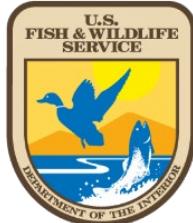


4/28/2021

Restoration Progress Report for the Lower Fox River and Green Bay Natural Resource Damage Assessment

Fox River/Green Bay Natural Resource Trustees





The [U.S. Fish and Wildlife Service](#) works with others to conserve, protect, and enhance fish, wildlife, plants, and their habitats for the continuing benefit of the American people.



The [Wisconsin Department of Natural Resources](#) is dedicated to protecting and enhancing our natural resources: our air, land and water; our wildlife, fish and forests and the ecosystems that sustain all life. To provide a healthy, sustainable environment and a full range of outdoor opportunities. To ensure the right of all people to use and enjoy these resources in their work and leisure. To work with people to understand each other's views and to carry out the public will. And in this partnership consider the future and generations to follow.



The [Oneida Nation](#) mission is “to strengthen and protect our people, reclaim our land and enhance the environment by exercising our sovereignty”.



The [Menominee Indian Tribe of Wisconsin](#) or Omaeqnomenewak (People of the Wild Rice) mission is “to promote, protect, and preserve our rights, resources, and culture by utilizing responsible leadership and judicious exercise of our sovereign powers”.

Restoration Progress Report for the Lower Fox River and Green Bay Natural Resource Damage Assessment

Fox River/Green Bay Natural Resource Trustees

June 30, 2012 through December 31, 2018

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Executive Summary

A Letter from the Trustees

We are proud to be the Fox River Natural Resource Trustees – proud of the partnerships, proud of the process, and proud of the accomplishments. Four Trustee governments with diverse backgrounds have been working collaboratively for more than 25 years to administer settlement funds, restore the natural resources that were injured, and compensate the public for this loss over time.

The Trustees have been implementing restoration projects with settlement funds since 2002. Support from our local partners has enhanced the NRDA process by providing additional conservation perspectives, expanding technical restoration expertise, and leveraging funds for project cost sharing. The Trustees are grateful for the contributions of local scientists, conservation partners, and community members every step of the way.

We have implemented many projects along the Fox River and throughout northeast Wisconsin within the designated restoration area including land preservation, stream and wetland restoration, fish population enhancements, spawning habitat, and recreational fishing projects. Many of these projects have cultural components that help compensate tribal communities for their losses. As a result, great progress has been made restoring the environment for injured natural resources and future generations of recreational users to enjoy them.

Trustee supported investments have contributed widely to important Great lakes coastal wetlands, restoring critical migration areas for shorebirds, waterfowl, and raptors, protecting and restoring habitats in the Pool Lakes; enhancing spawning habitat for northern pike, bolstering the iconic Lake Sturgeon, and creating and maintaining a world-class fishery. We are helping to make this a place the community can enjoy recreating in, and are closer to being able to catch and eat clean, safe fish from the Fox River and other local waterways.

The Fox River Natural Resource Trustees will continue their important restoration work for fish and wildlife recovery over the next decade and uphold our promise to provide a healthier environment for all to interact with and appreciate.



A good mind. A good heart. A strong fire.



Introduction

Background

Starting in the mid-1950s, Lower Fox River paper companies and associated waste treatment facilities began to release polychlorinated biphenyls (PCBs) to the Lower Fox River/Green Bay ecosystem. These releases resulted in adverse impacts (“injuries”) to natural resources, including to surface water and associated sediments, as well as to wildlife, including birds and fish. Through a process known as natural resource damage assessment (NRDA), “Trustees” of the natural resources have evaluated these injuries and determined what actions are necessary to restore or replace the resources as compensation to the public. The Trustees are organized into a Trustee Council that includes the Wisconsin Department of Natural Resources, the Menominee Indian Tribe of Wisconsin, the Oneida Nation, and the U.S. Department of the Interior - represented by the U.S. Fish and Wildlife Service.

Authority to act on behalf of the public is given to Trustees under the federal [Comprehensive Environmental Response, Compensation, and Liability Act \(CERCLA\), or “Superfund,”](#) and the Clean Water Act. Under CERCLA, the Trustees focus on restoration of natural resources, while the U.S. Environmental Protection Agency, working with the Wisconsin Department of Natural Resources, supervises the cleanup and remediation activities for the Lower Fox River (e.g., dredging and removal or capping of contaminated sediments). Cleanup activities reduce risks to human health and the environment, but do not necessarily restore natural resources, which is the objective of the restoration activities undertaken by the Trustees. The parties responsible for the release of PCBs into the environment ultimately bear the cost of both cleanup and restoration.

Restoration Progress Reports and This Document

This document is the second Restoration Progress Report published in an effort to provide an overview of the actions taken by the Fox River Natural Resource Trustees to restore these injured resources. The first Restoration Progress Report was published in 2013, detailing all restoration actions taken from 2002 through June 30, 2012. The 33 fact sheets provided in this progress report highlight restoration projects that were ongoing or initiated from June 30, 2012 through December 31, 2018. Cumulative reporting totals are provided for completed projects from the initiation of Fox River NRDA restoration implementation in 2002 through December 31, 2018.

Using these funds, a wide variety of restoration projects have been implemented in northeast Wisconsin within the Fox River NRDA designated restoration area (see figure 1). In many cases, the Trustees’ partnership approach resulted in additional leveraged funds to increase the scope of a restoration project beyond what could have been achieved with NRDA settlement funding alone.

Other Important Trustee Documents

The current Trustee Council was formed through a Memorandum of Agreement (MOA) in 2002. These Trustees have been responsible for: 1) evaluating injuries to natural resources and corresponding losses in ecological and human use services as a result of PCB contamination, and 2) implementing restoration to compensate the public for those losses. [Injury evaluation activities](#) were guided by an assessment plan released in August 1996. Once natural resource injuries resulting from PCB releases were assessed, the restoration planning phases of NRDA began. The Trustees developed a Restoration Compensation and Determination Plan (RCDP) in 2000, which was followed by a Restoration Plan and Environmental Assessment (Restoration Plan) in 2003. The public has been an important voice throughout both the

assessment and restoration phases of Fox River NRDA by providing input to guide activities and decision-making.

The Trustees updated their Restoration Plan in 2016 with a more informed perspective concerning the success of the remedial strategy, progress in restoration implementation, knowledge of restoration science, and partnerships with other conservation entities. The Restoration Plan update (Update) set new restoration goals that are achievable with available funds and updated project selection criteria to reflect the new goals. Such restoration is expected to compensate the public for PCB-related injuries to the habitats, wildlife, and cultural and recreational uses within and adjacent to the Lower Fox River and Green Bay.

Now and into the future, the Trustees are guided by both the original Restoration Plan and the Update to conduct restoration focusing on sensitive aquatic, nearshore, and riparian habitats, as well as fish populations, to ultimately improve water quality and fisheries within the designated restoration area. The Trustees also implement projects that restore cultural resources and enhance opportunities for the public to benefit from an enhanced fishery in the Lower Fox River and Green Bay system.

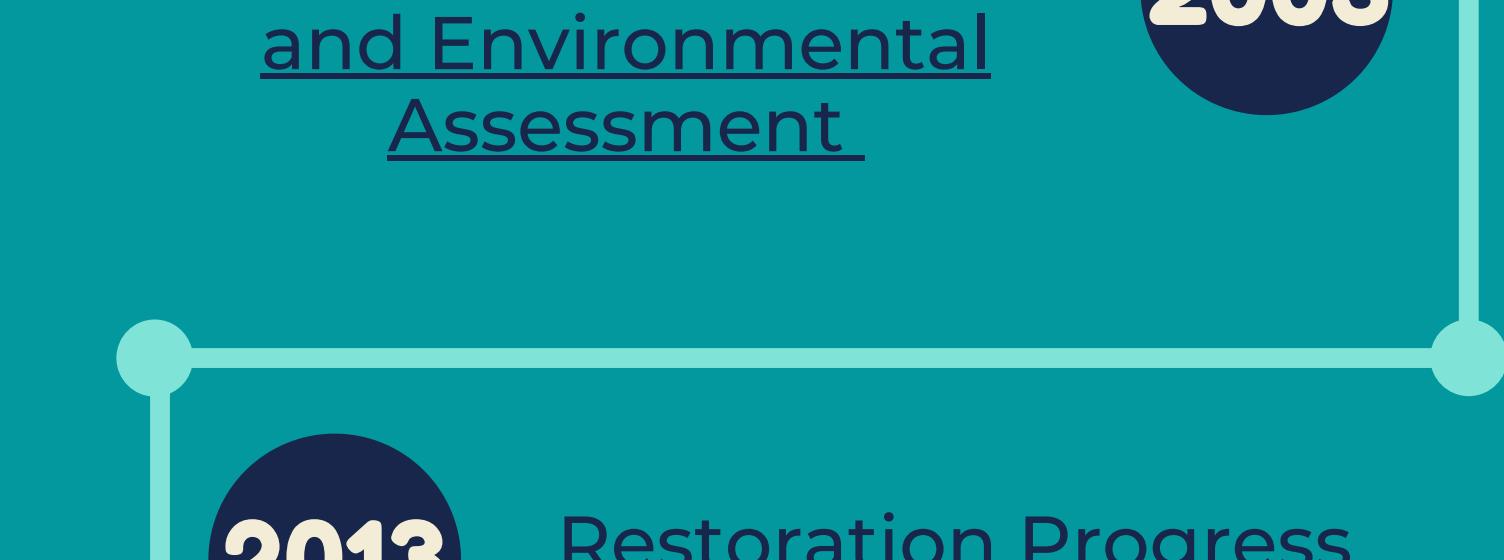


RESTORATION DOCUMENTS



2000

Restoration and Compensation Determination Plan



Joint Restoration Plan and Environmental Assessment

2003

Restoration Progress Report

2013



Updated Restoration Plan and Environmental Assessment

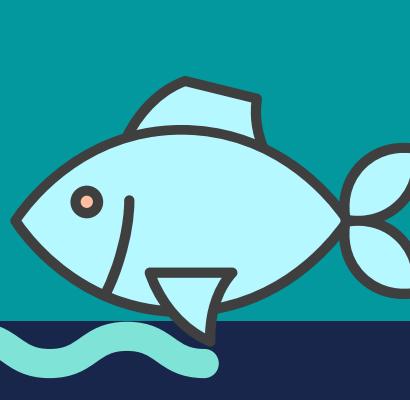
2016

2018

Monitoring and Adaptive Management Framework



Monitoring and Adaptive Management Framework



Cultural Resource Connections

Historically, the Lower Fox River and Green Bay provided food, transportation, and shelter to Native peoples prior to European settlement. And, due to its strategic location and rich biological resources it was an important area for trading posts and military fortifications. In keeping with the Trustee Restoration Plan and Update, preservation and/or restoration of resources that hold cultural value, especially those resources that are important to the Oneida and Menominee Tribes is a priority for the Trustees. This section outlines the cultural history and natural resource values of the Oneida and Menominee Tribes, as described by the tribes.

The Menominee Indians are the oldest continuous residents of Wisconsin. The Menominee are an Algonquin speaking nation and the name “O-MAEQ-NO-MIN-NIWUK” means “wild rice people.” Long ago, the French called the Menominee the “Folle Avoine Nation” or the “Nation of the Wild Oats” because of their dependence on the Wild Rice. The Menominee lived by hunting, fishing and gathering. The abundant wild rice was the staple food, augmented by corn, beans, and squash grown in small gardens. Boiling and roasting were the most common methods of cooking, but some foods were dried in the sun for winter use. Maple sugar and syrup were used as sweeteners and flavorings. Lake sturgeon was also particularly important as a food source, especially in the spring when the sturgeon would spawn at Keshena Falls on the Wolf River. The sturgeon were a welcome food source after long winters. Wild game and fish were abundant and utilized by the various bands of Menominee that roamed the land.

In the early 1820s, members of the Oneida Tribe of Indians journeyed from their homeland in the State of New York and entered into agreements with the Menominee and Ho Chunk Tribes for permission to stay in their territories. They settled along Duck Creek, where the presence of white pines was reminiscent of the Oneidas’ attractive homelands. In the following years, more Oneida migrated to this rich and fertile region to create a new homeland. This resulted in an Oneida Reservation of approximately 65,400 acres, located west of Green Bay in parts of Brown and Outagamie Counties. For 200 years Oneida people have made this place home. The current Reservation area in Wisconsin was chosen by the Oneida leaders in part because of the abundant wildlife, fish populations, and habitat diversity. Along with these abundant foods, the Oneida had an annual fishing season, which included the harvest of trout, walleye, pike, bass and white suckers (*Catostomus commersoni*). The harvest of fish played a key role in the Oneida way of life and was honored by ceremony and offerings to the Creator. There were established fishing and gathering areas along the waterways that were utilized annually. Since the beginning of time, the Oneida and each of the five Nations of the Iroquois Confederacy have been and continue to care for and protect all of Creation, including all fish and all of the waters.

The Lower Fox River and Green Bay restoration area encompasses a suite of habitat types that together support a wide range of fish and wildlife species. In addition to ecological functions, these natural resources also provide recreational, commercial, and cultural services. The Trustees will continue to prioritize projects that provide cultural value to the Menominee and Oneida.

Trustee Restoration Goals and Progress

Since 2002, the Trustees have recovered ¹\$88 million dollars in settlement funds to compensate for injury to natural resources in the Lower Fox River/Green Bay ecosystem. By the end of 2018, the Trustees initiated 150 projects consistent with restoration categories identified in the Restoration Plan (2003) and Update (2016). Restoration progress to-date has been measured in metrics of acres of preserved and/or restored habitat, as well as the amount of funding dedicated to fisheries and public use enhancements.



¹ Recovered funds include funding set aside for past NRDA assessment costs and future administrative costs.

Factsheets

The following section features fact sheets of projects that contributed to these goals from approximately 2012 – 2018.





