

DRAFT LAND PROTECTION PLAN AND
DRAFT ENVIRONMENTAL ASSESSMENT
FOR THE PROPOSED EXPANSION OF
**CHICKASAW AND LOWER HATCHIE
NATIONAL WILDLIFE REFUGES**

Dyer, Haywood, Lauderdale, and Tipton Counties, Tennessee



Southeast Region



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DRAFT LAND PROTECTION PLAN

I. Introduction and Purpose

The Fish and Wildlife Service (Service), Southeast Region, proposes to expand the current acquisition boundaries of Chickasaw and Lower Hatchie National Wildlife Refuges (NWRs). Chickasaw and Lower Hatchie NWRs are in extreme western Tennessee, on the north end of the Mississippi Alluvial Valley (MAV) (Figure 1), in close proximity to several conservation properties owned by the State of Tennessee (Figure 2). The Service proposes to expand the boundaries of Chickasaw NWR and Lower Hatchie NWRs, with the proposed Chickasaw NWR expansion being bounded to the north by following the Obion and Forked Deer Rivers upstream and encompassing a one-half-mile zone on either bank, then south along the Mississippi River on the west, including islands along its banks, then eastward to the Chickasaw bluffs, then southward to Lower Hatchie NWR. The Lower Hatchie NWR boundary would expand eastward along the Hatchie River corridor from Highway 51, following the 5-year floodplain upstream to Hatchie NWR (Figure 3). The proposed expansion would connect all three refuges, creating one contiguous wildlife corridor.

The purpose of the proposed refuge expansion is to meet the goals of the Lower Mississippi River Ecosystem (LMRE) by conserving valuable riverine and wetland habitat. In meeting these goals, the project would restore and protect key habitats, as well as conserve and manage migratory bird populations, fisheries and aquatic resources, threatened and endangered species, and other inter-jurisdictional trust resources and species. These lands provide valuable wildlife habitat utilized by species that are dependent on the Mississippi and Hatchie Rivers and their associated floodplains; additional habitat loss in these areas due to climate change and development could put these populations at further risk. More than 20 million acres of bottomland hardwood forests have vanished from the Lower Mississippi Valley (LMV) since European settlement as the Mississippi River has been cut off from more than 90 percent of its former floodplain. The proposed expansion includes the last major un-channelized tributary of the Lower Mississippi River, as well as one of the few un-leveed portions of the Mississippi River.

Acquisition of these areas would create landscape-level connectivity and an essential wildlife corridor reaching from Chickasaw NWR to the habitats of John Tully Wildlife Management Area (WMA), Cold Creek WMA, and Fort Pillow State Park; while ultimately connecting with Lower Hatchie NWR. The contiguous wildlife habitat corridor would continue along the Hatchie River floodplain from Lower Hatchie NWR to connect to Hatchie NWR and protect an additional 71.3 river miles of the Hatchie River. This landscape connectivity would protect and restore natural patterns of wildlife movement, providing resilient refugia to allow wildlife to adapt to impacts associated with climate change by conserving and restoring the hydrological functions of these watersheds.

The Service's LMRE Team supports the creation of this contiguous wildlife corridor and several partnership opportunities exist with state agencies and conservation organizations. The project is consistent with the goals and objectives of several significant regional, national, and international resource management partnerships and plans, including:

- North American Waterfowl Management Plan
- Lower Mississippi River Joint Venture Project
- Lower Mississippi Valley Migratory Bird Wetlands Conservation Initiative
- National Wetlands Priority Conservation Plan

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- Partners-in-Flight Initiative
 - Western Hemisphere Shorebird Reserve Network
 - Lower Mississippi River Ecosystem Plan
 - Hatchie River Plan
 - Hatchie River Alliance
 - Hatchie River Conservancy
 - West Tennessee Wildlife Resources Conservation Plan
 - Tennessee State Wildlife Action Plan

Furthermore, the project area contains an additional 71.3 miles of the Hatchie River, a designated Class I Natural River Area under the State of Tennessee's Scenic Rivers Program, and a river that The Nature Conservancy designated as "One of 75 Last Great Places on Earth Most Deserving of Protection."

The purposes of this Draft Land Protection Plan (Draft LPP) are to:

Present to the public a description of Fish and Wildlife Service (Service) policies, procedures, and land protection strategies for lands within the proposed acquisition boundaries;
Identify the proposed acquisition boundaries and inform landowners within the boundaries that their property is within the proposed acquisition boundaries; and
Inform landowners and the public of the Service's policy of acquiring lands only from willing sellers.

A. PROJECT DESCRIPTION

The proposed expansion lies in the upper MAV and the western East Gulf Coastal Plain (EGCP) in extreme western Tennessee. The boundaries would stretch from the drainages of the Obion and Forked Deer Rivers in extreme southern Dyer County, Tennessee, southward along the Mississippi River, to include Chickasaw NWR and the floodplain eastward to the Chickasaw Bluffs, to the confluence of the Hatchie and Mississippi Rivers in Lauderdale and Tipton Counties, Tennessee, at Lower Hatchie NWR, and then eastward upstream to Haywood County, Tennessee, and Hatchie NWR. Thus, the expansion would encompass the entire un-leveed 5-year floodplain and existing bottomland hardwood forests of the Mississippi and Hatchie Rivers.

The proposed project comprises two units: the Mississippi River Corridor Unit would connect to the northern approved acquisition boundary of Chickasaw NWR to provide a one-half mile buffer on either side of a 14-mile stretch of the Forked Deer and Obion Rivers, as well as 2.3 miles of the eastern shore of the Mississippi River, and then extend southward, directly connecting Chickasaw NWR to several state-protected properties, Sunk Lake Public Use Natural Area, and to Lower Hatchie NWR (Figure 3). The proposed expansion would be bounded on the east by the Chickasaw bluffs and on the west by the Mississippi River. It includes undeveloped river islands on the western bank of the Mississippi River and 49.2 miles of Mississippi River shoreline. The second unit is the Hatchie River Corridor Unit, which would connect Lower Hatchie NWR to Hatchie NWR, incorporating the 5-year floodplain of the Hatchie River and the Bear Creek watershed to the south, and protect an additional 71.3 miles of the Hatchie River (Figure 3).

When combined, the Mississippi River and Hatchie River Units comprise a total of 120,078 acres, and, in combination with other state-protected properties and existing refuges and approved acquisition boundaries, would lead to the protection of approximately 49.2 contiguous river miles along the east bank of the Mississippi River, and approximately 106.3 contiguous river miles of the Hatchie River and existing floodplain bottomland hardwood forests.

B. REFUGE PURPOSES

Chickasaw NWR was established on August 5, 1985, under the authority of 16 U.S.C. 715d (Migratory Bird Conservation Act). Subsequent lands were acquired under the authority of 16 U.S.C. 460k-1 (Refuge Recreation Act). The refuge was specifically authorized “for use as an inviolate sanctuary, or for any other management purpose, for migratory birds” (Migratory Bird Conservation Act) and is “suitable for (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, and (3) the conservation of endangered or threatened species” (Refuge Recreation Act). In addition, the refuge is authorized “for the development, advancement, management, conservation, and protection of fish and wildlife resources” 16 U.S.C. 742f (a) (4) and “for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude” 16 U.S.C. 742f (b) (1) (Fish and Wildlife Act of 1956).

Lower Hatchie NWR was established on June 19, 1980, under the authority of 16 U.S.C. 715d (Migratory Bird Conservation Act). Subsequent lands were acquired under the authority of 16 U.S.C. 460k-1 (Refuge Recreation Act). The refuge was specifically authorized “for use as an inviolate sanctuary, or for any other management purpose, for migratory birds” (Migratory Bird Conservation Act) and is “suitable for (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, and (3) the conservation of endangered or threatened species” (Refuge Recreation Act). In addition, the refuge is authorized “for the development, advancement, management, conservation, and protection of fish and wildlife resources” 16 U.S.C. 742f (a) (4) and “for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude” 16 U.S.C. 742f (b) (1) (Fish and Wildlife Act of 1956).

II. Resources

A. RESOURCES TO BE PROTECTED

Historically, the floodplain of west Tennessee was dominated by the Mississippi River and three major tributaries, the Obion, Forked Deer, and Hatchie Rivers. The landscape consisted of bottomland hardwoods, cypress brakes, river oxbow cutoffs, non-forested wetlands, and sandbars that occurred along the shoreline of the Mississippi. Before European settlement, the entire floodplain was subject to frequent nutrient-rich flood events that created a mosaic of habitats and allowed the dynamics of the system to function under natural conditions.

When these riverine systems operated under a natural hydrological regime, they provided a variety of habitat types critical to migratory birds, resident wildlife, local fisheries, and other biological resources. Although there were many ecotypes and ecotones in this system, the most prevalent included: open water; riverine; non-forested wetlands; swamps; bottomland hardwood forests; cypress forests; riparian zones; grasslands; sandbar; scrub/shrub; and upland forests (Table 1). Some of the most significant natural communities represented include:

BOTTOMLAND HARDWOOD FORESTS

Large expanses of bottomland hardwood forested wetlands border the Mississippi, Obion, Forked Deer, and Hatchie Rivers, their tributaries, and numerous sloughs and lakes within the proposed expansion areas. Due to annual precipitation cycles, water levels within these bottomland forests fluctuate by several feet from their low point in the summer months to flood stage during winter and spring. Forest types within the bottomland hardwood forests are dictated by soil types and soil moisture regimes and include forest cover types such as: eastern cottonwood; overcup oak-water hickory; swamp chestnut oak-cherrybark oak; sweetgum-willow oak; willow oak; sugarberry-American elm-green ash; or sycamore-sweetgum-American elm. Mast production in bottomland hardwood habitats provides an important food source for a wide variety of wildlife, including migratory waterfowl, deer, squirrel, and turkey, as over 25,000 acres of bottomland hardwoods within the proposed expansion lie within the 5-year floodplain and flood on a regular basis.

WOODED SWAMPS

Wooded swamp habitat is dominated by baldcypress, water tupelo, and/or swamp tupelo. Sites are characterized by frequent and prolonged flooding, with floodwaters that may exceed 3 meters (10 feet) in depth and either be stagnant or may flow at rates up to 7 kilometers (4 miles) per hour. In deep alluvial swamps, the common associates are red maple, black willow, water elm, and water locust. In the shallower margins, overcup oak, water hickory, American elm, green ash, Nuttall oak, sweetgum, and persimmon may also be present. Wooded swamps are also characterized by the presence of mosses, lichens, aquatic herbs, wet site shrubs (e.g., button bush, swamp-privet, and possumhaw), submerged aquatics (e.g., elodea, curly-leaf pondweed, bladderwort, and coontail), emergents (e.g., American lotus, cow lily, duckweed, waterfern, and yellow pond-lily), and woody vines. Similar to bottomland hardwoods, wooded swamps provide critical breeding, foraging, and resting/loafing habitat vital to migratory birds and wintering waterfowl as well as a variety of other wildlife.

NON-FORESTED WETLANDS

Emergent non-forested wetlands occur within openings in bottomland hardwoods. Forest openings may be formed by high winds, catastrophic floods, beaver activity, fire, or other causes. Non-forested wetlands within the MAV floodplain and EGCP are historically temporal in nature, but many are artificially maintained due to farming programs or other management activities. Non-forested wetlands in west Tennessee are typically dominated by smartweeds, sedges, millets, and other seed-producing grasses. Early successional non-forested wetlands are critical to many species of wildlife, especially waterfowl. These seasonally flooded areas are rich in seeds, invertebrates, and herbaceous matter. Scrub/shrub wetlands are typified by willows, buttonbush, and other shrubby woody species as well as perennial herbaceous vegetation. Decaying leaves provide substrate for invertebrates which, in turn, provide food for waterfowl, and plant seeds provide an important food source for waterfowl and other wildlife. Within the MAV, these habitats are often transitional between emergent moist-soil wetlands and forested wetlands.

SANDBAR

Sandbars occur periodically along the Mississippi and Hatchie Rivers, and vegetation is generally lacking, because sandbars are intermittently submerged and rearranged by floodwaters. Sandbars provide important habitat for species that inhabit open sandy areas, including glass lizards, race runners, and shorebirds. The federally listed interior least tern breeds and nests in small colonies on exposed river sandbars along the Mississippi River, along with softshell, snapping, and map turtles. At the present time, very few acres of sandbar habitat are currently protected in west Tennessee. The proposed expansion would protect 27.5 additional miles of the Mississippi River, 71.3 additional miles of the Hatchie River, and two additional Mississippi River islands, including towheads and bars. Sandbar habitat occurs along the shoreline of both rivers and along the banks of the islands, towheads, and bars. The total extent of available habitat changes with rising and falling river levels and is grouped with the adjacent habitat types (Table 1).

UPLAND FORESTS

Upland hardwood forests in west Tennessee consist primarily of southern red oak, black oak, northern red oak, blackjack oak, sweet gum, yellow-poplar, post oak, white oak, various hickories, and American beech. Upland forests occur within the proposed expansion area in higher elevation areas mainly along the Chickasaw bluffs that connect Chickasaw NWR and Lower Hatchie NWR. The bluffs and higher elevation ground between the bluffs and the bottoms provide escape routes for wildlife when the bottoms are flooded.

OPEN WATER

Permanent open water habitats are characterized as natural ponds, tupelo and baldcypress lined oxbows, sloughs, lakes, and streams. These areas retain water year-round and may dry out only during extreme drought events. Water depths are usually less than 10 feet, providing important resting and foraging areas for waterfowl and other migratory birds.

GRASSLANDS

Historically, native grasslands in west Tennessee occurred in patches in buffer areas on the forest edge, and a few pockets of grassland habitats still occur in the MAV on high ground adjacent to the Mississippi River bluff. A portion of upland habitat, particularly along the bluff between the existing acquisition boundaries of Chickasaw NWR and Lower Hatchie NWR, once were vegetated in native

grasses. Native grasslands and prairies are one of the most endangered ecosystems in the United States (Carey 2000), as most native grasslands have been converted to agricultural use to provide forage for cattle. These historical grassland habitats were characterized as either oak savannah or open treeless areas dominated by switchgrass, little bluestem, big bluestem, broomsedge, partridge pea, Indian grass, goldenrod, common ragweed, and giant ragweed. Unfortunately, most open grasslands in west Tennessee have been converted to other land uses or are dominated by nonnative cool season grasses as many of the remaining grasslands have been invaded by fescue, which greatly diminishes benefits to wildlife.

B. RELATIONSHIP OF PROJECT TO LANDSCAPE CONSERVATION GOALS AND OBJECTIVES

The proposed expansion areas are located within the LMRE. To promote the protection and management of the LMRE, the Service created the LMRE Team, whose express purpose is to enhance, restore, and conserve the natural functional processes and habitat types of the LMRE unit, while maintaining the economic productivity and recreational opportunities of the region.

Service resource priorities for the LMRE 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 (U.S. Fish and Wildlife Service 2002).

Acquisition and management of the proposed expansion areas would contribute towards the aforementioned ecosystem goals through the management of bottomland hardwoods and other wetland habitat as previously described for migratory waterfowl, neotropical songbirds, aquatic resources, and the recovery of threatened and endangered species. The proposed expansion is consistent with the goals of the Mississippi Alluvial Valley Joint Venture (MAVJV) Plan; acquisition and management of the proposed expansion areas would help reverse the persistent loss of wetland habitats and benefit all wetland-dependent migratory birds. The MAVJV Plan is also consistent with the Partners-in-Flight Mississippi Alluvial Valley Bird Conservation Plan, which identifies this area as one of thirteen 100,000-acre blocks for the conservation of migratory birds (Twedt, Pashley, Hunter, Mueller, Brown, and Ford 1999).

The LMRE plan also includes a goal to increase public awareness and support for LMRE resources and their management. The proposed expansion areas would offer excellent public use opportunities such as hunting, fishing, boating, wildlife observation, and environmental education and interpretation.

Acquisition and management of the proposed expansion areas are also consistent with the goals and objectives of the West Tennessee Wildlife Resources Conservation Plan (WTWRCP) (Tennessee Wildlife Resources Agency and U.S. Fish and Wildlife Service 2004). The WTWRCP was a collaborative effort between the Tennessee Wildlife Resources Agency (TWRA) and the Service to develop a strategic, landscape-level, biologically driven, land planning mechanism focused on the habitat needs of the fish and wildlife resources in western Tennessee, and addressed issues of mutual concern and benefit. This initiative involved both landscape-level planning and a multiple

species focus to encompass the broad spectrum of issues and priorities affecting biodiversity in western Tennessee. Included in the WTWRCPC were goals that outlined strategic planning for land management priorities, habitat objectives, and the identification of critical habitats. As a result of this planning effort, “focus” areas of high-priority were identified for acquisition, protection, or enhancement based on habitat requirements of eight major species groups, which included, but was not limited to, migratory landbirds, reptiles and amphibians, shorebirds, waterfowl, mammals, and aquatic species. The proposed expansion area meets several goals of the WTWRCPC, including the highest priority acquisition goal of protecting lands in the Hatchie River drainage. The second highest priority acquisition goal is establishing a connective habitat corridor from Chickasaw NWR to Lower Hatchie NWR by protecting lands along the eastern side of the Mississippi River, including all bluff habitats for a minimum of 300 feet beyond the top of the bluff (Tennessee Wildlife Resources Agency and U.S. Fish and Wildlife Service 2004). The proposed expansion would also help meet plan goals for protecting the following: high-quality water areas, high-quality herpetofaunal areas; the entire 100,000-acre Mississippi Alluvial Valley Bird Conservation Area; and the shorebird acquisition priority areas. The proposed expansion would also help meet the plan’s goal of expanding public use opportunities within 30 miles of the predominately metropolitan areas of Shelby and Tipton Counties.

The Service and other agencies consider bottomland hardwood forests a high priority on which to focus conservation and management efforts. A combination of land protection and habitat management methods is utilized by the Service and others to compensate for bottomland hardwood habitat loss and to meet shared/common long-term goals established for this area. The proposed expansion plan reflects the common interests of numerous state and federal agencies, local governments, non-governmental organizations, and private interests, and are supportive of numerous regionally, nationally, and internationally significant plans.

C. PARTNERSHIP EFFORTS/RELATED RESOURCES

Figure 2 depicts federal, state, and private conservation lands in west Tennessee. There are several properties managed by the State of Tennessee (TWRA and/or Tennessee Department of Environmental Conservation) within 20 miles of Chickasaw, Lower Hatchie, and Hatchie NWRs and the proposed expansion areas including: Tumbleweed WMA; Bogota WMA; White Lake Refuge and WMA; George L. Yarbrow Wetland; Ernest Rice, Sr., WMA; Tigrett Refuge and WMA; Eaton Bottom Wetland; Moss Island WMA; Lake Lauderdale Refuge; Cold Creek WMA; Fort Ridge Wetland; South Fork Waterfowl Refuge; Col. Forrest V. Durand Wetland; John Tully WMA including Upper Mav and Mav-Fullen Units; John Tully State Forest; Fort Pillow State Park; Fort Pillow State Prison; Chickasaw State Park; Chickasaw State Forest and WMA; Whiteville Lake; Oak Drain Wetland; Meeman-Shelby Forest State Park and Natural Area; and Eagle Lake Refuge. To the west, Big Lake WMA and Big Lake NWR in Arkansas and Warbler Woods State Natural Area in Missouri lie within 20 miles of Chickasaw NWR.

The proposed expansion would provide an important wildlife corridor by linking Chickasaw NWR to other state-managed habitats such as: John Tully WMA, John Tully State Forest, Cold Creek WMA, and Fort Pillow State Park and would continue through those areas to Lower Hatchie NWR. The proposed acquisition boundary would allow the Service to purchase other important habitat areas as willing sellers are identified. Further, the proposed expansion would protect the Hatchie River and existing bottomland hardwoods by linking Lower Hatchie NWR to Hatchie NWR.

III. Land Protection Strategy

A. ACTION AND OBJECTIVES

Acquisition and management of the proposed expansion areas, which total approximately 120,078 acres, would conserve valuable riverine corridors along the Mississippi and Hatchie Rivers. The floodplain habitats in this Draft LLP include the few remaining areas where the hydrological processes of the Mississippi River remain functional and where the bottomland hardwood resources in this area maintain a dynamic connection with the Mississippi River.

Protecting additional conservation lands on the Mississippi and Hatchie Rivers is critical to the management of refuge resources and directly ties into many of the goals and objectives for Chickasaw, Lower Hatchie, and Hatchie NWRs, as described in their respective April 2006 Comprehensive Conservation Plans including:

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

Objectives include managing refuge lands and resources to provide habitat to support duck- and goose-use days consistent with population objectives developed in the NAWMP and as stepped-down and described in the LMVJV Plan. Other objectives include continuation of reforestation efforts to establish red oak and other mast species on newly acquired lands that are not scheduled for water management development and, in cooperation with private, state, and federal partners, establishment of a contiguous block of forest within the approved acquisition boundary that connects to other conservation lands to support the designated 100,000-acre MAV Bird Conservation Area. Acquisition, management, and restoration of the lands within this proposed expansion would significantly increase duck- and goose-use days in the west Tennessee region. Further, there is the potential to reforest approximately 38,000 acres of bottomland hardwoods. The proposed expansion, in combination with other state and federal lands, would protect the designated 100,000-acre Migratory Bird Conservation Area in its entirety.

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

Objectives include providing feeding sites on refuge lands for interior least terns and cooperating with other resource agencies in minimizing disturbance to interior least tern nesting colonies on Mississippi River sandbars adjacent to the refuge; assisting in efforts to restore or enhance Mississippi River or Hatchie River habitats, which may be suitable for pallid sturgeon; and, enhancing, restoring, protecting, and managing imperiled species' habitat using all available conservation tools, including habitat management on existing lands (federal, state, and private), conservation easements, partnership agreements, conservation agreements; and land acquisition from willing sellers. Acquisition, management, and restoration of the lands within the proposed expansion would benefit interior least terns, pallid sturgeon, wood storks, and several state-listed species as described in the Major Wildlife Values section of the CCP.

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

The proposed expansion would directly assist the refuges to meet Goal 3 for migratory landbirds, which focuses on the acquisition and management of refuge lands to provide sufficient habitat to support species of management concern. This would be accomplished by working with partners toward the assemblage of a 100,000-acre block of forested land in west Tennessee between Chickasaw and Lower Hatchie NWRs and a 20,000-acre block of forested land along the Hatchie River. This goal was designed to support the establishment of sustainable populations of priority forest interior-nesting migratory songbirds by protecting blocks of forest habitat mapped by Partners-in-Flight and their cooperating partners. The MAV Migratory Bird Conservation Plan identifies 101 patches that, with varying amounts of reforestation, could provide forest patches of 10,000, 20,000, or 100,000 acres. Resource professionals believe that forest patches in these categories are the minimum sizes suitable to support breeding populations of various neotropical songbirds. Chickasaw NWR and the proposed expansion area are located in one of only thirteen 100,000-acre forest blocks designated within the Lower Mississippi River Alluvial Plain (LMRAP). According to Partners-in-Flight research, a typical 100,000-acre block contains 84,000 acres of core habitat capable of supporting the species most dependent upon large forest blocks, including swallow-tailed kites, red-shouldered hawks, broad-winged hawks, pileated woodpeckers, and Cooper's hawks (Mueller, Loesch, and Twedt 1999). These large forest blocks also are expected to support other less area-sensitive, forest-nesting migratory birds as well.

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

The proposed expansion would help meet this goal by protecting and managing shallowly flooded mudflat habitats with less than 25 percent vegetative cover and varying water levels, up to 8 inches, to support shorebirds year-round.

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

Objectives include restoring and maintaining natural secondary channels, oxbows, natural banks, sloughs, and backwater areas that connect to the Mississippi, Forked Deer, Obion, and Hatchie Rivers on the refuges; improving water quality and reducing annual flood damage by restoring flood plain hydrology on newly acquired lands where agricultural drainage is no longer needed; and promoting the enhancement and protection of riparian corridors.

Most of the proposed expansion lies within the floodplain of the Mississippi and Hatchie Rivers, which regularly flood the proposed expansion areas (outside of the Chickasaw Bluff) when the rivers reach flood stage. Protecting, restoring, and managing these wetland habitats would provide diverse and renewable resources, including several creeks, sloughs, and lakes. These areas provide good nurseries for juvenile fish, breeding areas for frogs and toads, and feeding areas for reptiles. Through conservation, restoration, and management of these lands and aquatic resources, water quality would increase, sedimentation would decrease, contamination would decrease, and critical habitats would be made available (e.g., resting, foraging, and breeding) for resident and migratory wetland-dependent and aquatic wildlife species.

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

The primary objective of this goal is to conserve, restore, and manage upland refuge lands to support resident wildlife species and population levels identified in the WTWRC. The proposed expansion would help meet this goal by protecting and managing several high-priority acquisition habitats identified in the WTWRC and discussed in the Major Wildlife Values and Relationship of Project to Ecosystem Management Goals and Objectives sections of these plans.

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

Objectives include providing appropriate and compatible fishing, hunting, wildlife observation and photography opportunities, environmental education and interpretation programs, and public outreach and awareness, consistent with sound biological principles, by maintaining existing access and facilities, and evaluating refuge resources for possible additional opportunities.

The proposed expansion would significantly increase public use opportunities in the west Tennessee region, particularly along the Hatchie River where there are only 3 public access points from Lower Hatchie NWR to Hatchie NWR, a distance of 48.2 river miles.

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

This goal demonstrates the commitment made by the refuge to conserve natural and cultural resources through partnerships, protection, and land acquisition. Among critical issues to be addressed are water quality, erosion and sedimentation, and cultural resource protection. With the enactment of the Antiquities Act of 1906, the Federal Government recognized the importance of cultural resources to the national identity and sought to protect archaeological sites and historical structures on those lands owned, managed, or controlled by the United States. Protecting, restoring, and managing the wetland resources within the proposed expansion area would help meet this goal by increasing water quality, decreasing erosion and sedimentation, and identifying and protecting cultural resources in the area. Partnerships with the state, natural resource managers, and other conservation groups would be enhanced.

B. LAND PROTECTION PRIORITIES

The Service's Proposed Action (Alternative B in the Draft EA) would result in the acquisition of up to 120,078 acres of wildlife habitat as an expansion of Chickasaw and Lower Hatchie NWRs, through a combination of fee-title purchases from willing sellers and less-than-fee-title purchases (e.g., conservation easements and cooperative agreements) from willing sellers. The Service believes these are the minimum interests necessary to conserve and protect the fish and wildlife resources in the proposed area.

All private properties within the proposed expansion have been prioritized for acquisition using the following criteria:

- Biological significance;
- Existing and potential threats;
- Significance of the area to refuge management and administration; and
- Existing commitments to purchase or protect land.

Two categories of land acquisition have been established, with the highest priority being the Priority I lands. A description of the lands within each of the priority groups is given below, and Table 2 summarizes the Service's land protection priorities and proposed method(s) of acquisition. Table 3 shows parcel-level tax map data listed by land protection priority group. Figure 4 (Maps 4A through 4K) identifies individual landowner tracts, and Figure 5 shows the locations of the project area and the respective priority groups.

PRIORITY GROUP I

Priority Group I consists of 919 individual properties (Table 2) that lie in the 5-year floodplain of both the Mississippi and Hatchie Rivers, and contain a variety of habitat types critical to migratory birds, local fisheries, and resident wildlife. This group was prioritized as Group I because of its potential for establishing the 100,000-acre block of contiguous forest identified as one of the thirteen Mississippi Alluvial Valley Bird Conservation Areas. It is a diverse area—consisting of open water, riverine, non-forested wetlands, swamps, bottomland hardwood forests, cypress forests, riparian zones, grasslands, sandbars, scrub/shrub, and upland forests—all represented within the expansion boundary (Table 1). Some of the most significant natural communities include 20,222 acres of existing bottomland hardwoods, 8,699 acres of wooded swamp and non-forested wetlands, and associated existing agricultural lands with the potential for afforestation, remnant slough systems, upland forests, and pastureland. The bottomland hardwood and wetland habitat types are increasingly rare, and represent some of the best non-fragmented forests remaining in the MAV. Furthermore, this group of properties would protect 49.2 miles of the east bank of the Mississippi River and an additional 71.3 miles, as approximately 35 miles are already protected inside Lower Hatchie NWR, on both banks of the Hatchie River.

PRIORITY GROUP II

Priority Group II represents 101 individual properties (Table 2) in outlying areas that would provide protection for Mississippi River islands, the riparian corridor of the Obion and Forked Deer Rivers, the watershed of Bear Creek that enters Hatchie NWR from the south, and additional agricultural lands (Table 1). The islands in the Mississippi River are composed mainly of bottomland forests, but most importantly, they contain sandbar habitats that provide critical nesting habitat for the endangered least tern. The river corridor lands would protect fragile riparian zones along heavily degraded agricultural fields, and provide the potential for afforestation in the future. The Bear Creek watershed lands would help to reduce sedimentation that is currently negatively impacting Hatchie NWR.

With the above criteria in mind, we configured our boundaries for fee-title and easement areas. The Service reserves the right to be flexible with the detailed priority list above, because a number of factors also influence the priority of land protection, including the availability of willing sellers and the availability of funding. In addition, the Service must be flexible in its methods and priorities of land protection to meet the needs of individual landowners.

C. LAND PROTECTION OPTIONS

The Service acquires lands and interests in lands, such as easements, and management rights in lands, such as leases or cooperative agreements, consistent with legislation or other congressional guidelines and executive orders, for the conservation of fish and wildlife and to provide wildlife-dependent public use for recreational and educational purposes. These lands include national wildlife refuges, national fish hatcheries, research stations, and other areas.

If approved, we would use the following options to implement the Final LPP:

- Option 1: Management or land protection by others
- Option 2: Less-than-fee-title acquisition by the Service
- Option 3: Fee-title acquisition by the Service

When land is needed to achieve fish and wildlife conservation objectives, the Service seeks to acquire the minimum interest necessary to meet those objectives, and acquire it only from willing sellers. Our proposal includes a combination of Options 1, 2, and 3 above. We believe this approach offers a cost-effective way of providing the minimal level of protection needed to accomplish refuge objectives, while also attempting to meet the needs of local landowners.

OPTION 1. MANAGEMENT OR LAND PROTECTION BY OTHERS

A great deal of land adjacent to and ecologically important to the proposed project is already owned by our partners or managed by our partners through conservation easements. It should be emphasized that the protection of this area fits well into a large landscape-scale wildlife and habitat corridor that is being pieced together in the area. This proposed project would serve as an important keystone in this conservation effort. The following partners manage and/or own property within the project area or manage and/or own property that is ecologically associated with the project area: Tennessee Wildlife Resources Agency, Tennessee Department of Environment and Conservation, Tennessee State Parks, The Nature Conservancy, and The Trust for Public Lands.

OPTION 2. LESS-THAN-FEE-TITLE ACQUISITION BY THE SERVICE

Under option 2, we would protect and manage land by purchasing only a partial interest, typically in the form of a conservation easement, from willing sellers. This option leaves the parcel in private ownership, while allowing us control over the land use in a way that enables us to meet our goals for the parcel or that provides adequate protection for important adjoining parcels and habitats. The structure of such easements would provide permanent protection of existing wildlife habitats, while also allowing habitat management or improvements and access to sensitive habitats, such as for endangered species or migratory birds. It would also allow for public use where appropriate. We would determine, on a case-by-case basis, and negotiate with each landowner, as to the extent of the rights we would be interested in acquiring. Those may vary, depending on the configuration and location of the parcel, the current extent of development, the nature of wildlife activities in the immediate vicinity, the needs of the landowner, and other considerations.

In general, any less-than-fee-title acquisition would maintain the land in its current configuration with no further subdivision. Easements are a property right, and typically are perpetual. If a landowner later sells the property, the easement would continue as part of the title. Properties subject to easements generally remain on the tax rolls, although the change in market value may reduce the assessment. The Service does not pay refuge revenue sharing on easement rights. Where we

identify conservation easements, we would be interested primarily in purchasing development and some wildlife management rights. Easements are best when:

- Only minimal management of the resource is needed, but there is a desire to ensure the continuation of current undeveloped uses and to prevent fragmentation over the long-term and in places where the management objective is to allow vegetative succession;
- A landowner is interested in maintaining ownership of the land, does not want it to be further developed, and would like to realize the benefits of selling development rights;
- Current land use regulations limit the potential for adverse management practices;
- The protection strategy calls for the creation and maintenance of a watershed protection area that can be accommodated with passive management; or
- Only a portion of the parcel contains lands of interest to the Service.

The determination of value for purchasing a conservation easement involves an appraisal of the rights to be purchased, based on recent market conditions and structure in the area. The Land Protection Methods section further describes the conditions and structure of easements.

OPTION 3. FEE-TITLE ACQUISITION BY THE SERVICE

Under Option 3, we would acquire parcels in fee title from willing sellers, thereby purchasing all rights of ownership. This option provides us the most flexibility in managing priority lands, ensuring the protection in perpetuity of nationally significant trust resources.

Generally, the lands we would buy require more than passive management (e.g., controlling invasive species, mowing or prescribed burning, planting, or managing for the six priority public uses). We only propose fee-title acquisition when adequate land protection is not assured under other ownerships, active land management is required, or we determined the current landowner would be unwilling to sell a partial interest like a conservation easement.

In some cases, the Service may convert a previously acquired conservation easement to fee-title acquisition; for example, when an owner is interested in selling the remainder of interest in the land on which we have acquired an easement. We would evaluate that need on a case-by-case basis.

D. LAND PROTECTION METHODS

We may use several methods of acquiring either a full or a partial interest in the parcels identified for Service land protection: (1) Purchase (e.g., complete title, or a partial interest like a conservation easement); (2) leases and cooperative agreements; (3) donations; and (4) exchanges.

