

Chapter 1: Introduction and Background

The State of Missouri is bordered and bisected by two of the nation's great rivers – the Missouri and the Mississippi. Missourians are stewards of and visitors to three national wildlife refuges in the southern half of the state that showcase and conserve their native wildlife heritage. The largest of the three – Mingo National Wildlife Refuge – preserves once common, now scarce bottomland hardwood forest and swamp along an ancient, abandoned channel of the Mississippi River, as well as the indigenous wild creatures that walk, hop, crawl, swim, swarm, slide, slither, and fly through these shade-filled sloughs and sluggish waters. The other two refuges – Pilot Knob NWR and Ozark Cavefish NWR – provide much-needed sanctuary to a pair of rare species clinging to existence: the Indiana bat and the Ozark cavefish.

Introduction

Mingo National Wildlife Refuge

Established in 1944 under authority of the Migratory Bird Treaty Act, the 21,592-acre Mingo NWR is located in Stoddard and Wayne counties in southeast Missouri, approximately 150 miles south of St. Louis. The Refuge serves as a resting and wintering area for migratory waterfowl, and peak waterfowl populations of 125,000 Mallards and 75,000 Canada Geese have been recorded. A shallow basin, the Refuge lies in an abandoned channel of the Mississippi River bordered on the west by the Ozark Plateau and on the east by Crowley's Ridge. The Refuge contains approximately 15,000 acres of bottomland hardwood forest, 5,000 acres of marsh and water, 1,275 acres of cropland and moist soil units, and 700 acres of grassy openings.

Recreational activities on the Refuge include fishing, hunting of waterfowl, squirrel, turkey, and deer,



Historic entrance sign, Mingo NWR. USFWS

canoeing, and wildlife observation. Annual visitation to the Refuge has averaged about 100,000 visits over the past 5 years. Public facilities include a Visitor Center, a bookstore, a 1-mile self-guided Boardwalk Nature Trail, a 19-mile self-guided Auto Tour Route, six overlooks, picnic tables, and a picnic shelter. A 7,730-acre portion of the Refuge is designated by Congress as Wilderness protected under the 1964 Wilderness Act.

Pilot Knob National Wildlife Refuge

Pilot Knob NWR was established in 1987. The 90-acre Refuge, a donation of the Pilot Knob Ore Company, is located on top of Pilot Knob Mountain in Iron County, Missouri. The Refuge contains abandoned iron mine shafts excavated in the mid-1800s

Figure 1: Location of Mingo, Pilot Knob and Ozark Cavefish National Wildlife Refuges



that have since become critical habitat for the federally-listed endangered Indiana bat. Bats enter the shafts in the fall to hibernate and exit in the spring. The numbers have varied, but at one point up to a third of the known world population of Indiana bats were believed to hibernate in the old mine. In the interest of public safety and to avoid disturbance to the bats, the Refuge is closed to public use. The Refuge is managed by Mingo NWR staff located approximately 75 miles away.

Ozark Cavefish National Wildlife Refuge

Ozark Cavefish NWR was established in 1991 to protect the federally-listed endangered Ozark cavefish. The 40-acre Refuge is located in Lawrence and Newton counties, Missouri, 20 miles west of Springfield. Turnback Creek Cave Spring is located on the Refuge. The spring is the outlet of an underground stream that contains a population of the Ozark cavefish. Human access to the underground stream is through Turnback Cave, which has openings on adjacent Missouri Department of Conservation land. The Refuge includes a separate 1.3-acre parcel located several miles away along Hearrell Spring in Neosho, Missouri. It adjoins the Service's Neosho National Fish Hatchery. The Refuge is closed to public use. Ozark Cavefish NWR is also managed by Mingo National Wildlife Refuge staff.



Mingo National Wildlife Refuge

The U.S. Fish and Wildlife Service

The Refuges are administered by the U.S. Fish and Wildlife Service (Service), the primary federal agency responsible for conserving, protecting, and enhancing the nation's fish and wildlife populations and their habitats. The Service oversees the enforcement of federal wildlife laws, management and protection of migratory bird populations, restoration of nationally significant fisheries, administration of the Endangered Species Act, and the restoration of wildlife habitat such as wetlands. The Service also manages the National Wildlife Refuge System.