Shoring Up Protection for Wetlands

Expanding Protected Land in the Wolf River Basin

While the release of polychlorinated biphenyls (PCBs) into the Fox River and Green Bay has led to extensive ecological damage, there are also many places in this region that harbor healthy habitats that support a wide array of species. However, many of these places are threatened by development and would be degraded or lost if not secured for conservation. The Fox River Trustees, along with key partners, have been working to identify and acquire ecologically valuable land for preservation. These preserved lands provide breeding habitat and increased food for a wide variety of fish, birds, and other wildlife, and thus can help compensate for PCB-related losses of habitat.

About Wildlife Habitat in the Wolf River Basin

The ecological value of wetland habitat in the Wolf River Basin has spurred recent interest in expanding conserved land in the region, and the State of Wisconsin Department of Natural Resources (WI DNR) manages several thousand acres of wildlife areas the area. Before emptying into the Fox River, the Wolf River winds through a corridor of high-quality floodplain forests and open wetlands in east-central Wisconsin. Heavy springtime flows in the river support critical spawning habitat for many species of fish, including walleye and one of the world's largest remaining populations of sturgeon. The river's many backwaters and ponds are also heavily used by waterfowl and migratory songbirds; as well as a diverse collection of reptiles, amphibians, and insects. Preserving land now will help prevent the future degradation and fragmentation of habitat through development, and will ensure that this area can continue support wildlife, hunting, and recreation in the future.



Blanding's turtle

Returning to a Healthy Environment

Since 2013, the Fox River Trustees have supported Wisconsin Department of Natural Resources (WI DNR) in their efforts to acquire and protect of multiple properties containing valuable wetland habitat in the Wolf River Basin, Green Bay West Shores, and Door Peninsula (see Projects 1.1–1.4 and 2.1 in the [2013 Restoration Progress Report for the Lower Fox River and Green Bay Natural Resource Damage Assessment](#), which can be found on our website). Most recently, the WI DNR completed the acquisition and protection of wetlands on two parcels of land. The first was a 148-acre property within the boundary of the Wolf River Bottomlands Natural Resource Area, an area identified by the WI DNR as a high priority

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for protection. The purchased land contains wetlands adjacent to the Wolf River just upstream of Lake Poygan, and its preservation will protect water quality in habitat known to support fish spawning and rearing. The second parcel purchased contained 127 acres of wetlands in the Village of Suamico in Brown County. This property abuts and is hydrologically connected to Barkhausen Creek, which flows to Green Bay and hosts annual spawning runs of a variety of native fish species. Thus, protecting this land will help safeguard valuable fish habitat and help sustain the water quality in Green Bay. WI DNR is continuing to assess additional parcels for potential purchase and conservation in cooperation with the Trustees.

About this Effort

The Fox River Trustees support the long-term recovery, protection, and enhancement of the natural resources of the Lower Fox River and Green Bay system. Starting in the mid-1950s, paper companies and other entities released PCBs into the Lower Fox River and Green Bay. These releases resulted in injuries to fish, wildlife, surface water, and sediments. Through a process known as natural resource damage assessment (NRDA), the Trustees assessed these injuries and entered into settlement agreements with the parties responsible for the PCB releases. Since 2002, the Trustees have recovered \$90 million for restoration projects that compensate for PCB-related injuries to natural resources.

Birds	Fish	Turtles
Waterfowl <i>Forster's tern</i> Shorebirds <i>Black-crowned night heron</i> Waterbirds <i>American bittern</i> Birds of prey <i>Bald eagle</i> 	Northern pike 	Blanding's turtle 

EXAMPLES OF WILDLIFE BENEFITING FROM RESTORATION

"Shoring Up Protection for Wetlands" is a fact sheet about wetland preservation efforts in the Wolf River Basin, Green Bay West Shores and Door Peninsula areas (NRDA Projects 1, 21, 82, 83, and 206); it was produced by Abt Associates under contract to the U.S. Fish and Wildlife Service.



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Restoration Snapshot

Activity:	Land acquisition to protect wetlands in the Wolf River Basin, Green Bay West Shores, and Door Peninsula
Funding:	NRDA funds: \$7,852,084 (\$7,352,084 of which were previously reported in the 2013 RPR) Leveraged funds: 1,919,699 (\$1,613,861 of which were previously reported in the 2013 RPR)*
Size:	3,925 (3,441 of which were previously reported in the 2013 RPR)*
Status:	Multiple acquisitions, including those described above, are complete, but further acquisitions are in progress.
Location:	Various locations in the Wolf River Basin, Green Bay West Shores, and Door Peninsula

*Data regarding project size and leveraged funding are provided only for acquisitions that were completed by the end of 2017.



Expanding the Oconto Preserve

Protecting Valuable Wetland Habitat along the Western Shores of Green Bay

Many outdoor enthusiasts are aware of key challenges facing natural areas in the greater Green Bay area. Historic fishing areas have been closed off due to pollution, high water and waves have degraded wetlands that were once extensive and productive, and invasive species have pushed out native ones in favorite fishing and hunting spots. However, many natural gems remain vibrant and intact along the rivers and shores of Green Bay. Protecting these areas is critical to supporting the birds, fish, and other wildlife that are integral to the treasured natural heritage of Wisconsin.

About Wetland Habitat on the Western Shore of Green Bay

The wetlands found along the western shore of Green Bay are recognized as exceptionally valuable ecological habitat. Their importance for water quality, flood abatement, carbon storage, and wildlife has been recognized by many local and regional organizations. More specifically, these coastal wetlands provide important spawning and nursery habitat for a wide array of native fish, such as northern pike, as well as stopover habitat for wetland-dependent birds, including migrating waterfowl, shorebirds, and neotropical songbirds.

Because of the ecological value of the area, a number of partnering organizations have been involved in protecting and restoring its habitats for many decades. The Northeast Wisconsin Land Trust (NEWLT) has actively preserved land that adjoins the expansive Green Bay West



American bittern

Shore Wildlife Area, managed by Wisconsin's Department of Natural Resources (DNR), which covers more than 9,000 acres and includes the Oconto Marsh Unit.

Returning to a Healthy Environment

With Fox River Trustee support, NEWLT purchased two parcels of land abutting the Oconto Marsh Unit of DNR's Green Bay West Shore Wildlife Area, adding 148 acres to its Oconto Preserve. The property is situated near the city of Oconto and local schools, offering easy access



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for the local community. An additional 28 acres of high-quality wetland habitat, which are located outside of the preserve boundaries, were also purchased by NEWLT with NRDA funding. These protected lands contain important habitat for migrating waterfowl, breeding birds, and foraging shorebirds, and local residents often spot bald eagles on the properties. The streams and adjacent wetlands in the protected areas also serve as important spawning areas for northern pike, and their preservation will help protect the water quality of the bay. Opportunities for community members to fish, hike, bird watch, cross-country ski, and enjoy nature at this preserve are plentiful. NEWLT is engaging local leaders, community members, and school groups in preserve activities. NEWLT is looking to continue expanding wildlife protection in the area through the purchase of additional parcels. See <https://www.newlt.org/oconto-preserve> for more information.

About this Effort

The Fox River Trustees support the long-term recovery, protection, and enhancement of the natural resources of the Lower Fox River and Green Bay system. Starting in the mid-1950s, paper companies and other entities released polychlorinated biphenyls (PCBs) into the Lower Fox River and Green Bay. These releases resulted in injuries to fish, wildlife, surface water, and sediments. Through a process known as Natural Resource Damage Assessment (NRDA), the Trustees assessed these injuries and entered into settlement agreements with the parties responsible for the PCB releases. Since 2002, the Trustees have recovered \$90 million for restoration projects that compensate for PCB-related injuries to natural resources.

Birds	Native Fish	Reptiles
Mallard American bittern Forster's tern Bald eagle	Northern pike	Blanding's turtle
		

EXAMPLES OF WILDLIFE BENEFITING FROM RESTORATION

"Expanding the Oconto Preserve" is a fact sheet about acquiring and protecting habitat along the western shore of Green Bay (NRDA Projects 180 and 219); it was produced by Abt Associates under contract to the U.S. Fish and Wildlife Service.

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Restoration Snapshot

Activity:	Acquiring and protecting habitat along the western shore of Green Bay
Funding:	NRDA funds: \$323,993 Leveraged funds: \$343,232*
Size:	176.9 acres*
Status:	Two acquisitions complete; one is in progress
Location:	Oconto County, WI

*Data regarding project size and leveraged funding are provided only for restoration projects that were completed by the end of 2017



Open Door for Wildlife

Acquisition and Preservation of Areas in and near Door County Provide a Safe Haven for Wildlife

Door County, a vibrant peninsula within northeast Wisconsin, is abundant with unique natural features that also make it a popular tourist destination. The peninsula is surrounded by water on both sides, including Green Bay on the west side and Lake Michigan on the east side. Continued growth and development in this area have encroached on natural spaces where wildlife live and thrive. Acquiring and protecting land in and around Door County has become an essential safeguard against the stress and pressure of development and growth, to ensure that wildlife has adequate healthy habitat.

About Door County Land Preservation

The Door County Peninsula is a special natural area of Green Bay, hosting some of the rarest habitat types and most threatened species in the state. Door County is also adjacent to the Grand Traverse Island Chain, a biologically rich, largely undeveloped island chain that stretches into Michigan's Garden Peninsula. Because of the ecological importance of these areas, several efforts have been aimed at acquiring and protecting high-quality habitat for wildlife in them.

Sustaining a Healthy Environment

The Fox River Trustees provided support to four projects to acquire and protect ecologically important land in Door County and the Grand Traverse Island Chain. Each of these is described in more detail below. The work described here builds on efforts previously supported by the Trustees to conserve habitat in Door County and western Green Bay (see Project 1.2 in the [2013 Restoration Progress Report for the Lower Fox River and Green Bay Natural Resource Damage Assessment](#), which can be found on our website).



St. Martin Island bluffs (photograph by Frykman Gallery)

Chambers Island and Gibraltar-Ephraim Swamp Protection

The Door County Land Trust purchased 112 acres on Chambers Island and 12 acres in the Gibraltar-Ephraim Swamp, an area on the Door Peninsula threatened by increasing development pressure. Protecting and preserving these lands will help maintain critical and contiguous forest and wetland habitats for a host of migratory birds and rare plant and animal species that use these protected areas. The project will also preserve the quality of surface and groundwater entering Green Bay, supporting the health of its fisheries. This important land acquisition secured the protection of 4,700 feet of undeveloped Lake MacKaysee shoreline, 22 acres of wet forest and cedar swamp, and 90 acres of northern mesic and wet-mesic forest on Chambers Island where many rare species birds breed. It also protects 12 acres of northern wet forest dominated by white cedar in the Gibraltar-Ephraim Swamp, which offers protected space



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for the federally endangered Hine's emerald dragonfly, and other plants and wildlife.

The Grand Traverse Island Chain: St. Martin Island and Detroit Island (two projects)

On St. Martin Island, the Trustees provided support to The Nature Conservancy to acquire approximately 94% of St. Martin Island, or 1,243 acres of undeveloped land. This action secured the protection of critical migratory stopover habitat for migratory birds, as well as important foraging and spawning habitat for a variety of native fish and other aquatic species. The scale of the purchase also allows managers to maintain habitat integrity across a diverse range of coastal habitats, including wetlands and associated northern hardwood and boreal forests.

With Trustee support, the Green Bay National Wildlife Refuge is working to acquire and protect ecologically valuable tracts of land on Detroit Island. Detroit Island is an elongated stretch of land that serves as one of the most productive fish nurseries in northern Green Bay – especially for smallmouth bass. The island provides important habitat for migratory birds, butterflies, and insects, and is home to 25 state endangered or at-risk species of birds including the bald eagle. If the land acquisition is successful, it would add approximately 150 acres to the Green Bay National Wildlife Refuge.

Birds	Fish	Insects	Native Plants
Waterfowl mallard mergansers	Colonial waterbirds cormorants egrets	Northern pike Spotted musky Walleye	Hine's emerald dragonfly
Shorebirds plovers	Birds of prey bald eagle northern goshawk	Brown Trout Suckers Bass Yellow Perch	Dwarf lake iris

EXAMPLES OF WILDLIFE AND PLANTS BENEFITING FROM RESTORATION

Planned Preservation: Little Sturgeon and Sawyer Harbor Sub-Watersheds

With Trustee support, the Door County Land Trust has targeted Little Sturgeon and Sawyer Harbor Sub-Watersheds for land acquisition because it is a prime area for spawning, rearing, and adult habitat for fish. In this area, poor water quality has compromised musky eggs in Sawyer Harbor, while natural walleye reproduction has disappeared from Little Sturgeon Bay. The land acquisition would protect habitat for Green Bay fisheries, such as musky and walleye, as well as other fish that spawn in both areas, including smallmouth bass, largemouth bass, northern pike, and yellow perch. This project is in the planning stages.

About this Effort

The Fox River Trustees support the long-term recovery, protection, and enhancement of the natural resources of the Lower Fox River and Green Bay system. Starting in the mid-1950s, paper companies and other entities released polychlorinated biphenyls (PCBs) into the Lower Fox River and Green Bay. These releases resulted in injuries to fish, wildlife, surface water, and sediments. Through a process known as natural resource damage assessment (NRDA), the Trustees assessed these injuries and entered into settlement agreements with the parties responsible for the PCB releases. Since 2002, the Trustees have recovered \$90 million for restoration projects that compensate for PCB-related injuries to natural resources.

"Open Door for Wildlife" is a fact sheet about land preservation and acquisition in Door County (NRDA Projects 181, 195, 211, and 225); it was produced by Abt Associates under contract to the U.S. Fish and Wildlife Service.



