# FINAL
# ENVIRONMENTAL ASSESSMENT

## Habitat Management Plan

## Cahaba River National Wildlife Refuge

**Bibb County, Alabama**

**U.S. Fish and Wildlife Service**

**April 2007**

Facility: Cahaba River NWR, Bibb County, Alabama
Title: Cahaba River National Wildlife Refuge Habitat Management Plan

## FINDING OF NO SIGNIFICANT IMPACT

For the reasons briefly presented below and based on an evaluation of the information contained in the supporting references enumerated below, I have determined that management activities described as the Preferred Alternative (Alternative 3) in the attached Environmental Assessment (sub-section II.C) at Cahaba River National Wildlife Refuge is not a major Federal action which would significantly affect the quality of the human environment within the meaning of Section 102(2)(c) of the National Environmental Policy Act of 1969. An Environmental Impact Statement will, accordingly, not be prepared.

Reasons:

1. The refuge was established through congressional legislation to conserve, enhance and restore the native aquatic and terrestrial community of the Cahaba River, and to conserve, enhance and restore habitat to maintain and assist in the recovery of animals and plants that are listed as threatened and endangered species.

2. There are no anticipated negative impacts to threatened and endangered species or other wildlife populations on the Refuge.

3. The preferred alternative represents the optimal ecological approach for successfully restoring refuge terrestrial and aquatic communities.

Supporting References:

1. Environmental Assessment
2. Section 7 Consultation

for Regional Director, FWS, Region 4

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# I. PURPOSE AND NEED FOR ACTION

## *A. INTRODUCTION*

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 preserving endangered and threatened species. Refuges offer a wide variety of wildlife-dependent recreational opportunities and many have visitor centers, wildlife trails, and environmental education programs. Nationwide, about 30 million visitors annually hunt, fish, observe and photograph wildlife, or participate in educational and interpretive activities on refuges.

The establishment of Cahaba River National Wildlife Refuge was approved through a Congressional Act in 2002 to: (1) conserve, enhance, and restore the native aquatic and terrestrial community characteristics of the Cahaba River; (2) to conserve, enhance, and restore habitat to maintain and assist in the recovery of animals and plants that are listed as threatened or endangered species; (3) to ensure that hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation are the priority general public uses of the refuge when providing opportunities for compatible fish- and wildlife-oriented recreation; and (4) to encourage the use of volunteers and to facilitate partnerships among the Service, local communities, conservation organizations, and other non-federal entities when promoting public awareness of the refuge's resources and those of the National Wildlife Refuge System.

On September 25, 2002 the Service established the Refuge and acquired initial Refuge lands. In partnership with The Nature Conservancy (TNC), the Service began acquiring land for the Cahaba River National Wildlife Refuge in September 2002. By May 30th 2005, 3,489 acres had been acquired. In February 2004, the Regional Director (Southeast Region) of the U.S. Fish and Wildlife Service (Service) authorized the expansion of the acquisition boundaries of the refuge to include an additional 340 acres of property at the confluence of the Cahaba and Little Cahaba Rivers. This expansion will allow us to better manage the refuge, further protect the Cahaba River, and also provide greater protection to several species of plants that are known from nowhere else in the world but this area.

## *B. Background*

The U.S. Fish and Wildlife Service (USFWS) has prepared a Habitat Management Plan (HMP) for Cahaba River National Wildlife Refuge. HMPs are dynamic working documents that provide

refuge managers a decision making process; guidance for the management of refuge habitat; and long-term vision, continuity, and consistency for habitat management on refuge lands. Each plan incorporates the role of refuge habitat in international, national, regional, tribal, State, ecosystem, and refuge goals and objectives; guides analysis and selection of specific habitat management strategies to achieve those habitat goals and objectives; and utilizes key data, scientific literature, expert opinion, and staff expertise

The statutory authority for conducting habitat management planning on National Wildlife Refuges is derived from the National Wildlife Refuge System Administration Act of 1966 (Refuge Administration Act), as amended by the National Wildlife Refuge Improvement Act of 1997 (Refuge Improvement Act), 16 U.S.C. 668dd - 668ee. Section 4(a)(3) of the Refuge Improvement Act states: "With respect to the System, it is the policy of the United States that -- (A) each refuge shall be managed to fulfill the mission of the System, as well as the specific purposes for which that refuge was established ..." and Section 4(a)(4) states: "In administering the System, the Secretary shall monitor the status and trends of fish, wildlife, and plants in each refuge." The Refuge Improvement Act provides the Service the authority to establish policies, regulations, and guidelines governing habitat management planning within the System.

An HMP is a step-down management plan of the Refuge Comprehensive Conservation Plan (CCP). The CCP describes the desired future conditions of a refuge or planning unit and provides long-range guidance and management direction to achieve the purpose(s) of the refuge; helps fulfill the mission of the System; maintains and, where appropriate, restores the biological integrity, diversity, and environmental health of each refuge and the System; helps achieve the goals of the National Wilderness Preservation System, if appropriate; and meets other mandates. A CCP has not been accomplished on Cahaba River National Wildlife Refuge and will not be completed for several years. At the time of CCP preparation, the HMP will be reexamined and appropriate information will be incorporated into the CCP.

HMPs comply with all applicable laws, regulations, and policies governing the management of National Wildlife Refuge System. The lifespan of an HMP is 15 years and parallels that of refuge CCPs. HMPs are reviewed every 5 years utilizing peer review recommendations, as appropriate, in the HMP revision process or when initiating refuge CCPs. Annual Habitat Work Plans (AHWP) will contain specific management objectives to be completed in support of the Refuge HMP.

## *C. Proposed Action*

The Refuge Vision broadly reflects the reason for establishing the refuge, based on both legislated and planning purposes and objectives. The vision statement is as follows:

***"Cahaba River National Wildlife Refuge will be managed to conserve, enhance and restore the native aquatic and terrestrial community, along with providing educators, research scientists, and the public with a broad range of opportunities to appreciate and enjoy a biologically diverse and disappearing southern landscape."***

With establishment of the Refuge, natural resource management programs must be formulated and established according to Service goals and objectives. Based on Service Biological Integrity Policy, refuge management programs will be directed at maintaining and restoring the natural landscape to those biological communities that existed during presettlement times.

Refuge Environmental Setting and Background (Section 2.0) and Resources of Concern (Section 3.0) can be found in the HMP.

The following **management goals** were designed to meet Refuge establishment purposes and define general targets in support of the Refuge Vision.

