Restoring a Forest Legacy at Marais des Cygnes 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 Marais des Cygnes National Wildlife Refuge Restoration Initiative to meet the standards of the Climate, Community, and Biodiversity Alliance. The Marais des Cygnes National Wildlife Refuge Restoration Initiative is a unique opportunity to restore native hardwood forests that will benefit fish and wildlife, enhance water quality along the Marais des Cygnes River, create new areas for public recreation, and trap carbon dioxide.

On behalf of the US Fish and Wildlife Service, the nonprofit Conservation Fund used donations from its Go Zero® program to restore 776 acres of marginal land within the boundary of the Marais des Cygnes National Wildlife Refuge located in Linn County in eastern Kansas. The newly restored native bottomland hardwood forest will be managed by the Service to ensure its long-term protection and stewardship. The carbon offsets that are generated from this project are retired 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 Kansas'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 hunting, fishing, wildlife photography, wildlife observation, environmental education and environmental interpretation.

Since 2005, the Fund's Go Zero program has helped to engage 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 at a historic low, voluntary contributions are providing new private capital that is used 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 and monitors 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 Services' 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 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. Much of this activity has taken place on National Wildlife Refuge lands.

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 Marais des Cygnes NWR Comprehensive Conservation Plan.

Building on decades of experience and expertise, the Marais des Cygnes 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 Marais des Cygnes National Wildlife Refuge was established to protect a unique and diverse landscape, including an intersection of ecosystems joining the northernmost bottomland hardwood habitats of the Southeast and the prairies of the Great Plains. Today this bottomland hardwood ecosystem represents the last hardwood stand remaining in Kansas or anywhere in the Mountain-Prairie Region of the Fish and Wildlife Service. Restoring these lands is one of The Conservation Fund's highest priorities, resulting in cleaner air, cleaner water, and enhanced biodiversity for wildlife and people alike.

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G1. ORIGINAL CONDITIONS AT PROJECT SITE

G1.1 Location and Basic Physical Parameters

The Marais des Cygnes National Wildlife Refuge ("Marais des Cygnes NWR") was established in 1992 to protect bottomland hardwood habitats along the Marais des Cygnes River in Linn County, Kansas. The name, Marais des Cygnes, comes from the French language and means Marsh of the Swans. Trumpeter Swans, which were historically common in the Midwest, used the wetlands adjacent to the Marais des Cygnes River during spring and fall migration.

Located just 70 miles south of Kansas City, Marais des Cygnes NWR spans a 9,300-acre acquisition boundary between U.S. Highway 69 and the Missouri state line on either side of the Marais des Cygnes River in eastern Kansas. The Refuge owns approximately 7,500 acres within the 9,300 acre boundary; approximately 1,800 acres within the boundary remains in private ownership. Immediately west of the Refuge is the 7,600 acre Marais des Cygnes Wildlife Area, administered by the Kansas Department of Wildlife and Parks ("State Wildlife Area").

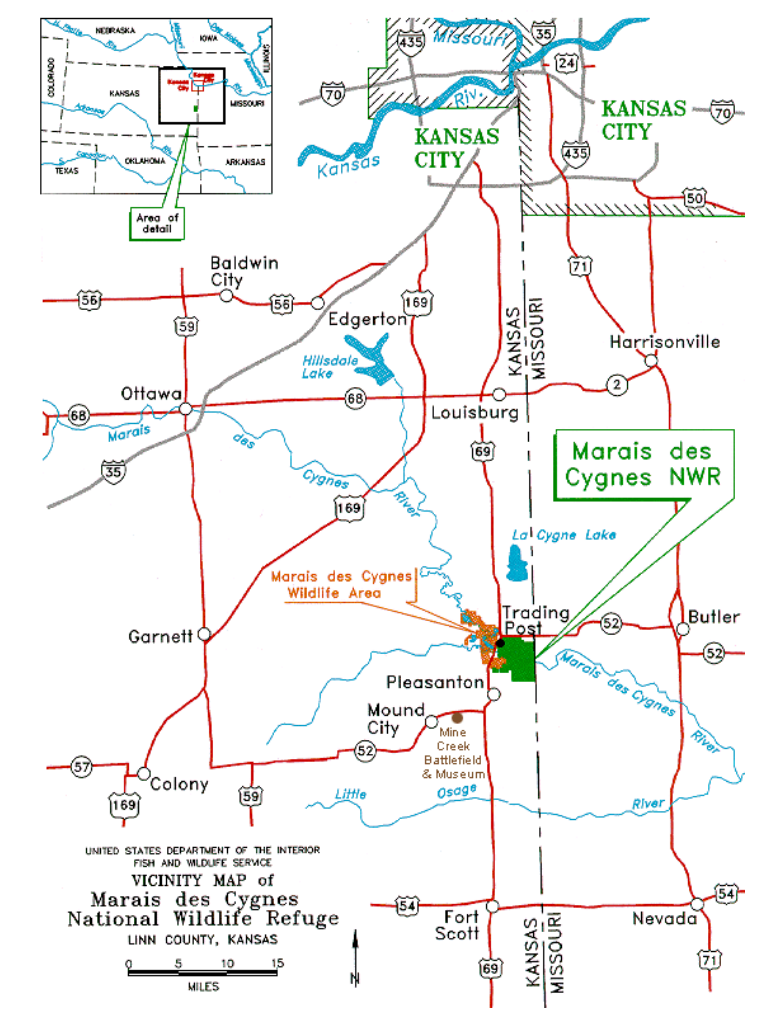

Figure 1: Map of Marais des Cygnes National Wildlife Refuge

The Go Zero Tracts

The fragmented forest landscape at Marais des Cygnes NWR represented an important opportunity to restore habitat and ecosystem connectivity. While the Refuge land was managed by the United States Fish and Wildlife Service ("USFWS" or "the Service"), much of it had little immediate value for wildlife. Nearly 800 acres across the Refuge that was historically forested was covered by annual and perennial weeds or used for agricultural purposes. It is likely that the weeded areas would have continued to be a nuisance for USFWS because the goldenrod-broomsedge habitat was unusually dense and prohibited any other type of growth from occurring. Restoring the acreage to its natural, forested condition was a high priority for the Refuge,[1] but there was limited or no funding available to support those efforts. After years of searching for public and private financing, an innovative partnership emerged that restored the biological integrity of the land, and at the same time, helped sequester carbon dioxide.

In early 2008, The Conservation Fund ("the Fund") and Environmental Synergy Inc. ("ESI") worked with the Service to plant native seedlings across 35 non-contiguous parcels, consisting of 776 acres, within Marais des Cygnes 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 but not limited to waterfowl and neotropical songbirds. Over their lifetime, these newly restored forests are expected to sequester thousands of tons of carbon dioxide equivalent 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 Marais des Cygnes 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.

[1] Marais des Cygnes Comprehensive Conservation Plan [hereinafter Marais des Cygnes CCP], pp. 30

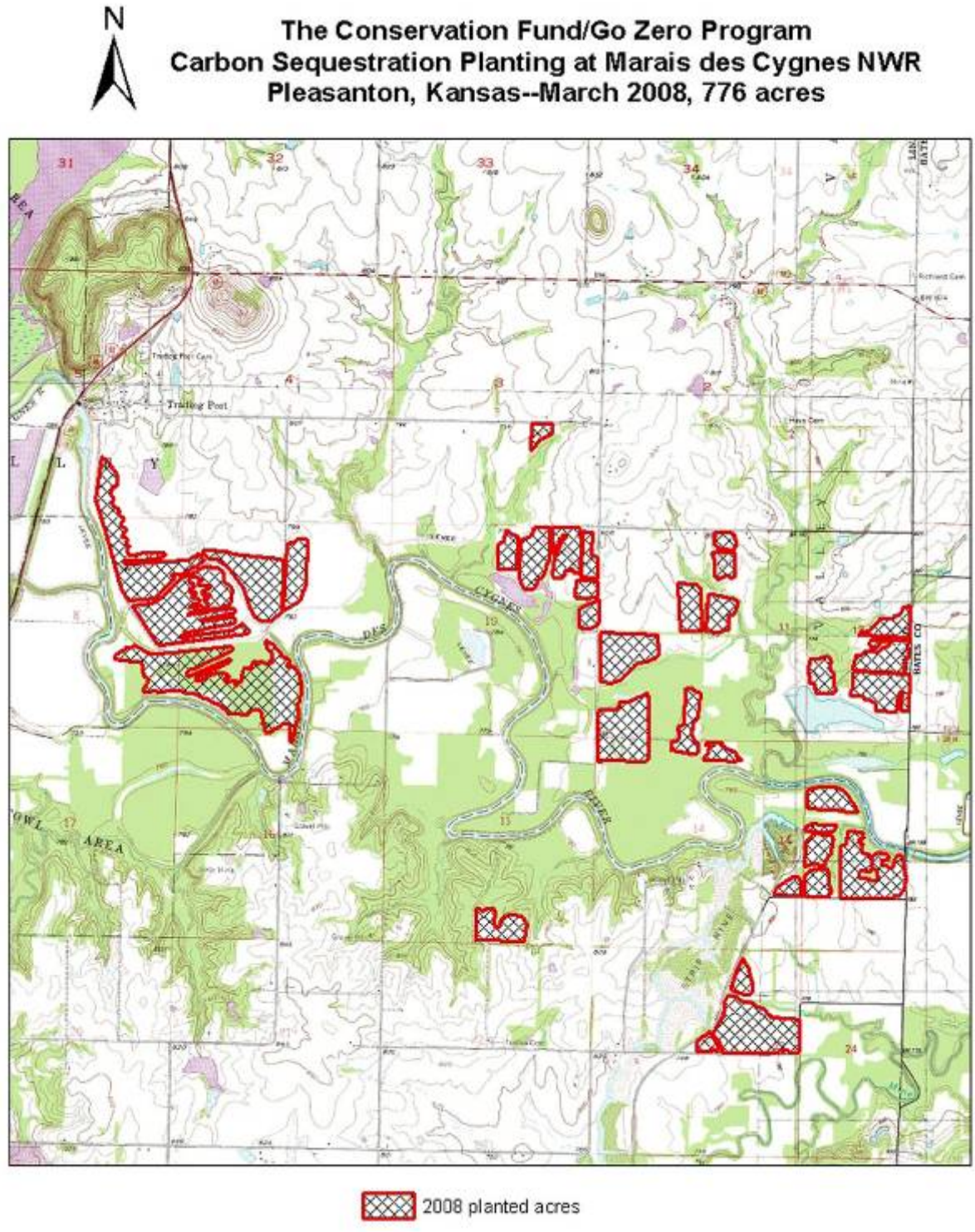

Figure 2: Map of Marais des Cygnes NWR

Climate

Marais des Cygnes NWR has a continental climate typical of the interior United States. The climate is characterized by large daily and annual variations in temperature. Winters are cold due to frequent southerly flows of air from the polar regions. Warm summer temperatures last for about six months and the transition seasons are fairly short. The average daily temperature in winter is about 31.0 F and summer average daily temperature is 79.4 F.

The Refuge is in the path of a fairly dependable current of moisture-laden air from the Gulf of Mexico. Precipitation is heaviest in late spring and early summer, much of it occurring as late-evening or nighttime thunderstorms. Precipitation averages 38.53 inches per year, with the highest monthly amounts occurring in spring and fall.

Elevations at the Refuge are approximately 800 feet above sea level. The combination of elevation and latitude gives the area a fairly long growing season that will exceed 200 days in most years. [2]

Geology and Topography

The topography of the Refuge, including the Tracts, lends itself to water retention. The Refuge has many natural scours, or low spots, about 5 inches in depth. These low spots are sometimes characterized as "ephemeral wetlands," or depressional wetlands that temporarily hold water in the spring and early summer or after heavy rains.[3] Periodically, these wetlands dry up, often in mid to late summer. They are isolated without a permanent inlet or outlet, but may overflow in times of high water. They produce abundant quantities of food for developing amphibians, reptiles and migrating birds, especially waterfowl.

Soils and Hydrology

The soil types on the Go Zero Tracts are either Osage (silty clay) series or Verdegris (silty loam) series,[4] both productive soil types naturally suited to bottomland hardwoods. These heavy clay soils do not have high rates of percolation or infiltration and retain moisture for a long time.

The hydrology of Marais des Cygnes NWR is heavily influenced by the Marais des Cygnes River. The main stem of the Marais des Cygnes River is approximately 177 river miles in length from the Kansas-Missouri state line to its headwaters south and west of Topeka, Kansas. Many Go Zero Tracts are directly on the river bank and all of the parcels lie within the watershed (within a half mile of the River). The River is characterized by high turbidity and high sediment load.

