

Restoring a Forest Legacy at Mingo National Wildlife Refuge

*A Forestland Restoration Partnership Between the US Fish and Wildlife Service and
The Conservation Fund's Go Zero® Program*

Project Design Document

Prepared by:

The Conservation Fund

With contributions from:

United States Fish and Wildlife Service

Environmental Synergy Inc.

EXECUTIVE SUMMARY

This Project Design Document is prepared for the Mingo National Wildlife Refuge Restoration Initiative to meet the standards of the Climate, Community and Biodiversity Alliance. The Mingo National Wildlife Refuge Restoration Initiative is a unique opportunity to restore native hardwood forests that will expand wildlife habitat, create new areas for public recreation and trap carbon dioxide.

On behalf of the US Fish and Wildlife Service, The Conservation Fund will use donations from its Go Zero[®] program to restore approximately 367 acres of marginal land within the boundary of the Mingo National Wildlife Refuge located in southeastern Missouri. The newly restored native bottomland hardwood forest will be managed by the Service to ensure its long-term protection and stewardship. All carbon accrued from this project shall be withheld from the carbon market and cannot be sold or banked for future offset purposes.

This project has been designed to:

- decrease the effects of climate change via carbon sequestration;
- restore southeastern Missouri's bottomland hardwood forest ecosystem; and
- create long-term community benefits in the form of improved recreational lands under the management of the US Fish and Wildlife Service for activities such as hunting, fishing, wildlife photography, wildlife observation, environmental education and environmental interpretation.

Since 2005, the Fund's Go Zero program has engaged Fortune 500 companies, their customers and employees, as well as other organizations and individuals seeking a positive response to two of our nation's most pressing environmental challenges: habitat loss and climate change. In a time when public financing for land conservation and habitat restoration is stretched thin, voluntary contributions are providing new private capital to further the Fund's mission to conserve and restore our nation's land and water legacy for current and future generations. From these Go Zero projects, the nation derives—and will continue to receive for many years into the future—significant public benefits, including cleaner air and water, restored wildlife habitat and enhanced areas for public recreation.

All of the Fund's forest-based carbon sequestration activities are conducted exclusively with state and federal natural resource agencies, including the US Fish and Wildlife Service. These organizations employ some of the world's top wildlife biologists, foresters and environmental professionals who serve as long-term stewards of the forests once they are restored. In March of 2007, the Fund and the US Fish and Wildlife Service entered into a Memorandum of Understanding that allowed all 550 of the Service's National Wildlife Refuges to benefit from the Fund's Go Zero program, building upon nearly a decade of partnership between the Fund and the US Fish and Wildlife Service to advance the science of carbon sequestration through reforestation.

THE CONSERVATION FUND

The National Wildlife Refuge System Improvement Act of 1997 requires each refuge to develop a Comprehensive Conservation Plan for achieving refuge objectives consistent with sound principles of fish and wildlife management, conservation, legal mandates and Fish and Wildlife Service policies. The National Environmental Policy Act requires each plan to examine a full range of alternative approaches to refuge management and to involve the public in selecting the approach best suited to each refuge's purposes. This project will implement many of the stewardship and management activities prescribed in the Mingo NWR Comprehensive Conservation Plan.

Building on decades of experience and expertise, the Mingo National Wildlife Refuge Restoration Initiative also benefits from our partnership with Environmental Synergy Inc., an Atlanta-based company providing afforestation and carbon quantification services to clients as a means to offset carbon dioxide emissions and promote sustainable forestry. They have planted more indigenous trees in the United States, on more acres of land, for the purpose of carbon sequestration than any other organization in the nation.

The Mingo National Wildlife Refuge was established to protect Missouri's unique bottomland hardwood ecosystem. Restoring this area is one of The Conservation Fund's highest priorities, resulting in cleaner air, cleaner water and enhanced biodiversity for wildlife and people alike.

**MINGO NATIONAL WILDLIFE REFUGE RESTORATION INITIATIVE:
TABLE OF CONTENTS**

EXECUTIVE SUMMARY.....	2
G1. ORIGINAL CONDITIONS IN THE PROJECT AREA	7
G1.1 Location and Basic Physical Parameters	7
G1.2 Vegetation.....	12
G1.3 Project Boundaries of the Project Area and the Project Zone.....	12
G1.4 Current Carbon Stocks at the Project Area	13
G1.5 Communities Located in the Project Zone	13
G1.6 Current Land Use and Land Tenure in the Project Zone	14
G1.7 Current Biodiversity in the Project Zone.....	15
G1.8 High Conservation Values within the Project Zone	17
G2. BASELINE PROJECTIONS.....	18
G2.1 Land Use Without Project.....	18
G2.2 Additionality	18
G2.3 Future Carbon Stocks Without Project.....	19
G2.4 Local Communities and Ecosystems Without Project.....	19
G2.5 Biodiversity Without Project.....	20
G3. PROJECT DESIGN AND GOALS	20
G3.1 Project Scope and Summary of Goals	20
G3.2 Description of Project Activities	20
G3.3 Project Location	21
G3.4 Project Timeframe	21
G3.5 Risks to Climate, Community and Biodiversity Benefits.....	21
G3.6 Maintenance of High Conservation Values	22
G3.7 Measures Taken to Enhance Benefits Beyond Project Lifetime	22
G3.8 Stakeholder Involvement.....	23
G3.9 Participation in CCBA Comment Period.....	25
G3.10 Conflict Resolution Tools.....	25
G3.11 Project Financial Support	26
G4. MANAGEMENT CAPACITY	26
G4.1 Project Proponent.....	26
G4.2 Management Capacity and Expertise	27
G4.3 Capacity Building.....	27
G4.4 Community Employment Opportunities.....	28
G4.5 Workers' Rights	28
G4.6 Worker Safety.....	29
G4.7 Financial Health of Implementing Organization.....	30
G5. LEGAL STATUS AND PROPERTY RIGHTS.....	31
G5.1 Compliance with National and Local Laws	31
G5.2 Approval from Appropriate Authorities	32

THE CONSERVATION FUND

G5.3	Free, Prior, and Informed Consent	32
G5.4	Involuntary Relocations	32
G5.5	Illegal Activities	33
G5.6	Carbon Rights.....	33
CLIMATE SECTION.....		34
CL1. NET POSITIVE CLIMATE IMPACTS		34
CL1.1	Net Change in Carbon Stocks	34
CL1.2	Net Change in Non-CO2 gases.....	37
CL1.3	Other GHG Emissions from Project Activities	37
CL1.4	Positive Net Climate Impact	37
CL1.5	Avoidance of Double Counting.....	38
CL2. OFFSITE CLIMATE IMPACTS (“LEAKAGE”)		38
CL2.1	Types of Leakage	38
CL2.2	Mitigation of Negative Offsite Impacts.....	38
CL2.3	Net Effect of Climate Impacts.....	39
CL2.4	Non-CO2 GHGs	39
CL3. CLIMATE IMPACT MONITORING		39
CL3.1	Monitoring Plan.....	39
CL3.2	Monitoring Plan Development	40
COMMUNITY SECTION		41
CM1. NET POSITIVE COMMUNITY IMPACTS		41
CM1.1	Community Benefits	41
CM1.2	Impact on High Conservation Values	42
CM2. OFFSITE STAKEHOLDER IMPACTS.....		43
CM2.1	Potential Negative Offsite Impacts	43
CM2.2	Mitigation of Negative Impacts	43
CM2.3	Net Stakeholder Impacts	43
CM3. COMMUNITY IMPACT MONITORING		44
CM3.1	Monitoring Plan.....	44
CM3.2	High Conservation Value Monitoring Plan.....	45
BIODIVERSITY SECTION		46
B1. NET POSITIVE BIODIVERSITY IMPACTS.....		46
B1.1	Biodiversity Impacts.....	46
B1.2	Impact on High Conservation Values	47
B1.3	Species Used by the Project	47
B1.4	Exotic Species in the Project Area	48
B1.5	Genetically Modified Organisms.....	48
B2. OFFSITE BIODIVERSITY IMPACTS.....		48
B2.1	Potential Negative Offsite Biodiversity Impacts.....	48
B2.2	Mitigation Plans	48

THE CONSERVATION FUND

B2.3 Evaluation of Potential Negative Offsite Biodiversity Impacts 48

B3. BIODIVERSITY IMPACT MONITORING 49

B3.1 Biodiversity Monitoring 49

B3.2 High Conservation Values 50

B3.3 Monitoring Plan Implementation 50

GOLD LEVEL SECTION..... 51

GL3.1 Vulnerability 51

CONCLUSION 53

EXHIBITS

- A. Memorandum of Understanding Between The Conservation Fund and U.S. Fish and Wildlife Service
- B. Letter from Thomas Melius, USFWS Midwest Regional Director
- C. List of Compliance Requirements
- D. *Wetlands* publication

G1. ORIGINAL CONDITIONS IN THE PROJECT AREA

G1.1 Location and Basic Physical Parameters

Mingo National Wildlife Refuge (“Mingo NWR”) was established in 1944 under the authority of the Migratory Bird Treaty Act to serve as a resting and wintering area for migratory waterfowl. Located in an area known as the Bootheel region of southeastern Missouri, the Refuge spans 21,592 acres across Stoddard and Wayne counties, approximately 150 miles south of St. Louis. The Missouri Department of Conservation’s 6,190-acre Duck Creek Conservation Area joins the Refuge on its north and east boundary. Figure 1 details Mingo NWR’s location within the State of Missouri. Figure 2 details the Refuge and the surrounding counties—including Stoddard, Wayne, Bollinger and Butler—which constitute the Project Zone.

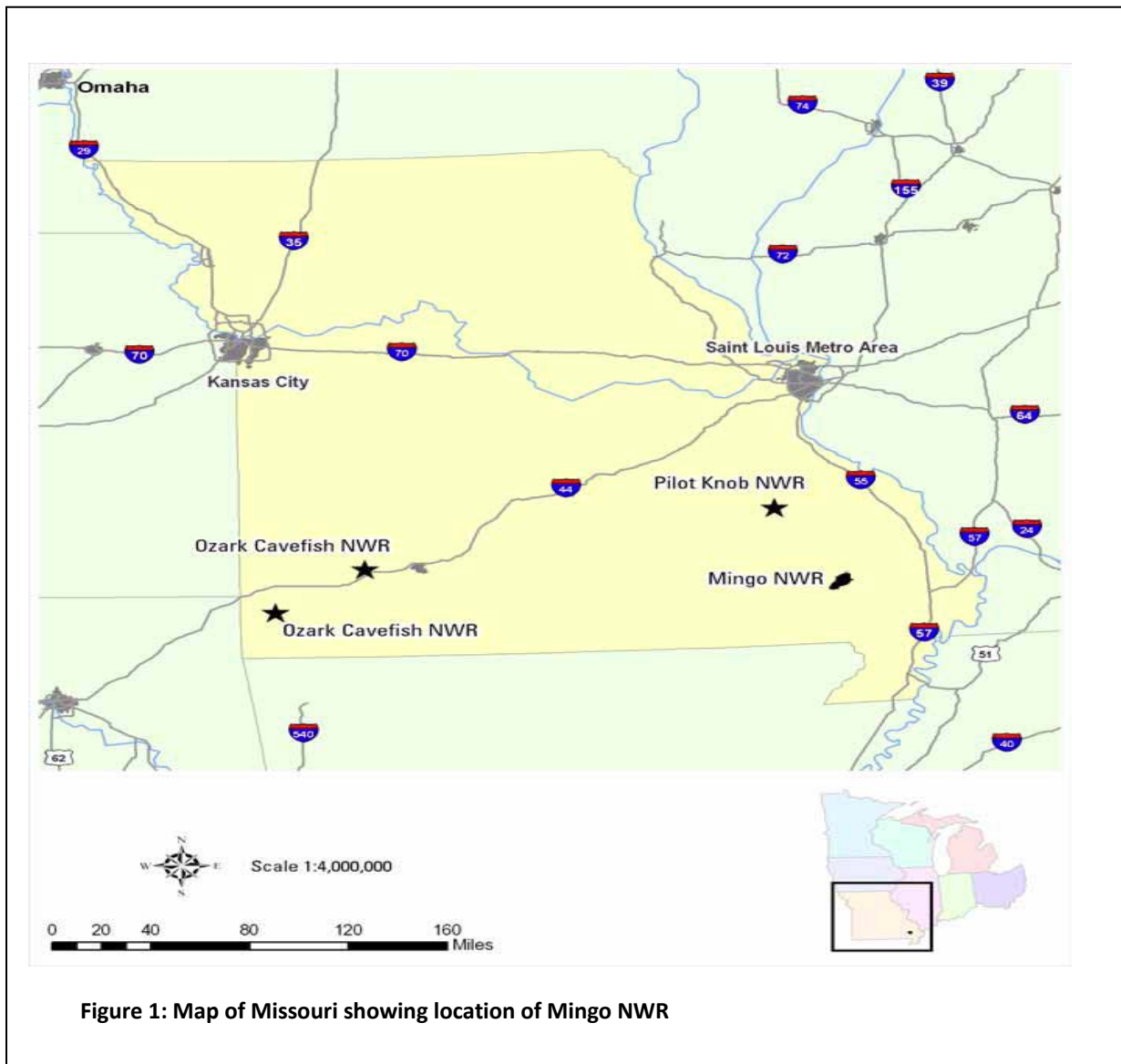
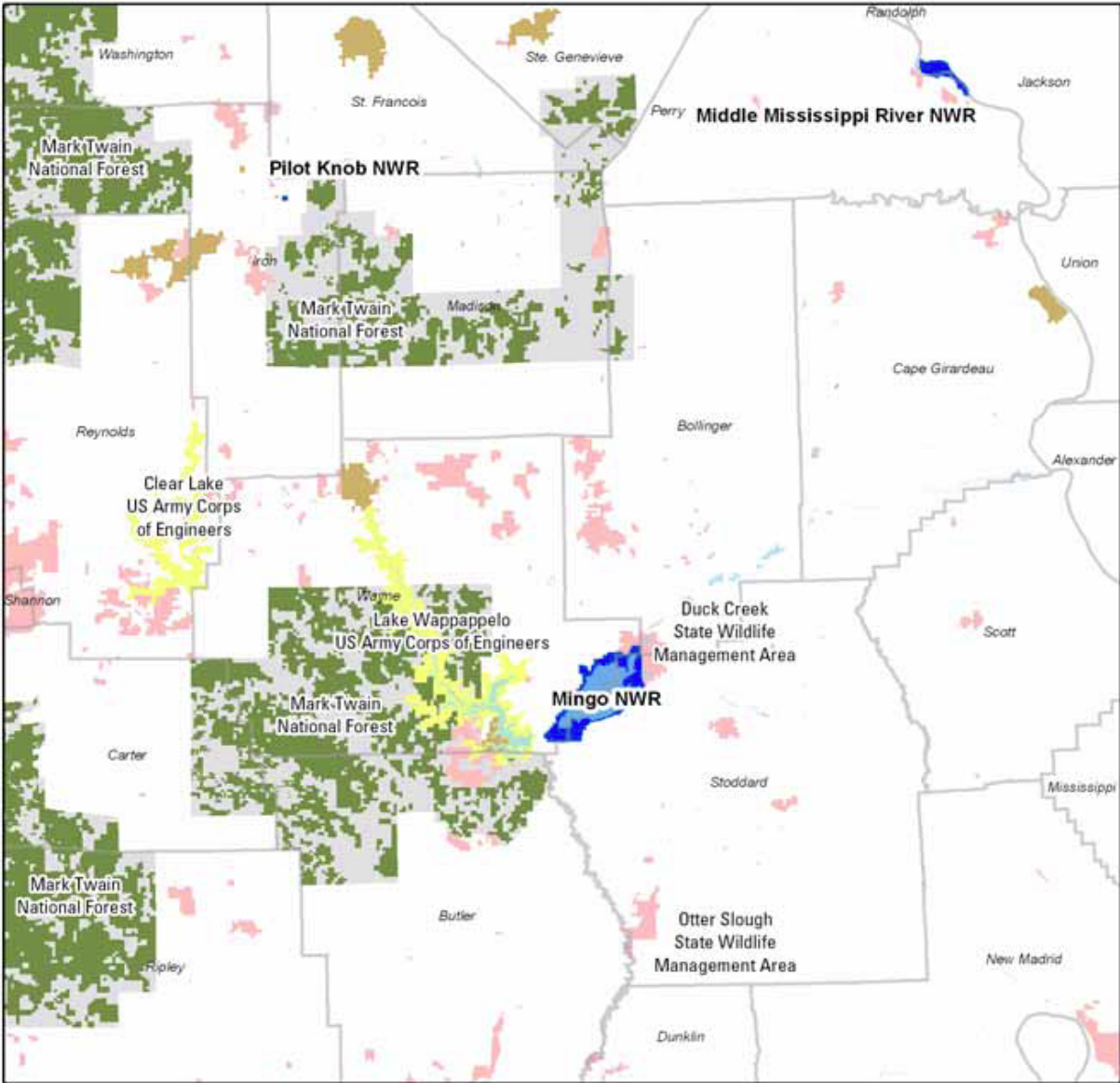