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Restoration Snapshot

Activity:	Preservation of habitat
Funding:	NRDA funds: \$1,195,200
	Leveraged funds: \$1,703,482*
Size:	Approximately 1,367 acres as of 2017*
Status:	Chambers Island, Ephraim Swamp, and St. Martin Island acquisitions completed as of 2017. Acquisitions on Detroit Island and in the Little Sturgeon and Sawyer Harbor Sub-Watersheds are in progress.
Location:	Wisconsin's Door County and Green Bay Islands

*Data regarding project size and leveraged funding are provided only for acquisitions that were completed by the end of 2017



Resting and Nesting Place

Providing Additional Bird and Wildlife Habitat

East of Lake Winnebago, Rush Lake and the surrounding area is a destination on the flyway for millions of migrating waterfowl. This rich and diverse area also supports other types of migratory and breeding birds, monarch butterflies, amphibians, mammals, and the state-endangered eastern prairie fringed orchid, all of which need healthy and connected habitats to sustain their populations. The acquisition of additional land in this area, managed for wildlife, provides a healthy and vibrant place for migratory and resident species. This area also provides boating, hunting, hiking, bird-watching, and wildlife viewing for residents and visitors.

About the Restoration and Protection of Waterfowl Habitat

The wetland complexes surrounding Lake Winnebago and Rush Lake are among Wisconsin's most important because of the diverse and vibrant wildlife populations they support. This area includes the Uihlein and Rosendale Waterfowl Production Areas (WPAs), which were designed to support resident and migratory waterfowl in this premier migratory bird area. Because of its ecological importance, protecting land in this area has been a high priority.

Once acquired for protection, wetland habitat is often actively managed to provide the conditions needed to support breeding and migrating waterfowl, shorebirds, wading birds, and other wetland-dependent wildlife and plants. For example, managers adjust water levels using pumps and water-control structures, conduct prescribed burns in the spring to maintain and rejuvenate wetland plants, and control invasive species. These activities improve habitat for waterfowl and other wildlife, helping offset injuries resulting from the release of polychlorinated biphenyls (PCBs) in the Fox River and Green Bay.



Uihlein WPA land acquisition (photograph by U.S. Fish and Wildlife Service)

Returning to a Healthy Environment

With funding from the Fox River Trustees, four projects have been conserving and restored wetlands in this area since 2013. These efforts, described in more detail below, build on previous Trustee efforts to conserve and restore wetlands in the Uihlein WPA and around Rush Lake (see projects 2.6 and 2.7 in the [2013 Restoration Progress Report for the Lower Fox River and Green Bay Natural Resource Damage Assessment](#), which can be found on our website).

Uihlein WPA Acquisitions (two projects)

In partnership with Ducks Unlimited (DU), the Fox River Trustees are supporting the acquisition of 230 acres of wetlands, upland habitat, and former agricultural land to expand the 2,000-acre Uihlein WPA; 70 acres have been acquired to date, and DU is in the process of acquiring the remaining 160 acres. The habitat will be maintained by



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controlling water levels, mowing, and managing invasive species. In addition, prescribed burns may be carried out for brush control in areas containing the eastern prairie fringed orchid.

Rush Lake Acquisition

In partnership with Ducks Unlimited, the Trustees are helping to secure the acquisition and protection of 168 acres of high-quality wetland and grassland habitat adjacent to Rush Lake, which will support waterfowl and improve water quality; remaining funding will be used to acquire and protect other valuable habitat. As with the lands acquired above, maintenance such as the use of water-control structures, prescribed burns, mowing, and invasive species control may be performed to maintain the habitat.

Rosendale WPA Restoration

A 60-acre wetland within the Rosendale WPA had become overrun by cattails and invasive species, primarily due to low water levels, which has degraded the value of the habitat, particularly for breeding and migrating waterfowl. To address the issue, the U.S. Fish and Wildlife

Service is installing a water-control structure and an associated dike, which will allow managers onsite to manipulate water levels and provide appropriate habitat to support waterfowl during peak migratory and breeding seasons.

About this Effort

The Fox River Trustees support the long-term recovery, protection, and enhancement of the natural resources of the Lower Fox River and Green Bay system. Starting in the mid-1950s, paper companies and other entities released PCBs into the Lower Fox River and Green Bay. These releases resulted in injuries to fish, wildlife, surface water, and sediments. Through a process known as natural resource damage assessment (NRDA), the Trustees assessed these injuries and entered into settlement agreements with the parties responsible for the PCB releases. Since 2002, the Trustees have recovered \$90 million for restoration projects that compensate for PCB-related injuries to natural resources.

Birds	Native Fish	Butterflies	Native Plants
Waterfowl mallard wood ducks	Songbirds sedge wren Canada warbler	Northern pike	Monarch
Waterbirds heron sandhill cranes	Birds of prey bald eagle northern harrier		Eastern prairie fringed orchid

EXAMPLES OF WILDLIFE AND PLANTS BENEFITING FROM RESTORATION

"Resting and Nesting Place" is a fact sheet about projects designed to conserve or restore wetland habitat in the areas surrounding Lake Winnebago and Rush Lake (NRDA Projects 177, 192, 226, and 230); it was produced by Abt Associates under contract to the U.S. Fish and Wildlife Service.



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Restoration Snapshot

Activity: Acquiring and restoring land for waterfowl and other wildlife habitat improvements

Funding: NRDA funds: \$1,260,000
Leveraged funds: \$76,000*

Size: 70 acres*

Status: One of the Uihlein acquisitions has been completed. All other projects are in progress.

Location: Uihlein and Rosendale WPAs, and Rush Lake, WI

*Data regarding project size and leveraged funding are provided only for restoration projects that were completed by the end of 2017



Protecting a Wetland Haven

Extending Protection around the Point au Sable Nature Preserve

Millions of birds stop along the shores of Green Bay as they migrate to and from their breeding grounds. When they stop to rest, they rely on vibrant wetlands on the Lake Michigan flyway to provide them with food and shelter. However, the growth of private development and agriculture throughout the Midwest, including in the greater Green Bay area, has led to the loss of the wetland habitat that these birds rely on to refuel and recharge. Wetland loss is a key contributor to regional declines in bird populations in the Great Lakes region, and a wide array of organizations are working to protect and restore high-quality habitat along key migratory corridors.

About the Point au Sable Nature Preserve

Point au Sable is located on a prominent peninsula along the east shore of Lower Green Bay, and it is one of the largest intact estuarine wetlands in all of Lake Michigan. Each spring and fall, thousands of migratory waterfowl, shorebirds, and songbirds pass through the area to feed and rest. Monitoring has demonstrated that this is one of the most diverse sites for birds within the Great Lakes. These wetlands also provide critical habitat for young, native fish that use wetland plants and submerged aquatic vegetation for refuge. Because of the ecological importance of the area, the University of Wisconsin - Green Bay (UW-Green Bay) has established the 184-acre Point au Sable Nature Preserve to protect these vibrant wetlands.

In addition to protecting habitat for birds, the preserve also serves as an outdoor "living" laboratory for university



Merganser

classes and graduate students that regularly conduct field trips and monitoring at the site. The site is open to the public for hiking, and the university administers a program for hunting at the preserve.

Key to the maintenance of coastal wetlands is protecting the habitat along the rivers and streams that feed into them. If riparian and stream habitat becomes degraded, it can erode, washing sediment and pollutants downstream and leading to losses in wetland vegetation and habitat.



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Returning to a Healthy Environment

With Fox River Trustee support, the Northeast Wisconsin Land Trust (NEWLT) will acquire 74 acres of land along Wequiock Creek, which flows into Point au Sable Nature Preserve. This land is currently slated for development, and contains a combination of uplands, agricultural land, perched wetlands, forested wetlands, and riparian buffer along the creek. After acquiring the land, NEWLT will donate it to UW-Green Bay. The land will become part of the Point au Sable Nature Preserve, providing additional educational and research opportunities. This acquisition will not only help protect habitat in the preserve, but also in the creek itself, which supports as many as 32 different fish species – more than any other studied tributary in the middle and lower Green Bay area. The protection of riparian habitat along the creek will also help sustain migratory songbirds during the fall and spring.

About this Effort

The Fox River Trustees support the long-term recovery, protection, and enhancement of the natural resources of the Lower Fox River and Green Bay system. Starting in the mid-1950s, paper companies and other entities released polychlorinated biphenyls (PCBs) into the Lower Fox River and Green Bay. These releases resulted in injuries to fish, wildlife, surface water, and sediments. Through a process known as Natural Resource Damage Assessment (NRDA), the Trustees assessed these injuries and entered into settlement agreements with the parties responsible for the PCB releases. Since 2002, the Trustees have recovered \$90 million for restoration projects that compensate for PCB-related injuries to natural resources.

Birds	Native Fish
Mallard Whip-poor-will Rusty blackbird	Northern pike Great Lakes spotted musky Yellow perch Small native stream fish

EXAMPLES OF WILDLIFE BENEFITING FROM RESTORATION

"Protecting a Wetland Haven" is a fact sheet about acquiring and protecting habitat along Wequiock Creek, which feeds into the Point au Sable Nature Preserve (NRDA Project 239); it was produced by Abt Associates under contract to the U.S. Fish and Wildlife Service.



foxrivenrda.org

Restoration Snapshot

Activity: Acquiring and protecting habitat along Wequiock Creek, which flows into Point au Sable Nature Preserve

Funding: NRDA funds: \$392,000
Leveraged funds: None as of 2017*

Size: None as of 2017*

Status: In progress

Location: Brown County, Wisconsin

*Data regarding project size and leveraged funding are provided only for restoration projects that were completed by the end of 2017



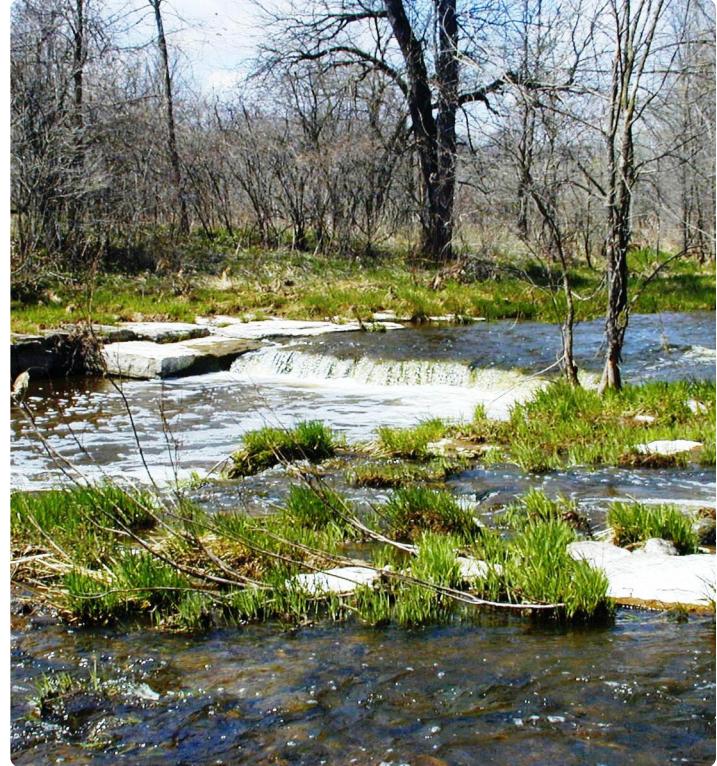
Protecting Trout Tributaries

Trout and Other Wildlife Habitat Protected on Oneida Land

Prior to the development of northeast Wisconsin, the Duck Creek area was a haven for fish and wildlife, and also served as the lifeblood of the Oneida Reservation. Hundreds of years ago, the forest bore maple syrup; northern pike and white suckers flourished in the waterways; and wetlands abounded with wild rice, which attracted flocks of migratory ducks – hence the waterway's name. Both Duck and Trout Creeks feed into Green Bay, and provide passage for fish to upstream foraging and spawning grounds. The creeks also are an integral part of southwestern Green Bay, the largest freshwater estuary in the world. However, as development has intensified, pollution, habitat loss, and habitat degradation have made it more difficult for fish to spawn and sustain their populations.

About Protecting Fish Habitat on Oneida Land

As noted above, Duck and Trout Creeks have historically provided important habitat for a wide variety of fish, including brook trout, northern pike, walleye, white suckers and the redside dace, a species of special concern in Wisconsin. These two creeks are not only important ecologically, but also culturally to the Oneida Nation, which has harvested fish and gathered plants along the creeks for subsistence purposes for almost 200 years. Unfortunately, development and agricultural activities have combined to threaten fish habitat in the area. The Fox River Trustees are supporting an array of efforts in the area that will protect and restore fish and wildlife habitats that are important to both the Oneida Nation and to local ecosystems.



Duck Creek

Returning to a Healthy Environment

With support from the Fox River Trustees, the Oneida Nation purchased land to ensure the protection of just over 93 acres of habitat that includes a large section of Trout Creek, a reach of Duck Creek, and other nearby



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riparian corridors. Using funding from other partners (only funding related to the acquisition of property is reported in this fact sheet), the Oneida Nation will restore degraded habitat on 32 acres of acquired land. In addition, the Oneida Nation plans to remove various structural impairments – such as ditches and dams – to improve the ecological functionality of the watershed. The protected land will be monitored for needed vegetation and invasive species management and erosion control. This acquisition and associated restoration actions will help protect and restore part of a cold-water trout stream, a variety of freshwater wetlands and riparian habitats, and upland areas. The project will also help ensure continued access for Tribal members to high-quality fishing, hunting, and gathering habitat along Trout and Duck Creeks.

About this Effort

The Fox River Trustees support the long-term recovery, protection, and enhancement of the natural resources of the Lower Fox River and Green Bay system. Starting in the mid-1950s, paper companies and other entities released polychlorinated biphenyls (PCBs) into the Lower Fox River



Trout Creek

and Green Bay. These releases resulted in injuries to fish, wildlife, surface water, and sediments. Through a process known as natural resource damage assessment (NRDA), the Trustees assessed these injuries and entered into settlement agreements with the parties responsible for the PCB releases. Since 2002, the Trustees have recovered \$90 million for restoration projects that compensate for PCB-related injuries to natural resources.

Birds	Fish	Turtles
Waterfowl mallard Birds of prey bald eagle	Brook trout Northern pike Redside dace Walleye White suckers	Wood turtles
		

EXAMPLES OF WILDLIFE BENEFITING FROM RESTORATION

"Protecting Trout Tributaries" is a fact sheet about land preservation and acquisition on the Oneida Reservation (NRDA Project Number 183); it was produced by Abt Associates under contract to the U.S. Fish and Wildlife Service.