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[2] Marais des Cygnes CCP, pp. 11

[3] Personal communication, Marais des Cygnes Refuge Biologist, Tim Menard

[4] Marais des Cygnes CCP, pp. 13

The Marais des Cygnes River overflows its banks about once every ten years. When the river does overflow, the floodwaters usually recede relatively quickly (within 10 days). Although the bottomland forests don't receive water often from overbank flows, these areas retain water throughout the winter and spring due to the combination of heavy rainfall and clay soils that characterize the area. After a rainfall, standing water can remain in pockets up to 4 or 5 inches deep. These soil conditions, combined with the topographical features such as the natural scours described above, are responsible for the bottomland hardwood habitat. [5]

Figure 3: Bottomland hardwood forests at Marais des Cygnes NWR

G1.2 Vegetation

A variety of vegetation exists on the Refuge. Habitat types include forest, wetlands, native prairie-savanna and introduced grasses and cropland. The riparian, bottomland hardwood forests of Marais des Cygnes NWR represent the last remaining hardwood forest stands across the Mountain-Prairie Region of the Service, including Kansas. Surveys from the 1850s highlighting the original 3,300 acres of bottomland forest along the Marais des Cygnes River show that almost 55 percent or 1,800 acres have since been converted to cropland or pasture.[6] Much of the remaining forest has been cut at least once. However, excellent mature or near-mature stands of pecan, oak, walnut, sycamore, ash, hickory and maple can be still be found along the River.

Prior to restoration, 85% of the Go Zero Tracts were covered with thick goldenrod and broomsedge, which had colonized the site in the mid-1990s when the property was taken out of agriculture, and this dense cover of grasses and forbs prohibited the growth of other species. The remaining 15% was being used as farmland and was leased by the Refuge to tenant farmers—primarily for corn, wheat, and sorghum—until the Go Zero project was implemented.

In order to select parcels for the Go Zero project, the Marais des Cygnes NWR Biologist consulted General Land Office (GLO) surveys and an 1856 historical vegetation map, which provided insight as to the historic location of forests in the Refuge area. GLO surveyors traversed the country during the 1850s approximating the forest-prairie boundary, and although the boundary was sometimes indistinct and often transient, changing over time due to fire, bison, and other disturbances, the GLO surveys offered useful guidance regarding historic forest location.

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[5] Personal communication, Marais des Cygnes Refuge Biologist, Tim Menard

[6] Marais des Cygnes CCP, pp. 16

When the Go Zero forest parcels mature, the predominant vegetation on the Tracts will be mixed oak floodplain woodlands. This habitat type is characterized by cold-deciduous woodlands that span gently sloping soils within floodplains along major rivers and streams.[7]

G1.3 Current Carbon Stocks at the Project Site

The global climate change benefits of reforestation projects are widely recognized. Land use change—especially deforestation—is a significant component of increasing atmospheric CO_2 levels and a cause of global warming.[8] Thus, reforestation 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 uses a model developed by ESI. The monitoring regime follows 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 from 19 established permanent plots, without reliance on default emission factors, and thus the ESI plan satisfies the IPCC Tier 3 highest level of accuracy criteria. The carbon impact of the Marais des Cygnes NWR Restoration Initiative is estimated at 335.7 metric tons of carbon dioxide equivalent per acre over one hundred 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 and 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 from which future gains can be measured against, essentially setting a zero baseline at project outset.

G1.4 Communities Located in and Around the Project Area

Marais des Cygnes NWR, which includes all of the Go Zero Tracts, is located in Linn County, Kansas, which is 39 miles south of the Kansas City Metropolitan Area. Linn County has a population of approximately 9,767 people.[9] In 2007, the median household income for Linn County was $41,251. The average median household income for Kansas in 2007 was $47,341; the median for the United States was $50,233.

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[7] Lauver, C. L., K. Kindscher, D. Faber-Langendoen, and R. Schneider. 1999. A classification of the natural vegetation of Kansas. The Southwestern Naturalist 44:4p. 421–443.

[8] 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.

[9] U.S. Census Bureau, QuickFacts, available at: http://quickfacts.census.gov/qfd/states/20/20107.html

Education

There are five public elementary and three public secondary schools located in Linn County. Approximately 80.9% of Linn County residents over age 25 are high school graduates and 12.7% have a bachelors degree or higher.[10] In Kansas, 86% of residents over age 25 are high school graduates and 25.8% have a bachelors degree or higher,[11] and in the United States, 80.4% of residents over 25 are high school graduates and 24.4% have completed a bachelor's or higher.[12]

G1.5 Current Land Use and Land Tenure at the Project Site

The Marais des Cygnes NWR was officially established in 1992, and additional Refuge lands have been added over time, purchased by the Service at fair market value from individual willing sellers.

The Go Zero Tracts are noncontiguous parcels all included within Marais des Cygnes NWR and owned by the Service. The Refuge had been looking for a restoration partner for several years before an agreement was negotiated with the Fund. Planting of the Tracts began in late December 2007 and continued through early 2008, and now the entire project area is managed by USFWS as forested wildlife habitat.

Figure 4: Pre-restoration lands at Marais des Cygnes NWR

Prior to restoration, a large percentage of the Go Zero Tracts were covered in annual and perennial weeds, primarily goldenrod and broomsedge. These lands were used as farmlands up until the mid-1990s, and when agricultural production ceased on the Tracts, these opportunistic species colonized these disturbed sites almost immediately. The density of the weed cover has precluded any other type of growth on these lands. The lands were occasionally burned by Marais des Cygnes NWR staff as part of the overall fire management plan on the Refuge. As detailed below in section

[10] U.S. Census Bureau, QuickFacts, available at: http://quickfacts.census.gov/qfd/states/20/20107.html

[11] U.S. Census Bureau, QuickFacts, available at: http://quickfacts.census.gov/qfd/states/20/20107.html

[12] U.S. Census Bureau, QuickFacts, *available at*: http://quickfacts.census.gov/qfd/states/00000.html

G3.7, the Refuge managed the Tracts as is, but had no funding to enhance the management of the Tracts as dictated by the Marais des Cygnes NWR Comprehensive Conservation Plan ("CCP").

The remaining parcels were used for agricultural production by two private individuals. One farmer, who used about two-thirds of the area, ended his lease with USFWS before restoration on the Tracts began for personal reasons unassociated with the restoration. USFWS ended the lease with the second individual, who moved his farming operations to other farm lands already in his possession.

Prior to its establishment, the Refuge was largely protected from modern development because much of the land was owned by a coal company. When high sulfur coal decreased in value, the land was put up for sale and was acquired by the Service from Pittsburgh and Midway Coal Company, a subsidiary of Chevron U.S.A., Inc. and the Midland Cattle Company.[13] Although there was some coal mining on Refuge lands, there was no active mining on any of the Go Zero Tracts. There are two coal leases that date from the 1920s on the original parcel purchased from Pittsburgh & Midway, but none of the Tracts are included in the area covered by these coal leases. To confirm that there were no additional outstanding leases that might impact the Go Zero Tracts, USFWS realty staff conducted a search of existing lease records and concluded that the Refuge owns the subsurface mineral rights on all of the Go Zero Tracts. Therefore, none of the Go Zero parcels should be directly affected by any preexisting coal rights on the Refuge. Mining on neighboring lands is extremely unlikely, given the long period of inactivity (80+ years) associated with the coal leases and the low value of the existing coal.

G1.6 Current Biodiversity in the Project Area

A primary project goal of the Fund and USFWS—in addition to carbon sequestration objectives—was to restore biodiversity within the project area by providing larger areas of connected habitat within the Refuge. Bottomland hardwoods are particularly important to wildlife due to their permanent nature and high level of plant diversity; floodplain hardwoods, being the most diverse of this group in plant species, are also the most diverse in animal species.

The hardwood bottoms, which are seasonally flooded by rainfall, provide an important habitat type for birds, and more than 300 avian species use the area at various times of the year. The emphasis at Marais des Cygnes NWR is on management for neotropical migrants, which nicely compliments management practices at the adjacent State Wildlife Area, which is primarily managed for waterfowl. The State Wildlife Area has approximately 1,100,000 waterfowl use-days during an average year, including 60,000 ducks and 20,000 geese per year and the extreme seasonal population can reach 130,000 ducks and 40,000 geese.[14] Enhanced

[13] Marais des Cygnes CCP, pp. 6

[14] Marais des Cygnes CCP, pp. 22

management within the Refuge could bring waterfowl use-days to a level equal to that now experienced at the State Wildlife Area.

When the bottomlands are not flooded, they provide habitat for deer, quail, squirrel, turkey, and other species. Mammals occurring in the area are diverse and include furbearers as well as game species. Bats, armadillos, coyote, mink, fox, beaver and chipmunk can all be found on the Refuge.

The Marais des Cygnes River is home to an unusually large and diverse freshwater mussel community and contains one of the top three concentrations of mussel diversity within the state of Kansas. Mussel species found in the River include the flat floater mussel (a state-listed threatened mollusk) and the strongest population of threeridge mussels within Kansas, along with many others including the butterfly mussel, fragile papershell mussel and yellow sandshell mussel. The River also provides habitat to numerous fish species including catfish, sunfish, bass and carp. Reptiles and amphibians, including turtles, frogs, toads, lizards, snakes and salamanders are also found on the Refuge.

There is currently not a wide range of biodiversity on the Go Zero Tracts because the project areas were recently covered in grasses and forbs or used for farmland. 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 immediately offer shelter for field sparrows and indigo buntings. When the new forest is between ten and thirty years old, it will be home to the brown thrasher, American woodcock, and Bell's vireo. After forty years, red-headed woodpecker, yellow-billed cuckoo and orchard orioles will inhabit the forest. In the future, the mature bottomland hardwood forest will provide habitat for the Cerulean warbler, prothonotary warbler, Acadian flycatcher, wood thrush, and red-shouldered hawk. In addition to bird species, the forest will also provide homes for other resident wildlife, including long-tailed weasel, bobcat and grey fox. The improvements in water quality caused by the restoration of the Go Zero Tracts will also enhance the freshwater mussel communities living in the Marais des Cygnes River by improving habitat conditions.

Figure 5: Freshwater mussel community in Marais des Cygnes River

G1.7 IUCN Red List Threatened Species

The data below were collected from several sources including the International Union for Conservation of Nature (IUCN),[15] USFWS,[16] and the Kansas Department of Wildlife and Parks.[17] The IUCN has a much broader approach to listing endangered and threatened species because it is done on a global scale and as a result, two of the endangered species listed by the USFWS were listed as "least concern" species by the IUCN. The table below shows the threatened and endangered species found at Marais des Cygnes NWR. Of the species listed below, the bald eagle is the most likely to use the restored forests on the Go Zero Tracts as potential habitat.

Table 1: Threatened or endangered species found on the refuge

Common Name	Species Name	US Federal Rating	Kansas Rating	IUCN Rating
Peregrine Falcon	*Falco peregrines*	Delisted	Endangered	Least Concern
Bald Eagle	*Haliaeetus leucocephalus*	Delisted	Endangered	Least Concern
Interior Least Tern	*Sterna antillarum*	Endangered	Endangered	Least Concern
Piping Plover	*Charadrius melodus*	Threatened	Threatened	Near Threatened

Species of Concern

In addition to the species identified on the Red List or by the federal and state wildlife agencies, the CCP for Marais des Cygnes NWR has identified priority species for conservation including numerous species that rely on bottomland hardwood habitat. These include the flatfloater mussel, central newt, northern spring peeper, northern crawfish frog, northern green frog, broadhead skink, eastern hognose snake, western earth snake and northern redbelly snake. These species are all state-listed and their status and habitat requirements will be given primary consideration when management actions are planned and implemented on the Refuge.

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[15] The IUCN Red List of Threatened Species, *available at*: http://www.iucnredlist.org/

[16] U.S. Fish and Wildlife Endangered Species Program, *available at*: http://www.fws.gov/endangered/

[17] Kansas Department of Wildlife and Parks, Linn County, Threatened and Endangered Species List, *available at:* http://www.kdwp.state.ks.us/news/Other-Services/Threatened-and-Endangered-Species/Threatened-and-Endangered-Species/County-Lists/Linn-County

G2. BASELINE PROJECTIONS

G2.1 Land Use Without Project

In order to carry out recommendations of the CCP, the Refuge had been looking for a restoration partner for several years before an agreement was negotiated with the Fund to restore the Go Zero Tracts. If the Fund had not undertaken the Marais des Cygnes Restoration Initiative, it is likely that the weeded areas would have continued to be a nuisance for USFWS because the goldenrod-broomsedge habitat was unusually dense and prohibited any other type of growth. The parcels being used for agricultural purposes would have continued being used as farmland. USFWS did not have the funds necessary to restore the land to bottomland hardwoods on its own; rather, the restoration of this land hinged on the Fund's ability to leverage multiple funding sources including private resources from individual and corporate donors.

G2.2 Future Carbon Stocks Without Project

Carbon stock changes without the Marais des Cygnes Restoration Initiative would be of limited size and significance. Carbon accrual in the areas dominated by goldenrod and broomsedge would be minimal as these plants prevent the establishment of tree seedlings due to their density. The carbon capture associated with agricultural plants is also considered to be zero as this sequestration would not be sustained over the long term because the agricultural products are harvested every year. 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.

G2.3 Local Communities Without Project

Prior to being restored by the Fund, the Go Zero Tracts were either farmed or overrun with weeds and not suitable for recreational purposes. Without the Go Zero project, the land would most likely have remained in this condition. Once the land is restored, however, local residents can use it for hunting and recreation. The restoration actions not only benefit the Tracts themselves, but also improve the neighboring land by enhancing biodiversity through forest connectivity. The overall quality of the Refuge will be improved and more easily enjoyed by local residents.