- **GOAL 1 – Participate in regional and cooperative efforts for water quality improvement and ecological restoration of the Cahaba River aquatic system;**

- **GOAL 2 - Protect, restore and enhance the Cahaba River aquatic environment adjacent to the refuge**

- **GOAL 3 - Provide an ecosystem management strategy for uplands that restores and maintains the mosaic cover of native pine and hardwood forest;**

- **GOAL 4 – Reestablish a recurring fire regime through prescribed burning to approximate conditions occurring in presettlement forests;**

- **GOAL 5 – Restore the longleaf pine and associated upland communities, where possible, to a condition that can be maintained through prescribed burning;**

- **GOAL 6 - Manage wetland, streamside and hardwood forests as a component of the mountain longleaf pine ecosystem;**

- **GOAL 7 – Manage the refuge as part of the regional landscape, while minimizing forest fragmentation and disturbed edge habitat within the refuge boundaries;**

- **GOAL 8 - Inventory, protect and manage rare, endangered, threatened and sensitive species and natural communities;**

- **GOAL 9 - Inventory and control exotic and invasive species;**

- **GOAL 10 – Maintain and restore native wildlife associated with longleaf pine and other refuge upland natural communities.**

- **GOAL 11 – Maintain an adequate firebreak system that fulfills management and public use needs, while minimizing adverse ecological effects on the natural landscape.**

- **Goal 12 – Restore River Road environment, while facilitating interpretive access to the river edge**

### *D. Comments on Draft EA*

**The draft environmental assessment was available for public review and comment from March 5, 2007 to April 5, 2007. Four comments were received from the public during the review period.**

**Comments from The Nature Conservancy suggested adding flexibility to the prescribed fire program and to longleaf pine restoration goals. The HMP was modified to reflect a broader range of management options based on site conditions (adaptive management).**

**One comment requested that horseback riding be considered as a refuge use within the plan. The HMP provides habitat management planning for the refuge and is not a public use document. Horseback riding was evaluated in the Public Use Plan (October 2004) and considered not compatible with the mission and purpose of the refuge at that time. This failure to meet compatibility requirements was based on lack of refuge infrastructure to support this use, and possible environmental degradation of soils and natural communities along riding trails.**

**Two comments were received in support of fishing and/or hunting programs on the refuge. Both fishing and hunting are considered priority wildlife dependant refuge uses, and were identified and determined compatible with the refuge purpose and mission in the previous Public Use Plan (2004).**

## II. ALTERNATIVES INCLUDING THE PROPOSED ACTION

The assessment of management options was evaluated through the following three alternatives. The HMP includes Habitat Management Strategies and Objectives (Section 5.0) for alternatives.

Alternative 1 (No Action - Protection of Natural Resources)
Alternative 2 (Prescribed Burn and Protection of Natural Resources)
Alternative 3 (Preferred Alternative – Implementation of HMP)

### *A. Alternative 1: No Action - Protection of Natural Resources*

Under this alternative, natural resources and wildlife are given protection, but active longleaf pine management, prescribed burning and natural resource/environmental programs are not implemented. Existing natural communities and loblolly pine plantations are allowed to proceed through natural succession. Damaging ecological impacts on the refuge would be treated on an "as needed basis".

### *B. Alternative 2: Prescribed Burning and Protection of Natural Resources*

In addition to protecting refuge natural resources, prescribed burning will be applied to all forest lands containing or suspected to have originally contained longleaf pine (Goal 4) and active long-term forest restoration will be pursued (Goals 5). Further refuge management would be treated on an "as needed basis" to fulfill regulatory requirements.

### *C. Alternative 3: Preferred Alternative – Habitat Management Plan*

Under the preferred alternative, the USFWS will implement all refuge management programs (Goals 1-12) described within the HMP. The overall strategy is to improve refuge environmental quality through integrated regional planning, protection, and restoration of degraded natural refuge systems. The long-term objective is to establish and restore the native aquatic and terrestrial landscape that existed on the refuge during the presettlement time period.

Alternative 3 (HMP) was selected as the preferred alternative. Without a comprehensive management program that includes protection, fire and restoration of degraded systems, the objective of improving biological integrity and maintaining ecosystem stability is unlikely. Historic mining and industrial forestry have left a highly altered landscape containing exotic species and monocultures of loblolly pine. Increasing urbanization in the river's upper watershed have further degraded and nearly destroyed the native aquatic community. Success in restoring this landscape requires a complex and highly diverse management approach in order to improve refuge environmental quality.

## III. AFFECTED ENVIRONMENT

This section describes refuge environments that would be affected through the three alternatives. A detailed description of the natural, social and cultural environment on the refuge can be found in the HMP (Sections 2.0 and 3.0). Background literature (Section 7.0) and scientific names are also provided in the HMP. The following sections provide an overview of resources located on the refuge.

## A. General

The refuge (3,489 acres) is located near the small town of West Blocton in Bibb County, Alabama. Birmingham is located 30 miles to the northeast, while Montgomery is 65 miles to the southeast (Figures 1 & 2). Approximately 3 miles of the Cahaba River flow through the refuge. The Cahaba River is considered "state waters" and is owned by the State of Alabama. Access to the river, however, is provided across refuge property. In February 2004, the refuge acquisition boundaries were expanded to include 340 acres to the south along the Cahaba and Little Cahaba Rivers.

## B. Aquatic Communities

The Cahaba River provides important habitat for a diverse assemblage of plants and animals, and is sought out by canoeists, fisherman and others for its scenic quality. The Cahaba supplies a large portion of Birmingham's drinking water supply, and also receives domestic and industrial wastewaters. Water quality degradation and the physical alteration of the river environment represent significant challenges for the survival of aquatic biota. The Cahaba River was selected by *American Rivers* in 1990 as one of the 10 most endangered rivers in the United States (American Rivers 1990).

The Cahaba River flows for nearly 190 miles through a variety of settings in central Alabama, draining approximately 1870 square miles and eventually joining the Alabama River near Selma. The upper half of the Cahaba flows through the Valley and Ridge Physiographic province with its characteristic rocky shoals of limestone, sandstone, shale and dolomite. After the Cahaba crosses the Fall Line into the Coastal Plain physiographic province, its winding waters slow as they flow across a mostly gravel and sand substrate.