PURCHASE

For most of the tracts in the boundary, the proposed method is listed as Fee-Title Purchase or Easement Purchase; however, the method we ultimately use depends partly on the landowner's wishes. We would purchase land from willing sellers only.

Fee-Title Purchase

A fee-title interest is normally acquired when: (1) The area's fish and wildlife resources require permanent protection not otherwise assured; (2) land is needed for visitor use development; (3) a pending land use could adversely impact the area's resources; or (4) it is the most practical and economical way to assemble small tracts into a manageable unit.

Fee-title purchase conveys all ownership rights to the Federal Government and provides the best assurance of permanent resource protection. A fee-title interest may be acquired by donation, exchange, transfer, or purchase (as the availability of funding allows).

Easement Purchase

Easement purchase refers to the purchase of limited rights (less-than-fee-title) from an interested landowner. The landowner would retain ownership of the land, but would sell certain rights identified and agreed upon by both parties. The objectives and conditions of our proposed conservation easements would recognize lands for their importance to wildlife habitat or outdoor recreational activities, and any other qualities that recommend them for addition to the National Wildlife Refuge System. Land uses that are normally restricted under the terms of a conservation easement include: (1) Development rights (agricultural, residential, etc.); (2) alteration of the area's natural topography; (3) uses adversely affecting the area's floral and faunal communities; (4) private hunting and fishing leases; (5) excessive public access and use; and (6) alteration of the natural water regime.

LEASES AND COOPERATIVE AGREEMENTS

Potentially, the Service can protect and manage habitat through leases and cooperative agreements. Management control on privately owned lands could be obtained by entering into long-term renewable leases or cooperative agreements with the landowners. Short-term leases could be used to protect or manage habitat until more secure land protection could be negotiated.

DONATIONS

We encourage donations in fee title or conservation easement in the approved areas. We are not aware currently of any formal opportunities to accept donations of parcels in our land protection boundary.

EXCHANGES

We have the authority to exchange land in Service ownership for other land that has greater habitat or wildlife value. Inherent in this concept is the requirement to get dollar-for-dollar value with, occasionally, an equalization payment. Exchanges are attractive because they usually do not increase federal land holdings or require purchase funds; however, they also may be very labor-intensive and take a long time to complete.

E. SERVICE LAND ACQUISITION POLICY

Once a land protection (i.e., refuge acquisition) boundary has been approved, we contact neighboring landowners to determine whether any are interested in selling. If a landowner expresses an interest and gives us permission, a real estate appraiser will appraise the property to determine its market value. Once an appraisal has been approved, we can present an offer for the landowner's consideration.

Appraisals conducted by Service or contract appraisers must meet federal as well as professional appraisal standards. In all fee-title acquisition cases, the Service is required by federal law to offer 100 percent of the property's appraised market value, which is typically based on comparable sales of similar types of properties.

We based the proposed land protection (i.e., refuge acquisition) boundary on the biological importance of key habitats. The establishment or expansion of this boundary gives the Service the approval to negotiate with landowners that may be interested or may become interested in selling their land in the future. With this internal approval in place, the Service can react more quickly as important lands become available. Our long-established policy is to work with willing sellers as funds become available and we continue to operate under that policy. Lands within this boundary do not become part of the refuge unless their owners willingly sell or donate them to the Service.

F. FUNDING

Because the proposed expansion areas provide wintering habitat for migratory waterfowl and songbirds, funding for this project would be sought through the Land and Water Conservation Fund, as authorized by the Fish and Wildlife Act of 1956, as amended (16 U.S.C. 742j) and the Migratory Bird Conservation Act of 1929 (16 U.S.C. 715d).

IV. Coordination

The Service coordinated with and sought input from the following officials, agencies, organizations, and tribes.

PUBLIC OFFICIALS:

Senator Lamar Alexander
Senator Robert Corker
Representative Stephen Fincher
Governor Bill Haslam
State Representative Debra Moody
State Representative Craig Fitzhugh
State Representative Bill Sanderson
State Senator Dolores R. Gresham
County officials for Lauderdale, Tipton, Haywood, and Dyer Counties
City officials for Ripley, Covington, Brownsville, and Dyersburg

AGENCIES:

Tennessee Wildlife Resources Agency
Tennessee Department of Environment and Conservation
U.S. Department of Agriculture
U.S. Geological Survey
U.S. Army Corps of Engineers
U.S. Environmental Protection Agency, Region 4
Tennessee Commission of Indian Affairs

PRIVATE ORGANIZATIONS:

The Trust for Public Land
The Nature Conservancy
Ducks Unlimited
The Conservation Fund
Tennessee Wildlife Federation
Mississippi River Corridor – Tennessee
Sierra Club Tennessee Chapter
Friends of West Tennessee Refuges
Tennessee Parks and Greenways Foundation
Chambers of Commerce for Dyersburg, Ripley, Covington, and Brownsville

TRIBES:

Chickasaw Nation
Delaware Nation of Oklahoma
Osage Nation
Peoria Tribe of Indians of Oklahoma
Quapaw Tribal Business Committee

Scoping was conducted during December 2012. Two public scoping meetings were held. The first meeting was held December 11, 2012, at the Tennessee Technology Center in Ripley, Tennessee. Approximately 100 members of the public attended. The second meeting was held December 12, 2012, at the Chamber of Commerce building in Brownsville, Tennessee. Approximately 80 members

of the public attended that meeting. The purpose of scoping was to seek input from the public regarding the expansion of Chickasaw and Lower Hatchie NWRs and to identify the issues that needed to be addressed in the planning process. These issues/comments are documented in Appendix F of the Draft EA.

Strategic habitat conservation (SHC) has been chosen as the Service’s strategy for accomplishing landscape scale conservation to achieve its mission. A Landscape Conservation Cooperative (LCC) is the primary vehicle through which SHC will be implemented. The proposed acquisition boundary lies within the geographic area covered by the Gulf Coastal Plains and Ozarks Landscape Conservation Cooperative (GCPO-LCC). Goals and objectives identified by the GCPO-LCC would be supported by this and other planning efforts for Chickasaw and Lower Hatchie NWRs.

Table 1. Distribution of habitat types within the proposed expansion area

Habitat Type	Mississippi River Unit (MRU) (Acres)*			Hatchie River Unit (HRU) (Acres)*			Total Acres
	MRU-1	MRU- 2	Total	HRU-1	HRU-2	Total	
Bottomland Hardwood Forest	1,687	6,134	7,821	18,535	704	19,239	27,060
Wooded Swamp	159	602	761	8,540	6	8,546	9,307
Non-Forested Wetland	54	210	264	1,393	9	1,402	1,666
Upland Forest	673	24	697	580	12	592	1,289
Open Water	4,795	3,619	8,414	1,949	0	1,949	10,363
Agriculture: Row Crop	18,427	13,277	31,704	14,859	340	15,199	46,903
Agriculture: Pasture/Grassland	1976	1819	3,795	17,602	1816	19,418	23,213
Sandbar	0	277	277	0	0	0	277
Total Acres	27,771	25,962	53,733	63,458	2,887	66,345	120,078

MRU-1 = Mississippi River Unit Priority One

* Acres calculated from West Tennessee Wildlife Resources

MRU-2 = Mississippi River Unit Priority Two

Conservation Plan Land use data

HRU-1 = Hatchie River Unit Priority One

HRU-2 = Hatchie River Unit Priority Two

Table 2. Protection priorities for the proposed expansion and recommended methods of acquisition

Priority Groups	Tract Size	Number of Tracts	Ownership Type	Method of Acquisition
1	<1 – 50 acres	517	Private	Fee Title
	51 – 100 acres	131	Private	Fee Title
	101 – 1000 acres	260	Private	Fee Title
	1001 – 3000 acres	9	Private	Fee Title
	>3000 acres	2	Private	Fee Title
2	<1 – 50 acres	27	Private	Fee Title
	51 – 100 acres	32	Private	Fee Title
	101 – 1000 acres	36	Private	Fee Title
	1001 - 3000 acres	6	Private	Fee Title
	>3000 acres	0	Private	Fee Title

Table 3. Tax map parcel data listed by priority group

Priority Group	Landowner	Parcel ID#	Approximate Acres	Map Location
MRU1	AGEE JOE & THELMA	852	1.00	Lauderdale East
MRU1	AKIN ALVIN N & SYLVIA	725	185.00	Lauderdale East
MRU1	ASHPORT PARTNERSHIP LTD	771	295.00	Lauderdale East
MRU1	ASSEMBLY OF GOD CHURCH	678	1.00	Lauderdale East
MRU1	BAILEY RUBY MAE EST	730	4.70	Lauderdale West
MRU1	BATES BARRY & WEAVER D	822	48.00	Lauderdale East
MRU1	BEASLEY TED M & DORIS A	737, 832	129.00	Lauderdale East
MRU1	BENJAMIN JOHN O & LOIS	936, 691	47.00	Lauderdale West
MRU1	BIRD NORMAGENE (MCHUGHES)	695	307.50	Lauderdale West
MRU1	BOE SUSAN V TRUST & BOE	681, 756, 812	609.50	Lauderdale East
MRU1	BROWNER ELLEN M (TRUSTEE)	861	237.00	Lauderdale West
MRU1	CHIPMAN FARMS L P	50,816, 853, 962	1069.70	Dyer West and Lauderdale East
MRU1	CHIPMAN J F JR	890, 933	456.00	Lauderdale East
MRU1	COLEMAN JOHNNIE	733	1.00	Lauderdale West
MRU1	CRAIG CATHERINE (HEIRS)	858	255.00	Lauderdale East
MRU1	CRAIN NEAL & MARTHA	867	29.01	Lauderdale East
MRU1	CROMWELL WADE ET AL	766	100.00	Lauderdale East
MRU1	CROOK RUTH ELENA (ET AL)	823	50.00	Lauderdale East

Priority Group	Landowner	Parcel ID#	Approximate Acres	Map Location
MRU1	CROWDER A C	727	102.55	Lauderdale West
MRU1	CROWDER HAROLD	855	118.00	Lauderdale East
MRU1	CROWDER RONALD W	685	97.00	Lauderdale East
MRU1	CROWDER RONALD WAYNE	760	1.00	Lauderdale East
MRU1	CROWDER ROY	776	114.00	Lauderdale East
MRU1	CROWDER ROY	937	8.58	Lauderdale East
MRU1	CURRIE DORA V	790	1.00	Lauderdale East
MRU1	ESCUE ANGELA (LE)	644	107.70	Lauderdale West
MRU1	ESCUE JOE T JR	905	66.42	Lauderdale West
MRU1	FLOYD STEVE ET AL	889	156.00	Lauderdale East
MRU1	FREE BETTY ANN	773	298.00	Lauderdale East
MRU1	FREEMAN SHARON K	793	101.85	Lauderdale East
MRU1	FULLEN FARMS INC	731, 770, 772, 778, 813, 825, 829, 857, 898, 762, 763	1231.41	Lauderdale East and West
MRU1	FULLEN JAMES III & BONITA	820	476.28	Lauderdale East
MRU1	FULLEN JIM	726	1498.00	Lauderdale East
MRU1	FULLEN JIM J & MARGARET	907	3136.00	Lauderdale West
MRU1	FULLEN JIMMY CO INC &	894	119.19	Lauderdale East
MRU1	GAINES ELLA JO ET AL	658	55.00	Lauderdale East

Priority Group	Landowner	Parcel ID#	Approximate Acres	Map Location
MRU1	GAINES RICHARD L &	850, 863	209.00	Lauderdale East
MRU1	GLIMP WILLIAM	774	92.80	Lauderdale East
MRU1	GOLDDUST BETHLEHEM BAPTIST	783	1.00	Lauderdale West
MRU1	GRUGETT KAY R	676	127.45	Lauderdale West
MRU1	HAISLIP THOMAS C	755	35.00	Lauderdale East
MRU1	HAR HAR FARMS LLC	687, 779	239.00	Lauderdale West
MRU1	HART WALTER (ESTATE OF)	831	90.00	Lauderdale East
MRU1	HART WALTER EST (HEIRS)	680	98.00	Lauderdale East
MRU1	HEFLIN JOHN III & WILLIAMS	827	119.50	Lauderdale West
MRU1	HENDERSON ROLAND	656, 689, 765, 784, 906, 646, 657	776.61	Lauderdale East and West
MRU1	HENDERSON ROLAND & SAM	947	168.00	Lauderdale West
MRU1	HENDERSON SAM D	932, 946, 865	834.71	Lauderdale East and West
MRU1	HENDERSON SAM/ROLAND/	866	44.39	Lauderdale West
MRU1	HIPP PAUL MRS	754	104.00	Lauderdale East
MRU1	HUGGINS WAYNE & DEBRA	639	1.00	Lauderdale East
MRU1	HUGHES ROBERT	810, 814, 888 928	202.00	Lauderdale East
MRU1	HUTCHERSON DALE & LINDA	724	18.20	Lauderdale East
MRU1	HUTCHERSON WILLIAM (EST)	961, 965, 969, 970, 971	204.50	Lauderdale East
MRU1	JAMES THOMAS R & FRANCES	938	104.50	Lauderdale West

Priority Group	Landowner	Parcel ID#	Approximate Acres	Map Location
MRU1	JELLISON FRED & PHYLLIS	904	1.00	Lauderdale East
MRU1	JELLISON PHYLLIS ANNETTE	735	1.00	Lauderdale East
MRU1	KEEN CAROL MAI	729	47.00	Lauderdale West
MRU1	KELTNER CHARLES & WILLIAM	788	588.09	Lauderdale East
MRU1	KIRKPATRICK GARY	811	1.00	Lauderdale East
MRU1	KOONCE JONAS D & CHARLOTTE	896	61.00	Lauderdale East
MRU1	LAND SUSAN	679	5.60	Lauderdale East
MRU1	LEE MORGAN D	899, 780, 830, 688, 692	106.60	Lauderdale West
MRU1	LEE SAMUEL	728	24.50	Lauderdale West
MRU1	LEE SAMUEL C & DOROTHY M	781	49.00	Lauderdale West
MRU1	LITTLES JERRY & PHYLLIS	887	1.00	Lauderdale West
MRU1	LUNSFORD FARM INC	694, 653	1205.00	Lauderdale East
MRU1	MALONE CHARLES F	848	103.50	Lauderdale East
MRU1	MARTIN BONNYLIN W	792	739.50	Lauderdale East
MRU1	MCGOWAN CHARLOTTE R ET AL	794	557.00	Lauderdale East
MRU1	MEADOWS BENNY & KATHERINE	818, 641	147.00	Lauderdale East
MRU1	MEADOWS GEORGE & PATSY	819	220.00	Lauderdale East
MRU1	MEADOWS RAY & LUCILLE	885	58.75	Lauderdale East
MRU1	MEADOWS SARAH	723, 959	183.14	Lauderdale East

Priority Group	Landowner	Parcel ID#	Approximate Acres	Map Location
MRU1	MEADOWS SCOTT	927	29.70	Lauderdale East
MRU1	MOORE JAMES L & PAMELA	924, 964, 966	70.00	Lauderdale East
MRU1	MORRIS HENRY T & WANDA C	931	108.00	Lauderdale East
MRU1	NEAR DENNIS	642	10.00	Lauderdale East
MRU1	NEW HOPE BAPTIST CHURCH	738, 815	2.90	Lauderdale East
MRU1	NEWMAN WAYNE & LISA	764	1.00	Lauderdale East
MRU1	NICHOLS WILLIAM B JR &	854	132.69	Lauderdale East
MRU1	NIXON JANE	698, 897, 923	174.80	Lauderdale East
MRU1	OLD MARK D & MARY A	849	36.81	Lauderdale East
MRU1	OLD PHYLLIS S & LARRY	809	52.92	Lauderdale East
MRU1	OLDS MARK (ET AL)	649	47.00	Lauderdale East
MRU1	OLDS PHYLLIS S & LARRY	808	27.73	Lauderdale East
MRU1	PATRICK JERRY L & BARBARA	935	1.00	Lauderdale West
MRU1	PENNINGTON STEVE & VICKIE	643	1.80	Lauderdale East
MRU1	PIERSON ISREAL	787	103.50	Lauderdale East
MRU1	REVIERE ROBERT J	732, 673, 828	795.45	Lauderdale West
MRU1	RHOADS CURT & BETTY J	696, 943	156.00	Lauderdale East
MRU1	RHOADS PHILIP C & EMILY C	697	52.99	Lauderdale East
MRU1	RHODES MARY J	650	74.00	Lauderdale East

Priority Group	Landowner	Parcel ID#	Approximate Acres	Map Location
MRU1	RHODES WILLIAM G & PAMELA	757	1.00	Lauderdale East
MRU1	ROGAN JACKIE ET AL	647	100.96	Lauderdale East
MRU1	SANDERS LARRY & LINDA	782	4.00	Lauderdale West
MRU1	SANDERS ZELFORD	690	95.20	Lauderdale West
MRU1	SAVAGE SUE (LE)	682	23.50	Lauderdale East
MRU1	SAVERSON ELNOR ET AL	652, 900, 939	34.30	Lauderdale West
MRU1	SIDES JOE & CAROLYN H	834	159.00	Lauderdale East
MRU1	SIMONTON HUGH T &	833	131.00	Lauderdale East
MRU1	SIMPSON JIM	893, 902	264.00	Lauderdale West
MRU1	SMITH PHILLIP & MARTHA J	892, 891	128.64	Lauderdale East
MRU1	SMITH RUTH	791	200.00	Lauderdale West
MRU1	STEELMAN ROBERT C SR	934	400.36	Lauderdale East
MRU1	SWEAT CLIFFORD & LOLA	761	382.90	Lauderdale East
MRU1	SWEAT DON & ELAINE	929	125.00	Lauderdale East
MRU1	SWEAT VIOLET ELAINE (LE)	640, 677, 786	302.00	Lauderdale East
MRU1	TANKERSLEY ONEAL & EMERSON	736	8.15	Lauderdale East
MRU1	TARACO INC	645	131.00	Lauderdale West
MRU1	UNGERECHT DANNY	775	122.00	Lauderdale East
MRU1	VANHOOSE DANIEL P & TAMMY	926	1.00	Lauderdale East

Priority Group	Landowner	Parcel ID#	Approximate Acres	Map Location
MRU1	VAUGHN BOBBY & CAROLYN	903	45.00	Lauderdale East
MRU1	VOLLNER ESTELLE	826	119.50	Lauderdale West
MRU1	VOLZ LOUISE (HEIRS)	859	1228.83	Lauderdale East
MRU1	WAKEFIELD HOBSON & THERESA	654	38.00	Lauderdale East
MRU1	WAKEFIELD J C III	895	50.00	Lauderdale East
MRU1	WAKEFIELD KARL ET AL	693, 752	255.50	Lauderdale East
MRU1	WAKEFIELD THERESA	655, 941, 942	327.50	Lauderdale East
MRU1	WALKER CAROL LEA	734	99.71	Lauderdale East
MRU1	WALKER CHARLES F	785, 901	212.60	Lauderdale West
MRU1	WALKER DANIEL JR	862, 960	38.00	Lauderdale East
MRU1	WALKER DANIEL TR LIV TR &	674, 721, 908	691.86	Lauderdale East
MRU1	WALKER DOLLY (LE)	945	218.00	Lauderdale East
MRU1	WALKER INEITA K TRUST	722	286.58	Lauderdale East
MRU1	WALKER LEWIS J JR TRUST	753, 940	550.37	Lauderdale East
MRU1	WALLACE JAMES P & PHYLLIS	777, 821	77.00	Lauderdale East
MRU1	WALLACE JAMES P SR &	686	1.00	Lauderdale East
MRU1	WEBB SCOTTIE & JEAN	930	1.00	Lauderdale East
MRU1	WHITE LAKE WATER FOWL LLC	824, 860	63.50	Lauderdale East
MRU1	WILLIAMS CLAY (NORA) MRS	883	131.00	Lauderdale East

Priority Group	Landowner	Parcel ID#	Approximate Acres	Map Location
MRU1	WILLIAMS LOUIS	769	1.00	Lauderdale East
MRU1	WINBUSH M C & CORA	789	83.00	Lauderdale East
MRU1	WISEMAN JAMES & MARGARETTE	648	99.60	Lauderdale East
MRU1	WOODARD RICHARD CLAYTON &	817	2.00	Lauderdale East
MRU1	WOODARD WAYNE & DOUGLAS	651	50.33	Lauderdale East
MRU1	WOODARD WAYNE & LINDA	944	20.00	Lauderdale East
MRU1	ZARECOR PATRICIA C	768	10.87	Lauderdale East

Priority Group	Landowner	Parcel ID#	Approximate Acres	Map Location
HRU1	ADAMS MARVIN	217	3.00	Zoom
HRU1	ADD-VAN FARMS & CO INC	368, 426	295.57	Tipton West
HRU1	ADKISON JULIE A ETAL	623	2.00	Tipton Middle
HRU1	ALEXANDER EUGENE	148	1.00	Tipton Middle
HRU1	ALEXANDER FARMS CO	164, 165, 169, 195, 240, 327	2163.52	Haywood West
HRU1	ALEXANDER JERRY	237, 334	2.21	Zoom
HRU1	ALSBROOK JAMES C	606	3.10	Tipton West
HRU1	ALSTON FAMILY GENERAL PART	663, 796	216.50	Tipton Middle
HRU1	ALSTON THOMAS O JR	634	113.00	Tipton West
HRU1	ANDERSON FARMS FAMILY	404, 452, 605	419.35	Tipton West and Middle
HRU1	ANDERSON STEPHEN W	167, 170	698.00	Haywood West

Priority Group	Landowner	Parcel ID#	Approximate Acres	Map Location
HRU1	ANDERSON WILLIE E	400, 461, 465	256.50	Tipton West and Middle
HRU1	ANTHONY J B JR	528	195.50	Tipton East
HRU1	ANTHONY SIDNEY	665, 719	215.47	Tipton East
HRU1	ASHMORE TIMOTHY ETUX	97	115.48	Haywood West
HRU1	AUSTIN TONY ETUX REBECCA	235	1.00	Zoom
HRU1	BAKER BEN	629, 630, 591	59.58	Tipton Middle
HRU1	BALLARD C P	534	108.40	Tipton West
HRU1	BALLARD DOUGLAS E	616	43.36	Tipton West
HRU1	BALLARD JAMES R & DARTHA	798	10.78	Tipton Middle
HRU1	BALLARD JASON	481	15.00	Tipton West
HRU1	BALLARD KEITHEL W	621	92.78	Tipton West
HRU1	BALLARD MARCUS R & SHARI	802, 841	3.20	Tipton East
HRU1	BALLARD PERRY L	453, 554	3.80	Tipton West
HRU1	BARNES CARL W	376	0.53	Tipton Middle
HRU1	BASKIN DALE ETAL BASKIN	593	69.65	Tipton West
HRU1	BASKIN DONALD M SR	366	65.70	Tipton Middle
HRU1	BASKIN ROBERT ETAL BASKIN	458, 522	98.14	Tipton West
HRU1	BASKIN ROBERT L ETUX ETAL	522	58.70	Tipton West
HRU1	BATES CHARLES ETUX	229	1.00	Haywood West
HRU1	BENNETT BETTY M	624	92.44	Tipton Middle
HRU1	BENNETT CHARLES E	428, 603	104.50	Tipton

Priority Group	Landowner	Parcel ID#	Approximate Acres	Map Location
HRU1	BILDERBACK GARY	415, 423, 495, 442, 501, 582, 599	310.78	Tipton Middle
HRU1	BILLINGS BROTHERS	632	100.00	Tipton Middle
HRU1	BILLINGS CHARLES	570, 468, 542,609	1058.05	Tipton Middle
HRU1	BILLINGS DONALD	466, 391	1.69	Tipton West
HRU1	BILLINGS MITCHELL	520	0.73	Tipton Middle
HRU1	BILLINGS SAMUEL W	405	3.00	Tipton West
HRU1	BILLINGS VERBLE A	437	0.40	Tipton Middle
HRU1	BILLINGS VERBLE M	561	0.71	Tipton Middle
HRU1	BILLINGS VICTOR M	497	1.94	Tipton Middle
HRU1	BISHOP DINAH ELIZABETH	120	1.00	Zoom
HRU1	BLACKBURN JOHNNY ETUX	211	1.00	Zoom
HRU1	BOND ELENE B L/E	60	5.18	Haywood West
HRU1	BOND JOE ETAL	142, 159, 257	21.50	Haywood West
HRU1	BOND JOHNNIE C JR ETUX	59	247.80	Haywood West
HRU1	BOND LOUIS T ETUX PAT	361	4.83	Haywood West
HRU1	BOND REX F ETUX HARRIET K	122	2.60	Zoom
HRU1	BOND ZELMA	362	1.00	Haywood West
HRU1	BOSWELL JERRY	625	37.32	Tipton Middle
HRU1	BOURNE MYRNA GAIL	244	914.00	Haywood West
HRU1	BOYD ANNE SANFORD TRUST	612	206.00	Tipton Middle
HRU1	BOYLAND J F	483	1.00	Tipton Middle
HRU1	BRADEN LARRY	982	0.50	Tipton Middle

Priority Group	Landowner	Parcel ID#	Approximate Acres	Map Location
HRU1	BRADLEY EMBRY EST	594	200.50	Tipton West
HRU1	BRANCH MILTON	393	52.00	Tipton West
HRU1	BRATSCHI KIM	740, 700	48.81	Tipton Middle
HRU1	BRINGLE BEVERLY ETAL	499, 513	143.00	Tipton West
HRU1	BRUMMETT JACK JR	236	1.00	Zoom
HRU1	BURLISON GIN COMPANY INC	408, 431	219.00	Tipton Middle
HRU1	BURLISON JAMES I	748, 877	30.50	Tipton East
HRU1	BURLISON JIMMY ETAL	548	102.55	Tipton West
HRU1	BURLISON R M	502	1.80	Tipton West
HRU1	BURLISON REAL ESTATE	511, 709	97.37	Tipton East and West
HRU1	CAGLE JERRY W & RITA J	910	89.88	Tipton Middle
HRU1	CANNON BLAND DR ETAL	125	340.00	Haywood West
HRU1	CANNON R V	324	217.97	Haywood West
HRU1	CARLTON HILLARD W ETUX	304	1.00	Zoom
HRU1	CARLTON TREVA A	254	1.00	Zoom
HRU1	CARPENTER DON ETUX	1013	7.00	Tipton West
HRU1	CARVER MARY ALISON ETAL	493	48.50	Tipton Middle
HRU1	CARVER MITCHELL G ETAL	339	1.25	Zoom
HRU1	CASTELLAW BILLY ETUX	282	1.00	Haywood West
HRU1	CEMETERY RICHARDSON	331	1.00	Haywood West
HRU1	CHAMBERS WILMA C	136, 341	2.70	Zoom
HRU1	CHANDLER GWENDOLYN M	269	88.48	Haywood West
HRU1	CHANEY DENNIS D	494	1.00	Tipton Middle
HRU1	CHANEY JAMES E	620	2.00	Tipton West

Priority Group	Landowner	Parcel ID#	Approximate Acres	Map Location
HRU1	CHANEY WILLIAM J & BARBARA	1004	2.00	Tipton East
HRU1	CHAPIN DOROTHY LANGDON	524	156.00	Tipton Middle
HRU1	CHAPMAN RANDY & KATHLEEN	660	1.60	Tipton Middle
HRU1	CHAPMAN RANDY RYAN SR	869	47.81	Tipton Middle
HRU1	CHERRY THOMAS & EMMA	874	2.50	Tipton East
HRU1	CHUMLEY JIMMY JR	500	1.00	Tipton Middle
HRU1	CITIFINANCIAL INC	297	1.00	Zoom
HRU1	CLIFF CURTIS ETAL WILLIAM	356	1.35	Tipton East
HRU1	CLIFF CURTIS JR ETAL	145, 360	9.00	Tipton East
HRU1	CLIFF MURLEE	359	1.00	Haywood West
HRU1	CLINE DONALD E	278	1.00	Zoom
HRU1	COATS CHARLES M	983	0.27	Tipton Middle
HRU1	COATS VIRGIL F	369, 386, 441	55.30	Tipton West
HRU1	COATS W A	370	2.00	Tipton Middle
HRU1	COATS WANDA	545	258.00	Tipton West
HRU1	COBB DAVID LYNN	94, 147, 329	22.20	Zoom
HRU1	COCHRAN RALPH L ETUX	1015	16.30	Haywood West
HRU1	COLBORN TERRY W ETUX	306	1.00	Zoom
HRU1	COLEMAN JOHNNIE R	357	1.00	Tipton East
HRU1	COLLIER HOLLY ETAL	208	6.40	Haywood West
HRU1	CONNELL MONTE S ETUX	102, 328	461.00	Tipton East
HRU1	COOK BENNIE F JR	469	48.15	Tipton Middle
HRU1	COOK HERSCHEL	372	0.60	Tipton Middle
HRU1	COOK PEGGY	521	40.00	Tipton Middle

Priority Group	Landowner	Parcel ID#	Approximate Acres	Map Location
HRU1	COOPER T D ETUX ETAL	321	89.50	Haywood West
HRU1	COTHRAN AND WILLIAMSON	573	228.50	Tipton East
HRU1	COTHRAN DICK ESTATE	523	8.00	Tipton Middle
HRU1	COTHRAN NORRIS	449	26.00	Tipton West
HRU1	COX MELBA ELIZABETH	273	100.00	Haywood West
HRU1	COZART LAURA JO STEWART	268	1.00	Zoom
HRU1	CRAIG DORIS MABLE	618	11.04	Tipton West
HRU1	CRAIG JOHN ARTHUR TRUST &	953	1.00	Tipton East
HRU1	CRAIN GLADYS ARMOUR ETAL	186, 301	3896.25	Haywood East and West
HRU1	CREWS EMMA D ETAL	299, 115	34.00	Haywood West
HRU1	CROMWELL BRANDON ETAL	374	69.38	Tipton Middle
HRU1	CROMWELL C D	517	32.00	Tipton Middle
HRU1	CROMWELL C D & JUANELL	958, 712	219.90	Tipton East
HRU1	CROMWELL C D & WADE	836, 880	506.80	Tipton Middle and Tipton East
HRU1	CROMWELL JUANELL & WADE	879	20.00	Tipton East
HRU1	CROMWELL WADE	882	239.00	Tipton East
HRU1	CURLIN I W EST	246	23.00	Haywood East
HRU1	CURRIE WANDA MARIE ETAL	200	66.50	Tipton East
HRU1	CURRINGTON DEXTER ETAL	508	0.60	Tipton Middle
HRU1	DANIEL CAROL TRUSTEE	478	176.50	Tipton Middle
HRU1	DAVIS ARLEAN	241	1.00	Haywood West
HRU1	DAVIS DIXIE	123	1.00	Haywood West
HRU1	DAVIS MARION ETAL	518	200.00	Tipton East

Priority Group	Landowner	Parcel ID#	Approximate Acres	Map Location
HRU1	DAVIS MARY ANNA	210	1.00	Haywood West
HRU1	DECK BRUCE C ETUX RITA L	230	1.40	Zoom
HRU1	DELASHMIT JACKIE ETUX LEE	249	49.56	Tipton East
HRU1	DELASHMIT JACKIE W ETUX	266	98.92	Tipton East
HRU1	DEVERELL R L ETAL R L	90	17.00	Tipton East
HRU1	DOSS ELAINE T	699	1.50	Tipton Middle
HRU1	DOWDY LORA M	353	1.00	Tipton East
HRU1	DOWNING DEBORAH LYNN	387, 388, 447, 490, 556	179.26	Tipton Middle
HRU1	DOYLE JANE SMITH	994	1.10	Tipton Middle
HRU1	DRAIN HORSE SHOE LAKE	280, 330	42.50	Haywood West
HRU1	DUNCAN PATSY GLASS	392	28.00	Tipton West
HRU1	DUPREE JAMES H (L/E)	184	1.00	Zoom
HRU1	DYSON JOE E	984	0.50	Tipton Middle
HRU1	EASLEY ELAINE MCINTYRE	560	62.00	Tipton East
HRU1	EDWARDS THOMAS R SR	986	1.13	Tipton Middle
HRU1	EDWARDS WILLIAM M	432, 440, 579	24.10	Tipton East
HRU1	ELDER CALVIN ETAL TONY	73, 150, 216, 283, 352	584.90	Haywood West
HRU1	ELROD KRISTINA	156	2.20	Haywood West
HRU1	ELROD LANNY	248	1.00	Zoom
HRU1	ELZEY JAMES	529	1.00	Tipton Middle
HRU1	ERWIN JOHN	380, 456, 564	242.30	Tipton Middle
HRU1	ESCUE CLARENCE H ETUX	161	2.62	Haywood West
HRU1	ESCUE CLARENCE J	243	7.90	Haywood West
HRU1	ESTES ODIE M & PATSIE R	870	0.55	Tipton Middle