G2.4 Biodiversity Without Project

Without the project, the land would have remained covered in weeds or in agricultural production, which would have an adverse impact on biodiversity. These non-forested parcels were interspersed broadly throughout the Refuge. Forest holes, such as those that existed at Marais des Cygnes NWR, lead to diminished bird nesting success, increased predation, and increased brood parasitism, especially from the brown-headed cowbird. Forest fragmentation created an atmosphere where cowbirds, who thrive in forest openings and edges, posed a large threat to other bird species. Without the project, many bird species would suffer from increased brood parasitism from the cowbird, leading to a decline in species richness.

Figure 6: Forest fragmentation prior to restoration at Marais des Cygnes NWR.

G2.5 Water and Soil Resources Without Project

In the absence of the project, the soil would remain covered by goldenrod-broomsedge habitat or, on the parcels used for agricultural purposes, the soil would continue to be farmed. The lack of native forest cover would continue to exacerbate problems with erosion resulting in high sediment load in the Marais des Cygnes 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. Also, the new canopy will effectively protect the soil from harsh winds and rain, both factors that contribute to soil erosion. In addition, many of the restored Go Zero Tracts are along the riverbank and the new forestland will help reduce sediment load into the river, which will improve water quality.

G3. PROJECT DESIGN AND GOALS

G3.1 Project Scope and Summary of Goals

The scope of the Marais des Cygnes NWR Restoration Initiative included restoring approximately 776 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 Kansas's bottomland hardwood forest ecosystem
- 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

The main project activities associated with the Marais des Cygnes NWR Restoration Initiative include: establishment of a monitoring plan, establishment of baseline conditions, evaluation of current carbon stocks, site preparation and planting, project monitoring and validation. These activities were undertaken by the Fund in conjunction with its partners, including USFWS and ESI. 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.

- ***Establish monitoring plan***

  ESI partnered with Winrock International ("Winrock") to develop a monitoring protocol for the Marais des Cygnes NWR Restoration Initiative. The monitoring framework at Marais des Cygnes is designed to generate an estimate of carbon sequestered in aboveground tree biomass to a known level of confidence. For this relatively small site, the most cost-effective approach was to allocate a pre-determined number (20) of permanent measurement plots distributed across the planting site (with one of the samples ultimately not viable, leaving 19). ESI is proactively committed to ongoing research in the area of carbon sequestration to continually improve the accuracy, knowledge base and ability to measure and predict carbon sequestration rates.

- ***Establish Baseline***

  Non-forest baseline conditions and lack of woody biomass stock at the Go Zero project area were verified by analysis of 1992 classified satellite imagery from USGS's National Land Cover Dataset and other appropriate imagery and site assessments in the field. Digital photos were recorded to further document baseline conditions.

- ***Evaluate Current Carbon Stocks***

  In each of the installed plots, soils were sampled with a standard soil corer and then subsequently analyzed for soil carbon percentage and bulk density. Four samples to 50cm depth were collected in each plot, one randomly located in each quarter of the circular plot. The soil samples from each core were bulked and all samples mixed together, with a sub-sample collected and placed in a labeled bag for carbon analysis. One additional soil core was taken from each sampling point and placed in one sample bag to be used for bulk density measurement. Soil bulk density measurements were adjusted for moisture and corrected to account for any rock fragments present.

- ***Site Preparation and Planting***

  The Go Zero Tracts were planted in late 2007 and early 2008. ESI collaborated with Marais des Cygnes NWR staff to assess site preparation needs and determine native species composition.

  Numerous native tree species (including seven varieties of Oak) were planted on the site, a mix largely determined by the Refuge to meet their habitat objectives. Refuge staff specifically tailored the species mix to each Tract based on soil characteristics and the ecology of the surrounding vegetation.

  Planting was done by machine, with an application of herbicide (Oust) during planting to discourage competition in the first year of seedling growth. No advance soil preparation was undertaken since machine planting also loosened soil compaction, important for moisture retention.

  The Service's recommended planting rate for the site was 302 seedlings per acre and was maintained uniformly across the planting site. Efforts were made to sufficiently intersperse each of the species across the site as to avoid large areas of single-species plantings.

Figure 7: Marais des Cygnes Refuge biologist analyzing tree seedling

- ***Project Monitoring***

  ESI's scientific guidance indicates that survivorship is best evaluated at age 3-4 years. In collaboration with Marais des Cygnes NWR staff, ESI will undertake a survival analysis on the Go Zero Tracts in this timeframe and report the results to the Fund with recommendations for any replanting. Marais des Cygnes NWR staff conducted a survival analysis after the first growing season and reported those results to the Fund.

  ESI will undertake on-site measurements of biomass within approximately one year after the fifth growing season, and of biomass and soil carbon within approximately one year after the 10th growing season to determine carbon stock change up to those dates and over the respective periods. Prior to, and between on-site monitoring, the calculations for reporting carbon capture will be based largely on the carbon accrual model developed for the Marais des Cygnes NWR Restoration Initiative, as described in Sections CL1 and CL3, together with any new research by ESI or other entities that may be considered to augment or supplant prior research.

- During on-site measurements, Standard Operating Procedures will be followed to measure dead woody material and other carbon pools as appropriate, to take repeat soil samples, and to analyze data. Biomass equations will be used (and developed where necessary) for converting diameter and tree height into total tree biomass data.

- ***Validation***

  This project will be validated by a third party and the offsets retired.

G3.3 Project Location

Maps of project site locations are provided in G1.

G3.4 Project Timeframe

The Fund planted the Go Zero Tracts with native bottomland hardwood trees in late December 2007 and through early 2008. The first seedling survival analysis was conducted by the Refuge biologist after the first growing season, in late summer of 2008. The project activities will be most intensive during the first few years of the Initiative when planting and the majority of monitoring activities will be taking place. Under the MOU, USFWS will provide long-term management of the land. The accounting period for the carbon offsets generated 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. 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 in Linn County; 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 tornadoes do occur in eastern Kansas, they happen rarely and their impact is usually confined to a small area. By planting Tracts scattered throughout the Refuge, the Go Zero project design has dispersed the risk of tornado damage, and large numbers of trees are unlikely to be affected should a tornado occur.

While there is always a small but potential risk due to human activities such as unlawful hunting or reckless destruction, the low population density in the area directly surrounding the Tracts, as well as law enforcement vigilance by the Refuge, makes human interference with the project unlikely.

G3.6 Stakeholder Identification

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 Marais des Cygnes NWR Restoration Initiative defined these partners, or stakeholders, as those parties who 1) own the Go Zero Tracts (“the landowner”), 2) currently own property adjacent to 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 Marais des Cygnes 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 land was planted by ESI, and ESI will monitor the carbon sequestration on the Tracts. USFWS owns the Tracts and is the entity responsible for the long-term management of the forestland. Interns from the community helped Refuge staff implement the project. Refuge management will consider and ultimately complement the operation of the adjacent State-operated Marais des Cygnes Wildlife Area. The Area shares about 2.7 miles of boundary with the Refuge and management of either property will affect the other. Careful coordination between managers of the two properties will be essential for optimum natural resource management in the Marais des Cygnes Valley. The farmers who were leasing land on the Tracts prior to the restoration are also listed as stakeholders because they were impacted by the project. The below table illustrates the list of stakeholders and their roles:

Table 2: Marais des Cygnes Restoration Initiative Stakeholders

NAME OF STAKEHOLDER	CONTACT INFORMATION	ROLE	RATIONALE	PROJECT PHASE
The Conservation Fund	Go Zero Operations Manager, 703-525-6300	Project Implementer	Managed and financed 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 Biologist, (620) 392-5553 ext. 111	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
Marais des Cygnes Wildlife Area	Marais des Cygnes Wildlife Area Manager, 913-352-8941	Neighboring Landowner	Directly involved with habitat management on the Tracts	Project implementation
Student Conservation Association	SCA Headquarters, 603-543-1700	Project Implementer	Directly involved with project implementation including site preparation and carbon proxy studies	Project implementation
Tenant Farmers	Confidential	Prior Leaseholder	Directly impacted by restoration	Project implementation

G3.7 Transparency and Project Information Availability

The transparency involved in Marais des Cygnes NWR's Comprehensive Conservation Plan ("CCP") process is directly relevant to the transparency of the Go Zero project because the project exists exclusively on Refuge lands and it directly implements CCP recommendations. The CCP specifically lists "coordinate forest restoration" and "plant trees by direct seeding or seedlings" as pieces of its public strategy to restore and maintain a core block of bottomland hardwoods along the Marais des Cygnes River and associated floodplain.[18]

The National Wildlife Refuge System Improvement Act of 1997 requires each refuge to develop a CCP for achieving refuge objectives consistent with sound principles of fish and wildlife management, conservation, legal mandates, and USFWS policies. The National Environmental Policy Act ("NEPA") 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. Management activities are then selected based on their efficacy in accomplishing refuge objectives.

Local residents were involved in every step of the Marais des Cygnes CCP development, which was initiated prior to the establishment of the Refuge. The Environmental Assessment ("EA"), which precedes the development of a CCP, was drafted with input from a number of sources. Scoping meetings and contacts occurred with residents and landowners of Linn County, the Kansas Department of Wildlife and Parks, other agencies of the State of Kansas, conservation organizations such as the Nature Conservancy and the cities of Pleasanton, La Cygne and Mound City. A variety of Federal, State, and local entities were also contacted. Input on the Refuge acquisition proposal was solicited through personal contacts, phone interviews, correspondence, notices in the media and public meetings.[19]

Notification of the Service proposal was provided to the public in the form of a regional news release and direct contacts. The Service provided a briefing to the Linn County Commissioners in mid-October 1991. Following release of the draft EA, a preliminary meeting was held in November 1991 at Pleasanton High School designed specifically to address any concerns of landowners within the project boundary. Approximately 35 landowners attended that meeting and only one landowner within the project boundary was unable to attend. Notification of the project and sufficient copies of the EA were provided to the Office of the Governor, State of Kansas for review and response in compliance with Executive Order 12372 – Intergovernmental Review of Federal Programs.[20]

A draft of the CCP was then made available to the public for review and comment. As part of this review, an open house was held in Pleasanton, Kansas on April 29, 1997. It was attended

[18] Marais des Cygnes CCP, pp. 31

[19] Marais des Cygnes CCP, pp. 2

[20] Marais des Cygnes CCP, pp.2

by approximately 40 people. The meeting outlined the fact that restoring agricultural and other lands to forest cover was one of the Refuge's top priorities. Public comments were then incorporated into the CCP. Most of the comments received at the open house or by letter dealt with the public use of the Refuge, especially public safety during the hunting seasons.[21] The CCP was finalized in March 1998.

As the Go Zero project developed, representatives from the Fund and ESI met on-site with Refuge staff and SCA volunteers to survey the potential planting areas, discuss species selection and coordinate public outreach activities. After the project was implemented, the Refuge included the Go Zero projects in its Habitat Management Plan and Annual Habitat Work Plan. The Refuge has also committed to highlighting the Go Zero project in its upcoming CCP revisions. The Refuge is now in the process of developing an informational kiosk that explains the Go Zero project and the benefits of forest restoration. The kiosk will also feature information on wildlife that will benefit from the Marais des Cygnes Restoration Initiative. An interpretive display will be placed at one of the fields along the Kansas state line road that details the goals of the project, its boundaries, and recognizes participating sponsor companies. There is also signage in Refuge headquarters signifying the Refuge's participation in the Go Zero project. In addition, the Marais des Cygnes NWR staff were featured and quoted in national outreach efforts during the summer of 2009 highlighting the Go Zero program and its specific benefits to wildlife on the Refuge.[22]

Figure 8: USFWS and Conservation Fund team members discuss Marais des Cygnes Restoration Initiative

The CCBA process provides an additional layer of project transparency. This Project Design Document ("PDD") will be made publicly available on the Climate, Community and Biodiversity Alliance ("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 Marais des Cygnes Refuge 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 Marais des Cygnes NWR Restoration Initiative will be available on the Fund's website.

[21] Marais des Cygnes CCP, pp. 2

[22] http://news.prnewswire.com/DisplayReleaseContent.aspx?ACCT=104&STORY=/www/story/06-22-2009/0005047562&EDATE=

G4. MANAGEMENT CAPACITY

G4.1 Management Team Experience

The management responsibilities of the Marais des Cygnes 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 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.

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'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.

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

G4.2 Management Capacity and Project Scale

The scale of the Marais des Cygnes Restoration Initiative is well within the management capacity of the Fund, USFWS, and ESI. As stated above, all of these organizations have a great deal of previous experience managing and monitoring forest carbon projects. For example, in addition to its Go Zero program, the Fund also owns 40,000 acres of redwoods and Douglas fir forests in Mendocino County, CA. The Fund manages these forests as sustainable working forests, benefiting both the environment and the local economy. All 40,000 acres of forest in CA have also been registered with the California Climate Action Registry ("CCAR") and produce verified carbon emission reductions.

G4.3 Technical Skills of Project Team

The Fund was responsible for project coordination and implementation of the reforestation project. The Go Zero program has completed multiple carbon projects of this kind in the past,

including a thousand acre project at Red River NWR, and possessed the skill set needed to implement the Marais des Cygnes NWR Restoration Initiative.