Figure 1: Map of Missouri showing location of Mingo NWR



Legend

- US Fish & Wildlife Service Lands
- Mark Twain National Forest
- Private Lands within National Forest
- DNR Parks
- US ACE Lands
- DOC Lands
- Counties
- Waterbodies



Scale 1:900,000

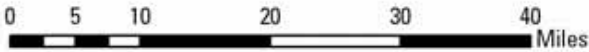


Figure 2: Map showing Project Zone

The Go Zero Tracts

Mingo NWR was established to preserve bottomland hardwood forests as well as provide waterfowl and other migratory birds in the Mississippi Flyway with nesting, feeding, brooding and resting habitat. When settlers first came to the Bootheel region, the area was covered by lush bottomland hardwood forests dominated by giant cypress and tupelo trees. Beginning in the late 1800s, the forests in the Bootheel region were cut for lumber, and by the 1930s, most of the land had been cleared. Lumber companies then looked to drain the swamplands to turn the area into profitable agricultural land. When drainage attempts failed, the land fell into neglect and wild hogs and cattle overran the area. Wildlife such as deer, beaver and wild turkey disappeared from the swamp and indiscriminate shooting of waterfowl became common. When the United States Fish and Wildlife Service (“USFWS” or “the Service”) purchased the land in 1945 to establish Mingo NWR, it was in deplorable condition.

Through careful protection and management by the Service, the natural forests of the area were restored and wildlife returned. Deer, beaver and wild turkey are now abundant. The western section of the Refuge, which includes the largest remaining tract of original bottomland hardwood forest in the Bootheel region, was designated as the Mingo Wilderness Area by Congress in 1976 and serves as an important wintering area for migratory waterfowl and critical habitat for swamp rabbits, wood ducks, migrating monarch butterflies and other species.

However, some of the forest landscape at Mingo NWR is still fragmented and these fragmented parcels have little immediate value for wildlife. Nearly 367 acres across the Refuge that was historically forested are now used for agricultural purposes. Restoring this acreage to its natural, forested condition is a high priority for the Refuge, but funding for restoration was not available until now. An innovative partnership with the Go Zero program will use private funding to restore the biological integrity of the land, and at the same time, help sequester carbon dioxide.

In early 2010, The Conservation Fund (“the Fund”) and Environmental Synergy Inc. (“ESI”) will work with the Service to plant native seedlings across 17 non-contiguous parcels, consisting of 367 acres, within Mingo NWR (the “Go Zero Tracts” or “the Tracts”) using donations from its Go Zero program. The Tracts will be managed by the Refuge as forested habitat for wildlife, including migratory waterfowl and the federally endangered Indiana bat (*Myotis sodalis*). Over their lifetime, these newly restored forests are expected to sequester thousands of tons of carbon dioxide equivalent (CO₂e) from the atmosphere. In addition to the benefits to biodiversity and climate, restoring these lands to their native habitat will help stabilize the top soil and slow the rate of erosion, thereby reducing the sediment load into the extensive system of ditches and streams that feed into the St. Francis River. These restored lands will also provide new recreational areas for public enjoyment.

The map below illustrates the locations of the Go Zero Tracts within the Refuge. These Go Zero Tracts constitute the Project Area.

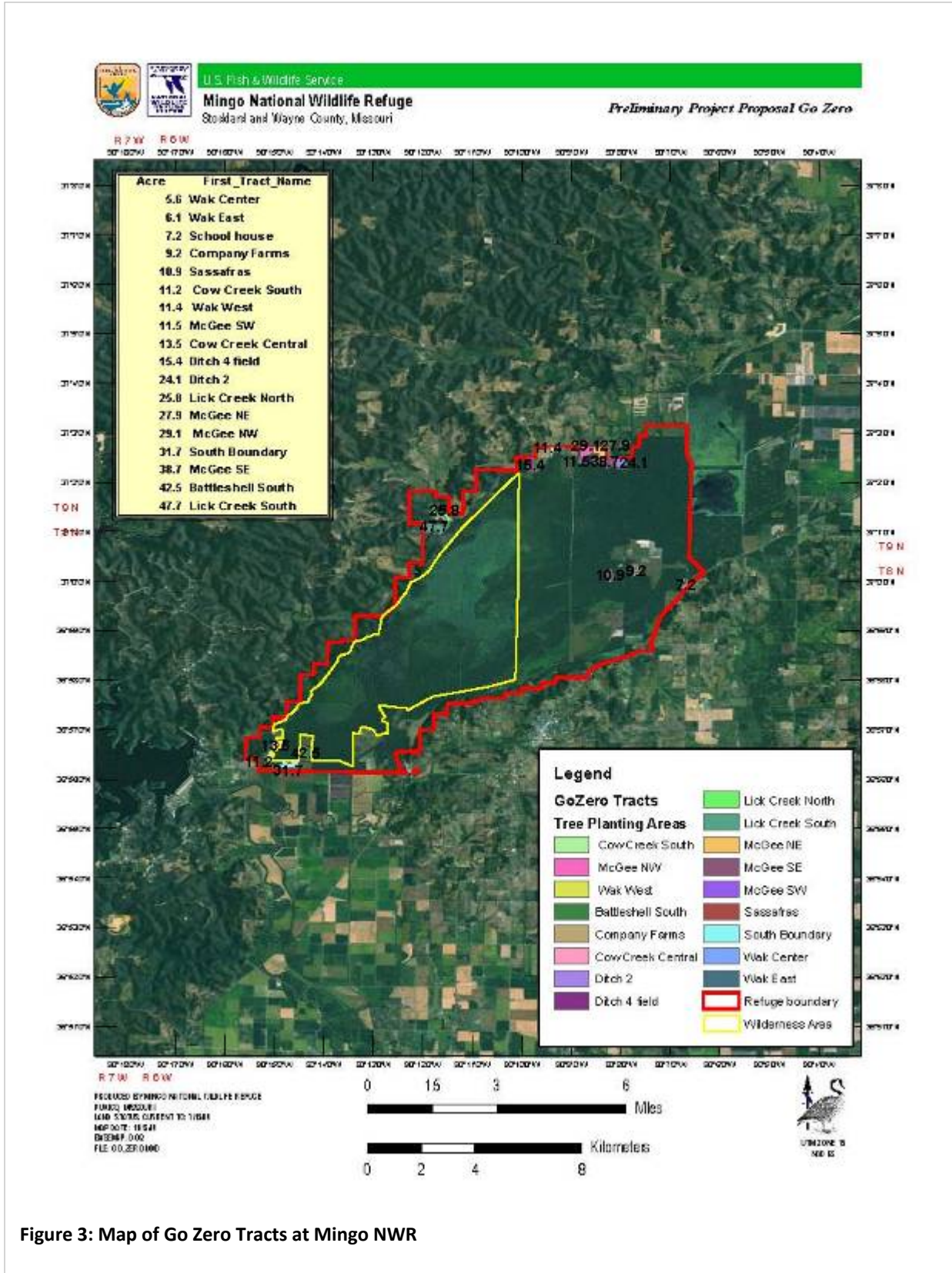


Figure 3: Map of Go Zero Tracts at Mingo NWR

Climate

Mingo NWR's climate is characterized by long, hot summers and fairly cool winters. Precipitation is generally heavy throughout the year and prolonged droughts are rare. Summer precipitation falls mainly in the form of afternoon thunderstorms. Total annual precipitation is 48 inches and about half of this falls between April and September. The average annual snowfall is 11 inches. The average winter temperature is 37 degrees Fahrenheit, and the average daily minimum temperature is 28 degrees. In summer, the average daily temperature is about 78 degrees and the average daily maximum temperature is 90 degrees.¹

Geology and Topography

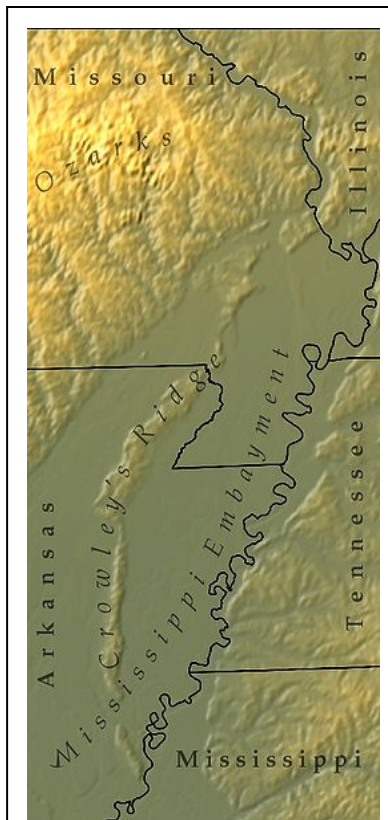


Fig. 4: The Refuge lies between the Ozarks and Crowley's Ridge

Mingo NWR lies in a basin formed in an ancient, abandoned channel of the Mississippi River. When the Mississippi River shifted east approximately 18,000 years ago, it abandoned its original channel and left behind a basin, now called Mingo Basin. The basin is bordered on the west by the Missouri Ozarks and on the east by a terrace called Crowley's Ridge, a prominent landform in the otherwise flat Mississippi floodplain. The St. Francis River flows from the Ozark Hills into the Advance Lowlands just south and west of the Refuge. When the Mississippi River shifted course, an alluvial fan built up where the St. Francis River entered the lowlands. The alluvial fan, which typically forms at the base of topographic features, acts as a natural levee, slowing drainage through the basin.

Several small sand ridges interrupt the otherwise level basin area. The ridges, which vary in shape, may be ancient sand bars deposited by the Mississippi River or sand forced to the surface by earthquakes. The Refuge is in the New Madrid seismic zone, but most of the quakes that have occurred recently are only detectable by sensitive instruments, and there have been no impacts on the Refuge.

Soils and Hydrology

The soil type on the Go Zero Tracts is Calhoun Silt Loam, which is a poorly drained, slowly permeable soil. These soils are subject to occasional or frequent flooding. The extent and duration of seasonal flooding fluctuates annually, recharging aquatic systems and creating a diversity of dynamic habitats.

Water movement drives the ecology of Mingo NWR. The refuge is located within the lower portion of the basin, and acts as a reservoir during periods of flooding from the St. Francis

¹ Mingo NWR Comprehensive Conservation Plan [hereinafter Mingo CCP], pp. 26

River and other surrounding rivers and streams. Water enters from all directions until runoff is complete and water levels stabilize. Water flow within the Refuge varies depending on water depths within each of the pools. Poor drainage within the basin is slowed further by the dikes, levees, and ditches across the Refuge. Water exits the Refuge and flows south to the St. Francis River, which flows south into Arkansas until it joins with the Mississippi River.²

G1.2 Vegetation

The Mingo Basin falls at a crossroads of the Ozark Plateau Ecosystem and Lower Mississippi River Ecosystem. The forested wetlands found across the Mingo Basin are characteristic of the Lower Mississippi River ecosystem while the upland forests found along the bluffs are characteristic of the Ozark Plateau ecosystem. The most extensive bottomland forest type within the Refuge is the oak hardwood bottoms, which occupy the shallowly inundated areas



Figure 5: Bottomland hardwood forests at Mingo NWR

along the banks between drainage ditch levees. The largest remaining contiguous tract- 15,000 acres- of the 2.4 million acres of bottomland hardwood forest that was once native to the Bootheel region is found on the Refuge.

The Go Zero Tracts are currently agricultural fields, which are used to grow soybeans, corn and sorghum. Some of the Tracts were also used for haying, grazing or for wildlife food plots, with occasional burning as part of the Refuge's fire management plan. As part of the Mingo NWR Restoration Initiative, they will be planted with bottomland hardwood

species including pin oak, overcup oak, willow oak, swamp chestnut oak, cherrybark oak, black walnut, pecan, bald cypress and persimmon. After the Tracts are planted, they will no longer be burned as part of the fire management plan.

G1.3 Project Boundaries of the Project Area and the Project Zone

The Project Area consists of 17 non-contiguous parcels within Mingo NWR. The locations and boundaries of these parcels are shown in Figure 3 in Section G1.1.