The refuge contains significant aquatic resources including three miles of the Cahaba River, as well as, portions of several tributary streams, including the Little Cahaba River, Caffee Creek and Little Ugly Creek. The refuge is located near the midpoint of the Cahaba River, approximately 95 river miles from both its headwaters and from its confluence with the Alabama River near Selma. The watershed area upstream of the refuge is approximately 650 sq miles. The Cahaba River, as it flows through the refuge, varies from 125 to 250 feet in width with a water depth from a few inches in the shoals to nearly ten feet in pools. Several small islands are scattered along the course but the dominant features in the channel are the flat bedrock shoals.

Attractive and boulder-strewn Caffee Creek is the largest tributary stream flowing through the refuge and averages 25 feet wide and less than a foot in depth. The southern boundary of the refuge contains a short stretch of the Little Cahaba River. The Little Cahaba River drains nearly 265 square miles with an average width of 50 to 75 feet. The Little Cahaba River flows through the Cahaba Valley district of the Valley and Ridge province whose bedrock is comprised of early Paleozoic limestone and dolomite.

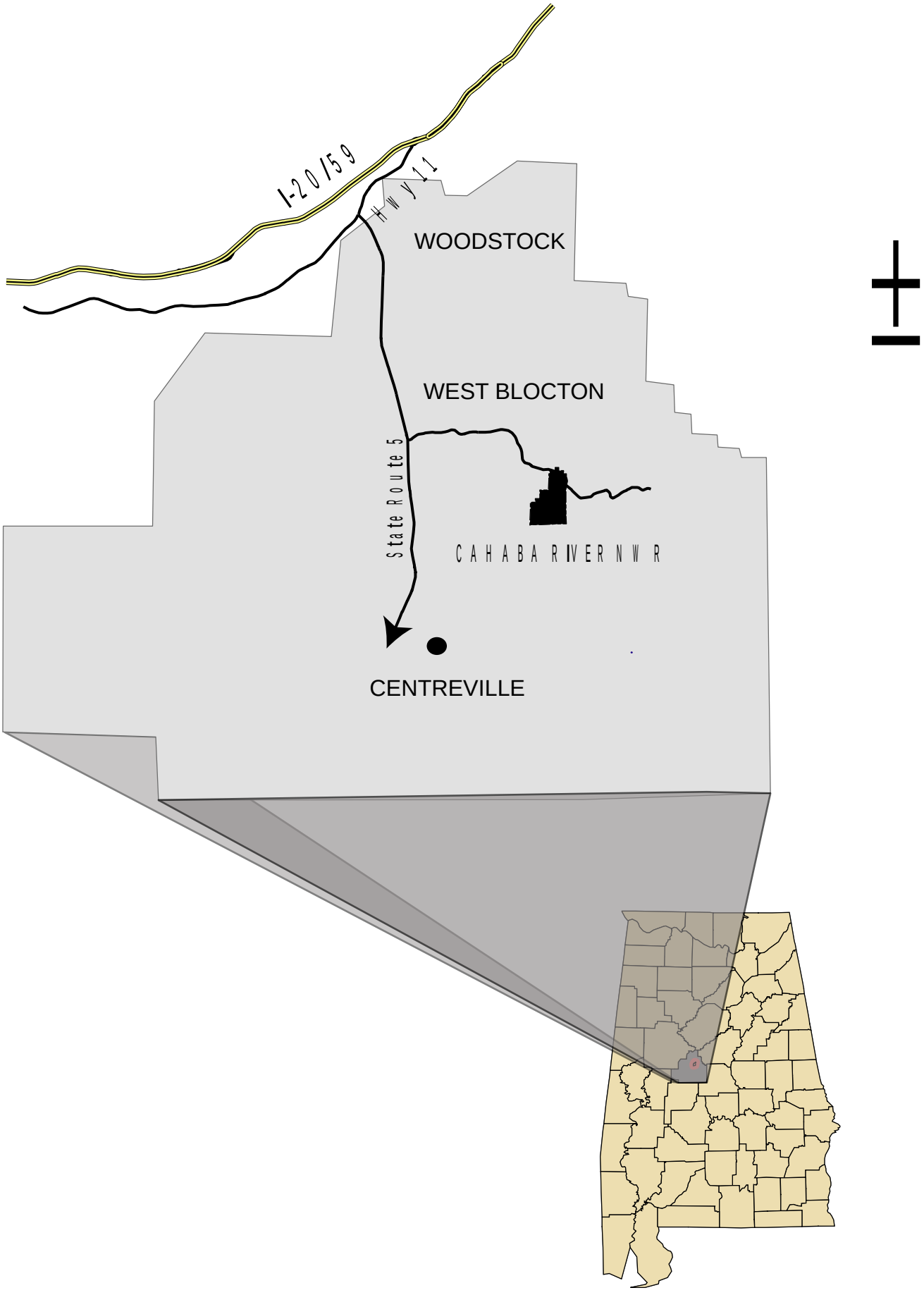


FIG. 1 CAHABA RIVER NATIONAL WILDLIFE REFUGE LOCATION

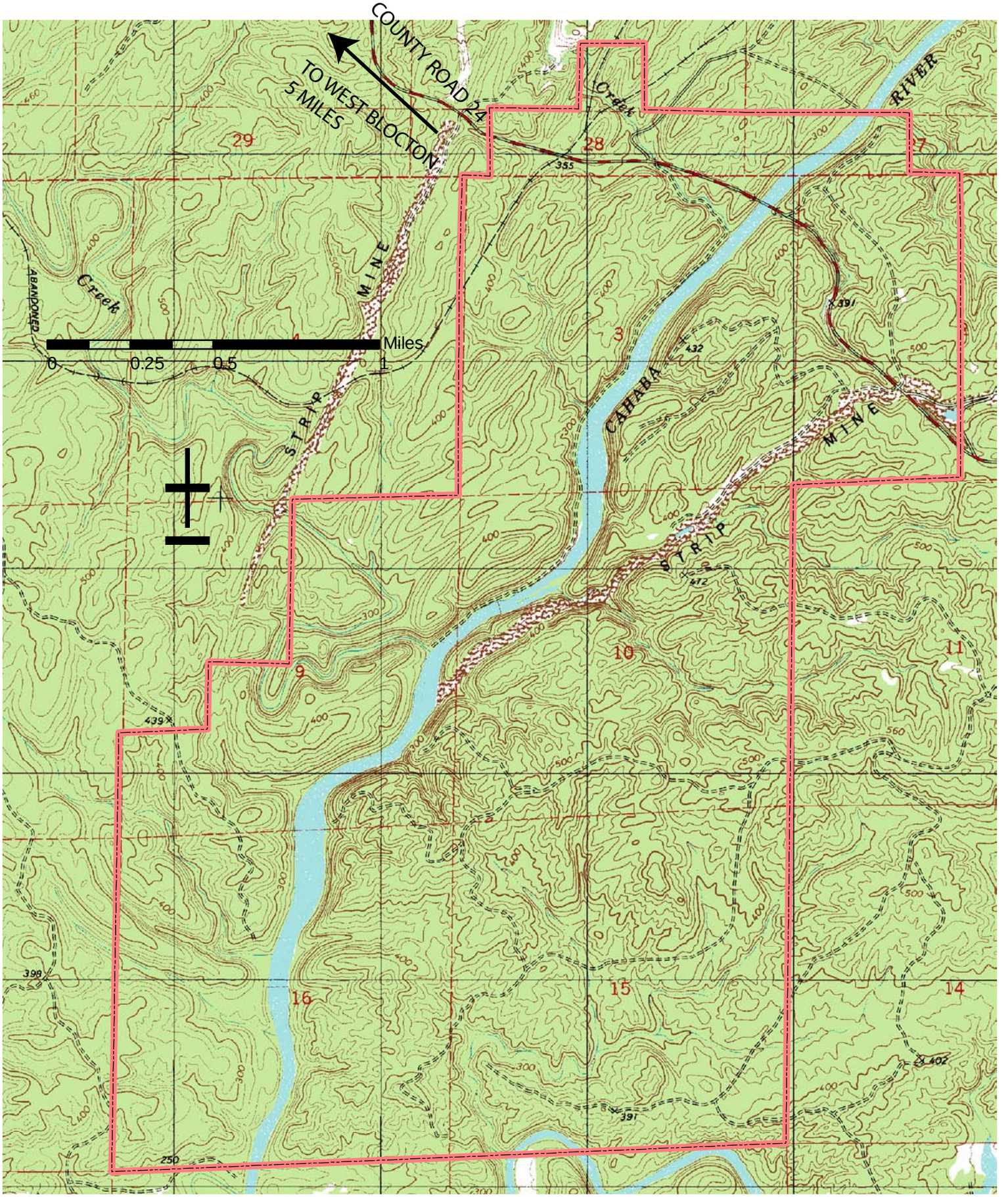


Fig. 2 Cahaba River National Wildlife Refuge Boundary

The biological richness and significance of the Cahaba River cannot be overstated. Historically, 131 species of fish, 43 species of freshwater mussels, 20 snail species, 24 crayfish species and 146 caddisfly species have been recorded from the river. The aquatic animals are not only diverse but nationally and globally significant.

Rare and declining species known from the Cahaba and listed under the federal Endangered Species Act include 5 species of fish, 3 snails and 11 mussels. The overall diversity and abundance of the Cahaba River fauna has declined over recent years. At least 15 species of mussels and 5 species of fish may have been extirpated from the system due to declines in habitat, water quality and connectivity with other populations.

The greatest threat to Cahaba River biotic communities is through water quality degradation. The primary force shaping water quality conditions appears to be rapid urbanization and commercial development in Jefferson, Shelby and St Clair Counties, north and upstream of the refuge. Multiple water quality surveys have found high levels of nitrogen and phosphorus, heavy metals, low dissolved oxygen, organic enrichment, siltation, and chemical spills in the upper basin. There are at least 103 industrial discharge permits in the Cahaba Basin, releasing a variety of toxic metals, chemicals and other substances. There are six municipal wastewater treatment plants in the upper basin with a combined discharge of 19 million gallons a day.

While water quality degradation represents a primary constraint in protecting and restoring the Cahaba River aquatic system, the longterm and gradual alteration of the river's physical environment represents one of the greatest threats to aquatic ecosystems. Species have evolved and adapted to the varied environment of a free flowing river. As man alters stream flows, channel structure and riparian zones, many species disappear from temperature fluctuations, sediment transport, variable dissolved oxygen and pH, substrate degradation, water depth and variable stream velocity.