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 appropriate skill set 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 and visitor days on the Refuge.

G4.4 Financial Health of Implementing Organizations

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 Marais des Cygnes 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 2007 990 Tax Return can be found at:
http://www.conservationfund.org/who_we_are/financials

G5. LAND TENURE

G5.1 Private Property and Land Rights

All Refuge lands have been acquired from willing sellers. The Service paid fair market value for all property acquired, based on real estate appraisals. The farmers who leased space on the Refuge were given advance notice regarding the Service's intention to reforest the agricultural parcels.

G5.2 Voluntary Nature of the Project

As noted above in G5.1, all of the lands acquired to establish the Refuge, including all of the Go Zero Tracts, were purchased from willing sellers.

G5.3 Potential In-Migration

Not relevant to project.

G6. LEGAL STATUS

G6.1 Compliance with Laws

Federal Law

The Marais des Cygnes Restoration Initiative is supported by a solid framework of federal laws. Marais des Cygnes Refuge was established pursuant to the Fish and Wildlife Act of 1956 and the Emergency Wetland Resources Act of 1986. The National Wildlife Refuge System Improvement Act of 1997 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.

On March 30, 2007, the Fund and USFWS signed a Memorandum of Understanding ("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.

National Historic Preservation Act

Section 106 of the National Historic Preservation Act mandates a review process for all federally-funded and permitted projects that will impact sites listed on, or eligible for listing on, the National Register of Historic Places. Certain activities on National Wildlife Refuges are subject to Section 106, which can require screening project areas for pre-historic or historic archeological artifacts.

Appropriate authorities from the Service gave verbal approval that no archeological survey or cultural resource review was necessary prior to implementation of the Go Zero project. In

addition, the Regional Historic Preservation Officer for USFWS confirmed in writing that there were no cultural resource concerns related to the plantings. According to the USFWS Preservation Officer, because the ground disturbance involved in planting the tree seedlings at Marais des Cygnes NWR did not exceed the existing plow zone disturbance from decades of crop planting, the planting process was considered a continuation of the historic use of the land. Therefore, no cultural resource review was necessary.

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

G6.2 Approval from Appropriate Authorities

As stated above, the Fund has a signed agreement with USFWS recognizing the Fund's ability to plant and restore land on National Wildlife Refuges.

G7. ADAPTIVE MANAGEMENT FOR SUSTAINABILITY

G7.1 Generation of Reliable Feedback

The CCP process is designed to generate reliable feedback to help guide management decisions on the Go Zero Tracts. The CCP process complies with standards outlined in the National Environmental Policy Act ("NEPA"), which requires CCPs both to examine a full range of alternative approaches to refuge management and also mandates involving the public in selecting the alternative best suited to the refuge's purposes. 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. In this way, feedback on management decisions is consistently generated and used to guide management decisions for the Tracts.

In addition, Marais des Cygnes uses the Refuge Annual Performance Plan reports ("RAPP reports") to document information regarding the Refuge. RAPP reports record information such as visitor use, numbers of participants in special events, number of volunteer hours, and rates the quality of fishing and hunting and other activities on the Refuge. The RAPP system is a fully automated, in-house system that links to other programs such as the Department of Interior maintenance database, and allows field offices to compile performance data and submit it to the regional office supervisor via an electronic workbook.

G7.2 Documentation of Decisions

The Fund has carefully maintained, and will continue to maintain, all files relating to the Marais des Cygnes NWR Restoration Initiative in a central permanent database to ensure that information on the project will remain with the Fund. The Fund also keeps copies of all ESI-related and Service-related documents in its central database, and is in continuous contact with ESI and Service staff to keep updating documentation and files. This will ensure that

experience and information is passed on rather than being lost when individuals leave the project.

Also, as mentioned above in G7.1, the Marais des Cygnes NWR staff produces an annual RAPP report documenting information on a wide variety of issues pertaining to the Refuge. These reports will be used to distribute information to the USFWS team and track project indicators.

In addition to participation and documentation at the Refuge level, USFWS participation in the Go Zero program includes knowledge transfer at the regional and national levels. Institutional knowledge is captured and shared in several ways. The Marais des Cygnes NWR Biologist was invited to Denver to present the Refuge's carbon work to the regional headquarters, and regional directors from the Service were invited to participate and observe the site visit for the Marais des Cygnes CCB audit.

Members of the Go Zero team were recently asked to participate in the Service's Carbon Sequestration Stakeholders meeting outside Washington DC. This meeting brought together individuals from many organizations including non-profits such as The Conservation Fund and other governmental organizations such as the U.S. Geologic Survey and the Bureau of Land Management. During this meeting, individuals presented on various aspects of successful carbon sequestration projects with the Service. Afterwards, meeting participants divided into breakout sessions to exchange ideas, concerns and challenges encountered during carbon projects. The minutes from these discussions were then circulated to all meeting participants to facilitate knowledge transfer.

Following the Stakeholders' meeting, the Service's Biological Carbon Sequestration Subgroup came together and set out detailed objectives for the Service's continued carbon sequestration work. These included summarizing the state of the existing knowledge on carbon sequestration and creating a toolkit to be used by government agencies to facilitate additional carbon work, as well as developing an outreach and education strategy for other federal and state agencies, Tribes, and the general public.

As described above, the Service is taking many steps to ensure that knowledge gained from its participation in Go Zero projects is documented at the regional and federal levels and used to facilitate future carbon projects around the nation.

G7.3 Project Flexibility

The CCP process also has a great deal of flexibility built into it. The plan is comprehensive in the sense that it addresses all activities that occur on the Refuge. However, management activities or strategies are stated broadly in the CCP. Detailed step-down plan and budgets are then prepared describing how a management strategy such as prescribed burning or prairie restoration is to be applied. These plans are adjusted frequently (usually annually) based on monitoring results, available funds, staff, and current Service policy. The effects of management actions are documented to provide information to future managers and managers of other refuges. In this way, CCPs are designed to be malleable documents that change as

the needs of the refuge change. They specifically allow Refuge staff to adapt management decisions to changing circumstances and provide a defined process to adjust project activities as needed.

The Marais des Cygnes NWR Restoration Initiative was also designed with the knowledge that the science of carbon sequestration is constantly evolving. ESI is proactively committed to ongoing research in the area of carbon sequestration to continually improve the accuracy, knowledge base and ability to measure and predict carbon sequestration rates.

G7.4 Commitment to Long-term Sustainability

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 the MOU 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. USFWS receives federal appropriations to carry out its mission of conserving, protecting and enhancing fish and wildlife and plants and their habitats. These funds ensure the long-term sustainability of the project.

G8. KNOWLEDGE DISSEMINATION

G8.1 Documentation of Project Lessons Learned

The lessons learned from this project will be documented on the Fund's web site, which will contain links to key documentation used in this project, including this PDD. This document will also be publicly available on the CCBA web page and serve as a useful tool to future project developers who are looking to do reforestation projects in the United States or other developed countries.

G8.2 Dissemination of Information

The USFWS has been in the process of preparing a Climate Change Strategic Plan to guide their climate change work and is conducting stakeholder workshops to discuss possible approaches to addressing climate change. One goal of these workshops is to expand terrestrial carbon techniques and to compile and share scientifically sound approaches, standards and guidelines for terrestrial sequestration activities. Members of the Marais des Cygnes Restoration Initiative team, from both USFWS and the Fund, will be attending these workshops and sharing information on conducting carbon projects on Refuge lands.

Carbon projects have gained popularity amongst refuges and there is a growing desire for information on implementing carbon projects on other Service-owned lands. Groups at both the regional and national levels have begun exchanging information on carbon projects, allowing for the successful replication of projects.

Project documents and relevant information are readily available from the following links:

The Conservation Fund web site: www.conservationfund.org

Climate, Community & Biodiversity Alliance web site: www.climate-standards.org

USFWS web site: http://www.fws.gov/

CLIMATE SECTION

CL1. NET POSITIVE CLIMATE IMPACTS

CL1.1 Estimation of Net Changes in Carbon Stocks

The estimation of net changes in carbon stocks for the Marais de Cygnes NWR Restoration Initiative was drawn from ESI's experience in measuring carbon accumulation across the US. The Fund contracted with ESI to plant the project area, measure the baseline conditions, and to monitor the project's ongoing carbon gains. In 2007, ESI and Winrock installed 20 permanent sample plots at the Refuge (of which 1 was not viable, leaving a sampling total of 19). Additionally, 45 plots were measured at proxy sites within the Refuge and in near proximity to the Refuge to estimate the future accrual of carbon in the ecosystem. Data was consulted to incorporate down dead, soil, and litter carbon. The table below shows the anticipated carbon accrual over time based on the ESI/Winrock study.[23] The data collection and the analysis were conducted by Winrock on behalf of ESI.[24] All values are metric tons CO_2e/acre.

[23] Smith, J.E., Heath, L.S., Skog, K.E. and Birdsey, R.A. 2006. Methods for calculating forest ecosystem and harvested carbon with standard estimates for forest types of the United States. Gen. Tech. Rep. NE-343. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northeastern Research Station. 216 p. The afforestation table for Elm-Ash-Cottonwood in the Northern Prairie States was used (B13).

[24] Pearson, TRH and Kaster G. 2008. Report on the carbon sequestration potential at Marais de Cygnes, Kansas. Report submitted to ESI.

Table 3: Anticipated CO2e/acre accrual over time across Go Zero Tracts at Marais des Cygnes NWR.

		Measured	Smith et al. (2006)				
Stand Age	**Total CO2e/acre**	**Live Tree**	**Standing Dead**	**Understory**	**Down Dead**	**Forest Floor**	**Organic Soil**
0	0	0	0	0	0	0	0
5	5.2	1.0	0.1	0.0	0.0	0.6	3.6
10	23	8.4	0.5	0.3	0.2	4.9	8.6
15	50.1	27.6	1.5	1.0	0.5	16.0	3.0
20	82	51.3	2.1	1.2	0.8	21.3	4.9
25	115.2	80.6	2.3	1.2	1.2	23.0	6.9
30	147.5	104.7	3.0	0.7	2.2	27.3	9.6
35	177.3	127.7	3.5	0.0	3.5	30.1	12.4
40	204.1	148.0	5.1	0.0	4.1	32.7	15.3
45	227.7	166.2	6.8	0.0	4.6	34.2	18.2
50	248	179.8	7.4	0.0	5.0	36.0	19.8
55	265.3	191.0	8.0	0.0	5.3	37.1	21.2
60	280	201.6	8.4	0.0	7.0	39.2	23.8
65	292.2	210.4	8.8	0.0	8.8	40.9	26.3
70	302.5	216.3	9.1	0.0	9.1	42.4	27.2
75	311	220.8	9.3	0.0	9.3	43.5	28.0
80	318	224.2	9.5	0.0	11.1	44.5	28.6
85	323.8	226.7	9.7	0.0	13.0	45.3	29.1
90	328.6	228.4	9.9	0.0	13.1	46.0	29.6
95	332.5	229.4	10.0	0.0	13.3	46.6	29.9
100	335.7	231.6	10.1	0.0	13.4	47.0	30.2

Pre-project carbon stocks

As noted in Section G1.3, pre-project carbon stocks (i.e., on the lands prior to reforestation) in woody biomass carbon stocks are zero. Generally, in afforestation or reforestation projects, non-woody (herbaceous) biomass carbon is neglected and assumed to be equal in the baseline and the "with-project" case; hence there is no need to quantify. Thus, the only baseline carbon stock is the soil carbon. The project monitoring program includes baseline soil measurements from which future gains can be observed.[25]

In 2008, Winrock and ESI collected data from 19 soil plots across the Refuge to establish the baseline soil conditions. The plots were divided into upland and bottomland strata to reflect the differing conditions. Figure 9 below shows the plot locations.