Priority Group	Landowner	Parcel ID#	Approximate Acres	Map Location
HRU1	ESTES RUSSELL ETUX	95	1.00	Haywood West
HRU1	EUBANKS EUGENIA R	715	14.50	Tipton East
HRU1	EVANS CYNTHIA M ETAL	293	96.50	Haywood West
HRU1	FANNIN JOYCE ETAL	89, 162	192.00	Haywood West
HRU1	FARMER H R JR	496	1.29	Tipton Middle
HRU1	FARMER WILLIAM S	998	1.50	Tipton Middle
HRU1	FARMER WILLIAM SANFORD	995, 997, 999	1.72	Tipton Middle
HRU1	FAUGHT DEBORAH P ETAL	406	1.00	Tipton West
HRU1	FEATHERSTONE BONNIE	129	1.00	Zoom
HRU1	FERGUSON KIMBERLY B ETAL	512	31.38	Tipton Middle
HRU1	FERRELL MARGARET ETAL	108	1.00	Zoom
HRU1	FERRELL TERRY	252	1.00	Zoom
HRU1	FIRST UNITED METHODIST	525	167.00	Tipton Middle
HRU1	FISHER ALBERTA	72, 83, 231, 303, 322	5.00	Zoom
HRU1	FISHER FERD R III LIV TR	563	151.90	Tipton Middle
HRU1	FISHER JEAN W	749, 920	224.00	Tipton East
HRU1	FISHER JONATHAN RYAN	751	19.30	Tipton East
HRU1	FISHER ROGER ETAL	706, 975	24.50	Tipton East
HRU1	FISHER ZANE	714, 978	32.60	Tipton East
HRU1	FITE JOHN TIM ETAL	445	15.00	Tipton Middle
HRU1	FLETCHER ADA B	633, 636	318.19	Tipton West
HRU1	FORSYTHE MICHAEL A ETUX	294	3.07	Zoom
HRU1	FORT WRIGHT HISTORICAL	503	1.00	Tipton West
HRU1	FRIEDMAN EMILY ETAL	264	185.00	Haywood West

Priority Group	Landowner	Parcel ID#	Approximate Acres	Map Location
HRU1	FRIEDMAN FARMS L P	166, 315	935.30	Haywood West
HRU1	FULL GOSPEL PENTECOSTAL	422	1.44	Tipton Middle
HRU1	FULLER WILLIAM R	742	0.15	Tipton Middle
HRU1	FULLER WILLIAM R	797	2.20	Tipton Middle
HRU1	G & J INVESTMENTS	364	3.25	Tipton Middle
HRU1	G B FARMS INC	417, 507, 576	102.50	Tipton Middle
HRU1	GALLASPY JOHN R III	201	1.00	Zoom
HRU1	GAUSE MARIE J	80	2.00	Tipton East
HRU1	GAUSE MARIE J ETAL	309, 342	94.32	Tipton East
HRU1	GAUSE TERRANT	675	17.50	Tipton East
HRU1	GILLIAND LOIS	176	1.00	Haywood West
HRU1	GLASS CHARLES E	509	2.00	Tipton Middle
HRU1	GLASS L B	425, 475, 484	220.12	Tipton West
HRU1	GLENN THADDEUS	480	134.20	Tipton Middle
HRU1	GRACEY GEORGE D JR ETAL	395	174.00	Tipton West
HRU1	GRAHAM BILLY CHARLES	421	5.21	Tipton East
HRU1	GRIFFIN JENNIFER DICKINSON	111, 119	2.00	Zoom
HRU1	GRIGGS CHARLES REVOCABLE	672, 851	2.00	Lauderdale South
HRU1	GUINN JOE B	67	315.76	Tipton East
HRU1	GUINN LARRY S ETAL GERALD	238	365.00	Haywood West
HRU1	GUY TONYA A	462	1.00	Tipton Middle
HRU1	HADLEY RICHARD M	367	28.84	Tipton Middle
HRU1	HALBROOK MARY ANN	62	4.20	Haywood West

Priority Group	Landowner	Parcel ID#	Approximate Acres	Map Location
HRU1	HALBROOK MICHAEL LEE ETAL	158	75.80	Haywood West
HRU1	HALL AVA DAWN	209, 239	2.00	Zoom
HRU1	HALL JACK JR ETAL	979, 981, 541, 980	4.38	Tipton Middle
HRU1	HALL TALLEY CAMILLE ETAL	587	126.50	Tipton West
HRU1	HALL TRENT ETUX JUNE	212	20.40	Haywood West
HRU1	HAMILTON RUBY	302	1.00	Zoom
HRU1	HARDEN JUDY M	544	1.07	Tipton Middle
HRU1	HARRISON BERNIE	1008	1.06	Tipton West
HRU1	HARRISON ELIZABETH CHANE	510, 583	1.82	Tipton Middle
HRU1	HARTSFIELD DEXTER ETUX	65	1.00	Tipton East
HRU1	HARTSFIELD KENNETH	578	1.00	Tipton East
HRU1	HASTINGS ROBERT C	550	156.20	Tipton Middle
HRU1	HAY JAMES ROLAND LEE	96	80.50	Haywood West
HRU1	HAYDEN J A III	957	499.54	Tipton East
HRU1	HAYES DAVID ETAL MIKE	155	1.00	Zoom
HRU1	HENDRIX HAROLD JR ETUX	1002	1.00	Haywood West
HRU1	HENDRIX LAVINIA H	101	114.03	Haywood West
HRU1	HENSON WILSON K	473	1.09	Tipton Middle
HRU1	HEREFORD FLORENCE BOND	232	127.00	Haywood West
HRU1	HIGGINS DELFAN E	110	1.84	Tipton East
HRU1	HILL FRED E III ETUX	180	3.52	Zoom
HRU1	HILL HUGH WILBUR ETAL	396	358.00	Tipton Middle
HRU1	HILL ROBERT	100	215.00	Tipton East

Priority Group	Landowner	Parcel ID#	Approximate Acres	Map Location
HRU1	HINSLEY KEVIN ETUX PEGGY	163, 344	2.00	Zoom
HRU1	HOGAN WILLIAM A	296	1.00	Zoom
HRU1	HOLCOMB SCOTTY & TERISA	720	1.00	Lauderdale South
HRU1	HOLDEN ELLA	75, 118	2.00	Zoom
HRU1	HOOPER TERRY ETAL TRAVIS	197	201.30	Haywood East
HRU1	HUFFMAN BINFORD	418, 566, 610	159.86	Tipton West
HRU1	HUFFMAN PHIL TRUST ETAL	438	125.00	Tipton West
HRU1	HUFFMAN RICHARD L	586	54.56	Tipton West
HRU1	HUFFMAN SWAYNE ETAL	701	114.24	Tipton Middle
HRU1	HURSTA JUDY	394	11.17	Tipton Middle
HRU1	JACKSON DANIEL J	183	49.00	Haywood West
HRU1	JOHNSON DONALD A	207	1.00	Zoom
HRU1	JOHNSON JONATHAN & REBECCA	795	3.34	Tipton Middle
HRU1	JONES JACOB W	987, 1000	0.85	Tipton Middle
HRU1	JONES RONALD	492, 540	317.00	Tipton Middle
HRU1	JORDAN HOWELL R & WILLIAM	664	113.40	Tipton Middle
HRU1	KELLER ALBERT ETUX INELL	311	129.40	Haywood West
HRU1	KELLER FRANK II & PATRICIA	702, 922	172.00	Tipton Middle
HRU1	KELLEY ALBERT CLAY	377, 384, 455, 485, 538, 558	775.50	Tipton West
HRU1	KELLEY BILLY	375, 463, 552	244.37	Tipton West
HRU1	KELLEY CLAY	472, 555, 565	153.00	Tipton West
HRU1	KELLEY JOHN RICHARD	389, 604	822.83	Tipton East

Priority Group	Landowner	Parcel ID#	Approximate Acres	Map Location
HRU1	KELLEY RICHARD	379, 435, 476, 539, 598	507.90	Tipton East and West
HRU1	KELLY JOHN RICHARD ETUX	336	100.70	Tipton East
HRU1	KNIGHT LEIGH	74	1.00	Haywood West
HRU1	KOONCE JOHN PAUL	876	66.26	Tipton Middle
HRU1	LAFRAIN JAMES P (EST)	140	1.00	Zoom
HRU1	LAKE NORVELLA	589	1.40	Tipton Middle
HRU1	LANCASTER PARKER	381	24.83	Tipton West
HRU1	LAND MATTHEW	443, 526, 537	177.40	Tipton West
HRU1	LANHAM RAY	590	0.75	Tipton Middle
HRU1	LAWLER JOSEPH MICHAEL	450	180.00	Tipton Middle
HRU1	LAWRENCE DENNIS L/E	179	1.30	Zoom
HRU1	LAWRENCE JUDY LYNN	382	108.00	Tipton East
HRU1	LEA CHRIS W ETAL JODY T	202, 307	143.70	Tipton East
HRU1	LEA WILLIAM M	106	10.50	Tipton East
HRU1	LEE THOMAS ETUX KATHRYN	143, 281	8.42	Haywood West
HRU1	LINDSEY ROBERT	638	0.61	Tipton Middle
HRU1	LITTLEJOHN VIRGINIA(HEIRS)	909	31.50	Tipton Middle
HRU1	LONON CHARLES W ETUX	316	127.60	Haywood West
HRU1	LONON MARY D ETAL WILLIAM	66	253.50	Haywood East
HRU1	LONON MARY PATSY	168	667.00	Haywood East
HRU1	LONON NEDRA R ETVIR	233	45.93	Zoom
HRU1	LOTT BERNARD E	628, 1022	578.01	Tipton West
HRU1	LUNCEFORD DONNA B SMITH	569, 597	10.03	Tipton Middle

Priority Group	Landowner	Parcel ID#	Approximate Acres	Map Location
HRU1	M D MCCLENNAN	744	9.60	Tipton Middle
HRU1	MANN PAT H JR ETAL ANN	323, 104, 116, 220, 345	850.35	Tipton East and Haywood West
HRU1	MANN SARAH H	320, 126	555.87	Haywood West
HRU1	MANN THOMAS F	132, 234, 291	419.61	Tipton East and Haywood West
HRU1	MANN SAM ETUX ELMIRA	284	1.00	Zoom
HRU1	MARTIN JERRY	308	2.61	Zoom
HRU1	MASSEY JOHN MICHAEL ET AL	710	25.00	Tipton East
HRU1	MATHIAS MYRTLE	976	1.90	Tipton East
HRU1	MCCALLA FARMS LP	383, 390, 459, 504, 592, 601, 607	602.94	Tipton East
HRU1	MCCALLA JOHN MANN IV	430	60.50	Tipton Middle
HRU1	MCCLAIN ROSELLA O	409	155.00	Tipton West
HRU1	MCCLERKIN MARGARET	996	0.44	Tipton Middle
HRU1	MCCOOL THOMAS WINDROW	76, 117	19.37	Haywood West
HRU1	MCDIVITT SAMMY O	1009	0.60	Tipton West
HRU1	MCDOW E R	474, 516, 574, 613, 371, 489, 546	458.80	Tipton Middle
HRU1	MCINTOSH WALTER	1005, 1007	2.13	Tipton Middle
HRU1	MCINTYRE JOHN A	467	40.00	Tipton East
HRU1	MCKNATT HELEN	631	64.64	Tipton Middle
HRU1	MCTMAHAN CHARLINE H	921	902.00	Tipton East
HRU1	MEACHAM CHRISTINE C	277	1.00	Zoom
HRU1	MILLER EDNA E	68, 194, 276	400.00	Tipton East
HRU1	MILLER LEROY ETUX	363	4.83	Haywood West

Priority Group	Landowner	Parcel ID#	Approximate Acres	Map Location
HRU1	MILLER LUMBER CO INC	838, 948	522.00	Lauderdale South and Tipton Middle
HRU1	MILLS DIANNE B	584	211.00	Tipton East
HRU1	MILLS WILLIAM BARNEY	617	1.00	Tipton West
HRU1	MOORE KATHLEEN SMITH ETAL	608	199.44	Tipton Middle
HRU1	MOORER CEMETERY	952	3.60	Tipton East
HRU1	MORTON BOBBY ETUX FAYE	61, 91, 190, 206, 326	5.75	Zoom
HRU1	MORTON DONALD E	446	13.00	Tipton East
HRU1	MULLEN CHRIS ETUX	85	1.00	Zoom
HRU1	MURLEY MILDRED JONES ETAL	519	107.00	Tipton Middle
HRU1	NAIFEH JAMES O JR ETAL	551	226.00	Tipton East
HRU1	NAIFEH ONIE L/E	225	266.00	Tipton East
HRU1	NANNEY CAYCE D ETUX	124	1.00	Zoom
HRU1	NEAL JOE LOUIS	614, 615	10.00	Tipton Middle
HRU1	NEEDHAM MICHAEL SHAWN ETAL	451	7.88	Tipton West
HRU1	NEFF WILLIAM M	198	1.00	Zoom
HRU1	NORFOLK TIMMIE W	354	1.00	Tipton East
HRU1	NORMAN JERRY DONALD	482	5.54	Tipton Middle
HRU1	NORWOOD M H	272	1.00	Zoom
HRU1	OSBORNE ANNE M	671	254.64	Tipton Middle
HRU1	OSBORNE ANNE M ET AL	799, 847	309.32	Tipton Middle
HRU1	OVERALL CHARLOTTE B	413	2.00	Tipton Middle
HRU1	OVERALL ROBERT LANIER ETAL	434, 464	228.50	Tipton West

Priority Group	Landowner	Parcel ID#	Approximate Acres	Map Location
HRU1	OWEN ANN	666, 912	405.50	Tipton Middle
HRU1	OWENS ETTA R	295	1.00	Haywood West
HRU1	PARKER PATRICK JR & MARTHA	806	34.50	Tipton East
HRU1	PARKS ROBERT S ETAL	319	1.63	Haywood West
HRU1	PARR FRANK WAYNE	567	0.86	Tipton West
HRU1	PARR WILLIAM	486	1.75	Tipton East
HRU1	PARRISH EVELYN J	703	21.70	Tipton East
HRU1	PATE JANETTE WALKER	151	286.55	Haywood East
HRU1	PATRICK LINDA	414	57.00	Tipton Middle
HRU1	PEAT ROBERT JR &	805	0.50	Tipton East
HRU1	PENNEL V E JR	298, 343	317.83	Haywood West
HRU1	PERKINS ALICE MOORE	358	2.10	Haywood West
HRU1	PERRY ANDREW ETUX	193, 137	70.52	Haywood West
HRU1	PERRY JIMMY D	219	1.00	Zoom
HRU1	PERRY WILLIE D ETUX	64	2.00	Haywood West
HRU1	PETREE CAMILLE	868	183.00	Lauderdale South
HRU1	PINNER JERRY A	1010	2.00	Tipton West
HRU1	PINNER WILLIE R	572	202.84	Tipton West
HRU1	PITMAN LARRY T	253, 113, 135, 69, 271	14.75	Zoom
HRU1	PORCH KEITH	274	51.37	Haywood West
HRU1	POWELL BILL N ESTATE	191	1678.00	Tipton East
HRU1	POWELL FAMILY TRUST (THE)	214	590.00	Tipton East
HRU1	POWELL JAMES H FAMILY	144	43.61	Haywood West

Priority Group	Landowner	Parcel ID#	Approximate Acres	Map Location
HRU1	POWELL JAMES H TRUST	205	330.00	Haywood West
HRU1	POWELL RAILEY W	172, 349, 300, 596, 553, 577, 611	4804.50	Haywood West and Tipton East
HRU1	POWELL WALTER H ETAL JANE	63, 93, 98, 105, 215	2635.63	Tipton East
HRU1	PRICE ROBERT W ETUX	139, 146, 178	3.00	Zoom
HRU1	PRICE THOMAS L (LE)	873	9.00	Tipton Middle
HRU1	PRICE W Y	843	9.00	Tipton Middle
HRU1	PUGH BRADLEY	557	1.00	Tipton West
HRU1	PUGH THOMAS A ETUX CATHY C	114	2.31	Zoom
HRU1	QUEEN DAVID	708, 871	99.92	Tipton East
HRU1	QUEEN E L & THOMAS	747, 875, 878	63.50	Tipton East
HRU1	QUEEN ORA BELLE	662, 718	168.50	Tipton Middle
HRU1	R K M INC	378	29.16	Tipton Middle
HRU1	RALPH BROTHERS FARM	141	400.00	Tipton East
HRU1	RALPH K ETAL RALPH R ETAL	401	546.20	Tipton East
HRU1	RALPH L D JR	454	18.10	Tipton East
HRU1	RANDOLPH ASSEMBLY OF GOD	619	2.00	Tipton West
HRU1	RAWLS MAUDE E EST	109	92.75	Haywood West
HRU1	RAY GEORGE D JR	365	170.20	Tipton East
HRU1	RAY GEORGE M	373	3.12	Tipton Middle
HRU1	RAY JAMES CARTER	515	6.88	Tipton East
HRU1	REELFOOT LUMBER CO	951	96.00	Tipton Middle
HRU1	REID ELIZABETH W	71	124.00	Haywood West

Priority Group	Landowner	Parcel ID#	Approximate Acres	Map Location
HRU1	RICE JUSTIN	602	40.99	Tipton West
HRU1	RICE LARRY W	410	30.00	Tipton Middle
HRU1	RICE SHAD ESTATE	705	127.00	Tipton East
HRU1	RICE T B	711, 713, 846, 668	443.87	Tipton East
HRU1	RICHARDSON ED ESTATE	562	0.69	Tipton Middle
HRU1	RICHARDSON WALTER JR	989, 990	0.77	Tipton Middle
HRU1	ROBERTS R L EST	600	49.00	Tipton West
HRU1	ROBINSON JAMES W ETUX	153	1.00	Zoom
HRU1	ROBISON BETTY	313, 325, 348	3.00	Zoom
HRU1	RONE ROY ETUX IRENE	433	0.50	Tipton East
HRU1	ROWAN ORA LEE SANDERS	199	48.00	Tipton East
HRU1	RUCKS DOROTHY C (EST)	279, 175	154.20	Haywood West
HRU1	RUFFIN JAMES STERLING III	543	215.80	Tipton Middle
HRU1	RUSSELL DONALD	335	1.00	Zoom
HRU1	SANDERS ARCHIE D ETUX	223	42.51	Haywood West
HRU1	SANDERS BOBBY C JR	412	2.32	Tipton Middle
HRU1	SANDERS DUDLEY ETUX	149	47.00	Haywood West
HRU1	SANDERS DWIGHT ETUX	82	1.10	Haywood West
HRU1	SARGEANT GARY ETUX PEGGY	160, 222	2.00	Zoom
HRU1	SARGENT GARY E ETUX PEGGY	263, 130	13.51	Zoom
HRU1	SAWTELLE JEAN T	622	11.97	Tipton West
HRU1	SELF ANNE	131	1.00	Zoom
HRU1	SENSABAUGH CLAUD D ETUX	245	50.00	Haywood West

Priority Group	Landowner	Parcel ID#	Approximate Acres	Map Location
HRU1	SENSABAUGH GEO W JR	99	90.00	Haywood West
HRU1	SHAW FRANK ETAL	287	3.00	Haywood West
HRU1	SHELL PIPE LN CORP	289	10.00	Tipton East
HRU1	SHEPPADS LAKE CLUB	333	16.50	Haywood West
HRU1	SILANO CLAIRE	881	15.00	Tipton East
HRU1	SIMNS SAM MARIE	332	2.20	Haywood West
HRU1	SIMPSON DAVID	213	1.00	Zoom
HRU1	SITTON KENNETH ETAL	420	39.94	Tipton West
HRU1	SMITH ALVIN JACOB	559	1.00	Tipton Middle
HRU1	SMITH ARTHUR FOX	317	289.00	Tipton East
HRU1	SMITH BOBBY G	580	5.80	Tipton Middle
HRU1	SMITH DANIEL K & CARLA	661	177.50	Tipton Middle
HRU1	SMITH DARRYL L ETAL	535	42.00	Tipton Middle
HRU1	SMITH DONALD W	439	1.00	Tipton Middle
HRU1	SMITH FAYRENE	527	0.80	Tipton Middle
HRU1	SMITH FREDDY O ETUX	1016	1.00	Haywood West
HRU1	SMITH GARY C	549	1.00	Tipton Middle
HRU1	SMITH HENRY T L/E	1014	1.00	Haywood West
HRU1	SMITH JIMMY ETUX PAULA	1017	1.36	Haywood West
HRU1	SMITH LEWIS ETUX	337	1.00	Zoom
HRU1	SMITH MARGARET DURHAM	470	39.00	Tipton Middle
HRU1	SMITH R W	429	80.00	Tipton Middle
HRU1	SMITH ROBERT SR	399	1.50	Tipton Middle
HRU1	SMITH RUBEN	487	297.00	Tipton Middle
HRU1	SMITH SPURGEON	403	55.00	Tipton Middle

Priority Group	Landowner	Parcel ID#	Approximate Acres	Map Location
HRU1	SMITH T C	498	50.96	Tipton Middle
HRU1	SOLOMON MAUDIE L	750, 803	1065.00	Tipton East
HRU1	SPENCER SUE WALKER	255	120.99	Haywood East
HRU1	SPILDE KEITH D	991, 992	0.79	Tipton Middle
HRU1	SPRINGER ROBERT WAYNE	531	5.00	Tipton Middle
HRU1	STAGGS DANNY	227	1.00	Zoom
HRU1	STANLEY LARRY GENE ETUX	128	1.46	Haywood East
HRU1	STANLEY PAUL ETAL STEVEN	182, 188	2.00	Zoom
HRU1	STARNES EDDIE C TRUSTEE	635	316.00	Tipton West
HRU1	STEELE DEWAYNE ETUX GAIL	203	1.00	Zoom
HRU1	STERNENBERG WILLIAM SCOTT	585	1.50	Tipton Middle
HRU1	STRAUBIE WALTER BILLY G &	915	105.00	Tipton Middle
HRU1	STUBBLEFIELD RICHARD WAYNE	416	1.50	Tipton Middle
HRU1	SULLIVAN C H JR & RUTH	949	366.00	Lauderdale South
HRU1	SUMROW BILL JR	716, 743	329.86	Tipton Middle
HRU1	SUMROW JOHN & BARBARA	837	237.00	Tipton Middle
HRU1	TALIAFERRO SEAMON &	954	1.00	Tipton East
HRU1	TALIAFERRO T O	842	1.40	Tipton East
HRU1	TAMM BROS	256	156.00	Haywood West
HRU1	TATE W A & MARY J WEBB	667	109.00	Tipton Middle
HRU1	TAYLOR MAGNOLIA	800, 839	74.50	Tipton Middle
HRU1	TAYLOR SANDRA S	471	0.60	Tipton Middle

Priority Group	Landowner	Parcel ID#	Approximate Acres	Map Location
HRU1	TAYLOR WILLIAM R (EST)	314	1.68	Tipton East
HRU1	TEMPLETON DAVID BISHOP II	402	1.00	Tipton East
HRU1	TEXAS GAS TRANSMISSION	588	1.00	Tipton Middle
HRU1	THORNTON ALBERT A & LORINE	840	21.70	Tipton East
HRU1	THORNTON TAYLOR	79	188.20	Haywood West
HRU1	THORNTON WILLIAM C ETAL	571	183.10	Tipton West
HRU1	TIMBES THOMAS O	1003	34.00	Haywood West
HRU1	TINSLEY LARRY	70	1.00	Zoom
HRU1	TOARMINA STEPHEN D TRUST	1006	2.32	Tipton Middle
HRU1	TOWNSEND WANDA MAE	626	1.40	Tipton Middle
HRU1	TRAVIS DELL R	717	171.00	Lauderdale South
HRU1	TRAVIS DELL R	739	171.00	Lauderdale South
HRU1	TUCKER MARK S ETUX TINA L	171	25.00	Haywood West
HRU1	TURNER ANNE SANFORD TRUST	424	84.00	Tipton Middle
HRU1	TURNER DANIEL H & GLENDA	835	1.00	Tipton Middle
HRU1	TURNER EUGENE & LINDA	950	1.00	Tipton Middle
HRU1	TURNER J H & PATRICIA	741	54.00	Tipton Middle
HRU1	TURNER JOHN LANDON TRUST	460	50.00	Tipton Middle
HRU1	TURNER KERRY	187, 288	22.50	Tipton East
HRU1	TURNER MICHAEL	457, 491	393.50	Tipton Middle
HRU1	TURNER PETER M ETUX	192, 196	394.95	Tipton East

Priority Group	Landowner	Parcel ID#	Approximate Acres	Map Location
HRU1	UNGERECHT DAN JR DAN SR &	845, 955, 977	204.10	Tipton East
HRU1	VEIRS JAMES WALTER III	285	1.00	Haywood West
HRU1	VEIRS LYNN W ETAL LOIS W	267	1.00	Zoom
HRU1	VESTAL AUBREY	228	1.00	Zoom
HRU1	VESTAL AUBREY ETUX RUTH	138	1.00	Zoom
HRU1	VOLNER JACKIE L ETUX	250	1.00	Zoom
HRU1	VOLUNTEER BANK TRUSTEE	533	55.00	Tipton Middle
HRU1	WADDELL CURTIS L	312	1.00	Zoom
HRU1	WAITS DANNY	444, 547	123.32	Tipton West
HRU1	WAITS PATSY MIZE REVOCABLE	568, 581	333.27	Tipton West
HRU1	WAITS WILLIAM F REVOCABLE	427	52.50	Tipton West
HRU1	WALK WILLIAM B ETUX ETAL	419, 575	171.50	Tipton West
HRU1	WALKER DOROTHY & THOMAS JR	919	90.00	Tipton East
HRU1	WALKER JUNE D	261	291.23	Haywood East
HRU1	WALKER ROBERTA TRUST	801	167.00	Tipton East
HRU1	WALKER W H III	86, 154, 218	294.32	Haywood East
HRU1	WARD DOREAN LEWIS	707	3.19	Tipton East
HRU1	WARREN DAVID LEE ETUX	174	5.50	Haywood West
HRU1	WARREN LEE M	221	3.70	Haywood West
HRU1	WATSON CALVIN G ETUX SUE	259	1.00	Zoom
HRU1	WATSON JOHN D	1011	2.00	Tipton Middle
HRU1	WEBB JAMES RANEY	844, 872, 913, 914, 916, 917, 925	401.00	Tipton East

Priority Group	Landowner	Parcel ID#	Approximate Acres	Map Location
HRU1	WEBB RANEY & THORNTON	704	50.00	Tipton Middle
HRU1	WEBB SARAH	804	21.25	Tipton East
HRU1	WELCH FARMS PARTNERSHIP	107	431.00	Tipton East
HRU1	WESLEY LAKE CLUB	92	408.00	Haywood West
HRU1	WESLEY LAKE SPORTING CLUB	350	146.00	Zoom
HRU1	WESTERN VALLEY	1012	1.25	Tipton Middle
HRU1	WHITLEY BUFORD ESTATE	505	39.50	Tipton Middle
HRU1	WHITSON LARRY ET AL	745	39.50	Tipton Middle
HRU1	WHITTIEMORE DAVID LYNN	189	1.46	Zoom
HRU1	WHITTIEMORE WINSTON	173, 338, 351	112.00	Haywood West and Zoom
HRU1	WILKINS JOHN	411, 627, 637, 506	142.58	Tipton West
HRU1	WILKINS JOHN H JR	532	1.42	Tipton West
HRU1	WILLIAMS CORA ETAL	993	0.25	Tipton Middle
HRU1	WILLIAMS JOHN BRADLEY	595	382.00	Tipton East
HRU1	WILLIAMS KEVIN	746, 974	8.20	Tipton East
HRU1	WILLIAMS MARK C	242	1.00	Zoom
HRU1	WILLIAMSON CORA BURNETTE	988	0.50	Tipton Middle
HRU1	WILLIS FAMILY TRUST	78	138.80	Tipton East
HRU1	WILLIS JOHN HERBERT	185, 247	346.50	Tipton East
HRU1	WILLIS TOMMIE (EST)	292	537.80	Tipton East
HRU1	WILLOW GROVE MISSIONARY	385	1.00	Tipton East
HRU1	WILLS LETTIE MAE	87, 265	61.69	Haywood West
HRU1	WILSON FLOYD	985	1.50	Tipton Middle

Priority Group	Landowner	Parcel ID#	Approximate Acres	Map Location
HRU1	WILSON LETA	477	148.50	Tipton East
HRU1	WILSON NELL ESTATE	397	23.00	Tipton Middle
HRU1	WILSON SUSAN R	347, 355, 918	260.75	Tipton East
HRU1	WINBERRY MINNIE P	536	1.00	Tipton East
HRU1	WINDROW PAUL M (EST)	305	15.41	Haywood West
HRU1	WINFREY WHIT	310, 262, 260	3.00	Zoom
HRU1	WISEMAN JAMES S & MARGARET	670, 807, 911	112.13	Tipton Middle
HRU1	WOOTEN E A	530	157.00	Tipton Middle
HRU1	WOOTEN RUSSELL HENRY	436	2.00	Tipton Middle
HRU1	WORLDWIDE FIBER NETWORKS	659	1.47	Tipton Middle
HRU1	WYNN BARRY	884	5.00	Tipton East
HRU1	YARBRO E F	488	64.00	Tipton West
HRU1	YARBRO O E ETAL DAVID ETAL	448	106.40	Tipton West
HRU1	YARBRO WILMA L ETAL	398, 479	84.50	Tipton West
HRU1	YOUNG DOROTHY LYLES	407, 514	1.19	Tipton Middle

Priority Group	Landowner	Parcel ID#	Approximate Acres	Map Location
MRU2	AGEE FRANKLIN D	55	40.00	Dyer East
MRU2	AKINS SUE C. ETAL RUTH A	3	153.00	Dyer East
MRU2	ALFORD KENNETH ETUX ETAL	1023	78.00	Dyer West
MRU2	AMMONS CAROLYN ETAL	13	18.00	Dyer East
MRU2	BIRD EDEN ETAL	46	190.00	Dyer West

Priority Group	Landowner	Parcel ID#	Approximate Acres	Map Location
MRU2	BURKS BOB L ETAL	42	90.00	Dyer East
MRU2	CALCUTT FARMS INC	12, 30	658.00	Dyer East
MRU2	CEMETERY	57	1.00	Dyer East
MRU2	CHIPMAN FARMS L.P.	50	384.70	Dyer East
MRU2	CRAWFORD MARY C BOWEN - TR	758	58.26	Lauderdale West
MRU2	CRIHFIELD CAROLYN &	4, 972	582.00	Dyer East
MRU2	DON MEDLIN CO	11, 33	3333.00	Dyer East and West
MRU2	DYKES DEARL D	28, 10	117.00	Dyer East
MRU2	DYKES MARY SUE	24	29.00	Dyer East
MRU2	ELLIS PATSY RUTH	22	476.00	Dyer West
MRU2	FOLL FRANK STANTON &	864	1020.00	Lauderdale West
MRU2	HOLMES ROY R	759	54.36	Lauderdale West
MRU2	ISLAND 34 LLC	669	2391.00	Tipton West
MRU2	KING KATHRYN ANN MOORE	47	116.00	Dyer East
MRU2	LINEBERRY JASON	41, 31, 51, 54	502.30	Dyer West
MRU2	MAGEE & TAYLOR	40	200.00	Dyer West
MRU2	MCAFEE JAMES E	53	105.90	Dyer East
MRU2	MCBRIDE HOWARD JR ETAL	48	11.00	Dyer East
MRU2	MCCLURE FARMS LP ETAL	20	31.50	Dyer East
MRU2	MCWILLIAMS RICKY JOSEPH	9, 45	629.00	Dyer West
MRU2	MEADOWS LEON	973	100.00	Dyer East
MRU2	MEADOWS ROGER ALAN	29, 36	52.80	Dyer East
MRU2	MEEKS LEONARD C	38	262.80	Dyer East
MRU2	MOORE ROSS	886	78.20	Lauderdale West

Priority Group	Landowner	Parcel ID#	Approximate Acres	Map Location
MRU2	MORELAND B WHITE FARMS INC	856	198.00	Lauderdale West
MRU2	MOSS ISLAND LAND CO INC	2, 23, 58	497.25	Dyer West
MRU2	NUNN WARREN NICHOLAS	15, 17, 18, 43, 52	353.20	Dyer East
MRU2	PAGE CAROLE	37, 44	358.40	Dyer East
MRU2	PALMER FAMILY OF DYER CO	8	240.00	Dyer East
MRU2	PARRY RYAN A ETAL PATRICK	27	52.00	Dyer East
MRU2	PERMENTER CLIFFORD	49	99.00	Dyer East
MRU2	PIERCE JERE E	6, 14, 32, 34	1680.50	Dyer West and Dyer East
MRU2	PRIDE JUSTIN ET AL	56	1.00	Dyer East
MRU2	REEVES EUGENE E	26	885.00	Dyer East
MRU2	SMITH BASIL E	7	41.00	Dyer East
MRU2	SMITH MARTHA TAYLOR ETALS	19	943.00	Dyer East
MRU2	SULLIVAN JAMES T ET AL	683	654.40	Lauderdale West
MRU2	SUNRISE LLC	956	1500.00	Tipton West
MRU2	THORNTON W I JR	25	332.00	Dyer East
MRU2	TURNBO FELIX	5	5.20	Dyer East
MRU2	WALKER A D JR	16	94.00	Dyer East
MRU2	WEST TENN DUCK FARMS LLC	1	81.30	Dyer East
MRU2	WHITE CHRISTY	21	95.00	Dyer West
MRU2	WHITE MICHAEL D ETAL TRUST	35	74.00	Dyer East
MRU2	WHITNEL CHARLES P	39	88.00	Dyer East

Priority Group	Landowner	Parcel ID#	Approximate Acres	Map Location
MRU2	WILLIAMS KEVIN F	684	1671.80	Lauderdale West

