including information on the availability of the Draft CCP/EA, the comment period, and public meeting locations, were sent to more than 45 area newspapers, television studios, and local radio stations.

Determination (check one below):

_____ Use is Not Compatible
__X__ Use is Compatible with Following Stipulations

Stipulations Necessary to Ensure Compatibility:

The cooperative farming program is regulated through annual cooperative farming agreements that specify the field crops to be grown, acceptable farming practices, and approved pesticide use procedures. Special conditions contained in each cooperative farming agreement provide the following requirements: no fall disking allowed, vegetative filter strips are maintained around all fields and water bodies, crops must be harvested by November 15, and no drainage of seasonally flooded habitat is allowed until after March 1. Refuge crops will be planted in designated fields and not be manipulated in any way after maturity, and only approved pesticides will be used when the level of pest occurrence is at the economic threshold level as indicated by crop scouting. Under these carefully controlled conditions, the cooperative farming program has been and is expected to continue to be compatible with the refuge's purposes.

Justification:

The cooperative farming actions as set forth in the Cropland Management Plan for Tensas River NWR are in accordance with Service guidelines for the protection, management, and enhancement of habitats for wildlife populations on the refuge. Adherence to the Cropland Management Plan promotes the enhancement of habitats for migratory birds, threatened and endangered species, and resident wildlife.

NEPA Compliance for Refuge Use Description:

_____Categorical Exclusion without Environmental Action Statement

_____Categorical Exclusion and Environmental Action Statement

__X___Environmental Assessment and Finding of No Significant Impact

_____Environmental Impact Statement and Record of Decision

Mandatory 10-Year Re-evaluation Date: 08/24/2019

Use: Research Studies

This activity will allow university students and professors, non-governmental researchers, and governmental scientists access to the refuge's natural environment to conduct both short- and long-term research projects. The outcome of this research will result in better knowledge of our natural resources and improved methods to manage, monitor, and protect refuge resources. The refuge will support research by the Service, the U.S. Geological Survey, and others on the Louisiana black bear, neotropical migratory birds, waterfowl, woodcock, bottomland hardwood restoration and management, fisheries, amphibians and reptiles, forest bats, and sandhill cranes. Efforts will be made to expand partnerships with Louisiana State University and other universities.

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.

Anticipated Impacts of the Use:

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

Determination (check one below):

____ Use is Not Compatible

__X__ Use is Compatible with Following Stipulations

Stipulations Necessary to Ensure Compatibility:

Each request for use of the refuge for research will be examined on its individual merit. Questions of who, what, when, where, and why will be asked to determine if requested research contributed to the refuge purposes and could best be conducted on the refuge without significantly affecting the resources. If so, the researcher will be issued a special use permit. Progress will be monitored and the researcher will 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 plants and animals that might occur.

Public Review and Comment:

This compatibility determination was part of the Draft Comprehensive Conservation Plan and Environmental Assessment (Draft CCP/EA) for Tensas River National Wildlife Refuge, which was announced in the *Federal Register* and made available for public comment from February 4 – March 6, 2009 (74 FR 6053). Methods used to solicit public review and comment included posted notices at Refuge Headquarters and area locations, and more than 200 copies of the Draft CCP/EA were distributed to adjacent landowners; the public; and local, state, and federal agencies. Public meetings were held in Tallulah and Winnsboro, Louisiana. Individual flyers, announcing these meetings, were sent out to the entire mailing list. The dates, times, locations, and comment period were specified in the flyer. News releases, including information on the availability of the Draft CCP/EA, the comment period, and public meeting locations, were sent to more than 45 area newspapers, television studios, and local radio stations.

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

_____Categorical Exclusion without Environmental Action Statement

_____Categorical Exclusion and Environmental Action Statement

__X__ Environmental Assessment and Finding of No Significant Impact

_____Environmental Impact Statement and Record of Decision

Mandatory 10-Year Re-evaluation Date: 08/24/2019

Use: Horse/Mule Special Use
(for raccoon hunting at night)

While not one of the six priority wildlife-dependent public uses listed or identified in the National Wildlife Refuge System Improvement Act of 1997, the use of horse/mule pack animals exists at Tensas River National Wildlife Refuge to facilitate raccoon hunting at night.

Where would the use be conducted?

Annual permits from the refuge are required for using horses or mules for night-time raccoon hunting, which is allowed in designated open areas of the refuge.

When would the use be conducted?

Using horses and mules for raccoon hunting would be restricted to the season as set by refuge regulations.

How would the use be conducted?

A map with designated roads and trails and any other refuge-specific regulations is available in the refuge annual hunting and fishing regulations.

Why is this use being proposed?

Those using horses for raccoon hunting have historically used this area for this wildlife-dependent activity.

Availability of Resources:

Resources involved in the administration and management of the use:

Minimal resources would be required. Some law enforcement would be necessary to provide resource and visitor protection.

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

None. The lands have been open to the public since they were acquired. Use of pack animals is a self-initiated activity with no amenities provided specifically for this activity. Thus, access trails, parking lots, and staff to enforce regulations have already been provided by the Service.

Maintenance costs:

Negligible, with road maintenance conducted for operations other than this public use.

Monitoring costs:

Minimal costs would be involved to monitor for resource impacts and to determine if use is above compatibility.

Offsetting revenues:

None

Anticipated Impacts of the Use:

The purpose of this section is to critically and objectively evaluate the potential effects that horse and mule pack animals could have on the wildlife, habitat, and other public use elements encompassed in refuge purposes. One key concern is to maintain adverse impacts within acceptable limits. Therefore, one of the functions of this section is to point out whether adverse impacts are within or exceed these acceptable thresholds.

Impacts related to use of pack animals include invasive plant seed dispersal, soil compaction and erosion, stream sedimentation, trail widening, vegetation trampling, direct wildlife disturbance, and direct and indirect conflicts with other recreationists.

Invasive plants can be spread to new sites through manure. Horse digestive systems are relatively inefficient and seeds of invasive plants are often still viable after passing through the horse digestive system. This could result in introduction and/or spread of invasive species, limiting the ability to restore and maintain natural biological diversity within a refuge. However, while the above-mentioned relationship between horses and the spread of invasive species is well known in western states, there are no known problems of this type in southern bottomland hardwood habitat that is found on this refuge. For example, use of pack animals has occurred on this refuge for several years, and there has never been an instance of a new invasive species encroaching into this habitat associated with its use.

Soil disturbance is often created through soil compaction with as much as 1,500 psi. exerted on the soil surface with each step. Additionally, hoof action tends to dig up and puncture the soil surface, which causes sediment loss and increases potential for disturbance-tolerant vegetation to establish. The use is minimal at this time with a special use permit system in place for monitoring for greater impacts.

Trail widening can occur with horses or hikers with vegetation getting flattened and churning up soil. This can increase spread of previously established invasives by providing loose disturbed soil for germination. This impact initially increases invasive plant encroachment with light to moderate trail use and eventually can lower species richness values to near zero with heavy impacts. This type of impact occurs with several priority wildlife-dependent uses and must be continually monitored with refuge operations as well.

There is some temporary disturbance to wildlife due to human activity on the land, but it is minimal. Studies have shown that activities restricted to trails and roads will often allow wildlife, especially migratory birds, to habituate to human presence due to the activity being consistently on a trail versus moving unpredictably (Gabrielsen and Smith 1995). Disturbance, such as flushing a nesting bird, is inherent to these activities, but the disturbance is temporary and not significant. One study even identified that disturbance of waterfowl to horseback riders resulted in tolerance up to 46 meters versus 75 meters with hikers (Miller et al., 1998) and 77 to 273 meters with boaters. Many wildlife species appear to be habituated to livestock, and thus are less likely to flee when approached through this method. However, any form of approach will likely result in some level of disturbance-related impact. Monitoring of disturbance would be conducted, and high levels of disturbance would be grounds for the manager to close the area to these uses or restrict the uses further to minimize harm.

Anticipated impacts described suggest that unrestricted use of horses and mules could lead to invasive plant seed encroachment, vegetative trampling, and disturbance to wildlife. These impacts could be cumulative with associated impacts from other public use opportunities. These effects would not be focused on roads and trails when riding horses or mules for raccoon hunting in designated areas of the refuge. However, so few individuals request a permit for this activity that the impacts are expected to be minimal to negligible.

Public Review and Comment:

This compatibility determination was part of the Draft Comprehensive Conservation Plan and Environmental Assessment (Draft CCP/EA) for Tensas River National Wildlife Refuge, which was announced in the *Federal Register* and made available for public comment from February 4 – March 6, 2009 (74 FR 6053). Methods used to solicit public review and comment included posted notices at Refuge Headquarters and area locations, and more than 200 copies of the Draft CCP/EA were distributed to adjacent landowners; the public; and local, state, and federal agencies. Public meetings were held in Tallulah and Winnsboro, Louisiana. Individual flyers, announcing these meetings, were sent out to the entire mailing list. The dates, times, locations, and comment period were specified in the flyer. News releases, including information on the availability of the Draft CCP/EA, the comment period, and public meeting locations, were sent to more than 45 area newspapers, television studios, and local radio stations.

Determination (check one below):

_____ Use is Not Compatible

__X__ Use is Compatible with Following Stipulations

Stipulations Necessary to Ensure Compatibility:

- Each individual participating is responsible for knowing and complying with refuge regulations.
- Open roads are subject to seasonal closures based on the presence of sensitive wildlife populations.
- Horse trailers are restricted to designated parking areas.

Justification:

While not listed as a primary wildlife-dependent recreational use under the National Wildlife Refuge System Administration Act of 1997, use of horses and mules for raccoon hunting is a standard and historical means of transporting game and appreciating the outdoors. Therefore, horseback/mule riding, as described in this compatibility determination, is determined compatible with the refuge mission of providing wildlife-dependent public use.

The use of horses and mule pack animals is believed to be a compatible public use under the stipulations outlined in this compatibility determination. Primary reasons for this determination include:

- Use of horseback riding is in support of raccoon hunting (a priority wildlife-dependent recreational use).
- This use is infrequent and seasonal with only low levels expected.

- Impacts associated with this use are not believed to exceed impacts already caused by other public use activities.

It is understood from the summary of anticipated impacts that there are elements of allowing the use of horses and mules for raccoon hunting to have the potential of detrimental effects. Yet, this often is the case with several of the primary wildlife-dependent recreational uses that support the refuge mission and purpose (Pease et al., 2005). Hence, the refuge has to constantly consider spatial and seasonal control of public access to minimize disturbance during critical times, such as when waterfowl are overwintering on the refuge, and fat deposition and energy conservation are important, or during the nesting period. Any impacts would be monitored closely and this compatibility determination re-evaluated if necessary.

Mandatory 10-Year Re-evaluation Date: 08/24/2019

Use: Fire Management

Fire management will be conducted at Tensas River NWR and at Farm Service Agency inventory lands the refuge administers in Madison, Tensas, Franklin, East Carroll, and Richland Parishes, Louisiana. Refuge personnel, with assistance from the Louisiana Department of Agriculture and Forestry, through a cooperative agreement, will actively suppress all wildfire by employing accepted firefighting methods, ranging from the use of hand tools to tractor plows. Wildfire presuppression will be conducted by disking firebreaks at hardwood plantations determined to be the most vulnerable to wildfire. No prescribed burning will be undertaken in existing bottomland hardwood forests, but prescribed burning may be used to site-prepare fallow agricultural lands for reforestation purposes.

Availability of Resources:

Resources involved in the administration and management of the use:

Refuge personnel would be required to assist in this effort. The time required would depend on the size of the effort and area targeted to be burned.

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

Special heavy field equipment would be necessary during these activities due to the possibility of needing to create fire breaks.

Maintenance costs:

There would be recurring costs due to the need to periodically repeat fire management on selected sites.

Monitoring costs:

Refuge personnel would be needed throughout the activity to assure that all fires were contained to the designated treatment areas.

Offsetting revenues:

None

Anticipated Impacts of the Use:

Anticipated impacts of fire management at Tensas River NWR are minimal due to a low-incidence fire history and low-intensity expected fire behavior in the main fuel types present. Degradation of soil, water, vegetation, and air quality could result from wildfire suppression, presuppression, or prescribed burning.

Public Review and Comment:

This compatibility determination was part of the Draft Comprehensive Conservation Plan and Environmental Assessment (Draft CCP/EA) for Tensas River National Wildlife Refuge, which was announced in the *Federal Register* and made available for public comment from February 4 – March 6, 2009 (74 FR 6053). Methods used to solicit public review and comment included posted notices at Refuge Headquarters and area locations, and more than 200 copies of the Draft CCP/EA were distributed to adjacent landowners; the public; and local, state, and federal agencies. Public meetings were held in Tallulah and Winnsboro, Louisiana. Individual flyers, announcing these meetings, were sent out to the entire mailing list. The dates, times, locations, and comment period were specified in the flyer. News releases, including information on the availability of the Draft CCP/EA, the comment period, and public meeting locations, were sent to more than 45 area newspapers, television studios, and local radio stations.

Refuge Determination:

_____ Use is Not Compatible

__X__ Use is Compatible with Following Stipulations

Stipulations Necessary to Ensure Compatibility:

Fire management will be conducted according to the revised Fire Management Plan.

Minimum-impact wildfire suppression techniques (mainly constraints on the use of mechanical equipment) will be applied where prolific tree or ground denning by threatened Louisiana black bears (*Ursus americanus luteolus*) is documented or where bears are observed. These constraints will also be applied where hydric soils or steep terrain exist. Low-ground-pressure tracks will be used on dozers or tractor-plows to reduce soil compaction and rutting. Mechanical equipment will avoid known archaeological or historic sites and in the event a previously undiscovered site is encountered, an Unanticipated Site Discovery Plan will be followed. Whenever possible, at least a refuge resource advisor will accompany non-refuge firefighters to ensure protection of refuge resources.

Presuppression activities (disking firebreaks at refuge plantations) will have prior approval from the U.S. Army Corps of Engineers under General Permit No. 49 to comply with Section 404 of the Clean Water Act, as well as consultation with the Regional Archaeologist and the Louisiana State Historic Preservation Office to comply with Section 106 of the National Historic Preservation Act.

Prior to any prescribed burning, a Prescribed Fire Plan outlining environmental constraints and pertinent actions will be completed. In addition to the Clean Water Act and National Historic Preservation Act compliance, voluntary smoke management guidelines administered by the

Louisiana Department of Agriculture and Forestry will be adhered to in order to comply with Section 118 of the Clean Air Act.

Justification:

Wildfire suppression and presuppression activities will protect lives, property, wildlife, and wildlife habitat. In particular, it will protect the habitat of the threatened Louisiana black bear. Prescribed burning to site-prepare fallow agricultural land will contribute to restoring a portion of the devastated bottomland hardwood ecosystem as well as restoring bear habitat.

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

_____Categorical Exclusion without Environmental Action Statement

_____Categorical Exclusion and Environmental Action Statement

__X___Environmental Assessment and Finding of No Significant Impact

_____Environmental Impact Statement and Record of Decision

Mandatory 10-year Re-evaluation Date: 08/24/2019

Approval of Compatibility Determinations

The signature of approval is for all compatibility determinations considered within the CCP for Tensas River NWR. If one of the descriptive uses is considered for compatibility outside of the CCP, the approval signature becomes part of that determination.

Refuge Manager: 7-9-2009
(Signature/Date)

Regional Compatibility Coordinator: 7-20-09
(Signature/Date)

Refuge Supervisor: 7-27-2009
(Signature/Date)

Regional Chief, National Wildlife Refuge System, Southeast Region: 7-30-09
(Signature/Date)

Appendix G. Intra-Service Section 7 Biological Evaluation

REGION 4
INTRA-SERVICE SECTION 7 BIOLOGICAL EVALUATION FORM

Originating Person: Kelly Purkey
Telephone Number: 318-574-2664
E-Mail: Kelly_purkey@fws.gov
Date: 11/07/2007

PROJECT NAME (Grant Title/Number): Tensas River 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
_X_ Refuges/Wildlife

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

III. Station Name: Tensas River National Wildlife Refuge

IV. Description of Proposed Action (attach additional pages as needed):

Implementation of the Comprehensive Conservation Plan for Tensas River NWR by adopting the preferred alternative of Ecosystem Management that will provide guidance, management direction, and operation plans for the next 15 years.

V. Pertinent Species and Habitat:

A. Include species/habitat occurrence map:

B. Complete the following table:

SPECIES/CRITICAL HABITAT	STATUS[1]
Louisiana Black Bear	T, PCH
Ivory-billed Woodpecker	E

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

VI. Location (see CCP Figure X):

A. Ecoregion Number and Name: Region 4, Lower Mississippi River Ecosystem

B. County and State: Franklin, Madison, Tensas, Parishes, LA

C. Section, township, and range (or latitude and longitude): T15N R10E Sections 1, 2, 3, 9, & 16 and Parts of Sections 4, 10, 11, 12, 15, 20, & 21; T15N R11E Sections 13 & 23 and Parts of Sections 6, 7, 11, 12, 14, 16,17, & 24.