CL1.2 Non-CO2 greenhouse gases

Non-CO_2 gases are not expected to account for a significant percentage of the Marais des Cygnes NWR Restoration Initiative's overall greenhouse gas ("GHG") impact and are not considered significant because of multiple factors. First, site preparation methods did not

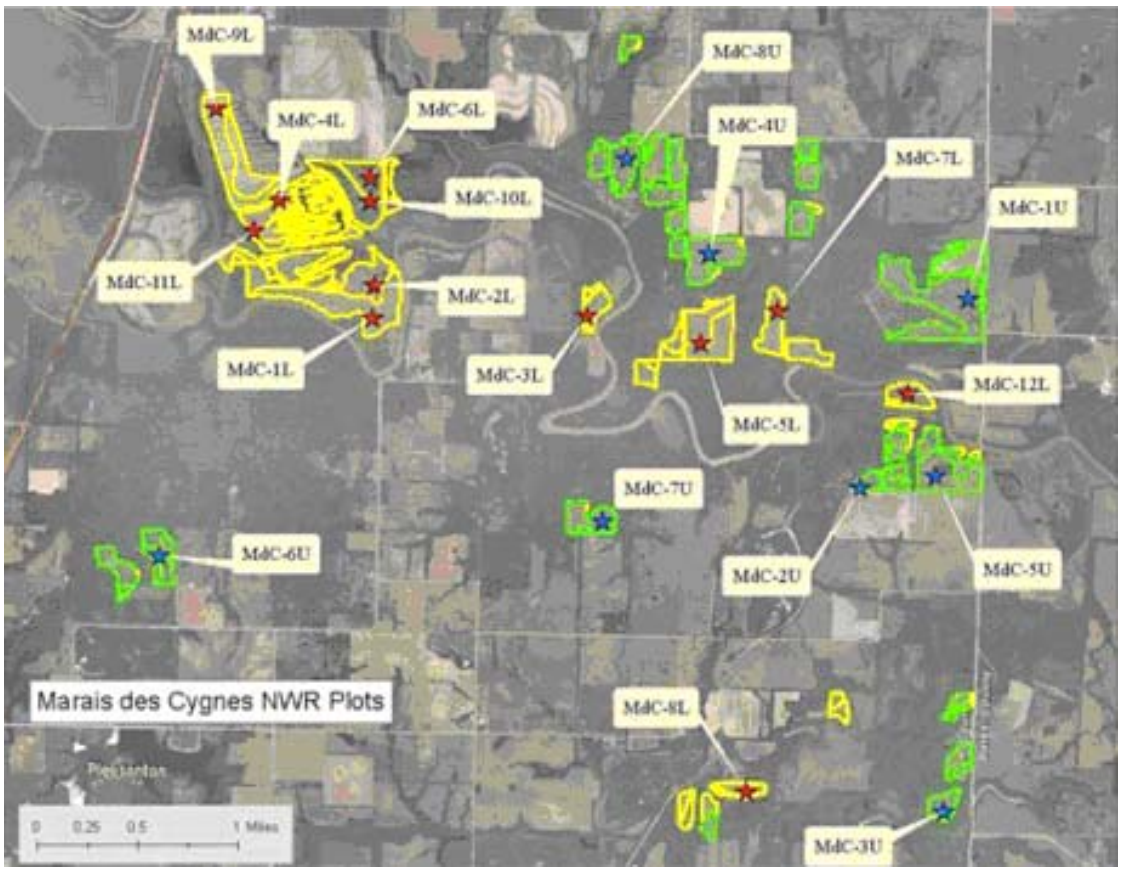

Figure 9: Soil carbon plot locations

[25] Pearson, TRH. And Grimland S. 2008. Report on the soil carbon stocks prior to afforestation at Marais des Cygnes, Kansas. Report submitted to ESI.

cause significant long-term net decreases of soil carbon stocks or increases of non-CO_2 emissions from the soil. For example, no chemical fertilizers or burning treatments were used on site during site preparation or planting.

Second, the soil disturbance associated with planting was 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 were 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 Net Climate Impact

As noted above, the climate model predicts 248 metric tons of CO_2e/acre (i.e., 273 short tons per acre) at year 50, and 335.7 metric tons of CO_2e/acre (i.e., 370 short tons per acre) at year 100. The annualized average for the first 50 years is 5.5 metric tons of CO_2e/acre per year (i.e., 6 short tons of CO_2 equivalent per acre per year).

Other Considerations – Permanence and Additionality

When assessing the net climate impact of a project, other factors such as the project's permanence and additionality are also taken into account. To ensure project permanence, as noted above, 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 secured by long-term forest and land management plans. Under the MOU 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 Marais des Cygnes NWR's CCP (see Exhibit B, Letter from USFWS Acting Regional Director Richard Coleman).

Careful risk assessments were made before choosing to restore the Go Zero Tracts, and the possibility of any unanticipated risk is mitigated by a buffer pool of offsets that will not be issued or sold. This buffer will be large enough to account for any impacts that might reduce the total carbon offsets generated by this project.

Also, in accordance with the Fund's planting principles, all of the Fund's forest-based carbon sequestration projects result in additional carbon dioxide capture compared to that which would otherwise have occurred. As stated above, the Go Zero Tracts were once healthy, forested ecosystems. They were deforested mid-century and converted to agricultural use. Without the Go Zero project, these Tracts would have likely remained in agriculture or covered by weeds with a net climate impact of zero.

CL2. OFFSITE CLIMATE IMPACTS

CL2.1 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.[26] 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. One farmer, who used about two-thirds of the agricultural area, ceased his farming operations before restoration on the Tracts began for personal reasons unassociated with the restoration. The other individual moved his farming operations to other farmlands already in his possession. These actions are representative of an overall trend; cropland use in the region as a whole has been declining since 1950.[27] Therefore, no activity leakage should be expected as a result of this project.

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 effect.

CL2.3 Net Effect of Climate Impacts

The total net effect of this project when considering the offsite impacts will be positive. As noted above, the expected offsite impacts will be small.

CL3. CLIMATE IMPACT MONITORING

CL3.1 Monitoring Plan

Background

ESI's monitoring protocol for the Marais des Cygnes NWR Restoration Initiative was developed jointly with Winrock. ESI is proactively committed to ongoing research in the area of carbon sequestration to continually improve the accuracy, knowledge base and ability to measure and predict carbon sequestration rates.

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[26] 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

[27] 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.

Precision Levels

The monitoring framework at Marais des Cygnes is designed to generate an estimate of carbon sequestered in aboveground tree biomass at a known level of confidence. For this relatively small and isolated site, the most cost-effective approach is to allocate a pre-determined number of permanent measurement plots distributed across the planting site. In the case of the Marais des Cygnes NWR Restoration Initiative, it was determined that approximately 20 plots would be appropriate (with 19 actually resulting).

Monitoring Protocol

ESI's monitoring protocol for the Go Zero Tracts consists of three components: (I) base-year analysis (i.e., to determine soil carbon stocks and establish permanent monitoring plots); (II) tree survival analysis after the fourth growing season and; (III) measurement of carbon stocks after the tenth growing season.

1. Base-year analysis

Non-forest baseline conditions and lack of woody biomass on the Project Area have been verified by analysis of 1992 classified satellite imagery from USGS's National Land Cover Dataset and/or other available and appropriate imagery and site assessments. Digital photos were recorded to further document baseline conditions.

Soil Sampling: Soils were sampled with a standard soil corer. Four samples to 50cm depth were collected in each plot, one randomly located in each quarter of the circular plot. The soil from each core was bulked and all samples mixed together, with a sub-sample collected and placed in a labeled bag for carbon analysis. One additional soil core was taken from each sampling point and placed in a sample bag for bulk density determination. Soil bulk density measurements were adjusted for moisture and corrected to account for any rock fragments present.

Future soil sampling points will be located as close as possible to the original points to facilitate change detection. Re-measurements of soil will be compared on an equal mass basis, particularly important for detecting real changes over time.

2. Tree survival analysis

Survival will be assessed on the Tracts in the fourth year following planting, likely during the fall so that the healthy seedlings can be detected as leaves change color. ESI will report results to the Fund and advise on any suggested replanting or overplanting. ESI has established random plots on the Go Zero Tracts that will be marked with GPS coordinates and physical markers to remain as permanent sample plots.

3. Monitoring of soil and tree biomass carbon during the project

ESI will undertake on-site carbon measurements of biomass within approximately one year after the 5th growing season, and of biomass and soil carbon within approximately one year after the 10th growing season to determine the carbon stock change up to

those dates and over the respective periods. The measurement will include live trees, dead woody material, and repeat soil sampling, with data analysis and a report to the Fund. Biomass equations will be used (and developed where necessary) for converting diameter and tree height data into total tree biomass data.

Prior to, and between on-site monitoring, the calculations for reporting carbon capture will be based largely on the carbon accrual model developed for the Marais des Cygnes Project, together with any new research by ESI or other entities that may be considered to augment or supplant prior research. Figure 10 below reflects the results of the ESI and Winrock effort to develop a carbon accrual curve for this region.[28,29]

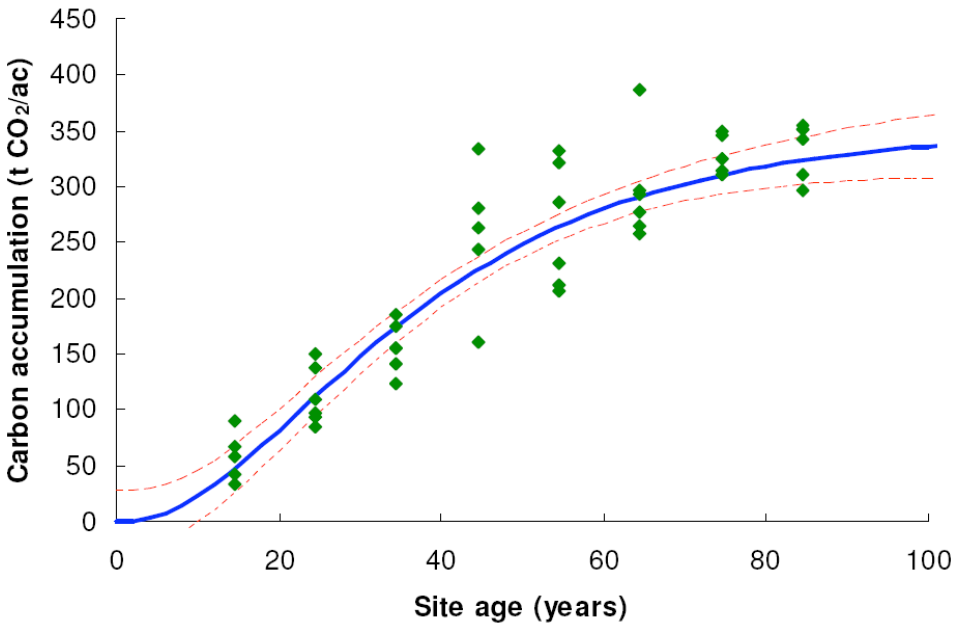

Figure 10: Predicted carbon accumulation for bottomlands in Kansas. Derived from field data on tree biomass and USFS default data on additional pools (understory, dead wood, litter and soil organic carbon). Mean and 95% confidence interval is displayed. Units are metric tons of carbon dioxide equivalent per acre.

[28] Pearson, TRH and Kaster G. 2008.

[29] Schroeder, P., S. Brown, J. Mo, R. Birdsey and C. Cieszewski, 1997.Biomass estimation for temperate broadleaf forests of the United States using inventory data. Forest Science 43: 424-434.

Monitoring Plan and Compliance with the IPCC Good Practice Guidelines[30]

The monitoring regime at Marais des Cygnes NWR follows IPCC Good Practice Guidance ("IPPC GPG")[31], specifically Chapter 4.3 Guidance for Projects. Over the life of the project, carbon sequestration estimates will be derived from direct measurements on the 19 established 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 GPG; Tiers 1 and 2 do not use direct, continuous measurement.

The ESI measurement and monitoring plan was designed and implemented to measure and quantify (or document the absence of) and discount baseline carbon stocks in terrestrial pools (above and belowground biomass, standing and lying dead wood, mineral soil carbon) measured at the initiation of the project from the same pools monitored over the life of the project. Focus is on measuring stocks (rather than fluxes) and thus the ESI monitoring plan is designed for stock change accounting advocated by the IPCC.[32] In conformance with IPCC GPG regarding explicit quantification of uncertainties and reducing uncertainties, the ESI monitoring plan is designed to produce estimates of forest carbon with a known level of confidence and employs random sampling to reduce bias.

Also per IPCC GPG, the ESI monitoring plan includes a Quality Assurance/Quality Control plan to control for errors in sampling and data analysis, and provide documentation and consistency in data archiving to permit 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 to permit independent review of source data over the life of the project. This is in compliance with a key overarching guideline of the IPCC GPG:
"data and information to be documented, archived and reported to facilitate review and assessment of inventory estimates" (IPCC GPG Chapter 1).

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[30] David Shoch of TerraCarbon and ESI provided the following description.

[31] Penman, J., M. Gytarsky, et al. (2003). Good Practice Guidance for Land Use, Land-Use Change and Forestry. Hayama, Kanagawa, Japan, IPCC National Greenhouse Gas Inventories Programme.

[32] IPCC GPG, 2003.

CL4. ADAPTING TO CLIMATE CHANGE AND CLIMATE VARIABILITY

CL4.1 Regional Climate Change Impacts

Regional climate change and climate variability may impact the Marais des Cygnes NWR Restoration Initiative. Changes in temperature, precipitation and CO_2 levels have shown to impact tree growth and competition. In particular, changing precipitation patterns paired with increased temperatures may result in increased stress on ecosystems. However, it is also possible that increased CO_2 concentrations may allow for higher water use efficiencies in trees to compensate for increasing temperatures in some locations.

Kansas's climate may experience significant change over the next century. By the close of the 21st century, Kansas could see up to an 8º Fahrenheit increase in average annual temperature.[33] By 2060, there could be up to 6º F increase in temperature.[34] Precipitation at the project site may change by anywhere from -20% to +40% depending on the season. In general, climate models show an increase in precipitation in the winter and spring with a decrease in precipitation in the summer and fall. The frequency of extreme hot days in summer is expected to increase along with the general warming trend.[35] The figures below[36,37] show some of the predicted changes in temperature and precipitation in the future. It is important to note that the Marais des Cygnes NWR is located on the edge of the climate studies referenced here. Many climate studies focused on the Great Plains region or the Midwest region, and the project site is located directly on the border of these regions. However, the conclusions drawn from the studies still apply to the broader project location.