The National Wildlife Refuge System

Refuge lands are part of the National Wildlife Refuge System, which was founded in 1903 when President Theodore Roosevelt designated Pelican Island in Florida as a sanctuary for brown pelicans. Today, the System is a network of over 545 refuges covering more than 95 million acres of public lands and waters. Most of these lands (82 percent) are in Alaska, with approximately 16 million acres located in the lower 48 states and several island territories. The National Wildlife Refuge System is the world's largest collection of lands specifically managed for fish and wildlife. Overall, it provides habitat for more than 5,000 species of birds, mammals, fish, and insects. As a result of international treaties for migratory bird conservation as well as other legislation, such as the Migratory Bird Conservation Act of 1929, many refuges have been established to protect migratory waterfowl and their migratory flyways from their northern nesting grounds to southern wintering areas. Refuges also play a vital role in preserving endangered and threatened species. Among the most notable is Aransas National Wildlife Refuge in Texas, which provides winter habitat for the whooping crane. Likewise, the Florida Panther Refuge protects one of the nation's most endangered predators, and the Mississippi Sandhill Crane Refuge an endangered, non-migratory species of the sandhill crane.

Refuges also provide unique opportunities for people. When it is compatible with wildlife and habitat conservation, they are places where people can enjoy wildlife-dependent recreation such as hunting, fishing, wildlife observation, photography, environmental education, and interpretation. Many refuges have visitor centers, wildlife trails, automobile tours, and environmental education programs. Nationwide, approximately 30 million people visited national wildlife refuges in 1997.

The National Wildlife Refuge System Improvement Act of 1997 established several important mandates aimed at making the management of national wildlife refuges more cohesive. The preparation of comprehensive conservation plans is one of those mandates. The legislation directs the Secretary of the Interior to ensure that the mission of the National Wildlife Refuge System and purposes of the individual refuges are carried out. It also requires the Secretary to maintain the biological integrity, diversity, and environmental health of the National Wildlife Refuge System.

The mission of the System is to:

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

The Refuge System's goals are to:

- # Conserve a diversity of fish, wildlife, and plants and their habitats, including species that are endangered or threatened with becoming endangered.
- # Develop and maintain a network of habitats for migratory birds, anadromous and interjurisdictional fish, and marine mammal populations that is strategically distributed and carefully managed to meet important life history needs of these species across their ranges.
- # Conserve a diversity of fish, wildlife, and plants and their habitats, including species that are endangered or threatened with becoming endangered.
- # Provide and enhance opportunities to participate in compatible wildlife-dependent recreation (hunting, fishing, wildlife observation and photography, and environmental education and interpretation).
- # Foster understanding and instill appreciation of the diversity and interconnectedness of fish, wildlife, and plants and their habitats.

Refuge Purposes

Mingo National Wildlife Refuge

Beginning in 1944, land was acquired for Mingo NWR with the approval of the Migratory Bird Con-

servation Commission. The purpose of the Refuge derives from the Migratory Bird Conservation Act, "... for use as an inviolate sanctuary, or for any other management purpose, for migratory birds" (16 U.S.C. 715d). In acquiring the first tract for the Refuge, the land was identified as "urgently needed for the protection and conservation of migratory waterfowl and other wildlife." In a 1954 presentation to the Migratory Bird Conservation Commission, the Refuge was described as an "important unit in the Mississippi Flyway" and "an important wintering ground for many species of waterfowl."

One tract of the Refuge was acquired with Bureau of Outdoor Recreation funds. The purpose associated with this funding derives from the Refuge Recreation Act and includes lands "...suitable for (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species ..." 16 U.S.C. 460k-1 (Refuge Recreation Act (16 U.S.C. 460k-460k-4), as amended).

An additional purpose was acquired when Congress designated the 7,730 acre Mingo Wilderness in 1976. The establishing legislation for the Wilderness (Public Law 94-557) states that "wilderness areas designated by this Act shall be administered in accordance with the applicable provisions of the Wilderness Act..." The purposes of the Wilderness Act are additional purposes of that part of the Refuge that is within the Mingo Wilderness. The purposes of the Wilderness Act are to secure an enduring resource of wilderness, to protect and preserve the wilderness character of areas within the National Wilderness Preservation System (NWPS), and to administer the NWPS for the use and enjoyment of the American people in a way that will leave these areas unimpaired for future use and enjoyment as wilderness.