D. Distance (miles) and direction to nearest town: 10 miles Southwest of Tallulah.

E. Species/habitat occurrence: Louisiana black bears are common on the refuge and on surrounding lands. Ivory-billed woodpeckers historically, but not currently, used 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):

Implementing Alternative C, Ecosystem Management, would have minimal disturbance to the Louisiana black bear and ivory-billed woodpecker. Louisiana black bears could potentially be disturbed due to increased human/bear interactions. However, public use has occurred on the refuge since 1983, during which time bear populations have greatly increased. Habitat management practices in the CCP will advance the recovery of the Louisiana black bear in this area and contribute to the recovery and future delisting potential.

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

Law enforcement officials will monitor public use to ensure that all activities are within legal regulations. The heaviest public use is expected to occur during the bear dening season, which will limit human/bear interactions. The refuge will continue to educate the public about the legal protection provided to the Louisiana black bear, how refuge management actions will contribute to the recovery, and the importance of its continued existence in the ecosystem.

VIII. Effect Determination and Response Requested:

SPECIES/ CRITICAL HABITAT	DETERMINATION[1]			RESPONSE1 REQUESTED
	NE	NA	AA	
Louisiana Black Bear/PCH		X		
Ivory-billed Woodpecker		X		

[1]*DETERMINATION/ RESPONSE REQUESTED:*

signature (originating station) 4/8/2008 date

Refuge Manager
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 6/23/08 date

Supervisor LFO
title office

Appendix H. Wilderness Review

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 Tensas River 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 CCP.

Appendix I. Refuge Biota

BIRDS

Symbols which appear in this checklist represent the following:

Seasonal appearance
Sp - Spring - March, April, May
S - Summer - June, July, August
F - Fall - September, October, November
W - Winter - December, January, February

Seasonal abundance
a - Abundant - Can be easily found
c - Common - Can be regularly found
u - Uncommon - Infrequently found
r - Rare - Recorded on a few occasions
e - Extirpated - No longer found in area

Common Name	Scientific Name	W	Sp	Su	F
Pied-billed grebe	*Podilymbus podiceps*	u	u	x	u
American white pelican	*Pelecanus erythrorhynchos*				
Double-crested cormorant	*Phalacrocorax auritus*				
Anhinga	*Anhinga anhinga*	r	c	c	c
American bittern	*Botaurus lentiginosus*	-	u	-	u
Least bittern	*Botaurus lentiginosus*				
Great blue heron	*Ardea herodias*	u	u	c	u
Great egret	*Casmerodius albus*	-	u	c	u
Snowy egret	*Egretta thula*	-	u	u	u
Little blue heron	*Egretta caerulea*	r	a	a	a
Tricolored heron	*Egretta tricolor*	-	r	r	r
Cattle egret	*Bubulcus ibis*	r	c	c	c
Green-backed heron	*Butorides striatus*	-	u	u	u
Black-crowned night-heron	*Nycticorax nycticorax*	-	r	r	r
Yellow-crowned night-heron	*Nycticorax violaceus*	c	c	c	c
White ibis	*Eudocimus albus*	-	u	u	u
Wood stork	*Mycteria Americana*	-	-	r	r
Greater white-fronted goose	*Anser albifrons*	r	r	-	r

Common Name	Scientific Name	W	Sp	Su	F
Snow goose	*Chen caerulescens*	u	u	-	u
Ross' goose	*Chen rossii*				
Canada goose	*Branta Canadensis*	r	r	-	r
Wood duck	*Aix sponsa*	a	c	c	c
Green-winged teal	*Anas crecca*	u	u	-	u
American black duck	*Anas rubripes*	u	r	-	r
Mallard	*Anas platyrhynchos*	a	c	-	c
Northern pintail	*Anas acuta*	u	r	-	r
Blue-winged teal	*Anas discors*	u	c	r	u
Northern shoveler	*Anas clypeata*	u	r	-	r
Gadwall	*Anas strepera*	u	r	-	r
American wigeon	*Anas Americana*	u	u	-	r
Canvasback	*Aythya valisneria*				
Redhead	*Aythya Americana*				
Ring-necked duck	*Aythya collaris*	r	-	r	r
Lesser scaup	*Aythya affinis*	r	r	-	r
Common goldeneye	*Bucephala clangula*				
Bufflehead	*Bucephala albeola*				
Hooded merganser	*Mergus cucullatus*	r	r	r	r
Common merganser	*Mergus merganser*	r	-	-	-
Ruddy duck	*Oxyura jamaicensis*				
Black vulture	*Coragyps atratus*	c	u	u	u
Turkey vulture	*Cathartes aura*	u	u	u	u
Osprey	*Pandion haliaetus*	-	r	-	-
American swallow-tailed kite	*Elanoides forficatus*	-	-	r	-
Mississippi kite	*Ictinia mississippiensis*	-	c	u	r
Bald eagle	*Haliaeetus leucocephalus*	r	-	-	-
Northern harrier	*Circus cyaneus*	u	u	-	u
Sharp-shinned hawk	*Accipiter striatus*	r	r	-	r
Cooper's hawk	*Accipiter cooperii*	r	r	r	r
Red-shouldered hawk	*Buteo lineatus*	c	c	c	c
Broad-winged hawk	*Buteo platypterus*	-	u	u	u

Common Name	Scientific Name	W	Sp	Su	F
Red-tailed hawk	*Buteo jamaicensis*	c	c	u	c
Rough-legged hawk	*Buteo lagopus*				
Golden eagle	*Aquila chrysaetos*	r	-	-	-
American kestrel	*Falco sparverius*	u	u	r	u
Merlin	*Falco columbarius*	-	r	-	r
Peregrine falcon	*Falco peregrinus*	r	r	e	r
Wild turkey	*Meleagris gallopavo*	c	c	c	c
Northern bobwhite	*Colinus virginianus*	u	u	u	u
King rail	*Rallus elegans*	r	r	r	r
Virginia rail	*Rallus limicola*	-	-	-	-
Sora rail	*Porzana Carolina*	r	r	-	r
Purple gallinule	*Porphyrula martinica*	-	r	r	r
American coot	*Fulica Americana*	u	r	-	r
American golden plover	*Pluvialis dominica*	-	c	-	r
Killdeer	*Charadrius vociferous*	u	u	u	u
American avocet	*Recurvirostra Americana*	-	r	-	-
Greater yellowlegs	*Tringa melanoleuca*	-	c	-	c
Lesser yellowlegs	*Tringa flavipes*	r	c	-	c
Solitary sandpiper	*Tringa solitaria*	-	u	-	u
Willet	*Tringa semipalmata*	-	r	-	-
Spotted sandpiper	*Actitis macularia*	-	u	-	u
Upland sandpiper	*Bartramia longicauda*	u	-	-	-
Semipalmated sandpiper	*Calidris pusilla*	r	-	-	-
Western sandpiper	*Calidris mauri*	r	-	-	-
Least sandpiper	*Calidris minutilla*	u	u	-	u
White-rumped sandpiper	*Calidris fuscicollis*	-	r	u	r
Baird's sandpiper	*Calidris bairdii*	-	r	-	-
Pectoral sandpiper	*Calidris melanotos*	-	c	-	c
Dunlin	*Calidris alpine*	u	u	-	u
Buff-breasted sandpiper	*Tryngites subruficollis*	-	c	-	-
Long-billed dowitcher	*Limnodromus scolopaceus*	-	r	-	-
Common snipe	*Gallinago gallinago*	c	c	-	c
American woodcock	*Scolopax minor*	u	r	r	r

Common Name	Scientific Name	W	Sp	Su	F
Ring-billed gull	*Larus delawarensis*				
Rock dove	*Columba livia*	r	r	r	r
Mourning dove	*Zenaida macroura*	a	a	a	a
Common ground-dove	*Columbina passerine*	r	-	r	r
Black-billed cuckoo	*Coccyzus erythropthalmus*	-	r	-	r
Yellow-billed cuckoo	*Coccyzus americanus*	-	c	c	c
Greater roadrunner	*Geococcyx californianus*	-	-	r	-
Barn owl	*Tyto alba*	r	r	r	r
Eastern screech-owl	*Megascops asio*	a	a	a	a
Great horned owl	*Bubo virginianus*	r	r	r	r
Barred owl	*Strix varia*	a	a	a	a
Long-eared owl	*Asio otus*	r	-	-	-
Short-eared owl	*Asio flammeus*	-	-	-	-
Common nighthawk	*Chordeiles minor*	-	u	u	u
Chuck-will's-widow	*Caprimulgus carolinensis*	-	u	u	r
Whip-poor-will	*Caprimulgus vociferous*	-	u	u	r
Chimney swift	*Chaetura pelagica*	-	u	u	u
Ruby-throated hummingbird	*Archilochus colubris*	-	a	a	a
Belted kingfisher	*Megaceryle alcyon*	u	-	-	u
Red-headed woodpecker	*Melanerpes erythrocephalus*	c	u	u	u
Red-bellied woodpecker	*Melanerpes carolinus*	a	a	a	a
Yellow-bellied sapsucker	*Sphyrapicus varius*	u	u	-	u
Downy woodpecker	*Picoides pubescens*	c	c	c	c
Hairy woodpecker	*Picoides villosus*	u	u	u	u
Northern flicker	*Colaptes auratus*	u	u	u	u
Pileated woodpecker	*Dryocopus pileatus*	c	c	c	c
Ivory-billed woodpecker	*Campephilus principalis*	e	e	e	e
Olive-sided flycatcher	*Contopus cooperi*	-	r	-	r
Eastern wood-pewee	*Contopus virens*	-	c	c	c
Yellow-bellied flycatcher	*Empidonax flaviventris*	-	u	-	u
Acadian flycatcher	*Empidonax virescens*	-	c	c	c
Alder flycatcher	*Empidonax alnorum*	-	u	-	u

Common Name	Scientific Name	W	Sp	Su	F
Willow flycatcher	*Empidonax traillii*	-	u	-	u
Least flycatcher	*Empidonax minimus*	-	u	-	u
Eastern phoebe	*Ayornis phoebe*	c	u	-	u
Vermillion flycatcher	*Pyrocephalus rubinus*				
Great crested flycatcher	*Myiarchus crinitus*	-	c	c	c
Eastern kingbird	*Tyrannus tyrannus*	-	c	u	c
Scissor-tailed flycatcher	*Tyrannus forficatus*	-	r	-	r
Horned lark	*Eremophila alpestris*	c	c	u	c
Purple martin	*Progne subis*	-	c	u	c
Tree swallow	*Tachycineta bicolor*	r	c	u	c
Northern rough-winged swallow	*Stelgidopteryx serripennis*	-	u	r	u
Bank swallow	*Riparia riparia*	-	r	-	r
Cliff swallow	*Petrochelidon pyrrhonota*	-	r	-	r
Barn swallow	*Hirundo rustica*	-	c	u	c
Blue jay	*Cyanocitta cristata*	a	a	a	a
American crow	*Corvus brachyrhynchos*	c	c	c	c
Fish crow	*Corvus ossifragus*	u	u	u	u
Carolina chickadee	*Poecile carolinensis*	a	a	a	a
Tufted titmouse	*Baeolophus bicolor*	a	a	a	a
Red-breasted nuthatch	*Sitta Canadensis*				
White-breasted nuthatch	*Sitta carolinensis*	u	u	u	u
Brown-headed nuthatch	*Sitta pusilla*				
Brown creeper	*Certhia Americana*	u	u	-	u
Carolina wren	*Thryothorus ludovicianus*	a	a	a	a
House wren	*Troglodytes aedon*	u	u	-	u
Winter wren	*Troglodytes troglodytes*	u	u	-	u
Sedge wren	*Cistothorus platensis*	u	u	-	u
Marsh wren	*Cistothorus palustris*	u	u	-	u
Golden-crowned kinglet	*Regulus satrapa*	c	u	-	c
Ruby-crowned kinglet	*Regulus calendula*	c	c	-	c
Blue-gray gnatcatcher	*Polioptila caerulea*	r	c	c	c
Eastern bluebird	*Sialia sialis*	u	u	r	u

Common Name	Scientific Name	W	Sp	Su	F
Veery	*Catharus fuscescens*	-	u	-	u
Gray-cheeked thrush	*Catharus minimus*	-	u	-	u
Swainson's thrush	*Catharus ustulatus*	-	c	-	c
Hermit thrush	*Catharus guttatus*	c	c	-	c
Wood thrush	*Hylocichla mustelina*	-	c	c	c
American robin	*Turdus migratorius*	a	c	-	c
Gray catbird	*Dumetella carolinensis*	r	c	u	c
Northern mockingbird	*Mimus polyglottos*	c	c	c	c
Brown thrasher	*Toxostoma rufum*	c	a	u	a
American pipit	*Anthus rubescens*	c	c	-	c
Cedar waxwing	*Bombycilla cedrorum*	c	c	r	-
Loggerhead shrike	*Lanius ludovicianus*	u	u	u	u
European starling	*Sturnus vulgaris*	a	a	c	a
White-eyed vireo	*Vireo griseus*	r	a	a	a
Solitary vireo	*Vireo solitarius*	u	u	-	u
Yellow-throated vireo	*Vireo flavifrons*	-	c	c	c
Warbling vireo	*Vireo gilvus*	-	r	r	r
Philadelphia vireo	*Vireo philadelphicus*	-	u	-	u
Red-eyed vireo	*Vireo olivaceus*	-	a	a	a
Bachman's warbler	*Vermivora bachmanii*	-	e	e	e
Blue-winged warbler	*Vermivora pinus*	-	u	-	u
Golden-winged warbler	*Vermivora chrysoptera*	-	u	-	u
Tennessee warbler	*Vermivora peregrine*	-	a	-	a
Orange-crowned warbler	*Vermivora celata*	u	u	-	u
Nashville warbler	*Vermivora ruficapilla*	-	u	-	u
Northern parula	*Parula Americana*	-	a	a	c
Yellow warbler	*Dendroica petechia*	-	u	-	u
Chesnut-sided warbler	*Dendroica pensylvanica*	-	c	-	c
Magnolia warbler	*Dendroica magnolia*	-	c	-	c
Black-throated blue warbler	*Dendroica caerulescens*	-	r	-	-
Yellow-rumped warbler	*Dendroica coronata*	a	a	-	a
Black-throated green	*Dendroica virens*	-	c	-	c

Common Name	Scientific Name	W	Sp	Su	F
warbler					
Blackburnian warbler	*Dendroica fusca*	-	u	-	u
Yellow-throated warbler	*Dendroica dominica*	-	c	c	c
Pine warbler	*Dendroica pinus*	r	-	r	r
Prairie warbler	*Dendroica discolor*	-	r	-	r
Palm warbler	*Dendroica palmrum*				
Bay-breasted warbler	*Dendroica castanea*	-	c	-	c
Blackpoll warbler	*Dendroica striata*	-	c	-	c
Cerulean warbler	*Dendroica cerulean*	-	u	r	u
Black-and-white warbler	*Mniotilta varia*	-	c	r	c
American redstart	*Setophaga ruticilla*	-	c	c	c
Prothonotary warbler	*Protonotaria citrea*	-	a	a	a
Worm-eating warbler	*Helmitheros vermivorus*	-	u	-	u
Swainson's warbler	*Limnothlypis swainsonii*	-	c	c	c
Ovenbird	*Seiurus aurocapillus*	-	c	-	u
Northern waterthrush	*Seiurus noveboracensis*	-	a	-	a
Louisiana waterthrush	*Seiurus motacilla*	-	a	-	a
Kentucky warbler	*Oporornis formosus*	-	c	c	c
Connecticut warbler	*Oporornis agilis*	-	r	-	-
Mourning warbler	*Oporornis Philadelphia*	-	r	-	-
Common yellowthroat	*Geothlypis trichas*	u	c	c	c
Hooded warbler	*Wilsonia citrine*	-	c	c	c
Wilson's warbler	*Wilsonia pusilla*	-	r	-	r
Canada warbler	*Wilsonia Canadensis*	-	c	-	c
Yellow-breasted chat	*Icteria virens*	-	u	u	u
Summer tanager	*Piranga rubra*	-	c	c	c
Scarlet tanager	*Piranga olivacea*	-	u	-	u
Northern cardinal	*Cardinalis cardinalis*	a	a	a	a
Rose-breasted grosbeak	*Pheucticus ludovicianus*	-	c	-	c
Blue grosbeak	*Passerina caerulea*	-	c	u	c
Indigo bunting	*Passerina cyanea*	-	a	a	a
Painted bunting	*Passerina ciris*	-	c	c	c
Dickcissel	*Spiza Americana*	-	a	a	u