[33] Wuebbles, D. J. and K. Hayhoe (2004). "Climate Change Projections for the United States Midwest." Mitigation and Adaptation Strategies for Global Change **9**(4): 335-363.

[34] Schoof, J. T., S. C. Pryor, et al. (2007). "Downscaling daily maximum and minimum temperatures in the Midwestern USA: a hybrid empirical approach." International Journal of Climatology **27**(4): 439-454.

[35] Ebi, K. L. and G. A. Meehl (2007). Regional Impacts of Climate Change: Four Case Studies in the United States. The Heat is On: Climate Change & Heatwaves in the Midwest. Washington, DC, Pew Center on Global Climate Change**:** 20.

[36] Schoof et al., 2007

[37] Wuebbles & Hayhoe, 2004.

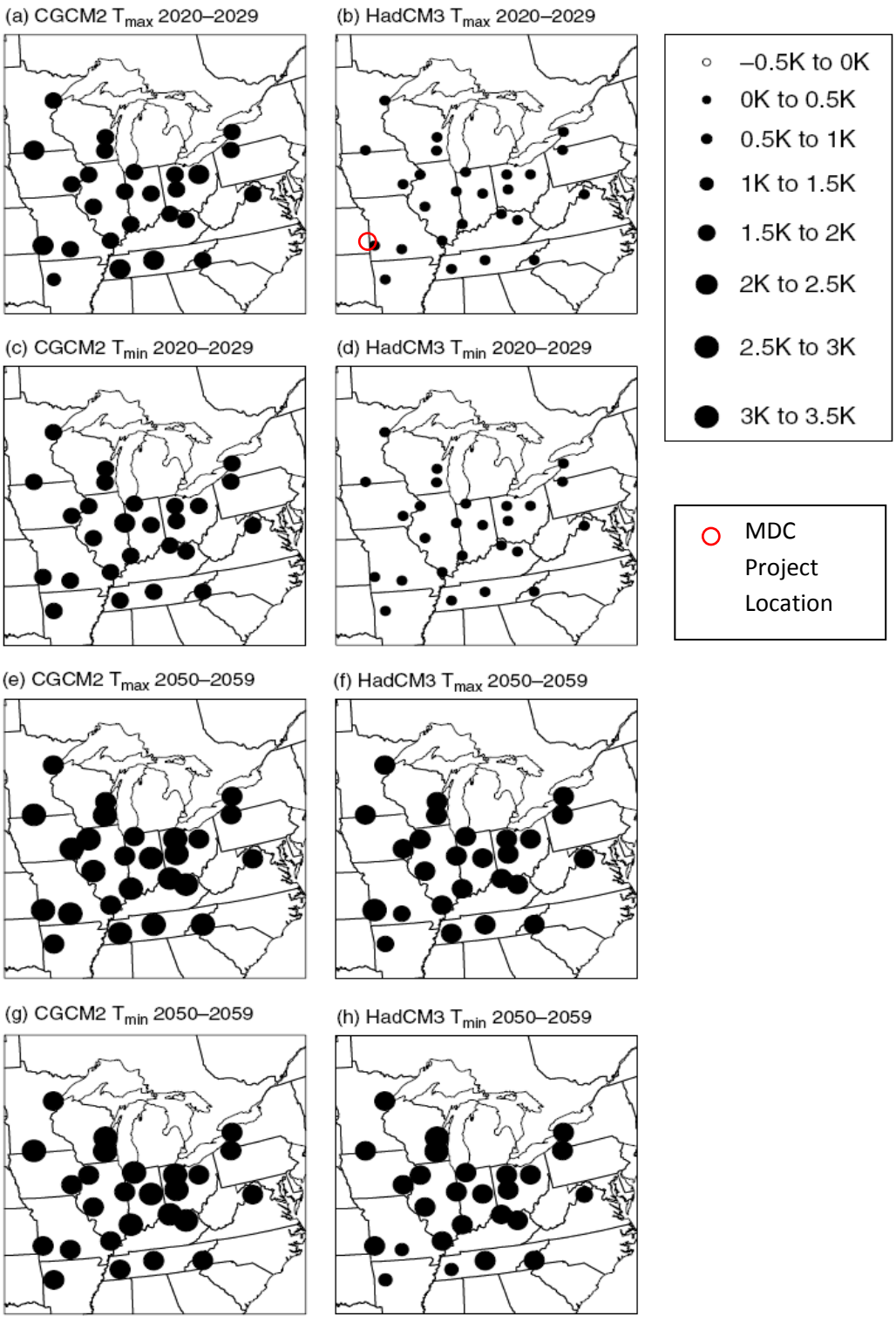

Figure 11: Predicted changes in maximum and minimum temperatures across the Midwest (1 °K = 1.8 °F)

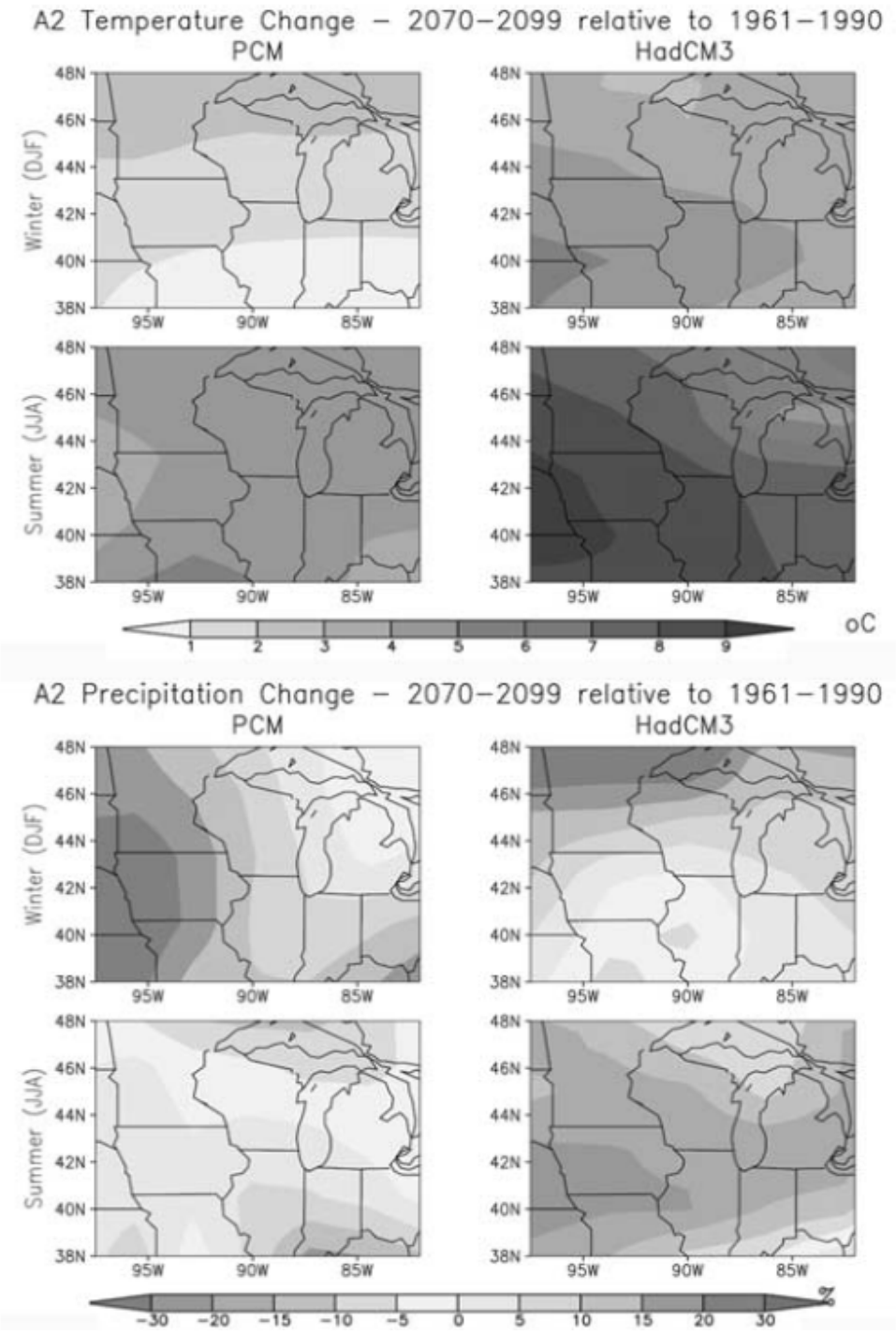

Figure 12: Temperature and Precipitation projections relative to past climate.

CL4.2 Measures Taken to Anticipate Climate Change Impacts

The project location could potentially suffer mortality if there is a combination of increasing temperatures paired with decreasing precipitation in the summer months. This outcome is uncertain given that it is still not clear how ecosystems will react to and adapt to the suite of changing environmental variables that may occur with a changing climate.[38] Many of the native species used in the Marais des Cygnes NWR Restoration Initiative may be capable of adapting to changes in climate (in particular hotter temperatures) given that their natural ranges are quite broad and in many cases extend to the Gulf of Mexico where average temperatures are generally higher.[39] If significant mortality does occur, the Fund has contracted with ESI to replant areas that suffer significant mortality within the first ten years.

In addition to the direct mitigation of climate change impact on the Go Zero Tracts, the Marais des Cygnes NWR Restoration Initiative will, in fact, help mitigate climate change impacts by reversing a previous deforestation trend and by improving watershed and wetland protection. Healthy ecosystems are more resilient to climate variability and climate change impacts. By restoring forests to this region, this project is reducing the risk of severe flooding, stabilizing river and stream banks to prevent severe erosion, and slowing desiccation of rivers and underground water sources during severe droughts.

CL5. CARBON BENEFITS WITHHELD FROM REGULATORY MARKETS

All of the carbon benefits generated by the Marais des Cygnes NWR Restoration Initiative will be withheld from regulated greenhouse gas markets and will be retired upon their sale.

[38] Norby, R. J. and Y. Luo (2004). "Evaluation ecosystem responses to rising atmospheric CO_2 and global warming in a multi-factor world." New Phytologist **162**: 281-293.

[39] Little, E.L., Jr., 1977, Atlas of United States trees, volume 4, minor Eastern hardwoods: U.S. Department of Agriculture Miscellaneous Publication 1342, 17 p., 230 maps

COMMUNITY SECTION

CM1. NET POSITIVE COMMUNITY IMPACTS

CM1.1 Community Benefits

The Go Zero Tracts, which were previously weed-covered or agricultural lands with minimal public recreation value, can now be enjoyed by the entire public and especially residents in the surrounding Kansas City Metropolitan Area. The Tracts will provide numerous recreational opportunities to local residents, including hunting, fishing, wildlife photography and observation, environmental education and interpretation.

The majority of recreational uses of the area are oriented toward river recreation or waterfowl and game hunting. A variety of clubs use the Refuge each year for opportunities to observe waterfowl, general birding, hiking in the natural areas, or viewing wildflowers and other plant species. These clubs travel from throughout the State of Kansas and the Midwest region to enjoy the naturalness and diversity of the area. The quality of their experience on the Refuge will be improved due to the Tracts' restoration, which will lead to improved water quality along the River, improved forest and habitat conditions and increased wildlife species richness.

The Refuge also provides educational and employment opportunities to individuals in the surrounding community. The Student Conservation Association ("SCA") sponsors two internship opportunities on the Marais des Cygnes Refuge each year from January - March, with a focus on fire ecology monitoring. The Go Zero project expanded the learning opportunities available for the SCA interns. They performed a majority of the site preparation for the Marais des Cygnes NWR Restoration Initiative, and assisted with the proxy studies for carbon sequestration including coring trees and setting up plots. Participating in the project allowed both of the SCA interns to acquire skills they would not have otherwise gained, making them more valuable as employees on Marais des Cygnes NWR and other Refuges, especially as carbon projects continue to grow in popularity.

Figure 13: SCA intern evaluating a tree core sample

The Go Zero project's positive community impact will be measured by monitoring the community 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 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 14 below illustrates the predicted increase in community use that can be expected as a result of the Go Zero project.