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Restoration Snapshot

Activity: Land acquisition to protect parts of Trout and Duck creeks, and other important stream corridors

Funding: NRDA funds: \$280,000
Leveraged funds: \$1,118,750

Size: 93.25 acres

Status: Complete

Location: Oneida Reservation, Wisconsin



Extending and Connecting Conservation

Acquiring and Restoring Habitat in Marquette County

Wildlife tends to thrive in less developed areas, where one is more likely to find intact lakes, rivers, wetlands, and forests. However, such areas are becoming more difficult to find in a growing and developing Wisconsin. This makes protecting and connecting existing habitat even more important, not only for the fish, birds and mammals that depend on it, but also for the hunters, fishers, and outdoor enthusiasts who enjoy it.

About Wildlife Habitat in Marquette County

Marquette County, located in central Wisconsin, is a relatively undeveloped area that is well known among nature enthusiasts, hunters, and fishers as a great place for wildlife. The county is home to Buffalo Lake, Lake Puckaway, and multiple streams and rivers that support an array of migratory and resident birds and fish. Because of its valuable natural habitat, the county harbors multiple areas that have been set aside for conservation, including the Fox River National Wildlife Refuge (NWR); Muir Park State Natural Area; and John Muir Memorial Park, a 150-acre site that includes the boyhood home of John Muir, an influential naturalist and conservationist. These and other natural areas in Marquette County provide essential wildlife habitat and opportunities for outdoor recreation.

Returning to a Healthy Environment

With Fox River Trustee support, the Natural Heritage Land Trust acquired and placed into protection 198 acres of



Northern cricket frog

land in Marquette County that connects the northeast corner of the Fox River NWR, the northern boundary of Muir Park State Natural Area, and John Muir Memorial Park. This area includes 38 acres of the original John Muir family farm, an important conservation legacy to the people of Wisconsin and the United States. The land was acquired in 2014. The Natural Heritage Land Trust has also undertaken restoration of cropland to improve wildlife habitat and water quality, including habitat restoration on 17 acres of wetland habitat, 2 acres of wet-mesic prairie, and 40 acres of oak-hickory woodland/savanna. The



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eastern portion of the property was transferred to the Ice Age Trail Alliance in 2015, and the western portion was transferred to the U.S. Fish and Wildlife Service in 2016 for ongoing restoration and management activities. The project will help enhance and protect wildlife habitat and will also improve quality along an unnamed tributary of the Fox River that flows across the property.

About this Effort

The Fox River Trustees support the long-term recovery, protection, and enhancement of the natural resources of the Lower Fox River and Green Bay system. Starting in the mid-1950s, paper companies and other entities released polychlorinated biphenyls (PCBs) into the Lower Fox River and Green Bay. These releases resulted in injuries to fish, wildlife, surface water, and sediments. Through a process known as Natural Resource Damage Assessment (NRDA), the Trustees assessed these injuries and entered into settlement agreements with the parties responsible for the PCB releases. Since 2002, the Trustees have recovered \$90 million for projects that compensate for PCB-related injuries to natural resources.

Birds	Reptiles	Amphibians
Henslow's sparrow Yellow rail American bittern	Slender glass lizard Blanding's turtle	Northern cricket frog
		

EXAMPLES OF WILDLIFE BENEFITING FROM RESTORATION

"Extending and Connecting Conservation" is a fact sheet about the acquisition of habitat in Upper Fox River Watershed (NRDA Project 193); it was produced by Abt Associates under contract to the U.S. Fish and Wildlife Service.



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Restoration Snapshot

Activity: Acquiring and restoring habitat in the Upper Fox River Watershed

Funding: NRDA funds: \$450,000
Leveraged funds: \$445,580

Size: 198 acres

Status: Completed

Location: Marquette County, Wisconsin



Replanting Prairies for Waterfowl

Restoring Native Prairie Habitat in the Brillion and Killsnake Wildlife Areas

The area surrounding Lake Winnebago is well known among hunters and birders as a key stop-over area for millions of migrating waterfowl. Many wetlands and prairies in the region also provide critical nesting habitat for waterfowl and other wetland-dependent birds, helping ensure that the area remains vibrant and productive for future generations. Proactive restoration efforts are helping enhance the protection and productivity of valuable wildlife areas in this region.

About Prairie Restoration in the Brillion and Killsnake Wildlife Areas

The land within the Brillion and Killsnake Wildlife Areas has long been recognized as highly productive for waterfowl, and Wisconsin's Department of Natural Resources (DNR) began managing land in the area in the late 1940s to protect and improve the ability of the habitat to support wildlife. Over time, DNR has increased its ownership of land within the wildlife areas and has undertaken various activities to enhance the areas' productivity.

While each of these two wildlife areas contains tracts of high-quality, valuable habitat, many of the lands acquired were formerly farms with degraded lands that need restoration in order to support wildlife. For example, some areas are dominated by invasive species, making it difficult or impossible for birds and other animals to



Blue-winged teal

forage or nest there. Restoring these former agricultural lands, particularly areas near wetlands or waterbodies where waterfowl rest and forage, is important for improving waterfowl productivity.



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Returning to a Healthy Environment

With funding from the Fox River Trustees, Wisconsin's DNR has been working with local farmers to remove nonnative species, prepare seedbeds, and replace agricultural crops (such as corn, alfalfa, and brome) with native prairie species in the Brillion and Kill snake Wildlife Areas. Farmers have also helped mow newly seeded vegetation to ensure proper establishment. Restoration has been focused on habitat located within 1 mile of existing wetlands or waterways, as this is where upland nesting waterfowl, such as the blue-winged teal and mallard, prefer to nest. This work builds on similar activities supported by the Trustees in these areas (see project 2.9 in the [2013 Restoration Progress Report for the Lower Fox River and Green Bay Natural Resource Damage Assessment](#), which can be found on our website). Future activities may include more plantings and fire management of the newly established prairies.

Taken together, these actions will help improve the breeding activity and success of waterfowl in the region, helping offset injuries to birds resulting from the release of polychlorinated biphenyls (PCBs) in the Fox River and Green Bay. Prairie restoration will also help reduce erosion and protect the water quality of nearby waterways.

About this Effort

The Fox River Trustees support the long-term recovery, protection, and enhancement of the natural resources of the Lower Fox River and Green Bay system. Starting in the mid-1950s, paper companies and other entities released PCBs into the Lower Fox River and Green Bay. These releases resulted in injuries to fish, wildlife, surface water, and sediments. Through a process known as Natural Resource Damage Assessment (NRDA), the Trustees assessed these injuries and entered into settlement agreements with the parties responsible for the PCB releases. Since 2002, the Trustees have recovered \$90 million for restoration projects that compensate for PCB-related injuries to natural resources.

"Replanting Prairies for Waterfowl" is a fact sheet about prairie restoration on former farmland in the Brillion and Kill snake Wildlife Areas (NRDA Project 69); it was produced by Abt Associates under contract to the U.S. Fish and Wildlife Service.



foxrivenrda.org

Restoration Snapshot

Activity:	Restore upland prairie habitat for waterfowl nesting
Funding:	NRDA funds: \$100,000 (reported in previous RPR; no additional funds) Leveraged funds: \$78,861 (\$67,552 of which was reported in previous RPR; or an additional \$11,310)
Size:	326 acres (277 acres of which were reported in previous RPR; or an additional 49 acres)
Status:	Completed
Location:	Calumet and Manitowoc counties



Making Way for Ducks and Ducklings

Enhancing Wetland Productivity for Waterfowl in the Lower Fox and Wolf River Basins

When looking for a place to rest and nest, waterfowl and other wetland-dependent birds are most drawn to lush, vibrant areas that are likely to provide them with ample food and protection. Tens of thousands of birds look for this kind of productive habitat each spring and fall while they are migrating through southern Green Bay and nearby areas. Many organizations have been working together to protect and restore this type of habitat to sustain key wildlife populations and improve related recreational activities, including hunting, hiking, and bird watching.

About the Wetlands in the Lower Fox and Wolf River Basins

The wetlands found within the Lower Fox and Wolf River Basins are recognized for their ability to provide improved water quality, flood control, carbon storage, and habitat for wildlife. These wetlands are particularly well known for their importance to wetland-dependent birds, including migrating and breeding waterfowl, shorebirds, and songbirds.

Because of the ecological value of the wetlands along this migratory flyway, state, county, and other organizations have been involved in protecting its habitats. This has led to the creation or expansion of a number of wildlife areas and preserves managed by



Wood ducks

Wisconsin's Department of Natural Resources (DNR), the Brown County Parks Department, and other local entities. While these organizations, in many cases with Fox River Trustee support, have been successful in securing valuable wetlands for protection, the productivity of some protected wetlands can often be improved. This can be done in a number of ways, including removing invasive species, planting native plants, and helping managers control water levels to promote a mix of open water, mud flats, and wetland plants to support different types of birds.



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Returning to a Healthy Environment

With Fox River Trustee support, Ducks Unlimited (DU) is restoring habitat on more than 500 acres of protected wetlands in the Lower Fox River and Wolf River Basins. More specifically, DU will focus on restoring habitat in the following areas:

- Oconto Marsh
- Barkhausen Waterfowl Preserve
- Bergstrom Waterfowl Complex
- Bohn Farms and Tews Acres

DU's restoration efforts on each of these properties will help provide improved habitat for breeding and migrating waterfowl, spawning sites for northern pike, and breeding habitat for amphibians.

About this Effort

The Fox River Trustees support the long-term recovery, protection, and enhancement of the natural resources of the Lower Fox River and Green Bay system. Starting in the mid-1950s, paper companies and other entities released polychlorinated biphenyls (PCBs) into the Lower Fox River and Green Bay. These releases resulted in injuries to fish, wildlife, surface water, and sediments. Through a process known as Natural Resource Damage Assessment (NRDA), the Trustees assessed these injuries and entered into settlement agreements with the parties responsible for the PCB releases. Since 2002, the Trustees have recovered \$90 million for restoration projects that compensate for PCB-related injuries to natural resources.

Birds	Native Fish	Butterflies
Mallard Wood duck Black tern Songbirds	Northern pike	Monarch

EXAMPLES OF WILDLIFE BENEFITING FROM RESTORATION

"Making Way for Ducks and Ducklings" is a fact sheet about wetland restoration efforts on conserved wetlands in the Lower Fox River and Wolf River Basins (NRDA Project 231); it was produced by Abt Associates under contract to the FWS.

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Restoration Snapshot

Activity: Wetland restoration in protected areas in the Lower Fox River and Wolf River Basins

Funding: NRDA funds: \$521,000
Leveraged funds: None as of 2017*

Size: None as of 2017*

Status: In progress

Location: Brown, Oconto, Outagamie, and Winnebago Counties, Wisconsin

*Data regarding project size and leveraged funding are provided only for restoration projects that were completed by the end of 2017



Weeding Out Wetlands at the Edge of the Woods

Restoring Wetland Habitat to Better Support Wildlife

Committed to a balance with and appreciation of nature, the Oneida Nation created shallow water wetlands at the “Edge of the Woods” between Duck and Trout creeks to attract and support waterfowl and related recreational and cultural experiences in the late 1990s. “Edge of the Woods” is a traditional term for welcoming travelers who are passing through or visiting Oneida territory. Travelers would set up a camp at the edge of the woods, or territory, and village leaders would send advocates to meet them and discuss their plans before bringing them into the village. The restored property is located near the edge of the reservation boundary and therefore was named “Edge of the Woods.” However, after the initial restoration effort, the site’s wetlands became overrun with an invasive species that choked out native plants and provided little benefit to wildlife or people. This project is focused on removing the invasive species and bringing back native plants that will better support wildlife and the important cultural and recreational and uses of the area.

About the Importance of Wetland Habitat Restoration

Waterfowl, shorebirds, wading birds, songbirds, amphibians, and reptiles all depend on high-quality wetlands for feeding, breeding, and migrating. Healthy wetlands also add scenic beauty to an area; and help residents and visitors enjoy outdoor activities, including hunting, hiking, and bird watching. However, common



Aerial view of the project area shows linear rows of planted trees and shrubs after mowing.

reed (*Phragmites australis*), a non-native plant, invades freshwater wetlands and create impenetrable stands of vegetation that ruin views, cover trails, and provide little to no support to native wildlife. Removing common reed from wetlands is an often difficult, but essential, first step in rehabilitating degraded wetlands. Planting native plants while also controlling common reed can help restore functioning wetlands that support wildlife, recreation, and cultural uses of an area.



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Returning to a Healthy Environment

In 1998, the Oneida Nation created a series of scrapes, or shallow depressions that seasonally hold water, and several dikes on the Oneida Reservation, primarily to provide habitat for waterfowl. Since then, common reed has invaded the area, degrading the wetland and overtaking recreational trails. In an early phase of this project, herbicide and annual mowing were used to control this invasive plant, with native wetland species planted in the same area (see Project 2.11 in the [2013 Restoration Progress Report for the Lower Fox River and Green Bay Natural Resource Damage Assessment](#), which can be found on our website). However, these initial restoration efforts were ultimately unsuccessful and common reed re-invaded the site.

After this initial setback, in 2017 the project team began to try to find a more effective way to control common reed. Instead of only using annual herbicide applications and annual mowing, the team is now also mowing between rows of planted shrubs and trees several times during each growing season. This will help control the growth of common reed and allow native plants to more strongly re-establish during the growing season. In 2017, after reducing common reed by applying herbicides and mowing, the project team planted 7,500 shrubs and trees, and the restored area continues to be monitored and managed to keep the habitat healthy and in balance.

Tribal members utilize this site for recreation and cultural purposes. Hunting, gathering, and other activities are common at Edge of the Woods. Because of its unique cultural significance, this site is managed for tribal members only, and thus is not open to the general public.