Common Name	Scientific Name	W	Sp	Su	F
Rufous-sided towhee	*Pipilo erythrophthalmus*	c	c	c	c
Chipping sparrow	*Spizella passerine*	u	u	-	u
Field sparrow	*Spizella pusilla*	u	u	-	u
Vesper sparrow	*Pooecetes gramineus*	u	u	-	u
Savannah sparrow	*Passerculus sandwichensis*	c	c	-	c
Grasshopper sparrow	*Ammodramus savannarum*	r	r	-	r
Le conte's sparrow	*Ammodramus leconteii*	-	r	-	r
Fox sparrow	*Passerella iliaca*	u	u	-	u
Song sparrow	*Melospiza melodia*	c	c	-	c
Lincoln's sparrow	*Melospiza lincolnii*	r	r	-	r
Swamp sparrow	*Melospiza Georgiana*	c	c	-	c
White-throated sparrow	*Zonotrichia albicollis*	a	a	-	a
White-crowned sparrow	*Zonotrichia leucophrys*				
Harris' sparrow	*Zonotrichia querula*				
Dark-eyed junco	*Junco hyemalis*	a	c	-	c
Lapland longspur	*Calcarius lapponicus*	u	u	-	u
Bobolink	*Dolichonyx oryzivorus*	-	u	-	u
Red-winged blackbird	*Agelaius phoeniceus*	c	c	c	c
Eastern meadowlark	*Sturnella magna*	c	c	c	c
Rusty blackbird	*Euphagus carolinus*	c	u	-	u
Brewer's blackbird	*Euphagus cyanocephalus*	u	u	-	u
Common grackle	*Quiscalus quiscula*	a	c	c	c
Brown-headed cowbird	*Molothrus ater*	c	c	c	c
Orchard oriole	*Icterus spurious*	-	c	c	c
Northern oriole	*Icterus galbula*	-	u	r	u
Purple finch	*Carpodacus purpureus*	u	u	-	u
Pine siskin	*Carduelis pinus*	u	u	-	u
American goldfinch	*Carduelis tristis*	c	c	u	c
Evening grosbeak	*Coccothraustes vespertinus*				
House sparrow	*Passer domesticus*	u	u	u	u

MAMMALS THAT COULD OCCUR ON TENSAS RIVER NWR

Common Name	Scientific Name
Virginia opossum	*Didelphis virginiana*
Nine-banded armadillo	*Dasypus onvemcinctus*
Short-tailed shrew	*Blarina brevicauda*
Least shrew	*Cryptotis parva*
Big brown bat	*Eptesicus fuscus*
Red bat	*Lasiurus borealis*
Hoary bat	*Lasiurus cinereus*
Seminole bat	*Lasiurus seminolus*
Southeastern myotis	*Myotis austroriparius*
Evening bat	*Nycticeius humeralis*
Eastern pipistrelle	*Pipistrellus subflavus*
Rafinesque's big-eared bat	*Plecotus refinesquii*
Brazilian free-tailed bat	*Tadarida brasiliensis*
Swamp rabbit	*Sylvilagus aquaticus*
Eastern cottontail	*Sylvilagus floridanus*
Gray squirrel	*Sciurus carolinensis*
Fox squirrel	*Sciurus niger*
Southern flying squirrel	*Glaucomys volans*
American beaver	*Castor canadensis*
Marsh rice rat	*Oryzomys palustris*
Fulvous harvest mouse	*Reithrodontomys fulvescens*
White-footed mouse	*Peromyscus leucopus*
Cotton mouse	*Peromyscus gossypinus*
Hispid cotton rat	*Sigmodon hispidus*
Eastern wood rat	*Neotoma floridana*
Woodland vole	*Microtus pinetorum*
Muskrat	*Ondatra zibethicus*
House mouse	*Mus musculus*
Black rat	*Rattus rattus*

Common Name	Scientific Name
Norway rat	*Rattus norvegicus*
Nutria	*Myocaster coypus*
Coyote	*Canis latrans*
Gray fox	*Urocyon cinereoargenteus*
Red fox	*Vulpes vulpes*
Louisiana black bear	*Ursus americanus luteolus*
Raccoon	*Procyon lotor*
Long-tailed weasel	*Mustela frenata*
Mink	*Mustela vison*
Striped skunk	*Mephitis mephitis*
River otter	*Lutra canadensis*
Cougar	*Felis concolor*
Bobcat	*Lynx felis*
White-tailed deer	*Odocoileus virginianus*

REPTILES THAT COULD OCCUR ON TENSAS RIVER NWR

Common Name	Scientific Name
American alligator	*Alligator mississippiensis*
Green anole	*Anolis carolinensis*
Eastern fence lizard	*Sceloporus undulates*
Five-lined skink	*Eumeces fasciatus*
Broad-headed skink	*Eumeces laticeps*
Ground skink	*Scincella lateralis*
Common snapping turtle	*Macroclemys temminckii*
Mississippi map turtle	*Graptemys kohni*
Ouachita map turtle	*Graptemys ouachitensis*
Painted turtle	*Chrysemys picta*
River cooter	*Chrysemys concinna*
Cooter	*Pseudemys floridana*
Common slider	*Trachemys scripta*
Chicken turtle	*Deirochelys reticulatia*
Razorback musk turtle	*Sternotherus carinatus*
Stinkpot	*Sternotherus odoratus*
Common mud turtle	*Kinosternon subrubrum*
Gulf coast box turtle	*Terrapene carolina*
Spiny softshell turtle	*Apalone spinifer*
Green water snake	*Nerodia cyclopion*
Plainbelly water snake	*Nerodia erythrogaster*
Southern water snake	*Nerodia fasciata*
Diamondback water snake	*Nerodia rhombifera*
Glossy water snake	*Nerodia rigida*
Brown snake	*Storeria dekyi*
Rough green snake	*Opheodrys aestivus*
Western ribbon snake	*Thamnophis proximus*
Eastern garter snake	*Thamnophis sirtalis*

Common Name	Scientific Name
Glossy crayfish snake	*Regina rigida*
Graham's crayfish snake	*Regina grahamii*
Western worm snake	*Carphophis vermis*
Eastern hognose snake	*Heterdon platyrhinos*
Mud snake	*Rarancia abacura*
Mississippi green water snake	*Nerodia cyclopion*
Plain-bellied water snake	*Nerodia erythrogaster*
Banded water snake	*Nerodia fasciata*
Diamond-backed water snake	*Nerodia rhombifer*
Rough green snake	*Opheodrys aestivus*
Blue racer	*Coluber constrictor*
DeKay's snake	*Storeria dekayi*
Western ribbon snake	*Thamnophis proximus*
Common garter snake	*Thamnopis sirtalis*
Rough earth snake	*Virginia striatula*
Smooth earth snake	*Virginia valeriae*
Ring-necked snake	*Diadophis punctatus*
Rat snake	*Elaphe obsolete*
Common kingsnake	*Lampropeltis getulus*
Milk snake	*Lampropeltis triangulum*
Copperhead	*Agkistrodon contortrix*
Cottonmouth	*Agkistrodon piscivorus*
Timber rattlesnake	*Crotalus horridus*
Texas coral snake	*Micrurus tenere*

FISH THAT COULD OCCUR ON TENSAS RIVER NWR

Common Name	Scientific Name
Spotted gar	*Lepisosteus oculatus*
Longnose gar	*Lepisosteus osseus*
Shortnose gar	*Lepisosteus platostomus*
Alligator gar	*Atractosteus spatula*
American eel	*Anguilla rostrata*
Skipjack herring	*Alosa chrysochloris*
Gizzard shad	*Dorosoma cepedianum*
Threadfin shad	*Dorosoma petenense*
Redfin pickerel	*Esox americanus*
Chain pickerel	*Esox niger*
Common carp	*Cyprinus carpoi*
Mississippi silvery minnow	*Hybognathus nuchalis*
Speckled chub	*Hybognathus aestivalis*
Golden shiner	*Notemigonus crysoleucas*
Emerald shiner	*Notropis atherinoides*
River shiner	*Notropis blennius*
Ghost shiner	*Notropis buchanani*
Ironcolor shiner	*Notropis chalybaeus*
Silverband shiner	*Notropis shumardi*
Weed shiner	*Notropis texanus*
Mimic shiner	*Notropis volucellus*
Bullhead minnow	*Pimephales vigilax*
Red shiner	*Cyprinella lutrensis*
Blacktail shiner	*Cyprinella venusta*
Redfin shiner	*Lythrurus umbratillis*
Speckled chub	*Macrhybopsis aestivalis*
Silver chub	*Macrhybopsis storeriana*
Pugnose minnow	*Opsopoeodus emiliae*
Creek chubsucker	*Erimyzon oblongus*

Common Name	Scientific Name
Lake chubsucker	*Erimyzon sucetta*
Smallmouth buffalo	*Ictiobus bubalus*
Bigmouth buffalo	*Ictiobus cyprinellus*
Black buffalo	*Ictiobus niger*
Spotted sucker	*Minytrema melanops*
Blacktail redhourse	*Moxostoma poecilurum*
Blue catfish	*Ictalurus furcatus*
Yellow bullhead	*Ictalurus natalis*
Channel carfish	*Ictalurus punctatus*
Stonecat	*Noturus flavus*
Tadpole madtom	*Noturus gyrinus*
Flathead catfish	*Ameiurus melas*
Yellow bullhead	*Ameiurus ntalis*
Pirate perch	*Aphredoderus sayanus*
Golden topminnow	*Fundulus chrysotus*
Blackstripe topminnow	*Fundulus notalus*
Starhead topminnow	*Fundulus blairae*
Blackspotted topminnow	*Fundulus olivaceus*
Mosquitofish	*Gambusia affinis*
Brook silversides	*Labidesthes sicculus*
Inland silversides	*Menidia beryllina*
Gulf pipefish	*Syngnathus scovelli*
Striped bass	*Morone saxatilis*
White bass	*Morone chrysops*
Yellow bass	*Morone mississippiensis*
Flier	*Centrarchus macropterus*
Banded pygmy sunfish	*Elassoma zonatum*
Warmouth	*Lepomis gulosus*
Green sunfish	*Lepomis cyanellus*
Orangespotted sunfish	*Lepomis humilis*

Common Name	Scientific Name
Bluegill sunfish	*Lepomis macrochirus*
Dollar sunfish	*Lepomis marginatus*
Longear sunfish	*Lepomis megalotis*
Redead sunfish	*Lepomis microlophus*
Spotted sunfish	*Lepomis punctatus*
Bantam sunfish	*Lepomis symmetricus*
Largemouth bass	*Micropterus salmoides*
White crappie	*Pomoxis annularis*
Black crappie	*Pomoxis nigromaculatus*
Bluntnose darter	*Etheostoma chlorosomum*
Creole darter	*Etheostoma collettei*
Cypress darter	*Etheostoma proeliare*
Logperch	*Percina caprodes*
Sauger	*Stizostedion canadense*
Freshwater drum	*Aplodinotus grunniens*

AMPHIBIANS THAT COULD OCCUR ON TENSAS RIVER NWR

Common Name	Scientific Name
Three-toed amphiuma	*Amphiuma tridactylum*
Western lesser siren	*Siren intermedia*
Mole salamander	*Ambystoma talpoideum*
Spotted salamander	*Ambystoma maculatum*
Marbled salamander	*Ambystoma opacum*
Central newt	*Notophthalmus viridescens*
Dwarf American toad	*Bufo americanus*
Woodhouse's toad	*Bufo woodhousii*
Northern cricket frog	*Acris crepitans*
Spring creeper	*Hyla crucifer*
Cope's gray treefrog	*Hyla chrysoscelis*
Green treefrog	*Hyla cinerea*
Gray treefrog	*Hyla versicolor*
Striped chorus frog	*Pseudacris triseriata*
Eastern narrow-mouthed toad	*Gastrophryne carolinensis*
Bullfrog	*Rana catesbeiana*
Green frog	*Rana clamitans*
Southern leopard frog	*Rana sphenocephala*
Pickerel frog	*Rana palustris*

PLANTS THAT COULD OCCUR ON TENSAS RIVER NWR

Common Name	Scientific Name
Horsetail	*Equisetum hyemale*
Ebony spleenwort	*Asplenium platyneuron*
Southern lady fern	*Athyrium filax-femina aspleniodes*
Holly fern	*Cyrtomium fortunei*
Mariana maiden fern	*Macrothelypteris torresiana*
Sensitive fern	*Onoclea sensibilis*
Resurrection fern	*Polypodium polypodioides*
Christmas fern	*Polystichum acrostichoides*
Southern shield fern	*Thelypteris kunthii*
Shield fern	*Thelypteris hispidula*
Blunt-lobed woodsia	*Woodsia obtuse*
Japanese climbing-fern	*Lygodium japonicum*
Mosquito fern	*Azolla caroliniana*
Waterclover	*Marsilea uncinata*
Hairy waterclover	*Marsilea vestita*
Southern grape fern	*Botrychium biternatum*
Rattlesnake-fern	*Botrychium virginianum*
Bulbous adder's-tongue	*Ophioglossum crotalophoroides*
Common adder's-tongue	*Ophioglossum vulgatum*
Doedor cedar	*Cedrus deodora*
Eastern red cedar	*Juniperus virginiana*
Shortleaf pine	*Pinus echinata*
Slash pine	*Pinus elliottii*
Loblolly pine	*Pinus taeda*
Baldcypress	*Taxodium distichum*
Tule	*Typha domingensis*
Cattail	*Typha latifolia*
Pondweed	*Potamogeton diversifolius*
Pondweed	*Potamogeton nodosus*
Southern naiad	*Najas quadalupensis*
Creeping burhead	*Echinodorus cordifolius*

Common Name	Scientific Name
Arrowhead	*Sagittaria calycina*
Duck-potato	*Sagittaria latifolia*
Giant arrowleaf	*Sagittaria montevidensis*
Arrowhead	*Sagittaria platyphylla*
Smooth joyweed	*Alternanthera paronichyoides*
Alligatorweed	*Alternanthera philoxeroides*
Prostrate pigweed	*Amaranthus albus*
Southern amaranth	*Amaranthus australis*
Green amaranth	*Amaranthus hybridus*
Carelessweed	*Amaranthus palmeri*
Rough pigweed	*Amaranthus retroflexus*
Water hemp	*Amaranthus rudis*
Spiny amaranth	*Amaranthus spinosus*
Roughfruit amaranth	*Amaranthus tuberculatus*
Slender snakecotton	*Froelichia gracilis*
Frog's bit	*Limnobium spongia*
Spring bentgrass	*Agrostis hyemalis*
Foxtail	*Alopocurus carolinianus*
Bushy bluestem	*Andropogon glomeratus*
Broomsedge	*Andropogon virginicus*
Prairie three-awn grass	*Aristida oligantha*
Giant cane	*Arundinaria gigantha*
Giant reed	*Arundo donax*
Oats	*Avena sativa*
Carpetgrass	*Axonopus affinis*
Big carpetgrass	*Axonopus furcatus*
King ranch bluestem	*Bothriochloa ischaemum*
Signalgrass	*Brachiaria platyphylla*
Little quaking-grass	*Briza minor*
Japanese chess	*Bromus japonicus*
Bromegrass	*Bromus racemosus*
Rescuegrass	*Bromus unioloides*
Coastal sandbar	*Cenchrus incertus*

Common Name	Scientific Name
Inland sea oats	*Chasmanthium latifolium*
Chasmanthium	*Chasmanthium laxum*
Chasmanthium	*Chasmanthium sessiliflorum*
Showy chloris	*Chloris virgata*
Stout woodreed	*Cinna arundinacea*
Bermudagrass	*Cynodon dactylon*
Orchardgrass	*Dactylis glomerata*
Panicgrass	*Dichanthelium acuminatum implicatum*
Panicgrass	*Dichanthelium acuminatum lindheimeri*
Panicgrass	*Dichanthelium commutatum*
Openflower panicgrass	*Dichanthelium laxiflorum*
Crabgrass	*Digitaria ciliaris*
Smooth crabgrass	*Digitaria ischaemum*
Northern crabgrass	*Digitaria sanquinalis*
Crabgrass	*Digitaria villosa*
Junglerice	*Echinochloa colonum*
Barnyardgrass	*Echinochloa crusgalli*
Walter's millet	*Echinochloa walteri*
Goosegrass	*Eleusine indica*
Virginia wild rye	*Elymus virginicus*
Lovegrass	*Eragrostis barrelieri*
Lacegrass	*Eragrostis capillaries*
Stinkgrass	*Eragrostis cilianensis*
Lovegrass	*Eragrostis glomerata*
Teal lovegrass	*Eragrostis hypnoides*
Lovegrass	*Eragrostis minor*
Lovegrass	*Eragrostis pectinecea*
India lovegrass	*Eragrostis pilosa*
Purple lovegrass	*Eragrostis spectabilis*
Sugarcane plumgrass	*Erianthus giganteus*
Prairie cupgrass	*Eriochloa contracta*
Cupgrass	*Eriochloa gracilis*
Nodding fescue	*Festuca obtuse*