Pilot Knob National Wildlife Refuge Purpose

Pilot Knob NWR protects critical habitat for the Indiana bat. The area was acquired by donation as authorized by The Endangered Species Act of 1973 (16 U.S.C. 1534(a)(2)). The Endangered Species Act establishes the purpose of the Refuge: "to conserve (A) fish or wildlife which are listed as endangered species or threatened species...." Although not part of the Refuge purpose, additional reasons cited for establishing Pilot Knob NWR were to:

- # Secure the land where mine entrances were located to prevent unauthorized use of the area and eliminate human disturbance of hibernating bats.
- # Prevent the loss of bat habitat.
- # Help maintain and increase the existing bat population with the goal of eventually delisting the Indiana bat.

Ozark Cavefish National Wildlife Refuge Purpose

Ozark Cavefish NWR protects essential habitat for the Ozark cavefish, gray bat, and other unique species associated with Turnback Creek Cave. The area was acquired by purchase under authority of the Endangered Species Act of 1973. The Endangered Species Act establishes the purpose of the Refuge "... to conserve (A) fish or wildlife which are listed as endangered species or threatened species or (B) plants" The particular purpose noted in the Environmental Assessment pertaining to the acquisition of Turnback Creek Cave Springs was: "to insure the biological integrity of this cave ecosystem that provides essential habitat for the threatened Ozark Cavefish, the endangered Gray Bat, and other cave-adapted amphipods, isopods, cave snails, pseudoscorpions, millipedes, and other cave organisms."

Refuge Visions

Mingo National Wildlife Refuge

Preamble

Mingo National Wildlife Refuge protects a remnant of the bottomland hardwood and cypress-tupelo swamp ecosystem that once formed a 2.5 million-acre contiguous natural landscape throughout the Mississippi River basin. The 21,592-acre Refuge represents the largest area in southeast Missouri of remaining habitat for numerous native and threatened plant and animal species. The Refuge touches the southeast boundary of the Ozark Plateau and slopes abruptly from an upland oak-hickory forest to bottomland hardwood forest, lower marsh, and expansive swamp and ditch system. Since the beginning of the 20th century, these lands have been drained and deforested for agricultural purposes, which has highly modified the natural landscapes and ecosystem functions. Guided by legal mandates, the Refuge has successfully pioneered techniques that maintain a delicate balance of preservation and active management strategies for reforestation and hydrological integrity of the natural systems for the

benefit of migratory birds, other wildlife, and wildlife-dependent public use. The Refuge is located in a community that appreciates both the natural diversity and the rich biological integrity of the Refuge and the surrounding public and private lands that add to the core network of the natural landscape.

Vision Statement

Applying proven and innovative management practices, Refuge personnel will continue to ensure the protection of the Refuge ecosystems, including the preservation of the 7,730-acre Wilderness Area, designated in 1976. Active management of non-Wilderness lands will utilize proactive strategies to maintain a high quality, sustainable, and highly diverse ecosystem. Proactive adaptive strategies will include traditional and accepted practices to protect the Refuge and surrounding lands from additional threats to the system, such as air quality and hydrological threats. The Refuge staff will continue to develop regeneration techniques and manage water levels to ensure the health and vitality of Refuge habitats.

Adaptive strategies will also assure continued consideration of the values and preservation of cultural resources where appropriate and consistent with natural resources management. Priority public-use opportunities will be provided and enhanced for the more than 90,000 annual visitors, in harmony with healthy habitats and sustainable wildlife populations.

This vision will be accomplished by continuing and expanding efforts to partner with state and federal agencies and the surrounding community, including neighboring landowners, stakeholders, supporters, and friends.



Stanley Creek, Mingo NWR. USFWS

Pilot Knob National Wildlife Refuge

Vision Statement

In cooperation with others, Pilot Knob NWR will protect and maintain critical habitat that contributes to the recovery of the federally-listed endangered Indiana bat and gray bat. Visitors will enjoy scenic beauty and learn about the Refuge and the surrounding area in ways that are safe and that do no harm to the habitat or the bats that depend on it.

Ozark Cavefish National Wildlife Refuge

Vision Statement

In cooperation with others, Ozark Cavefish NWR will contribute to the recovery of the federally-listed threatened Ozark cavefish and other subterranean species through habitat conservation, landowner education, and watershed protection within the Springfield Plateau.