Priority Group	Landowner	Parcel ID#	Approximate Acres	Map Location
HRU2	CHAMBERLAIN ANN L/E	340	76.00	Haywood West
HRU2	CRAIN GLADYS ARMOUR ETAL	270	740.70	Haywood West
HRU2	EDMONDS CAROL HARDISTER	84, 134, 226	219.46	Haywood West
HRU2	HARDISTER EDWARD L ETUX	318	10.00	Haywood West
HRU2	HARDISTER LARRY ETAL CAROL	152	131.37	Haywood West
HRU2	HICKORY GROVE DISTRICT	77	37.73	Haywood West
HRU2	HOHENBERGER JACK L	1018	1.00	Haywood West
HRU2	HOWSE WILLIAM L	177, 181	130.20	Haywood West
HRU2	LEATH JIMMY ETAL	103, 204, 275, 286, 346	767.69	Haywood West
HRU2	LITTLEJOHN JIMMY	157	252.83	Haywood West
HRU2	LITTLEJOHN JIMMY SHANE	290	5.20	Haywood West
HRU2	LONON MARY PATSY	112	139.00	Haywood West
HRU2	MILAM STEVEN L ETUX	224	27.50	Haywood West
HRU2	NEWMAN JOTTYE E	133	83.00	Haywood West

Priority Group	Landowner	Parcel ID#	Approximate Acres	Map Location
HRU2	QUALLS DEBORAH AKINS	251, 88	12.50	Haywood West
HRU2	STEELE DWAYNE ETUX GENEVA	1001	1.00	Haywood West
HRU2	WATSON JAMES E ETUX	1020, 1021, 1019	8.75	Haywood West
HRU2	WATSON ROBERT O	258	1.00	Haywood West
HRU2	WELLSAND LOREN	81	1.00	Haywood West
HRU2	WILLIAMS DENNIS EST	127	96.00	Haywood West
HRU2	WORRELL BILLY B TRUSTEE	121	154.00	Haywood West

Figure 1. Location of Chickasaw, Lower Hatchie, and Hatchie NWRs

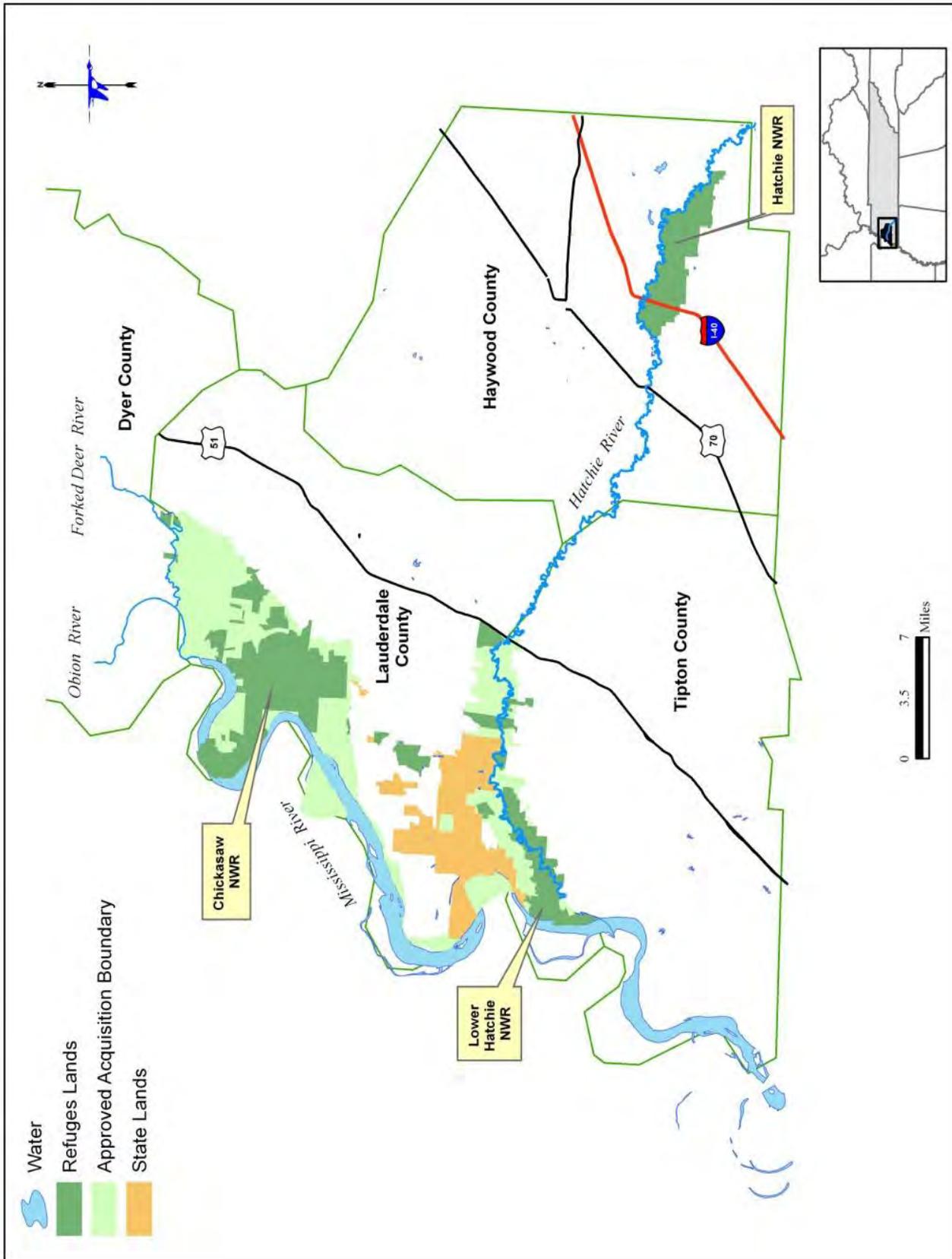


Figure 2. West Tennessee Conservation Lands

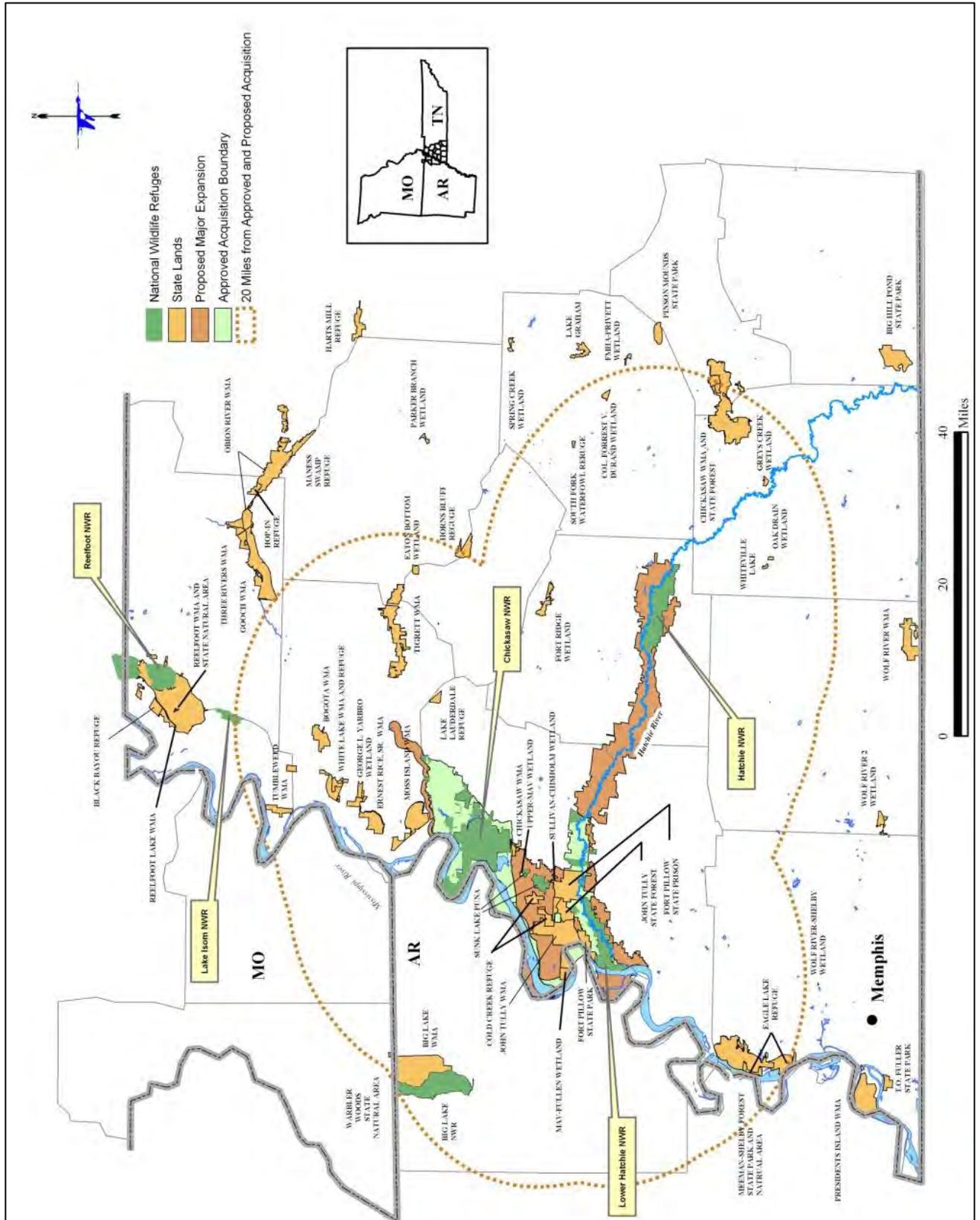


Figure 3. Proposed expansion areas between Chickasaw, Lower Hatchie, and Hatchie NWRs