## *C. Vegetation*

Refuge natural communities are far different from those that existed on the historic landscape. Over the past 50 years much of the region has been converted from longleaf pine forest to loblolly pine plantations. Fire, which was part of natural and anthropogenic processes in this fire dependant ecosystem, has also disappeared from the landscape. The effects of replacing the original upland forests with loblolly pine plantations, and the elimination of fire have dramatically altered refuge natural communities. These landuse changes, along with soil disturbance and the subsequent spread of invasive species, have added to the impact, further altering refuge uplands. Within this landscape, however, there remains small microhabitats (steep slopes) or residual seed bases (e.g. Georgia aster) that retain some of the original more natural characteristics, or provide a seed bank for reestablishing a fire dependant system through prescribed burning. Approximately 60 percent of the refuge is in pine plantations and clear-cuts, 30 percent is hardwood and hardwood-mixed pine forest, 5 percent is natural longleaf pine forest and 5 percent consists of aquatic river environments.

Longleaf pine is a key tree species in a complex fire-dependant ecosystem long native to the Southeast. These forests primarily owe their existence to lightning related wildfires that were augmented by Native American practices of burning the forest. The former presettlement forest is believed to have evolved through lightning fires that occurred from May through July (Brown and Smith 2000) at an interval of two to eight years (Outcalt 2000). Higher ridges and the most xeric sites on the refuge were probably covered by pure stands of longleaf pine during the presettlement period. Xeric-mesic slopes and ridges may have contained a more mixed cover of longleaf and shortleaf pines, along with upland oaks and hickories. Ravines and more protected environments may have been dominated by deciduous trees and loblolly pine.

Natural communities documented on the refuge are described below. These community types are classified in accordance with the system developed by NatureServe and The Nature Conservancy in cooperation with federal, state and academic partners.

- Interior Longleaf Pine Woodland (1 association)
- Upland Mixed Forest (3 associations)
- Forest Plantations (2 associations)
- Bottomland and Floodplain Forests (3 associations)
- Hydric Communities (2 association)

Rare plants documented on the refuge and included within the Nature Conservancy's Tracking List (ANHP 2006) include spring coralroot (along Caffee Creek), Alabama croton (scattered in uplands), shoals spider lily (Cahaba River), smooth veiny peavine (steep banks along Cahaba River), maidenbush (river scour community), broadleaf barbara's buttons (along secondary streams), Wherry's phlox (along refuge and county roads), Nevius' stonecrop (east of river), slender bunchflower (refuge streams), Elliott's fan-petal (river scour community), silky camellia (refuge streams) and Georgia aster (scattered in uplands).