Purpose and Need for Plan

This Comprehensive Conservation Plan (CCP) articulates the management direction for the Refuges for the next 15 years. Through the development of goals, objectives, and strategies, this CCP describes how the refuges also contribute to the overall mission of the National Wildlife Refuge System. Several legislative mandates within the National Wildlife Refuge System Improvement Act of 1997 have guided the development of this plan. These mandates include:

- # Wildlife has first priority in the management of refuges.
- # Wildlife-dependent recreation activities – hunting, fishing, wildlife observation, wildlife photography, environmental education and interpretation – are priority public uses of refuges. We will facilitate these activities when they do not interfere with our ability to fulfill the refuges’ purpose or the mission of the Refuge System.
- # Other uses of the refuge will only be allowed when determined appropriate and compatible with refuge purposes and mission of the Refuge System.

The plan will guide the management of the refuges by:

- # Providing a clear statement of direction for the future management of the refuges.

- # Providing refuge neighbors, users, and the general public with an understanding of the Service’s management actions on and around the refuge.
- # Ensuring the refuges’ management actions and programs are consistent with the mandates of the National Wildlife Refuge System.
- # Ensuring that refuge management considers federal, state, and county plans.
- # Establishing long-term continuity in refuge management.
- # Providing a basis for the development of budget requests on the refuges’ operational, maintenance, and capital improvement needs.

Existing Partnerships

Working with others via intra- and interagency partnerships is important in accomplishing the mission of the Service as well as assisting Mingo, Pilot Knob and Ozark Cavefish national wildlife refuges in achieving their purposes. Partnerships with other federal and state agencies and with a diversity of public and private organizations are increasingly important. Other agencies can provide invaluable assistance in research and maintenance. Private groups and non-profit organizations greatly enhance public involvement in the Refuge, building enthusiasm and support for its mission.

Within the Ozark Plateau Ecosystem that encompasses all three refuges, the Service partners with a number of other agencies and institutions, both governmental and non-governmental. These include:

- # State agencies, including the Missouri Department of Conservation and the Missouri Department of Natural Resources;
- # Federal agencies, including the U.S. Forest Service, U.S. Environmental Protection Agency, National Park Service, U.S. Geological Survey Biological Resources Division, and U.S. Department of Agriculture;
- # Local governments;
- # Universities;
- # Local landowners;
- # Non-governmental conservation organizations, such as The Nature Conservancy, the Trust for Public Land, and Bat Conservation International; Caving Clubs and Spelunkers.

Besides the partnerships that the Fish and Wildlife Service holds on the national and regional (eco-

system) level, Mingo NWR maintains informal partnerships with the following agencies:

- # Missouri Department of Conservation
- # Missouri Department of Natural Resources
- # Missouri Department of Transportation
- # Missouri Highway Patrol
- # USDA Natural Resources Conservation Service (NRCS, formerly the Soil Conservation Service or SCS)
- # Ducks Unlimited
- # U.S. Navy Seabees
- # U.S. Army Corps of Engineers
- # Farm Services Agency
- # U.S. Forest Service
- # Gaylord Laboratory, University of Missouri

Volunteers and Friends Group

The Refuge also relies on the selfless dedication of volunteers to extend the efforts of staff. Volunteers play a vital role in the management and maintenance of the fish and wildlife resources on Mingo NWR. In an era of flat or declining budgets, it is more important now than ever that volunteers step forward to help protect and preserve our natural resource heritage for present and future generations to enjoy.

Mingo NWR is especially fortunate in enjoying the support of a particularly committed group of volunteers, the Friends of Mingo Swamp. The Friends have raised tens of thousands of dollars to fund projects like butterfly gardens, benches, food plots and interpretive signs (McCarty, 2004).

Museums and Repositories

The Refuge museum collections include primarily archeological materials. The Refuge has no collections of artwork, Service history paraphernalia (e.g., signs, equipment), botany, zoology, geology, paleontology. The archeological collection consists of more than 47,000 items, 22 of which are on display at the Refuge Visitor Center. Collections are stored under terms of a curatorial cooperative agreement with the University of Missouri at Columbia.

History and Establishment

About 25,000 years ago, the Mississippi River ran between the Ozark Mountains and Crowley's Ridge.



Friends member Leroy Romine maintaining ADA hunting blinds on Mingo NWR. USFWS

Approximately 18,000 years ago, the river shifted, slicing its way through Crowley's Ridge to join the Ohio River farther north. The abandoned river bed developed into a rich and fertile swamp (USFWS, no date-b).