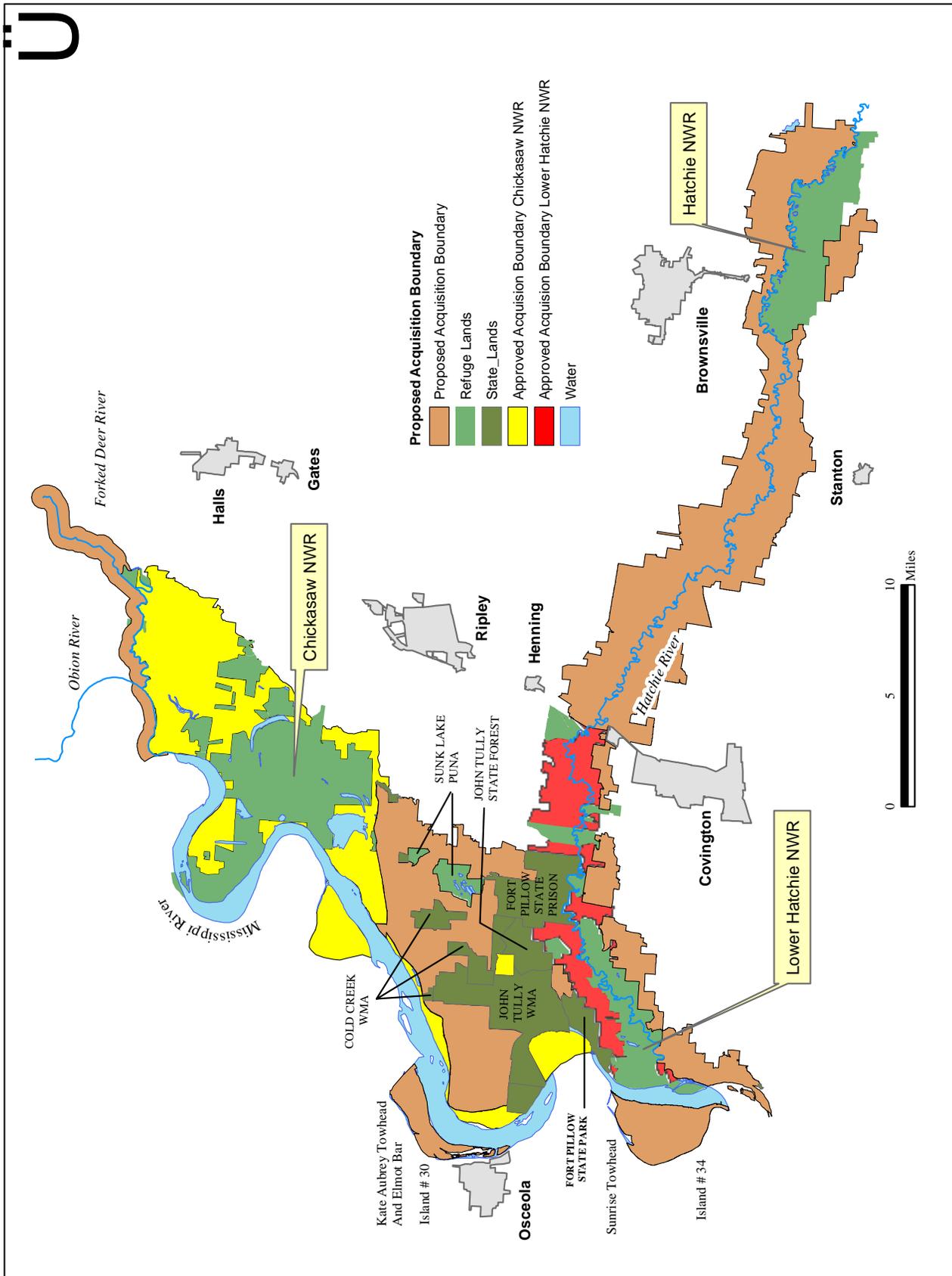


Figure 4A. Dyer County East

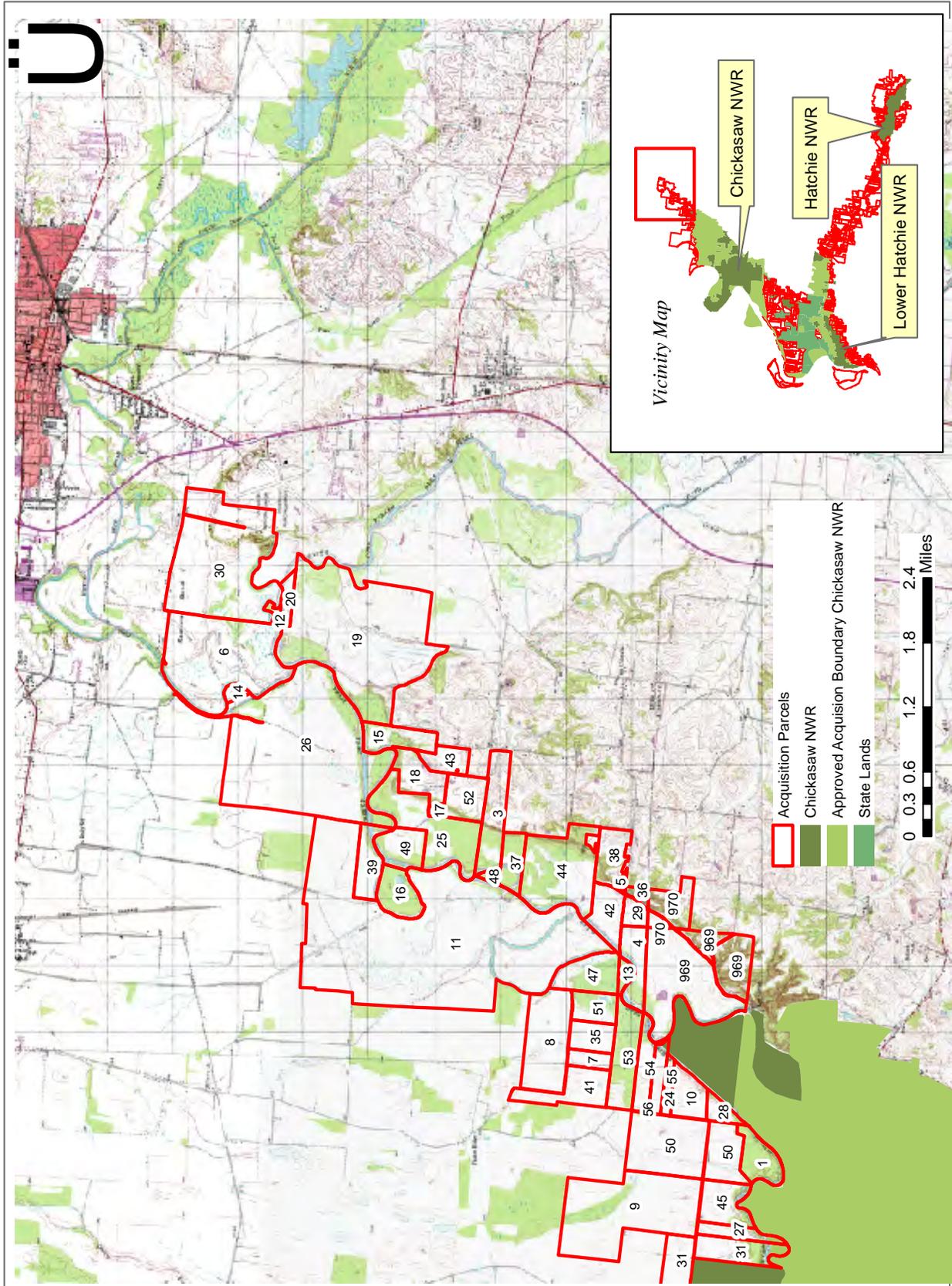


Figure 4 B. Dyer County West

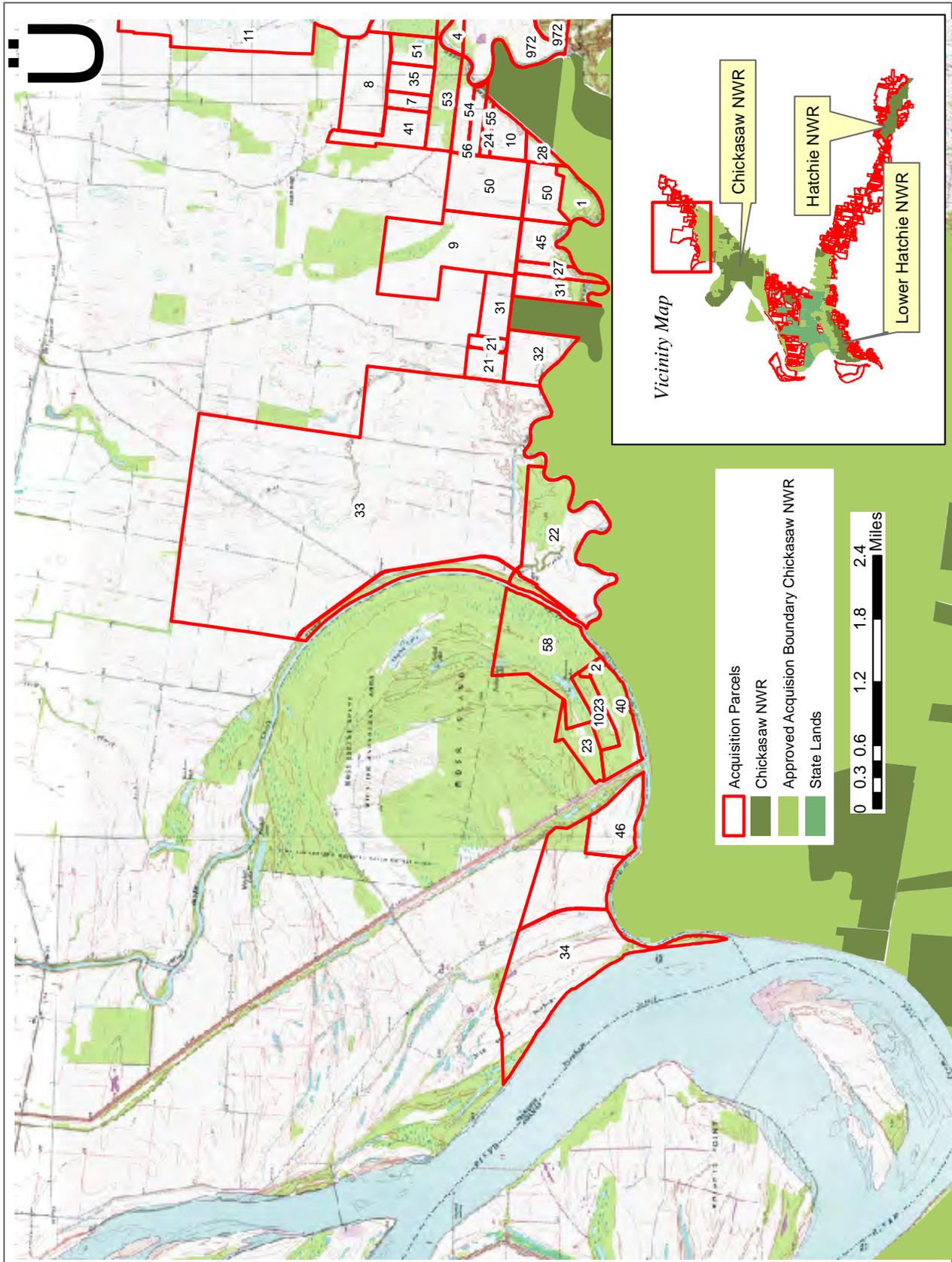


Figure 4 D. Lauderdale County West

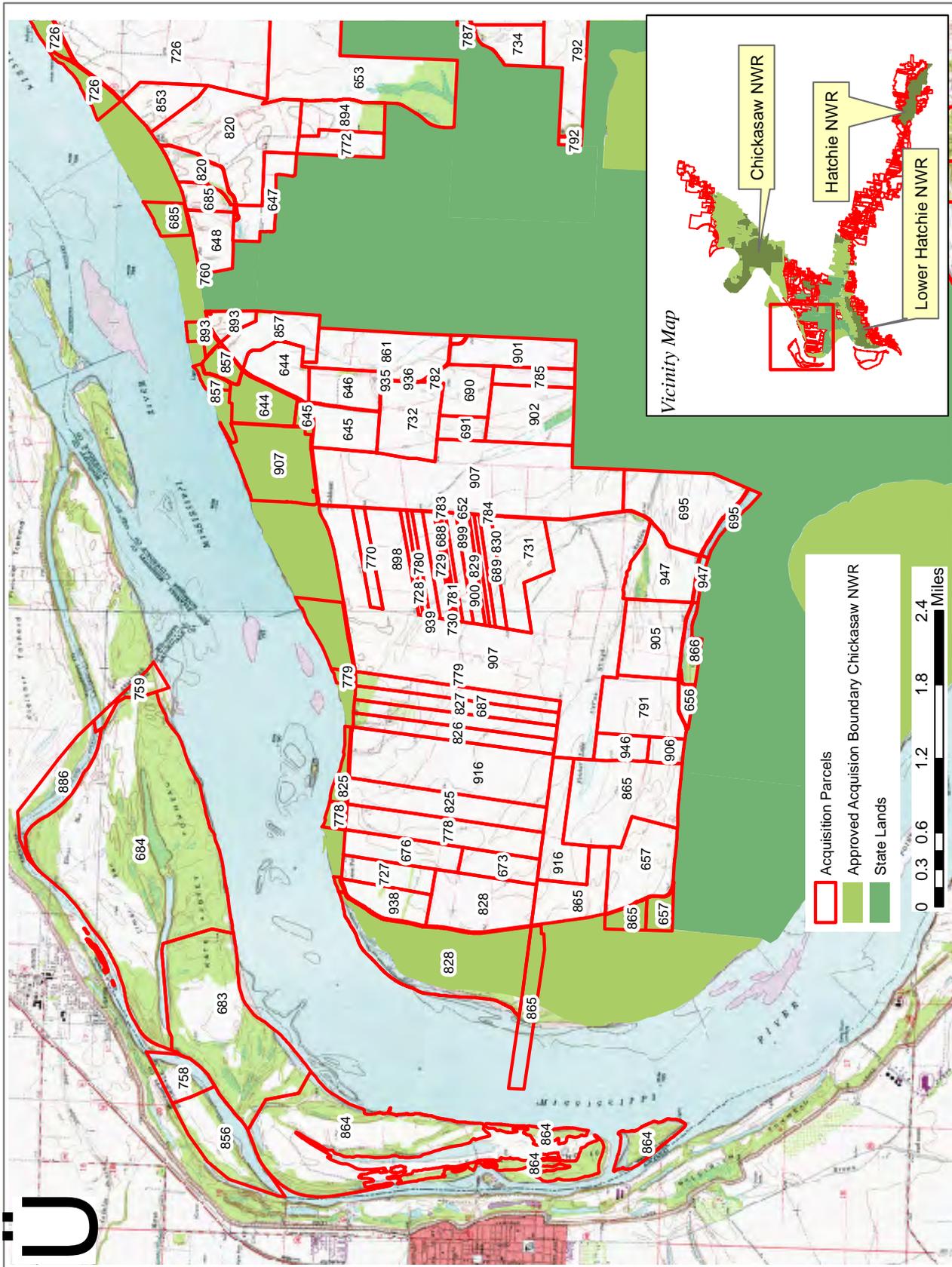


Figure 4 E. Lauderdale County South

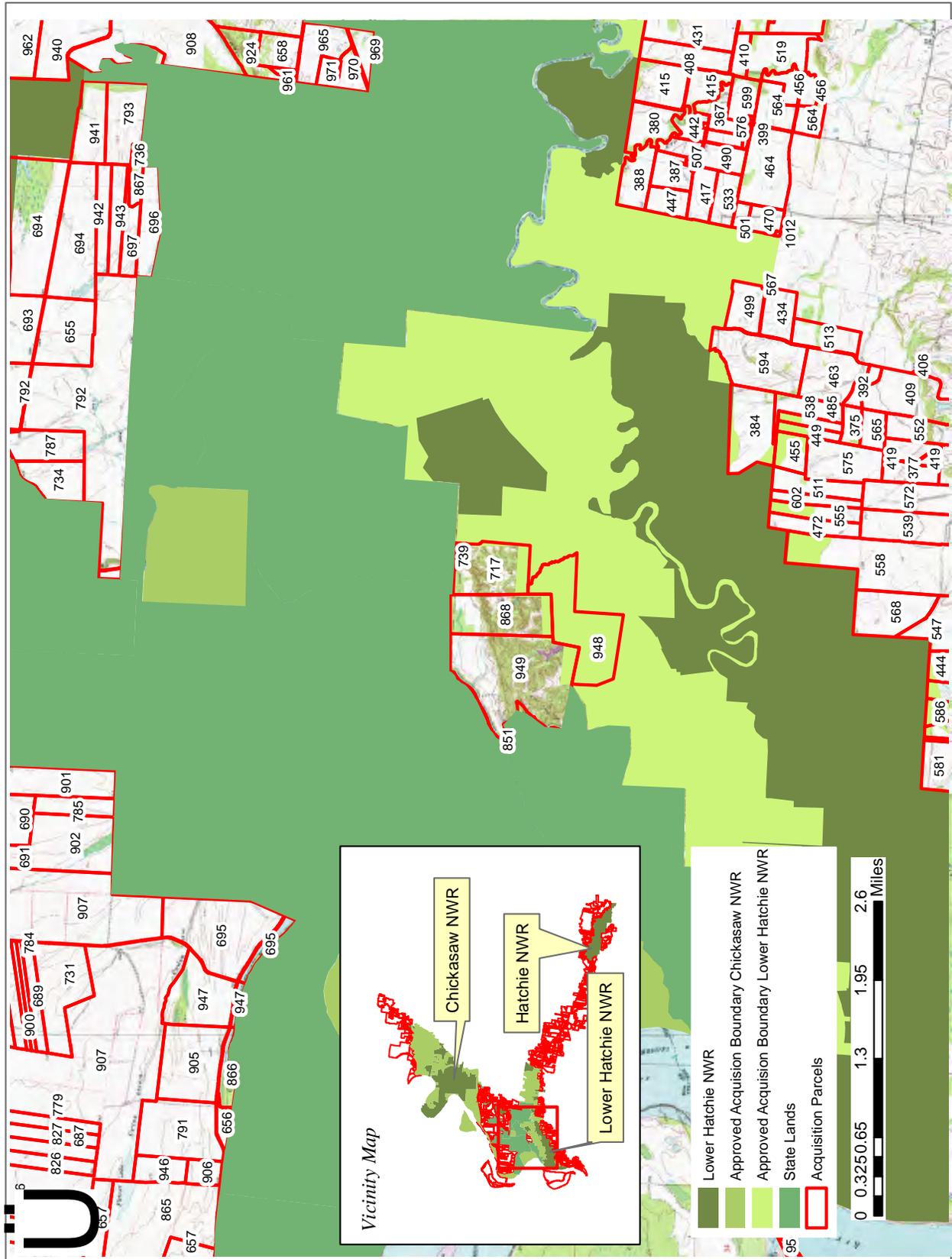


Figure 4 F. Tipton County West

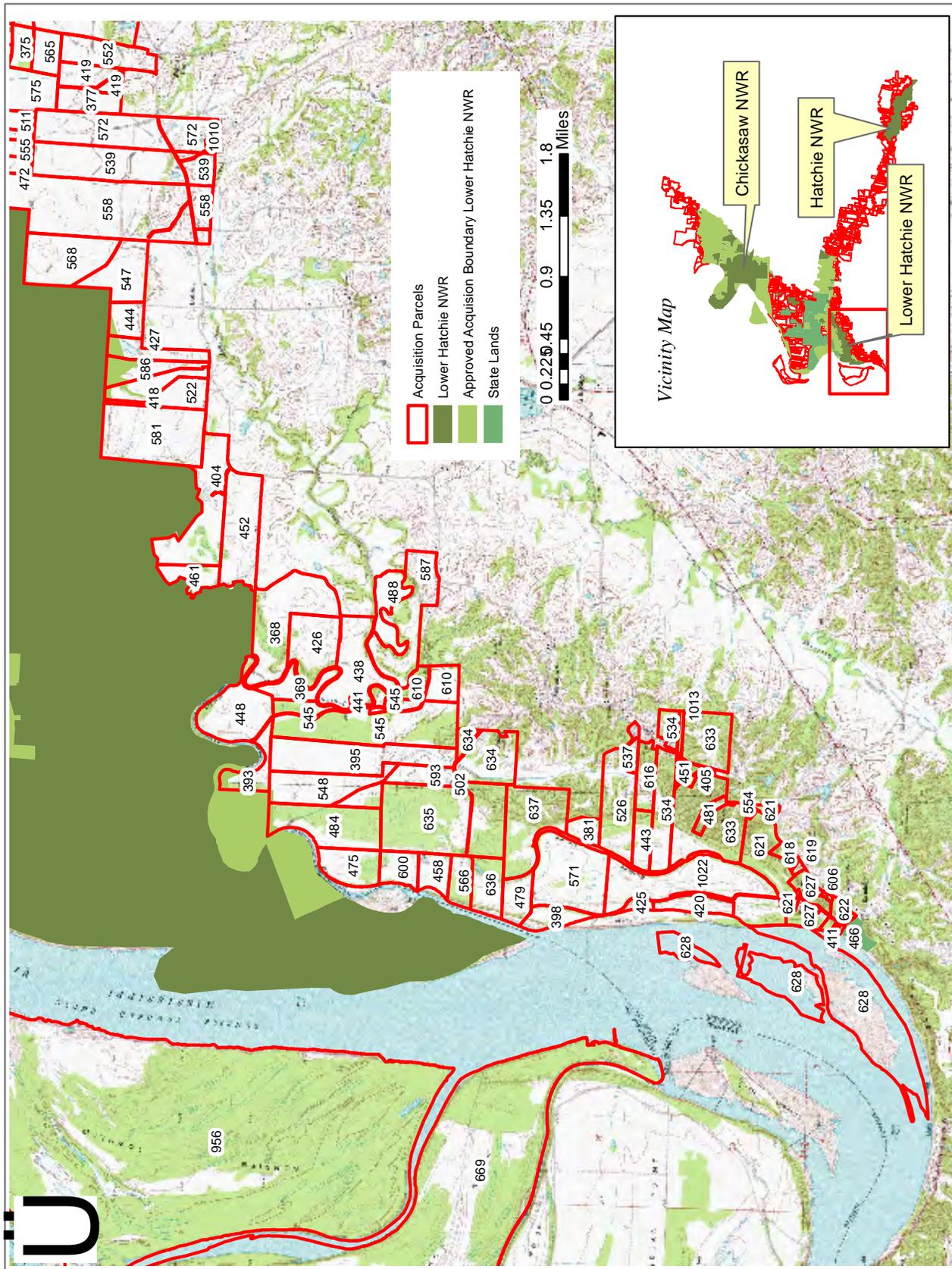


Figure 4 H. Tipton County East

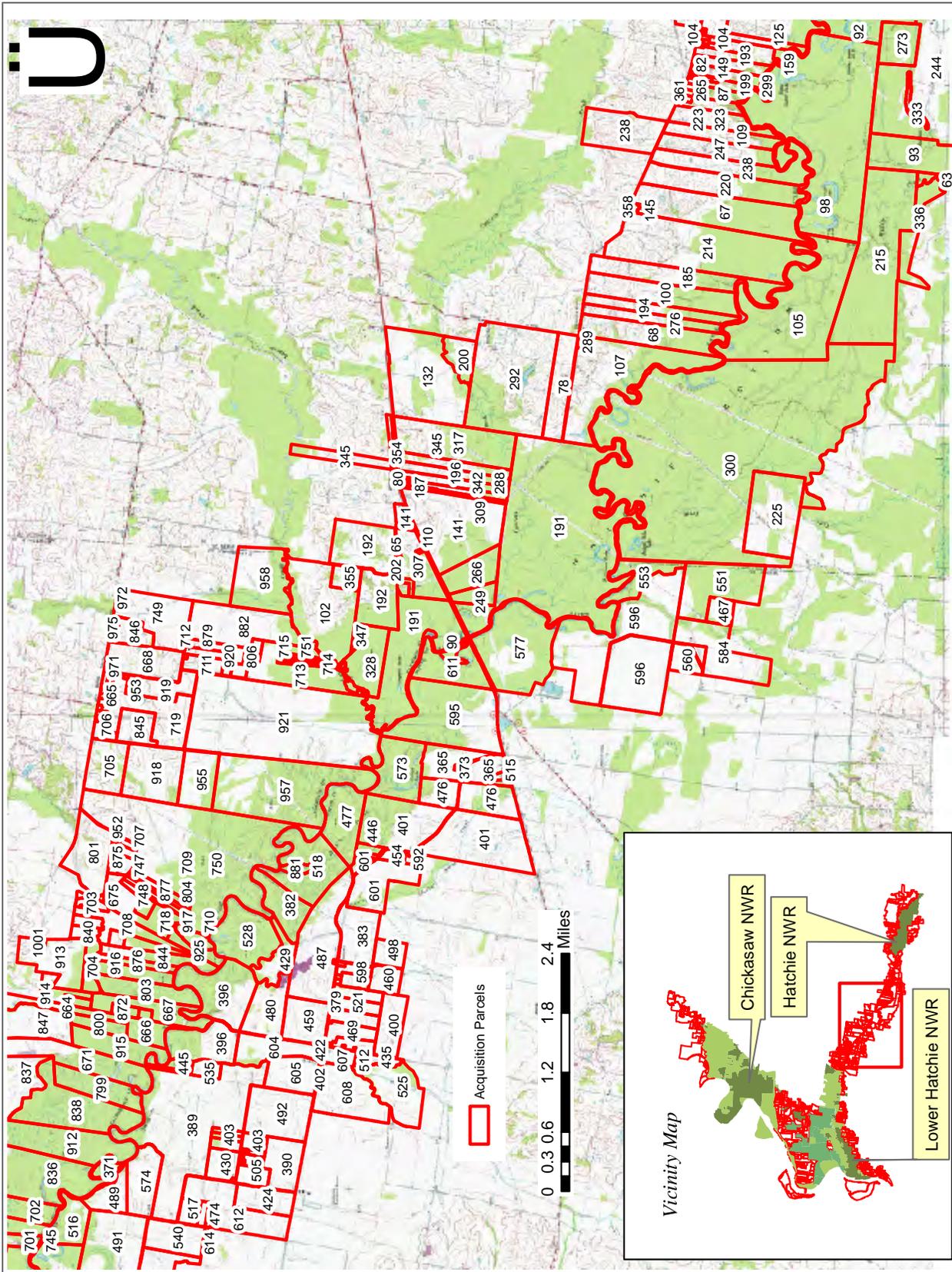


Figure 4 J. Haywood County Zoom

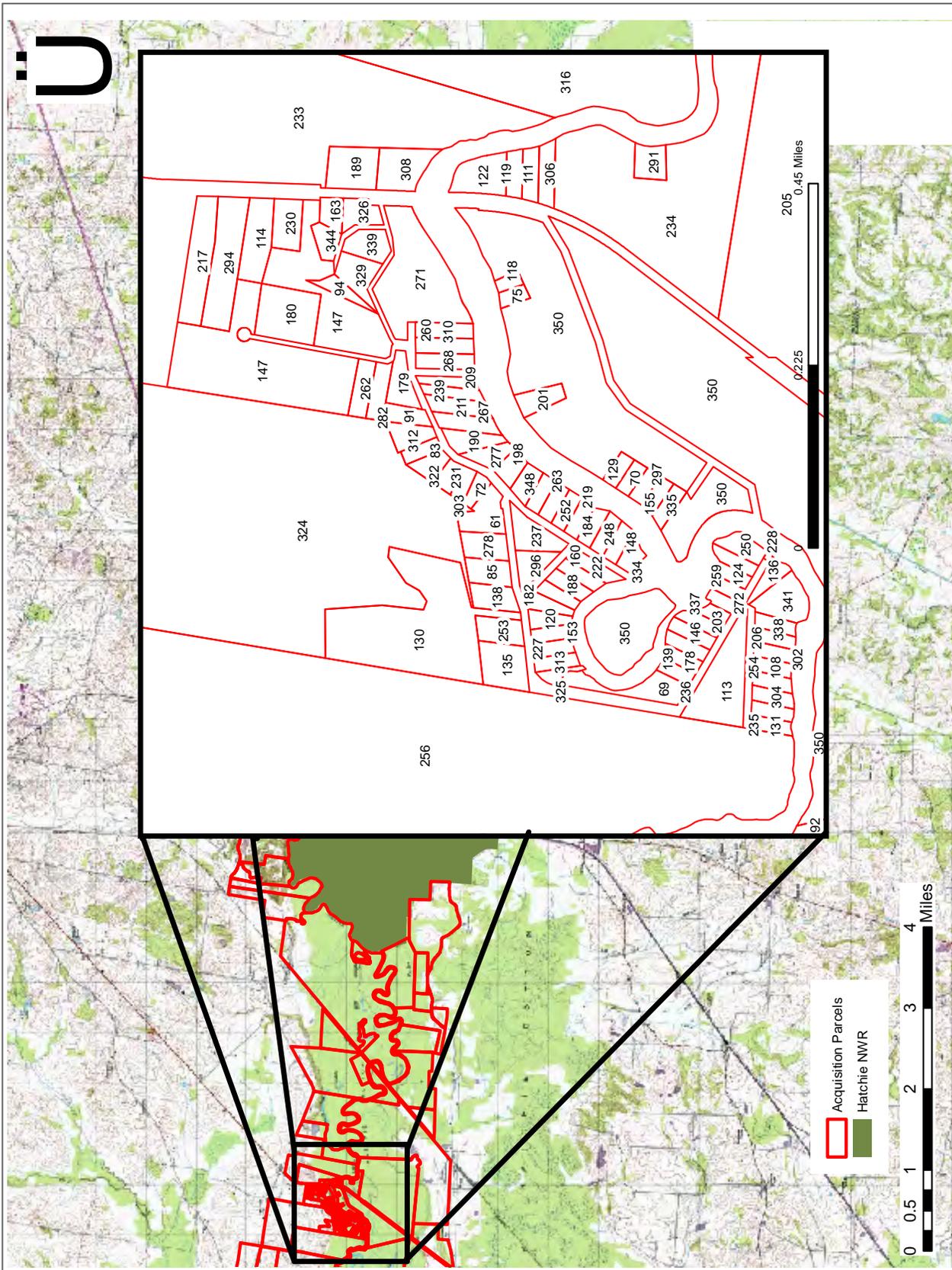


Figure 4 K. Haywood County East

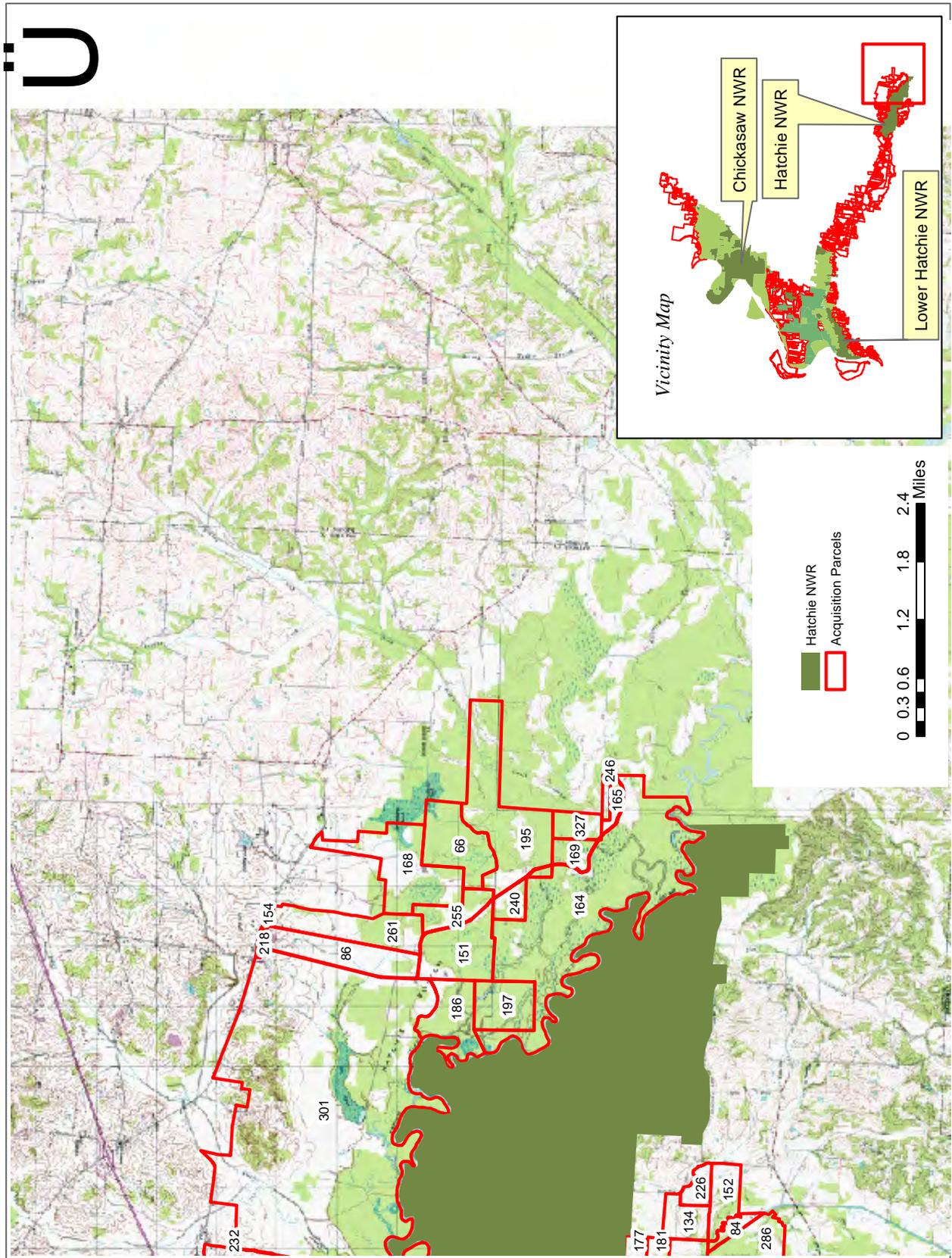
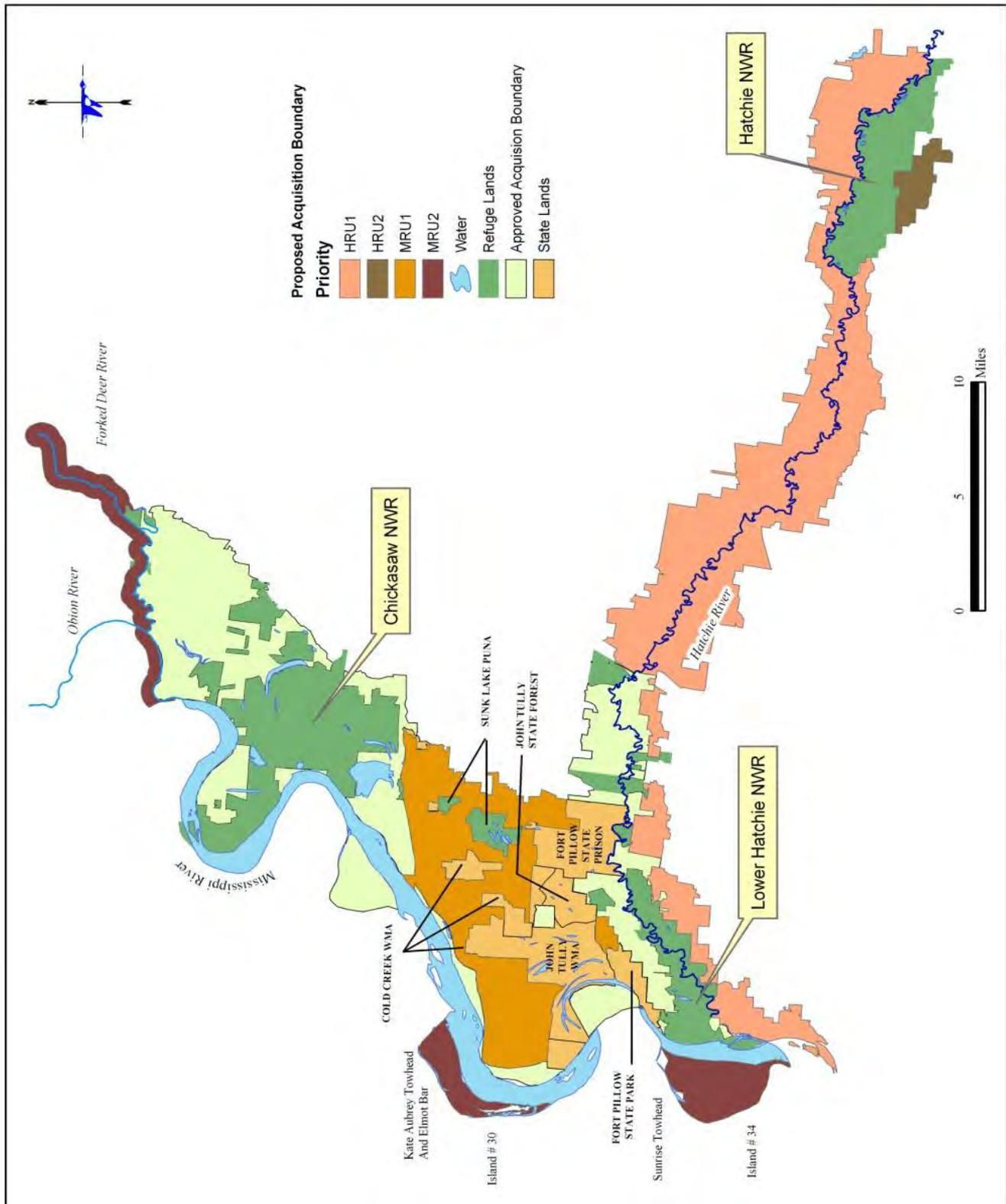


Figure 5. Project area land protection priority groups



DRAFT ENVIRONMENTAL ASSESSMENT

I. Purpose and Need for Action

A. INTRODUCTION

The Fish and Wildlife Service (Service) proposes to protect and manage bottomland hardwoods and riverine wetlands in Dyer, Haywood, Lauderdale, and Tipton Counties, Tennessee, through the expansion of Chickasaw and Lower Hatchie National Wildlife Refuges (NWRs).

The mission of the National Wildlife Refuge System is “to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans” (National Wildlife Refuge System Improvement Act of 1997). 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 threatened and endangered species. Refuges offer a wide variety of wildlife-dependent recreational opportunities and many have visitor centers, wildlife trails, and environmental education programs. Nationwide, about 25 million visitors annually hunt, fish, observe and photograph wildlife, or participate in educational and interpretive activities on refuges.

The scope of this Draft Environmental Assessment (Draft EA) is limited to the proposed acquisition of lands for the expansion of Chickasaw and Lower Hatchie NWRs. This Draft EA is not intended to cover the development and/or implementation of detailed, specific programs for the administration and management of those lands. A conceptual management plan (Appendix B) and interim compatibility determination (Appendix C) are enclosed to provide general outlines on how the proposed lands would be managed. The appendices are provided as general information for the public in its review of the Draft EA. If the refuges are expanded and the needed lands or interests in lands are acquired, the Service would modify the refuges’ existing management plans to incorporate the new lands and resources under its control. At that time, these modified refuge management plans would be reviewed in accordance with the Departmental requirements of the National Environmental Policy Act.

B. PURPOSE AND NEED

This Draft EA presents a proposal for protection of additional wildlife habitat in Dyer, Lauderdale, Tipton, and Haywood Counties, Tennessee, through the expansion of the acquisition boundaries for Chickasaw and Lower Hatchie NWRs, which respectively lie in the Mississippi Alluvial Valley (MAV) and the East Gulf Coastal Plain (EGCP). The purpose of the proposed refuge expansion is to contribute to the goals of the Lower Mississippi River Ecosystem (LMRE) by conserving valuable riverine and wetland habitat, restoring and protecting key habitats such as bottomland hardwood forests, forested wetlands, un-leveed floodplains, and the only un-channelized tributary of the Mississippi River in Tennessee, plus the conservation and management of migratory bird populations, fisheries and aquatic resources, threatened and endangered species, and other inter-jurisdictional trust resources and species. The Service’s Lower Mississippi River Ecosystem (LMRE) Team also supports the creation of this contiguous managed wildlife corridor and several partnership

opportunities exist with state agencies and conservation organizations. The project is consistent with the goals and objectives of several significant regional, national, and international resource management partnerships and plans, including:

- North American Waterfowl Management Plan
- Lower Mississippi River Joint Venture Project
- Lower Mississippi Valley Migratory Bird Wetlands Conservation Initiative
- National Wetlands Priority Conservation Plan
- Partners-in-Flight Plan
- Western Hemisphere Shorebird Reserve Network
- Lower Mississippi River Ecosystem Plan
- Hatchie River Plan
- Hatchie River Alliance
- Hatchie River Conservancy
- West Tennessee Wildlife Resources Conservation Plan
- Tennessee State Wildlife Action Plan

Furthermore, the project area contains 71.3 miles of the Hatchie River, a designated Class I Natural River Area under the State of Tennessee's Scenic Rivers Program, and 49.2 miles associated with the Mississippi River.

The Lower Mississippi Valley (LMV) is among the most heavily modified areas in the southeastern United States and has the dubious distinction of being one of the most deforested of all southeastern physiographic areas (Twedt et al. 1999). The LMV once supported a vast bottomland hardwood forest complex that extended along the Mississippi River from Illinois to Louisiana. Today, less than 20 percent of this bottomland hardwood forest remains, and most is fragmented or remains in scattered patches throughout the region. Large expanses of habitat have been cut over, drained, and cleared along the Mississippi River for agriculture and flood control. Floodwaters once recharged wildlife habitats and created rich, dynamic systems that supported a diverse abundance of fish and wildlife species. Today, the LMV is fragmented by levees and regional hydrology is restricted by flood control projects and agricultural diversion. Water quality is significantly impacted by agricultural and industrial runoff, as rivers and water bodies throughout the region are highly turbid and laden with pesticides, and now only support a small fraction of the once-abundant aquatic resources.

Primary threats to the proposed acquisition area include:

- Increased development of agricultural lands and increased deforestation resulting in continued habitat loss, fragmentation, and increased erosion;
- Construction of navigation and water diversion projects and construction of levees to protect farm lands from flooding, resulting in continued loss of and impacts to the system's natural hydrology and increased sedimentation and channelization of streams and rivers; and
- Global climate change.

Acquisition boundaries are administrative lines delineating areas in which the Service may consider negotiations with willing landowners for acquisition of an interest in land. Lands within a refuge acquisition boundary do not become part of the refuge unless and until a legal interest is acquired through a management agreement, easement, lease, donation, or purchase. Lands within an acquisition boundary are not subject to any refuge regulations or jurisdiction unless and until an interest is acquired. Land interests are acquired from willing sellers only. Any landowner within an approved acquisition boundary, even though the surrounding parcels may have been purchased by the Service, retains all the

rights, privileges, and responsibilities of private land ownership. This includes, but is not limited to, the right to access, hunting, vehicle use, control of trespass; the right to sell the property to any other party; and the responsibility to pay local real estate or property taxes. Additional information regarding the Service's land acquisition policy is provided in Chapter III of the Draft LPP.

Within approved acquisition boundaries, the Service would be able to enter into negotiations for the purchase and protection of environmentally sensitive lands. The most urgent needs for acquiring an interest in these lands are as follows:

- Protect contiguous bottomland hardwood forests adjacent to the Hatchie River;
- Restore portions of the un-leveed area of the MAV along the Mississippi River to bottomland hardwood forests;
- Protect lands between both national wildlife refuges and along the Hatchie River corridor to increase core habitat for wintering waterfowl, neotropical migratory landbirds, and spawning areas for lowland fish;
- Protect existing and potential habitat on Mississippi and Hatchie Rivers' sandbars for the endangered least tern;
- Implement completion of contiguous forest blocks in excess of 100,000 acres to address needs identified in national and regional plans;

C. BACKGROUND

Chickasaw NWR is in Lauderdale County, Tennessee, approximately eight miles west of Ripley, and lies adjacent to the Mississippi River (Figure 6). The refuge was approved by the Migratory Bird Conservation Commission on May 14, 1985, to protect 37,500 acres of bottomland hardwoods and adjacent habitats for migratory waterfowl. The original 1985 acquisition approval was divided into two separate units: a 23,600-acre upper unit, of which 22,376 acres are owned and/or managed by the refuge; and a 13,900-acre lower unit, of which 12,000 acres have been subsequently purchased and conserved by the State of Tennessee. The refuge received approval in 1987 for a minor expansion of 4,500 acres to the upper unit. On July 6, 2000, a major expansion was approved by the Director of the Fish and Wildlife Service to add an additional 31,480 acres to the upper unit for a total approved acquisition boundary of 73,480 acres (Figure 3). Of the 73,480 acres within the approved acquisition boundary for Chickasaw NWR, the Service owns in fee title approximately 20,439 acres and manages an additional 5,388 acres of contiguous lands managed under a no-fee lease from the Tennessee Wildlife Resources Agency (TWRA). Adding the state-managed acreage (12,000 acres) to the Service-managed acreage brings the combined acreage to 37,827.

Lower Hatchie NWR is in rural west Tennessee, approximately 18 miles west of Henning, at the confluence of the Hatchie and Mississippi Rivers in Lauderdale and Tipton Counties (Figure 6). The refuge was established on June 19, 1980, under the Migratory Bird Conservation Act, to protect 6,400 acres of bottomland hardwood forests and adjacent habitats to conserve and manage important habitat needed for migrating and wintering waterfowl. The 1980 acquisition boundary was expanded on June 7, 1985, to include 2,224 additional acres; on September 14, 2000, to include 12,052 additional acres; and on April 14, 2006, to include an additional 1,645 acres in Lauderdale and Tipton Counties for a total approved acquisition boundary of 22,321 acres (Figure 3). Of the 22,321 acres within the approved acquisition boundary for Lower Hatchie NWR, the Service owns in fee title approximately 10,388 acres. In addition to the fee-title lands at Lower Hatchie NWR, approximately 1,873 acres of lands (Sunk Lake Public Use Natural Area) are managed under a no-fee lease from the Tennessee Department of Environmental Conservation, bringing the total refuge acreage to approximately 12,270 acres as of September 30, 2008.

The scope of this Draft EA is limited to the proposed acquisition of lands for the expansion of the Chickasaw NWR boundary to Lower Hatchie NWR and the expansion of Lower Hatchie NWR eastward along the Hatchie River to Hatchie NWR. The proposed expansion of Chickasaw NWR is bounded by the Mississippi River on the west, including oxbow islands along its banks and Chickasaw bluff on the east. The Service also proposes to expand the Lower Hatchie NWR boundary eastward along the Hatchie River corridor following the 5-year floodplain to Hatchie NWR. The proposed expansion would connect all three refuges, creating one contiguous wildlife corridor. This Draft EA is not intended to cover the development and/or implementation of detailed, specific programs for the administration and management of those lands. Both refuges have approved comprehensive conservation plans that would dictate the management of the proposed lands. Uses on the proposed area would include those approved under existing refuge compatibility determinations. Chickasaw and Lower Hatchie NWRs have approved compatibility determinations with stipulations for the following activities: hunting; recreational fishing; environmental education and interpretation; wildlife observation and photography; firewood cutting (personal); off-road vehicles (for use only by visitors with severe mobility impairments); forest management; hiking, jogging, and walking; resource research studies; horseback riding; and cooperative farming. If the refuges are expanded and the needed lands or interests in lands are acquired, the Service would modify the existing step-down management plans to incorporate the new lands and resources under its control. At that time, these modified refuge management plans would be reviewed in accordance with the Departmental requirements of the National Environmental Policy Act (NEPA).

Modifications to the historic floodplain in combination with extensive habitat losses and conversions to agriculture have resulted in dramatic population declines in overwintering waterfowl populations, migratory forest birds, resident wildlife, and have caused major declines in fisheries and aquatic resource productivity. Recent studies indicate significant population declines in some species of neotropical migratory birds (Askins, Lynch, and Greenberg 1990), and it has been estimated that less than one percent of remaining areas of bottomland hardwood forests are large enough to support source populations of area-sensitive species, such as cerulean warblers, Swainson's warblers, and swallow-tailed kites (Bonney, Pashley, Cooper, and Niles 1999). Although deforestation has decreased from 1950s levels, King and Keeland 1999, estimated that 900,000 acres of forested habitats were lost in the Lower Mississippi Alluvial Valley (LMAV) from the mid-70s to the mid-80s in Arkansas, Louisiana, and Mississippi, alone. It is anticipated that the rate of habitat loss and forest fragmentation would continue to increase in the proposed expansion areas as anthropogenic perturbations place greater demands on these limited resources. Thus, acquisition, conservation, and management of the wetland resources within the proposed expansion area would protect and restore critical habitats for resting, foraging, and breeding for resident and migratory wetland-dependent and aquatic wildlife species. As described previously, the proposed expansion includes un-leveed Mississippi River floodplain habitat as well as the 5-year floodplain of 71.3 miles of the un-leveed, un-channelized Hatchie River. The 5-year floodplain of the Hatchie River supports the largest remaining extent of forested floodplain in Tennessee. These areas represent some of the last remaining habitat in the LMAV where the hydrological function remains in place, and protecting these areas and the remaining hydrological function is critical to the success of bottomland hardwood forest reforestation efforts.

Since the 1930s, the Lower Mississippi River has been straightened for navigation by constructing 16 cut-offs that have shortened the river by 150 miles. Hundreds of miles of rock wing dikes and bank stabilization structures have also been built for navigation. To reduce flooding on agricultural land, both sides of the river have been lined with levees. Modifications to the historic floodplains have caused major declines in fisheries and aquatic resource productivity, for example, 22 species of mussels are declining in the Lower Mississippi River (U.S. Fish and

Wildlife Service 1999). Water quality issues resulting from agricultural runoff have led to a large hypoxic “dead zone” of up to 7,000 square miles in the Gulf of Mexico at the mouth of the river. Massive navigation and flood control works have negatively altered the natural processes of the river, as it is now stabilized and unable to function as the dynamic system that both created and destroyed a wide variety of fish and wildlife habitats, such as riffles, oxbows, sand bars, willow banks, and side channels. Equally damaging, the river and its tributaries are denied access to the floodplains for over 90 percent of their length. The physical and biological interaction between the river, its tributaries, and the floodplains is crucial as flooding into the enormous alluvial plain provided fish and amphibian spawning sites, nutrient and sediment exchange, and a wealth of varied aquatic and wetland habitats (U.S. Fish and Wildlife Service 1999). Additionally, floodplain ponds affect reproduction in fishes and amphibians and the loss of seasonally flooded forests has the potential to negatively impact continental waterfowl populations.

Natural patterns of erosion and sedimentation have been greatly altered, with a resulting increase of erosion on both upland and alluvial soils, along with increases in sedimentation rates in bottoms, swamps, brakes, oxbow lakes, and other depressional areas. Sediment loading in streams and rivers has increased, disrupting natural patterns of aggradation and degradation. Upland soils in west Tennessee are composed of loess or windblown sediments that were transported during glacial periods; underlying these are coastal plain sands which are exposed by rain and runoff. As channel beds rise due to sedimentation, the frequency of surface flooding can increase and the floodplain water table can rise, changing the species composition of bottomland hardwood forests to permanently flooded swamps. Excessive sand deposition can kill standing timber and convert bottomland hardwoods to stands of red maple and sycamore. As cited by Diehl 2000, the U.S. Department of Agriculture cautioned in 1986 that “swamping may be so prevalent as to change most of the Hatchie River basin floodplain into a marsh condition, with only remnants of the present bottomland hardwood timber remaining (U.S. Department of Agriculture Soil Conservation Service 1986a).” The Natural Resources Conservation Service estimated that 640,000 tons or 1,280,000,000 pounds of bedload (sand) accumulate in the Hatchie River each year (U.S. Department of Agriculture Soil Conservation Service 1986b). Since publication of the first Hatchie River report (U.S. Department of Agriculture Soil Conservation Service 1970), the channel of the Hatchie River has become shallower and flooding has increased (U.S. Department of Agriculture Soil Conservation Service 1986b). These wetter conditions inhibit growth of hardwoods and lead to premature mortality of existing hardwood forests.

There are only three counties in the MAV portion of west Tennessee (Shelby, Tipton, and Lauderdale Counties) that are un-leveed and have maintained hydrological connection to the Mississippi River. Further, the Hatchie River is the last major un-channelized tributary of the Lower Mississippi River Basin. Although the frequency and duration of flooding have increased in these areas due to the channelization and construction of levees upstream of these areas, the proposed expansion areas represent some of the last remaining habitat in the MAV where the hydrological function remains in place. Acquiring these tracts would help the refuge meet its conservation priorities and initiatives by conserving high-quality habitat and allowing for the restoration of row crop farmed areas along the un-leveed portion of the Mississippi and Hatchie Rivers to forested habitat; and reducing siltation and contaminants from the use of herbicides, pesticides, and fertilizers while restoring and conserving forested connectivity to habitat.

D. PROPOSED ACTION

The Service proposes to acquire, protect, and manage lands and waters through fee-title purchases, leases, conservation easements, and/or cooperative agreements from willing sellers. All lands and waters acquired would be managed by the Service as part of the West Tennessee National Wildlife

Refuge Complex. The objectives of the proposed expansion would be to establish a 100,000-acre-plus contiguous forest block to:

- 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, 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;
- Protect contiguous bottomland hardwood forests adjacent to and existing in the Hatchie River 5-year floodplain;
- Protect lands between all three national wildlife refuges and along the Hatchie River corridor to increase habitat for neotropical migratory landbirds, wintering waterfowl, and spawning areas for lowland fish;
- Protect existing and potential habitats on Mississippi River and Hatchie River sandbars for the endangered least tern;

It is anticipated that funding for this proposal would be provided through the Migratory Bird Conservation Fund or the Land and Water Conservation Fund. The authority for the use of these funds for land acquisition is the Emergency Wetlands Resources Act of 1986, or the Migratory Bird Conservation Act of 1929.

II. Affected Environment

This chapter describes the environment that would be affected by the implementation of the alternatives. It is organized under the following impact topics, which includes the area's natural vegetation, land use, fish and wildlife resources, related resources, landscape perspective, climate change factors, cultural resources, and socioeconomic and sociocultural conditions.

A. GENERAL

The proposed expansion falls within the drainage basins of the Mississippi, Obion, Forked Deer, and Hatchie Rivers. These basins occur in two physiographic regions, the MAV and the EGCP. The Mississippi River has been cut off from 90 percent of its former floodplains due to the construction of levees, greatly reducing the ecological values of the wetland and aquatic habitats for fish spawning, nutrient and sediment exchange, sediment reduction, and other water quality improvements (U.S. Fish and Wildlife Service 1999). There are three un-leveed counties in the MAV in west Tennessee: Shelby, Tipton, and Lauderdale. These counties support approximately 375,056 acres of functional un-leveed floodplain habitat; approximately 26 percent of which falls within the existing acquisition boundaries of Chickasaw and Lower Hatchie NWRs and other public lands. The proposed expansion captures approximately 38,127 acres, or an additional 10 percent, of the remaining un-leveed floodplain. The Hatchie River is the last major un-channelized tributary of the Lower Mississippi River Basin that lies south of Cairo, Illinois, and contains the largest forested floodplain in Tennessee. Because this portion of the Mississippi River and the entire Hatchie River have remained undammed, un-channelized, and un-leveed, the natural processes that drive the ecosystem are functional in these areas.

These riverine systems contain a variety of habitat types critical to migratory birds, local fisheries, and other biological resources in the area including: open water; riverine; non-forested wetlands; swamp; bottomland hardwood forests; cypress forests; riparian zones; grasslands; sandbar; bluff; scrub/shrub; and upland forests (Table 4).

B. HABITAT AND LAND USE

Large expanses of bottomland hardwood forested wetlands border the Mississippi, Obion, Forked Deer, and Hatchie Rivers, their tributaries, and numerous sloughs and lakes within the proposed expansion areas. Due to annual precipitation cycles, water levels within these bottomland forests fluctuate by several feet from their low point in the summer months to flood stage during winter and spring. Forest types within the bottomland hardwood forests are dictated by soil types and soil moisture regimes and include forest cover types such as: eastern cottonwood; overcup oak-water hickory; swamp chestnut oak-cherrybark oak; sweetgum-willow oak; willow oak; sugarberry-American elm-green ash; or sycamore-sweetgum-American elm. Mast production in bottomland hardwood habitats provides an important food source for a wide variety of wildlife, including migratory waterfowl, deer, squirrel, and turkey, as over 25,000 acres of bottomland hardwoods within the proposed expansion would regularly flood.

Wooded swamp habitat is dominated by baldcypress, water tupelo, and/or swamp tupelo. Sites are characterized by frequent and prolonged flooding, and flood waters may exceed 3 meters (10 feet) in depth and may be stagnant or may flow at rates up to 7 kilometers (4 miles) per hour. In deep alluvial swamps, the common associates are red maple, black willow, water elm, and water locust. In the shallower margins overcup oak, water hickory, American elm, green ash, Nuttall oak, sweetgum, and persimmon may also be present. Wooded swamps are also characterized by the presence of

mosses, lichens, aquatic herbs, wet site shrubs (e.g. button bush, swamp-privet, possumhaw), submerged aquatics (e.g. elodea, curly-leaf pondweed, bladderwort, coontail), emergents (e.g. American lotus, cow lily, duckweed, waterfern, yellow pond-lily), and woody vines. Similar to bottomland hardwoods, wooded swamps provide critical breeding, foraging, and resting/loafing habitat vital to migratory birds and wintering waterfowl as well as a variety of other wildlife.