Common Name	Scientific Name
Meadow fescue	*Festuca pratensis*
Arkansas mannagrass	*Glyceria septentrionalis arkansana*
Velvetgrass	*Holcus lanatus*
Little barley	*Hordeum pusillum*
Barley	*Hordeum vulgare*
Southern cutgrass	*Leersia hexandra*
Catchfly-grass	*Leersia lenticularis*
Rice cutgrass	*Leersia oryzoides*
Whitegrass	*Leersia virginica*
Sprangletop	*Leptochloa canadense*
Red sprangletop	*Leptochloa filiformis*
Amazon sprangletop	*Leptochloa panicoides*
Ryegrass	*Lolium perenne*
Nimblewill muhly	*Muhlenbergia schreberi*
Basketgrass	*Oplismenus hirtellus setarius*
Rice	*Oryza sativa*
Witchgrass	*Panicum capillare*
Fall panicgrass	*Panicum dichotomiflorum*
Panicgrass	*Dichanthelium dichotomum*
Savannah panicum	*Phanopyrum gymnocarpon*
Gaping panicum	*Steinchisma hians*
Panicgrass	*Panicum ramosum*
Torpedograss	*Panicum repens*
Redtop panicum	*Panicum rigidulum*
Bull paspalum	*Paspalum boscianum*
Dallisgrass	*Paspalum dilatatum*
Knotgrass	*Paspalum distichum*
Florida paspalum	*Paspalum floridanum*
Water paspalum	*Paspalum fluitans*
Bahiagrass	*Paspalum notatum*
Early paspalum	*Paspalum praecox*
Hairy-seed paspalum	*Paspalum pubiflorum*
Thin paspalum	*Paspalum setaceum*

Common Name	Scientific Name
Vaseygrass	*Paspalum urvillei*
Canarygrass	*Phalaris angusta*
Carolina canarygrass	*Phalaris caroliniana*
Annual bluegrass	*Poa annua*
Fall bluegrass	*Poa autumnalis*
Kentucky bluegrass	*Poa pratensis*
American cupscale	*Sacciolepis striata*
Little bluestem	*Schizachyrium scoparium*
Foxtail	*Setaria faberi*
Foxtail	*Setaria geniculata*
Yellow foxtail	*Setaria glauca*
Sorghum	*Sorghum bicolor*
Johnsongrass	*Sorghum halepense*
Sloughgrass	*Spartina pectinata*
Priarie wedgescale	*Sphenopholus obtusata*
Sand dropseed	*Sporobolus cryptandrus*
Smutgrass	*Sporobolus indicus*
Dropseed	*Sporobolus pyramidatus*
Smutgrass	*Sporobolus vaginiflorus*
St. Augustine	*Stenotaphrum secundatum*
White tridens	*Tridens albescens*
Purpletop	*Tridens flavus*
Longspile tridens	*Tridens strictus*
Eastern gamagrass	*Tripsacum dactyloides*
Wheat	*Triticum aestivum*
Six-weeks fescue	*Vulpia octaflora*
Corn	*Zea mays*
Southern wildrice	*Zizaniopsis miliacea*
Caric-sedge	*Carex albolutescens*
Caric-sedge	*Carex amphibola*
Yellowfruit sedge	*Carex annectens*
Caric-sedge	*Carex atlantica*
Caric-sedge	*Carex blanda*

Common Name	Scientific Name
Caric-sedge	*Carex caroliniana*
Caric-sedge	*Carex cephalophora*
Cherokee sedge	*Carex cherokeensis*
Caric-sedge	*Carex complanata*
Crowfoot sedge	*Carex crus-corvi*
Caric-sedge	*Carex festucacea*
Caric-sedge	*Carex flaccosperma*
Caric-sedge	*Carex frankii*
Caric-sedge	*Carex gigantea*
Caric-sedge	*Carex granularis*
Caric-sedge	*Carex hyalinolepis*
Caric-sedge	*Carex intumescens*
Hop sedge	*Carex lupulina*
Caric-sedge	*Carex muriculata*
Caric-sedge	*Carex nigromarginata*
Caric-sedge	*Carex oxylepis*
Sedge	*Carex retroflexa*
Caric-sedge	*Carex squarrosa*
Caric-sedge	*Carex triangularis*
Caric-sedge	*Carex tribuloidea*
Caric-sedge	*Carex typhina*
Caric-sedge	*Carex vulpinoides*
Flatsedge	*Cyperus acuminatus*
Flatsedge	*Cyperus aristatus*
Flatsedge	*Cyperus brevifolius*
Flatsedge	*Cyperus compressus*
Flatsedge	*Cyperus erythrorhizos*
Flatsedge	*Cyperus esculentus*
Flatsedge	*Cyperus globulosus*
Flatsedge	*Cyperus iria*
Flatsedge	*Cyperus odoratus*
Flatsedge	*Cyperus ovularis*
Flatsedge	*Cyperus polystachyos*

Common Name	Scientific Name
Nutgrass	*Cyperus pseudovegetus*
Flatsedge	*Cyperus rotundus*
Flatsedge	*Cyperus strigosus*
Flatsedge	*Cyperus surinamensis*
Flatsedge	*Cyperus tenuiflorus*
Flatsedge	*Cyperus virens*
Spikesedge	*Eleocharis albida*
Spikesedge	*Eleocharis microcarpa*
Spikesedge	*Eleocharis montevidensis*
Blunt spikesedge	*Eleocharis obtuse*
Dwarf spikesedge	*Eleocharis parvula*
Spikesedge	*Eleocharis tenuis*
Fimbristylis	*Fimbristylis autumnalis*
Fimbristylis	*Fimbristylis vahlii*
Umbrellasedge	*Rhynchospora corniculata*
Beakrush	*Scirpus koilolepis*
Stonerush	*Scleria oligantha*
Dwarf palmetto	*Sabal minor*
Virginia snakeroot	*Aristolochia serpentaria*
Green dragon	*Arisaema dracontium*
Jack-in-the-pulpit	*Arisaema quinatum*
Jack-in-the-pulpit	*Arisaema triphyllum*
Elephant ear	*Colocasia esculenta*
Duckweed	*Lemna minor*
Duckweed	*Lemna perpusilla*
Great duckweed	*Spirodela oligorrhiza*
Duckweed	*Spirodela polyrhiza*
Watermeal	*Wolffia columbiana*
Watermeal	*Wolffia papulifera*
Florida mudmidget	*Wolfiella floridana*
Mudmidget	*Wolfiella lingulata*
Spanish moss	*Tillandsia usneoides*
Dayflower	*Commelina communis*

Common Name	Scientific Name
Widow's-tears	*Commelina diffusa*
Dayflower	*Commelina erecta*
Dayflower	*Commelina virginica*
Spiderwort	*Tradescantia occidentalis*
Spiderwort	*Tradescantia ohiensis*
Water hyacinth	*Eichhornia crassipes*
Mud-plaintain	*Heteranthera limosa*
Mud-plaintain	*Heteranthera reniformis*
Bog rush	*Juncus acuminatus*
Bog rush	*Juncus biflorus*
Rush	*Juncus brachycarpus*
Bog rush	*Juncus dichotomus*
Diffuse rush	*Juncus diffusissimus*
Soft rush	*Juncus effuses*
Bog rush	*Juncus marginatus*
Bog rush	*Juncus scirpoides*
Slender rush	*Juncus tenuis*
Bog rush	*Juncus tenuis dudleyi*
Bog rush	*Juncus torreyi*
Garlic	*Allium ampeloprasum*
Crwo poison	*Allium bivalve*
Canada garlic	*Allium canadense*
Fragrant onion	*Allium inodorum*
Garlic	*Allium sativum*
False garlic	*Allium vineale*
Daylily	*Hemerocallis fulva*
Hyacinth	*Hyacinthus orientale*
Spring star-flower	*Ipheion uniflorum*
Grape hyacinth	*Muscari rarcemosum*
Star-of-Bethlehem	*Ornithogalum umbellatum*
Auriculed greenbrier	*Smilax auriculata*
Catbrier	*Smilax bona-nox*
Catbrier	*Smilax glauca*

Common Name	Scientific Name
Bristly greenbrier	*Smilax hispida*
Common greenbrier	*Smilax rotundifolia*
Greenbrier	*Smilax smallii*
Tulip	*Tulipa eichleri*
False aloe	*Manfreda virginica*
Spanish bayonet	*Yucca aloifolia*
Bear grass	*Yucca filamentosa*
Desert horsepurslane	*Trianthema portulacastrum*
Spiderlily	*Hymenocallis americana*
Spiderlily	*Hymenocallis liriosme*
Snowflake	*Leucojum aestivum*
Surprise lily	*Lycoris radiate*
Daffodil	*Narcissus incomparabilis*
Jonquil	*Narcissus jonquilla*
Daffodil	*Narcissus odorus*
False narcissus	*Narcissus pseudonarcissus*
Polyanthus narcissus	*Narcissus tazetta*
Zephyr lily	*Zephyranthes candida*
Gladiolus	*Gladiolus x gandavensis*
Red flag	*Iris fulva*
Flag	*Iris x germanica*
Southern blue flag	*Iris virginica*
Blue-eyed grass	*Sisyrinchium angustifolium*
Blue-eyed grass	*Sisyrinchium exile*
Blue-eyed grass	*Sisyrinchium minus*
Blue-eyed grass	*Sisyrinchium mucronatum*
Blue-eyed grass	*Sisyrinchium rosulatum*
Indian shot	*Canna flaccida*
Southern twayblade	*Listera australis*
Pale green orchid	*Platanthera flava*
Ladies tresses	*Spiranthes odorata*
Oval ladies tresses	*Spiranthes ovalis*
Spring ladies tresses	*Spiranthes vernalis*

Common Name	Scientific Name
Lizard's tail	*Saururus cernuus*
White poplar	*Populus alba*
Eastern cottonwood	*Populus deltoids*
Swamp cottonwood	*Populus heterophylla*
Lombardy poplar	*Populus nigra*
Weeping willow	*Salix babylonica*
Sandbar willow	*Salix exigua interior*
Black willow	*Salix nigra*
Bitter pecan	*Carya aquatica*
Bitternut hickory	*Carya cordiformis*
Pecan	*Carya illinoensis*
Black hickory	*Carya texana*
Black walnut	*Juglans nigra*
River birch	*Betula nigra*
Ironwood	*Carpinus caroliniana*
Compton oak	*Quercus comptoniae*
Cherrybark oak	*Quercus falcate*
Laurel oak	*Quercus laurifolia*
Overcup oak	*Quercus lyrata*
Cow oak	*Quercus michauxii*
Small live oak	*Quercus minima*
Water oak	*Quercus nigra*
Nuttall oak	*Quercus nuttallii*
Mouse-ear cress	*Arabidopsis thaliana*
Lake cress	*Aromoracia aquatica*
Bird rape	*Brassica campestrius*
Leaf mustard	*Brassica juncea*
Rape	*Brassica napus*
Black mustard	*Brassica nigra*
Common kale	*Brassica oleracea*
Bird rape	*Brassica rapa*
Shepard's-purse	*Capsella bursa-partoris*
Spring cress	*Cardamine bulbosa*

Common Name	Scientific Name
Hairy bittercress	*Cardamine hirsuta*
Smallflowered cress	*Cardamine prviflora*
Bittercress	*Cardamine pensylvanica*
Swinecress	*Coronopus didymus*
Whitlowgrass	*Braba brachycarpa*
Peppergrass	*Lepidium verginicum*
Bog marshcress	*Rorippa palustris cernua*
Yellowcress	*Rorippa sessiliflora*
Rockcress	*Sibara virginica*
White mustard	*Sinapis alba*
Charlock	*Sinapis arvensis*
Hedgemustard	*Sisymbrium officinale*
Cat-whiskers	*Cleome spinosa*
Ditch stonecap	*Penthorum sedoides*
Sweetgum	*Liquidambar styraciflua*
Sycamore	*Platanus occidentalis*
Parsley piert	*Alchemilla microcarpa*
Flowering quince	*Choenomeles lagenaria*
Bigtree hawthorn	*Crataegus berberifolia*
Cockspurthorn	*Crataegus crus-galli*
Parsley haw	*Crataegus marshallii*
Pasture haw	*Crataegus spathulata*
Green hawthorn	*Crataegus viridis*
Indian strawberry	*Duchesnea indica*
White avens	*Geum canadense*
Apple	*Malus pumila*
Wild plum	*Prunus americana*
Chickasaw plum	*Prunus angustifolia*
Laurel cherry	*Prunus caroliniana*
Hortulana plum	*Prunus hortulana*
Bigtree plum	*Prunus mexicana*
Wildgoose plum	*Prunus munsoniana*
Peach	*Prunus persica*

Common Name	Scientific Name
Black cherry	*Prunus serotina*
Flatwood plum	*Prunus umbrellata*
Fierythorn	*Pyracantha coccinea*
Common pear	*Pyrus communis*
Rose	*Rosa anemoneflora*
Macartney rose	*Rosa bracteata*
Rose	*Rosa cathayensis*
French rose	*Rosa gallica*
Cherokee rose	*Rosa laevigata*
Multiflora rose	*Rosa multiflora*
Blackberry	*Rubus betulifolius*
Northern dewberry	*Rubus flagellaris*
Louisiana blackberry	*Rubus louisianus*
Southern dewberry	*Rubus trivialis*
Spiraea	*Spiraea crenata*
Spiraea	*Spiraea vanhouttei*
Jointvetch	*Aeschynomene indica*
Mimosa	*Albizzia julibrissin*
Leadplant	*Amorpha fruticosa*
Amorpha	*Amorpha laevigata*
Hog peanut	*Amphicarpa bracteata*
American potato bean	*Apios americana*
Peanut	*Arachis hypogaea*
Emperor’s candlesticks	*Cassia alata*
Partridge pea	*Cassia fasciculate*
Wild senna	*Cassia marilandica*
Wild sensitive plant	*Cassia nictitans*
Sicklepod	*Cassia obtusifolia*
Coffee senna	*Cassia occidentalis*
Redbud	*Cercis canadensis*
Showy crotalaria	*Crotalaria spectabilis*
Illinois bunchflower	*Desmanthus illinoensis*
Beggerticks	*Desmodium canescens*

Common Name	Scientific Name
Tick-clover	*Desmodium cuspidatum*
Tick-clover	*Desmodium glabellum*
Beggerticks	*Desmodium laevigatum*
Beggerticks	*Desmodium paniculatum*
Boykin clusterpea	*Dioclea multiflora*
Milk pea	*Galactia regularis*
Waterlocust	*Gleditsia aquatica*
Honey locust	*Gleditsia triacanthos*
Soybean	*Glycine max*
Yellow vetchling	*Lathyrus aphaca*
Singletary pea	*Lathyrus hirsutus*
Creeping bush clover	*Lespedeza repens*
Japanese clover	*Lespedeza striate*
Spotted burclover	*Medicago arabica*
Black medic	*Medicago lupulina*
Burclover	*Medicago polymorpha*
White sweet clover	*Melilotus alba*
Sour clover	*Melilotus indica*
Powder puff	*Mimosa strigillosa*
Pea vine	*Pisum sativum*
Mesquite	*Prosopis pallida*
Kudzu	*Pueraria lobata*
Black locust	*Robinia pseudoacacia*
Rattlebush	*Sesbania drummondii*
Coffeebean	*Sesbania exaltata*
Bagpod coffeebean	*Sesbania vesicaria*
Trailing wild bean	*Strophostyles helvola*
Rabbitfoot clover	*Trifolium arvense*
Big hop-clover	*Trifolium campestre*
Least hop-clover	*Trifolium dubium*
Crimson clover	*Trifolium incarnatum*
Clover	*Trifolium lappaceum*
Red clover	*Trifolium pretense*

Common Name	Scientific Name
White clover	*Trifolium repens*
Persian clover	*Trifolium resupinatum*
Arrowleaf clover	*Trifolium vesiculosum*
Smooth vetch	*Vicia dasycarpa*
Deerpea	*Vicia ludoviciana*
Pigmy-flowered vetch	*Vicia minutiflora*
Common vetch	*Vicia sativa*
Narrow-leaved vetch	*Vicia sativa nigra*
Hairy vetch	*Vicia villosa*
Cowpea	*Vigna unguiculata*
Wisteria	*Wisteria frutescens*
Kentucky wisteria	*Wisteria macrostachya*
Dissected cranesbill	*Geranium dissectum*
Cranesbill	*Geranium sphaerospermum*
Creeping ladies'-sorrel	*Oxalis corniculata*
Shamrock sorrel	*Oxalis rubra*
Yellow wood-sorrel	*Oxalis stricta*
Puncture weed	*Tribulus terrestris*
Trifoliate orange	*Poncirus trifoliate*
Prickly ash	*Zanthoxylum clava-hervulis*
Chinaberry tree	*Melia azedarach*
Three-seeded mercury	*Acalypha gracilens*
Three-seeded mercury	*Acalypha ostryifolia*
Three-seeded mercury	*Acalypha rhomboidea*
Three-seeded mercury	*Acalypha virginica*
Caperonia	*Caperonia palustris*
Wolly croton	*Croton capitatus*
Goat croton	*Croton glandulosa*
Croton	*Croton monanthagynus*
Spurge	*Euphorbia dentate*
Summer poinsetta	*Euphorbia heterophylla*
Spurge	*Euphorbia humistrata*
Spotted spurge	*Euphorbia maculate*