Birds	Reptiles	Amphibians
Waterfowl Shorebirds Songbirds	Turtles <i>Wood turtle</i>	Frogs

EXAMPLES OF WILDLIFE BENEFITING FROM RESTORATION

About this Effort

The Fox River Trustees support the long-term recovery, protection, and enhancement of the natural resources of the Lower Fox River and Green Bay system. Starting in the mid-1950s, paper companies and other entities released polychlorinated biphenyls (PCBs) into the Lower Fox River and Green Bay. These releases resulted in injuries to fish, wildlife, surface water, and sediments. Through a process known as natural resource damage assessment (NRDA), the Trustees assessed these injuries and entered into settlement agreements with the parties responsible for the PCB releases. Since 2002, the Trustees have recovered \$90 million for restoration projects that compensate for PCB-related injuries to natural resources.

"Weeding out Wetlands at the Edge of the Woods" is a fact sheet about the control of invasive plants and the rehabilitation wetland habitat in Brown County, Wisconsin (NRDA Project 115); it was produced by Abt Associates under contract to the U.S. Fish and Wildlife Service.



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Restoration Snapshot

Activity: Restore wetland habitat by controlling invasives and planting native trees and shrubs

Funding: NRDA funds: \$28,360 (\$35,000 was allocated and reported in the previous RPR, but the project cost less than anticipated and \$6,640 was redirected to other projects)
Leveraged funds: \$1,750 (reported in previous RPR)

Size: 30 acres

Status: Major activities completed; ongoing monitoring and maintenance

Location: Brown County, Wisconsin



Interconnected Improvements

Restoring the Suamico River and Wetlands to Improve Wildlife Habitat

The South Branch of the Suamico River flows through the Oneida Nation reservation and sustains some of the region's most vibrant wetlands. The land near the South Branch of the Suamico River is used for farming and for recreational activities such as hiking, gathering, fishing, and hunting. Wildlife that live in or migrate through this area rely on the natural habitat to reach spawning or breeding areas, and to find food and protection from the elements. Wetlands are particularly important because they serve as a filter that keeps the water clean and they support a wide array of insects, amphibians (e.g., frogs, toads), and small fish – and this in turn attracts many different species of birds and mammals.

About Habitat Restoration in the Suamico River

The South Branch of the Suamico River and its headwaters flows through the northeast corner of the Oneida Nation reservation and sustains some of the region's most vibrant wetlands and riverine habitats. The wetlands along the river provide critical support to an array of wildlife, including birds, amphibians, and reptiles, which use the habitat for foraging, breeding, or rest during migration. These wetlands also provide flood mitigation; scenic beauty to the area; and support important recreational activities, including hunting, hiking, and bird watching. Healthy stream habitat within the Suamico River watershed is also ecologically and culturally valuable. For example, well-functioning stream habitat supports fish that migrate to and from spawning grounds through rivers and streams, including northern pike. Similar to wetlands, stream habitat also supports recreation, fishing, boating, and other cultural activities.

However, wetlands at the headwaters of the South Branch of the Suamico River, which are on Oneida Nation land, have been degraded by agricultural activities,



Wetland marsh (Photo by Oneida environmental staff)

development, ditching, and invasive species. These factors have led to poor water quality and dense stands of invasive plants that are not suitable for waterfowl or other wetland-dependent wildlife. Further downstream in the South Branch of the Suamico River, stream and floodplain habitats have also been highly degraded by agricultural runoff, residential development, and river channelization or the narrowing and straightening of a stream to control water flow. As a result, the area no longer has the stream habitat and high-water quality that best supports northern pike and other native fish.

Returning to a Healthy Environment

The Fox River Trustees have supported two projects to restore habitat along the Suamico River, which are described in more detail below. These efforts build on those described for projects 2.2 and 3.5 in the [2013 Lower Fox River and Green Bay Restoration Progress Report](#), which is available on our website.



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Wetland Restoration at the Headwaters of the Suamico River
 The Oneida Nation undertook a combination of actions to restore degraded wetlands at the headwaters of the South Branch of the Suamico River and attract migrating and breeding waterfowl for viewing and hunting. Key activities included filling ditches, installing water control structures, excavating soil, and building berms to contain and control water. These actions led to the creation of open water areas, nesting islands, and a variety of wetland habitat types that support a wide array of waterfowl and shorebirds.

Downstream Restoration in the Suamico River

Further downstream, the Oneida Nation restored stream and floodplain habitats in a degraded stretch of the river to improve water quality and in-stream habitat, and to attract and support spawning northern pike. More specifically, the project:

- Converted the ditched and straightened waterway to a more natural, meandering stream
- Removed invasive plants
- Re-established native plants along the stream corridor.

Birds	Fish	Mammals	Native Plants
Migrating and breeding waterfowl <i>Forster's tern</i> <i>Rails</i> <i>Bitterns</i> <i>Egrets</i> 	Migrating and reproducing northern pike 	Mink 	Wild rice Wild bergamot 

EXAMPLES OF WILDLIFE AND PLANTS BENEFITING FROM RESTORATION

The restored area now provides more suitable habitat for northern pike, and also allows pike and other fish to more easily access upstream spawning habitat. Because the stream is now able to travel in a more natural, meandering path, it is less likely to flood.

About this Effort

The Fox River Trustees support the long-term recovery, protection, and enhancement of the natural resources of the Lower Fox River and Green Bay system. Starting in the mid-1950s, paper companies and other entities released polychlorinated biphenyls (PCBs) into the Lower Fox River and Green Bay. These releases resulted in injuries to fish, wildlife, surface water, and sediments. Through a process known as natural resource damage assessment (NRDA), the Trustees assessed these injuries and entered into settlement agreements with the parties responsible for the PCB releases. Since 2002, the Trustees have recovered \$90 million for restoration projects that compensate for PCB-related injuries to natural resources.

"Interconnected Improvements" is a fact sheet about wetland, stream, and floodplain restoration in and at the headwaters of the Suamico River (NRDA Projects 116 and 153); it was produced by Abt Associates under contract to the U.S. Fish and Wildlife Service.

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Un-tarnishing Silver Creek

Collaboration and Innovation to Restore Habitat and Water Quality in Silver Creek

Silver Creek is a cold water stream that once supported brook trout and is home to the redside dace, a species of special concern in Wisconsin. It flows through some of Wisconsin's picturesque farmland, including land belonging to the Oneida Nation. The Silver Creek area is home to waterfowl, many types of fish, and other wildlife. Residents and visitors enjoy recreational activities along the creek including hiking on nature trails, camping, geocaching, bicycling, hunting, and trapping. The environmental health of this area is at risk due to runoff and erosion that deteriorate the water quality and natural areas throughout the watershed. For this reason, riparian areas (where water and land meet) need restoration to improve water quality and reinvigorate the ecosystem so that plants, fish, and animals can thrive.

About Silver Creek

Located in the central part of the Oneida Reservation, Silver Creek flows into Duck Creek and ultimately empties into Green Bay. Similar to other streams in the area, high levels of phosphorus and sediment have affected the water quality in Silver Creek. The Oneida Nation is the largest land owner in the 4,800-acre Silver Creek watershed. Through innovative partnerships led by NEW Water, also known as the Green Bay Metropolitan Sewerage District, conservation groups are working together to restore and protect this area.

Returning to a Healthy Environment

The Fox River Trustees have supported three projects focused on protecting and restoring the Silver Creek watershed. Each project is described in more detail below.

Improving Water Quality

With support from the Trustees as well as other funders, NEW Water led a highly collaborative and innovative



Wood turtle

approach to reduce excess phosphorous and sediment in the watershed, and improve water quality in Silver Creek. NEW Water partnered with a wide array of organizations, including Tribes, governmental entities, nonprofits, academic researchers, and farmers, in developing a coordinated and multi-pronged approach to improve water quality across the watershed. This approach serves as a model for other similar projects throughout the Fox River and Green Bay watershed. As a starting point, NEW Water and partners assessed every acre in the watershed – through field and stream surveying, inventories of stream bank erosion and in-stream sediment deposition, soil and stream monitoring, landowner interviews, field walks, and data analyses – to effectively focus restoration efforts. Based on the information gathered, NEW Water and partners implemented a range of best management practices throughout the watershed, included planting buffers along streams, planting cover crops, using no-till cropping systems, restoring wetlands and



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streams, planting for pollinators, and using water and sediment control basins and other practices. The funding from the Fox River Trustees was primarily focused on habitat-related improvements in these efforts. Partners continue to monitor water quality in Silver Creek to document water quality improvements, and adjust future restoration actions as needed.

Stream Restoration (two projects)

The Fox River Trustees also provided support to the Oneida Nation to design and implement a new stream corridor along Silver Creek that will provide healthy habitat and connectivity for seasonal fish migrations and spawning. The design includes changing a degraded and straightened ditched stream to a naturally meandering waterway, planting vegetation along the stream, and improving in-stream habitat. When implemented, these changes will help reduce erosion and sedimentation, help keep water temperatures cooler in the heat of the summer, and provide a more hospitable environment for fish. Because the restoration improves the stream's ability to cope with high-water flows and higher temperatures, the new riparian corridor will also help the Oneida Nation adapt to climate change. Once completed, the stream

restoration will improve water quality and enhance the habitat for wide variety of wildlife. The project will also improve habitat for the declining redside dace, a ray-finned minnow known to feed on airborne insects by leaping from the water. The Oneida Nation will monitor the site before and after restoration to assess the impacts of the project on water quality and wildlife, and any needed corrective actions will be taken to maximize project benefits.

About this Effort

The Fox River Trustees support the long-term recovery, protection, and enhancement of the natural resources of the Lower Fox River and Green Bay system. Starting in the mid-1950s, paper companies and other entities released polychlorinated biphenyls (PCBs) into the Lower Fox River and Green Bay. These releases resulted in injuries to fish, wildlife, surface water, and sediments. Through a process known as natural resource damage assessment (NRDA), the Trustees assessed these injuries and entered into settlement agreements with the parties responsible for the PCB releases. Since 2002, the Trustees have recovered \$90 million for restoration projects that compensate for PCB-related injuries to natural resources.

Birds	Native Fish	Turtles
Mallard Grasshopper sparrow Bald eagle	Brook trout Northern pike Redside dace	Wood turtle

EXAMPLES OF WILDLIFE BENEFITING FROM RESTORATION

"Un-Tarnishing Silver Creek" is a fact sheet about restoration at Silver Creek Stream (NRDA Projects 184, 184b, and 196); it was produced by Abt Associates under contract to the U.S. Fish and Wildlife Service.

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Restoration Snapshot

Activity:	Collaboration and innovation to improve habitat and water quality in Silver Creek
Funding:	NRDA funds: \$348,399 Leveraged funds: \$205,546*
Size:	86.3 acres and 1.7 river miles*
Status:	Water quality efforts complete. Silver Creek restoration plan complete; implementation of the plan in progress.
Location:	Silver Creek Watershed, Oneida Reservation

*Data regarding project size and leveraged funding are provided only for restoration projects that were completed by the end of 2017



Building Back the Buffer

Creating Riparian Buffers to Protect Streams in the Lower Fox River Basin

At the edge of streams, creeks, and rivers in the Lower Fox River Basin, the riparian habitat – or section of land that meets the water – serves as an important buffer to the waterways. Here, the vegetated ground serves as a filter to remove pollutants and sediment from the water before it enters the channel, keeping the water clean and healthy for wildlife. With the right vegetation in the buffer, this protective space can also stabilize stream banks and prevent erosion, decrease flooding, shade the water to keep it cool during heat extremes, and offer food and cover for wildlife.

For a number of areas in the Lower Fox River Basin, the riparian habitat has been degraded and became invaded by non-native plants, making it less effective as a buffer and less desirable for wildlife. For this reason, the restoration of the riparian buffers became an essential environmental priority for the Outagamie County Land Conservation Department (OCLCD), its partners, and the community.

About Riparian Buffers in the Lower Fox River Basin

Agriculture is central to the economy and culture of Wisconsin, including in Outagamie, Calumet and Brown and Counties, where productive farms are found along streams and ponds in the Lower Fox River Basin. However, runoff from fertilizers and sediment from nearby farms can pollute local waterways if appropriate vegetative “buffers” between farmland and streams are not in place. Riparian buffers are small strips of natural, native vegetation that are sustained along streams near farms



Riparian buffer

that help trap sediment, absorb nutrients in fertilizers, stabilize stream banks, and support native wildlife. They are a best practice that many farmers use to ensure the long-term health of local streams, wetlands, and ponds; and to support migrating and breeding birds and mammals. The installation and maintenance of riparian buffers are recognized by multiple federal and state programs as an effective best practice for protecting water quality.

Because of water quality concerns in the region, Outagamie County and local municipalities have been



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looking for ways to increase the installation, maintenance, and effectiveness of agricultural buffers. Of particular interest are efforts to improve the water quality of watersheds identified in the 2012 Fox River Total Maximum Daily Load plan as those contributing the most pollutants, including Apple, Upper Duck, Kankapot, and Plum creeks.

Returning to a Healthy Environment

OCLCD is restoring or enhancing 40 acres of riparian habitat along Apple, Kankapot, Plum, and Upper Duck creeks in the Lower Fox River Basin to improve water quality. At project locations supported by Fox River natural resource damage assessment (NRDA) funds, OCLCD is aiming to establish 35-foot riparian buffers that are comprised of primarily native plants. In Kankapot, Plum, and Upper Duck creeks, OCLCD will enhance a total of 20 acres of existing riparian buffer by removing invasive plants and adding natives. In Apple Creek, OCLCD will create 10 acres of new riparian buffers. In addition to creating buffers around streams, OCLCD will

improve 10 acres of streambank habitat on sides of the stream channel in Apple, Kankapot, and Plum creeks. More specifically, OCLCD will remove invasive species, stabilize streambanks, and plant native plants. At all project sites, the OCLCD will monitor restored areas to ensure that the buffers are properly maintained.