Emergent non-forested wetlands occur within openings in bottomland hardwoods. Forest openings may be formed by high winds, catastrophic floods, beaver activity, fire, or other causes. Non-forested wetlands within the Mississippi Alluvial Floodplain and EGCP are typically ephemeral in nature, but may be artificially maintained due to farming programs or other management activities. Non-forested wetlands in west Tennessee are typically dominated by smartweeds, sedges, millets, and other seed-producing grasses. Early successional non-forested wetlands are critical to many species of wildlife, especially waterfowl. These seasonally flooded areas are rich in seeds, invertebrates, and herbaceous matter. Scrub/shrub wetlands are typified by willows, buttonbush, and other shrubby woody species as well as perennial herbaceous vegetation. Decaying leaves provide substrate for invertebrates which in turn provide food for waterfowl, and plant seeds provide an important food source for waterfowl and other wildlife. Within the MAV, these habitats are often transitional between emergent moist-soil wetlands and forested wetlands.

Upland hardwood forests in west Tennessee consist primarily of southern red oak, black oak, northern red oak, blackjack oak, sweet gum, yellow poplar, post oak, white oak, various hickories and American beech. Upland forests occur within the proposed expansion area in higher elevation areas mainly along the bluff that connects Chickasaw NWR and Lower Hatchie NWR. The bluff and higher elevation ground between the bluff and the bottoms provide escape routes for wildlife when the bottoms are flooded.

Permanent open water habitats are characterized as natural ponds, tupelo and baldcypress-lined oxbows, sloughs, lakes, and streams. These areas retain water year-round and may dry out only during extreme drought events. Water depths are usually less than 10 feet, providing important resting and foraging areas for waterfowl and other migratory birds.

Sandbars occur periodically along the Mississippi and Hatchie Rivers. Vegetation is generally lacking on sandbars, as sandbars are intermittently submerged and rearranged by floodwaters. Sandbars provide important habitat for species that inhabit open sandy areas, including glass lizards, race runners, and shorebirds. The federally listed interior least tern breeds and nests in small colonies on exposed river sandbars along the Mississippi River, along with softshell, snapping, and map turtles. Presently, very few acres of sandbar habitat are protected in west Tennessee. If acquired, the proposed expansion would protect 27.5 additional Mississippi River miles, 71.3 additional Hatchie River miles, and two additional Mississippi River islands, including towheads and bars. Sandbar habitat occurs along the shoreline of both rivers and along the banks of the islands, towheads, and bars. The total extent of available habitat is dynamic and changes with rising and falling river levels and is grouped with the adjacent habitat types in Table 4.

The largest extent of the proposed acquisition area is in agricultural land, with corn, cotton, and soybeans comprising the majority of the crops produced. This area is subject to spring flooding, with soybeans, which can be planted later than corn and cotton, comprising the largest acreage farmed. To support the objectives set forth in the NAWMP, it is anticipated that approximately 80 percent (38,000 acres) of these agricultural lands would be re-forested, and the remaining 20 percent (9,000 acres) would be managed as open land habitats, including agricultural crops.

A portion of upland habitat, particularly along the bluff between the existing acquisition boundaries of Chickasaw NWR and Lower Hatchie NWR are grazed. Native grasslands and prairies are one of the most endangered ecosystems in the United States (Carey 2000), as most native grasslands have been converted to agricultural use, including cattle. Any remaining grasslands have been invaded by fescue (*Festuca arundinacea*), which greatly diminishes benefits to wildlife as this exotic grass species forms dense mats of impenetrable vegetation that precludes utilization by small mammals and landbirds. These historical grassland habitats were characterized as open treeless areas dominated by switchgrass, little bluestem, big bluestem, broomsedge, partridge pea, Indian grass, goldenrod, common ragweed, and giant ragweed. Historically, native grasslands occurred in patches in buffer areas on the edges of forested wetlands, and a few pockets of grassland habitats still occur in the MAV on high ground adjacent to the Mississippi River bluff. Most open grasslands in the EGCP have been converted to other land uses or are dominated by nonnative cool season grasses. To help meet the objectives set forth in the Partners-in-Flight Plan, approximately 80 percent (18,000 acres) of uplands would be reforested and native grasses and agriculture would be established on the remaining 20 percent (5,000 acres).

Table 4. Distribution of habitat types within the proposed expansion area

Habitat Type	Mississippi River Unit (MRU) (Acres)*			Hatchie River Unit (HRU) (Acres)*			Total Acres
	MRU-1	MRU- 2	Total	HRU-1	HRU-2	Total	
Bottomland Hardwood Forest	1,687	6,134	7,821	18,535	704	19,239	27,060
Wooded Swamp	159	602	761	8,540	6	8,546	9,307
Non-Forested Wetland	54	210	264	1,393	9	1,402	1,666
Upland Forest	673	24	697	580	12	592	1,289
Open Water	4,795	3,619	8,414	1,949	0	1,949	10,363
Agriculture: Row Crop	18,427	13,277	31,704	14,859	340	15,199	46,903
Agriculture: Pasture/Grassland	1976	1819	3,795	17,602	1816	19,418	23,213
Sandbar	0	277	277	0	0	0	277
Total Acres	27,771	25,962	53,733	63,458	2,887	66,345	120,078

MRU-1 = Mississippi River Unit Priority One
 MRU-2 = Mississippi River Unit Priority Two
 HRU-1 = Hatchie River Unit Priority One
 HRU-2 = Hatchie River Unit Priority Two

* Acres calculated from West Tennessee Wildlife Resources Conservation Plan Land use data

C. WILDLIFE RESOURCES

The bottomland hardwood forests of the MAV serve as important habitat for breeding landbirds and neotropical migratory birds in the spring and fall, and the LMV serves as the primary wintering ground for mid-continent waterfowl populations. The Mississippi Alluvial Valley Conservation Plan identifies waterfowl objectives and Priority Landbird Species as priorities on which to focus research and

conservation dollars; Chickasaw NWR and the proposed expansion area are located in one of only thirteen 100,000-acre forest blocks designated within the LMRAP. The proposed expansion would directly aid the refuges in meeting migratory land bird goals, which focus on the acquisition and management of refuge lands to provide sufficient habitat to support species of management concern.

The combination of Chickasaw, Lower Hatchie, and Hatchie NWRs are known to support wintering waterfowl population numbers exceeding 300,000 dabbling ducks, and the bottomland hardwoods and early successional wetlands within the proposed acquisition area are known to support 29 Priority Landbird Species (Twedt et al. 1999). Additionally, a minimum of 107 species of landbirds use the MAV and EGCP as breeding grounds, with another 70-plus species utilizing bottomland hardwoods as a primary migration habitat (Twedt et al. 1999). In addition to benefiting the aforementioned species, acquisition of the proposed expansion would benefit three species of landbirds that need large areas of contiguous forests: cerulean warblers, which need tracts of 20,000 acres of bottomland hardwood trees for nesting (Hamel and Dunning, Jr., 2000); Swainson's warblers, which need tracts of bottomland hardwood forest of 10,000 acres with a cane understory for breeding areas (Meanly 1971); and Swallow-tailed kites, which need tracts of 100,000-plus acres of bottomland hardwoods to complete critical life history events. It is believed that by working with partners toward the assemblage of a 100,000-acre block of forested land in west Tennessee between Chickasaw and Lower Hatchie NWRs and a 20,000-acre block of forested land along the 5-year floodplain of the Hatchie River, these habitat goals could eventually be achieved.

In addition to the aforementioned priority avian species, there are two federally listed avian wildlife species that occur in the region: the interior least tern and the wood stork.

The endangered interior least tern commonly utilizes sandbar habitats along the Mississippi River in Lauderdale and Tipton Counties as breeding and nesting areas. Least terns also use Chickasaw and Lower Hatchie NWRs as feeding areas; congregations of 10 or more individuals feeding over these refuges are commonly seen during the summer. Acquisition of additional lands with shallow and permanent water would provide areas where small fish are available as a food resource for the least tern, and, in accordance with the Interior Least Tern Recovery Plan objectives for the Mississippi River that identifies acquisition of breeding habitat as an objective, protection of the Mississippi and Hatchie River sandbars would ensure that current breeding areas are maintained.

Of the 17 species of storks worldwide, only the wood stork occurs within the United States. Although wood storks are an uncommon visitor to west Tennessee, they are undergoing an apparent range expansion as these birds have been documented to occur in the region within the last 10 years. In August 2004, wildlife biologist Gary Pogue and refuge operations specialist, Chris Graves (pers. comm.) observed 110 wood storks on Champion Lake, Lower Hatchie NWR. This group of birds was observed utilizing the refuge for approximately 10 days before departing. The wood stork has been listed as endangered since 1984, and the loss of feeding habitat is one of the major causes of its decline. Wetland drainage and hydroperiod alteration have lowered the availability of fish for the wood stork and other wading birds that use interior wetlands and reduced available shallow and/or ephemeral ponds used for nesting, feeding, and roosting. Land acquisition is listed as an objective in the Wood Stork Recovery Plan; therefore, acquisition and management of the proposed expansion areas would benefit this species through the restoration of local hydrology and the creation of seasonal wetlands and year-round open water areas.

The existing bottomland hardwood forests and associated non-forested habitats along these river systems also support high populations of endemic wildlife. Some endemic species are important game animals, such as fox and gray squirrels, eastern cottontail and swamp rabbits, white-tailed deer, wild turkey, raccoons, and northern bobwhite quail. The northern bobwhite quail is currently experiencing population decline in west Tennessee, and upland habitats restored by this project

would help sustain local populations. Other species, such as resident songbirds, small and medium-sized mammals, reptiles, and amphibians, are critical to the environmental health and biodiversity of the area and its ecosystem. Acquisition of additional lands for trust species would reestablish habitat conditions that were historically found in the MAV and the EGCP, and would benefit many of these declining species, including 6 state listed mammals, 1 state listed lizard, and 22 state listed plant species (Table 5).

Table 5. Documented rare species occurrences within the proposed expansion area from the Tennessee Natural Heritage Program Rare Species Observations for Mississippi and Lower Hatchie River Watersheds

Documented Rare Species Known from the Hatchie, Obion and Mississippi River Watersheds in the Project Area		Global/State Rank	State Status	Federal Status	Habitat
Vertebrate (Bird)	Accipiter striatus Sharp-shinned Hawk	G5/ S3,S4	D	None	Forests and open woodlands
	Anhinga anhinga Anhinga	G5/ S1	D	None	Swamps, lakes, and sluggish streams at low elevations.
	Ardea alba Great Egret	G5/S2, S3	D	None	Marshes, swampy woods, streams, lakes, and ponds; also fields and meadows.
	Chondestes grammacus Lark Sparrow	G5/ S1	LT	None	Open habitats with scattered bushes and trees, prairie, cultivated areas, fields with bushy borders.
	Dendroica cerulea Cerulean Warbler	G4/S3	D	None	Mature deciduous forest, particularly in floodplains or mesic conditions.
	Egretta caerulea Little Blue Heron	G5/S2, S3	D	None	Bodies of calm shallow water.
	Haliaeetus leucocephalus Bald Eagle	G5/S3	D	None	Areas close to large bodies of water; roosts in sheltered sites in winter; communal roost sites common.
	Ictinia mississippiensis Mississippi Kite	G5/S2, S3	D	None	Undisturbed stands of lowland and floodplain forests and along major rivers.
	Limnothlypis swainsonii Swainson's Warbler	G4/S3	D	None	Mature, rich, damp, deciduous floodplain and swamp forests.

Documented Rare Species Known from the Hatchie, Obion and Mississippi River Watersheds in the Project Area		Global/State Rank	State Status	Federal Status	Habitat
	Sphyrapicus varius Yellow-bellied Sapsucker	G5/ S1B S4N	D	None	Deciduous or mixed deciduous-coniferous forest; winters statewide and breeds in Appalachian mountains
	Sterna antillarum athalassos Interior Least Tern	G4/S2, S3	LE	LE	Mississippi River sand bars & islands, dikes.
	Thryomanes bewickii Bewick's Wren	G5/S1	LE	None	Brushy areas, thickets and scrub in open country, open and riparian woodland.
	Tyto alba Barn Owl	G5,S3	D	None	Open and partly open country, often around human habitation, farms
	Vireo bellii Bell's Vireo	G5/ S1B	None	None	Thickets adjacent to water, bottomlands; west Tennessee
Vertebrate (Mammal)	Corynorhinus rafinesquii Rafinesque's Big-eared Bat	G3,G4/ S3	D	None	Caves, hollow trees, abandoned buildings; often associated with forested areas.
	Myotis grisescens Gray Myotis	G3/S2	LE	LE	Cave obligate year-round; frequents forested areas; migratory.
	Neotoma floridana illinoensis Eastern Woodrat	G5/S3	D	None	Forested areas, caves & outcrops.
	Sorex longirostris Southeastern Shrew	G5/S4	D	None	Various habitats including wet meadows, damp woods, and uplands.
	Synaptomys cooperi Southern Bog Lemming	G5/S4	D	None	Marshy meadows, wet balds, & rich upland forests.
	Zapus hudsonius Meadow Jumping Mouse	G5/S4	D	None	Open grassy fields; often abundant in thick vegetation near water bodies.

Documented Rare Species Known from the Hatchie, Obion and Mississippi River Watersheds in the Project Area		Global/State Rank	State Status	Federal Status	Habitat
Vertebrate (Reptile/Amphibian)	Hyla gratiosa Barking Treefrog	G5/S3	D	None	Low wet woods and swamps esp. with ephemeral ponds.
	Ophisaurus attenuatus longicaudus Eastern Slender Glass Lizard	G5/S3	D	None	Dry upland areas including brushy, cut-over woodlands and grassy fields; nearly statewide but obscure; fossorial.
	Sistrurus miliarius streckeri Western Pygmy Rattlesnake	G5/S2, S3	LT	None	Usually near water in river floodplains, swamps, marshes, and wet prairies; occasionally drier wooded uplands.
Vertebrate (Fish)	Ammocrypta beani Naked Sand Darter	G5/S2	D	None	Shifting sand bottoms & sandy runs.
	Ammocrypta vivax Scaly Sand Darter	G5/S2	D	None	Small to medium rivers with sandy substrate.
	Atractosteus spatula Alligator Gar	G3,G4/S1	D	None	Sluggish pools of large rivers, oxbows, swamps, and backwaters.
	Cycleptus elongatus Blue Sucker	G3,G4/S2	LT	None	Swift waters over firm substrates in big rivers.
	Etheostoma pyrrhogaster Firebelly Darter	G2,G3/S2	D	None	Sand and gravel bottomed pools of headwaters, creeks, and small rivers; upper Coastal Plain; west Tennessee
	Hybognathus placitus Plains Minnow	G4/S1	D	None	Clear to highly turbid rivers and creeks with sandy bottoms; Mississippi River & immediate environments.
	Macrhybopsis gelida Sturgeon Chub	G3/S1	D	None	Large turbid rivers & their larger tributaries; Mississippi River proper.
	Macrhybopsis meeki Sicklefin Chub	G3/S2	D	None	Main channel of the Mississippi River in swift currents over sand and gravel substrates.

Documented Rare Species Known from the Hatchie, Obion and Mississippi River Watersheds in the Project Area		Global/State Rank	State Status	Federal Status	Habitat
	Notropis dorsalis Bigmouth Shiner	G5/S1	D	None	Cool, low-gradient creeks over sand or fine gravel substrates; tributaries near confluence of Mississippi River.
	Noturus gladiator Piebald Madtom	G3/S3	D	None	Large creeks & rivers in moderate-swift currents with clean sand or gravel substrates; Mississippi River tributaries.
Invertebrate (Mussel)	Obovaria jacksoniana Southern Hickorynut	G2/S1	None	None	Rivers with medium-sized gravel substrates and low-mod current; Hatchie river; Mississippi River watershed.
	Villosa vibex Southern Rainbow	G5/S2	None	None	Mud or soft sand in small rivers & creeks in areas with moderate current; Hatchie and Mississippi River systems.
	Webbhelix multilineata Striped Whitelip	G5/S2	None	None	Low wet habitats, marshes, floodplains, meadows; lake margins; under leaf litter or drift; Mississippi River floodplain.
Invertebrate (Crustacean)	Fallicambarus hortoni Hatchie Burrowing Crayfish	G1/S1	LE	None	Primary burrower; uses saturated or seasonally saturated soils associated with permanent bodies of water; Mississippi River tributaries, Coastal Plain.
Vascular Plants	Acmella oppositifolia Creeping Spot-flower	G5/S3	S	None	Swamps And Wetlands
	Agalinis auriculata Earleaved False-foxtail	G3/S2	LE	None	Barrens
	Agalinis heterophylla Prairie False-foxtail	G4,G5/S1	LT	None	Barrens

Documented Rare Species Known from the Hatchie, Obion and Mississippi River Watersheds in the Project Area	Global/State Rank	State Status	Federal Status	Habitat
Carex gravid Heavy Sedge	G5/S1	S	None	Rocky River Bluffs
Carex hyalina Tissue Sedge	G4/S1	S	None	Forested Bottomland Swamps
Carex oxylepis var. pubescens Hairy Sharp-scaled Sedge	G5/S1	S	None	Wooded Bluffs, Floodplains
Carex reniformis Reniform Sedge	G4/S1	S	None	Rich Bottomland Woods
Ceratophyllum echinatum Prickly Hornwort	G4/S1	S	None	Slow Moving Streams
Dichanthelium ensifolium ssp. ensifolium Small-leaved Panicgrass	GNR/S2	S	None	Moist Pine Barrens
Hottonia inflata Featherfoil	G4/S2	S	None	Wet Sloughs And Ditches
Hydrastis canadensis Goldenseal	G4/S3	S	None	Rich Woods
Iris fulva Copper Iris	G5/S2	LT	None	Bottomlands
Juglans cinerea Butternut	G4/S3	LT	None	Rich Woods and Hollows
Magnolia virginiana Sweetbay Magnolia	G5/S2	LT	None	Forested Acidic Wetlands
Neobeckia aquatica Lake Cress	G4/S2	S	None	Gum Or Cypress Swamps
Panax quinquefolius American Ginseng	G3,G4/S3,S4	S	None	Rich Woods
Penstemon tubiflorus Small-flowered Beardtongue	G5/S1	S	None	Moist Woods

Documented Rare Species Known from the Hatchie, Obion and Mississippi River Watersheds in the Project Area		Global/State Rank	State Status	Federal Status	Habitat
	Phacelia ranunculacea Blue Scorpion-weed	G4/S2, S3	S	None	Alluvial Woods
	Polygonum arifolium Halberd-leaf Tearthumb	G5,S1	T	None	Wetlands and marshes
	Prenanthes crepidinea Nodding Rattlesnake-root	G4/S2	E	None	Rich Bottomlands
	Sagittaria platyphylla Ovate-leaved Arrowhead	G5/S2, S3	S	None	Swamps, Emergent
	Schisandra glabra Red Starvine	G3/S2	LT	None	Rich Mesic Woods, Bluffs
	Spiranthes odorata Sweetscent Ladies'-tresses	G5,S1	E	None	Swamps, Pond margins
	Ulmus crassifolia Cedar Elm	G5/S2	S	None	Swamps

D. FISHERY RESOURCES

One federally listed fish species occurs in the waters of the Mississippi and Hatchie Rivers, the pallid sturgeon. The endangered pallid sturgeon is primarily restricted to the main channels of the Mississippi River (Etnier and Starnes 1993), but it is also suspected to use permanent backwater areas along the Hatchie River as nursery areas during spawning which is believed to occur in mid-summer (Etnier and Starnes 1993). The pallid sturgeon requires flowing water to thrive, and its habitat preference may be for deep, swift waters. However, sturgeons have also been collected in sluggish areas along sandbars on the insides of bends and behind wing dams (Etnier and Starnes 1993), feeding on a diet of aquatic insects, larvae, and small fish. Although little is known about this species, it likely requires a specific set of physical conditions (e.g., current, substrate, turbidity, and temperature) to complete its life cycles (e.g., migrate, spawn, hatch, develop and grow). Acquisition and management of the proposed expansion areas would benefit this species through the protection and restoration of critical nursery areas, by contributing to improved water quality through the reduction of sediment loads and agricultural chemical run-off from agricultural lands into the Hatchie and Mississippi Rivers, and by supporting land acquisition objectives in the Pallid Sturgeon Recovery Plan that identifies major Mississippi River tributaries upstream of the Yazoo River in Mississippi as a priority areas.

The dynamic nature of these river systems and their flooding regimes, coupled with the associated creeks, sloughs, oxbows, lakes, and chutes, provide a reliable and renewable fisheries resource. When flooding occurs in the spring, oxbows, high flow channels, and vernal pools all provide important breeding areas for lowland fishes, including largemouth bass, white and black crappie, an array of sunfishes, pallid sturgeon, gizzard shad, carp, buffalo, and, in the case of the Hatchie River, eleven distinct species of catfish. The Hatchie River also supports 35 species of mussels and over 100 different species of fish (Hardeman County September 2007 Hatchie River Initiative). Additionally, there are 9 species of state listed rare fish, 3 species of state listed rare mussels, and 1 state listed invertebrate crayfish that inhabit the areas included in the proposed expansion.

The fisheries resource also includes those fishes that inhabit large river floodplains, such as alligator gar, paddlefish, catfish, and American eel. The proposed area also has numerous small creeks and tributaries that support many species of minnows, shiners, crayfish, and other forage fish. Freshwater mussels are also present in both rivers, and, when these rivers flood in the spring, large areas of highly important spawning grounds and nursery habitat become available within the flooded forest.

E. RELATED RESOURCES

See Figure 7 for related resources.

F. CLIMATE CHANGE

The State of Tennessee recently released a document evaluating Climate Change and Potential Impacts to Wildlife in Tennessee (Tennessee Wildlife Resources Agency 2009). Overall, the predictions for Tennessee indicate that there will likely be a loss of wetlands and mature forests, increased droughts, increased water demands, increased nonpoint runoff and sedimentation due to large scale precipitation events, increased erosion due to larger scale flood events, and increased temperatures over the remainder of this century.

Climate change models contain large variations, but overall it is anticipated that global climate change will likely negatively affect aquatic environments in Tennessee as increased droughts and water demands may cause hydrologic changes in microhabitats, reduced wetted area, and degraded water quality. Increased droughts are anticipated to decrease invertebrate and amphibian populations, disrupt fish migrations, and expose all fauna to higher water temperatures and lower dissolved oxygen, resulting in stress and mortality. Longer anticipated growing seasons and increased human consumption associated with increased population projections will result in increased water withdrawals. Increased precipitation during individual rain events will increase nonpoint runoff, sedimentation, and turbidity in areas of poor or inadequate riparian buffer. Increases in turbidity are expected to negatively affect black crappie populations. Larger floods and longer droughts could cause increased erosion, reduced water supply, and increase the spread of invasive species (Tennessee Wildlife Resources Agency 2009).

Likewise, migratory bird species that utilize wetlands and mature forests are anticipated to undergo population declines due to habitat loss, northward range shifts, and reduced reproductive success related to mistimed spring arrival with peak insect emergence, reduced insect availability due to drought, and/or poor physical condition of arriving migratory birds. Migratory birds associated with early successional upland habitat (grassland) may benefit with increased habitat availability. Long distance migrants (such as waterfowl) will likely suffer the greatest declines due to less wintering habitat available and loss of winter or breeding habitat in other portions of their range. Migration patterns may also shift as temperatures remain warmer in northern areas. Resident waterfowl (such

as wood ducks) are predicted to decline with the drier conditions expected (Tennessee Wildlife Resources Agency 2009).

Acquiring and managing the proposed expansion areas would allow us to manage toward these less certain future conditions and attempt to abate global climate change impacts, by trying to maintain the current conditions despite climate change (Johnson et al. 2008). This expansion proposal applies SHC principles and provides land and water protection through the following:

- Increase extent of protected areas;
- Improve species representation and habitat restoration within the expansion boundary;
- Improve management and restoration of existing protected areas to facilitate resilience of species;
- Design new natural areas and restoration sites to maximize habitat resilience;
- Protect and establish new movement corridors, stepping stones, and refugia;
- Manage and restore ecosystem function rather than focusing on specific components (species or assemblages);
- Improve species survival by increasing landscape permeability to species movement;

The Service's plan: Rising to the Urgent Challenge: Strategic Plan for Responding to Accelerating Climate Change (U.S. Fish and Wildlife Service 2010a) and Strategic Plan for Inventories and Monitoring on National Wildlife Refuges (U.S. Fish and Wildlife Service 2010b) identify several techniques and approaches that could be specifically employed within the Refuge System to facilitate adaptation to climate change. Acquiring, restoring, and managing the proposed expansion areas would result in:

- Reforesting riparian habitats;
- Acquiring buffers, and establishing corridors to eliminate dispersal barriers;
- Conserving projected climate change refugia;
- Establishing other marshland vegetation where freshwater lake levels fall;
- Restoring historic hydrologic regimes and retaining adequate water to sustain aquatic species and wildlife;

The proposed major expansion plan would accomplish the aforementioned objectives by restoring bottomland hardwood, and emergent and non-forested wetland habitats that historically were present in this portion of the Mississippi, Hatchie, and Obion Rivers' floodplains, and would restore hydrological functions such as surface sheet flow and recharge of underground aquifers. The proposal would: protect key ecosystem features and refugia habitat, including streams of priority aquatic systems (i.e., Hatchie River and associated tributaries within its 5-year floodplain) and a priority conservation area (i.e., Lower Mississippi Valley Migratory Bird Conservation Area); maintain or establish riparian buffers along streams to lessen impacts of temperature increases; and protect, restore, and maintain corridors to facilitate migration routes for species and/or populations to facilitate gene flow. The proposed expansion areas contain a variety of habitats as described in the Habitat and Land Use section to provide resilience and support numerous viable populations, ensuring representation of a mixture of species as described in the Wildlife Resources and Fishery Resources sections. Protecting the proposed expansion areas would help maintain numerous viable populations by protecting strategically important lands and waters and meeting population goals. The proposed expansion areas contains more than 54,808 acres that could be restored to bottomland hardwood forest, which would help support several globally imperiled species of concern and other priority fish and wildlife (Table 5) and provide terrestrial carbon sequestration.

G. SOCIOECONOMIC AND SOCIOCULTURAL CONDITIONS

The rural setting and sparse population of the refuges are characteristic of much of west Tennessee. Population estimates, percent population change, percentage of individuals below poverty level, and per capita annual incomes are listed in Table 6 (U.S. Census Bureau 2010). Agriculture and light industry provide the major economic bases in the region.

Table 6. Populations, population trends, poverty levels, and per capita income of Dyer, Haywood, Lauderdale, and Tipton Counties, Tennessee

County	Population	% Change in Population	% of people below poverty	Average Per Capita Income (\$)
Dyer	37,841	+1.4	17.7	16,451
Haywood	18,881	-4.6	21.9	14,669
Lauderdale	26,471	-2.3	23.6	13,682
Tipton	59,495	+16	13.7	17,952

H. 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 type 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.

Archaeological investigations have occurred on each of the refuges and in nearby areas of west Tennessee and have identified several significant sites, including remains of a prehistoric village on Lower Hatchie NWR. It is anticipated that many more sites would be identified and protected within the proposed expansion areas. The Region 4 Regional Archaeologist would conduct an archaeological review during the detailed planning phase of the proposed expansion, as it is anticipated that areas would be discovered and mapped that are likely to contain cultural resources.

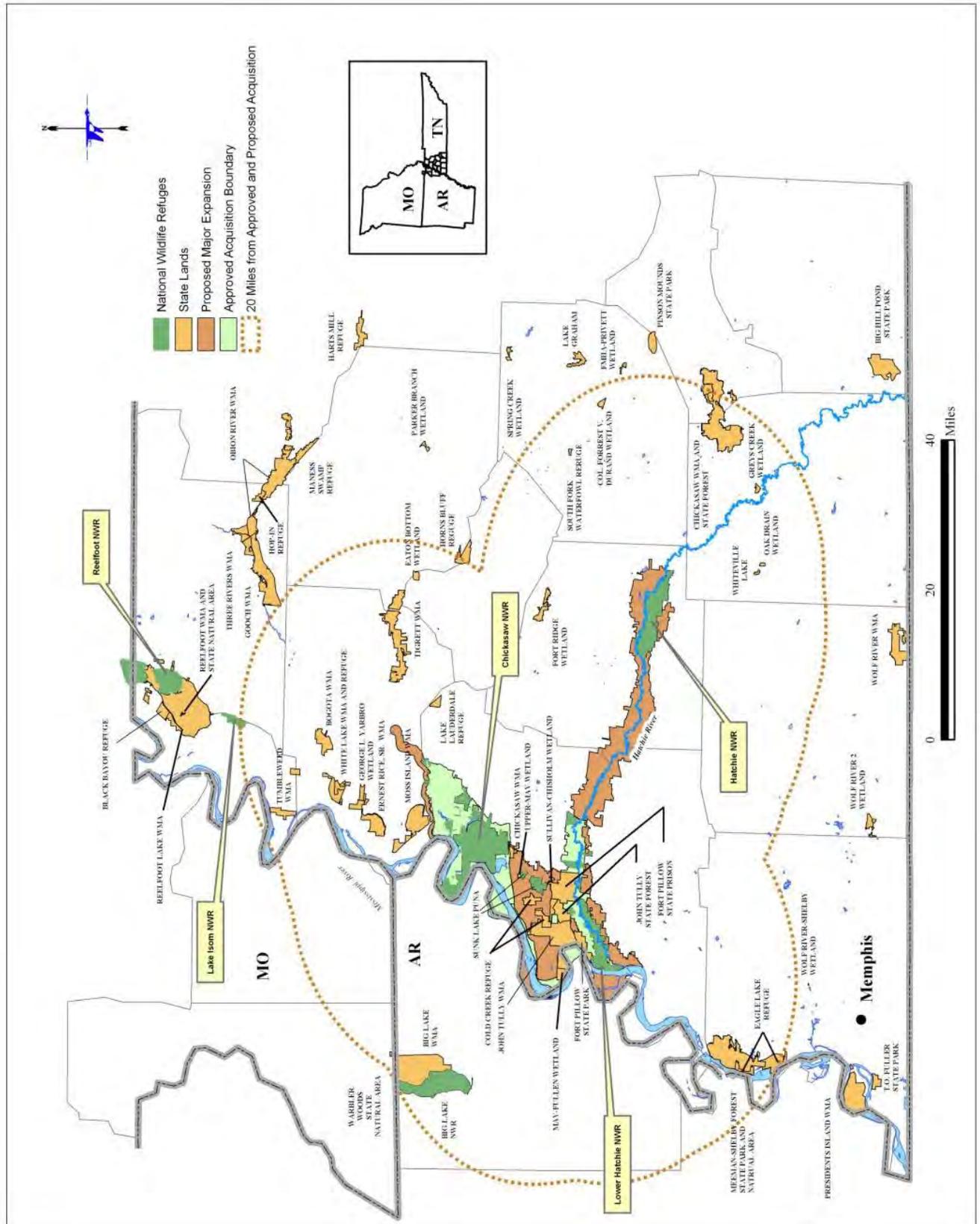
None of the refuge sites covered by this Draft LPP/Draft EA are known to be eligible for inclusion on the National Register at this time and they would not be designated as scientific sites. Official designation as scientific sites, as part of the planning process, also carries the risk of alerting illegal

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.

Section 106 of the National Historic Preservation Act of 1966, as amended, and Section 14 of the Archaeological Resources Protection Act require the Service to evaluate the effects of any of its actions on cultural resources [e.g., historical, architectural and archaeological that are listed or eligible for listing in the National Register of Historic Places (NRHP)]. In accordance with these regulations, the Service has coordinated the review of this proposal with the Tennessee State Historic Preservation Office.

The Service believes that the proposed acquisition of lands would have no adverse effect on any known or yet-to-be identified NRHP-eligible cultural resources. However, in the future, if the Service plans or permits any actions that might affect eligible cultural resources, it would carry out appropriate site identifications, evaluations, and protection measures as specified in the regulations and in Service directives and manuals.

Figure 7. Conservation ownership/land management within and near the proposed expansion area



III. Alternatives Including the Proposed Action

In determining how to achieve the fish and wildlife habitat protection goals for the project lands and waters identified in this document, the Service considered and evaluated three alternatives. These are:

A. ALTERNATIVE 1: NO ACTION

This is the "status quo" alternative. Under this alternative, the Service would not acquire any of the lands proposed for the expansion of Chickasaw and Lower Hatchie NWRs. The proposed project lands would remain in private ownership and current land uses would continue. Protection of the fish and wildlife habitats and natural resource values of these lands would be contingent upon the enforcement of existing federal, state, and local environmental regulations (Clean Water Act, state water quality and pollution laws, etc.), and the discretion of the private landowners.