## *D. Wildlife Resources*

Freshwater mollusks are one of the most imperiled biotic groups in the world. Over half of all known or presumed aquatic animal extinctions in the United States since European settlement have been freshwater mussels and snails unique to the Mobile Basin (USFWS 2000). Only 75 percent of snail species and 71 percent of the mussels historically occurring in Alabama are still alive today. Only 17 percent of the snails and 21 percent of mussels in present-day state environs can be considered secure. The remainder are imperiled to various degrees, ranging from relict populations no longer reproducing to widespread species suffering from declining population levels (Mirarchi et al. 2004).

With 118 snail species in the Mobile River basin, the Cahaba River is recognized as containing the most diverse snail population in the world. In addition, 42 mussel species historically existed in the Cahaba, which exceeds the number found in all of Europe. The Cahaba River is Alabama's longest free-flowing river, which is largely responsible for the basin's rich mollusk fauna. The

prominence of shoals along the upper river reaches and lack of significant development along much of the river further add to the river's diversity richness. The refuge is located within the most species rich section of the river (Paul Johnson, personal communications). At the same time, rampant development of Jefferson and Shelby Counties, and decades of coal mining have degraded river water quality and hydrologic flows that continue to place stress on present-day populations.

Eight mussels and 11 snails considered rare have been recorded on or adjacent to the refuge. During a recent HMP scoping meeting with regional aquatic ecologists, the delicate spike was considered the most significant mussel population on the refuge (Garland 2006).

Alabama's rivers and streams are inhabited by one of the richest fish faunas in North America, numbering around 300 freshwater species (Mirarchi et al. 2004). Ninety-three species are suspected to inhabit aquatic systems on or adjacent to the refuge (Mettee et al. 1996). Continuing development within the state has placed stress on many of these populations, particularly those fish that depend on a free-flowing river system. Five fish historically or recently documented from the river are considered a conservation concern; blue shiner (probably extirpated), rock darter, Cahaba shiner, skygazer shiner, and goldline darter.

Alabama reptiles and amphibians total 154 species, which include 30 frogs, 43 salamanders, 12 lizards, 40 snakes, 28 turtles, and the alligator (Mirarchi et al. 2004). The Ridge and Valley Physiographic Province is somewhat unique in that this region seems to support a higher percentage of Coastal Plain species than other regions north of the Fall Line (Mount 1975). Thirty-seven amphibians and 60 reptiles are suspected to inhabit terrestrial and aquatic habitats on the refuge.

Alabama provides critical breeding, wintering, and migratory habitats for a large number of birds. A total of 420 species of been documented in the state. Of this total, 178 are known breeders with 158 regularly breeding in the state. Additionally, 174 species regularly winter, and 80 species migrate through Alabama (Mirarchi 2004). The refuge is located along the north-south flowing Cahaba River, and provides inviting habitat for both resident and migrating species. The presence of both aquatic and uplands on the refuge further increases the diversity of local habitat types and the variety of birds that can be expected on the refuge. To date, 84 birds have been recorded for the Alabama Breeding Bird Atlas project on or near the refuge. Birds recorded for the atlas that are considered a conservation concern are Mississippi kite, bald eagle, Cooper's hawk, Kentucky warbler, wood thrush and Swainson's warbler.

Alabama has viable breeding populations of 60 native and exotic mammal species (Mirarchi et al. 2006). Fifty-five of these species potentially inhabit the refuge. The eastern fox squirrel and gray bat are the only mammals of conservation concern that are expected to inhabit or forage on the refuge.

## *E. Endangered Species*

Recovery plans for individual species that inhabit refuge waters and lands have only been prepared for the blue shiner (USFWS 1995) and the Cahaba shiner (USFWS 1992). Remaining federally listed species are treated through an ecosystem recovery approach (USFWS 2000; USFWS 2005).

The Mobile Basin Recovery Plan (USFWS 2000) represents the sole recovery plan for 22 aquatic species in the basin. An addendum document was later prepared to treat six snails in greater detail (USFWS 2005). Both plans were developed to compliment earlier individual recovery plans. While delisting was considered a recovery objective for the goldline darter, mussels were considered imperiled to the degree that delisting was unrealistic, and prevention of extinction and further decline were set as recovery objectives. Specific actions needed include:

- Protect habitat integrity and quality
- Consider options for river and stream mitigation strategies that give high priority to avoidance and restoration.
- Promote voluntary stewardship to reduce nonpoint pollution from private landuse.
- Encourage and support community based watershed stewardship planning and action.
- Develop and implement public education programs and materials defining ecosystem management and watershed stewardship responsibilities.
- Conduct basic research on endemic aquatic species and apply the results of this research toward management and protection
- Develop and implement technology for maintaining and propagating endemic species in captivity.
- Reintroduce aquatic species into restored habitats, as appropriate.
- Monitor listed species population levels and distribution and review ecosystem management strategy.
- Coordinate ecosystem management actions and species recovery efforts.

The more recent addendum recovery plan (USFWS 2005) for six snails provides specific recovery needs for the three snails documented from the refuge (flat pebblesnail, cylindrical lioplax and round rocksnail). The immediate recovery objective for the cylindrical lioplax and flat pebblesnail is reclassification from endangered to threatened. The eventual recovery objective for all three snails is to restore the species to viable self-sustaining levels so that they no longer require protection of the Endangered Species Act. The recovery plan provides five criteria or factors that will be considered for downlisting or delisting snail species:

- The present or threatened destruction, modification or curtailment of its habitat or range;
- overutilization for commercial, recreational, scientific or educational purposes;
- the threat of disease or predation, particularly the presence of the introduced black carp;
- the inadequacy of existing regulatory mechanisms, particularly sensitivity of snails to certain pollutants; and

- other natural or manmade factors affecting its continued existence, particularly that of catastrophic events.

Eleven species classified as federally endangered, threatened or as candidates for federal listing have been documented on the refuge, in immediate vicinity or are highly suspected to inhabit refuge communities. These eleven species are described in greater detail within the following section. An additional three species have been identified by Ecological Services as potentially occurring on the refuge; orange-nacre mucket mussel (*Lampsilis perovalis*), Mohr's Barbara buttons (*Marshallia mohrii*) and Georgia rockcress (*Arabis georgiana*). These species are not discussed in detail and are not believed to occur on the refuge at the present time. They however represent potential species that could move onto the refuge or occur at some future time. Both Georgia rockcress and Mohr's Barbara buttons have been found short distances south and southwest of the refuge.