Common Name	Scientific Name
Snow-on-the-mountain	*Euphorbia marginata*
Eyebane	*Euphorbia nutans*
Spurge	*Euphorbia prostrate*
Spurge	*Euphorbia serpens*
Spurge	*Euphorbia spathulata*
Leaf-flower	*Phyllanthus caroliniensis*
Leaf-flower	*Phyllanthus urinaria*
Castor-oil plant	*Ricinus communis*
Chinese tallowtree	*Sapium sebiferum*
Terrestrial starwort	*Callitriche deflexa austinii*
Water starwort	*Callitriche heterophylla*
Water starwort	*Callitriche peploides*
Winged sumac	*Rhus copallinum*
Smooth sumac	*Rhus glabra*
Poison ivy	*Toxicodendron redicans*
Pawpaw	*Asimina triloba*
Bufford holly	*Ilex cornata*
Decidous holly	*Ilex deciduas*
American holly	*Ilex opaca*
Yaupon	*Ilex vomitoria*
Spindletree	*Euonymus japonicus*
Box elder	*Acer negundo*
Drummond's red maple	*Acer rubrum drummondii*
Red maple	*Acer rubrum*
Silver maple	*Acer saccharinum*
Balloonvine	*Cardiospermum halicacabum*
Western soapberry	*Sapindus saponaria*
Touch-me-not	*Impatiens capensis*
Nandina	*Nandina domestica*
Mandrake	*Podophyllum peltatum*
Rattanvice	*Berchemia scandens*
Redvine	*Brunnichia ovata*
Carolina buckthorn	*Rhamnus caroliniana*

Common Name	Scientific Name
Peppervine	*Ampelopsis ardorea*
Heartleaf peppervine	*Ampelopsis cordata*
Marinevine	*Cissus incisa*
Virginia creeper	*Parthenocissus quinquefolia*
Summer grape	*Vitis aestivalis*
Gray grape	*Vitis cinerea*
Red grape	*Vitis palmate*
Riverbank grape	*Vitis riparia*
Muscadine	*Vitis rotundifolia*
Fox grape	*Vitis vulpine*
Velvetleaf butterprint	*Abutilon theophrasti*
Spurred anoda	*Anoda cristata*
Upland cotton	*Gossypium hirsutum*
Okra	*Abelmoschus esculentus*
Halberd-leaved rose-mallow	*Hibiscus laevis*
Wolly rose-mallow	*Hibiscus moscheutos lasiocarpus*
Rose-of-sharon	*Hibiscus syriacus*
Malachra	*Malachra capitata*
Wax mallow	*Malvaviscus arboreus*
Carolina mallow	*Mediola caroliniana*
Teaweed	*Sida rhombifolia*
Prickly teaweed	*Sida spinosa*
Chocolate-weed	*Melochia corchorifolia*
Saint Andrew’s cross	*Ascyrum hypericoides*
Nits-and-lice	*Hypericum drumondii*
Saint John’s wort	*Hypericum mutilum*
Saint John’s wort	*Hypericum punctatum*
Saint John’s wort	*Triadenum walteri*
Pinweed	*Lechea villosa*
Field pansy	*Viola bicolor*
Violet	*Viola langloisii*
Violet	*Viola missouriensis*
Violet	*Viola walteri*

Common Name	Scientific Name
Maypop	*Passiflora edulis*
Passionflower	*Passiflora lutea*
Toothcup	*Ammannia coccinea*
Crepe-myrtle	*Lagerstroemia indica*
Loosestrife	*Lythrum alatum*
Loosestrife	*Lythrum alatum lanceolatum*
Toothcup	*Rotala ramosior*
Velvetleaf gaura	*Gaura parviflora*
Primrose-willow	*Ludwigia decurrens*
Cylindric-fruited ludwigia	*Ludwigia glandulosa*
Water-primrose	*Ludwigia leptocarpa*
Marsh purslane	*Ludwigia palustris*
Water-primrose	*Ludwigia peploides*
Primrose	*Ludwigia uruguayensis*
Common evening primrose	*Oenothera biennis*
Cut-leaved evening primrose	*Oenothera laciniata*
Showy primrose	*Oenothera speciosa*
Desert horsepurslane	*Trianthema portulacastrum*
Watermilfoil	*Myriophyllum heterophyllum*
Parrotfeather	*Myriophyllum pinnatum*
Mermaidweed	*Proserpinaca palustris*
Devil's walkingstick	*Aralia spinosa*
English ivy	*Hedera helix*
Sand parsley	*Ammoselinum butleri*
Dill	*Anethum graveolens*
Wild chervil	*Chaerophyllum tainturieri*
Marsh parsley	*Ciclospermum leptophyllum*
Spotted water hemlock	*Cicuta maculata*
Honewort	*Cryptotaenia canadensis*
Finger dogshade	*Cynosciadium digitatum*
Queen Anne's lace	*Daucus carota*
Rattlesnakeweed	*Daucus pusillus*
Eryngo	*Eryngium hookeri*

Common Name	Scientific Name
Button eryngo	*Eryngium prostratum*
Pennywort	*Hydrocotyle ranunculoides*
Water pennywort	*Hydrocotyle verticillata*
Limnosciadium	*Limnosciadium pinnatum*
Mock bishopweed	*Ptilimnium capillaceum*
Ribbed mock bishopweed	*Ptilimnium costatum*
Laceflower	*Ptilimnium nuttallii*
Black snakeroot	*Sanicula canadensis*
Sanicle	*Sanicula smallii*
Prickly scaleseed	*Spermolepis echinata*
Scaleseed	*Spermolepis inermis*
Hedge parsley	*Torilis arvensis*
Knotted hedge parsley	*Torilis nodosa*
Trepocarpus	*Trepocarpus aethusae*
Roughleaf dogwood	*Cornus drummondii*
Dogwood	*Cornus florida*
Dogwood	*Cornus foemina*
Balck gum	*Nyssa sylvatica*
Featherfoil	*Hottonia inflate*
Water-pimpernel	*Lysimachia redicans*
Water-pimpernel	*Samolus parviflorus*
False buckthorn	*Bumelia lanuginose*
Chittimwood	*Bumelia lycioides*
Persimmon	*Diospyros virginiana*
Small snowbell	*Styrax americana*
Swamp privet	*Forestiera acuminate*
White ash	*Fraxinus americana*
Carolina ash	*Fraxinus caroliniana*
Green ash	*Fraxinus pennsylvanica*
Pumpkin ash	*Fraxinus profunda*
Bigleaf privet	*Ligustrum ovalifolium*
Chinese privet	*Ligustrum sinense*
Miterwort	*Cynoctonum mitreola*

Common Name	Scientific Name
Juniperleaf	*Polypremum procumbens*
Blue star	*Amsonia tabernaemontana*
Indian hemp	*Apocynum cannabinum*
Climbing dogbane	*Trachelospermum difforme*
Periwinkle	*Vinca major*
Aquatic milkweed	*Asclepias perennis*
Redring milkweed	*Asclepias variegata*
Green antelopehorn	*Asclepias viridis*
Blue vine	*Cynachum laeve*
Climbing milkweed	*Matelea decipiens*
Trailing spring rod	*Matelea gonocarpa*
Ebony spleenwort	*Asplenium platyneuron*
Hedge bindweed	*Calystegia sepium*
Field bindweed	*Convovulus arvensis*
Dodder	*Cuscuta compacta*
Dodder	*Cuscuta glabrior*
Dodder	*Cuscuta gronovii*
Pony's foot	*Dichondra carolinensis*
Scarlet morning-glory	*Ipomoea coccinea*
Ivyleaf morning-glory	*Ipomoea hederacea*
Morning-glory	*Ipomoea indica acuminate*
Small white morning-glory	*Ipomoea lacunose*
Wild sweet potato	*Ipomoea pandurata*
Common morning-glory	*Ipomoea purpurea*
Coastal morning-glory	*Ipomoea trichocarpa*
Moonvine	*Ipomoea turbinate*
Morning-glory	*Ipomoea wrightii*
Tievine	*Jacquemontia tamnifolia*
Phlox	*Phlox drummondii*
Perennial phlox	*Phlox paniculata*
Downy phlox	*Phlox pilosa*
Hydrolea	*Hydrolea ovata*
Waterleaf	*Hydrolea uniflora*

Common Name	Scientific Name
Baby blue-eyes	*Nemophila aphylla*
Stickseed	*Hackelia virginiana*
Turnsole	*Heliotropium indicum*
Heliotrope	*Heliotropium procumbens*
Field gromwell	*Lithospermum arvense*
Field gromwell	*Lithospermum tuberosum*
Forget-me-not	*Myosotis macrosperma*
Forget-me-not	*Myosotis verna*
French mulberry	*Callicarpa americana*
Northern frogfruit	*Phyla lanceolata*
South american vervain	*Verbena bonariensis*
Prostate vervain	*Verbena bracteata*
Brazilian vervain	*Verbena brasiliensis*
Rose vervain	*Verbena canadensis*
Texas vervain	*Verbena halei*
Vervain	*Verbena montivedensis*
Tuber vervain	*Verbena rigida*
White vervain	*Verbena urticifolia*
Gulf vervain	*Verbena xutha*
Bugleweed	*Ajuga reptans*
Ground ivy	*Glechoma hederacea*
Henbit	*Lamium amplexicaule*
Purple deadnettle	*Lamium purpureum*
Lion’s ears	*Leonotis nepetifolia*
Bugleweed	*Lycopus rubellus*
Peppermint	*Mentha piperita*
Basil beebalm	*Monarda clinopodioides*
Beefsteakplant	*Perilla frutescens*
Heal-all	*Prunella vulgaris*
Lyreleaf sage	*Salvia lyrata*
Mad-dog skullcap	*Scutellaria lateriflora*
Skullcap	*Scutellaria parvula*
Shade betany	*Stachys agraria*

Common Name	Scientific Name
Florida betany	*Stachys floridana*
Hedgenettle	*Stachys tenuifolia*
American geremander	*Teucruim canadense*
Oakleaf thornapple	*Datura quercifolia*
Jimsonweed	*Datura stramonium*
Tomato	*Lycopersicon esculentum*
Common gardin petunia	*Petunia hybrida*
Petunia	*Petunia parviflora*
Groundcherry	*Physalis anqulata*
Groundcherry	*Physalis cordata*
Clammy groundcherry	*Physalis heterophylla*
Downy groundcherry	*Physalis pubescens*
Groundcherry	*Physalis pumila*
Groundcherry	*Physalis virginiana*
Groundcherry	*Physalis viscosa*
Nightshade	*Solanum americanum*
Horsenettle	*Solanum carolinense*
Silverleaf nightshade	*Solanum elaeagnifolium*
Buffalo-bur	*Solanum rostratum*
Prairie agalinis	*Agalinis heterophylla*
Water-hyssop	*Bacopa monnieri*
Disc water-hyssop	*Bacopa rotundifolia*
Hedge hyssop	*Gratiola neglecta*
Hedge hyssop	*Gratiola virginiana*
Leucospora	*Leucospora multifida*
Oldfield toadflax	*Linaria canadensis*
Texas toadflax	*Linaria texana*
Butter-and-eggs	*Linaria vulgaris*
False pimpernel	*Lindernia anagallidea*
False pimpernel	*Lindernia dubia*
Mazus	*Mazus japonicus*
Mecardonia	*Mecardonia acuminate*
Monkeyflower	*Mimulus alatus*

Common Name	Scientific Name
Royal empresstree	*Paulownia tomentosa*
Beard-tongue	*Penstemon laevigatus*
Beard-tongue	*Penstemon tenuis*
Common mullein	*Verbascum thapsus*
Wayside speedwell	*Veronica agrestis*
Corn speedwell	*Veronica arvensis*
Purslane speedwell	*Veronica peregrine*
Persian speedwell	*Veronica persica*
Crossvine	*Bignonia capreolata*
Trumpetcreeper	*Campsis redicans*
Southern catalpa	*Catalpa bignonioides*
Bladderwort	*Utricularia biflora*
Bladderwort	*Utricularia gibba*
Bladderwort	*Utricularia radiate*
Wild mudwort	*Dicliptera brachiata*
Lanceleaf water-willow	*Justicia ovata lanceolata*
Wild petunia	*Ruellia caroliniensis*
Fring-leaf wild petunia	*Ruellia humilis*
Stalked wild petunia	*Ruellia pedunculata*
Wild petunia	*Ruellia strepens*
Lopseed	*Phryma leptostachya*
Buckthorn	*Plantago aristata*
Plaintain	*Plantago heterophylla*
Common plaintain	*Plantago major*
Plaintain	*Plantago rugelii*
Pale-seeded plaintain	*Plantago virginica*
Plaintain	*Plantago wrightiana*
Buttonbush	*Cephalanthus occidentalis*
Poor joe	*Diodia teres*
Buttonweed	*Diodia virginiana*
Catchfly bedstraw	*Galium aparine*
Widl licorice	*Galium circaezans*
Blunt bedstraw	*Galium obtusum*

Common Name	Scientific Name
Bedstraw	*Galium pedemontanum*
Hairy bedstraw	*Galium pilosum*
Dye bedstraw	*Galium tinctorium*
Small bluets	*Houstonia minima*
Bluets	*Houstonia pusilla*
Partridgeberry	*Michella repens*
Pentodon	*Pentodon pentandrus*
Field madder	*Sherardia arvensis*
Smooth buttonweed	*Spermococe glabra*
Winter honeysuckle	*Lonicera fragrantissima*
Honeysuckle	*Lonicera japonica*
Honeysuckle	*Lonicera semperviren*
Elderberry	*Sambucus canadensis*
Corn salad	*Valerianella radiate*
Manso	*Cayaponia quinqueloba*
Watermelon	*Citrullus lanatus*
Dudaim melon	*Cucumis melo*
Yellow-floered gourd	*Cucurbita pepo*
Melonettee	*Melothria pendula*
Balsam apple	*Monardica palsamina*
One-seeded bur-cucumber	*Sicyos angulatus*
Cardinalflower	*Lobelia cardinalis*
Venus' looking-glass	*Triodanis biflora*
Venus' looking-glass	*Triodanis lamprosperma*
Venus' looking-glass	*Triodanis perfoliata*
Purple cudweed	*Gamochaeta purpurea*
Rabbit tobacco	*Gnaphalium obtusifolium*
Cudweed	*Gnaphalium purpureum falcatum*
Scratch daisy	*Haplopappus divaricatus*
Bitterweed	*Helenium amarum*
Swamp sunflower	*Helianthus angustifolius*
Common sunflower	*Helianthus annus*
Tall sunflower	*Helianthus grosseserratus*

Common Name	Scientific Name
Hairy sunflower	*Helianthus hirsutus*
Muck sunflower	*Helianthus simulans*
Paleleaf woodland sunflower	*Helianthus strumosus*
Jerusalem artichoke	*Helianthus tuberrosus*
Golden aster	*Heterotheca pilosa*
Golden aster	*Heterotheca subaxillaris*
Queendevil	*Hieracium gronovii*
Sumpweed	*Iva annua*
Potato dandelion	*Krigia dandelion*
Dwarf dandelion	*Krigia cespitosa*
Dwarf dandelion	*Krigia virginica*
Lettuce	*Lactuca canadensis*
Woodland lettuce	*Lactuca floridana*
Biannual lettuce	*Lactuca ludoviciana*
Prickly lettuce	*Lactuca serriola*
Disc mayweed	*Matricaria discoidea*
Pineapple weed	*Matricaria matricarioides*
Melanthera	*Melanthera nivea*
Climbing helpweed	*Mikania cordifolia*
Climbing helpweed	*Mikania scandens*
Butterweed	*Packera glabella*
Santa maria feverfew	*Parthenium hysterophorus*
Camphorweed	*Pluchea camphorata*
Saltmarsh fleabane	*Pluchea odorata*
Canela	*Pluchea purpurescens*
Heller's cudweed	*Pseudognaphalium helleri*
Rabbit-tobacco	*Pseudognaphalium obtusifolium*
False dandelion	*Pyrrhopappus carolinianus*
Smallflower desert-chicory	*Pyrrhopappus pauciflorus*
Black-eyed susan	*Rudbeckia hirta*
Butterweed	*Senecio glabellus*
Starry rosinweed	*Silphium asteriscus*
Wholeleaf rosinweed	*Silphium integrifolium*