The Project Zone consists of the entire Mingo NWR, which spans 21,592 acres. Mingo NWR is located within Stoddard and Wayne Counties and borders Butler and Bollinger Counties, and

² Mingo CCP, pp. 27

these four communities make up the Project Zone. The entire Refuge, which spans 21,592 acres, is included within this area. The boundaries and locations of these counties and their relationship to the Refuge are shown in Figure 2 in G1.1.

G1.4 Current Carbon Stocks at the Project Area

The climate change mitigation and adaptation benefits of afforestation projects are widely recognized. Land use change—especially deforestation—is a significant component of increasing atmospheric CO₂ levels and a cause of global warming.³ Thus, restoring native forests represents a natural way to reduce these effects and combat climate change.

In order to quantify the carbon sequestration rates for the project, the Fund used a model developed by ESI. The monitoring regime follows the IPCC's 2006 Guidelines for National GHG Inventories for Agriculture, Forestry, and Other Land Use. Over the life of the project, carbon sequestration estimates will be derived from direct measurements on permanent plots, without reliance on default emission factors. The carbon impact of the Mingo NWR Restoration Initiative is estimated at 328 metric tons of CO₂ equivalent per acre (i.e., 361 short tons per acre) over 100 years.

Pre-project carbon stocks (i.e., on the lands prior to reforestation) in woody biomass carbon stocks are zero. Non-woody (herbaceous) biomass is neglected and assumed to be equal in the baseline scenario and in the “with-project” scenario so there is no need to quantify it. The only significant current carbon stock at the project site is the soil carbon. The project monitoring protocol includes soil measurements against which future gains can be measured.

G1.5 Communities Located in the Project Zone

Mingo NWR is located in Wayne and Stoddard counties and is adjacent to Bollinger and Butler counties. According to the 2008 Census, the total population of the four counties is 95,562 individuals. This area, which comprises the Project Zone, is less ethnically and racially diverse than the State of Missouri as a whole. The area also has a lower average income and less high school and college education than the state's population as a whole. The below table shows the relative diversity, income and educational levels in the Project Zone as compared to the State of Missouri and the United States.

³ IPCC, 2007: Summary for Policymakers. In: *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Table 1: Income, Diversity and Education Levels in the Project Zone⁴

	Non-White Population (2008 Census)	Median Household Income (2007)	High School Graduates (persons age 25+) (2000 Census)	Bachelor’s degree or higher (persons age 25+) (2000 Census)
United States	20.2%	\$50,740	80.4%	24.4%
Missouri	15%	\$45,012	81.3%	21.6%
Wayne County	3%	\$27,931	59.7%	6.8%
Stoddard County	3.1%	\$32,337	66.9%	10.1%
Butler County	8.2%	\$32,364	70.5%	11.6%
Bollinger County	3.4%	\$35,372	70.7%	6.9%

G1.6 Current Land Use and Land Tenure in the Project Zone

Mingo NWR lies at the northern tip of the Lower Mississippi Valley (“LMV”) Ecosystem, where it meets the Ozark Plateau Ecosystem. The forested wetlands found across the Mingo basin are characteristic of the LMV Ecosystem. The LMV Ecosystem was a 25 million acre complex of forested wetlands that extended along both sides of the Mississippi River from Illinois to Louisiana. Today, less than twenty percent of the bottomland hardwood forest remains and most is fragmented or in scattered patches throughout the region. Conservation and restoration of these forests is a top priority for the Service.

Mingo’s bottomland hardwood forests were cleared for lumber beginning in the late 1800s. Timber companies looking to reap additional revenue funded projects to drain the swamplands. Legislation passed in the early 1900s allowing the formation of drainage districts in the region. In 1914, more than 20 such drainage districts existed in Stoddard County, including the Mingo Drainage District near Puxico. However, the Mingo Drainage District, like many others, struggled financially and when land values plummeted during the Great Depression, the Mingo District defaulted on bond payments and went bankrupt. Unregulated land uses followed until

⁴ All data obtained from the United States Census Bureau, available at: <http://quickfacts.census.gov/qfd/states/29000.html>

the U.S. Fish and Wildlife Service acquired the property in 1945.⁵ By the time the Service acquired the land, it had been deforested, drained with an extensive series of ditches, and grazed indiscriminately by livestock. Careful stewardship by the Service allowed the land to recover over time.

Of the 2.4 million acres that once covered southeastern Missouri, Mingo NWR contains the largest remaining tract of bottomland hardwood forest – 15,000 acres. In 1976, Congress designated part of this forested area in the western portion of the Refuge as the Mingo Wilderness Area; this wilderness designation is given to the most natural and undisturbed places in America. As illustrated on the map in G1.1, several of the Go Zero Tracts border the Mingo Wilderness Area. The Lick Creek Tracts are directly adjacent to the Wilderness Area in the northwestern corner of the Refuge. Four of the other Go Zero Tracts fall within an inholding that was carved out when creating the Wilderness Area boundary in the southwest corner of the Refuge.

Prior to restoration, all of the Go Zero Tracts were used for agricultural purposes. Twelve are actively managed for crops, primarily soybeans. The other five Tracts were recently taken out of cropland by the Service and are now managed for hay production and grazing. Those five Tracts are occasionally burned by Mingo NWR staff as part of the overall fire management plan on the Refuge.

Farmers sign annual contracts with the Refuge each year in order to plant crops on Refuge lands, and these contracts change considerably from year to year. Until 2008, the Go Zero Tracts being used for soybean and other crop production were farmed by one individual. When he stopped farming the land, two other individuals took over farming on the Tracts, allowing them each to increase their total acreage in 2009. Although they will no longer be able to use the Go Zero Tracts in 2010 and beyond, both farmers will continue farming on other agricultural farmlands available on the Refuge.

G1.7 Current Biodiversity in the Project Zone

Mingo NWR is a major migration and wintering area for migratory waterfowl. A total of 279 resident and migratory bird species use Refuge habitats throughout each year. Tens of thousands of mallards, Canadian geese, and other migrating waterfowl use Refuge wetlands as stopover or wintering habitat. Bald eagles, least bitterns and mourning doves are among the 108 bird species that regularly breed on the Refuge.⁶ Three active nesting territories for bald eagles can be found at Mingo NWR, including one site that has fledged 43 young over 19 years.⁷ The peregrine falcon and the whooping crane have also been found on the Refuge.

⁵ Mingo CCP, pp. 19

⁶ Mingo National Wildlife Refuge, Wildlife Observation Summary, available at: <http://www.fws.gov/midwest/Mingo/wildlifeobserve.html>

⁷ Mingo CCP, pp. 31

In addition to migratory birds, Mingo provides year-round habitat for a variety of other species. Thirty-eight mammal species are found within the Refuge, including the red and grey fox, white-tailed deer, woodchuck, bobcat, river otter, opossum and swamp rabbit. More than 30 species of frogs, toads, salamanders and snakes are found on the Refuge including the poisonous western cottonmouth, southern copperhead, and timber rattlesnake. At least 46 species of fish are found at Mingo NWR, including catfish, spotted bass and green sunfish.⁸



Figure 6: A bald eagle in flight

Mingo NWR also has a very significant bat population. In August 2009, the Southeastern Bat Diversity Network conducted a bat survey throughout southeast Missouri. Mingo NWR had 6-8 sites surveyed as part of this effort, including sites near the Go Zero Tracts. During the survey, the Refuge documented the presence of the federally endangered Indiana bat, and an Indiana bat maternity colony (a place where female bats congregate to bear and raise their young) was found on the edge of one of the Go Zero Tracts (Lick Creek South). Substantial numbers of other bat species, including the uncommon Rafinesque big-eared bat and southeastern bat, were also documented.⁹ The federally endangered grey bat was also found at Mingo NWR during a previous bat survey in 2006. The bats were likely drawn to Mingo NWR because wooded riparian areas are critical foraging and feeding sites for many bat species.

There is currently not a wide range of biodiversity on the Go Zero Tracts because the project areas are used for farmland or were recently hayed or burned. As the newly planted forest matures, it will rapidly begin to provide habitat to numerous species and enhance biodiversity in the area. The young tree seedlings will offer shelter for the yellow warbler, American redstart, song sparrow, common yellowthroat, field sparrows and indigo buntings. When the new forest is between fifteen and forty years old, it will safeguard the yellow-throated vireo, Kentucky warbler, Eastern wood peewee, Acadian flycatcher and summer tanager. In the future, the mature bottomland hardwood forest will provide habitat for many of these species as well as the Cerulean warbler, scarlet tanager and great crested flycatcher. In addition to bird species, the Go Zero project will directly benefit the Refuge's bat population because most of these species roost in trees.

⁸ Mingo CCP, pp. 31

⁹ United States Forest Service, 2009 Southeastern Bat Diversity Network Bat Blitz Success Stories, available at: <http://www.fs.fed.us/r9/ssrs/story?id=4781>

G1.8 High Conservation Values within the Project Zone

The Project Zone contains high conservation values, including protected areas, endangered species, critical habitat, threatened ecosystems, and areas that provide essential ecosystem services. These features are described in further detail below.

Protected Areas: Mingo Wilderness Area

In 1964, Congress passed the Wilderness Act for the preservation and protection of wilderness lands in their natural condition. Under the Wilderness Act, Congress defined wilderness as “...an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain.” The Act defines these areas as having “outstanding opportunities for solitude or a primitive and unconfined type of recreation.” In 1976, Congress designated 7,730 acres located within the western side of the Refuge as the Mingo Wilderness Area. The Mingo Wilderness Area contains the largest remaining contiguous tract of bottomland hardwood forest in southeastern Missouri. It serves as an important wintering area for migratory waterfowl and critical habitat for swamp rabbits, wood ducks, migrating monarch butterflies and other species.

The Mingo Wilderness Area has also been classified by the International Union for the Conservation of Nature (IUCN) as a Category 1b protected area, which denotes a large unmodified area retaining its natural character and influence, without permanent or significant human habitation. The primary objective of this classification is to protect the long-term integrity of natural areas that are undisturbed by significant human activity, free of modern infrastructure and where natural forces and processes are predominate, so that current and future generations have the opportunity to experience wilderness.

Endangered Species

As discussed in G1.7, the Refuge is home to the federally endangered Indiana bat. The Indiana bat, which is also listed as endangered on the IUCN Red List, has experienced a serious population decline, estimated to be more than 50% over the past 10 years.¹⁰ Indiana bats raise their young and roost under the bark of trees in riparian forests. Most maternity colonies have been located in pockets of forest alongside agriculturally dominated landscapes, like the forested areas at Mingo NWR.

The federally endangered grey bat was also found at Mingo NWR during a previous bat survey in 2006. This species is listed as Near Threatened on the IUCN Red List. Fortunately, population totals are increasing due to conservation efforts in the United States. The grey bat spends most of its year living in caves, and uses forested areas along the banks of streams and lakes—such as those at Mingo NWR—for feeding and foraging.

¹⁰ The IUCN Red List of Threatened Species, available at: <http://www.iucnredlist.org/apps/redlist/details/14136/0>

Critical Habitat

The Mingo Basin has been identified as a critical migration and wintering habitat for waterfowl by the Lower Mississippi Valley Habitat Joint Venture of the North American Waterfowl Management Plan. It was identified as critical habitat for many neotropical migrant birds of concern by Partners in Flight and the North American Bird Conservation Initiative (NABCI), and designated an imperiled ecosystem land type by the Missouri Natural Areas Committee. The Service determined the area provides critical remnant habitat for many federal and state-listed endangered, threatened and declining plant and animal species.¹¹

Threatened Ecosystems

Prior to European settlement, about 2.4 million acres of bottomland hardwood forest and associated habitats covered most of southeast Missouri. Today, less than 80,000 acres of bottomland hardwood forest remain. The largest contiguous block (15,000 acres) occurs at the Refuge.¹² The Refuge was established, in part, to safeguard this threatened ecosystem.

Ecosystem Services

Bottomland hardwood habitats in the Mingo Basin support a rich diversity of plants and animals and have regionally important functions and values including flood water storage and conveyance, filtration, transformation of sediments and contaminants and cycling of essential nutrients and minerals.

G2. BASELINE PROJECTIONS

G2.1 Land Use Without Project

If the Fund does not implement the Mingo NWR Restoration Initiative, the Go Zero Tracts will continue to be used for agricultural purposes. USFWS does not have the funds necessary to restore the land to its native bottomland hardwood state on its own; rather, the restoration of this land hinges on the Fund's ability to leverage multiple funding sources including private resources from individuals, corporations and foundations.

G2.2 Additionality

In accordance with the Fund's planting principles, all of the Fund's afforestation-based carbon sequestration projects result in additional carbon dioxide capture compared to that which would otherwise have occurred. Without the Go Zero project, these Tracts would remain in

¹¹ Mingo National Wildlife Refuge, Fish and Wildlife Management Summary, available at: <http://www.fws.gov/Midwest/Mingo/wildlifemanage.html>

¹² Mingo National Wildlife Refuge, Forest Management Summary, available at: <http://www.fws.gov/midwest/Mingo/forest.html>

agricultural use or will be hayed or burned as the Refuge does not have the funding necessary to restore these areas.

G2.3 Future Carbon Stocks Without Project

Carbon stock changes without the Mingo NWR Restoration Initiative would be of limited size and significance. The carbon capture associated with agricultural plants is considered to be zero as this sequestration would not be sustained over the long term because the agricultural products are harvested every year. Additionally, no deadwood and litter would be expected to accumulate. The soil carbon stocks would also remain relatively constant. There is the potential for some small loss in soil carbon stocks as the land is managed over time. Lastly, the carbon emissions associated with agricultural management and use of fertilizers on the farmed parcels would most likely continue. Parcels that are hayed and/or burned will have similar features as parcels used for agriculture in that they are not expected to have increasing carbon stocks over time.

G2.4 Local Communities and Ecosystems Without Project

Without the Go Zero project, the land would most likely remain as farmland or used for haying and grazing. Once the land is restored, however, local residents can use it for recreational activities like hunting, fishing, and wildlife photography. Several of the Go Zero Tracts are located in the Refuge's general hunt area, which is open to deer hunting, archery and other types of recreation. While row crops are poor areas for hunting, the newly restored forests will provide excellent recreational opportunities. The restoration actions not only benefit the Tracts themselves, but also improve the neighboring land by closing forest gaps and restoring forest connectivity. The overall quality of the Refuge will be improved and more easily enjoyed by local residents.



Figure 7: Restoration will improve land for community use at Mingo NWR.