**Gray Bat (Myotis grisecens) – Endangered** – With few exceptions, the gray bat is restricted to caves for roosting. Available roosting opportunities on the refuge are rare to nonexistent, but the bat probably does forage along the river and larger tributary streams. It often travels up to 30 miles from roosting caves to forage during the night.

**Bald Eagle (*Haliaeetus leucocephalus*)- Threatened –** Bald eagles are found throughout Alabama along major lake and river systems. Due to devastating effects of DDT, the breeding population disappeared from the state in the 1960s. However, with the banning of DDT and intensive restoration efforts in following years, the eagle has made a spectacular recovery with 47 statewide confirmed nests in 2003 (Alabama Nongame Program 2006). Although fish comprise the major part of their diet, small animals such as rats, rabbits, opossums, raccoon, snakes and turtles are also eaten. They usually nest in large trees near water. While confirmed nesting has not been documented along the Cahaba River (Hudson, personal communications), eagles have recently been observed by refuge personnel and others (AOS 2006) during the spring. It is highly probable that eagles are or in the future will nest along the river on the refuge.

**Blue shiner (*Cyprinella caerulea*) – Threatened** – The Blue shiner historically inhabited the Cahaba River above the Fall Line. It was last collected in 1971 and now believed to be extirpated from the Cahaba River. Disappearance of this fish from the river is attributed to deteriorating water quality (e.g. nutrification and low dissolved oxygen). As a requirement for delisting, the Recovery Plan (USFWS 1995) specifies at least one adequately protected population exist in the Cahaba River. Additional surveys and possible reintroduction are considered preliminary steps in achieving this objective.

**Cahaba Shiner (*Notropis cahabae*) – Endangered –** The Cahaba shiner is restricted to the main stem of the Cahaba River and Locust Fork. The shiner historically occurred in 76 miles of the Cahaba River, extending from Helena, Shelby County in the north to Centerville, Bibb County in the south. Currently, it is only found in 15 miles of the river from Centerville upstream to the Piper Bridge (Mirarchi et al. 2004). Five separate collection sites have been recorded on the refuge. Habitat is associated with shoal macro-habitats in quiet backwaters below or adjacent to

riffles and runs over clean sand and gravel substrates. The shiner is usually only associated with smaller tributaries during periods of high water where individuals move into the mouths of creeks and streams. The largest and most concentrated collection of Cahaba Shiners to date was made in the mouth of refuge tributary streams (B.R. Kuhajda, personal communications, February 15, 2006). The reproductive period extends from May to July with fish maturing at one year of age and possibly spawning the second year. Adults are believed to feed on small crustaceans, aquatic insect larvae, and perhaps some vegetation (Mirarchi et al. 2004). The Cahaba shiner is threatened by high nutrient loads, point and nonpoint source pollution, siltation and strip-mining activities (NatureServie 2006).

The Recovery Plan (USFWS 1992) considers degraded water quality as the greatest adverse impact to the Cahaba shiner. Reclassification of the shiner to threatened status will be considered achievable;

- when numbers allow the capture of at least five per hour with a 12 foot seine in suitable habitat throughout the 76 miles of historic range;
- populations are documented to be viable over ten years; and
- the Cahaba River drainage is protected from water quality degradation.

**Goldline Darter (*Percina aurolineata*) – Threatened –** The goldline darter can be found in the middle portion of the Cahaba River and two of its tributaries, Little Cahaba River and Schultz Creek. It has been extirpated from upper regions of the Cahaba, and currently is known from Blue Girth Creek upriver to just north of Marvel. Two collection sites have been recorded within central portions of the refuge. The darter occurs in swift to moderate current over a substrate of cobble or small boulders interspersed with sand, gravel and pebbles. Riffles often have vegetation on rocks and a border of water willow. It is a benthic feeder taking insects and possibly other macroinvertebrates from rocks. The darter is believed to spawn from late March to early June, and buries its eggs in fine sands or gravel in eddies downstream and between rocks (Mirarchi et al. 2004). Current threats to the goldline darter primarily involve excessive nutrient loads and siltation (NatureServe 2006).

The recovery objective for the darter is delisting with the following criteria (USFWS 2000):

- known populations are shown to be stable or increasing for a period of at least five years;
- a demonstrated trend in water quality improvement in the reach of the Cahaba River occupied by this fish; and
- community developed watershed plans are implemented to protect and monitor water and habitat quality in all occupied watersheds.

**Fine-lined Pocketbook (*Lampsilis altilis*) – Threatened –** An endemic mussel found in the Coosa, Tallapoosa and Cahaba River systems. It persists in low numbers at several sites in the Coosa and Tallapoosa River systems, but is extremely rare in the Cahaba River (Mirarchi et al. 2004). A single dead shell was collected from Caffee Creek Shoals during a recent refuge mussel survey (Hartfield 2004). Preferred habitat includes a variety of substrates from clean sand and gravel riffles to depositional areas along stream margins. Females reportedly release

glochidia in March with primary hosts including redeye, spotted and largemouth bass and marginal hosts including green sunfish. Physical modification of river substrate and water quality degradation constitute threats to the mussel's future. Recommendations for recovery include the need to consider augmentation of existing populations and possible reintroduction into areas where the mussel has been extirpated (Mirarchi et al. 2004).

Recovery of the fine-lined pocketbook to the point of delisting is unlikely in the near future (USFWS 2000). Recovery objectives are:

- to prevent the continued decline of the species by locating, protecting, and restoring stream drainages with extant populations; and
- to restore stream habitats to a degree that would allow expansion and/or reintroduction.

**Triangular Kidneyshell (*Ptychobranchus greeni*) – Endangered –** An endemic mussel found in the Black Warrior, Cahaba and Coosa River systems. Healthy populations remain in the Bankhead National Forest, with small isolated populations found in the Locust Fork, Cahaba River and upper Coosa River (Mirarchi et al. 2004). The mussel has not been collected on the refuge, but has been found both above and below the refuge, increasing the probability of eventually being discovered on the refuge (Hartfield 2004). Preferred habitat includes riffle habitats with gravel and sand substrate in medium to large streams. A long-term brooder that releases glochidia in March, with the Warrior, Tuskaloosa , and black-banded darters, and the Mobile logperch as primary hosts. The mussel is vulnerable to extirpation because of localized distribution and rarity of remaining populations. Recommendations for recovery include possible augmentation and/or reintroduction (Mirarchi et al. 2004).