Common Name	Scientific Name
Milk thistle	*Silybum marianum*
Bear’s-foot	*Smallanthus uvedalia*
Goldenrod	*Solidago altissima*
Blue stemmed goldenrod	*Solidago caesia*
Goldenrod	*Solidago canadensis*
Anisescented goldenrod	*Solidago odora*
Wrinkleleaf goldenrod	*Solidago rugosa*
Butter burweed	*Soliva mutisii*
Stickerweed	*Soliva pterosperma*
Field burrweed	*Soliva sessilis*
Sow thistle	*Sonchus asper*
Sow thistle	*Sonchus oleraceus*
Southern annual saltmarsh aster	*Symphyotrichum divaricatum*
Drummond's aster	*Symphyotrichum drummondii*
Rice button aster	*Symphyotrichum dumosum*
White panicle aster	*Symphyotrichum lanceolatum*
Calico aster	*Symphyotrichum lateriflorum*
Pringle's aster	*Symphyotrichum pilosum*
Smooth white oldfield aster	*Symphyotrichum racemosum*
American spotflower	*Spilanthes americana*
Dandelion	*Taraxacum officianle*
White crownbeard	*Verbesina virginica*
Ironweed	*Veronia gigantean*
Missouri ironweed	*Vernonia missurica*
Cocklebur	*Xanthium strumarium*
Youngia	*Youngia japonica*
Zinnia	*Zinnia elegans*
Common yarrow	*Achillea millefolium*
Oppositeleaf spotflower	*Acmella oppositifolia*
White snakeroot	*Ageratina altissima*
Common ragweed	*Ambrosia artemisiifolia*
Lanceleaf ragweed	*Ambrosia bidentata*
Western ragweed	*Ambrosia psilostachya*

Common Name	Scientific Name
Giant ragweed	*Ambrosia trifida*
Dogfennel	*Anthemis cotula*
Sweet wormwood	*Artemisia anna*
Bushy aster	*Aster dumosus*
White woodland aster	*Aster lateriflorus*
New england aster	*Aster novae-angliae*
Frost aster	*Aster pilosus*
Aster	*Aster praealtus*
Slim aster	*Aster subulatus*
Aster	*Aster subulatus ligulatus*
White aster	*Aster vimineus*
Salt bush	*Baccharis halimifolia*
Bearded beggarticks	*Bidens aristosa*
Spanish needles	*Bidens bipinnata*
Discoid beggarticks	*Bidens discoides*
Stick-tights	*Bidens frondosa*
Beggarticks	*Bidens laevis*
Bur marigold	*Bidens mitis*
Beggarticks	*Bidens pilosa*
Boltonia	*Boltonia asteroides*
Boltonia	*Boltonia diffusa*
Cornflower	*Centaurea cyanus*
Soft golden aster	*Chrysopsis pilosa*
Common chicory	*Cichorium intybus*
Tall thistle	*Cirsium altissimum*
Plumed thistle	*Cirsium discolor*
Horrid thistle	*Cirsium horridulum*
Blue mistflower	*Conoclinium coelestinum*
Horseweed	*Conyza bonariensis*
Horseweed	*Conyza canadensis*
Horseweed	*Conyza ramosissima*
Garden tickweed	*Coreopsis tinctoria*
Spanish needles	*Cosmos bipinnatus*

Common Name	Scientific Name
Hawksbeard	*Crepis pulchra*
Clasping coneflower	*Dracopis amplexicaulis*
Purple coneflower	*Echinacea purpurea*
Yerba del Tago	*Eclipta alba*
False daisy	*Eclipta prostrata*
Elephant’s foot	*Elephantopus carolinianus*
Devil's grandmother	*Elephantopus tomentosus*
Fireweed	*Erechtites hieraciifolia*
Whitetop fleabane	*Erigeron annuus*
Philadelphia fleabane	*Erigeron philadelphicus*
Oakleaf fleabane	*Erigeron quercifolius*
Whitetop fleabane	*Erigeron strigosus*
Slender-leaf fleabane	*Erigeron tenuis*
Cypressweed	*Eupatorium capillifolium*
Yankeeweed	*Eupatorium compositifolium*
Throughwort	*Eupatorium perfoliatum*
White snakeroot	*Eupatorium rothrockii*
Roundleaf thoroughwort	*Eupatorium rotundifolium*
Smallflower thoroughwort	*Eupatorium semiserratum*
Late-flowering boneset	*Eupatorium serotinum*
Flat-topped goldenrod	*Euthamia leptocephala*
Facelis	*Facelis retusa*
Boneset	*Fleischmannia incarnate*
Narrowleaf everlasting	*Gamochaeta falcata*
Cudweed	*Gamochaeta pennsylvanica*
Spoonleaf purple everlasting	*Gamochaeta purpurea*
Button burrweed	*Gymnostyles anthemifolia*

RARE, THREATENED, & ENDANGERED SPECIES & NATURAL COMMUNITIES

(Tracked by the Louisiana Natural Heritage Program in Franklin, Madison, and Tensas Parishes – March 2007)

Mucket	*Actinonaias ligamentina*
Golden eagle	*Aquila chrysaetos*
Short-eared owl	*Asto flammeus*
Ringtail	*Bassariscus astutus*
Bottomland Hardwood Forests	
Red wolf	*Canis rufus*
Cypress-knee sedge	*Carex decomposita*
Western worm snake	*Carphophis amoenus vermis*
Cypress-tupelo Swamp	
Cerulean warbler	*Dendroica cerulean*
Purple cornflower	*Echinacea purpurea*
Three-angle spikerush	*Eleocharis tricostata*
Wolf spikerush	*Eleocharis wolfi*
Spike	*Elliptio dilatata*
Ebonyshell	*Fusconata ebena*
Eastern managrass	*Glyceria seplentrionalis*
Sandhill crane	*Grus canadensis*
Bald eagle	*Haliaeetus leucocephalus*
Fatmucket	*Lampsilis siliguoidea*
While heelsplitter	*Lasmigona complanata*
Alligator snapping turtle	*Macrocroclemys temminckii*
Snow melanthera	*Melanthera nivea*
Mesic Hardwood Forests	
Square-stemmed monkey-flower	*Mimulus ringens*
Mississippi terrace prairie	
Meadow evening primrose	*Oenothera pilosetta*
Pyrimid pigtoe	*Pleurobema rubrum*

Silty horsetail	*Pleurocera canaliculata*
Paddlefish	*Polyodon spathula*
Fat pocketbook	*Potamtius capax*
Long-beaked baldrush	*Rhynchospora scirpoides*
Pallid sturgeon	*Scaphirhynchus albus*
Small Stream Forest	
Prairie cordgrass	*Spartina pectinata*
Interior least tern	*Sterna antillarus athalassos*
Squaw-foot	*Strophitus undalatus*
Sweetgum-Water Oak Bottomland Forest	
Gulf pipefish	*Syngnathus scovelli*
Louisiana black bear	*Ursus americanus luteolus*
Waterbird Nesting Colony	
Wet hardwood flatwoods	

Appendix J. Budget Requests

The Refuge System currently faces a backlog of project, operational, maintenance, and equipment needs. The current Refuge Operations Needs System (RONS) and Service Asset Maintenance Management System (SAMMS) provide a list of proposed projects for the refuge, over and above the current base operating budget of the refuge. The refuge's RONS and SAMMS needs would continue under this CCP. The RONS and SAMMS databases will be updated to reflect the needs and proposed actions outlined in this CCP.

Refuge Operations Needs System (RONS) Fiscal Year (FY) 2008 Requested Projects

All Projects	Project Summary	Project Description
43690 Tensas River NWR FY08-1849 SR: 2 RS: 12 RR:	One-Time: RecurBase: $97,292 Tot. 1st Year: $97,292	**Title: Protect Resources with Refuge Law Enforcement Officer** Description: Provide one full-time LE officer to protect wildlife, lands, facilities, employees and the general public on Tensas River NWR. This 80,000-acre refuge spans 60+ miles of the Tensas River, with 170+miles of roads and trails. The lone LE officer is unable to handle the workload. A growing number of violations are not enforced due to low law enforcement staffing levels. An additional full-time officer will not only provide added public safety, compliance with oil and gas regulations, decrease hunting violations, and decrease poaching activities, but will also provide invaluable backup for the other refuge officer. Protection is the most basic form of wildlife management. This project will dedicate an additional full-time law enforcement officer to conserve and protect wildlife and wildlife habitats. See CCP Projects 1, 2, 3, and 11
Permanent Staff: Temporary Staff:	**Num Cost** 1 $97,292	
43690 Tensas River NWR FY08-1854 SR: 9 RS: RR:	One-Time: $125,000 RecurBase: Tot. 1st Year: $125,000	**Title: Restore Boundary lines** Description: Description: Restore and rehabilitate newly acquired lands by contracting surveyors to complete in depth surveys of recently purchased and/or existing refuge lands adjacent to private in holders. The refuge has recently acquired 11,000 acres that raised many issues with adjacent landowners and those with property within the new refuge boundary. It is imperative to have certified land surveys to protect from adjacent landowner/in-holder encroachment and to provide appropriate signage to enforce correct boundaries of the refuge. These surveys will aid with proper identification of refuge boundaries delineated in accordance with realty laws and Service policy. The purpose of this project is important to ensure human safety during hunting season, and protect Service assets, property, and habitats. See CCP Projects 9 and 10
Permanent Staff: Temporary Staff:	**Num Cost**	

All Projects	Project Summary	Project Description
43690 Tensas River NWR FY08-1857 SR: 6 RS: RR:	One-Time: $160,000 RecurBase: Tot. 1st Year: $160,000	**Title: Survey cultural resources on the refuge.** Description: Conduct a short-term survey on all existing and newly discovered cultural resources on the refuge. This area, which spans 80,000 acres, has known cisterns, mounds, and artifacts dating from the Civil war that need to be identified and recorded for historical purposes. A contractor would have to survey all refuge acreage, compile past archeological data, conduct interviews with knowledgeable public, and provide a final product to include a set of maps identifying the sites complete with descriptions. This project will be essential in identifying historical sites, maintaining archeological integrity/security which provides assistance to refuge management in preserving these sites and heritage. This will be a joint effort between the Service, State HIPO, and state agency (Louisiana). See CCP Project 8
Permanent Staff: Temporary Staff:	**Num Cost**	
43690 Tensas River NWR FY08-1859 SR: 3 RS: RR:	One-Time: $44,000 RecurBase: $15,000 Tot. 1st Year: $152,000	**Title: Eradicate invasive, exotic trifoliate orange** Description: Restore and conduct long-term monitoring on 5,000 acres of bottomland hardwood forest habitat. Objective is to sustain hardwood species, remove invasive species (Poncirus trifoliata), conduct integrated control of invasive in comparison to native hardwood habitat, and monitor response to management actions. This plant has little wildlife value and out-competes native plants, which, in turn, decreases the habitat quality. Results would directly benefit migratory bird species such as Swanson's warbler, hooded warbler, as well as the threatened Louisiana black bear. Partnerships with private land owners, USDA, and other state agencies would allow greater coverage of the control of this invasive and exotic species. This project would implement control/eradication strategies to eliminate existing infestations and to prevent the spread of this aggressive invader species. See CCP Projects 1, 2, 3, 9, and 11
Permanent Staff: Temporary Staff:	**Num Cost** 3 $93,000	

All Projects	Project Summary	Project Description
43690 Tensas River NWR FY08-4012 SR: 4 RS: RR:	One-Time: $21,000 RecurBase: $10,000 Tot. 1st Year: $124,000	**Title: Evaluate Restoration of Natural Bottomland Hardwood Systems** Description: Conduct long-term vegetation monitoring and wildlife response on 1,500 acres of reforested areas + or - 20 years, to evaluate the effects of bottomland hardwood forest restoration. Land historically cleared for marginal agriculture has been reclaimed for bottomland hardwood forest habitat. Early evaluations of reforested areas prove that species survival and spacing are not maximizing desirable wildlife habitat. Data from inventoring, cruising, and other evaluation techniques will be used to develop a plan to effectively manage this areas in the future. Techniques such as pre-commercial thinning or other silvicultural treatments will be evaluated for their effects on species diversity, vegetative response, and wildlife usage for management in these early reforested areas. Partnerships with Louisiana Wildlife and Fisheries and other state agencies. See CCP Project 1, 2, 3, and 11
	Num Cost	
Permanent Staff: Temporary Staff:	3 $93,000	
43690 Tensas River NWR FY08-4269 SR: 5 RS: RR:	One-Time: RecurBase: $94,588 Tot. 1st Year: $94,588	**Title: Evaluate Bottomland Hardwood Restoration Techniques** Description: Provide forestry assistance to establish monitoring and evaluation protocols to determine the success of reforestations efforts on Tensas River NWR. There is a major push to reforest marginal farmlands in the Mississippi River Alluvial Valley. Thousands of acres have been planted, but seedling survival and planting techniques, etc., have not been evaluated. Tensas River NWR currently has 15,000+ acres that have been re-planted, with thousands of additional acres in the planning stage. Responsibilities will include long-term tree survival determination, evaluation of planting techniques, species composition, and development/implementation of a long-term plan to insure survival criteria are met and future management maximizes habitat benefits for wildlife. See CCP Project 1, 2, 3, and 11
	Num Cost	
Permanent Staff: Temporary Staff:	1 $94,588	

All Projects	Project Summary	Project Description
43690 Tensas River NWR FY08-4296 SR: 7 RS: RR:	One-Time: RecurBase: $77,650 Tot. 1st Year: $77,650	**Title: Provide additional infrastructure support for 80,000+ acres** Description: Provide one equipment operator to support infrastructure to facilitate hunting, fishing, wildlife observation, wildlife photography, and education and interpretation on Tensas River NWR. With 80,000 acres of bottomland hardwood habitat accessed by 172 miles of roads and trails, it is essential to efficiently and safely maintain the refuge's infrastructure. Logistically, it is very difficult to work on the refuge, and an additional equipment operator could significantly contribute to the maintenance backlog that exists on the refuge. See CCP Project 1, 2, 3, 9, and 11
Permanent Staff: Temporary Staff:	**Num** **Cost** 1 $77,650	
43690 Tensas River NWR FY08-4300 SR: 8 RS: RR:	One-Time: RecurBase: $94,588 Tot. 1st Year: $94,588	**Title: Provide additional management support for 80,000+ acres** Description: Provide one Refuge Operations Specialist to assist in all aspects of management of Tensas River NWR. Responsibilities would include RONS, SAMMS, property management, assistance with habitat management techniques, infrastructure projects, etc. This position would be a good beginning for a young employee that needs introduction and guidance at the start of their career. See CCP Project 1, 2, 3, 9, and 11
Permanent Staff: Temporary Staff:	**Num** **Cost** 1 $94,588	

All Projects	Project Summary	Project Description
43690 Tensas River NWR FY08-4303 SR: 10 RS: RR:	One-Time: RecurBase: $77,650 Tot. 1st Year: $77,650	**Title: Provide additional infrastructure support for 80,000+ acres** Description: Provide one full-time maintenance worker to assist in all aspects of infrastructure maintenance and management. This generalist will be a "jack of all trades" that can help with facility and equipment maintenance, and provide much needed support the refuge's large backlog of maintenance needs. See CCP Project 1, 2, 3, 9, and 11
Permanent Staff: Temporary Staff:	**Num Cost** 1 $77,650	
43690 Tensas River NWR FY08-72490 SR: 11 RS: RR:	One-Time: $135,000 RecurBase: Tot. 1st Year: $135,000	**Title: Control of Nuisance wildlife and predators** Description: Manage nuisance native species such as beaver and nutria to reduce damage to bottomland hardwood ecology. Refuge staff will be allowed to manage nuisance native species by trapping or eradication, until they cannot control the population. At this point, a contractor from USDA, or non-government agency will be allowed to control the population by extensive seasonally trapping. Non-native wildlife populations, such as feral hogs are responsible for damage to plant communities, wildlife, agricultural crops, forestry and spread of disease as well as competition for wildlife food. Upon presence of feral hogs, the population will need to be eliminated to prevent it from being established. See CCP Project 1, 2, 3, 4, 9, and 11
Permanent Staff: Temporary Staff:	**Num Cost**	