In addition to improving the recreational areas, the restoration will also improve water and soil quality on the Refuge. In the absence of the project, the soil would continue to be burned, grazed or farmed. The organic material in the soil would be continually depleted by these practices. The lack of native forest cover would continue to exacerbate erosion, resulting in high sediment load in the ditches and creeks which feed into the St. Francis River. Once restored, erosion will be reduced due to new forest establishment, which will replenish both soil carbon and soil nutrients. The soil quality of the Tracts will be healthier due to increased diversity of plant life and biomass accumulation associated with forest regeneration.

G2.5 Biodiversity Without Project

Without the project, the land would remain in agricultural production, which would have an adverse impact on biodiversity. These non-forested parcels were interspersed broadly throughout the Refuge. Forest holes, like those at Mingo NWR, lead to diminished bird nesting success, increased predation and increased brood parasitism, especially from the brown-headed cowbird. Without the project, many bird species would suffer from increased brood parasitism from the cowbird, leading to a decline in species richness.

G3. PROJECT DESIGN AND GOALS

G3.1 Project Scope and Summary of Goals

The scope of the Mingo NWR Restoration Initiative includes restoring approximately 367 acres of land to its native habitat by planting it with tree species indigenous to the area.

The three primary goals of the project are:

- Decrease the effects of climate change via carbon sequestration
- Restore southeastern Missouri's bottomland hardwood forest ecosystem and its biodiversity
- Create long-term community benefits in the form of recreational lands under the management of USFWS for hunting, fishing, wildlife photography, wildlife observation, environmental education and environmental interpretation.

G3.2 Description of Project Activities

Major project activities associated with the Mingo NWR Restoration Initiative include: site preparation and planting of native trees, survival checking, and carbon monitoring, all described in further detail below. As noted previously, the Fund has partnered with ESI to provide planting and monitoring services for this project. A contract is in place between the Fund and ESI outlining ESI's project responsibilities. In addition, project activities include setting up monitoring plans for tracking appropriate community and biodiversity variables (described in sections CM3.1 and B3.1 respectively). These activities will be undertaken by the Fund in conjunction with its partners.

- *Site Preparation and Planting*

The Go Zero Tracts will be planted in 2010. ESI has worked with Mingo NWR staff to assess site preparation needs and determine the native species composition. A mix of bottomland hardwoods (including seven species of oaks) was chosen by the Refuge to meet their habitat objectives. Planting will be undertaken by machine, with an application of Oust during planting to discourage competition in the first year of seedling growth. No advance site preparation will be needed because machine planting will loosen soil compaction, which is important for moisture retention.

The Service recommended planting rate for the site is 302 seedlings per acre which will be maintained uniformly across the planting site. Efforts will be made to sufficiently intersperse each of the species across the site as to avoid large areas of single-species plantings.

- ***Survival Checking***

ESI will flag a sample of trees during planting and, in collaboration with Mingo NWR staff, ESI foresters will perform a survival check after one year. ESI will also undertake a survival analysis on the Go Zero Tracts in or around the fifth growing season to confirm that the target tree density per acre is well established.

- ***Carbon Monitoring***

The activities associated with baseline development and the long-term carbon monitoring plan for the project are discussed in Section CL3.

G3.3 Project Location

The Project Area consists of 17 non-contiguous parcels within Mingo NWR as shown in Figure 3 in G1.1. The Project Zone consists of the entire Mingo NWR, which spans 21,592 acres. The Refuge is located within Stoddard and Wayne Counties and borders Butler and Bollinger Counties. The boundaries and locations of these counties and their relationship to the Refuge are shown in Figure 2 in Section G1.1.

G3.4 Project Timeframe

The Fund will plant the Go Zero Tracts with a mix of native bottomland hardwood trees in late winter/early spring 2010. The project activities will be most intensive during the first few years of the Initiative when planting and the majority of monitoring activities will take place. Under the Memorandum of Understanding between the Fund and USFWS, USFWS will provide long-term management of the trees and the land. The accounting period for the carbon accrued on the Go Zero Tracts is 100 years.

G3.5 Risks to Climate, Community and Biodiversity Benefits

For each Go Zero project, the Fund works with the nation's leading public natural resource agencies and non-governmental organizations to ensure that trees are planted in protected areas that have long-term management plans to ensure accuracy and certainty of carbon sequestration and reduce any risks to the expected climate, community and biodiversity benefits of a project. Project areas with high risk of loss, such as from fire or drought, often do not qualify.

Careful risk assessments were made before choosing to restore the Go Zero Tracts at Mingo; this land was selected for restoration for several reasons. The Tracts are located in a relatively wet area, which reduces risk of drought and also minimizes risk of fire. The risk of damage from storms is also fairly low. Although strong storms do occur in southeastern Missouri, they happen rarely and their impact on forests is usually limited. By planting Tracts scattered

throughout the Refuge, the Go Zero project design has dispersed the risk of damage, and large numbers of trees are unlikely to be affected should a storm occur.

The possibility of any unanticipated risk is mitigated by a buffer pool of offsets that will not be sold. It is anticipated that this buffer will be large enough to account for any impacts that might reduce the total carbon accumulation generated by this project

G3.6 Maintenance of High Conservation Values

The National Wildlife Refuge System Improvement Act of 1997 requires each refuge to develop a Comprehensive Conservation Plan (“CCP”) for achieving refuge objectives consistent with sound principles of fish and wildlife management, conservation, legal mandates, and USFWS policies. Management activities are then selected based on their efficacy in accomplishing refuge objectives. CCPs are reviewed annually, and management activities are modified whenever the annual review or other monitoring indicates that the CCP needs changing to achieve the goals or purpose of the Refuge. The CCP process is designed to generate reliable feedback to help guide management decisions on the Go Zero Tracts and maintain the high conservation values that exist within the Project Zone.

The Mingo NWR CCP specifically lists increasing the bottomland hardwood acreage on the Refuge as part of its overall forest management plan and describes the Refuge’s intent to more actively manage bottomland forest habitat to benefit forest-dependent wildlife, especially migratory waterfowl, neotropical migratory birds and mammals.¹³ In order to accomplish this, Mingo NWR engages in careful and comprehensive conservation planning using the guidance provided by migratory bird conservation initiatives that have developed around the region, including the Lower Mississippi Valley Joint Venture, which strives to increase populations of waterfowl and other wildlife by protecting, restoring and enhancing habitats within the Joint Venture Region.¹⁴

G3.7 Measures Taken to Enhance Benefits Beyond Project Lifetime

For each Go Zero project, the Fund works with the nation’s leading public natural resource agencies, such as USFWS, to ensure that trees are planted in protected areas that have long-term management plans to ensure accuracy and certainty of carbon sequestration. Under a Memorandum of Understanding (“MOU”) (see Exhibit A) between USFWS and the Fund, the Service has agreed to provide long-term protection and management of Go Zero projects under natural conditions and according to best wildlife and habitat management practices. The MOU is strengthened by the Service’s commitment to incorporate the Go Zero Tracts into

¹³ Mingo CCP, pp. 58-59.

¹⁴ Mingo CCP, pp. 22. Mingo NWR is in the Lower Mississippi Valley Joint Venture, one of 12 habitat-based joint ventures designed to reach its objectives through a combination of efforts by private, state and federal entities within defined geographic areas. The Lower Mississippi Valley Joint Venture strives to provide habitat for overwintering waterfowl within the Mississippi Alluvial Valley and West Gulf Coastal Plain Bird Conservation Regions.

Mingo NWR's CCP, as stated in a letter from Thomas Melius, the USFWS Midwest Regional Director (see Exhibit B), which will outline long-term management plans for the Tracts. To help supplement long term management activities, the Fund makes a one-time payment to the USFWS for each Go Zero acre it restores. These funds ensure the Service will have the ability to steward the project over time.

G3.8 Stakeholder Involvement

For each Go Zero project, the Fund works with an array of public and private partners to engage project donors, select and evaluate a project location, conduct site preparation, secure and plant the appropriate seedlings, monitor and measure the carbon accrued over time and facilitate the long-term use of the property (for the community and for wildlife).

The Mingo NWR Restoration Initiative defined these partners, or stakeholders, as those parties who 1) own the Go Zero Tracts ("the landowner"), 2) currently own property near the Go Zero Tracts ("the neighbor"), 3) were using the land prior to its restoration ("the leaseholder"), 4) were directly involved with site selection, acquisition, planting, biological monitoring, carbon monitoring or long-term management ("project implementers"), 5) donated to support the project (the "donors") and/or 6) are members of local groups who use Mingo NWR ("community members").

The Fund is managing the restoration. The restoration of the land was made possible, in part, by the Fund's donors. The trees will be planted by ESI, and ESI will monitor their survival. USFWS owns the Tracts and is the entity responsible for the long-term management of the forestland. The Duck Creek Conservation Area, managed by the Missouri Department of Conservation, is directly adjacent to the Refuge and coordinates habitat management strategy with Mingo NWR. Foresters from the Missouri Department of Conservation consulted with Refuge staff on which trees should be planted on the Go Zero Tracts. The farmers who were leasing land on the Tracts prior to the restoration are also listed as stakeholders because they will be impacted by the project in that they will be assigned different parcels on the Refuge to farm. The Mingo Swamp Friends Group supports habitat management work on the Refuge and its volunteer program supports all aspects of Refuge operations including studies, habitat management, wildlife management, visitor services, infrastructure maintenance and improvements, and outreach.

These stakeholders have various roles in project development and implementation. For example, the Service is involved in all decision making, including species selection, site preparation and long-term management decisions for the Go Zero Tracts. ESI is actively involved in decision-making, and has offered guidance to the Fund and USFWS on planting methodology and timing. USFWS, ESI, and the Fund have been in frequent contact to discuss all aspects of the project. Discussions were also held with the tenant farmers in advance of the restoration to allow them time to plan for the following growing season. Both the Duck Creek Conservation Area and the Mingo Friends group have been engaged by the Refuge and given a description of the project and its intended impacts. Both groups have expressed full support of the Mingo NWR Restoration Initiative. The table below illustrates the list of stakeholders and their roles.

THE CONSERVATION FUND

Table 2: Mingo NWR Restoration Initiative Stakeholders

NAME OF STAKEHOLDER	CONTACT INFORMATION	ROLE	RATIONALE	PROJECT PHASE
The Conservation Fund	Go Zero Operations Manager, 703-525-6300	Project Implementer	Manage and finance restoration and planting of the Go Zero Tracts	Project development and project implementation
The Conservation Fund donors	Confidential	Donors	Financial support of the project	Donations used to support project development and implementation
US Fish and Wildlife Service	Refuge Manager or Assistant Refuge Manager, 573-222-3589	Project Implementer/ Landowner	Directly involved with project planning and implementation; future landowner and long-term steward of the forestland	Project development, implementation and long-term project management
ESI/ ESI Contractors	ESI President, 770-447-4638	Project Implementer	Directly involved with project planning and implementation, including planting and carbon monitoring	Project development, implementation and monitoring
Duck Creek Conservation Area (Missouri Dept of Conservation)	Duck Creek Conservation Area Biologist 573-222-3337	Neighbor	Directly involved with habitat management on the Tracts	Project Implementation
Mingo Swamp Friends	Mingo Swamp Friends Board Member 573-776-5305	Local Community	Friends group, whose mission is to support Mingo NWR, will be an advocate for the Go Zero Tracts.	Project Implementation
Tenant Farmers	Confidential	Prior Leaseholder	Directly impacted by restoration	Project implementation

THE CONSERVATION FUND

In addition to the groups listed above, there were additional opportunities for community members to voice their opinions on the restoration of the Go Zero Tracts. Local residents were active participants in the CCP process, which specifically listed bottomland hardwood forest restoration as a Refuge priority.

As the project evolves over time, the project proponents will continue to engage these stakeholder groups. Once the Go Zero Tracts are planted, the Fund will engage in public relations activities targeting local news outlets to help increase project awareness. Celebration and dedication ceremonies with stakeholders will be conducted after the planting. ESI, in conjunction with Refuge staff, will conduct survival checks of the trees at year one and again five years after planting. The Refuge will continue to work with the Duck Creek Management Area and the Friends group to develop and support habitat management and conservation strategies on the Refuge. They will also have continued contact with the impacted farmers, who will continue farming elsewhere on the Refuge.

G3.9 Participation in CCBA Comment Period

USFWS and the Fund will take numerous steps to communicate and publicize the Climate, Community and Biodiversity Alliance (“CCBA”) project during the public comment period. This Project Design Document (“PDD”) will be made available on the CCBA website and is open to comments from the public. The PDD will also be available on the Refuge’s website and in hard copy through the Mingo NWR visitor center, ensuring that project documentation is available near the project site and available to local residents who do not have access to the Internet. In addition, all key documentation and information regarding the Mingo NWR Restoration Initiative will be available on the Fund’s website. These various methods will allow many Refuge users, including hunters, bird watchers and nature historians, to learn about the project and also allow the Refuge staff an opportunity to consult with these groups about project developments.

G3.10 Conflict Resolution Tools

All grievances related to project planning and implementation must be filtered through the Mingo NWR staff because the project is being implemented on federally-owned land. The Refuge has a detailed appeals process that can be utilized by anyone who is adversely affected by any decision of the Refuge manager. If an individual disagrees with a Refuge decision, he or she has thirty days to appeal to the area manager, and shall be notified in writing within 30 days of the area manager’s decision to further appeal in writing to the appropriate regional director. The regional director’s decision will be considered the final decision, and the appellant shall be provided an opportunity for oral presentation before the area manager or regional director within the respective thirty day appeal periods. In this way, the area manager and regional manager will function as mediators to resolve any conflicts.

Because the land is already owned by the federal government and the project is implementing actions already approved in the CCP, grievances are not anticipated. Local community members, including local citizens, non-governmental conservation organizations and

employees of tribal, state and local agencies, have already been engaged in the CCP process.¹⁵ Two public scoping meetings were held to provide an opportunity to discuss issues related to the CCP with Refuge and planning staff, and concerns about Refuge plans were solicited and addressed.

G3.11 Project Financial Support

The Mingo NWR Restoration Initiative is made possible by donations to the Fund's Go Zero program. Before the project was initiated, a budget was developed to ensure that the donations would cover all of the costs of the project, including design, implementation, and long term monitoring.

G4. MANAGEMENT CAPACITY

G4.1 Project Proponent

The management responsibilities of the Mingo NWR Restoration Initiative are split between the Fund and USFWS. As described in G3.2, the Fund has also contracted with ESI to provide planting and monitoring services. Descriptions of each organization's experience and responsibilities are detailed below.