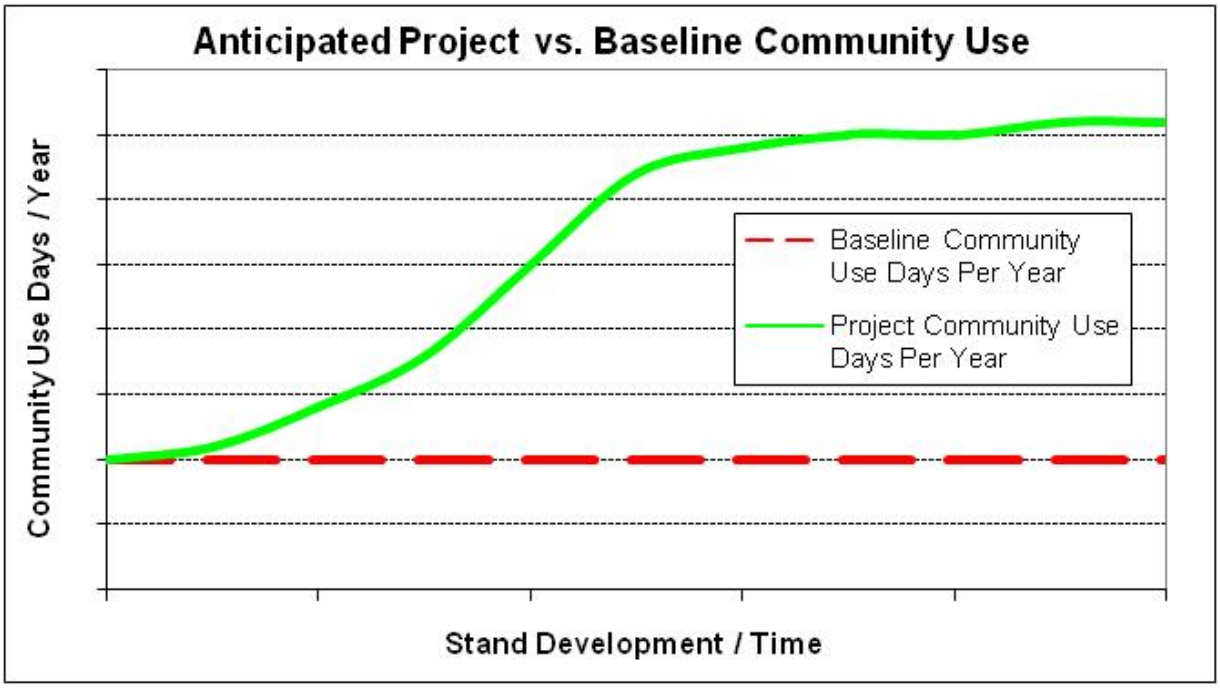

Figure 14: Anticipated Project vs. Baseline Community Use Over Time

As illustrated by Figure 14, the Marais des Cygnes 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 farmland or covered in weeds and not well suited to recreational activities such as hiking or birding. Therefore, the net community impact of the project can be considered positive.

CM1.2 Stakeholder Participation in Project Planning

As stated in Section G3.6, stakeholders played various but active roles in project development and implementation. For example, the Service was involved in all decision making, including species selection, site preparation and long-term management decisions for the Go Zero Tracts. ESI was actively involved in decision-making, and has offered guidance to the Fund and USFWS on planting methodology and timing. Service staff, including the Refuge Manager, met with ESI contractors and staff on an almost daily basis while the planting process was taking place, and consultation took place between USFWS, ESI, and the Fund with great

frequency during all phases 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.

The Area Manager for the neighboring state-run Marais des Cygnes Wildlife Area was notified and consulted before the project was implemented. He encouraged Marais des Cygnes NWR to use State Wildlife Area lands for proxy studies and any other informational needs. When the SCA interns arrived at the Refuge, they were given information by Refuge staff about the Go Zero project and their related responsibilities.

The below chart shows the comments provided by stakeholders and how they were addressed:

Table 4: Marais des Cygnes NWR Restoration Initiative stakeholder input

NAME OF STAKEHOLDER	ROLE	COMMENTS PROVIDED	COMMENTS ADDRESSED	METHOD
The Conservation Fund	Project Implementer	Projects must adhere to Go Zero Principles	Ongoing	Various
The Conservation Fund donors	Donor	Projects must adhere to Go Zero Principles	Provided with project updates via email shortly after the planting. Hosted on-site dedication event open to donors, media and community.	Email
US Fish and Wildlife Service	Project Implementer	USFWS provided information on site selection, preparation and species selection for the Go Zero Tracts. They also provided comments on future maintenance of the Tracts.	The advice of USFWS on site preparation and species selection was followed by ESI and the Fund during the planting process. USFWS management plans will be followed for maintenance of Tracts as forestland.	Oral/written communication between team members during project development and implementation
ESI / ESI Contractors	Project Implementer	ESI and its contractors provided advice to USFWS and the Fund on planting methodology (including advice on best timing)	ESI's suggestions on how and when to plant were followed by the Fund and USFWS during the restoration process.	Oral/written communication between team members leading up to planting date

NAME OF STAKEHOLDER	ROLE	COMMENTS PROVIDED	COMMENTS ADDRESSED	METHOD
State Wildlife Area	Neighbor	Wildlife Area provided helpful information on bottomland hardwoods	Area manager worked with Refuge to conduct carbon curve proxy studies on State Wildlife Area property.	Oral/written communication between Marais des Cygnes NWR staff and State Wildlife Area Manager.
Student Conservation Association	Project Implementer	Provided knowledge, skills and labor needed for project completion	Advice used by Refuge staff during site preparation	Oral communication with Refuge staff
Tenant Farmers	Previous Leaseholder	Notification was given to farmers by Refuge staff that leases would be ended so restoration could begin	Tenant farmers made arrangements and informed Refuge staff of plans	Oral communication with Refuge staff

In addition to the interactions listed above, there were numerous opportunities for community members to voice their opinions on the restoration of the Go Zero Tracts. As detailed in section G3.7, local residents were active participants in the CCP process, which specifically listed bottomland hardwood forest restoration as a Refuge priority. After the planting was completed, the Fund held a public event on site at Marais des Cygnes NWR, attended by approximately 35 people, to highlight and celebrate the restoration activities. Attendees participated in ceremonial tree planting, oral presentations, and a Refuge-guided tour of the Tracts.

As noted in G3.7, Marais des Cygnes NWR and the Fund are continuing to work together closely to inform stakeholders about the Go Zero project, and are implementing new ways to communicate with user groups about the project. For example, the Refuge and the Fund are in the process of developing an informational panel on the Refuge welcome kiosk that explains the Go Zero program, the partnerships involved and the benefits of forest restoration. An interpretive display will also be placed at one of the fields along the Kansas state line road that details the goals of the project, its boundaries, and recognizes participating sponsor companies. The Marais des Cygnes NWR staff were featured and quoted in national outreach

efforts during the summer of 2009 highlighting the Go Zero program and its specific benefits to wildlife on the Refuge.[40]

The Refuge will continue to inform visitors about the Go Zero project through routine contacts at headquarters and in the field, and the project will also be incorporated into discussions with local groups such as the Lions Club, school groups, and watershed groups. In addition, the Project Design Document will be posted on both the Fund's web site and the Refuge website and hard copies of the PDD will be made available at Marais des Cygnes NWR headquarters. 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.

CM1.3 Conflict Resolution and Grievance Procedures

All grievances related to the Refuge, including those pertaining to the restoration of the Go Zero Tracts, are filtered through the Marais des Cygnes NWR staff. The Refuge staff aims to respond to grievances within 30 days, and will attempt to resolve all reasonable grievances within a timely manner. All major grievances will be documented, and phone complaints will be recorded in a phone log. The Go Zero planting occurred in late 2007/early 2008 and there have been no grievances to date.

Marais des Cygnes Refuge does its best to anticipate and head off potential grievances. For example, when it proposed changes to its hunting regulations, the Refuge posted these changes at the Refuge's main office and commonly used public access points, and allowed individuals the opportunity to comment on the proposed changes in writing. Comments were considered and sometimes incorporated into the changes. If any changes are planned for the Refuge related to the Go Zero Tracts, the Refuge will use the same procedure to ensure that community members are provided an opportunity to express their opinion.

CM2. OFFSITE COMMUNITY IMPACTS

CM2.1 Potential Negative Offsite Community Impacts

There are no potential negative community impacts from restoring the Go Zero Tracts within Marais des Cygnes NWR. Most of the land was previously not used for any purpose; it just sat covered in grasses and forbs. Fifteen percent of the land was previously used for farming, but the farmer who used two-thirds of this area ended his contract with the Refuge before the project started. The remaining one-third was farmed by another individual but this land only represented a small percentage of his total acreage. The second individual has continued

[40] http://news.prnewswire.com/DisplayReleaseContent.aspx?ACCT=104&STORY=/www/story/06-22-2009/0005047562&EDATE=

farming on land already in his possession. Therefore, no jobs should be lost in the community due to the cessation of farming on the Tracts.

CM2.2 Mitigation of Negative Impacts

There are no anticipated negative impacts caused by the restoration of the Go Zero Tracts. As stated above, one tenant farmer ended his contract before the project started and the other moved his farming to another piece of agricultural property already in his possession, so no jobs were lost due to the project. There should be no impact on Linn County tax rolls because the Go Zero Tracts were already owned by USFWS.

CM2.3 Net Social and Economic Impacts

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

CM3. COMMUNITY IMPACT MONITORING

CM3.1 Monitoring Plan

Marais des Cygnes NWR staff will monitor the community benefits generated by the Marais des Cygnes NWR Restoration Initiative, as described in CM1.1, 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, and celebratory events, is expected to increase as illustrated in Figure 15 below. Community use of the Tracts, and the entire Refuge, for public recreation and enjoyment is a significant benefit of the Go Zero projects and, therefore, an appropriate variable for community impact monitoring.

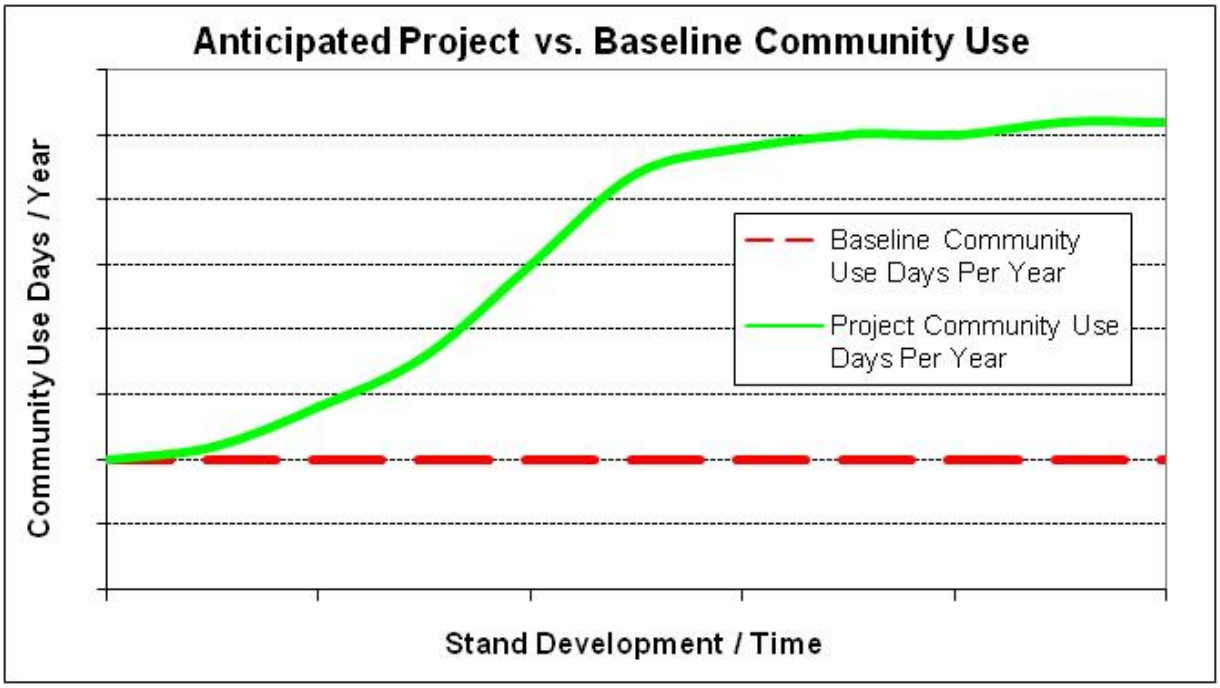

Figure 15: Anticipated Project vs. Baseline Community Use Over Time

The number of visitors using the Go Zero Tracts will be monitored by the Refuge's law enforcement staff (including 1 full-time and 1 dual-function law enforcement officer), who patrol the Refuge on a regular basis throughout the year and keep a log of visitor use. They will record visitor usage of the Go Zero parcels and will tally and report visitor numbers periodically in order to track community usage of the parcels over time. Visitation for the entire Refuge is already monitored in this same way and recorded annually via the RAPP reports. The monitoring plan for the Go Zero Tracts will be incorporated as a subset of the overall Refuge monitoring plan.

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.

CM4. CAPACITY BUILDING

CM4.1 Accommodates Communities

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 is preparing 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 Marais des Cygnes Restoration Initiative team are participating in these workshops and sharing lessons learned about conducting carbon projects on Refuge lands.

In addition, as mentioned in section CM1.1, the Go Zero project provided valuable training for two local SCA interns, who gained useful skills related to carbon sequestration projects. These interns will be able to replicate these skills on other Refuges in future employment opportunities.

Figure 16: Participants in Marais des Cygnes NWR Restoration Initiative ceremonial dedication

CM4.2 Inclusion of All Groups

Information relevant to the project's impact on climate, community and biodiversity is public and accessible to interested parties via the Climate, Community and Biodiversity Alliance website, the Fund's website, the Service's website or the Refuge visitor center. USFWS staff participating in the project are residents of the local community; the project is not targeted at particular "elite" groups.

CM4.3 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.

CM4.4 Community Participation

Community residents, including Refuge staff, are integral members of the Go Zero project team. They have participated in project design and implementation and have contributed photographs and information to this PDD.