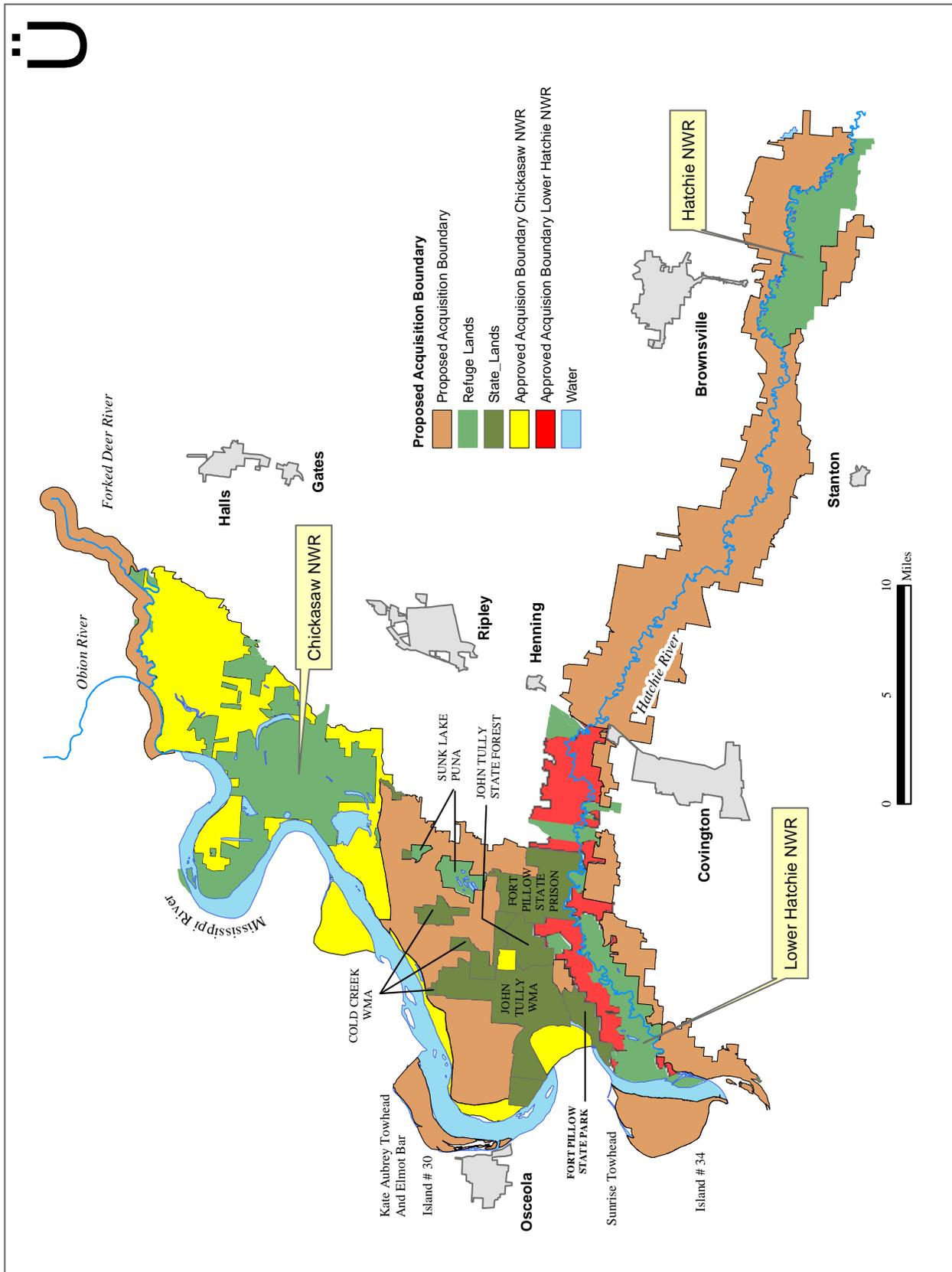
B. ALTERNATIVE 2: PROTECTION AND MANAGEMENT OF UP TO 120,078 ACRES BY THE FISH AND WILDLIFE SERVICE (PROPOSED ACTION)

Under this alternative, the Service would acquire up to 120,078 acres of habitat for protection and management as part of Chickasaw and Lower Hatchie NWRs (Figure 8). These areas would be included in the approved acquisition boundary of the refuge. This is the proposed action, which provides the maximum potential to manage for bottomland hardwoods and riverine systems.

C. ALTERNATIVE 3: PROTECTION AND MANAGEMENT OF UP TO 294,544 ACRES BY THE FISH AND WILDLIFE SERVICE

Under this alternative, the Service would acquire up to 294,544 acres of bottomland hardwood and riverine habitats for protection and management as part of Chickasaw and Lower Hatchie NWRs (Figure 9). The Service would acquire sufficient interest in the identified lands to prevent conflicting land uses and to manage the areas for their wildlife values. The same acquisition methods as described in Alternative 2 would apply to this alternative.

Figure 8. Lands included in the proposed project under Alternative 2



IV. Environmental Consequences

This section analyzes and discusses the potential environmental impacts of the three management alternatives described in Section II.

A. ALTERNATIVE 1: NO ACTION

Under this alternative, the Service would take no action to acquire, protect, and manage any lands to expand the Chickasaw and Lower Hatchie NWRs.

Future habitat protection under existing laws and regulations may be insufficient to prevent significant degradation of the area's fish and wildlife resource values. Federal executive orders involving the protection of wetlands and floodplains only apply to federal agencies. They do not apply to habitat alterations by non-federal entities, which receive no federal funds.

The primary deterrent against the loss of resource values is the Army Corps of Engineers' Section 404 permit program, which is administered under the authority of the Clean Water Act. This program requires permits for most types of work in wetlands. Most of the wetlands in the project area qualify for protection under this program. In addition, the State of Tennessee has regulatory authority over the area and would not permit any developments that would violate the state's water quality standards.

However, there is no assurance that the protection offered by these regulations would be consistent with protection of the area's fish and wildlife resources. The regulatory programs are designed to accomplish different objectives. In addition, these programs are subject to changes in the law and to varying definitions and interpretations, often to the detriment of wetlands. The Corps of Engineers' regulatory authority provides for the issuance of Section 10 and/or Section 404 permits when it is not contrary to the public interest to do so and provided other conditions are met. Fish and wildlife conservation is only one of several public interest factors that are considered in permit issuance decisions. If fish and wildlife conservation is outweighed by other factors, permits that would alter the wetlands in the proposed refuge unit area could be issued.

Other potential adverse impacts of the "No Action" alternative include destruction of habitat due to residential and commercial development as increased development and urbanization on the proposed area is one of the primary threats to wildlife in this area. Forest fragmentation, road-associated impacts, degradation, fragmentation and loss of habitat, incompatible public uses, exotic species introduction, hydrologic modifications, and introduced predators are some additional potential negative human impacts to the proposed area.

Another potential threat to the proposed area is a decline in the fisheries resources as a result of incompatible land management practices. Disturbance to the soil from agriculture and infrastructure development leads to increased erosion and sedimentation in nearby creeks and tributaries, which results in a decline in water quality, increased turbidity, higher water temperatures, and lower dissolved oxygen content in the water column.

The desired fish and wildlife protection objectives, therefore, cannot be achieved to any degree under this alternative. Specifically, implementation of "No Action" would adversely impact the area's valuable fish, waterfowl, and wildlife habitats.

B. ALTERNATIVE 2: PROTECTION AND MANAGEMENT OF UP TO 120,078 ACRES BY THE FISH AND WILDLIFE SERVICE (PROPOSED ACTION)

Under this alternative, the Service would acquire up to 120,078 acres of habitat as part of Chickasaw and Lower Hatchie NWRs. The land protection priorities and proposed methods of acquisition are summarized in Chapter III of the Draft LPP.

The purpose of the proposed project would be to:

- 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;
- Protect and restore contiguous bottomland hardwood forests adjacent to and existing in the Hatchie River 5-year flood plain;
- Protect lands between all three national wildlife refuges and along the Hatchie River corridor to increase core habitat for neotropical migratory landbirds and wintering waterfowl, and spawning areas for lowland fish;
- Protect existing and potential habitat on Mississippi River and Hatchie River sandbars for the endangered least tern;

Under this alternative, the desired fish and wildlife protection objectives could be achieved, and would help to achieve the goals of the WTWRCP, which identifies the lands along the Mississippi River and the Hatchie River corridor as lands of primary concern in Tennessee.

The proposed alternative would ultimately allow for the conservation of over 120,078 additional acres of wildlife habitat consisting of 48,673 acres of bottomland floodplain habitat, 71,405 acres of upland forest and grasslands, and would lead to the protection of approximately 49.2 contiguous river miles along the east bank of the Mississippi River and approximately 106.3 contiguous river miles of the Hatchie River.

Currently in the MAV, only 20 percent of historic bottomland hardwood forests remain, and most of those remnant tracts are highly fragmented due to the advent of agriculture. The proposed expansion area would increase the core size of forest blocks and provide necessary corridors for wildlife. These lands are of importance to hundreds of thousands of migratory waterfowl, such as mallards, teal, pintail, shovelers, gadwall, and wood ducks, which use these lands not only as wintering habitat, but also for the flooded bottomland food resources which are necessary for these birds to prepare for spring breeding activities. Bottomland hardwoods are rich in high-energy natural herbaceous plant seeds, acorns, and aquatic invertebrates and are critically important to waterfowl for pair bonding, loafing, sanctuary, thermal cover, and feeding, which underscores the significance of these forests to wintering waterfowl. In fact, a study conducted by Louisiana State University in 2008 found that female mallards captured and fitted with transmitters spent the majority of the winter in bottomland hardwood forest habitat (Davis, Afton, and Cox 2008), and other studies (Heitmeyer 1985) have shown that these areas are critical feeding and staging areas which allow mallards to acquire sufficient body mass to successfully complete annual reproductive cycles upon their return to the breeding grounds. Neotropical migratory birds, such as prothonotary, Swainson's, and worm-eating warblers, along with Mississippi kites, follow the Mississippi and Hatchie Rivers during spring

and fall to complete various stages of their life cycles, and wood storks use these areas during late summer to feed after dispersing from their breeding grounds. The LMVJV considers forest interior landbirds utilizing bottomland hardwood forests a priority resource, particularly Kentucky, Swainson's, and cerulean warblers, and these species are known to have higher reproductive success in large core areas of forest rather than in small, isolated blocks. Furthermore, cerulean warblers are classified as a bird of conservation concern requiring critical recovery and immediate management activities in the LMRE. Large expanses of bottomland hardwoods are important for breeding cerulean warblers, with estimates from researchers suggesting that forest tracts as large as 8,000 ha (19,700 acres) may be required to ensure sustainable cerulean warbler populations in the LMRE (LMVJV Habitat Suitability Index Model). The cerulean warbler has experienced dramatic declines over the last 30 years, and since this species is already known to occur on all three refuges, the proposed acquisition would provide additional habitats to sustain this species. Additionally, bald eagles winter on the refuges, and several breeding pairs nest on the refuges and next to the rivers, along with rookeries of great and little blue herons, egrets, and night-herons, which thrive in these bottomlands. Rafinesque's big-eared and southeastern myotis bats, both species of concern, utilize water tupelo-baldcypress brakes that have persisted within these bottomland forests.

The adjacent uplands provide a retreat for resident species such as deer and wild turkey during periods of extended flooding and support numerous migratory and resident bird species that utilize or require upland hardwood and grassland habitats. A few of these species include red-tailed hawk, yellow-billed cuckoo, pileated woodpecker, pine warbler, red-headed woodpecker, eastern wood-peewee, eastern phoebe, brown-headed nuthatch, Bachman's sparrow, pine siskin, and American goldfinch. The proposed area also contains some upland hardwoods with species such as white, southern red, and cherrybark oak along with various hickories that are disappearing due to the current economic climate. Unfortunately, this particular ecotype is becoming an endangered ecosystem. Its decline, if allowed to continue, would have negative impacts on many upland-dependent wildlife species.

Two federal species of concern, the Rafinesque's big-eared bat and southeastern myotis bat, are found in bottomland hardwood forests in the proposed area. These bats most often use large, hollow water tupelo and black gum as roost sites (Cochran 1999; Hoffman 1999; Gooding and Langford 2004), but have also been found in baldcypress, willow oak, sweetgum, and many other species of hollow trees in mature bottomland hardwood forests. The bottomland hardwoods in the proposed expansion area provide important foraging habitat and roost sites for these bats, and the protection of cavity trees is critical for their conservation.

The historic range of black bears included all forested areas of North America; in the southeastern United States, this species has been eliminated from 90 percent of its former range. The Louisiana black bear, a subspecies of American black bear, is federally threatened in Louisiana, Mississippi, and eastern Texas, and repatriation efforts have been ongoing in other states to reintroduce bears into their former habitats. Black bears are currently not present in west Tennessee, but occur across the Mississippi River in Arkansas on White River NWR, which lies within 125 air miles. With a home range as large as 25 square miles, black bears would benefit from the protected corridor and the subsequent increase in core area. The acquisition of the proposed expansion lands would provide and protect a contiguous block of bottomland hardwood forest which would have the potential to provide future black bear habitat.

Acquisition of the proposed areas would protect against further development and urbanization, plus additional forest fragmentation, degradation, hydrologic modifications, and loss of habitat would not occur.

Incompatible timber harvest practices such as high grading would not occur under this alternative. A forest habitat management program would be implemented to meet wildlife and habitat objectives, with harvest practices following established wildlife/forestry guidelines. Afforestation of open lands would be a priority to ensure that desirable forest tree species composition is properly established and maintained.

Fisheries resources would be protected under this alternative, because the land would not have additional infrastructure development and hydrology patterns would suffer no further anthropomorphic modifications. Massive navigation and flood control works have negatively altered the natural processes of the river, as it is now stabilized and unable to function as the dynamic system that both created and destroyed a wide variety of fish and wildlife habitats, such as riffles, oxbows, sand bars, willow banks, and side channels. Equally damaging, the river and its tributaries are denied access to the floodplain for over 90 percent of its length. This physical and biological interaction between river and floodplain is crucial as flooding into the enormous alluvial plain provided fish and amphibian spawning sites, nutrient and sediment exchange, and a wealth of varied aquatic and wetland habitats (U.S. Fish and Wildlife Service 1999). With the proposed acquisition, spawning grounds and nursery habitat would be protected as floodplain hydrology would remain intact, and water quality (i.e., temperature, turbidity and dissolved oxygen) would remain high.

C. ALTERNATIVE 3: PROTECTION AND MANAGEMENT OF UP TO 294,544 ACRES BY THE FISH AND WILDLIFE SERVICE

Under this alternative, the Service would acquire up to 294,544 acres of bottomland hardwood and riverine habitat as part of Chickasaw and Lower Hatchie NWRs. Under this alternative, the Service would acquire up to 294,544 acres, which would extend the proposed expansion boundary upstream along the South Fork of the Forked Deer and Hatchie Rivers to the upper end of their respective 5-year floodplains. The proposed acreage in this alternative would include all of the acreage in the proposed alternative (up to 120,078 acres) plus an additional 174,466 acres consisting of each river's 5-year floodplain plus associated major tributaries. This alternative was rejected, because the tracts that include the tributaries and the upper reach of the river typically are narrow and include only small segments of the desired floodplain. Additionally, the 5-year floodplain is encroached upon by the towns of Dyersburg, Ripley, Covington, Brighton, Bolivar, and Jackson, and is crossed by many roads, power lines, railroads, and gas line easements, which reduce the potential value of core habitat.

D. CUMULATIVE EFFECTS

The National Environmental Policy Act requires that cumulative impacts be considered in an environmental assessment. Cumulative impact is defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7).

Based on the nature of the proposal, the location of the site and the current land use, the proposed action would not have any significant effects on the quality of the human environment, including public health and safety. Further, because the purpose of the proposal is to protect, maintain, and where possible, enhance the natural habitat of the lands within the proposed acquisition area, the proposal is not expected to have any significant adverse effects on the area's wetlands and floodplains, pursuant to Executive Orders 11990 and 11988.

Implementation of the proposed action would not involve any highly uncertain, unique, unknown, or controversial effects on the human environment. The proposed action would not establish a precedent for future actions with significant effects, nor would it represent a decision in principle about a future consideration. No cumulatively significant impacts on the environment would be anticipated.

In addition, the proposal would not significantly affect any unique characteristic of the geographic area, such as historical or cultural resources, wild and scenic rivers, or ecologically critical areas. The proposal would not significantly affect any site listed in or eligible for listing in the NRHP, nor would it cause loss or destruction of significant scientific, cultural, or historical resources. The area's cultural resources would be protected under the regulations of the National Historic Preservation Act of 1966, as amended, the Archaeological Resources Protection Act, and the Advisory Council on Historic Preservation (36 CFR 800). The Tennessee State Historic Preservation Office would be contacted whenever any future management activities have the potential to affect cultural resource sites.

All tracts acquired by the Service in fee title would be removed from local real estate tax rolls, because federal government agencies are not required to pay state or local taxes. However, the Service makes annual payments to local governments in lieu of real estate taxes, as required by the Refuge Revenue Sharing Act (Public Law 95-469). Payment for acquired land is computed on whichever of the following formulas is greatest: (1) Three-fourths of 1 percent of the fair market value of the lands acquired in fee title; (2) 25 percent of the net refuge receipts collected; or (3) 75 cents per acre of the lands acquired in fee title. Thus, if all lands are acquired within the proposed expansion area, the estimated annual revenue-sharing payment to be made to Dyer County would be up to \$150,052; Lauderdale County up to \$644,920; Tipton County up to \$313,960; and Haywood County up to \$427,388.

No actions would be taken that would lead to a violation of federal, state, or local laws imposed for the protection of the environment.

E. ENVIRONMENTAL JUSTICE

Federal actions which may have disproportionate effects on human health or environmental conditions for minority or low-income populations must be evaluated, and those effects identified and addressed, by the agency proposing the action, under Executive Order 12898 (Federal Register Vol. 59, No. 32, 1994). For the actions described in the alternatives in this Draft EA, the affected communities are relatively homogeneous, and no disproportionate effects on any low-income or minority community could be identified under any of the alternatives. Further, no significant adverse human health or environmental effects could be identified for any human communities in or near the proposed acquisition boundary.

F. RECOMMENDATION

Alternative 2 is recommended as the proposed alternative as it would allow for the acquisition of these areas to provide up to 56,000 acres of reestablished bottomland and upland forest, would protect an additional 27,000 acres of existing forest within the expansion boundary, and, when combined with existing federal and state forests, would provide approximately 190,000 acres of contiguous forest lands to support the objectives outlined in other national and state plans for waterfowl, priority landbirds, waterbirds, upland wildlife, reptiles, amphibians, and fish. It is also better suited to serve the purpose as outlined in the establishing legislation for each refuge, as well as the stated goals and objectives, vision, and purpose(s) as developed in each CCP.

APPENDICES

Appendix A. Science-Based Criteria

The following information is provided as an appendix to supplement and summarize information in the Draft LPP/Draft EA, to demonstrate compliance with “Interim Guidance on Prioritizing Land Protection Efforts of the National Wildlife Refuge System.”

A. PRIORITY CONSERVATION OBJECTIVES AND SURROGATE SPECIES

Recovery of threatened and endangered species

This expansion would contribute to the recovery of three species that are currently listed as endangered: the Indiana bat, the least tern, and the pallid sturgeon. The Indiana Bat Recovery Plan (U.S. Fish and Wildlife Service 2007) cites a minimum population goal of 457,000 and identifies conserving and managing summer habitats to maximize survival and fecundity rates as one of the “Action-Needed” items. The project would help to protect the Indiana bat by providing up to 100,000 acres of habitat, thereby reducing fragmentation, providing maternity roosts, and increasing forage areas by connecting state- and federal-owned habitats. Indiana bats have yet to be documented on either refuge, but, if they occur, would utilize these bottomland hardwoods during the summer months for roosting, maternity, and foraging areas. The least tern uses Mississippi River sandbars near Chickasaw and Lower Hatchie NWRs for nesting habitat during the summer months, and protection of the existing islands inside the expansion boundary would contribute to the ability of this species to successfully hatch their young. Additionally, it would facilitate meeting the goals of the Least Tern Recovery Plan (U.S. Fish and Wildlife Service 1990), which identifies the protection and enhancement of summer breeding habitats as a priority in reaching the population goal of 2,200 to 2,500 individuals in the Lower Mississippi River. The Pallid Sturgeon Recovery Plan (U.S. Fish and Wildlife Service 1993) identifies “restore habitats and functions of the Missouri and Mississippi River ecosystems” as the number one action needed to assist with the recovery of the pallid sturgeon. With functional completion, water quality would increase due to the reduction of sediments and the filtering of pesticide influx to the waters of the Mississippi and Hatchie Rivers, thereby improving habitat quality for the pallid sturgeon, as well as restoring and maintaining the functional hydrology that still exists on this stretch of the Mississippi River. Increasing habitat acreage, and especially reducing fragmentation, increasing connectivity, reducing sedimentation and pesticide run-off, and restoring hydrology would all contribute to the recovery of each of these species.

Implementing the North American Waterfowl Management Plan

Due to the location of Chickasaw and Lower Hatchie NWRs in the Mississippi River Flyway, the refuges are an important migration stop-over and provide quality habitat for wintering waterfowl as the two refuges, when combined, currently hold over 300,000 ducks and 40,000 white fronted and snow geese. Additionally, they provide a combined average of 5,700,000 Duck Energy Days (DED’s) for waterfowl through the cooperative farming program, as well as an additional 1,800,000 DED’s supplied through actively managed moist-soil units located in designated sanctuary areas on each refuge. The ridge and swale topography provide many small bodies of seasonally flooded highly productive wetlands, as the proximity to the Mississippi and Hatchie Rivers makes the area conducive to annual flooding. Also, the numerous water bodies on the refuge provide quality year-round habitat for breeding wood ducks, as cypress/tupelo brakes and remnant river oxbows containing buttonbush afford optimal brood habitat, along with an

abundance of natural cavities in the bottomland hardwoods which provide quality nesting habitat. Functional completion of the proposed acquisition would approximately quadruple the refuge's contribution to wood duck and migratory waterfowl wintering habitat in the LMAV.

Conserving Migratory Birds in Decline

A major focus of management activities on Chickasaw and Lower Hatchie NWRs is the conservation of migratory birds. The Partners-in-Flight Plan (Rich et al. 2004), listed 29 migratory birds known to occur on Chickasaw and Lower Hatchie NWRs as species of continental importance, including 17 which have action categories of Management or Immediate Action due to their recent declines in population, as well as another 70-plus species that rely on bottomland hardwoods as a critical stopover during migration. Many of these species are area-dependent, and are represented by the three tentative surrogate species noted below, as described by (Twedt et al. 1999).

Surrogate Species

Surrogate species have not yet been identified for the LMAV by the GCPO-LCC. However (Twedt et al. 1999), suggested the use of three migratory bird species to represent other area-sensitive breeders in the LMAV. These are Swainson's warbler, which represents a suite of birds with recommended habitat patch size of 4,700 ha (11,600 acres), cerulean warbler, which represents a suite of birds with recommended patch sizes between 4,700 ha and 8,000 ha (19,760 acres), and swallow-tailed kite, which represents a suite of birds with patch size requirements up to 40,000 ha (98,800 acres). Increasing the forested acreage of Chickasaw and Lower Hatchie NWRs would allow the refuges for the first time to support viable populations of all three of these surrogates, and by extension, all of the other area-dependent bottomland hardwood breeders in the LMAV.

B. ACHIEVEMENT OF STATED POPULATION OBJECTIVES

Threatened and Endangered Species - Indiana Bat, Least Tern, Pallid Sturgeon

The Recovery Plan for the Indiana bat (U.S. Fish and Wildlife Service 2007) provides for a population size of 457,000 individuals. The Indiana bat has yet to be documented on either refuge, but the refuges lie within the historical range of the species. Therefore, the best method the refuge can utilize to contribute to the recovery is to provide large expanses of suitable habitat. The Least Tern Recovery Plan (U.S. Fish and Wildlife Service 1990) calls for the interior population to increase from 5,000 individuals to 7,000 birds. During a 2011 nesting survey conducted on the Mississippi River from Cape Girardeau, Missouri, to Baton Rouge, Louisiana (Jones 2011), 5 colonies containing 76 nests and 1,361 individuals were located on the Mississippi River islands that are included in the expansion boundary. However, at the present time, these islands are unprotected from human disturbance which puts these nesting colonies at risk. Acquiring these islands would contribute to the recovery of the interior population of the least tern through the protection of these nesting colonies. The pallid sturgeon uses deep holes and runs in the Mississippi River for feeding areas, and the floodplains of the Mississippi and Hatchie Rivers for nursery areas. The project would contribute to the overall health of the Mississippi River through sediment reduction and filtering of pesticide runoff, as well as protecting and maintaining the functional hydrology of the system, which would have indirect positive impacts on recovery efforts.

Increasing and consolidating the land base on which these populations depend would greatly increase the chances that these objectives would be met.

Waterfowl

Functional completion of the proposed acquisition would allow the protection and/or restoration of nearly 100,000 acres of bottomland hardwood habitat and associated wetland habitats, which would represent 4.8 percent of the restoration/enhancement goal for waterfowl habitat in the

LMVJV (NAWMP Committee 2004). The refuges currently supply wintering habitat to peak populations of approximately 300,000 ducks, comprised mainly of mallard, northern pintail, green-winged teal, gadwall, American wigeon, and northern shoveler. Additionally, several thousand wood ducks winter on the refuges and a smaller number are year-round residents. Census estimates for wood ducks are imprecise because aerial survey methods are not accurate for wooded habitat, but effectively quadrupling the habitat acres would theoretically allow for a fourfold increase in the number of birds that utilize these habitats.

Migratory Birds

Numeric population objectives are given by (Rich et al. 2004) for species of continental importance in the Partners-in-Flight Plan. The following species of continental importance, as identified in the Partners-In-Flight document, require bottomland hardwood habitat for breeding and are either summer residents or have the potential to be summer residents on Chickasaw and Lower Hatchie NWRs. Roughly quadrupling the bottomland hardwood forest acreage on these refuges would not only push the refuges over the threshold for the area-dependent breeders with the largest patch-size requirements (see surrogate species discussion above), but also would allow them to contribute to the listed continental population objectives for the six species which have been given objectives to “increase” (Table A1).

Table A1. Population objectives given by (Rich et al. 2004) for 12 bottomland hardwood bird species which breed or potentially breed in the proposed expansion area

Common Name	Continental Population Objective
Swallow-tailed Kite	Increase 100%
Red-headed Woodpecker	Increase 100%
Acadian Flycatcher	Maintain
Wood Thrush	Increase 50%
White-eyed Vireo	Maintain
Yellow-throated vireo	Maintain
Yellow-throated Warbler	Maintain
Cerulean Warbler	Increase 100%
Prothonotary Warbler	Increase 50%
Swainson’s Warbler	Maintain
Kentucky Warbler	Increase 50%
Hooded Warbler	Maintain

C. PRIORITY CONSERVATION AREAS

Chickasaw and Lower Hatchie NWRs lie in the LMAV, on the northern tip of the wintering grounds, in an area that is an extremely important migration corridor for waterfowl and migratory birds in North America. This expansion was identified as one of 13 proposed 100,000-acre blocks in the MAV Bird Conservation Plan; the specific site was identified and designated in the WTWRCPP, a regional planning document which was developed to serve as the biological

foundation for cooperative wildlife management activities between the TWRA and the Service in west Tennessee. Priority rankings and designated locations were derived at the landscape scale from the Partners-in-Flight Plan and were based on the potential for restoration to reduce habitat fragmentation and increase average forest patch size in the LMAV.

D. VULNERABILITY AND RESILIENCY

Climate Change

Refuge priority species have not been formally evaluated for vulnerability to climate change. However, the following sections summarize some of the potential consequences of climate change on the refuge.

Changes in Temperature

Increases in temperature, including fewer freezing days, more days over 90 degrees F, and higher mean temperatures overall, will have a profound effect on refuge ecology and operations. Productivity of the refuge's forested and agricultural systems may decrease as temperatures increase past optimal ranges, although it is also possible that forests will become more productive with a longer growing season and higher CO₂ concentrations. Subtropical wetland forest systems consistently increase in productivity with higher CO₂ concentrations, but also release more methane (CH₄), which is a more potent greenhouse gas than CO₂ (Bridgham, Megonigal, Keller, Bliss, and Trettin 2006). With increasing temperatures, aquatic systems would be characterized by lower dissolved oxygen (DO), resulting in more frequent fish kills and low productivity (CCSP 2009). Heat stress can affect forest ecosystems directly. For example, in a study on the Savannah River Site in South Carolina, cow oak (*Quercus michauxii*) regeneration in canopy gaps like those prescribed by (LMVJV Forest Resource Conservation Working Group 2007) was affected by heat stress; survival was higher in shaded areas and very low in the centers of gaps. The authors attributed low survival near the center of the gaps to heat and moisture stress (Collins and Battaglia 2002). Agricultural systems are also likely to be affected, as soil temperatures near the soil surface in agricultural fields can be up to 5 degrees C (~12 degrees F) higher than air temperatures more than 30 cm (~1 ft.) above the soil, thereby having the potential to negatively affect crop production. For example, corn, the preferred agricultural crop produced on these refuges for high energy waterfowl food, germinates best at 27 to 32 degrees C (~80-83 F), but lethal temperatures during the critical germination phase are near 40 degrees C (104 F). Thus, if air temperatures exceed 95-plus degrees immediately after planting, corn seed germination may not occur. Also, productivity of vegetative-stage corn plants peaks at about 35 degrees C (95 degrees F) and drops off quickly as air temperature approaches 40 degrees C (104 degrees F). Corn yields have been shown to be significantly reduced by heat stress during pollination (Wiatrak 2011).

Aquatic environments also are susceptible to heat-related changes. Increases in temperature can affect animals directly, and can also result in lower dissolved oxygen levels, which can stress or kill fish and other animals. There is evidence that pallid sturgeon eggs and larvae are stressed by summer water temperatures in excess of 30 degrees C (Blevins 2011). Elevated temperatures resulting from climate change could therefore directly affect the reproduction of this listed species. It is not clear that the conservation actions described in this Draft LPP/Draft EA would have any effect on mainstem water temperatures in the Mississippi or Hatchie Rivers, except indirectly by reducing sedimentation and thus maintaining natural channel depths.

Changes in Precipitation Amount and Patterns

Precipitation timing, overall quantity, and intensity have already changed over much of the central United States, and further negative changes are predicted (CCSP 2009). Specifically, for the area including the refuges, the following changes have already been observed between 1958 and 2007, and similar trends are predicted through 2100: higher fall precipitation,

decreased precipitation during spring and summer, increased frequency of summer drought conditions, and increased intensity of rainfall events. The result of these conditions would be more drought stress during the growing season, increased spring and summer storm intensity, and more fall and winter flooding.

Summer drought would increase the risk of plantation failure on afforested lands, especially during the first growing season after planting, and may necessitate herbaceous weed control as a method of managing soil moisture in young plantations. Conversely, and on a local scale, establishment of forested habitat would buffer temperature extremes as compared with those experienced on open agricultural lands.

Interior least terns breed on sandbar islands in the Mississippi and its tributaries, including within the proposed acquisition boundary. These birds require exposed sandbar habitat from May through August for successful breeding; untimely flooding would result in nest failure. Changes in timing and intensity of precipitation have the potential to change habitat availability for this species. Floods caused by intense local rainfall events could reduce breeding success, as could prolonged growing season drought which exposed land connections between former islands and the river bank, rendering the breeding habitat unproductive because of land-based predator access (Szell and Woodrey 2003).

Changes in Phenology and Species Distribution Due to Climate Change

Although the precise effects of climate change on the refuge are unknown, it is highly likely that the increase in temperatures would cause a distributional shift of some species or whole communities as summarized by (Fischlin et al. 2007). Many migratory animal species, including birds, move annually in response to weather conditions, and their behavior, including migratory routes and timing, is therefore sensitive to climate. Changes in the timing and geography of migration are of particular concern because of a potential disconnect between migrants, their food resources, and breeding grounds if the phenology of each life event advances at different rates (Root, Price, Hall, Schneider, Rosenzweig, and Pounds 2003).

Effects of increasing patch size and reducing fragmentation on vulnerability to climate change

Implementing the proposed acquisition would reduce vulnerability by increasing habitat connectivity and integrity and by reducing non-climate change ecosystem stressors, two important objectives from the Service's strategic plan for responding to accelerating climate change (U.S. Fish and Wildlife Service 2010). Over the long term, established forests would be more resilient to change compared with agricultural habitats because their much greater diversity would confer stability and the capacity to change without suffering catastrophic declines in diversity or productivity.

Habitat Fragmentation

The establishment of a 100,000-plus-acre block of forest which connects all three existing national wildlife refuges, as well as several properties owned by the State of Tennessee, would directly address habitat fragmentation in LMAV bottomland hardwoods by allowing connection of existing state and federal habitat patches and would ultimately increase the total acreage of forested habitat.

Appendix B. Conceptual Management Plan

CONCEPTUAL MANAGEMENT PLAN FOR THE PROPOSED EXPANSION OF CHICKASAW AND LOWER HATCHIE NWRs DYER, HAYWOOD, LAUDERDALE, AND TIPTON COUNTIES, TENNESSEE

INTRODUCTION

This Conceptual Management Plan for the proposed expansion of Chickasaw and Lower Hatchie NWRs is an overview of how the lands would be managed until the comprehensive conservation plan (CCP) for each refuge is updated. A Conceptual Management Plan does not detail where facilities would be located or show where public use would be allowed. These details would be included in the updated comprehensive conservation plan, for which public input would be solicited.

The proposed expansion would encompass up to 120,078 acres in Dyer, Haywood, Lauderdale, and Tipton Counties, Tennessee.

MANAGEMENT GOALS

Goals of the National Wildlife Refuge System: (1) To conserve, restore, and enhance in their natural ecosystems (when practicable) all species of animals and plants that are endangered or threatened with becoming endangered; (2) to perpetuate the migratory bird resource; (3) to conserve a natural diversity and abundance of flora and fauna on refuge lands; (4) to provide an understanding and appreciation of fish and wildlife ecology and man's role in his environment; and (5) to provide refuge visitors with quality, safe, wholesome, and enjoyable recreational experiences oriented toward wildlife to the extent these activities are compatible with the purposes for which the refuge was established.