The National Wildlife Refuge System, managed by the USFWS, is the world's premier system of public lands and waters, set aside to conserve America's fish, wildlife and plants. The Refuge System has grown to more than 96 million acres, including 550 refuges and 37 wetland districts. Refuge management is the core business of USFWS, and management of the restored Go Zero Tracts will be the responsibility of the Service.

The Conservation Fund is one of the nation's foremost environmental nonprofits dedicated to protecting America's most important landscapes and waterways for future generations. Since its founding in 1985, the Fund has helped its partners safeguard wildlife habitat, working farms and forests, community greenspace, and historic sites totaling more than 6 million acres nationwide. The Fund is responsible for project coordination and implementation of this reforestation project. The Go Zero program has completed multiple forest carbon projects of this kind in the past, including a 1182 acre project at Red River NWR and a 776 acre project at Marais des Cygnes NWR and possesses the skills needed to implement the Mingo NWR Restoration Initiative.

The Fund has partnered with ESI to provide planting and monitoring services for this project. ESI is an Atlanta-based company providing afforestation and carbon quantification services to clients as a means to offset carbon dioxide emissions and promote sustainable forestry. ESI has planted more indigenous trees in the United States, on more acres of land, for the purpose of carbon sequestration than any other organization in the nation. ESI professionals have tremendous experience working with federal, state, non-profit and other business partners to

¹⁵ Mingo CCP, pp. 10-11

provide programs combining state-of-the-art carbon sequestration science and restoration of ecologically damaged ecosystems.

G4.2 Management Capacity and Expertise

The scale of the Mingo Restoration Initiative is well within the management capacity of the Fund, USFWS and ESI. All of these organizations have a great deal of previous experience managing and monitoring forest carbon projects. The Fund, USFWS and ESI previously worked together and successfully implemented several projects of this kind, including projects at Red River NWR and Marais des Cygnes NWR, and have the skills necessary to carry out the Mingo NWR Restoration Initiative.

The Fund is a national leader in developing and implementing forest carbon projects. The Fund's carbon sequestration programs, including, but not limited to Go Zero, have helped to restore 20,000 acres with 6 million trees, which will capture an estimated 7.2 million tons of carbon dioxide equivalent from the atmosphere over their lifetime. In addition, the Fund owns 40,000 acres of redwoods and Douglas fir forests in Mendocino County, CA and manages these forests as sustainable working forests, benefiting both the environment and the local economy. All 40,000 acres have been registered with the Climate Action Reserve and produce verified carbon emission reductions. The Fund is dedicated to the development of forest carbon partnerships and long-term oversight of projects.

The employees of ESI have the skills and knowledge needed for packaging and storing seedlings, planting seedlings, soil sampling, carbon monitoring, tree survival analysis and monitoring of soil and tree biomass carbon during the project lifetime.

The USFWS team possesses the skills needed for biodiversity monitoring and long term habitat monitoring and the ability to maintain the Tracts as forestland. In addition, USFWS has the skill set needed to monitor certain community variables such as public use of the Refuge.

G4.3 Capacity Building

This project will increase knowledge transfer across the public and private sectors regarding the science of carbon sequestration via reforestation. USFWS employees at both the regional and national levels are increasingly interested in leveraging the private dollars that result from these carbon sequestration projects as a way to facilitate acquisition and restoration of public lands. USFWS employees have started exchanging lessons learned and best management practices for carbon sequestration projects, allowing for the successful replication of projects in other communities. Members of the Go Zero project team have been, and will continue to be, instrumental in this information exchange.

Specifically, the USFWS has drafted a Climate Change Strategic Plan to guide their climate change work and is conducting stakeholder workshops to discuss possible approaches to addressing climate change. The workshops aim to expand terrestrial carbon techniques and to compile and share scientifically sound approaches, standards and guidelines for terrestrial sequestration activities. Members of the Mingo NWR Restoration Initiative team are participating in these workshops and sharing lessons learned about conducting carbon projects

on Refuge lands. In addition, members of the team addressed the USFWS Region 3 Project Leaders meeting, which is a meeting of Refuge managers, to discuss prior carbon sequestration projects and new opportunities for projects on Refuges in the future.

G4.4 Community Employment Opportunities

The Mingo NWR Restoration Initiative was not designed to create new long-term employment opportunities. The Go Zero Tracts are within the Refuge and managed by existing Refuge staff. The Service will be in charge of managing the lands as forestland according to the provisions set forth by the MOU. If new employment positions are created through this project, they will be within USFWS. As a federal agency, USFWS must comply with all federal Equal Employment Opportunity laws. Individuals will not be denied opportunities in employment because of their race, sex, age, religion, color, national origin, physical or mental disability or any other factors not properly relevant to employment.

The Mingo NWR Restoration Initiative will create short-term employment opportunities – primarily during the planting and restoration phases. ESI uses independent contractors to provide tree planting services for the project. ESI does not discriminate with respect to race, creed or gender in employment or contractor opportunity and specifies employee benefits in written employment agreements.

In addition, members of the Mingo Job Corps will be used to help establish monitoring plots across the Tracts. The Mingo Job Corps, which operates in connection with the USDA Forest Service, offers hands-on career technical training as well as academic training to young adults, as they also work towards a GED or high school diploma. Mingo Job Corps members often participate in volunteer projects on the Refuge, and the Mingo NWR Restoration Initiative will provide another skill building and educational opportunity for these students.

Inclusion of Women

While federal laws are in place to protect the ability of all groups to participate in the project, women have been instrumental in project implementation. Women make up a significant percentage of the Fund's Go Zero staff and the president of the project's lead planting and monitoring partner, ESI, is a woman.

G4.5 Workers' Rights

Employees of USFWS are protected by federal labor and employment laws. Fund employees are also protected by applicable state and federal laws, and by the rights and policies described in the Fund Employee Manual. ESI specifies certain rights for all contract employees in its contracts, including workers' compensation insurance in amounts not less than state-required minimums. ESI vendor contracts also include provisions meant to protect the rights of any employees or subcontractors of ESI contractors.

A list of all laws applicable to Mingo NWR is attached as Exhibit C. They are further elaborated upon in Section G5.1.

G4.6 Worker Safety

The long-term management of the Go Zero project presents few, if any, worker safety risks. However, there are some inherent safety risks involved with the actual planting of the Tracts. ESI, which contracts out most of its tree planting services provided to clients, has two ESI staff foresters who oversee and participate in field operations; they are both Registered Foresters and Certified Wildlife Biologists with over 55 years' combined experience with state and federal conservation agencies prior to joining ESI.

The main requirements of ESI foresters and carbon monitoring contractors with respect to field safety are:

- Demonstrated experience in agriculture and/or forestry work including ATV use. Completion of an ATV safety course is preferred but not mandatory (current staff foresters have completed such). ESI provides a copy of the US Fish and Wildlife Service's "Four Wheel All Terrain Vehicle Training Guide" to its employees and employees are required to use safety goggles and gloves at all times when riding ATVs and to have two helmets on premises (with use recommended at all times).
- At least two persons must be present on a project site at all times (no solo work or visits).
- ESI vehicles (trucks and ATVs) used in travel and field operations must be regularly maintained and kept in good working order.
- ESI contractors are supervised in the field by ESI staff foresters and/or USFWS refuge personnel during field operations.

There is no specified penalty for failure to comply but executive company management stresses safety in regular communication with employees and contractors.

The "planter bin" on the machine planter used by ESI vendors—where workers sit and insert the tree seedlings into the ground—is encased such that sticks and field debris cannot reach them. Cameras in the tractor allow the tractor driver to see the planting bin at all times, and communication is possible between planter and driver. This is the same machine used by timber companies for tree plantation planting. ESI vendors have been engaged in planting operations for many years, including for government agencies overseeing the Conservation Reserve and Wetland Reserve tree planting programs.

The Occupational Safety and Health Administration (OSHA) and the Service require health and safety training for all USFWS employees.¹⁶ USFWS safety policy is designed to minimize any

¹⁶ Additional information on USFWS Safety Program Management is available at:
<http://www.fws.gov/policy/240fw1.html>

risks to worker safety, including requiring Refuge personnel to undertake an ATV safety course.

G4.7 Financial Health of Implementing Organization

USFWS is a financially stable agency within the United States government, funded through federal appropriations, and does not pose a financial risk to the longevity of the Mingo NWR Restoration Initiative.

The Fund leverages conservation dollars from our public and private partners, saving taxpayers more than \$1 billion in land purchase costs to date on lands valued in excess of \$3.6 billion. The Fund puts an average of 97 percent of its budget directly into conservation programs and just 1 percent into fundraising. The Fund is recognized annually as one of the nation's top environmental organizations by two charity watchdog organizations, American Institute of Philanthropy and Charity Navigator.

The Fund's work is made possible with generous support from individuals, foundations, corporations and government agencies. Its commitment to accountability and donor transparency remains a cornerstone of its operations. Copies of the Fund's 2008 Consolidated Audit and 2008 990 Tax Return can be found at:
http://www.conservationfund.org/who_we_are/financials

G5. LEGAL STATUS AND PROPERTY RIGHTS

G5.1 Compliance with National and Local Laws

A full list of federal laws and compliance requirements is included in the Mingo NWR CCP as Appendix E, and also attached to this document as Exhibit C. Descriptions of significant legislation are elaborated upon below.

Migratory Bird Treaty Act of 1918

Mingo NWR was established in 1944 under the authority of the Migratory Bird Treaty Act, which designated the protection of migratory birds as a federal responsibility. The Migratory Bird Treaty Act provided for regulations to control the taking of migratory species, and enabled other regulations, including the closing of areas, federal or non-federal, to the hunting of migratory birds.

National Wildlife Refuge System Improvement Act

In 1997, the National Wildlife Refuge System Improvement Act established a clear legislative mission of wildlife conservation for the refuge system and actions were initiated that same year to comply with the directive of this new legislation. This Act required CCPs to be completed for all refuges, with full public involvement, to help guide the management of each refuge.

Memorandum of Understanding

On March 30, 2007, the Fund and USFWS signed a MOU (see Exhibit A) pursuant to the Fish and Wildlife Coordination Act, 16 U.S.C. §§ 661-667e and the Fish and Wildlife Act of 1956, 16 U.S.C. §§ 742a – 742j. The Coordination Act authorizes the Service to “provide assistance to, and cooperate with, Federal, State, and public or private agencies and organizations in the development, protection, rearing, and stocking of all species of wildlife, resources thereof, and their habitat . . .” 16 U.S.C. § 661. The goal of the MOU is to create private/public partnerships as a way to generate support for the restoration and conservation of native habitats. Under the MOU, the Fund agrees to—among other things—seek donations from individuals, corporations and other organizations to support Go Zero habitat restoration projects on National Wildlife Refuges across the country. USFWS agrees to—among other things—be responsible for oversight and approval of habitat restoration activities on the ground and provide long-term management of these lands under natural conditions, and according to best wildlife and habitat management practices.

Wilderness Act (1964), as amended

The Wilderness Act directed the Secretary of the Interior to review every roadless area of 5,000 or more acres within the National Wildlife Refuge and National Park Systems and to recommend to the President the suitability of each such area or island for inclusion in the National Wilderness Preservation System, with final decisions made by Congress.

In 1976, Congress designated 7,730 acres within the Refuge as the Mingo Wilderness Area. This is the most pristine environment on the refuge. Visitors are welcome to walk, canoe,

photograph, fish, and study nature in the Wilderness Area but, but according to federal laws, no motorized vehicles or boats are allowed in order to keep the area as natural as possible.

National Environmental Policy Act

The National Environmental Policy Act (“NEPA”) requires the disclosure of the environmental impacts of any major federal action significantly affecting the quality of the human environment. NEPA requires each CCP to examine a full range of alternative approaches to refuge management and to involve the public in selecting the approach best suited to each refuge's purposes. Actions recommended in the CCP must be vetted under the NEPA process, which includes review of environmental and historical impacts (per the National Historic Preservation Act). Because restoration of bottomland hardwoods is a recommended action in the CCP, it has already been approved under the NEPA process. The Refuge will also file a categorical exclusion for the planting; an action may be categorically excluded from a detailed environmental analysis under NEPA if it meets certain criteria which a federal agency has previously determined as having no significant environmental impact. Because the planting was already vetted under NEPA during the CCP process, it does not need to be evaluated again.

Labor Law

Our contracts indicate that our partners, including ESI, have complied with national, state and local labor laws.

G5.2 Approval from Appropriate Authorities

As stated in G5.1, the Fund and the Service have an MOU, attached as Exhibit A, signed by then-Director of U.S. Fish and Wildlife Service Dale Hall, allowing Go Zero restoration projects to take place on any National Wildlife Refuge within the United States.

G5.3 Free, Prior, and Informed Consent

The Go Zero Project will not encroach uninvited on government property, private property or community property. All of the project lands are already owned by the federal government as part of the National Wildlife Refuge System, and the MOU between USFWS and the Fund allows Go Zero projects to take place on any Refuge within the United States.

G5.4 Involuntary Relocations

The Mingo NWR Restoration Initiative does not require the involuntary relocation of people or activities. The Service owns all of the Tracts being restored as part of the Mingo NWR Restoration Initiative. Some of the Tracts were leased to individual farmers for agricultural use because the Refuge did not have the funding necessary to restore the Tracts to bottomland hardwoods per the Refuge's CCP. The leases change annually and the farmers sign new contracts every year. The farmer who had been leasing most of the Go Zero Tracts recently stopped farming and two new farmers started working on these lands beginning in 2009. When these farmers started working on the Tracts, each of them was informed by the Refuge that some of their lands were going to be planted with bottomland hardwood trees in 2010.

The Refuge offered the farmers new opportunities for farming on some of Mingo's moist soil units and in other areas of the Refuge. The farmers are expected to continue farming other parcels on the Refuge and will not clear any new land for farming.

G5.5 Illegal Activities

There are no anticipated illegal activities that could affect the project. The project is being implemented in a National Wildlife Refuge, which is protected and patrolled by Refuge law enforcement staff. Activities on the Refuge must comply with all federal laws. While there is always a small but potential possibility of illegal activity such as unlawful hunting or logging or reckless destruction, the low population density in the area directly surrounding the Tracts, as well as law enforcement vigilance by the Refuge, makes this unlikely.

G5.6 Carbon Rights

The Go Zero program was created as a philanthropic approach to offsetting the annual carbon dioxide emitted by a specific activity, business, organization or individual. All carbon accrued by Go Zero projects is withheld from the regulated carbon markets and cannot be banked for future offset purposes, traded, or sold by Go Zero donors in the future. The MOU between the Service and the Fund makes clear that the goal of the Go Zero program and partnership is to generate support for forest restoration projects without generating carbon sequestration credits that can be sold or traded. In a letter to The Conservation Fund, Thomas Melius, USFWS Midwest Regional Director, reiterated that any carbon offsets generated as a result of Go Zero projects on the Refuge would be retired and not traded in the future (see Exhibit B).