After planting was completed, the Fund conducted a ceremonial dedication event in May 2008 to highlight the restoration of the land and the importance of the nation's Refuge system. Local community members and stakeholders were invited to this event, where they had the opportunity to learn more about the Marais des Cygnes NWR Restoration Initiative. Several stakeholders may be invited to participate in additional site activities, donor visits, media tours and media interviews to help increase awareness about the Initiative across the community and the State.

CM5. BEST PRACTICES IN COMMUNITY INVOLVEMENT

CM5.1 Knowledge of Local Customs

The project was developed with strong knowledge of local customs. USFWS staff consists of local residents who are keenly attuned to local culture. Residents in the area are enthusiastic about hunting, hiking and outdoor activities and welcomed improvements to the land in their area for these recreational opportunities.

Figure 17: Members of the restoration team including staff from ESI, the Fund, Marais des Cygnes Refuge and SCA interns

CM5.2 Stakeholder Employment

The Marais des Cygnes 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 Marais des Cygnes NWR Restoration Initiative did create short-term employment opportunities – primarily during the planting and restoration phases. ESI used 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.

Also, as mentioned in section CM1.1, the Marais des Cygnes Restoration Initiative enriched the internship opportunity of the two SCA interns, allowing them to learn a broader range of skills than they would normally learn during an internship at the Refuge. The experience they gained from working on the Go Zero project gave them increased job marketability and will allow them to participate in future carbon projects.

CM5.3 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.

CM5.4 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 some contractors). ESI 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 two workers sit and insert the tree seedlings into the ground—is encased such that sticks and field debris cannot reach them. It 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 CRP and WRP tree planting programs.

The Occupational Safety and Health Administration (OSHA) and the Service require health and safety training for all USFWS employees.[41] USFWS safety policy is designed to minimize any risks to worker safety, including requiring Refuge personnel to undertake an ATV safety course.

[41] Additional information on USFWS Safety Program Management is available at: http://www.fws.gov/policy/240fw1.html

BIODIVERSITY SECTION

B1. NET POSITIVE BIODIVERSITY IMPACTS

B1.1 Net Positive Biodiversity Under the Project Scenario

The Marais des Cygnes NWR Restoration Initiative will restore key parcels within the boundary of Marais des Cygnes NWR and will have significant positive effects on biodiversity and the wildlife that depend on bottomland hardwood forests. Marais des Cygnes NWR is an especially important area for many bird species, including migratory birds. However, lands that existed on the Go Zero Tracts prior to the restoration did not and could not support a large variety of birdlife because many bird species require habitat that includes complex vertical and horizontal structure for nesting or foraging. Research on avian colonization has shown that bird species richness rises as bottomland hardwood forests age due to an increase in this structural complexity.[42] The newly planted forests will rapidly develop the complex habitat necessary for successful breeding, nesting, and overall survival. 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 18 below illustrates the anticipated increase in bird species richness as a result of the Go Zero project.

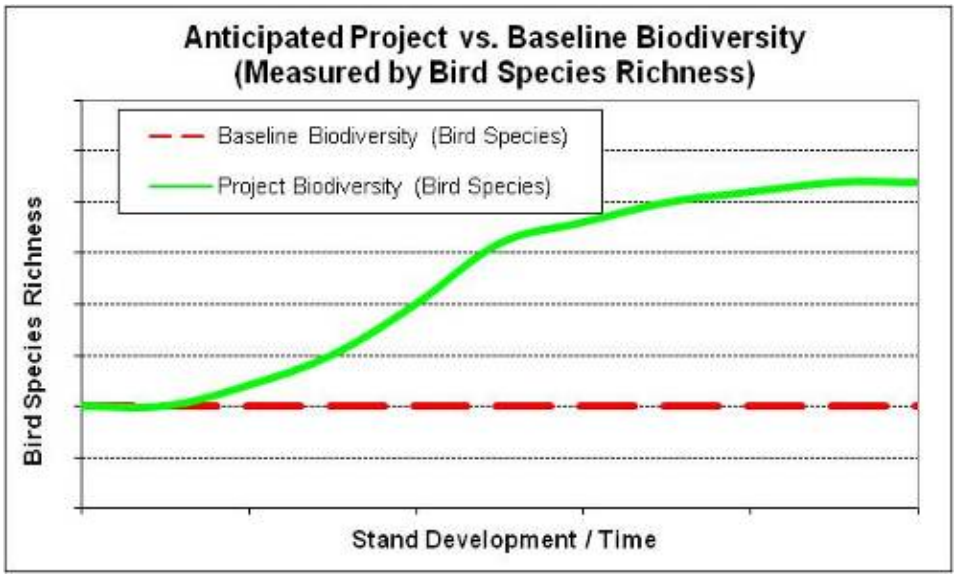

Figure 18: Anticipated Project vs. Baseline Biodiversity Over Time

[42] 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.

Specifically, the young tree seedlings planted at the Go Zero Tracts will immediately offer shelter for field sparrows and indigo buntings. When the new forest is between ten and thirty years old, it will be home to the brown thrasher, American woodcock and Bell's vireo. After forty years, red-headed woodpecker, yellow-billed cuckoo and orchard orioles will inhabit the forest. In the future, the mature bottomland hardwood forest will provide habitat for the Cerulean warbler, prothonotary warbler, Acadian flycatcher, wood thrush, and red-shouldered hawk. In addition to bird species, the forest will also provide homes for other resident wildlife, including long-tailed weasel, bobcat and grey fox.

Figure 19: Red-headed woodpecker

Without the project, the land would remain in agricultural production, and/or, remain overrun with annual and perennial weeds, 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.[43]

Forest fragmentation such as existed at Marais des Cygnes NWR can lead to diminished bird nesting success, increased predation, and increased brood parasitism, especially from the brown-headed cowbird. Forest fragmentation at Marais des Cygnes 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 Marais des Cygnes 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 Possible Adverse Effects of Non-Native Species

Only native species were used for the Marais des Cygnes NWR Restoration Initiative.

[43] 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

B1.3 Threatened Species

Threatened species on the IUCN Red List, as well as those listed by USFWS and tracked by the Kansas Department of Wildlife and Parks, are listed in Section G1.7 of this project document.

B1.4 Species Used by the Project

In accordance with the Fund's planting principles, the Go Zero Tracts were planted with native bottomland hardwood forest species chosen by USFWS and designed to restore the fully functioning natural systems of Marais des Cygnes NWR. Tree species included black walnut, bur oak, green ash, Kentucky coffeetree, hickory, northern red oak, pecan, persimmon, pin oak, post oak, red mulberry, shellback hickory, shumard oak, swamp white oak, sycamore, white ash and white oak.

Figure 20: Oak seedling

B1.5 Genetically Modified Organisms

All Go Zero projects are planted with natural, native trees. No genetically modified organisms will be used to generate carbon credits from this project.

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 Marais des Cygnes NWR.

B2.2 Mitigation Plans

N/A

B2.3 Net Effect of Project on Biodiversity

In light of the above information, the net effect of the restoration of the Go Zero Tracts on biodiversity will be highly positive on both the Go Zero Tracts and Marais des Cygnes NWR as a whole.

B3. BIODIVERSITY IMPACT MONITORING

Biodiversity within Marais des Cygnes NWR is actively studied and monitored by USFWS staff. As mentioned in Section G7.1, Refuge management issues an annual RAPP report containing

information on the quality of fish and wildlife on the Refuge. As noted in section B1.1, the Marais des Cygnes 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. A shift in the overall bird community from early successional species such as indigo buntings and yellow-breasted chats to forest interior species like the wood thrush and Acadian flycatcher is also anticipated. A positive correlation between stand development and species richness is anticipated as illustrated in Figure 21.

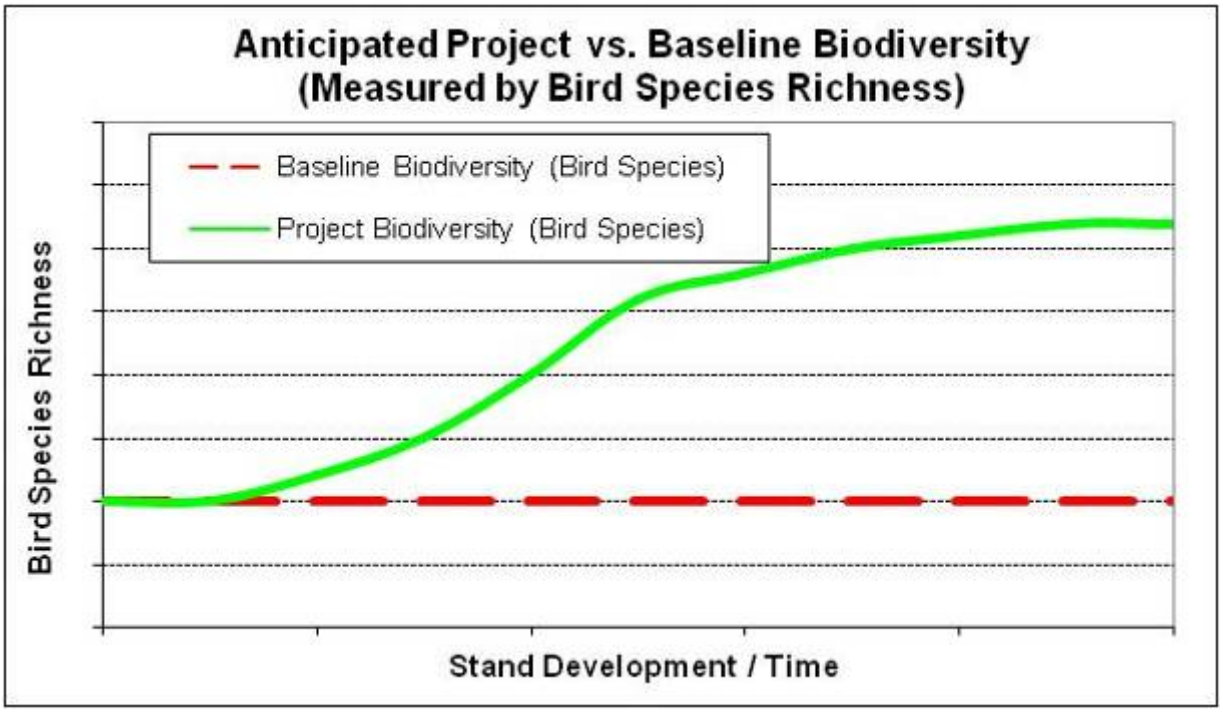

Figure 21: Anticipated Project vs. Baseline Biodiversity Over Time

Changes in species richness will be monitored via an annual bird survey along the Marais des Cygnes River. Each June, biological staff from the University of Kansas and the Service float the 8-mile section of the River which flows through the Refuge. The breeding bird survey documents the occurrence of riparian species adjacent to the largest planting fields in the Go Zero restoration project. The Service has the benefit of 11 years of data collection before the planting occurred; a gap in the dataset occurs in 2008 because water levels remained too high for safe canoeing. Therefore, post-planting monitoring began in June 2009.

The monitoring will detect changes to the bird community as a result of the Go Zero project. The river transect covers several of the largest fields within the Go Zero planting project and from the river, you can see the Go Zero Tracts. The monitoring team starts the survey before 6:00 a.m and finishes by 10:30 a.m. Three people are required, with two paddling and the third listening, watching, and documenting occurrence. Many more birds are heard than seen, requiring good knowledge of bird calls.

The riparian bird survey is one of the surveys noted in the Marais des Cygnes NWR RAPP report, and is already included in Refuge protocols including the Annual Habitat Work Plan. The resulting data sets are kept in Service files. As noted in section G7.1, the CCP for Marais des Cygnes 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 the species richness surveys will be considered when devising and implementing management plans for the Refuge. Over time, it is expected that the trees will mature and support a bird community typical of the forest interior and the forest will be managed accordingly.

B4. NATIVE SPECIES USE

As previously stated in B1.2, and in accordance with the Fund's planting principles, all Go Zero carbon sequestration projects are planted with native trees.

B5. WATER AND SOIL RESOURCE ENHANCEMENT

The restoration of the Go Zero Tracts and subsequent management of the Tracts by USFWS will confer many benefits to soil and water quality. The Marais des Cygnes River has high turbidity and a high sediment load. The restoration of the Go Zero Tracts, all which are within the River's watershed, will reduce sediment load in several ways. Erosion will be reduced due to new forest establishment, and bottomland hardwoods—as opposed to goldenrod-broomsedge habitat—will be more effective at retaining soil on site. The tree canopy that will grow on the Tracts will protect the soil through interception of wind and rain because the canopy is very effective at reducing the energy of raindrops which dislodge soil particles. The replanted areas will improve water quality by filtering and flushing nutrients and reducing sediment before it reaches open water. Overall water quality should improve because soil, nutrient, and chemical inputs associated with agriculture will be reduced due to the cessation of farming on the Tracts. Finally, the Tracts' soil quality will be healthier due to increased diversity of plant life and biomass accumulation associated with forest regeneration.

CONCLUSION

The Marais des Cygnes NWR Restoration Initiative is a unique opportunity to restore Kansas's native bottomland hardwood forests and help mitigate climate change while conferring community and biodiversity benefits to eastern Kansas. In addition to sequestering carbon dioxide from the atmosphere, the Go Zero Tracts will restore fragmented habitat, enhance water quality along the Marais des Cygnes River, and improve the quality of public recreation areas for all to enjoy.