Recovery of the triangular kidneyshell to the point of downlisting to threatened is unlikely in the near future (USFWS 2000). The immediate recovery objective is to prevent extinction by relocating, protecting and restoring stream drainages with extant populations.

**Round Rocksnail (*Leptoxis ampla*) – Threatened –** An endemic snail that historically was found throughout the Coosa and Cahaba River systems. Within the Cahaba River system, the snail is currently only known from river shoals in Bibb and Shelby counties, Shade and Sixmile Creeks, and the Little Cahaba River (Mirarchi et al. 2004). Within the refuge, the snail is considered the most abundant shoal's snail and was collected from both Hargrove and Caffee Creek Shoals (Hartfield 2004). It has also been found just south of the refuge along the Little Cahaba River (USFWS, Daphne Field Office). Preferred substrate is gravel, cobble and boulders at depths of less than one meter along the river channel and larger tributaries. Little is known concerning life history, but females are believed to lay eggs from March to mid-May with individuals living about two years. The rapid decline of this snail in the Cahaba River is attributed to sedimentation, sediment toxicity and poor water quality. Recommendations for recovery include possible augmentation and/or reintroduction (Mirarchi et al. 2004).

The recovery plan (USFWS 2005) establishes the following criteria for delisting this fish:

- a minimum of three natural or re-established populations have been shown to be persistent for a period of ten years; and
- there are no apparent or immediate threats to the populations.

**Flat Pebblesnail (*Lepyrium showalteri*) – Endangered –** An endemic snail that historically occurred in both the Coosa and Cahaba River systems. Presently know from shoals along the Cahaba River in Shelby and Bibb Counties, and from the Little Cahaba River south of the refuge. An augmentation/reintroduction population (400-500 snails) was released at Upper Shoals on the refuge in 2005 (Paul Johnson, personal communications). Additionally, the flat pebblesnail was recently rediscovered at Hargrove Shoals in 2004 (Paul Freeman, personal communications). Very little is known concerning life history of this rare snail, but preferred habitat includes smooth stones in the rapid current of small to large rivers. Within the Cahaba River, the decline of this snail is attributed to sedimentation and water pollution. Recommendations for recovery include possible augmentation and/or reintroduction (Mirarchi et al. 2004).

The recovery plan (USFWS 2005) established the following criteria for reclassification to threatened status:

- the existing population has been shown to be stable or increasing over a period of ten years;
- there are no apparent or immediate threats to the listed population;
- a captive population has been established at an appropriate facility, and the species has been successfully propagated; and
- a minimum of two additional populations have been established within historic range

**Cylindrical Lioplax (*Lioplax cyclostomaformis*) – Endangered –** An endemic snail that historically occurred throughout the Mobile River Basin. Currently, the snail appears extant in only 15 miles of the Cahaba River above the Fall Line in Bibb and Shelby counties (Mirarchi et al. 2004). Within the refuge, the snail was considered uncommon and collected from Hargrove and Caffee Creek Shoals during recent mussel surveys (Hartfield 2004). The snail requires unusual and specialized substrate of mud beneath large rocks located in rapid shoal's current. Little is known concerning life history, with life spans reported from three to 11 years. Degraded water quality and modification of river flows are credited with the disappearance of this snail. Recommendations for recovery include possible reintroduction (Mirarchi et al. 2004)

The recovery plan (USFWS 2005) criteria for reclassification of cylindrical lioplax to threatened status are the same as those provided for flat pebblesnail.

**Georgia Aster (*Symphyotrichum georgianum*) – Candidate –** Georgia aster is a showy flowering plant restricted to the Piedmont and Ridge and Valley physiographic provinces from Alabama to North Carolina. In Alabama, the plant is represented by 34 occurrences in seven counties, primarily in the central portion of state. Within the refuge the aster is widespread along road openings in the Belcher Tract and along the margins of recently planted longleaf pine

restoration sites. Openings through the forest created by a continuing fire regime appear needed to maintain this species. With implementation of a prescribed burning program and longleaf pine restoration that opens the forest floor to sunlight, this plant should benefit and increase on the refuge in the future.

### *F. Cultural Resources*

Section 106 of the National Historic Preservation Act of 1966, as amended, and Section 14 of the Archeological Resources Protection Act require the Service to evaluate the effects of any of its actions on cultural resources (historic, architectural and archeological) that are listed or eligible for listing in the National Register of Historic Places (NRHP). Systematic cultural or historic resource surveys have not been accomplished on the refuge. In addition, the State Historic Preservation Office (SHPO) currently has no sites recorded within refuge boundaries.

Should previously unrecorded cultural resources be encountered during refuge management activities, all activities will cease at that specific location and reasonable efforts will be taken to avoid or minimize damage to the site. The Office of the Regional Archaeologist will be immediately notified and advised of the nature of the discovery.

Should human remains be encountered during refuge management activities or permitted activities, all actions will cease at that specific location. The Refuge Manager, the Regional Archaeologist, and the Refuge Law Enforcement Officer will be contacted immediately. The SHPO, the County Medical Examiner, and the pertinent tribes will be notified pursuant to the provisions of the Native American Grave Protection and Repatriation Act.

## IV. ENVIRONMENTAL CONSEQUENCES

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

The 1997 National Wildlife Refuge System Improvement Act firmly established that wildlife conservation takes priority on National Wildlife Refuges. It established a framework for ensuring refuge uses are compatible with the mission of “conservation, management, and, where appropriate, restoration of the fish, wildlife, and plant resources and their habitats”. The Ecological Integrity Provision of the Act further requires refuges to “ensure that the biological integrity, diversity and environmental health of the System are maintained”. Subsequent Integrity Policy established that, in accordance with Refuge Purpose, the highest measure of biological integrity, diversity, and environmental health can be achieved through restoration and management of historic landscape cover. The legislated purpose of establishing Cahaba River National Wildlife Refuge directs the Service to: “conserve, enhance, and restore the native aquatic and terrestrial community characteristics of the Cahaba River, and to conserve, enhance, and restore habitat to maintain and assist in the recovery of animals and plants that are listed as

threatened or endangered species. Only the Preferred Alterative (Alternative 3) comprehensively treats mandates included in the legislative establishment of the refuge.

The following discussion identifies and discusses the environmental consequences of six major refuge programs included under the Preferred Alternative.