CLIMATE SECTION

CL1. NET POSITIVE CLIMATE IMPACTS

CL1.1 Net Change in Carbon Stocks

ESI has been contracted by the Fund to plant the Project Area, to measure the baseline conditions and to monitor the project's ongoing carbon gains. In 2007, ESI led an extensive research effort to build upon earlier predictive models of carbon sequestration in the Lower Mississippi Valley ("LMV"). The 2007 initiative involved a consortium of leaders in forest science and carbon project development, drawing on expertise from representatives of ESI, Winrock International ("Winrock"), The Nature Conservancy, the Yale School of Forestry and Environmental Studies, the USDA Forest Service Center for Bottomland Hardwoods Research in Stoneville, Mississippi and the U.S. Geological Survey. The team amassed the most comprehensive dataset of bottomland hardwood stands yet assembled for the region, drawing on 540 biomass plot measurements, and produced the most reliable predictive model to date. The findings were published in the peer reviewed journal *Wetlands* (Shoch et al, 2009) (attached as Exhibit D).

This most recent research is specific to a geographic band within the Lower Mississippi Alluvial Valley. Mingo NWR is on the periphery of this region and USFWS and ESI staffs have agreed that the bottomland hardwood tree species, soils and growth patterns at Mingo NWR are similar to those in the Alluvial Valley. Due to these ecological similarities, the predictive model will be applied to the Mingo NWR Restoration Initiative through age 15 when the variability of young stands is too high to achieve target precision levels with direct measurement (ESI, unpublished data). After age 15, direct measurements will be undertaken to assess the change in carbon stocks over time.

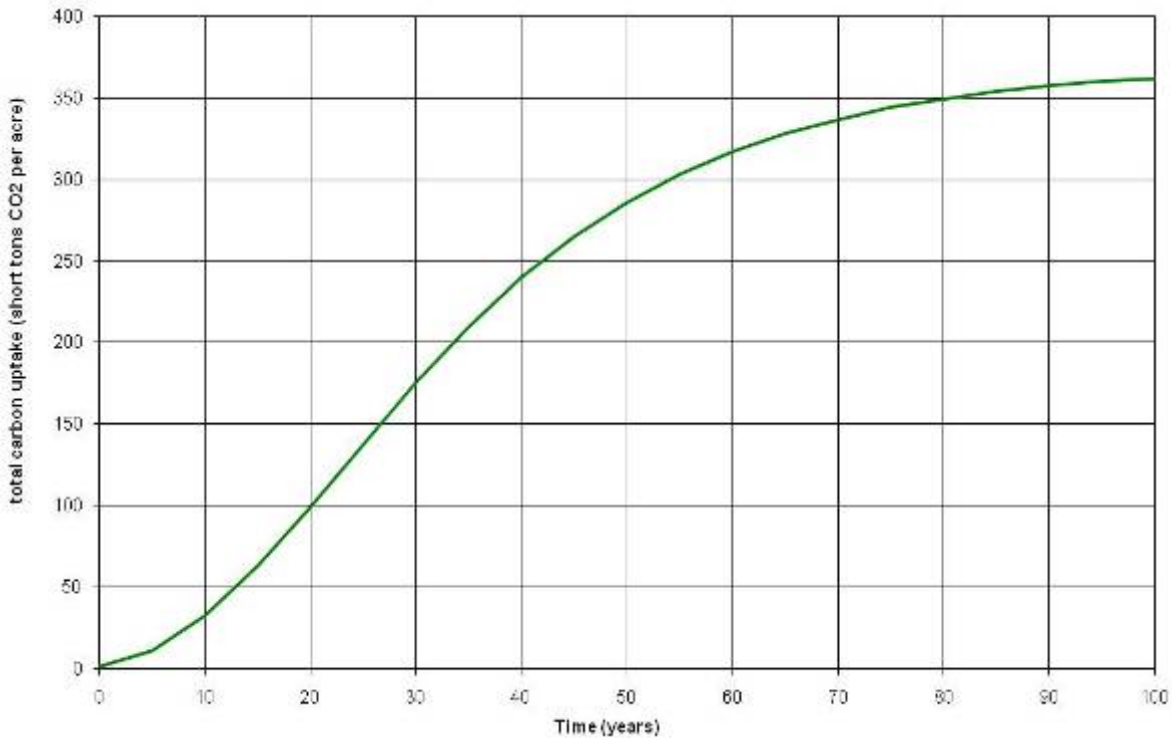
The predictive model, illustrated in Table 3 and Figure 8 below, combines the new empirical biomass data from Shoch et al. with forest inventory data represented in USDOE 1605(b) tabular estimates for minor pools (e.g., dead wood, understory and soil carbon).

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Table 3: Tabular data of projected carbon curve over 100 year period of LMV bottomland hardwood forest. (courtesy David Shoch, TerraCarbon LLC)

Measured		USDOE tables			(metric)	(short tons)
Stand age	Live tree Biomass, tC/ha	Soil	Dead Wood and Understory	TOTAL	t CO ₂ -e/ac	t CO ₂ -e/ac
0	0.8	0	0.0	0.8	1	1.4
5	4.8	0.1	1.9	6.8	10	11.2
10	14.4	0.5	5.0	19.9	30	32.6
15	29.8	1.1	7.6	38.5	57	63.0
20	49.3	1.9	9.4	60.6	90	99.0
25	70.4	2.9	10.9	84.2	125	137.6
30	90.9	4	12.1	107.0	159	175.0
35	109.6	5.1	13.3	128.0	190	209.3
40	125.7	6.2	14.6	146.5	217	239.5
45	139.1	7.3	15.5	161.9	240	264.7
50	149.9	8.3	16.6	174.8	259	285.8
55	158.5	9.2	17.6	185.3	275	302.9
60	165.2	10.1	18.4	193.7	287	316.7
65	170.3	10.7	19.4	200.4	297	327.8
70	174.3	11.3	20.2	205.8	305	336.6
75	177.4	11.8	21.0	210.2	312	343.7
80	179.7	12.2	21.6	213.5	317	349.1
85	181.4	12.4	22.4	216.2	321	353.5
90	182.7	12.7	23.2	218.6	324	357.5
95	183.7	13	23.2	219.9	326	359.6
100	184.5	13.3	23.2	221.0	328	361.3

Figure 8: Predictive Model for carbon sequestration in bottomland hardwoods in the Lower Mississippi Valley Region



Monitoring Plan and Compliance with the IPCC Good Practice Guidelines¹⁷

ESI’s carbon measurement and monitoring plan for bottomland afforestation projects in the Lower Mississippi Valley follows general principles of carbon accounting provided in Chapter 4 (AFOLU; Agriculture, Forestry and Other Land-use) of the IPCC 2006 Guidelines for National Greenhouse Gas Inventories and IPCC Good Practice Guidance (IPCC GPG 2003), specifically Chapter 4.3 Guidance for Projects.

Over the life of the project, carbon sequestration estimates will be derived from direct measurements on permanent plots, without reliance on default emission factors, and thus the ESI plan satisfies the IPCC Tier 3 highest level of accuracy criteria. Note that there is a wide range in robustness of carbon accounting approaches (Tiers 1 to 3) that are in compliance with the IPCC 2006GL; Tiers 1 and 2 do not use direct, continuous measurement as does the ESI monitoring plan.

This direct measurement approach is applied in quantifying baseline stocks against which net project performance will be tracked. On-the-ground observations serve to confirm the absence of woody biomass, and soil carbon stocks are estimated through direct sampling and analysis. The ESI measurement and monitoring plan was designed and implemented to measure and

¹⁷ David Shoch of TerraCarbon and ESI provided the following description.

quantify carbon stocks in terrestrial pools (above and belowground biomass, standing and lying dead wood, mineral soil carbon). Over the life of the project, carbon stocks can then be determined as the difference in the current carbon stock and stocks measured at the initiation of the project (i.e. the baseline carbon stock). This focus on measuring stocks (rather than fluxes) is designed for stock change accounting advocated by the IPCC.

In further conformance with IPCC guidance regarding explicit quantification of uncertainties and reducing uncertainties, the ESI monitoring plan is designed to quantify and control for uncertainty in estimates by employing optimum sampling intensity and unbiased allocation of measurement plots to produce estimates with a known level of confidence.

Finally, per IPCC 2006GL guidance, the ESI monitoring plan includes a Quality Assurance/Quality Control (QA/QC) plan to control for errors in sampling and data analysis. This QA/QC plan provides documentation and consistency in data archiving thus permitting efficient third-party auditing and evaluation against measurement and quantification standards over the life of monitoring. ESI maintains a database of GIS coverages detailing parcel boundaries and plot locations, and raw field measurements and analyses permitting independent review of source data over the life of the project.

CL1.2 Net Change in Non-CO₂ gases

Non-CO₂ gases are not expected to account for more than a 5% increase or decrease of the Mingo NWR Restoration Initiative's overall greenhouse gas ("GHG") impact and are not considered significant because of multiple factors. First, site preparation methods will not cause increases of non-CO₂ emissions from the soil. Second, the soil disturbance associated with planting will be minimal. When soil is disturbed, some of the carbon stored in the soil can be lost to the atmosphere and in some cases, especially with wetlands and water-bogged soil, soil disturbance can cause methane loss. The Go Zero Tracts will be planted by a machine in which a mechanized tool called a "foot" opens a planting slit 12-16" deep, which simultaneously loosens the soil for better moisture retention and creates a hole for the seedling. A special wheel then tightens up the surface soil around the seedling, reducing soil disturbance. Our expectation is that there should be no long-term methane emissions associated with machine planting and any short term emissions should be quickly recovered by incorporation of new soil organic matter from forest growth.

CL1.3 Other GHG Emissions from Project Activities

The Fund does not anticipate any other GHG emissions to result from the project activities. No fertilizers will be used and very little site-preparation is needed. Emissions generated by tractors during planting will be monitored and deducted from the final project sequestration estimates.

CL1.4 Positive Net Climate Impact

The climate model predicts a net climate impact of 259 metric tons of CO₂ equivalent per acre (i.e., 286 short tons per acre) at year 50, and 328 metric tons of CO₂ equivalent per acre (i.e.,

361 short tons per acre) at year 100. The annualized average for the first 50 years is 5.2 metric tons of CO₂ equivalent per acre per year (i.e., 5.7 short tons of CO₂ equivalent per acre per year). As stated above, any emissions from fossil fuel combustion generated during planting will be subtracted from this total.

CL1.5 Avoidance of Double Counting

All of the carbon benefits generated by the Mingo NWR Restoration Initiative will be withheld from regulated greenhouse gas markets and will be retired upon their sale. The Fund uses an online database system to track all offset tons and their disbursement to buyers. Once tons have been allocated to a particular site, they are retired and made unavailable for sale to other buyers. This system is kept on secure servers at Fund headquarters. In addition, all Go Zero contracts and marketing materials state that all carbon accrued by Go Zero projects is withheld from the carbon market and cannot be banked for future offset purposes, traded, or sold by Go Zero donors in the future.

CL2. OFFSITE CLIMATE IMPACTS (“Leakage”)

CL2.1 Types of Leakage

It is unlikely that leakage due to this project will be a major concern. According to a white paper published by the Offset Quality Initiative, reforestation and afforestation projects are less likely to be affected by potential leakage impacts than other carbon projects.¹⁸ In this case, the primary concern is that because lands were taken out of agricultural production and restored to trees, the tenant farmers who previously used the land may clear healthy forests to create more viable agricultural lands offsite. However, the individuals who farmed on the Go Zero Tracts have no intentions of clearing any forested lands. These farmers will move operations to other farmlands already in their possession and will also have the opportunity to farm on moist soil units and other agricultural lands on the Refuge. These actions are representative of an overall trend; cropland use in the region as a whole has been declining since 1950.¹⁹ Therefore, no activity shifting leakage should be expected as a result of this project.

The Fund does not believe that market leakage effects will be significant. One reason for this is that timber harvest volumes will not be affected by the project. The Fund also does not expect any other measurable leakage effects.

CL2.2 Mitigation of Negative Offsite Impacts

Because no offsite impacts attributable to project leakage are anticipated, no direct actions will be necessary to mitigate their effects.

¹⁸ Ensuring Offset Quality: Integrating High Quality Greenhouse Gas Offsets into North American Cap-and-Trade Policy. July, 2008. The Offset Quality Initiative. Available: <http://www.offsetqualityinitiative.org/index.html>

¹⁹ Brown, D. G., K. M. Johnson, et al. (2005). "Rural Land-Use Trends in the Coterminous United States, 1950-2000." *Ecological Applications* 15(6): 1851-1863.

CL2.3 Net Effect of Climate Impacts

The Fund does not expect any leakage to occur; therefore, no adjustment was made to the Net Climate Impact figures seen in CL1.4

CL2.4 Non-CO2 GHGs

The Fund does not expect there to be any non-CO2 offsite effects.

CL3. CLIMATE IMPACT MONITORING

CL3.1 Monitoring Plan

Background

The carbon monitoring plan that governs the Mingo NWR Restoration Initiative was developed in 2001 by Winrock for ESI with the objective of establishing a scientific basis for measuring carbon stock changes over time on reforestation sites with similar characteristics in the LMV. Their research indicated that parameters like flood mark height, soil series or bulk density insignificantly impact carbon sequestration and therefore, multiple planting sites in the LMV, including the Go Zero Tracts at Mingo, can be treated as one population in the statistical analysis of plot measurements.

Sampling Design

Cohort Monitoring: The monitoring plan involves grouping for long-term measurement and monitoring purposes all LMV plantings within a two-year cohort. This regional, cohort-based system provides a monitoring umbrella that incorporates multiple project sites under a single monitoring platform, thereby reducing required intensity of sampling on any individual site. This is currently the most cost-effective approach to tracking carbon sequestration across large areas.

Sample Size: Based on the original analysis provided by Winrock, one hundred permanent monitoring plots are established for each two-year cohort to achieve a minimum precision of biomass stock estimates of +/-10% of the mean with 95% confidence beginning at age 15-20 through maturity.

Sample Plot Allocation: Plots are systematically assigned to plantings by spatially delineating all tracts and consolidating a list of tracts and respective areas into one population. Selecting a random start, plots are then assigned across the planting sites. Within each tract, plot location(s) were also located at random using Arcview software extension "random.avx", ensuring that any point within a given planting site has an equal chance of being selected.