About this Effort

The Fox River Trustees support the long-term recovery, protection, and enhancement of the natural resources of the Lower Fox River and Green Bay system. Starting in the mid-1950s, paper companies and other entities released polychlorinated biphenyls (PCBs) into the Lower Fox River and Green Bay. These releases resulted in injuries to fish, wildlife, surface water, and sediments. Through a process known as NRDA, the Trustees assessed these injuries and entered into settlement agreements with the parties responsible for the PCB releases. Since 2002, the Trustees have recovered \$90 million for restoration projects that compensate for PCB-related injuries to natural resources.

Birds	Native Fish	Reptiles	Mammals	Pollinators
Mallard ducks Wood ducks Blue-winged teals Bald eagles	Northern pike Muskellunge Small, native-stream fish	Turtles Snapping turtle	Red fox	Monarch butterfly Honey bees
				

EXAMPLES OF WILDLIFE BENEFITING FROM RESTORATION

"Building Back the Buffer" is a fact sheet about the creation of riparian buffers along multiple creeks in farmlands of the Lower Fox River area (NRDA Project 234); it was produced by Abt Associates under contract to the U.S. Fish and Wildlife Service.



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Restoration Snapshot

Activity: Creating or enhancing riparian buffers in the Lower Fox River area

Funding: NRDA funds: \$228,000
Leveraged funds: None as of 2017*

Size: None as of 2017*

Status: In progress

Location: Outagamie, Brown, and Calumet counties

*Data regarding project size and leveraged funding are provided only for restoration projects that were completed by the end of 2017



Looking Out for Wildlife

Restoring Riverine and Shoreline Habitats for Wildlife in Ashwaubenon

The village name "Ashwaubenon" is derived from a native Ojibwe term that translates to a "place where they watch, keep a lookout." It is located on a peninsula between Ashwaubenon Creek and the Lower Fox River. Because of its unique setting between urban, river, and farmlands, this part of Wisconsin has long attracted people and wildlife. However, as the area has enjoyed more economic growth and development, some of the natural areas within Ashwaubenon have become degraded. The village has been exploring opportunities for enhancing and restoring shoreline habitat on its properties to help keep a look out for the area's wildlife.

About River and Shoreline Habitat Restoration in Ashwaubenon

The Lower Fox River flows from Lake Winnebago through Ashwaubenon and other municipalities to Green Bay and Lake Michigan over approximately 39 miles. It was, and still is, a major hub of pulp and paper production, but pollution and habitat degradation from paper mills, development, invasive species, and agricultural activities have reduced the ability of the area to support native fish, amphibians, and birds.

In Ashwaubenon, there are two sites along the Fox River that have been significantly degraded by shoreline development and invasive species. The first site was an abandoned parcel along the Fox River that was redeveloped by the Village of Ashwaubenon for housing. The site was formerly a dwelling that included a parking spot for an amphibious aircraft. The parking spot was protected by a breakwater consisting of rip rap or large stones that blocked water circulation and created stagnant areas covered in algae and devoid of oxygen. The area surrounding the breakwater and parking spot had also become overrun with invasive species.



Ashwabomay Park. Conceptual Enhancement (credit: Stantec).

The second site is Ashwabomay Park, an 84-acre park that includes multiple sporting fields, a swimming lake, a playground, walking trails, and other community amenities. The park is located at the confluence of Ashwaubenon Creek and the Fox River, and contains roughly 6,350 linear feet of riparian shoreline. Along the shoreline in the park, marsh areas have been degraded by Phragmites, or common reed; and swamp and forest habitats have been invaded by buckthorn. In addition, multiple areas along the shoreline are eroding and contain very little habitat for fish, amphibians, or birds.



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Returning to a Healthy Environment

With funding from the Fox River Trustees, the Village of Ashwaubenon has improved aquatic and shoreline habitats in each of these opportunity areas, as described below.

Aquatic Restoration along the Fox River

To restore the abandoned breakwater, the village placed culverts in the structure to facilitate water flow and improve nearshore water quality. Trees growing on the old breakwater were removed and then anchored to it at varying elevations to provide habitat for fish, turtles, shore birds, and waterfowl. Local residents and visitors utilize the shoreline area for fishing, walking, and viewing wildlife.

Shoreline Restoration in Ashwaubomay Park

The village is also restoring Ashwaubomay Park in two distinct phases. In Phase 1, the village is removing and controlling invasive plants with herbicides and replanting with native species, including sedges, rushes, and shrubs. In Phase 2, the village is improving wetland, shoreline, and aquatic habitats within the park by:

Birds	Native Fish	Reptiles
Great blue heron Osprey	Walleye Sturgeon Smallmouth bass Great Lakes spotted musky	Painted turtles Blanding's turtles
		

EXAMPLES OF WILDLIFE BENEFITING FROM RESTORATION

- Installing nesting platforms for colonial waterbirds
- Creating feeding, spawning, and cover structures in the Fox River for amphibians, reptiles, and fish, such as anchored log structures, off-shore sunken logs, and submerged fish spawning and feeding reefs
- Planting disturbed areas with native vegetation suitable for native shorebirds
- Installing an osprey platform on the southern boundary of the park near the Fox River.

About this Effort

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"Looking Out for Wildlife" is a fact sheet about riverine and shoreline habitat restoration along the lower Fox River in the Village of Ashwaubenon (NRDA Project 220); it was produced by Abt Associates under contract to the U.S. Fish and Wildlife Service.



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Restoration Snapshot

Activity:	Restoring aquatic and shoreline habitats along the lower Fox River
Funding:	NRDA funds: \$140,000 Leveraged funds: None as of 2017*
Size:	None as of 2017*
Status:	In progress
Location:	Village of Ashwaubenon

*Data regarding project size and leveraged funding are provided only for restoration projects that were completed by the end of 2017



Moving a Delta in a Positive Direction

Restoring and Protecting Wildlife Habitat in the Duck Creek Delta of Lower Green Bay

Barrier islands in the United States are most often associated with communities on the East and Gulf coasts. However, some areas of the Great Lakes can act very much like barrier island systems, where shallow islands protect rich, diverse wetlands behind them from erosion, allowing vegetation and wildlife to thrive. These types of systems are often threatened, or destroyed, by the effect of waves, wind, and changing water levels against a hardened shoreline. But they can also be restored through creative, coordinated efforts, such as efforts supported by the Fox River Trustees.

About the Duck River Delta and the Cat Island Chain

Historically, the shallow wetlands, beaches and mudflats in the Duck Creek Delta, found along the southwestern shores of Green Bay just below the Cat Island Chain, provided essential habitat for a wide variety of wildlife, including fish, shorebirds, waterfowl, and amphibians. Prior to the 1970s, Cat, Willow, and Bass Islands provided important protection for these habitats, sheltering them from the strong winds and waves of Lake Michigan. However, during extremely high water levels in the mid-1970s, a series of severe storms during ice breakup resulted in catastrophic erosion of the islands. This left the delta exposed to wind- and wave-driven erosion, which led to the loss of nearly all of this regionally important habitat.



Wild rice seeding in the Duck Creek Delta, lower Green Bay.
Credit: Ducks Unlimited

Recently, however, there has been a coordinated effort among many organizations to restore the Cat Island Chain and the Duck Creek Delta. Recent efforts have focused on rebuilding the islands using sediment that had been removed from nearby areas to maintain key navigational routes to the Port of Green Bay. While these efforts have been successful, there has been less focus on restoring the delta habitat behind these newly re-created islands. Trustees have begun to support a coordinated effort to re-establish key wildlife habitats in the delta.



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Returning to a Healthy Environment

With Trustee support, Ducks Unlimited (DU) and the University of Wisconsin Green Bay (UWGB) are working with partners to re-establish high-quality wetland habitat for native fish and birds in the Duck Creek Delta. To that end, efforts include:

1. Developing a comprehensive restoration plan for the Duck Creek Delta and Cat Island Chain, which will ensure effective prioritization, coordination, and implementation of restoration actions in the area.
2. Creating logjams near the outflow of Duck Creek to reduce wave action and shoreline erosion in the bay; encourage vegetation establishment; improve water quality; provide nursery habitat and shelter for native fish; and provide loafing areas for birds, reptiles, and amphibians.
3. Planting 30 acres of wetland vegetation along the shoreline of the bay with wild celery, wild rice, and hard-stem bulrush, including 10 acres directly shoreward of the installed logjams. Another 20 acres will be restored with project partners.

Birds	Fish	Turtles	Native Plants
Bald eagle Mallard Black tern	Northern pike Spotted musky Forage fish Yellow Perch	Blanding's turtle Wood turtles	Wild rice

EXAMPLES OF WILDLIFE AND PLANTS BENEFITING FROM RESTORATION

4. Enhancing wetland and pike habitat on Ken Euers Nature Preserve along the shores of the Duck Creek Delta by rehabilitating an existing, but unused, dike system. This system will maintain water levels that best support productive, native wetlands.

Taken together, these four actions will help re-establish and protect critical wetland habitat in lower Green Bay, enhancing the ability of a wide array of aquatic and wetland-dependent wildlife to thrive in the area.

About this Effort

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"Moving a Delta in a Positive Direction" is a fact sheet about habitat restoration efforts in the Duck Creek Delta (NRDA Project 212); it was produced by Abt Associates under contract to the FWS.



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Restoration Snapshot

Activity: Restore habitat in the Duck Creek Delta of Lower Green Bay

Funding: NRDA funds: \$500,000

Leveraged funds: None as of 2017*

Size: None as of 2017*

Status: In progress

Location: Lower Green Bay, Wisconsin

*Data regarding project size and leveraged funding are provided only for restoration projects that were completed by the end of 2017



Terning Habitat Around

Restoring Habitat to Support Common and Forster's Terns

Common terns are not as common as they once were in the Great Lakes. The same is true of Forster's terns. Seeing these birds around Green Bay, and in the Great Lakes more generally, has become rarer as people have disturbed, developed, and polluted the habitats that terns need to thrive. However, a variety of efforts are underway to help turn things around for these ecologically significant, culturally important, and charismatic birds.

About Common and Forster's Tern Habitat in Wisconsin

Both the common and Forster's tern are listed as endangered in Wisconsin. In the late nineteenth century, there was an abundance of breeding colonies of common and Forster's terns in the Green Bay region, but their numbers have declined precipitously since then. These population declines are due in large part to the loss or deterioration of wetland habitat as well as the harm caused by the presence of polychlorinated biphenyls (PCBs) in the habitats that these birds used for foraging and breeding.

While common and Forster's terns will undoubtedly benefit from the multitude of regional efforts to protect and restore wetlands for other wildlife (e.g., waterfowl), their recovery could be accelerated by restoration actions that aim to directly improve their foraging and nesting habitat.

Returning to a Healthy Environment

The Fox River Trustees have supported three projects, described below, that will provide important benefits



Great Blue Heron foraging near emergent vegetation on Lake Puckaway. (Photo by Green Lake County)

to common or Forster's terns. These projects build on previous Trustee-supported efforts to help these two species recover (see projects 3.14 and 3.23 in the [2013 Lower Fox River and Green Bay Restoration Progress Report \(RPR\)](#), which can be found on our website).

Restoring Nesting Habitat on Lake Poygan

Lake Poygan is one of a series of interconnected lakes fed by the Fox and Wolf Rivers in Wisconsin that are collectively referred to as the Winnebago Pool Lakes. This lake covers 14,102 acres, and provides habitat for birds



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and a wide variety of fish. Historically, the Forster's tern nested on shallow, vegetated sand bars in Lake Poygan that were protected by large cane beds. These cane beds lost more than 20 percent of their total area, which led to a corresponding reduction in Forster's terns, in part due to reduced nesting success. To address this issue, this project protected 5.28 acres of nesting habitat in Lake Poygan's West Bay by rebuilding a section of a degraded sand bar and restoring the canes that will prevent its erosion.

Lake Puckaway Breakwater

Lake Puckaway is a natural shallow lake on the Fox River, approximately 40 river miles upstream of Little Lake Butte des Morts. It provides important habitat for a wide array of fish, including walleye, largemouth bass, bluegill, crappie, and perch. These habitats are also important foraging areas for Forster's terns, which nest in the area and feed on the fish. Aquatic vegetation has been declining in many areas of Lake Puckaway, in large part due to the lack of protection against wind and wave energy. To help enhance critical aquatic habitat at the lake, this project created a new breakwater made of timber that is now protecting approximately 40 acres of habitat from wind- and wave-related erosion. This breakwater will help increase aquatic vegetation; sustain wildlife in the area, including terns; and improve local water quality.

Creating a Nesting Island in Lower Green Bay

In Lower Green Bay, common tern colonies historically nested on a series of shoals and gravel islands protected by the Cat Island Chain, a series of barrier islands. Unfortunately, in the mid-1970s, sustained high water levels, high-energy waves, and shoreline disturbance

contributed to the loss and eventual disappearance of the islands. Without the protection from wave action, the shoals and gravel islands in the area south of the Cat Island Chain became unsuitable for nesting. While the restoration of the Cat Island Chain is underway, this project is focused on providing high-quality nesting habitat for terns immediately, forgoing the time typically needed for such shoals to develop naturally. More specifically, the project is building a 0.5-acre sand and gravel island to support at least 100 nesting pairs of common terns. The island will be protected by rip rap, which will encircle the island and provide additional habitat for fish, including walleye, lake trout, and whitefish.

About this Effort

The Fox River Trustees support the long-term recovery, protection, and enhancement of the natural resources of the Lower Fox River and Green Bay system. Starting in the mid-1950s, paper companies and other entities released PCBs into the Lower Fox River and Green Bay. These releases resulted in injuries to fish, wildlife, surface water, and sediments. Through a process known as Natural Resource Damage Assessment (NRDA), the Trustees assessed these injuries and entered into settlement agreements with the parties responsible for the PCB releases. Since 2002, the Trustees have recovered \$90 million for restoration projects that compensate for PCB-related injuries to natural resources.

"Terning Habitat Around" is a fact sheet about tern-focused habitat restoration efforts (NRDA Projects 29, 155, and 222); it was produced by Abt Associates under contract to the FWS.