Native Americans were attracted to the swamp because of the abundant wildlife. Most likely, Native American occupation was seasonal and related to hunting opportunities in the swamp. Water-loving animals, such as beaver, river otter, raccoons, and rabbit thrived. White-tailed deer, Wild Turkey, Ruffed Grouse and timber wolves were common on the edges of the swamp and nearby bluffs.

In 1804, the Louisiana Purchase acquired this territory for the United States. At that time, the population of Missouri's entire Bootheel was very low and the swamp area that is now the Refuge was considered inaccessible. When Missouri became a state in 1821, all of the counties in southeast Missouri had settlers, except Stoddard and Dunklin counties, although Cape Girardeau was one of the most important river towns in Missouri.

Settlers first approached the swamp because of its extensive old-growth cypress and tupelo forests.

The giant cypress trees were the first to be felled and converted into railroad ties and building lumber. The T.J. Moss Tie Company was a large Bootheel lumbering operation headquartered in Puxico. By 1888, T.J. Moss was the largest tie contractor in the state, and many of their ties were cut from trees taken from Mingo Swamp. A large sawmill was operated just north of Puxico on land now within Mingo NWR. Production of the Bootheel lumber industry peaked between 1900 and 1910. During its peak, the Bootheel was consistently the leading lumber-producing area of Missouri. However, by 1935 most of the large operations had ceased. The giant trees had been removed and it was necessary to find suitable lumber in other places.

Yet the powerful and wealthy lumber companies had not lost interest in the Bootheel. If the swampy land could be drained it could once more become an important source of revenue. The size of the projects remained small because of the expanse involved. The lumber companies had considerable capital to invest, but demanded large grants of land for the drainage and were frequently more interested in the land than in efficiency of their drainage ditches. The State Legislature passed an act that allowed the formation of drainage districts, financed by long-term bonds. For the first time, drainage projects could be adequately financed and many drainage districts were created in the Bootheel.

In 1914, more than 20 drainage districts existed in Stoddard County. One of them was the Mingo Drainage District, a small district in the Advance Lowlands near Puxico. More than \$1 million was spent to make Mingo Swamp suitable for farming. A system of seven major north-south ditches was constructed to drain water from the swamp into the St.

Francis River, about 10 miles south of Puxico. Except for the narrow southern extension of the district south of Puxico, the District's boundary and the Mingo NWR boundary are essentially the same. The ditches constructed by the District are used today by the Refuge for water control and management.

During the Great Depression, land values plummeted and many of the large landholders (lumber companies) defaulted on payment of taxes rather than continue to maintain unprofitable investments in the land. Throughout the Bootheel, many drainage districts were unable to meet financial obligations and defaulted on bond payments, largely because they couldn't absorb the loss of revenue created by the large landholders. Mingo District was one of these.

Drainage attempts at Mingo had not been completely successful, at least in part because of the overflow from the St. Francis River. Also, the soil was not as productive as in other areas of the Bootheel. During the 1930s, Mingo District became insolvent.

The remaining timber was cut by anyone without regard to ownership. The area had become open range country, with cattle and hogs roaming freely across the entire swamp. To maintain this grassy condition, the land was burned frequently, as much as several times a year. Hogs and cattle became so numerous that they overflowed into the small towns near the swamp. Indiscriminate shooting of waterfowl was common. Other wildlife species were also not faring well. Beaver and deer had disappeared and Wild Turkey had nearly been extirpated from the swamp.

In 1944, the U.S. Fish and Wildlife Service purchased 21,592 acres of the Mingo Swamp and established the Mingo National Wildlife Refuge. The condition of the land and its living resources was deplorable. Over the previous half-century, humans had reduced a beautiful swamp, lush with the growth of plants and alive with animals, into a burned and eroded wasteland. Through careful management, most of the natural plants and animals were restored. Native trees have replaced much of the brush and briers, and a canoe trip down the Mingo River will now reveal little to the casual observer of the abuses to which this land was subjected in years past. Deer, Wild Turkey, bobcat and beaver are once again plentiful. The Refuge is now able to pursue its primary purpose: providing food and shelter for migratory birds.



Sweet's Cabin, Mingo NWR. USFWS

Legal Context

In addition to the Refuge's establishing legislation and the National Wildlife Refuge System Improvement Act of 1997, several Federal laws, executive orders, and regulations govern administration of the Refuge. Appendix F contains a partial list of the legal mandates that guided the preparation of this plan and those that pertain to Refuge management activities.