Methodology for on-site Measurements

The LMV monitoring plan includes a comprehensive Standard Operating Procedure that details how soil carbon is sampled and analyzed in the base year and how live biomass, dead woody material, and soil will be sampled and measured in subsequent years.

Baseline Carbon Stocks: Land use history for each tract is documented by ESI, and non-forest baseline site conditions verified by analysis of satellite imagery, aerial photos, USGS National Land Cover Dataset and/or other available and appropriate imagery. Where necessary, tract boundaries are redrawn to exclude any pre-existing tree cover. Digital photos are taken on-site prior to planting to further document baseline conditions and verify the absence of pre-existing woody biomass.

Within twelve months of planting, initial measurements of soil carbon are taken in each of the 100 monitoring plots to determine base year carbon stocks for the project. Soils are sampled using a standard soil corer. Four samples to 50 cm depth were collected in each plot, one randomly located in each quarter of the circular plot. The soil from each core is bulked and all samples mixed together, with a sub-sample collected and placed in a labeled paper bag for carbon analysis. One additional soil core is taken from each sampling point and placed in a separate sample bag to be used for bulk density determination. Soil bulk density measurements are adjusted for moisture and corrected to account for any rock fragments present. Soil samples are then analyzed to determine carbon content, which together with bulk density, is used to estimate the amount of carbon per unit area (to 50 cm depth).

Subsequent Monitoring: The Fund will use the modeled curve discussed in Section CL1.1 for estimating carbon accrual for the project until age 15-20 when the variability of young stands stabilizes enough to reach target precision levels with direct measurement. Future monitoring will be coordinated by The Fund with its project partners.

Quality Assurance/Quality Control

ESI maintains a database of raw field measurements and analyses, and GIS coverages detailing parcel boundaries and plot locations, to permit independent review of source data over the life of the project. In addition, the monitoring plan includes specific Quality Assurance/Quality Control measures to control errors in sampling and data analysis, and to provide documentation and consistency in data archiving. This enables efficient third-party auditing and evaluation against measurement and quantification standards.

Leakage Monitoring

In order to monitor potential leakage over five years, Refuge staff will communicate with the tenant farmers that were previously farming the Go Zero Tracts and determine if they have cleared land for agriculture as a result of their loss of access to the Go Zero Tracts. As stated in G5.4, the farmers are not expected to clear any land for farming.

CL3.2 Monitoring Plan Development

The Fund and ESI have developed a long term monitoring plan (as described above) for the Mingo NWR Restoration Initiative.

COMMUNITY SECTION

CM1. NET POSITIVE COMMUNITY IMPACTS

CM1.1 Community Benefits

The Go Zero Tracts are currently agricultural lands with minimal public recreation value. However, once these lands are restored with native forest, they can be enjoyed by the entire public and especially residents in the surrounding communities. Over 100,000 visits occur annually to Mingo NWR and the restored Tracts will improve the quality of recreational opportunities available including hunting, wildlife photography and observation, environmental education and interpretation, biking, hiking, jogging, berry and mushroom gathering and picnicking. The majority of recreational uses at the Refuge are oriented toward hunting and birding. Several of the Go Zero Tracts are located in the Refuge's general hunt area, and are commonly used for deer hunting and archery. Once these parcels are restored with bottomland forests, the quality of the hunting in these areas will be greatly improved. In addition, each January the Refuge hosts a special deer hunt for hunters using primitive weapons, such as muzzle-loading rifles. This hunt, which is coordinated with the Missouri Department of Conservation and requires an advance application, takes place within the Mingo Wilderness Area; it will now also be able to take place on the Go Zero Tracts that neighbor the Wilderness Area.

Environmental education opportunities will also be improved. Each year the Refuge hosts numerous community educational events such as Eagle Days and Ecology Days. During Eagle Days, hosted in conjunction with the Missouri Department of Conservation and Mingo Friends Group, over 2,000 individuals, including many school groups, visit the Refuge and the neighboring Duck Creek Conservation Area for live eagle presentations, guided viewing tours of bald and golden eagles and their nests, and informational sessions. During Ecology Days, 4th and 5th grade students from Stoddard and Butler Counties visit the Refuge to reinforce what students learn about Missouri's natural resources in the classroom. The quality of these experiences on the Refuge will be improved due to the Tracts' restoration, which will lead to improved forest and habitat conditions.

The Go Zero project's positive community impact will be measured by monitoring the community



Figure 9: Local schoolchildren participating in Mingo NWR Ecology Days

use of the Go Zero Tracts over time. The surrounding community will be able to use the land for a variety of activities like those described above, including hunting, hiking, bird watching and the special activity days. Although increase in use will likely be modest at first, it is anticipated that visitor use days will be positively correlated with the Tracts' stand development. As the stands develop into mature bottomland hardwood forest, activities such as hiking, bird watching, photography and hunting are expected to increase, and a rise in activity levels should lead to corresponding increases in overall fitness, health and wellbeing amongst community members. Figure 10 below illustrates the predicted increase in community use that can be expected as a result of the Go Zero project.

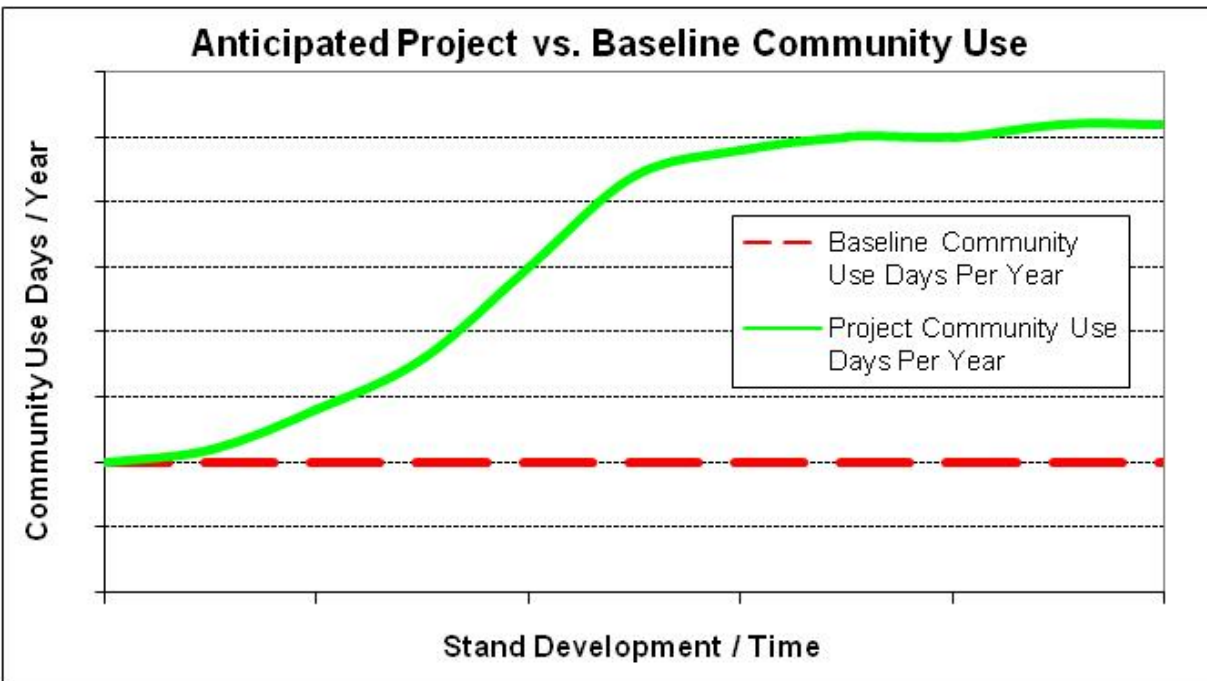


Figure 10: Anticipated Project vs. Baseline Community Use Over Time

As illustrated by Figure 10, the Mingo NWR Restoration Initiative is expected to generate an increasingly positive community impact over time. In the absence of the project, the land would have remained as agricultural land and not well suited to recreational activities such as hiking, birding, or hunting. Therefore, the net community impact of the project can be considered positive.

CM1.2 Impact on High Conservation Values

The Mingo NWR Restoration Initiative should have only positive effects on the High Conservation Values described in G1.8. The bottomland hardwoods at the Refuge provide important ecosystem functions for the surrounding area including flood water storage and conveyance, filtration, and cycling of essential nutrients and minerals. Planting more bottomland hardwoods throughout the Refuge will only enhance these functions. Also, the



Figure 11: Community members watching the sky during Eagles Days at Mingo NWR

Restoration Initiative will highlight the Refuge's role in the community as a place for local residents to appreciate their natural surroundings and celebrate the outdoors through events like Eagle Days and Ecology Days.

CM2. OFFSITE STAKEHOLDER IMPACTS

CM2.1 Potential Negative Offsite Impacts

There are no potential negative stakeholder impacts from restoring the Go Zero Tracts within Mingo NWR.

Most of the land was previously leased to farmers for agricultural use on a year-to-year contract basis; two farmers were using the land for soybean production prior to project implementation. The Go Zero Tracts represent a small percentage of their overall acreage and the farmers will be able to continue farming on other Refuge lands next year, including opportunities to farm on some of the Refuge's moist soil units. Therefore, no jobs should be lost in the community due to the cessation of farming on the Tracts. There will be no impact on county tax rolls because the Go Zero Tracts were already owned by USFWS.

CM2.2 Mitigation of Negative Impacts

There are no anticipated negative impacts caused by the restoration of the Go Zero Tracts. As stated above, each farmer will be able to continue farming on other property. The Refuge will also offer new opportunities on its moist soil units. Therefore, no jobs will be lost due to the project.

CM2.3 Net Stakeholder Impacts

As stated above in CM2.1, there are no anticipated negative stakeholder impacts caused by the restoration of the Go Zero Tracts. Restoring the Tracts to native forest confers many benefits on the surrounding community and community stakeholders (such as the Friends group), as described in CM1.1. Thus, the net effect on the community is positive.

CM3. COMMUNITY IMPACT MONITORING

CM3.1 Monitoring Plan

Mingo NWR staff will monitor the community benefits generated by the Mingo NWR Restoration Initiative with specific attention paid to the anticipated rise in community use of the Go Zero Tracts. As the seedlings develop into a mature bottomland hardwood forest, public activity on the Tracts, including hunting, birding, environmental education and celebratory events, is expected to increase as illustrated in Figure 12 below. All of the Go Zero Tracts are open to hunting at some point during the year, and hunting conditions will be especially improved once the lands are restored. In addition, the Refuge is developing a scenic pull-out stop by one of the Tracts which is already along the Refuge’s existing auto tour. The pull-out stop will feature signage explaining the forest restoration processes taking place at Mingo NWR through the Restoration Initiative. Explanatory brochures will be available next to the display. Community use of the Tracts (and the entire Refuge) for public education and enjoyment is a significant benefit of the Go Zero project and, therefore, an appropriate variable for community impact monitoring.

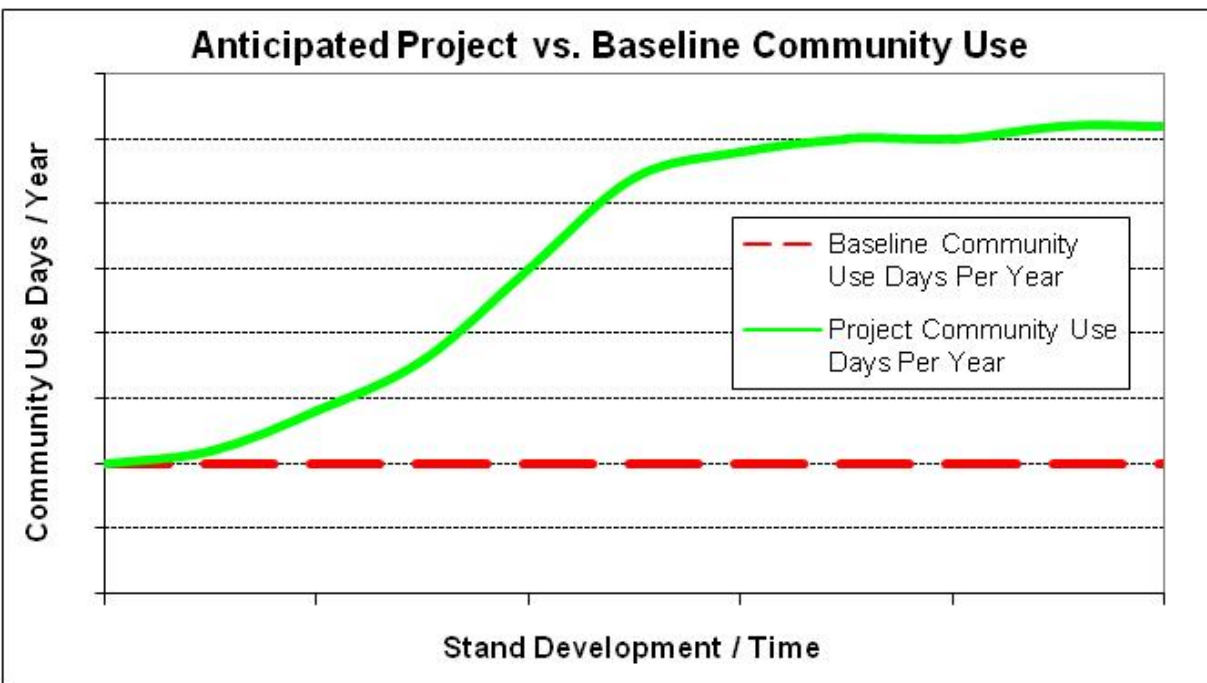


Figure 12: Anticipated Project vs. Baseline Community Use Over Time

Mingo NWR already tracks visitors to the Refuge through the use of car counters. There are about 8-10 car counters in place at different points within the Refuge, including one along the Refuge’s auto tour route. The Refuge’s auto tour is a one-way road which travels through the Refuge and passes several of the Go Zero Tracts, including the Tract which will soon feature the educational display. The Refuge has had a car counter along this route (at a location near the Tracts) for the past several years and has collected baseline data on the number of visitors using this route. The Refuge will continue to monitor traffic along this route and will compare it

to the baseline. Also, once the environmental display near the Tracts is complete, the Refuge will use either a car counter or a person counter positioned at the pull-out to track how many people stop at the new display on the Go Zero Tract. Visitor usage will also be monitored by tracking the number of individuals who take educational brochures from the display. This will allow the Refuge to monitor changes in visitor use specifically on the Tracts.