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Restoration Snapshot

Activity:	Tern habitat restoration
Funding:	NRDA funds: \$467,192 (\$217,192 of which was previously reported in 2013 RPR) Leveraged funds: \$7,539 (all newly reported)*
Size:	40 acres (all newly reported)*
Status:	Lake Poygan and Puckaway restoration completed; the construction of a tern nesting island in Lower Green Bay is in progress
Location:	Marquette, Brown, and Winnebago Counties

*Data regarding project size and leveraged funding are provided only for restoration projects that were completed by the end of 2017



Sensible Dike Repairs for Wildlife

Addressing Leaks in the Sensiba Dike to Improve Conditions for Wildlife

Coastal wetlands are crucial to the environmental health of the Green Bay region. They provide breeding grounds for fish, birds, and other wildlife. Wetlands also capture pollutants and prevent them from entering the waterway, and protect communities from flooding. Located on the north side of the Suamico River, the Sensiba State Wildlife Area is a rich coastal wetland on Green Bay's west shore that hosts fish, waterfowl, and other wildlife; and is often sought out by residents and visitors for outdoor recreation. Inland areas offer a shaded mixture of hardwood, cottonwood, aspen, and oak trees; and a variety of shrubs and grasses. The Sensiba State Wildlife Area was established in 1948 as an area for waterfowl production when the land was donated by Lucille Sensiba. However, the wetlands in this area are at risk due to a deteriorating dike system.

About the Sensiba Dike

The Sensiba Dike is part of the Green Bay West Shores Wildlife Area and was installed to manage the water levels in the wetland. Unfortunately, the dike began to leak, affecting resource managers' abilities to control water levels. When water levels are low and cannot be raised, wetlands are at risk of being invaded by cattails and common reed (or Phragmites), which thrive in drier conditions. Invasive-dominated wetlands provide little to no foraging or breeding habitats to birds, fish, or other wildlife. When water levels are high and cannot be lowered, mudflats or shallow marsh habitats may disappear, which are critical to supporting waterfowl, shorebirds, wading birds, and other wildlife, particularly



during migration. Repairing the dike will help managers ensure that an appropriate mix of wetland habitats are present to support wildlife breeding and migration, and that these habitats can be maintained over the long-term.

Returning to a Healthy Environment

This project builds on previous efforts supported by the Fox River Trustees to fix the Sensiba Dike, which entailed applying bentonite to the dike's surface (see Project 3.3 in the [2013 Restoration Progress Report for the Lower Fox River and Green Bay Natural Resource Damage Assessment](#), which can be found on our website). When this initial repair attempt failed, the Trustees supported a revised approach that injected mud and other materials

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to shore up the dike and reduce leaks. This second attempt appears to have been more successful than the first, but ongoing and active maintenance has been required to sustain the repairs. The Wisconsin Department of Natural Resources continues to manage and monitor the water levels in the wetlands of the Sensiba Unit. The agency is also tracking the condition of the habitat and will address invasive plant encroachment as needed. This can involve managing the vegetation with prescribed burns, herbicides, mowing, and other techniques.

The maintenance of this ecologically important wetland is also providing clear benefits to people. Located just 10 miles north of the City of Green Bay, this conservation area is popular with residents and tourists. There is a developed trail system and viewing platform on top of the dike, which support hiking and wildlife viewing. Visitors also canoe, cross-country ski, fish, hunt, and trap at the site.

About this Effort

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Birds

Wood duck
Great blue heron
Solitary sandpiper
Black tern
Forster's tern
Red-winged blackbird
Bald eagle



Native Fish

Northern pike



EXAMPLES OF WILDLIFE BENEFITING FROM RESTORATION

"Sensible Dike Repairs for Wildlife" is a fact sheet about repair and restoration at the Sensiba Dike (NRDA Project 35 and 35b-c); it was produced by Abt Associates under contract to the U.S. Fish and Wildlife Service.



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Restoration Snapshot

Activity:	Repair failing dike and improve water management infrastructure
Funding:	NRDA funds: \$189,272 (\$35,000 of which were previously reported in the 2013 RPR) Leveraged funds: \$919,678 (all newly reported)
Size:	365 acres (all newly reported)
Status:	Completed
Location:	Suamico, Brown County, Wisconsin



Breakwalls for Wetlands

Constructing Breakwalls to Protect Wetlands in Lakes Poygan and Winneconne

Wetlands and near shore aquatic habitat do best when they are protected from winds and waves. Since the 1950s, where lakes were impounded, protective marsh edges have eroded and water clarity has decreased, resulting in dramatic vegetation losses and declining fish and wildlife populations. Breakwalls can help prevent vegetation and sediment from washing away in extreme weather, and also provide the calm waters needed to support the kinds of vegetation that help young and adult fish thrive. Ducks and other waterfowl also use the wetlands behind breakwalls for feeding and resting.

About the Wetlands in Lakes Poygan and Winneconne

Lake Poygan, located near the village of Winneconne, Wisconsin, is an expansive widening of the Wolf River that covers more than 14,000 acres; the eastern third of the lake is often referred to as Lake Winneconne. These two lakes are part of the Winnebago Pool system, a series of interconnected, shallow lakes fed by both the Fox and Wolf Rivers. They provide habitat for a wide range of fish, including sturgeon, walleye, northern pike, largemouth bass, bluegill, crappie, and perch, and help provide habitat for Forster's terns, which nest in the area. These wetlands also support migrating and breeding birds, including waterfowl and shorebirds. However, many of these wetlands have been degraded by high wind and waves, which have submerged and eroded this valuable habitat.



Crappie

Returning to a Healthy Environment

The Fox River Trustees have supported two efforts to help protect the wetlands in Lakes Poygan and Winneconne, described in more detail below.

Phase II of Lake Poygan Breakwater

Ducks Unlimited and other local partners are aiming to construct a large breakwater structure on the north shore of Lake Poygan at the mouth of the Wolf River. The

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breakwater will serve three major purposes: to prevent turbid river current from flowing through the habitat restoration area, to reduce sediment re-suspension, and to protect the shoreline from erosion. The breakwater will allow the expansion of native aquatic vegetation, which will provide habitat for fish, birds, and other wildlife. This estimated 2,200-foot expansion is the second phase of the breakwater project. Phase I constructed a 1,170-foot breakwater, and a planned third and final phase will potentially add another 4,000 feet of breakwater.

Lake Winneconne Breakwater

Winnebago County will install two offshore breakwalls at sites along the northern shore of Lake Winneconne (i.e., Clark's Bay and Stabenow) to protect, preserve, and restore wetlands. In Clark's Bay, more than 2,100 feet of wetland frontage is currently unprotected and exposed to potential erosion and loss. At Stabenow, more than 1,700 feet of wetland frontage is unprotected and also threatened. The constructed breakwalls will be approximately 2,800 feet long and will protect

the 3,800 feet of nearby wetlands. This project is also expected to help re-establish emergent and submergent aquatic plant communities in the 34 acres of open water located behind the breakwalls.

About this Effort

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Birds

Forster's tern
Mallard
Osprey
Bald eagle



Native Fish

Walleye
Northern pike
Largemouth bass
Bluegill
Crappie
Perch



EXAMPLES OF WILDLIFE BENEFITING FROM RESTORATION

"Breakwalls for Wetlands" is a fact sheet about the construction of breakwalls to protect wetlands in Lakes Poygan and Winneconne (NRDA Projects 218 and 237); it was produced by Abt Associates under contract to the U.S. Fish and Wildlife Service.

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Restoration Snapshot	
Activity:	Building breakwaters to protect wetlands in Poygan and Winneconne lakes
Funding:	NRDA funds: \$600,000 Leveraged funds: None as of 2017*
Size:	None as of 2017*
Status:	Both projects are in progress
Location:	Lakes Poygan and Winneconne, Wisconsin

*Data regarding project size and leveraged funding are provided only for restoration projects that were completed by the end of 2017



Meeting a Restoration Challenge

Using Science to Secure Restoration Success at Terrell's Island

The restoration of a natural area often does not go according to plan. Even the most carefully designed restoration projects often have to be adjusted once the initial plan is put in place. Any number of unexpected things can happen that may throw a newly restored system off balance, including the invasion of unwanted plants or animals, an unplanned disturbance, or changes in how water moves in a lake or stream. For this reason, restoration specialists typically think of restoration as a process, and understand that the tools and approaches they use may need to change over time to attain project goals. This approach to restoration, more generally referred to as "adaptive management," is being used to good effect at Terrell's Island just west of Oshkosh, Wisconsin.

About Restoration at Terrell's Island

The marsh known as Terrell's Island was once one of the most productive fish and wildlife areas in the Winnebago Lake System – a system that includes Lake Butte des Morts, Lake Poygan, and the rivers that connect them. However, since the 1950s, when the lakes were impounded, protective marsh edges have eroded and water clarity has decreased, resulting in dramatic vegetation losses and declining fish and wildlife populations.

To restore fish and wildlife habitat on Lake Butte des Morts, the Terrell's Island Restoration Project, completed



Ringed-neck duck

in 1998, encircled a 500-acre remnant wetland with a 10,645-foot breakwater. The breakwater was designed to decrease wind- and wave-related erosion of the wetland, which would improve water clarity and allow aquatic vegetation to regrow. The project was initially successful, with dramatic and almost immediate improvements in water clarity, aquatic plants, and fish and wildlife. However, over time, conditions in the restored area deteriorated, leading to the collapse of the aquatic vegetation and the fishery. Please see the following website for more information: <https://dnr.wi.gov/topic/lands/WildlifeAreas/lakebdm.html>.



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Returning to a Healthy Environment

The Fox River Trustees have supported two projects that will help put the restoration of Terrell's Island back on track, and each is described in more detail below.

Identifying the Causes of Ecosystem Decline

The Wisconsin Department of Natural Resources (DNR) is doing extensive monitoring in the project area to understand what caused the decline of the restored area. Many potential contributing factors have been identified, including the invasion of carp, the establishment of large rookeries of cormorants and pelicans in the area, and a lack of nutrient flushing from the wetland. DNR staff are conducting fyke net and electrofishing surveys, aerial surveys of waterfowl, water quality sampling, and carp tagging to help ascertain key dynamics in the restored system and to assess the impact of future restoration actions. The monitoring completed to date during this project has already helped guide the design for another project, described below.

Enhancing Water Exchange with Lake Butte des Morts

This project will install approximately five culverts of various sizes at strategic locations in the breakwater to

increase water exchange between Terrell's Island and Lake Butte des Morts. Maintaining the protection from wind and waves but enhancing water exchange should help flush out nutrients that can build up within the breakwater, which will increase overall water quality and allow aquatic plants to re-establish. The overarching goal of the project is to help rebuild vegetative habitat, re-establish use by desirable fish and wildlife, and bring back healthy gamefish and panfish, which can be enjoyed by anglers.

About this Effort

The Fox River Trustees support the long-term recovery, protection, and enhancement of the natural resources of the Lower Fox River and Green Bay system. Starting in the mid-1950s, paper companies and other entities released polychlorinated biphenyls (PCBs) into the Lower Fox River and Green Bay. These releases resulted in injuries to fish, wildlife, surface water, and sediments. Through a process known as Natural Resource Damage Assessment (NRDA), the Trustees assessed these injuries and entered into settlement agreements with the parties responsible for the PCB releases. Since 2002, the Trustees have recovered \$90 million for restoration projects that compensate for PCB-related injuries to natural resources.

Birds	Native Fish
Mallards Wood ducks Ring-necked ducks	Bluegill Crappie Largemouth bass Yellow perch

EXAMPLES OF WILDLIFE BENEFITING FROM RESTORATION



"Meeting a Restoration Challenge" is a fact sheet about using adaptive management to help ensure the success of wetland and aquatic habitat restoration efforts at Terrell's Island in Lake Butte des Morts (NRDA Projects 205 and 227); it was produced by Abt Associates under contract to the U.S. Fish and Wildlife Service.

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Restoration Snapshot	
Activity:	Adaptively managing the restoration of wetland and aquatic habitat at Terrell's Island
Funding:	NRDA funds: \$73,000 Leveraged funds: None as of 2017*
Size:	None as of 2017*
Status:	In progress
Location:	Lake Butte des Morts, Wisconsin

*Data regarding project size and leveraged funding are provided only for restoration projects that were completed by the end of 2017



Swimming Upstream at Duck Creek

Restoration along Duck Creek to Support Native Fish

Duck Creek, or Talu'kowáhné ka(w)yuhuatáti in Oneida and Séqsepaketaheqkoneh in native Oneida, was named for the multitude of ducks swimming in its waters. When the Oneida Tribe came to Wisconsin in the late 1800s, the Menominee Tribe provided this land to them. Duck Creek bisects the Oneida reservation and serves as an important location for tribal members to fish, hunt, gather, and engage in cultural practices. Duck Creek is also important for wildlife that live within the waters, including northern pike and other native fish. Duck Creek eventually flows into Green Bay and is a key feature of Pamperin Park, the largest developed park in Brown County and a popular place for fishing, picnicking, and special events. Water flows within Duck Creek have been affected by dams and river channelization, requiring stream restoration to improve the ecological health and beauty of the place.

About Stream and Riparian Restoration in Duck Creek

Along Duck Creek, the existence of two obsolete and unused dams prevented native fish from accessing more than 180 miles of stream and wetland habitats. This is a common issue throughout Wisconsin and in the Midwest – dams that once supported local industries or recreation now lie unused and degrade habitat and water quality, and prevent fish from moving to upstream habitats they use for feeding, reproduction, resting, or migrating.



Dam at Duck Creek during the removal (photograph courtesy of Wisconsin Department of Natural Resources)

Some of natural areas that lie alongside Duck Creek also became degraded by people, typically through efforts to control water flow and reduce flooding. For example, sections of Duck Creek have been channelized, or straightened, to help water move more quickly downstream and prevent flooding in Pamperin Park. However, these efforts replaced natural streamside habitat with concrete to prevent the stream channel from eroding and changing shape over time. These changes have greatly reduced the value of the habitat for fish, which typically thrive in tree-lined streams with cool,



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meandering waters containing stones, roots, and wood that they can use for refuge. Channelization along Duck Creek has also increased the amount of sediment and pollution reaching the stream, because water is no longer being filtered through soil before it enters the waterway. This reduced water quality has limited the stream's ability to support migrating and spawning fish.