All Projects	Project Summary	Project Description
43690 Tensas River NWR FY08-7250 SR: 12 RS: RR:	One-Time: RecurBase: $62,419 Tot. 1st Year: $62,419	**Title: Science based monitoring and inventory of wildlife populations** Description: Initiate a biological inventory of wildlife and plant species on Tensas River NWR to develop a species list of each. The inventory will result in an understanding of distribution and frequencies of wildlife on the refuge. Data will be collected on game and non-game birds, mammals, reptiles, amphibians, mollusks, and fish. This information is critical for the development and implementation of the refuge Comprehensive Conservation Plan and step-down plans. It is necessary for evaluating the impacts of management practices on native flora and fauna and identifying opportunities to conserve and enhance endangered, rare, and unique fauna on Service land. See CCP Project 3, 4, 5, 6, 7 and 11
Permanent Staff: Temporary Staff:	**Num Cost** 1 $62,419	
43690 Tensas River NWR FY08-7251 SR: 13 RS: RR:	One-Time: $20,000 RecurBase: $30,000 Tot. 1st Year: $50,000	**Title: Conduct active participation in Louisiana Black Bear Recovery Process** Description: Refuge efforts for participating in these activities will include; 1) continued support and assistance with University of Tennessee, LDWF, and Black Bear Conservation efforts, 2) conduct public education and outreach on living with bears to the local community and coordinate with other agencies as necessary in this outreach, 3) coordination of beat related research and other activities throughout the northeast Louisiana, 4) provide supplies for monitoring (radio collars, immobilizing drugs, travel, training, aerial surveillance, etc.), and needed for researchers related to Louisiana black bear, and 5) conduct forest habitat management. See CCP Project 1and 7
Permanent Staff: Temporary Staff:	**Num Cost**	

All Projects	Project Summary	Project Description
43690 Tensas River NWR FY08-7252 SR: 14 RS: RR:	One-Time: $27,000 RecurBase: Tot. 1st Year: $27,000	**Title: Control Invasive Plants on Rainey Lake** Description: Control invasive plant on Tensas River NWR. Coontail poses a severe threat to the usefulness of Rainey Lake as a recreational fishing lake. This aquatic vegetation is dense and prevents boat passage over most of the lake. Extensive vegetative growth also contributes to poor water quality because it inhibits light from penetrating the water surface. Aquatic organisms such as fish, crayfish, frogs and native plants all decrease in abundance as coontail density increases. Potential treatment methods would be investigated and researched to determine the most efficient method to eliminate this problem. Treatment would increase the health of the lake and improve public fishing access to the area. See CCP Projects 3, 9, and 11
Permanent Staff: Temporary Staff:	**Num Cost**	
43690 Tensas River NWR FY08-7253 SR: 15 RS: RR:	One-Time: $23,000 RecurBase: $11,500 Tot. 1st Year: $34,500	**Title: Control Invasion of Woody Plants to Restore Wetlands** Description: Control invasion of woody plant species at Tensas River NWR Black willow has encroached on and, in some cases, taken over several moist soil management areas on the refuge. These areas are intended to produce emergent plants that provide food for the thousands of waterfowl that winter here, which is one of the purposes for refuge establishment. Willow trees rapidly spread throughout the impoundments and do not permit duck food production. This project would result in the mechanical removal of willow trees from these areas. This management strategy will improve quality of waterfowl foods and habitat and assist in meeting refuge objectives.. See CCP Projects 3, 9, and 11
Permanent Staff: Temporary Staff:	**Num Cost**	

All Projects	Project Summary	Project Description
43690 Tensas River NWR FY08-7254 SR: 16 RS: RR:	One-Time: $40,000 RecurBase: Tot. 1st Year: $40,000	**Title: Improve habitat on Lake Nick** Description: Improve the habitat on Lake Nick by removing non native vegetation, draining it, and disking the unit to promote waterfowl habitat. Lake Nick is a 6 - 10 acre lake that has been known to provide habitat for several thousand migratory waterfowl in times past. Using mechanical and chemical means of eliminating willow encroachment, vegetation succession and improve aquatic invertebrate response will create much better habitat for wildlife. Placing a water control structure on both ends will allow the water to be manipulated to control vegetation and aquatic invertebrates. The habitat is deteriorating and needs to be addressed to succession of willow in the lake that is closing it off. This project will open the area for migratory wildlife to nest, search for food, and provide hunting opportunities for the general public. See CCP Projects 3, 9, and 11
Permanent Staff: Temporary Staff:	**Num Cost**	
43690 Tensas River NWR FY08-7255 SR: 17 RS: RR:	One-Time: $25,000 RecurBase: Tot. 1st Year: $25,000	**Title: Improve habitat on Cooper Tract** Description: Improve habitat on Cooper tract will encourage migratory waterfowl, shorebirds, and other species of wildlife to utilize this habitat. Removal of willows and non native vegetation in the three sloughs by mechanical and chemical means will improve the habitat for several wildlife species for years to come. Installation of three water control structures that will allow water manipulation that will create desired habitat conditions for many wildlife species. This project will create 60+ acres of improved habitat for migratory waterfowl, shorebirds, and aquatic species. There are three units that will be managed by manipulating water levels in the fall and alternating the years the units are disked to maximize the potential of this habitat. See CCP Projects 3, 9, and 11
Permanent Staff: Temporary Staff:	**Num Cost**	

Service Asset Maintenance Management System (SAMMS) FY 2008 Requested Projects

Work Order	CCP Project # Reference	Description	Work Type
04134879	9 - 11	Repair FHWA Rte 011 Wildlife Drive Greenlea Bend	DM
04136073	9 - 11	Rehabilitate Alligator Bayou Parking Area. Curren	DM
2005217162	9 - 11	Rehab Rte 907 DM Child Of 04136703	DM
2005221365	9 - 11	Rehab. Parking Lot DM Child Of 03125785	DM
2005221421	9 - 11	Rehabilitate parking area DM child of 03125788	DM
2005222477	9 - 11	Rehab Rte 011 DM Child of 04134879	DM
2006512599	9 - 11	Repair Judd Bayou Bridge	DM
2006528269	9 - 11	Bridge Repairs 10020005	DM
2006534127	9 - 11	Repair Worn Parking Lot	DM
2006534135	9 - 11	Repair FHWA Rte 100 Mill Road	DM
2006534140	9 - 11	Repair FHWA Rte 102	DM
2006534499	9 - 11	Repair FHWA_____ Africa Lake Road	DM
2006534500	9 - 11	Repair FHWA Rte _____ Board Road	DM
2006534502	9 - 11	Repair FHWA Rte __ Chapman Field Road	DM
2006534509	9 - 11	Rehab Crystal Dummy Line Road	DM
2006534512	9 - 11	Rehab Dunlop Lake Road	DM
2006534513	9 - 11	Rehab Entrance Road To Maintenance Complex	DM
2006534517	9 - 11	Rehab Fish Hook Atv Trail	DM
2006534520	9 - 11	Rehab Fish Hook Parking Lot	DM
2006534521	9 - 11	Rehab Fool River Access Road	DM
2006534523	9 - 11	Rehab Greenlea Chute Access Road	DM
2006534529	9 - 11	Rehab Head Fields Roads	DM
2006534539	9 - 11	Rehab Hunter Bend ATV Trail	DM
2006534544	9 - 11	Rehab Judd Lake Cutoff Road	DM
2006534548	9 - 11	Rehab Little Bear Lake Road North	DM
2006534551	9 - 11	Rehab Little Bear Lake Road West	DM
2006534554	9 - 11	Rehab Little Fork ATV Trail	DM

Work Order	CCP Project # Reference	Description	Work Type
2006534562	9 - 11	Hab Little Break Road	DM
2006534566	9 - 11	Rehab Maintenance Shop Parking Lot	DM
2006534568	9 - 11	Rehab Mclemore ATV Trail	DM
2006534569	9 - 11	REHAB Mclemore North Woods Road	DM
2006534572	9 - 11	REHAB Mclemore South Cutover Road	DM
2006534573	9 - 11	Rehab Mill Bayou Road	DM
2006534574	9 - 11	Rehab Mower Woods ATV Trail	DM
2006534575	9 - 11	Rehab Mower Woods West Road	DM
2006534581	9 - 11	Rehab Parker Boy Bayou Road	DM
2006534582	9 - 11	Rehab Rainey Lake ATV Trail	DM
2006534590	9 - 11	Rehab Residence Road	DM
2006534593	9 - 11	Rehab River Road	DM
2006534594	9 - 11	Rehab Sharkey ATV Trail	DM
2006534597	9 - 11	Rehab Sharkey Cutoff	DM
2006534602	9 - 11	Rehab Tendal ATV Trail	DM
2006534620	9 - 11	Rehab Tendal Road	DM
2007647583	9 - 11	Rehab Quebec Road	DM
2007694107		Demolish Bridge	DM
2007716007	9 - 11	Repair Damaged Visitor Center	DM
2007734241	9 - 11	Repair Damaged Visitor Center	DM
2008839036	9 - 11	Repair Worn Shop	DM
2008841865	9 - 11	Replace Aged HVAC	DM
2008844107	9 - 11	Repair Worn Pole Barn	DM
2008844199	9 - 11	Repair Rotten Board	DM
2008844202	9 - 11	Culvert Is Too Short	DM
2008844203	9 - 11	Replace Worn Gates	DM
2008844204	9 - 11	Replace Worn Gates	DM
2008844206	9 - 11	Repair Over-grown Levee	DM
2008844207	9 - 11	Repair Over-grown Levee	DM
2008844208	9 - 11	Repair Over-grown Levee	DM
2008844209	9 - 11	Replace Worn Decking	DM
2008844210	9 - 11	Replace Decking And Roof On Obs Deck	DM
2008844215	9 - 11	Replace Missing And Worn Signs	DM
2008845120	9 - 11	Replace Damaged Roof	DM
2008845122	9 - 11	Demo Tower	DM

Work Order	CCP Project # Reference	Description	Work Type
2008845123	9 - 11	Replace Emergency Shut Off Switch	DM
2008845126	9 - 11	Repair Wash Out On Levee	DM
2008845128	9 - 11	Demo Remove	DM
2008847773	9 - 11	Replace Worn Out Bridge	DM
2008847781	9 - 11	Repair Decking Rotten, No Guard Rails, No Signs.	DM
2008847790	9 - 11	Repair Bridge Decking Rotten, No Sign	DM
2008847804	9 - 11	Repair Bridge Decking Rotten, No Sign.	DM
2008847920	9 - 11	Replace Rotten Wcs	DM
2008847922	9 - 11	Repair Worn Power Unit Motor	DM
2008847924	9 - 11	Repair Worn Power Unit Motor	DM
2008869395	9 - 11	Engineering Services	DM
96114789	9 - 11	Repair Mack Bayou Bridge-Bridge Was Constructed In 1986 and Consists Of Two Supported Spans of Steel Girde	DM
02120329	9 - 11	Replace 5-Ton Hydralic Lift With 8-Ton Electric Li	
03125645	9 - 11	Replace HEQ 1989 Skyland Equipment Co 210C Backhoe	ME
03125662	9 - 11	Replace HEQ 1993 Caterpillar E120B Excavator	ME
2006527480	9 - 11	Rehabilitate Quebec Access Road- Highway 80 to Refuge Boundary	DM
2007717416	9 - 11	2006 Mack	ME
2007720450	9 - 11	Construct Administrative Office and Visitor Center	CI
2008771873	9 - 11	CCA Tensas River STA Parent 43690	IN
2008846987	9 - 11	Replace Headquarters 1991 John Deere 4055 Tractor	ME
2008872532	9 - 11	Hurricane Gustav FDR - Tensas NWR	CI
2009914765	9 - 11	Tensas 2008 Authorized Storm Project Work Orders	CI
2009922845	9 - 11	FY 09 Tensas River Master	AD
2009922846	9 - 11	FY09 Tensas River RPI	AD
2009922847	9 - 11	FY09 Tensas River PPI	AD
2009929630	9 - 11	Construct Outdoor Environmental Education Classroom and Facilities.	FM
2009929633	9 - 11	Construct New Informational Kiosks on Numerous Refuge Entries	FM

Work Order	CCP Project # Reference	Description	Work Type
2009929635	9 - 11	Construct Boat Launch and Handicap Fishing Pier on Indian Lake	FM
2009929637	9 - 11	Construct 2 Handicap/Youth Fishing Piers over Greenlea Pond	FM
97101733	9 - 11	Replace HEQ 1985 Caterpillar 130G MIL Grader	ME
2008865256	9 - 11	Demolish and Remove Bridge	FM
2008877467	9 - 11	Repair Walk-in Cooler	FM
2008877479	9 - 11	Repair Trailer	FM
2008877492	9 - 11	Repair to Woodshop Based on 2008 CCA	FM
2008877510	9 - 11	Repair Deficiences according to 2008 CCA	FM
2008877560	9 - 11	Demo Grain Bin	FM
	9 - 11	Repair Damage Caused by Gustav	FM
2008877734	9 - 11	Replace Firing Range (Includes Removing Lead)	FM
2008879160	9 - 11	Replace Roof	FM
2008879161	9 - 11	Replace Blockhouse	FM
2008879162	9 - 11	Replace Kiosk	FM
2008879163	9 - 11	Replace Dilapidated/Missing Entrance Signs	FM

Appendix K. List of Preparers

The core planning team consisted of the listed individuals.

OVERVIEW

This appendix summarizes the consultation and coordination that has occurred to date in identifying the issues and alternatives that are presented in this CCP. It lists the meetings that have been held with the various agencies, organizations, and individuals who were consulted in the preparation of the CCP.

The Tensas River NWR CCP was written with the participation and assistance of refuge and Service staff, the Mangi Environmental Group (a contractor for the Service), and the LDWF. The CCP planning process itself began in May 2006, with the formation of a refuge planning team. A notice of intent to prepare a CCP had earlier been published in the *Federal Register* on September 8, 2006 (71 FR 53131).

In April 2005, in preparation for the CCP planning process, a team of biologists conducted a comprehensive biological review for the refuge. Participants in the biological review were drawn from the refuge and the Service, including Ecological Services, Realty, and Planning specialists. Other members included staff of the USDA, Natural Resources Conservation Service; Northwestern Louisiana University; Louisiana State University; and the LDWF.

In 2006, refuge and Service personnel met to conduct a Visitor Services Review. The information and recommendations in the reports of the biological and visitor services reviews proved a valuable "point of departure" for the authors of this CCP. Subsequently, the refuge hosted public scoping meetings on September 12 and 14, 2006, and began an outreach campaign through various media to collect ideas and concerns from all stakeholders. Please see Appendix D for more information on public scoping and overall consultation and coordination in plan development.

CORE PLANNING TEAM MEMBERS

The core planning team consisted of the listed individuals.

Kelly Purkey – Project Leader
Brett Hortman – Acting Project Leader (former)
Jerome Ford – Project Leader (former)
George Chandler – North LA NWR Project Leader
Ron Hollis – Deputy Project Leader
Stan Howarter – Wildlife Biologist (former)
Jean Mikeal – Wildlife Technician
Amanda Wilkinson – Park Ranger
Yancy Magee – Forester
John Dickson – Wildlife Biologist
Tommy Tuma – Louisiana Department of Wildlife and Fisheries
Lowery Moak – Louisiana Department of Wildlife and Fisheries
Tina Chouinard – Planning Biologist
Randy Williams – Consultant, Mangi Environmental Group, Service contractor
Meghan Morse – Mangi Environmental Group

INTERDISCIPLINARY PLANNING TEAM MEMBERS

Several individuals supported the planning process with participation on the biological review team, visitor services review team, and additional special topic discussions. Their information provided additional biological support for developing objectives found in this plan. Some members were internal to the Service and provided additional policy guidance and support for objective development as well.

BIOLOGICAL REVIEW TEAM

Bob Strader	U.S. Fish and Wildlife Service
Pat Stinson	U.S. Fish and Wildlife Service
Dan Twedt	U.S. Geological Survey
Stephen Earsom	U.S. Fish and Wildlife Service
Cedric Doolittle	U.S. Fish and Wildlife Service
Anthony Bridgewater	USDA, Natural Resources Conservation Service
Mike Chamberlain	Louisiana State University
Ken Reinecke	U.S. Geological Survey
Buddy Dupuy	Louisiana Department of Wildlife and Fisheries
Walter Cotton	USDA, Animal and Plant Health Inspection Service
Randy Wilson	U.S. Fish and Wildlife Service
Dave Hickman	Louisiana Department of Wildlife and Fisheries
David Breithaupt	Louisiana Department of Wildlife and Fisheries
Ken Clough	U.S. Fish and Wildlife Service
Fred Kimmel	Louisiana Department of Wildlife and Fisheries
Tom Edwards	U.S. Fish and Wildlife Service
Jeff Denman	U.S. Fish and Wildlife Service
John Simpson	U.S. Fish and Wildlife Service
Debbie Fuller	U.S. Fish and Wildlife Service
Jerome Ford	U.S. Fish and Wildlife Service
Stan Howarter	U.S. Fish and Wildlife Service
Maury W. Bedford	U.S. Fish and Wildlife Service
Louis Hinds	U.S. Fish and Wildlife Service
Bob Keeland	U.S. Geological Survey
Lindy Garner	U.S. Fish and Wildlife Service
Chuck Hunter	U.S. Fish and Wildlife Service
Scott Durham	Louisiana Department of Wildlife and Fisheries

VISITOR SERVICES REVIEW TEAM

Garry Tucker	Visitor Services and Outreach, Region 4
Doug Hunt	Southeast Louisiana Refuges
Andrea Dunstan	Noxubee NWR
Dorn Whitmore	Merritt Island NWR

OTHER CONTRIBUTORS

In addition to the above listed core and extended planning team members, a number of individuals and groups contributed to the CCP. These included local citizens and agencies and non-governmental organizations, such as the local chapter of The Nature Conservancy and Tensas River Refuge Association (a private citizen group organized to support the refuge), as well as Service Regional Archaeologist - Richard Kanaski. These contributors participated in the scoping meeting or provided input at various stages of the planning process.