Within the next 5 years, the Refuge also plans to develop a walking trail that would depart from the new scenic pull-out. This will also likely increase the number of visitors to the Tracts. Car and person counters will be used to monitor the increase in usage caused by the new walking trail.

At this time, there are no community variables at risk of being negatively impacted by the project as stated above in CM2.1 and CM2.2. If certain community variables become problematic over time, the grievance process is in place to notify USFWS of any potential problems.

CM3.2 High Conservation Value Monitoring Plan

The High Conservation Values associated with the Refuge's role as a community gathering place will be monitored by tracking visitor usage as described above. The ecological functions of the bottomland hardwoods will be monitored and maintained using Refuge management plans and the processes described in Mingo's CCP.

CM3.3 Community Impact Monitoring Implementation

The Refuge has outlined a plan to monitor the community impacts of the Mingo NWR Restoration Initiative in CM3.1. The Fund and Mingo NWR staff are committed to developing and fine-tuning the plan and will publish an updated plan within twelve months of validation against the CCBA standards.

BIODIVERSITY SECTION

B1. NET POSITIVE BIODIVERSITY IMPACTS

B1.1 Biodiversity Impacts

The Mingo NWR Restoration Initiative will restore key parcels within the boundary of Mingo NWR and will have significant positive effects on biodiversity and the wildlife that depend on bottomland hardwood forests. Mingo NWR was established to protect migratory birds but the bare Go Zero Tracts cannot currently support a large variety of birdlife because many bird species require habitat that includes complex vertical and horizontal structure for nesting or foraging. The newly planted forests will develop the complex habitat necessary for successful breeding, nesting and overall survival. Research on avian colonization has shown that bird species richness rises as bottomland hardwood forests age due to an increase in this structural complexity.²⁰ Because land cover at Mingo NWR is primarily mature forest or grasslands, birds that depend on early and mid-successional forests are particularly in need of new habitat area. Species such as prairie warblers, indigo buntings, American redstart, common yellowthroat and Eastern kingbird will all benefit from the new early successional forestland habitat. The new forests will also minimize the threats to many species posed by the brown-headed cowbird—a brood parasite which thrives in open habitat—by reducing forest fragmentation. Figure 14 below illustrates the anticipated increase in bird species richness as a result of the Go Zero project.



²⁰ Wilson, R.R. and D.J. Twedt. 2005. Bottomland Hardwood Establishment and Avian Colonization of Reforested Sites in the Mississippi Alluvial Valley. Pages 341-352 in L.H. Frederickson, S.L. King and R.M. Kaminski, editors, Ecology and Management of Bottomland Hardwood Systems: The State of Our Understanding. University of Missouri-Columbia. Gaylord Memorial Laboratory Special Publication No. 10, Puxico.

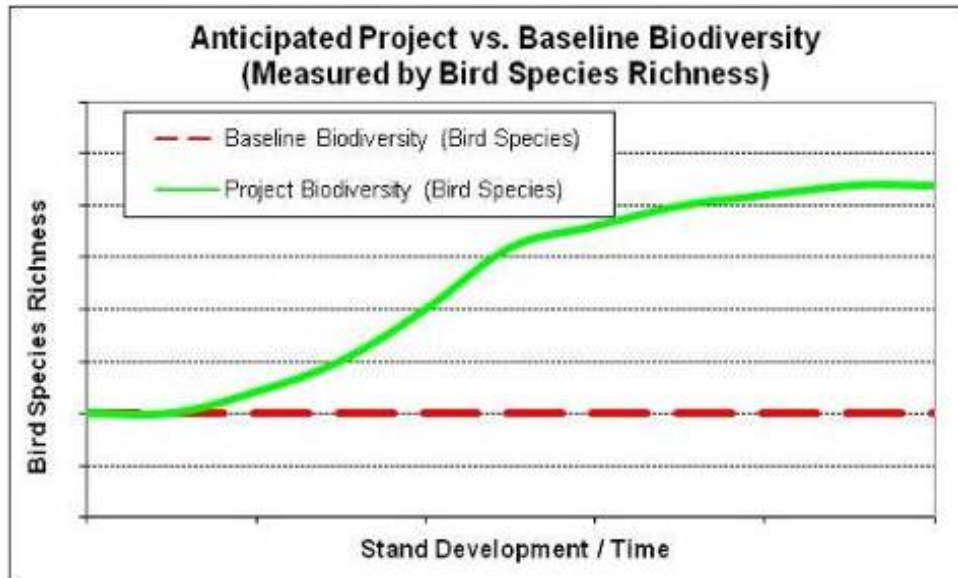


Figure 14: Anticipated Project vs. Baseline Biodiversity Over Time

Without the project, the land would remain in agricultural production, and/or continue to be hayed and burned as part of the Refuge management strategy, either of which would have an adverse impact on biodiversity. Habitat fragmentation negatively impacts species migration, breeding and overall survival rates; fragmentation due to land conversion has led to the decline of many avian species.²¹ Forest fragmentation at Mingo NWR had created an atmosphere where cowbirds, who like open habitat and forest edges, were able to thrive and threaten the survival of other bird species. Larger, more connected areas of natural habitat—including that made possible by the Go Zero restoration—will benefit the many species that rely on bottomland hardwoods at Mingo NWR. Therefore, the net biodiversity impact of the Go Zero project, in comparison to the “without project” scenario, is expected to be positive.

B1.2 Impact on High Conservation Values

High Conservation Values will not be negatively affected by the Mingo NWR Restoration Initiative. To the contrary, the project will have only positive effects on the High Conservation Values identified in G1.8. For example, the new forests will provide important new habitat for the endangered Indiana bat.

B1.3 Species Used by the Project

The Go Zero Tracts will be planted with native bottomland hardwood forest species carefully chosen by USFWS staff and designed to restore the fully functioning natural systems of Mingo NWR. Tree species include black walnut, northern red oak, white oak, shellbark hickory, nuttall

²¹ Twedt, D.J., R. R. Wilson, Management of Bottomland Hardwood Forests for Birds. Proceedings of 2007 Louisiana Natural Resources Symposium, *available at*: <http://www.lmvjv.org/research.htm>

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oak, willow oak, pin oak, blackgum, bald cypress, pecan, bur oak, black cherry, swamp chestnut oak, cherrybark oak, overcup oak, persimmon and water tupelo.

B1.4 Exotic Species in the Project Area

In accordance with Go Zero's planting principles, only native species will be used for the Mingo NWR Restoration Initiative.

B1.5 Genetically Modified Organisms

The Conservation Fund contracted with Environmental Synergy Inc. (ESI) to coordinate the tree planting for the Mingo project and ESI's foresters worked with Bradshaw Tree Inc., a professional tree planting service, to order the appropriate seedlings, package and store the seedlings, and plant the seedlings on the Go Zero Tracts. The seedlings used for the Mingo NWR Restoration Initiative were ordered from two separate nurseries: SuperTree Seedlings in Arkansas and the Morgan County Nursery in Kentucky. Both nurseries confirmed in writing that no genetically altered seedlings were sold to Mr. Bradshaw for use in the Go Zero project.

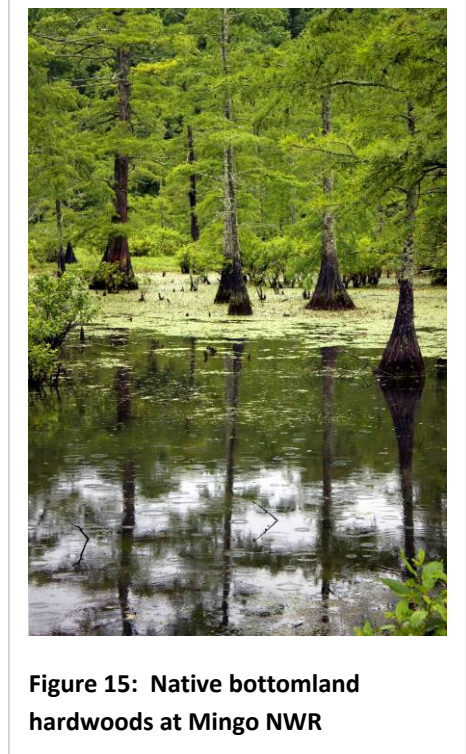


Figure 15: Native bottomland hardwoods at Mingo NWR

B2. OFFSITE BIODIVERSITY IMPACTS

B2.1 Potential Negative Offsite Biodiversity Impacts

Biodiversity offsite will only benefit from these newly restored parcels because the negative effects associated with fragmented forestlands should decrease. All positive biodiversity impacts associated with the Go Zero Tracts are extended offsite to adjacent lands and the entire Mingo NWR.

B2.2 Mitigation Plans

N/A

B2.3 Evaluation of Potential Negative Offsite Biodiversity Impacts

The net effect of the restoration of the Go Zero Tracts on biodiversity will be highly positive on both the Go Zero Tracts and Mingo NWR as a whole.

B3. BIODIVERSITY IMPACT MONITORING

B3.1 Biodiversity Monitoring

As noted in section B1.1, the Mingo NWR Restoration Initiative is expected to have a significant positive impact on the richness and variety of bird species found on the Tracts due to the increased habitat area, greater habitat complexity, and greater habitat connectivity provided by the newly planted bottomland hardwood forest. As stated in B1.1, a positive correlation between stand development and species richness is anticipated as illustrated in Figure 14.

In order to monitor the changes in bird species richness over time, the Refuge will set up survival plots and monitoring plots across the Tracts. There will be three survival plots per 100 acres of newly planted area, and each plot will have 100 trees (these will be used to determine the survival rates of the trees). Monitoring plots will be installed in these same locations and bird point counts will be conducted to determine bird species richness. These point counts will begin in 2010 after planting occurs and continue annually for the first five years. After that, Refuge staff will conduct point counts every five years to continue monitoring changes in bird species richness over time.

Standard point count methodology will be used to monitor the changes in the avian population. Sampling design and protocols will follow the standard operating procedures and guidelines outlined in *Landbird Monitoring Protocol for the U.S. Fish and Wildlife Service, Midwest and Northeast Regions*.²² Point count locations were randomly selected by the Service within afforestation units; only points greater than 100 meters from an edge were selected. All birds seen or heard during 10-minute point count duration will be recorded. Bird detections will be separated out into 1, 3, 5, and 10 minute intervals. In addition, bird detection distances will be estimated and recorded for each individual less than 50 meters from the point center. Flyovers will not be recorded since their specific habitat association to the restored sites cannot be determined. Each point count will be visited three times starting in mid-May through June. To facilitate comparison of the overall biodiversity effects between afforestation sites and existing agriculture, random control plots will be established in agriculture units and follow the same sampling protocol. Data will be analyzed using the program DISTANCE.

The CCP for Mingo NWR is reviewed and revised according to changes in ecological conditions and augmented by additional management plans that address specific strategies in support of Refuge goals. The results of these species richness surveys will be considered when devising and implementing management plans for the Refuge.

²² Knutson, M. G., N. P. Danz, T. W. Sutherland, and B. R. Gray. 2008. Landbird Monitoring Protocol for the U.S. Fish and Wildlife Service, Midwest and Northeast Regions, Version 1. Biological Monitoring Team Technical Report BMT-2008-01. U.S. Fish and Wildlife Service, La Crosse, WI. 25 pages + 11 Standard Operating Procedures pp. (<http://www.fws.gov/bmt/protocols.htm>)

B3.2 High Conservation Values

As detailed in G1.8, the Mingo Basin has been identified as a critical migration and wintering habitat for waterfowl and migratory birds. Point surveys, described in B3.1, will be used to monitor the impact of the project on these avian communities.

The Refuge is currently developing plans (in conjunction with the Forest Service) to monitor Indiana bat maternity colonies at Mingo NWR.

Other High Conservation Values will be managed and maintained according to the plans specified by the Refuge's CCP.

B3.3 Monitoring Plan Implementation

The Refuge has outlined a plan in Section B3.1 to monitor the biodiversity impact of the Mingo NWR Restoration Initiative. The Fund and Mingo NWR staff are committed to developing and fine-tuning the plan and will publish an updated plan within twelve months of validation against the CCBA standards.

GOLD LEVEL SECTION

GL3. EXCEPTIONAL BIODIVERSITY BENEFITS

GL3.1 Vulnerability

According to the vulnerability criteria, one globally threatened species must occur within the Project Zone. As described in section G1.7, the federally endangered Indiana bat has been found within Mingo NWR. The Indiana bat is listed as endangered by the IUCN Red List, the U.S. Fish and Wildlife Service, and by the Missouri Department of Conservation. Over the past 10 years, the bat has experienced a serious population decline.

Wooded riparian areas are needed by bats for foraging, roosting and breeding. Indiana bats raise young and roost under the bark of trees in riparian forests and favor species of oak and hickory trees, such as those planted as part of the Mingo NWR Restoration Initiative. In the summer, females gather beneath the loose bark of living and dead trees in maternity colonies of 50 to 100 individuals. One of these maternity colonies was found on the edge of a Go Zero Tract during the most recent Southeastern Bat Diversity Network Bat Blitz in August 2009. Indiana bats exhibit great loyalty to their roosting and hibernating sites and will return to the same locations year after year.

Changes in habitat resulting from agricultural development and conversion of forested land have affected the amount and quality of bat habitat. Some of the primary reasons cited for continuing population declines of the Indiana bat include loss and degradation of summer habitat and roost sites due to impoundment, stream channelization, housing development, clearcutting for agricultural use or incompatible forest management practices that result in a shortage of the microhabitats used for maternity roosts.²³ Harvesting trees and removing dead trees reduces the amount of available habitat and forces the bats to utilize areas where the potential for disturbance or predation may be higher.

One management strategy suggested by the Missouri Department of Conservation to help the recovery of the Indiana bat is to maintain continuous forest vegetation in riparian zones in order



Figure 16: Endangered Indiana bat

²³ IUCN Red List, available at: <http://www.iucnredlist.org/apps/redlist/details/14136/0>

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to increase favorable bat habitat.²⁴ The Go Zero project will implement this suggestion by increasing forest connectivity at Mingo NWR and improving and expanding Indiana bat habitat.

²⁴ Missouri Department of Conservation Endangered Species Guide Sheet, available at: <http://mdc.mo.gov/nathis/endangered/endanger/bat/>

CONCLUSION

The Mingo NWR Restoration Initiative is a unique opportunity to restore southeastern Missouri's native bottomland hardwood forests and help mitigate climate change while conferring community and biodiversity benefits to Missouri's bootheel region. In addition to sequestering carbon dioxide from the atmosphere, the Go Zero Tracts will restore fragmented habitat, enhance water quality in the Mingo Basin, and improve the quality of public recreation areas for all to enjoy.