**Forest Restoration.** Industrial forest plantations and historic mining have severely altered refuge landscape. Restoration of native forest cover involves prescribed burning, replanting native trees, exotic plant control, and rehabilitation of the few remaining native stands. Longleaf pine would be restored on upland sandy ridges and other sites suspected to have originally contained this tree species. While prescribed burning is useful for rehabilitating stands experiencing slight to moderate fire exclusion, most refuge forests have successionally evolved beyond the ability for restoration through fire. Removal of off-site loblolly pine, replanting and treatment of encroaching hardwoods are needed to restore native longleaf pine forests.

Alternatives 2 and 3 would provide programs for establishing native forest cover (Goals 4 and 5). Alternative 1 fails to provide any forest restoration programs.

**Environmental Restoration-regional.** Water quality degradation and the hydrological alteration of the river environment have been responsible for a decrease in river biodiversity. Both impacts are primarily the result of regional issues outside and north of refuge boundaries. It, therefore, becomes critical for the Service to participate in regional environmental planning and river remediation efforts. Most water quality impairments originate above the Fall Line and can be attributed to urban and industrial development in the Birmingham metropolitan area (ADCNR 2005). Located south of Birmingham, the refuge is the direct recipient of much of this degraded water quality and sedimentation. With degraded water quality and altered stream environments, refuge biota suffer and those unable to adapt to changing conditions become endangered, threatened or totally disappear from the river.

The refuge, on a local basis, can have little direct effect for improving water quality in the Cahaba River. It forms less than three-tenths of one percent of all river basin land. Benefits to refuge biota and the river in general can only be accomplished through region-wide efforts that improve water quality of the river and associated basin streams. With eventual water quality improvements, those species adapted to specialized habitats and a diverse aquatic community will be more able to compete and survive in a healthy environment.

Only Alterative 3 includes participation in region-wide efforts to improve river water quality (Goal 1). Alternatives 1 and 2 fail to include any efforts to participate in regional programs.

**Environmental Restoration-Local.** Both aquatic and terrestrial systems on the refuge have been degraded and altered through historic and recent land-use activities. Aquatic restoration proposals (Goal 2) involve sediment capturing structures, emergency spill preparation, hydrological monitoring and environmental restoration of River Road. Initial emphasis will be placed on stabilizing erosion and sedimentation along two-mile long River Road. This road

parallels the river along the west bank and currently contributes significant sediments from vehicle and recreational use.

Terrestrial communities on the refuge would benefit from native community and wetland restoration (Goal 3, 6 and 10), reduction of habitat fragmentation and ecological disturbance (Goal 7), invasive plant control (Goal 9), and ecological and physical restoration of the former Piper strip mine (Goal 12).

The former Piper Mine represents one of the more serious environmental concerns on the refuge. The mine is located on the refuge and was intermittently operated from the mid-1800s to the late 1900s. Mining techniques involved both subsurface mining and strip mining operations. Today, the site remains unreclaimed with strip-mine headwall, mine pit, gob pile (abandoned mine waste) and settling ponds exposed to natural weathering processes. Vegetation is scattered and indicative of highly disturbed soils and exotic invasives. Surface water runoff from the site can be expected to degrade water quality and transport coal fines into the Cahaba River. Drainage from mines has been associated with a variety of acute and chronic effects to aquatic life and the degradation of aquatic ecosystems (Tuttle 1998). Impacts may result from acid generation of exposed mine rock and the mobilization of acid-soluble metals. The occurrence of an orange precipitate in refuge streams receiving drainage from one coal pile suggests acid generation and mobilization is occurring on the refuge (Tuttle et al. 2004). Aquatic ecosystem impacts may also result from the enrichment of metal and trace elements in aquatic sediments of impacted streams. Coal from the Warrior Coal Fields in Alabama, which include portions of the Cahaba River Basin, has been recognized nationwide as having high metal and trace element concentrations (Goldhaber et al. 2000). Metal concentrations in sediments in mine-impacted streams in Alabama are also documented as elevated (Goldhaber et al. 2001). In addition, coals are also recognized as a source of polycyclic aromatic hydrocarbons (PAH) in aquatic systems.

Only Alterative 3 includes efforts to remediate local environmental concerns. Alternatives 1 and 2 fail to include any efforts to restore existing environmental impacts on the refuge. Environmental issues would be treated on an "as needed basis" to achieve the general refuge protection mandate. The lack of strategic planning and a comprehensive environmental planning approach in addressing these problems would significantly impede improving biological integrity and reestablishing/restoring native refuge communities.

**Endangered Species.** The HMP endangered species program involves comprehensive planning, management and restoration efforts. Federally listed species on the refuge were described in previous sections and receive direct protection from immediate threats under all alternatives. The HMP endangered species program, however, provides a comprehensive management approach for additional rare refuge species identified under other inventory sources (NatureServe Program and Alabama's Nongame Species Regulation, Alabama's Comprehensive Wildlife Strategy). These species represent potential biota that could become federally listed in the future if populations continue to decrease. Recovery of these species, along with federally listed species, should be viewed as a preventive approach to avoid future legislative protection. These species often inhabit sensitive natural communities that may require additional remediative and protection efforts to restore/maintain biological integrity.

Protection and management of federally listed and rare species are accomplished through the designation of "Significant Biological Areas (SBA)". These areas tend to contain unique or less disturbed habitat that is disappearing or rare within the region. Specific habitat delineations and management prescriptions are developed to provide added management or protection parameters for these sensitive and/or disappearing species.

Only Alternative 3 provides a comprehensive planning, protection, management and restoation strategy for federally listed and rare biota on the refuge. Alternatives 1 and 2 provide protection from immediate and identified threats for federally listed species, but fail to include a comprehensive strategic policy.

# V. INFORMATION ON PREPARERS

This document was prepared by Bill Garland, USFWS, Mountain Longleaf National Wildlife Refuge, Fort McClellan, Alabama

# VI. SUMMARY OF PROPOSED ACTION

As previously described, the Service proposes to implement a Habitat Management Plan for Cahaba River National Wildlife Refuge. This is the only alternative that biologically protects, manages and restores refuge biological communities. An analysis of three alternatives included:

Alternative 1: No Action - Protection of Natural Resources

Alternative 2: Prescribed Burning and Protection of Natural Resources – Goals 4 and 5

Alternative 3: Preferred Alternative- Implementation of Habitat Management Plan – Goals 1-12

An analysis of potential environmental and cultural resource impacts concludes that no significant adverse impacts are anticipated through implementation of the Preferred Alternative-Alternative 3. Alternatives 1 and 2 however would result in significant adverse environmental consequences by failing to establish comprehensive protection, management and restoration for refuge natural communities.

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