Appendix L. Finding of No Significant Impact

INTRODUCTION
The Fish and Wildlife Service proposes to protect and manage certain fish and wildlife resources in Franklin, Madison, and Tensas Parishes, Louisiana, through the Tensas River National Wildlife Refuge. An environmental assessment was prepared to inform the public of the possible environmental consequences of implementing the Comprehensive Conservation Plan for Tensas River National Wildlife Refuge. A description of the alternatives, the rationale for selecting the preferred alternative, the environmental effects of the preferred alternative, the potential adverse effects of the action, and a declaration concerning the factors determining the significance of effects, in compliance with the National Environmental Policy Act of 1969, are outlined below. The supporting information can be found in the environmental assessment, which was Section B of the Draft Comprehensive Conservation Plan for Tensas River National Wildlife Refuge.

ALTERNATIVES
In developing the Comprehensive Conservation Plan for Tensas River National Wildlife Refuge, the Fish and Wildlife Service evaluated three alternatives:

Alternative A: Current Management Direction (No Action Alternative)
Alternative B: Custodial Management Approach
Alternative C: Ecosystem Management (Preferred Action)

Each alternative is summarized below.

Alternative A – No Action Alternative

Current management and public use would continue under this alternative. Refuge management programs would continue to be developed and implemented with limited baseline biological information and limited monitoring. Wildlife surveys would still be completed for presence and absence of species and to alert refuge staff to large-scale changes in population trends. Cooperation with partners for monitoring waterfowl, eagle, fish, and deer herd health surveys would continue. The refuge would continue to provide habitat for and monitor the progress on the repatriation of the Louisiana black bear. It would also maintain the current habitat mix for the benefit of other migratory birds, shorebirds, marshbirds, and landbirds. Staff would continue existing surveys to monitor long-term population trends and health of resident species.

Bottomland hardwood forest management would continue at the current rate of thinning to maintain a closed canopy forest and retain as much water tupelo and bald cypress as possible. The open fields would continue with manipulating water levels for the moist-soil and cooperative cropland management. Management for invasives would continue with opportunistic treatment and mapping. Partnerships would continue with Louisiana Department of Wildlife and Fisheries (LDWF) for several biological programs, hunting regulations, and law enforcement issues. The refuge partners program would still develop projects with interested parties for carbon sequestration projects and invasives.

Hunting, fishing, and environmental education programs would continue to be the priority focus of public use on Tensas River National Wildlife Refuge, with no expansion of current opportunities. Current restrictions or prohibitions would remain. Environmental education and wildlife observation

and photography would be accommodated at present levels with a few interpretive sites added. Staffing would remain at current level with no new positions added, but current vacancies would be advertised and filled.

Alternative B – Custodial Management Approach

This alternative was driven by reducing costs of funding and staff with reduced habitat and wildlife management and a reduced public use program. The biological information would be modified to develop management programs that could be implemented less frequently, yet still accomplish the objectives. Extensive baseline inventorying and monitoring programs would be conducted with several partners to provide a solid foundation of the current condition of refuge habitat and wildlife while monitoring for changes in trends.

Additional research projects would be implemented in this alternative depending on granting opportunities and partnerships with other agencies and universities. An intensive bottomland hardwood forest inventory will be implemented to define current conditions and monitor natural successional changes. Management in the bottomlands would be limited so that the forest would go through natural succession as defined in a revised Forest Habitat Management Plan. Open fields would be allowed to go through natural succession to bottomland hardwood forests, and moist-soil units would not be maintained. Invasives management would become a priority to establish baseline information on location and density and protocols for control. Partnerships would continue to be fostered for several biological programs, hunting regulations, law enforcement issues, and research projects.

Public use would be limited under this alternative with custodial-level maintenance. Public use would be monitored more closely for impacts to wildlife, and with negative impacts, new restrictions or closures would result. Deer hunting would be allowed when data demonstrated that the population was exceeding the habitat carrying capacity and a reduction in herd size was necessary. An extensive survey for monitoring the deer population and its association with habitat conditions would be implemented. Fishing would continue as currently managed. Environmental education, wildlife observation, and wildlife photography would be accommodated at present levels; but access would be limited to July-October and February-April to minimize disturbance to migratory birds. Staffing would increase by four positions (e.g., biologist, forester, and two maintenance workers) to handle the increase in biological inventory, monitoring, and invasives control.

Alternative C – Ecosystem Management (Preferred Action)

Biological potential of historical habitats are restored and enhanced with most management actions emphasizing natural ecological processes to foster habitat functions and wildlife populations. The biological program will be enhanced with inventorying and monitoring so that adaptive management can be implemented for primarily migratory birds but other species of wildlife as well. A close evaluation of migratory bird use and nesting success on the refuge will be evaluated with granting opportunities and partnerships. Partnerships will be developed to establish scientifically valid protocols and collaboratively work on research projects associated with information needed to manage the habitats and wildlife, or, in other words, how forest management is affecting wildlife. Bottomland hardwood forest management will be developed based on an inventory defining current condition that could be conducted in a logical and feasible manner. Bottomlands will have management increased to open the canopy cover and increase structural and vegetation diversity. Water control structures and pumping capability will be improved to enhance moist-soil and cropland management for the benefit of wintering waterfowl. Invasives will be mapped and protocols for control established with the addition of a forester. Partnerships will continue to be fostered for several biological programs, hunting regulations, law enforcement issues, and research projects.

Under Alternative C, land acquisition, reforestation, and resource protection at Tensas River NWR will be intensified from the level now maintained in the "No Action" Alternative. In the refuge's Private Lands Program, staff will work with private landowners of adjacent tracts to manage and improve habitats. Staff will also explore opportunities with partners to protect existing and extend potential foraging areas off refuge's lands. Alternative C will provide a full-time law enforcement officer, an equipment operator, a maintenance mechanic, and a wildlife technician. The refuge will develop and begin to implement a Cultural Resources Management Plan.

Within 3 years of the date of the CCP, the refuge will develop a Visitor Services Plan to be used in expanding public use facilities and opportunities on the refuge. This step-down management plan will provide overall, long-term direction and guidance in developing and running a larger public use program at Tensas River NWR. Alternative C will also increase opportunities for visitors by improving and/or adding facilities such as photo-blinds, observation sites, and trails.

SELECTION RATIONALE

Alternative C was selected for implementation because it directs the development of programs to best achieve the refuge purpose and goals. Implementing the preferred alternative will result in management based on sound science for the conservation of a structurally diverse and species diverse bottomland hardwood habitat for migratory birds and resident wildlife. A focused effort will be placed on reducing invasive species, which are threatening the biological integrity of the refuge. Wintering waterfowl habitat will be maintained as important foraging habitat in the open fields and forested wetlands. Baseline inventorying and monitoring of management actions will be completed to gain information on a variety of species, from reptiles and amphibians to butterflies and several species of concern. Several cooperative projects will be conducted with universities, Louisiana Department of Wildlife and Fisheries, and other agencies and individuals to provide biological information to be used in management decisions. When compatible, the wildlife-dependent recreational opportunities for hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation will be provided and enhanced, while achieving the refuge purpose and remaining consistent with existing laws, Service policies, and sound biological principles.

Under this alternative, all lands under the management and direction of the refuge will be protected, maintained, and enhanced to best achieve national, ecosystem, and refuge-specific goals and objectives within anticipated funding and staffing levels. In addition, the action positively addresses significant issues and concerns expressed by the public.

Environmental Effects

Implementation of the Service's management action is expected to result in environmental, social, and economic effects as outlined in the comprehensive conservation plan. Habitat management, wildlife population management, resource protection, and visitor service activities on Tensas River National Wildlife Refuge would result in increased migratory bird utilization and production; increased protection for threatened and endangered species; enhanced wildlife populations; bottomland hardwood forest management; and enhanced opportunities for wildlife-dependent recreation and environmental education. These effects are detailed as follows:

1. Duck and shorebird use of the refuge would improve significantly as water management efforts would provide dependable flooded habitats to match the migration chronologies of these species. Forest breeding birds would benefit from refuge land acquisition, reforestation, and forest management actions. Woodcock population numbers and habitat use would be monitored and managed and woodcock use of the refuge would be expected to increase.

2. Migratory bird production would increase by enhancing forest habitat quality for neotropical migratory birds, habitat and food availability for wintering waterfowl, and through hydrological restoration and reforestation. Forest management practices, such as reforestation, selective harvests, and conservation of mature stand components, would benefit nesting and feeding habitat for neotropical migratory birds.

3. Refuge land acquisition, reforestation, and protection would benefit the recovery of threatened and endangered species. Refuge reforestation and forest management actions would provide improved habitat in support of black bear recovery efforts.

4. The refuge's habitat mix of cropland, early successional reforestation areas, and bottomland hardwood forests, as well as habitat management, would improve food and cover for resident wildlife species and enhance wetland communities within the refuge.

5. Habitat restoration and management, along with a focus on accessibility and facility developments, would result in improved wildlife-dependent recreational opportunities. While public use would result in some minimal, short-term adverse effects on wildlife, and user conflicts may occur at certain times of the year, these effects are minimized by site design, time zoning, and implementing refuge regulations. Anticipated long-term impacts to wildlife and wildlife habitats of implementing the management action are positive. In the long run, wildlife habitat and increased opportunities for wildlife-dependent recreation opportunities could result in an increase in economic benefits to the local community.

6. The following uses were found to be appropriate, compatible, and promote wildlife-dependent recreation: Wildlife observation and photography, environmental education and interpretation, fishing, field trials, boating, bottomland hardwood forest management, trapping, all-terrain vehicle use, cooperative farming program, research studies, horse/mule special use, and fire management

7. Implementing the comprehensive conservation plan is not expected to have any significant adverse effects on wetlands and floodplains, pursuant to Executive Orders 11990 and 11988, as actions would not result in development of buildings and/or structures within floodplain areas, nor would they result in irrevocable, long-term adverse impacts. In fact, a major thrust of the management action is to implement bottomland hardwood forest and open wetland restoration within the wildlife communities of the refuge that have been severely impacted by actions of previous landowners. Implementing the management action would result in substantial enhancement of forest and open wetland communities and net increases to the Nation's bottomland hardwood forest and open wetland acreage and quality.

POTENTIAL ADVERSE EFFECTS AND MITIGATION MEASURES

Wildlife Disturbance

Disturbance to wildlife at some level is an unavoidable consequence of any public use program, regardless of the activity involved. Obviously, some activities innately have the potential to be more disturbing than others. The management actions to be implemented have been carefully planned to avoid unacceptable levels of impact.

As currently proposed, the known and anticipated levels of disturbance of the management action are considered minimal and well within the tolerance level of known wildlife species and populations present in the area. Implementation of the public use program would take place through carefully controlled time and space zoning, establishment of protection zones around key sites, closures of all-terrain vehicle trails, and routing of roads and trails to avoid direct contact with sensitive areas, such

as nesting bird habitat, etc. All hunting activities (season lengths, bag limits, number of hunters) would be conducted within the constraints of sound biological principles and refuge-specific regulations established to restrict illegal or non-conforming activities. Monitoring activities through wildlife inventories and assessments of public use levels and activities would be utilized, and public use programs would be adjusted as needed to limit disturbance.

User Group Conflicts
As public use levels expand across time, some conflicts between user groups may occur. Programs would be adjusted, as needed, to eliminate or minimize these problems and provide quality wildlife-dependent recreational opportunities. Experience has proven that time and space zonings, such as establishment of separate use areas, use periods, and restricting numbers of users, are effective tools in eliminating conflicts between user groups.

Effects on Adjacent Landowners
Implementation of the management action would not impact adjacent or in-holding landowners. Essential access to private property would be allowed through issuance of special use permits. Future land acquisition would occur on a willing-seller basis only, at fair market values within the approved acquisition boundary. Lands are acquired through a combination of fee title purchases and/or donations and less-than-fee title interests (e.g., conservation easements, cooperative agreements) from willing sellers. Funds for the acquisition of lands within the approved acquisition boundary would likely come from the Land and Water Conservation Fund or the Migratory Bird Conservation Act. The management action contains neither provisions nor proposals to pursue off-refuge stream bank riparian zone protection measures (e.g., fencing) other than on a volunteer/partnership basis.

Land Ownership and Site Development
Proposed acquisition efforts by the Service would result in changes in land and recreational use patterns, since all uses on national wildlife refuges must meet compatibility standards. Land ownership by the Service also precludes any future economic development by the private sector. Potential development of access roads, dikes, control structures, and visitor parking areas could lead to minor short-term negative impacts on plants, soil, and some wildlife species. When site development activities are proposed, each activity will be given the appropriate National Environmental Policy Act consideration during pre-construction planning. At that time, any required mitigation activities will be incorporated into the specific project to reduce the level of impacts to the human environment and to protect fish and wildlife and their habitats.

As indicated earlier, one of the direct effects of site development is increased public use; this increased use may lead to littering, noise, and vehicle traffic. While funding and personnel resources will be allocated to minimize these effects, such allocations make these resources unavailable for other programs.

The management action is not expected to have significant adverse effects on wetlands and floodplains, pursuant to Executive Orders 11990 and 11988.

COORDINATION
The management action has been thoroughly coordinated with all interested and/or affected parties. Parties contacted include:

Congressional representatives
Governor of Louisiana
Louisiana Department of Wildlife and Fisheries

Louisiana State Historic Preservation Officer
Tunica-Biloxi Indians of Louisiana
Quapaw Tribe
Caddo Nation of Oklahoma
Local Community Officials
Interested Citizens
Conservation Organizations

FINDINGS

It is my determination that the management action does not constitute a major federal action significantly affecting the quality of the human environment under the meaning of Section 102(2)(c) of the National Environmental Policy Act of 1969 (as amended). As such, an environmental impact statement is not required. This determination is based on the following factors (40 C.F.R. 1508.27), as addressed in the Environmental Assessment, which was Section B of the Draft Comprehenisve Conservation Plan for Tensas River National Wildlife Refuge:

1. Both beneficial and adverse effects have been considered and this action will not have a significant effect on the human environment. (Environmental Assessment, pages 143-158)

2. The actions will not have a significant effect on public health and safety. (Environmental Assessment, pages 143-158)

3. The project will not significantly affect any unique characteristics of the geographic area, such as proximity to historical or cultural resources, wild and scenic rivers, or ecologically critical areas. (Environmental Assessment, pages 143-158)

4. The effects on the quality of the human environment are not likely to be highly controversial. (Environmental Assessment, pages 143-158)

5. The actions do not involve highly uncertain, unique, or unknown environmental risks to the human environment. (Environmental Assessment, pages 143-158)

6. The actions will not establish a precedent for future actions with significant effects nor do they represent a decision in principle about a future consideration. (Environmental Assessment, pages 143-158)

7. There will be no cumulatively significant impacts on the environment. Cumulative impacts have been analyzed with consideration of other similar activities on adjacent lands, in past action, and in foreseeable future actions. (Environmental Assessment, pages 154-158)

8. The actions will not significantly affect any site listed in, or eligible for listing in, the National Register of Historic Places, nor will they cause loss or destruction of significant scientific, cultural, or historic resources. (Environmental Assessment, page 143-158)

9. The actions are not likely to adversely affect threatened or endangered species, or their habitats. (Environmental Assessment, pages 143-158)

10. The actions will not lead to a violation of federal, state, or local laws imposed for the protection of the environment. (Environmental Assessment, pages 143-158)

SUPPORTING REFERENCES

US Fish and Wildlife Service. 2009. Draft Comprehensive Conservation Plan and Environmental Assessment for Tensas River National Wildlife Refuge, Franklin, Madison, and Tensas Parishes, Louisiana. U.S. Department of the Interior, Fish and Wildlife Service, Southeast Region.

DOCUMENT AVAILABILITY

The Environmental Assessment was Section B of the Draft Comprehensive Conservation Plan for Tensas River National Wildlife Refuge and was made available in February and March 2009. Additional copies are available by writing: Tensas River National Wildlife Refuge, 2312 Quebec Road Tallulah, Louisiana 71282.

Patrick Leonard

for Sam D. Hamilton
Regional Director

8/24/09

Date