The goals of the proposed expansion are the same as the goals in each refuge's approved CCP:

Goal 1. Waterfowl: Provide a complex of managed wintering and migration habitats for waterfowl that support the population goals and objectives established in the North American Waterfowl Management Plan and the West Tennessee Wildlife Resources Conservation Plan. Objectives include managing refuge lands and resources to provide habitat to support duck- and goose-use days consistent with population objectives developed in the North American Waterfowl Management Plan and as stepped-down and described in the Lower Mississippi Valley Joint Venture Plan. Other objectives include continuation of reforestation efforts to establish red oak and other mast species on newly acquired lands that are not scheduled for water management development and, in cooperation with private, state, and federal partners, establish a contiguous block of forest within the approved acquisition boundary that connects to other conservation lands to support the designated 100,000-acre Mississippi Alluvial Valley Bird Conservation Area.

Acquisition, management, and restoration of the lands within this proposed expansion would significantly increase duck-use and goose-use days in the west Tennessee region. Further, there is the potential to reforest approximately 38,000 acres of bottomland hardwoods and the proposed expansion, in combination with other state and federal lands, would protect the designated 100,000-acre Migratory Bird Conservation Area in its entirety.

Goal 2. Endangered and Threatened Species: Protect, manage, and enhance refuge habitats in a manner that will sustain or increase species' populations. Objectives include: providing feeding sites on refuge lands for interior least terns and cooperate with other resource agencies in minimizing disturbance to interior least tern nesting colonies on Mississippi River sandbars adjacent to the refuge; assisting in efforts to restore or enhance Mississippi River or Hatchie River habitats, which may be suitable for pallid sturgeon; and, enhancing, restoring, protecting, and managing imperiled species' habitat using all available conservation tools, including habitat management on existing lands (federal, state, and private), conservation easements, partnership agreements, conservation agreements, and land acquisition from willing sellers.

Acquisition, management, and restoration of the lands within the proposed expansion would benefit interior least terns, pallid sturgeon, wood storks, and several state listed species as described in the Resources to be Protected section.

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

The proposed expansion would directly help the refuges meet Goal 3 for migratory landbirds, which focuses on the acquisition and management of refuge lands to provide sufficient habitat to support species of management concern by working with partners toward the assemblage of a 100,000-acre block of forested land in west Tennessee between Chickasaw and Lower Hatchie NWRs and a 20,000-acre block of forested land along the Hatchie River within the next fifteen years. Goal 3 was designed to support the establishment of sustainable populations of priority forest interior-nesting migratory songbirds by protecting blocks of forest habitat mapped by Partners-in-Flight and its cooperating partners. The Mississippi Alluvial Valley Migratory Bird Conservation Plan identifies 101 patches that, with varying amounts of reforestation, could provide forest patches of 10,000, 20,000, or 100,000 acres. Resource professionals believe that forest patches in these categories are the minimum sizes suitable to support breeding populations of various neotropical songbirds. Chickasaw NWR and the proposed expansion area are located in one of only thirteen 100,000-acre forest blocks designated within the LMRAP. According to the Partners-in-Flight research, a typical 100,000-acre block contains 84,000 acres of core habitat capable of supporting the species most dependent upon large forest blocks, including swallow-tailed kites, red-shouldered hawks, broad-winged hawks, pileated woodpeckers, and Cooper's hawks (Mueller, Loesch, and Twedt 1999). These large forest blocks also are expected to support other less-area-sensitive, forest-nesting migratory birds as well.

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

The proposed expansion would help meet this goal by protecting and managing shallowly flooded mudflat habitats with less than 25 percent vegetative cover and varying water levels, up to 8 inches, to support shorebirds year-round.

Goal 5. Aquatic Resources: Maintain or improve aquatic habitat quantity, quality, and diversity to sustain or increase population levels of aquatic resources on the refuge in accordance with the West Tennessee Wildlife Resources Conservation Plan and other Service aquatic resource plans. Objectives include: restoring and maintaining natural secondary channels, oxbows, natural banks, sloughs, and backwater areas that connect to the Mississippi, Forked Deer, Obion, and Hatchie Rivers on the refuges; improve water quality and reduce annual flood damage by restoring flood plain hydrology on newly acquired lands where agricultural drainage is no longer needed; and promote the enhancement and protection of riparian corridors.

Most of the proposed expansion lies within the floodplains of the Mississippi and Hatchie Rivers, which regularly flood the proposed expansion areas (outside of the Chickasaw Bluff) when the rivers reach flood stage. Protecting, restoring, and managing these wetland habitats would provide diverse and renewable resources including several creeks, sloughs, and lakes. These areas provide good nurseries for juvenile fish, breeding areas for frogs and toads, and feeding areas for reptiles. Through conservation, restoration, and management of these lands and aquatic resources, water quality would increase, sedimentation would decrease, contamination would decrease, and critical habitats would be made available for resting, foraging, and breeding for resident and migratory wetland-dependent and aquatic wildlife species.

Goal 6. Resident Wildlife: Provide a complex of habitats suitable for a wide range of resident (endemic) wildlife species, including mammalian, avian, amphibian, and reptilian species, while achieving habitat management objectives and biological integrity with other native flora and fauna. The primary objective of this goal is to conserve, restore, and manage upland refuge lands to support resident wildlife species and population levels identified in the West Tennessee Wildlife Resources Conservation Plan.

The proposed expansion would help meet this goal by protecting and managing several high-priority acquisition habitats identified in the West Tennessee Wildlife Resources Conservation Plan and discussed in the Major Wildlife Values and Relationship of Project to Ecosystem Management Goals and Objectives sections of the CCP.

Goal 7. Public Use: Enhance public use of the refuge through development of an appropriate and compatible program of wildlife-dependent recreation and education/interpretation that is consistent with the National Wildlife Refuge System Improvement Act of 1997, benefiting visitors and promoting an understanding of the Lower Mississippi River Valley Ecosystem. Objectives include: providing appropriate and compatible fishing, hunting, wildlife observation and photography opportunities, environmental education and interpretation programs, and public outreach and awareness, consistent with sound biological principles, by maintaining existing access and facilities, and evaluating refuge resources for possible additional opportunities.

The proposed expansion would significantly increase public use opportunities in the west Tennessee Region, particularly along the Hatchie River where there are only 3 public access points from Lower Hatchie NWR to Hatchie NWR, a distance of 48.2 river miles.

Goal 9. Land Protection and Conservation: Conserve natural and cultural resources through partnerships, protection, and land acquisition. This goal demonstrates the commitment made by the refuge to conserve natural and cultural resources through partnerships, protection, and land acquisition. Among critical issues to be addressed are water quality, erosion and sedimentation, and cultural resource protection. With the enactment of the Antiquities Act of 1906, the Federal Government recognized the importance of cultural resources to the national identity and sought to protect archaeological sites and historic structures on those lands owned, managed, or controlled by the United States.

Protecting, restoring, and managing the wetland resources within the proposed expansion area would help meet Goal 9 by increasing water quality, decreasing erosion and sedimentation, and identifying and protecting cultural resources in the area. Partnerships with the state, natural resource managers, and other conservation groups would be enhanced.

REFUGE ADMINISTRATION

The proposed expansion of Chickasaw and Lower Hatchie NWRs would be administered and managed by the Service as part of the National Wildlife Refuge System and the West Tennessee National Wildlife Refuge Complex. Until the comprehensive conservation plan is updated, the proposed expansion areas would be managed in much the same manner as other national wildlife refuges within the Complex. The Service's Southeast Regional Office in Atlanta, Georgia, would provide technical assistance on such matters as engineering and public use planning.

The administrative headquarters for the proposed project area is located in Dyersburg, Tennessee. The headquarters office hours are from 7:00 a.m. to 3:30 p.m., Monday through Friday.

HABITAT MANAGEMENT

The proposed refuge expansion area was once prime bottomland hardwood habitat which occurred on over 90 percent of the expansion landscape. Nearly half of this land is now cleared and being used for agricultural grain production or converted to fescue pasture. However, there is significant acreage that remains in bottomland hardwoods, and this expansion would protect these existing forested lands. Habitat management on the proposed area would include management of existing bottomland hardwoods and reforestation of some agricultural fields to historic hardwood species. Populations of neotropical migratory birds, resident game and non-game species, and water quality would be greatly enhanced by this proposal.

Some of the cleared agricultural lands would be managed for native wetland vegetation, or have their natural hydrology restored. Water control structures would be installed for water level management and vegetation control and enhancement. Disking, burning, mowing, and vegetation removal could be used on some areas to manipulate vegetation or to control shrub encroachment. Disking and mowing are important management tools to reduce tree and shrub encroachment for the establishment of moist-soil plants that provide food for wintering waterfowl.

FISH AND WILDLIFE POPULATION MONITORING

Periodic surveys would be conducted on the proposed expansion area to document the occurrence of species and to assess population numbers and habitat use. Surveys would include waterfowl counts, nongame bird inventories, nesting surveys, endangered species and habitat monitoring, and breeding bird surveys. Banding and marking of wildlife may also be conducted.

Some surveys would be conducted in cooperation with the Tennessee Wildlife Resources Agency to tie into its current databases. Educational institutions, other governmental agencies, and private groups may also be allowed to conduct surveys or research on the refuge.

PUBLIC USE OPPORTUNITIES AND MANAGEMENT

The National Wildlife Refuge System Improvement Act of 1997 emphasizes the importance of providing wildlife-dependent recreational opportunities on national wildlife refuges as long as they are compatible with the goals of the refuge. Public use opportunities on the refuge would likely include both consumptive (e.g., hunting and fishing) and non-consumptive uses (e.g., wildlife observation and photography and environmental education and interpretation).

The following public use regulations, common to many national wildlife refuges, would be adopted to achieve the management goals for the refuge:

- Public entry is usually permitted year-round in those areas shown in the refuge leaflet and marked by appropriate signs.
- Use of the refuge for any activity is generally limited to daylight hours only. No camping or overnight parking is permitted.
- Possessing or discharging firearms is prohibited except during established hunting seasons in areas open to hunting.
- Collecting any plant or animal is prohibited unless otherwise specified.
- No person may search for, disturb, or remove from the refuge any cultural artifact or other historical artifact.
- Directing the rays of any artificial light for the purpose of spotting, locating, or taking any animal is prohibited.
- Entering or remaining on the refuge while under the influence of alcohol or drugs is prohibited.
- Fires are generally not permitted except for agricultural and forestry management practices.
- Dogs and other pets must be kept under control at all times except when specifically allowed.

Visitor Access

Public roads that traverse the proposed expansion area would remain open to public use. Logging roads are generally closed once a given tract is acquired. Off-road use of all-wheel-drive vehicles and all-terrain vehicles would generally be prohibited on the refuge.

Some areas may be closed to visitors at certain times of the year to protect sensitive wildlife and their habitat (e.g., a heron rookery). Signs and leaflets would clearly indicate the open and closed areas of the refuge. However, large blocks of a refuge are usually open for access by foot, canoe, or other non-motorized means. The needs of physically challenged persons would be considered and included during access planning for any refuge activity or facility.

Hunting

Recreational hunting of small game such as waterfowl, rabbit, and squirrels, as well as big game species including white-tailed deer and wild turkey may be permitted within the framework of state and federal regulations and licensing requirements. Seasons, areas, and types of hunting would be determined by safety, management needs, wildlife populations, size of areas, location, and public need. Refuge-specific hunting regulations would be coordinated with the Tennessee Wildlife Resources Agency.

Certain areas within the proposed expansion area may be closed to provide undisturbed areas for wildlife. Other areas may be closed to hunting to permit safe, non-consumptive visitor use during the hunting season.

Hunting from permanent tree stands and hunting with the aid of bait would be prohibited. The use of dogs to hunt white-tailed deer and feral hogs would be prohibited. Waterfowl hunting from permanent blinds would be prohibited.

Fishing

Fishing would be permitted within the framework of state regulations and licensing requirements. Boats would be permitted and motor size/use restrictions in certain refuge-controlled areas may be implemented if necessary to protect important habitat and wildlife resources. Air-thrust boats would be prohibited.

Trapping

The Service permits trapping of fur-bearing animals on national wildlife refuges where it may contribute to, or be compatible with, the management objectives of the refuge. Trapping is allowed only by special use permits, and the proposed expansion area may offer opportunities for this activity.

Wildlife Observation and Photography

Wildlife observation and photography would be encouraged. To provide opportunities for wildlife observation, facilities that might be developed include wildlife observation platforms and nature trails. The development of these facilities would depend upon the availability of funds.

Environmental Interpretation and Education

Environmental education and interpretive programs would be designed to enhance the visitor's understanding of natural resource management and ecological concepts. The proposed refuge expansion area could serve as an important "outdoor classroom" for local schools in the area. Teacher workshops may be offered to enhance ongoing environmental education programs. Interpretive programs would focus on self-guiding facilities, such as nature trails, information kiosks, leaflets and booklets, and interpretive signs along interesting features.

Law Enforcement

Enforcement of state and federal laws on a national wildlife refuge is important to safeguard the refuge's natural and cultural resources and protect and manage visitors. Refuge officers would work closely with other law enforcement agencies and complement their efforts.

FACILITIES MANAGEMENT

Boundaries of any lands acquired would be posted with national wildlife refuge signs at regular intervals. Signs and barriers may be used to protect sensitive wildlife habitats, to reduce disturbance to wildlife, or to assure public health and safety.

MISCELLANEOUS

Cultural Resource Management

The Service would inventory the archaeological and historical sites on the proposed refuge expansion area lands and assess their eligibility for listing on the National Register of Historic Places. Management would be coordinated with the State Historic Preservation Office and other pertinent federal and state agencies.

Fire Management

It is the policy of the Service to use fire when it is the most appropriate management tool for reaching habitat objectives. Wildfires, however, would be aggressively suppressed, unless such natural fires are a part of an approved fire management plan. Currently, the refuges operate under a fire management plan that includes a cooperative agreement with the Tennessee Wildlife Resources Agency, and the expansion would fall under the auspices of this plan. Protection and safety of people and property are top priorities within the fire management plan.

Pest Management

It is Service policy to control those weeds and other plants listed as noxious by the state. This control would emphasize non-chemical methods and would be directed at keeping noxious weeds and plants from spreading to adjacent private lands. In addition, other noxious plants and some animals may have to be removed in order to accomplish refuge goals.

Appendix C. Interim Compatibility Determinations

The CCP's for Chickasaw (U.S. Fish and Wildlife Service 2006) and Lower Hatchie (U.S. Fish and Wildlife Service 2006) NWRs have been completed along with compatibility determinations. If approved, the proposed lands covered under this Draft LPP/EA would be brought into the National Wildlife Refuge System and would be managed as current lands on Chickasaw and Lower Hatchie NWRs. Lands purchased to expand Chickasaw and Lower Hatchie NWRs have the following uses already found compatible, with stipulations: hunting, fishing, environmental education and interpretation, wildlife observation and photography, outdoor recreation (hiking, jogging, walking, bicycling), cooperative farming, non-motorized boating, all-terrain vehicle use (severe mobility impaired only), forest management, firewood cutting (personal use only), horseback riding, and resource research studies.

Appendix D. Intra-Service Section 7 Biological Evaluation

Originating Person: Randy Cook, Project Leader

Telephone Number: 731/287-0650; E-Mail: randy_cook@fws.gov

Date: November 1, 2012

PROJECT NAME: Chickasaw and Lower Hatchie National Wildlife Refuges' Proposed Acquisition Boundary Expansion

I. Service Program:

Ecological Services

Federal Aid

Clean Vessel Act

Coastal Wetlands

Endangered Species Section 6

Partners for Fish and Wildlife

Sport Fish Restoration

Wildlife Restoration

Fisheries

Refuges/Wildlife

II. State/Agency: Tennessee/USFWS

III. Station Name: Chickasaw and Lower Hatchie National Wildlife Refuges

IV. Description of Proposed Action (attach additional pages as needed):

The U.S. Fish and Wildlife Service (Service), Southeast Region, proposes to expand the current acquisition boundaries of Chickasaw and Lower Hatchie National Wildlife Refuges (NWRs). Chickasaw and Lower Hatchie NWRs are in extreme western Tennessee, on the north end of the Mississippi Alluvial Valley (MAV) (Figure 1 in Draft LPP), in close proximity to several State of Tennessee-owned conservation properties (Figure 2 in Draft LPP). The Service proposes to expand the boundaries of Chickasaw NWR and Lower Hatchie NWR, with the proposed Chickasaw NWR expansion being bounded to the north by following the Obion and Forked Deer Rivers upstream and encompassing a one-half mile zone on either bank, then south along the Mississippi River on the west, including islands along its banks, then eastward to the Chickasaw bluffs, then southward to Lower Hatchie NWR. The Lower Hatchie NWR boundary would expand eastward along the Hatchie River corridor from Highway 51, following the 5-year floodplain upstream to Hatchie NWR (Figure 3 in Draft LPP). When completed, the proposed expansion would connect all three refuges, creating one contiguous wildlife corridor.

The proposed project is comprised of two units: the Mississippi River Corridor Unit, which connects to the northern approved acquisition boundary of Chickasaw NWR to provide a one-half mile buffer on either side of a 14-mile stretch of the Forked Deer and Obion Rivers, as well as 2.3 miles of the eastern shore of the Mississippi River, and then extends southward, directly connecting Chickasaw NWR to several state-protected properties, Sunk Lake Public Use Natural Area, and to Lower Hatchie NWR (Figure 3 in Draft LPP). The proposed expansion includes undeveloped river islands on the western bank of the Mississippi River and is bounded on the east by the Chickasaw bluffs and by the

Mississippi River to the west, and includes 49.2 miles of Mississippi River shoreline. The second unit is the Hatchie River Corridor Unit, which will connect Lower Hatchie NWR to Hatchie NWR, incorporating the 5-year floodplain of the Hatchie River, the Bear Creek watershed to the south, and protect an additional 71.3 miles of the Hatchie River (Figure 3 in Draft LPP).

When combined, the Mississippi River and Hatchie River Units comprise a total of 120,078 acres, and, in combination with other state-protected properties and existing federal refuges and approved acquisition boundaries, would lead to the protection of approximately 49.2 of west Tennessee Mississippi River contiguous river miles and approximately 106.3 contiguous river miles of the Hatchie River and existing floodplain bottomland hardwood forests.

Acquisition and management of the proposed expansion areas would contribute toward ecosystem goals through the management of bottomland hardwoods and other wetland habitat as previously described for migratory waterfowl, neotropical songbirds, aquatic resources, and the recovery of threatened and endangered species. The proposed expansion is also consistent with the goals of the Mississippi Alluvial Valley Joint Venture Plan as acquisition and management of the proposed expansion areas would help reverse the persistent loss of wetland habitats and benefit all wetland-dependent migratory birds, as well as the Partners-in-Flight Mississippi Alluvial Valley Bird Conservation Plan that identifies this area as one of thirteen 100,000-acre blocks for the conservation of migratory birds (Twedt, Pashley, Hunter, Mueller, Brown, and Ford 1999).

V. Pertinent Species and Habitat:

- A. Include species/habitat occurrence map:
- B. Complete the following table:

Table D1. Listed/proposed species/critical habitat that occur or may occur within the project area

SPECIES/CRITICAL HABITAT	STATUS ¹
Least tern (<i>Sterna antillarum</i>)	E
Indiana bat (<i>Myotis sodalis</i>)	E
Pallid sturgeon (<i>Scaphyrhynchus albus</i>)	E

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

VI. Location (attach map):

- A. **Ecoregion Number and Name:** 27, Mississippi River
- B. **County and State:** Dyer, Haywood, Lauderdale, and Tipton Counties, TN
- C. **Section, township, and range (or latitude and longitude):** Approximate center of refuge: 89.40.00 W 35.50.00 N
- D. **Distance (miles) and direction to nearest town:** 10 miles west of Ripley, Tennessee

E. Species/habitat occurrence:

The least tern is a common visitor to the refuge; project area would have positive impacts as the preferred habitat of this species includes sandbars on the Mississippi River.

The Indiana bat has not been documented on the refuge. Two recent bat surveys using Anabat detection equipment and call identification software were conducted on June 5, 2012 and July 5, 2012, respectively. Neither survey detected the presence of Indiana bats on the refuge. Species detected from both surveys included: Big Brown bat (*Eptesicus fuscus*) – 2; Eastern Red bat (*Lasiurus borealis*) – 55; Evening bat (*Nycticeius humeralis*) – 53; Tri-colored bat (Eastern pipistrelle) (*Perimyotis subflavus*) – 163; and, Unknown – 4; Total bats detected – 277.

The pallid sturgeon is known to occur within the Mississippi River. It is possible that pallid sturgeon use the Mississippi and Hatchie Rivers' floodplains during high river stages for spawning and nursery areas.

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):

Least tern – Positive impact. The least tern utilizes existing sandbars for breeding and refuge lands for feeding activities. Acquisition of sandbar habitats would provide protection for least tern breeding activities, and additional areas for fishing.

Indiana bat – Positive impact. Habitat requirements for the Indiana bat are not completely understood, as there has been few research projects conducted on this species. Bottomland and floodplain forests were once thought to be the most important habitats during the summer, but subsequent study has shown that upland forest habitats may be equally important, especially in the southern portions of the species' range (http://en.wikipedia.org/wiki/Indiana_bat - cite_note-r35-1#cite_note-r35-1) (Gardner et al. 1991; Callahan et al. 1997). Thus, acquisition of the existing bottomland forested lands, along with the associated upland forests, combined with future afforestation efforts would greatly enhance habitat for this species.

Pallid sturgeon – Positive impact. Reduced pesticide use would result in fewer contaminants reaching the Mississippi and Hatchie Rivers, and afforestation of agricultural fields along with the restoration of hydrology would reduce sedimentation rates from flood and rainfall events.

References:

- Callahan, Edward V.; Drobney, Ronald D.; Clawson, Richard L. 1997.** Selection of summer roosting sites by Indiana bats (*Myotis sodalis*) in Missouri. *Journal of Mammalogy*. 78(3): 818–825
- Gardner, James E.; Garner, James D.; Hofmann, Joyce E. 1991.** Summer roost selection and roosting behavior of *Myotis sodalis* (Indiana bat) in Illinois. Final report. Champaign, IL: Illinois Department of Conservation, Illinois Natural History Survey. On file with: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory, Missoula, MT
- Twedt, D., David Pashley, Chuck Hunter, Allen Mueller, Cindy Brown, and Bob Ford. 1999.** Partners in Flight Bird Conservation Plan for the Mississippi Alluvial Valley. 71pp.

Table D2. Project impacts to listed/proposed species/critical habitat

SPECIES/ CRITICAL HABITAT	IMPACTS TO SPECIES/CRITICAL HABITAT
Least tern	Positive impacts through protection of nesting islands.
Indiana bat	Positive impacts through establishment of additional habitats
Pallid sturgeon	Potential positive water quality impacts, increased protection of spawning and nursery areas

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

Table D3. Conservation measures proposed to minimize or eliminate adverse impacts to proposed/listed species, critical habitat

SPECIES/ CRITICAL HABITAT	ACTIONS TO MINIMIZE IMPACTS
Least tern	Protection of exposed sandbar habitats from human encroachment would reduce negative impacts.
Indiana bat	Increased acres of habitat, along with protection of existing habitats (especially along the Hatchie River) would reduce further negative impacts to this species.
Pallid Sturgeon	Reduction of pesticide runoff and improved water quality would contribute to pallid sturgeon populations.

VIII. Effect Determination and Response Requested:

Table D4. The effect determination and response requested for impacts to each proposed/listed species/critical habitat

SPECIES/ CRITICAL HABITAT	DETERMINATION ¹			RESPONSE ¹ REQUESTED
	NE	NA	AA	
Least tern	X			Concurrence
Indiana bat	X			Concurrence
Pallid sturgeon	X			Concurrence

¹DETERMINATION/RESPONSE REQUESTED:

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

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

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

Signature (originating station)

Date

Title

If the project description changes or incidental take exceeds that which has been exempted under section 9 of the Act, then the Ecological Services Field Office must be contacted.

IX. Reviewing Ecological Services Office Evaluation:

A. Concurrence _____ Non-concurrence _____

B. Formal consultation required _____

C. Conference required _____

D. Informal conference required _____

E. Remarks (attach additional pages as needed):

Signature

Date

Title

Office

Appendix E. Interim Recreation Act Funding Analysis

Station Name: Chickasaw National Wildlife Refuge Expansion

Date Refuge Established: May 14, 1985

Purposes for which the Refuge was Established:

The refuge was approved by the Migratory Bird Conservation Commission on May 14, 1985, to protect approximately 37,500 acres of bottomland hardwoods and adjacent habitats for migratory waterfowl. This approval included two acquisition areas: a 23,600-acre upper area that is now Chickasaw National Wildlife Refuge (NWR) and a 13,900-acre lower area that today is owned and managed by the Tennessee Wildlife Resources Agency.

From 1985 to 1990, 14,934 acres of the upper unit were purchased by The Nature Conservancy for resale to the Service. In addition to these lands, a 190-acre tract at the west end of Chisholm Lake and a 1,428-acre block comprised of three contiguous tracts lying several miles east of the main body of the refuge were purchased by the Service in 1987 from landowners. This latter area is primarily agricultural and is being developed as feeding and resting areas for waterfowl and shorebirds. In 1997, a 437-acre tract known as the Marley Lease was purchased from the Trust for Public Land, with funds from the Migratory Bird Conservation Account. These purchases comprised the entirety of the 16,989 acres originally under Service fee-title ownership at Chickasaw NWR. In addition to the fee-title lands, Chickasaw NWR includes 4,847 acres of contiguous and 540 acres of noncontiguous lands managed under a no-fee lease from the Tennessee Wildlife Resources Agency, bringing the total refuge acreage to 22,376 acres as of 1998. Since that date, several smaller tracts, totaling 3,698 acres, have been acquired, bringing the current refuge acreage to 26,074.

Chickasaw NWR was authorized by the Migratory Bird Conservation Act of 1929 (16 U.S.C. 715d) for "use as an inviolate sanctuary, or for any other management purpose, for migratory birds." The Fish and Wildlife Act of 1956 established additional refuge purposes to be "for the development, advancement, management, conservation, and protection of fish and wildlife resources (16 U.S.C. 742f (a) (4)), "for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition or servitude" (16 U.S.C. 742 (b) (1)). Later, the Refuge Recreation Act of 1962 (16 U.S.C. 460(k) (1)) declared the refuge to be "suitable for (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, and (3) the conservation of endangered species or threatened species."

Recreational uses evaluated for the proposed expansion of Chickasaw NWR:

(1) Hunting; (2) fishing; (3) wildlife observation and photography; (4) environmental education and interpretation; (5) bicycling, hiking, walking, jogging; and (6) boating.

Funding required to administer and manage the recreational uses:

Minimal funding in the amount of \$50,000 would be made available to implement initial protection, hunt implementation, data collection, and non-consumptive uses.

Based on a review of the refuge budget allocated for recreational use management, I certify that funding is adequate to ensure compatibility and to administer and manage the recreational uses.

Project Leader: _____
(Signature/Date)

Refuge Supervisor: _____
(Signature/Date)

**Chief, National
Wildlife Refuge System,
Southeast Region:** _____
(Signature/Date)

Station Name: Lower Hatchie National Wildlife Refuge Expansion

Date Refuge Established: June 19, 1985

Purposes for which the Refuge was Established:

On June 19, 1980, the refuge was approved for the acquisition of 6,400 acres of bottomland hardwood forests and adjacent habitats for the management of wintering waterfowl and other migratory birds. In 1985, a 2,224-acre acquisition boundary was also approved.

Another approved acquisition boundary was established in 1999, in some places coinciding with the previous 1985 boundary, but encompassing approximately 15,329 additional acres in Lauderdale and Tipton Counties, adjacent to the existing refuge boundary (USFWS Land Protection Plan 2000).

Lower Hatchie NWR was authorized by the Migratory Bird Conservation Act of 1929 (16 U.S.C. 715d) for "use as an inviolate sanctuary, or for any other management purpose, for migratory birds." The Fish and Wildlife Act of 1956 established additional refuge purposes to be "for the development, advancement, management, conservation, and protection of fish and wildlife resources (16 U.S.C. 742f (a) (4)) and "for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition or servitude" (16 U.S.C. 742 (b) (1)). Later, the Refuge Recreation Act of 1962 (16 U.S.C. 460(k) (1)) declared the refuge to be "suitable for (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, and (3) the conservation of endangered species or threatened species."

Recreational uses evaluated for the proposed expansion of Lower Hatchie NWR:

(1) Hunting; (2) fishing; (3) wildlife observation and photography; (4) environmental education and interpretation; (5) bicycling, hiking, walking, jogging; and (6) boating.

Funding required to administer and manage the recreational use(s):

Minimal funding in the amount of \$50,000 would be made available to implement initial protection, hunt implementation, data collection, and non-consumptive uses.

Based on a review of the refuge budget allocated for recreational use management, I certify that funding is adequate to ensure compatibility and to administer and manage the recreational use(s).

Project Leader: _____
(Signature/Date)

Refuge Supervisor: _____
(Signature/Date)

**Chief, National
Wildlife Refuge System,
Southeast Region:** _____
(Signature/Date)

Appendix F. Public Involvement

PUBLIC SCOPING

Public scoping was initiated December 11, 2012. Two public scoping meetings, announced via press release to the Covington Leader, the Lauderdale Voice, Lauderdale County Enterprise, Brownsville States-Graphic, and Dyersburg State Gazette, and by letters mailed to all landowners within the proposed acquisition boundary, were held. The first public meeting was held December 11, 2012, at the Tennessee Technology Center in Ripley, Tennessee. Approximately 100 members of the public attended. The following evening, a second scoping meeting was held in Brownsville, Tennessee, at the Chamber of Commerce building. Attendance at that meeting was approximately 80.

Comments and questions at the meetings included the following [answers in brackets]:

- How is Fair Market Value determined? Would the value of improvements be included in the appraisal? [independent appraisers; yes]
- Will Eminent Domain be used to acquire property? [no]
- Would the refuge compete for acquisition funding with other refuges across the country if the Land Protection Plan were approved? [yes]
- Does FWS have the option of not purchasing property within the boundary, even if it is offered for sale? [yes]
- How would the refuge address the problem of flooding which is caused by beavers or other causes on the refuge and which extends to private property? [refuge tries to maintain existing drainage where possible]
- What is FWS's "backup plan" should the Land Protection Plan not be approved? [status quo]
- Farmers also create a lot of economic activity in the area, and pay taxes.
- Reclamation of farmland to cottonwood thickets is undesirable. [FWS agreed; managers attempt to control cottonwood and favor oak regeneration]
- The Federal Government has enough land; commodity production is more important.
- Private buyers cannot compete with the Federal Government in the real estate market.
- Refuges attract ducks away from private lands, reducing hunting quality.
- Does FWS buy land-locked tracts? How do they access those lands? [yes, and either by water or through existing access easements]
- Does FWS buy houses and land? [generally interested in wildlife habitat, or providing access to wildlife habitat]
- Was eminent domain used to acquire any of the 550+ refuges in the system? [yes; willing-seller acquisition has been the policy for many years, and is required by legal authority of funding sources]
- Would FWS acquire CRP/WRP acres? [yes—would purchase the remaining rights from the owner]
- What does "5-year floodplain" mean? [area flooded on average every 5 years]

Written comments received include the following:

- One attendee recommended adding the following areas to the proposed acquisition boundary: Lagoon Creek Bottoms, Big Muddy Creek Bottoms, and Little Muddy Creek Bottoms based on the wildlife present in those areas and the value of habitat.

-
- An attendee who preferred to remain anonymous commented: “Due to the increasing threats to our freedoms from outside and within, and considering our leaders' willingness to agree to international policies, an educated American has to question whether or not this national, not regional, pursuit of land grabbing is an extension of the United Nation's mandate, Agenda 21 and the proposed establishment of preserved land void of human presence for satisfaction of elitist biological and ideological goals.”

Appendix G. References

- Askins, R., Lynch, J., & Greenberg, R. (1990). Population declines in migratory birds in eastern North America. *Current Ornithology*, 1, 1-57.
- Blevins, D. (2011). Water-quality requirements, tolerances, and preferences of pallid sturgeon (*Scaphirhynchus albus*) in the lower Missouri River. Scientific Investigations Report, U.S. Department of the Interior U.S. Geological Survey.
- Bonney, R., Pashley, D., Cooper, R., & Niles, L. (1999). Strategies for bird conservation: the Partners in Flight planning process. Cornell Lab of Ornithology. Ithaca, NY: Cornell University.
- Bridgham, S., Megonigal, J., Keller, J., Bliss, N., & Trettin, C. (2006). The carbon balance of North American wetlands. *Wetlands*, 26(4), 889-916.
- Carey, J. (2000). Little habitat on the prairie. *National Wildlife*(June/July), 52-58.
- CCSP. (2009). Global climate change impacts in the United States. Cambridge University Press.
- Cochran, S. (1999). Roosting and habitat use by Rafinesque's big-eared bat and other species in a bottomland hardwood forest ecosystem. Jonesboro, AR: Arkansas State University.
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Appendix H. Information on Preparers

This document was prepared by:

Gary Pogue, Wildlife Biologist,
West Tennessee NWR Complex,
Text and Tables

Leif Karnuth, Forester,
West Tennessee NWR Complex,
Maps and Figures

Draft Land Protection Plan
and Draft Environmental Assessment
for the Proposed Expansion of

**Chickasaw and Lower Hatchie
National Wildlife Refuges**

Randy Cook - *Refuge Complex Manager*
Bryan Woodward - *Refuge Manager*

Chickasaw NWR
1505 Sand Bluff Road
Ripley, TN 38063

Phone: 731/635-7621
Fax: 731/635-0178

Chickasaw@fws.gov

U.S. Fish & Wildlife Service
1 800/344 WILD
<http://www.fws.gov>

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