Returning to a Healthy Environment

Two projects were carried out on Duck Creek in the vicinity of Pamperin Park to improve stream connectivity and riparian habitat to benefit native fish in the area. These efforts build on those described for project 4.5 in the [2013 Lower Fox River and Green Bay Restoration Progress Report](#), which is available on our website.

Dam Removal at Pamperin Park

The first project, implemented by the Oneida Nation, focused on the removal of two low-head dams near Pamperin Park. The project also included modification of a small dam near the park to ensure it would not serve as a barrier to native fish movement when there is a high flow of water in the stream; while preventing upstream movement of undesirable invasive species, such as sea lamprey and round goby.

Stream Restoration at Pamperin Park

The second project focused on improving stream habitat in Duck Creek in an area directly adjacent to Pamperin Park. More specifically, the Brown County Parks Department (BCPD) will work with a contractor to remove concrete that was installed in the 1950s to stabilize the stream bank. This will be replaced with more nature-based materials and native plants that will stabilize the stream's edge, while providing much higher-quality habitat for fish and other wildlife. BCPD staff will continue

to ensure the long-term success of the project with monitoring efforts.

About this Effort

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Birds	Native Fish	Amphibians
Waterfowl Waterbirds	Northern pike White Sucker Small native-stream fish	Frogs

EXAMPLES OF WILDLIFE BENEFITING FROM RESTORATION

"Swimming Upstream at Duck Creek" is a fact sheet about dam removal and riparian restoration efforts on Duck Creek (NRDA Projects 228 and 164); it was produced by Abt Associates under contract to the U.S. Fish and Wildlife Service.

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Restoration Snapshot

Activity: Dam removal, dam repair, and riparian restoration to support local fish populations

Funding: NRDA funds: \$235,000 total (\$15,000 of which were previously reported in the 2013 RPR)
Leveraged funds: \$104,000*

Size: None as of 2017*

Status: Dam removals and repairs completed; riparian restoration ongoing

Location: Pamperin Park, Brown County, Wisconsin

*Data regarding project size and leveraged funding are provided only for restoration projects that were completed by the end of 2017



Putting the Trout Back in Trout Creek

Restoring and Maintaining Creek Habitat at the Brown County Golf Course

If you were looking for a good place to fish for brook trout in Wisconsin several decades ago, you might assume that Trout Creek would be the perfect place to start. However, you would be mistaken. Years of development and pollution led to the decline of the creek, and until very recently, it did not even support its own namesake. Bringing this valuable fish back has been a key focus for the Oneida Nation, whose cultural practices and traditional or subsistence diet has close ties to Trout Creek and other reservation waters.

About Trout Habitat in Trout Creek

Since the migration of Oneida Tribal members to Wisconsin in the mid-1800s, annual fish harvests have played a central role in Oneida life, and these harvests have often been associated with cultural ceremonies. Tribal members have harvested a wide range of fish from a variety of waterways since their establishment in Wisconsin, including the historic capture of brook trout from Trout Creek. However, dams, development, logging, and run-off from farming practices have degraded the habitat quality in Trout Creek. The Tribe has been working with various partners over the past few decades to re-establish trout in Trout Creek so that Tribal members can resume fishing from this historically and culturally important stream.



Three different age classes of brook trout (Photo by Ernie Stevens III)

Returning to a Healthy Environment

With Trustee support, the Oneida Nation has been working to improve trout habitat within and along Trout Creek, focusing on a segment of the creek that runs through the Brown County-owned golf course, which lies within the reservation boundary. This work has been done through two projects, one of which was described in detail in the 2013 Lower Fox River and Green Bay



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Restoration Progress Report (RPR), but was not completed until after the report was issued (see project 4.4 in the [2013 Restoration Progress Report for the Lower Fox River and Green Bay Natural Resource Damage Assessment](#), which can be found on our website). Together, these projects are providing cold water-dependent trout with an alternative route around a warm pond.

Bypassing the Pond

Brook trout strongly prefer cold waters with high oxygen content. The golf course pond, which was created with a small dam, generated warm temperatures and low oxygen levels that were unsuitable for trout. The dam and the weir upstream of the pond also created barriers to fish passage. This project involved constructing a 400-foot stream segment to bypass this pond. The construction of the new stream habitat was completed in 2013, and the Tribe re-introduced brook trout to the creek in partnership with Wisconsin's Department of Natural Resources.

Shoring up the Bypass

This project focuses on shoring up and improving erosion control along approximately 50 feet of the newly constructed stream habitat that delivers sediment to the stream and degrades the habitat. The shoreline will be armored by placing rip rap, breaker run, or logs along the problematic areas of the stream bank. The tribe will monitor the site to ensure that the stream banks remain stable, adding materials as needed.

About this Effort

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"Putting the Trout Back in Trout Creek" is a fact sheet about the stream restoration in Trout Creek on the Brown County Golf Course (NRDA Projects 166 and 235); it was produced by Abt Associates under contract to the U.S. Fish and Wildlife Service.



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Restoration Snapshot

Activity:	Creation and maintenance of 400 feet of stream to bypass a pond on Trout Creek
Funding:	NRDA funds: \$90,000 (\$80,000 of which was previously reported in 2013 RPR) Leveraged funds: \$29,799 (\$17,000 of which was previously reported in 2013 RPR)*
Size:	400 feet of stream (previously reported in 2013 RPR)*
Status:	Construction of stream completed; maintenance in progress
Location:	Brown County Golf Course, Brown County, Wisconsin

*Data regarding project size and leveraged funding are provided only for restoration projects that were completed by the end of 2017



Pathways to Pike Reproduction

Restoring Northern Pike Spawning Habitat in the Fox River Basin

The Fox River watershed once harbored extensive, diverse, and productive coastal wetlands for northern pike and other native fish to spawn. Traveling upstream, one could find lush, vibrant wetlands along and at the end of tributaries, and these areas were typically easy for fish to access. However, development over the last century has been associated with restricted fish movement to upstream spawning areas, and to the degradation of wetland habitat critical to fish reproductive success. Local conservation and restoration efforts are now focused on repairing some of the damage of the past, and revitalizing wetlands to support some of Wisconsin's most culturally and ecologically important species.

About Northern Pike and its Habitat in the Fox River Watershed

Green Bay northern pike or "northerns" have evolved to travel from the bay to inland wetlands, often using flooded ditches and small streams to access them. Along the way, northerns often encounter obstacles, including dams or poorly positioned culverts, and a lack of suitable wetlands at the end of their journey. If they are successful in reaching wetlands to spawn, young pike fry spend several weeks maturing, then return to the bay to continue their life cycle. Impediments to fish passage and the loss of spawning habitat have led to the decline of northern pike throughout the region.

As a top predator in the bay, northern pike are critical to maintaining a healthy predator-prey balance. Historically, northern pike were a much larger component of the native fish community of Green Bay. Today, due in part to the restorations efforts funded by NRDA, there is a sizable population of northern pike in Green Bay and it supports an open water and ice fishery.



Northern pike juvenile caught during sampling after restoration.

There is still much room for further population restoration but progress is being made.

Returning to a Healthy Environment

The Fox River Trustees have been supporting three separate efforts to remove impediments to fish movement and provide fish with access to high-quality wetlands, which will help increase pike numbers in Green Bay and restore healthy predator-prey dynamics. Each project is described separately below.

Enhancing Northern Pike Spawning in the Tributaries of the Fox and East Rivers

The Brown County Land and Water Conservation Department (BCLWCD) is working with many partners, including the Fox River Trustees, to improve northern



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pike spawning success throughout Green Bay. While earlier Trustee-supported efforts focused on tributaries of the West Shore (see Project 3.4 of the [2013 Lower Fox River and Green Bay Restoration Progress report](#), which can be found on our website), the BCLWCD shifted its attention in 2015 to tributaries of the Fox and East Rivers. As with earlier phases of this work, Brown County is working to remove key obstacles to fish movement, restore vegetation along streams to reduce erosion, connect wetlands, and improve hydrological conditions to enhance spawning.

Improving Northern Pike Spawning in Oconto County

With Trustee support, the Oconto County Land Conservation Division is working to improve spawning habitat and fish passage in Oconto County through three main approaches. First, it is creating, restoring, and connecting wetlands along major pike spawning routes. Second, the Division is removing critical impediments to fish movement, such as dams and improperly placed culverts, which will allow fish to access upstream habitat. Finally, it is conducting pike-related research in conjunction with the Wisconsin Department of Natural Resources (DNR), the University of Wisconsin at Green Bay, and the Shedd Aquarium. This will help refine understanding of pike habitat conservation and restoration needs.

Birds

Mallard
American black duck
Wood duck



Native Fish

Northern pike



EXAMPLES OF WILDLIFE BENEFITING FROM RESTORATION



Creating Paths for Pike Along Spring Brook Creek

With Trustee support, DNR is undertaking a range of actions that will help restore wetland habitat within and just upstream of Spring Brook Creek, a tributary of Lake Butte des Morts on DNR's Glacial Habitat Restoration Area in Winnebago County. More specifically, DNR staff will replace several problematic culverts that block northern pike's passage to upstream habitat. In key culverts, "stop logs," or floodgates, will be used to control water levels during the spring to support wetland vegetation growth, facilitate fish movement, and support the development of fish eggs and fry before they are flushed downstream.

About this Effort

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"Pathways to Pike Reproduction" is a fact sheet about restoration of northern pike habitat (NRDA Projects 106b/c, 210, and 232); it was produced by Abt Associates under contract to the U.S. Fish and Wildlife Service.

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Restoration Snapshot

Activity: Restoring northern pike's access to high-quality spawning habitat in the Fox River watershed

Funding: NRDA funds: \$2,232,000 (\$622,000 of which were previously reported in the 2013 RPR)*
Leveraged funds: \$378,056 (all of which were previously reported in the 2013 RPR)*

Size: 128 acres (all of which were previously reported in the 2013 RPR)*

Status: All projects are ongoing

Location: Brown, Oconto, and Winnebago Counties, Wisconsin

*Data regarding project size and leveraged funding are provided only for restoration projects that were completed by the end of 2017



Thriving Trout

Restoring Five-Islands Creek to Support Brook Trout

Protecting the purity of water is a spiritual and cultural responsibility for Native Americans. In the Five-Islands Creek area of Wisconsin, fed by the sacred Wolf River, the waters are rich with brook trout, a subsistence food source for the Menominee Indian Tribe of Wisconsin. But not long ago, commercial practices disconnected the waterways and compromised riparian habitat and water quality, threatening local brook trout and Menominee access to this valuable resource.

About Five-Islands Creek and Brook Trout

In the late 1990s, a commercial fishing operation altered the Five-Islands Creek by using small check dams to create holding ponds for their trout fishing operation. The water ponded behind the check dams, warming the water and disconnecting Five-Islands Creek from the Wolf River. Once the commercial fishing operation ended, the ponds were deserted and they eventually filled and were blocked with sediment and silt, making them unusable and unhealthy to trout and people.

Brook trout are culturally significant to the Menominee people. While Menominee hunting and fishing rights are protected under a federal treaty, changes to the natural land and access to brook trout have directly affected tribal practices, including the ability of tribal members to fish and collect medicinal plants. Restoration was needed to remove the dams, reconnect important waterways, and restore tribal access to trout and other natural resources along Five-Islands Creek and the Wolf River.



Brook trout

Returning to a Healthy Environment

With Fox River Trustee support, the Menominee Tribe restored Five-Islands Creek by removing the check dams, underground piping, and trash; filling the old diversions; and restoring the stream channel and riparian wetlands. Since the start of this restoration effort, trout have gained access to an additional 0.24 miles of improved habitat along Five-Islands Creek. With the check dams removed, the cooler water in the creek will now provide a refuge for trout when water in the Wolf River becomes too warm during the summer. This improved habitat benefits not



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only brook trout (which are a food source for birds, otters, and turtles), but other wildlife such as frogs, shorebirds, and wading birds. The Menominee Indian Tribe will continue to monitor Five-Islands Creek to ensure the stream channel is stabilized and that improvements in streamside vegetation are sustained.

About this Effort

The Fox River Trustees support the long-term recovery, protection, and enhancement of the natural resources of the Lower Fox River and Green Bay system. Starting in the mid-1950s, paper companies and other entities released polychlorinated biphenyls (PCBs) into the Lower Fox River and Green Bay. These releases resulted in injuries to fish, wildlife, surface water, and sediments.

Through a process known as natural resource damage assessment (NRDA), the Trustees assessed these injuries and entered into settlement agreements with the parties responsible for the PCB releases. Since 2002, the Trustees have recovered \$90 million for restoration projects that compensate for PCB-related injuries to natural resources.



Restored brook trout habitat in Five-Islands Creek (photograph by Menominee Tribe).

"Thriving Trout" is a fact sheet about stream restoration in Five-Islands Creek (NRDA Project 185); it was produced by Abt Associates under contract to the U.S. Fish and Wildlife Service.



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Restoration Snapshot

Activity:	Restore brook trout habitat and aquatic connectivity in Five-Islands Creek
Funding:	NRDA funds: \$9,716 Leveraged funds: \$4,734
Size:	0.24 miles of stream opened to fish
Status:	Completed
Location:	Five-Islands Creek, Menominee Indian Reservation, Wisconsin



A Fishy Situation

Supporting Musky in Green Bay

The Green Bay and the Great Lakes are home to a unique native strain of musky called the Great Lake spotted musky. This large, majestic fish is both strong and territorial. Sometimes referred to as the fish of 10,000 casts, fishermen enjoy the thrill of getting a musky on their line and the fight that can last several hours to land the fish. Even with its size and speed, the musky population in Green Bay suffered near decimation in the last century. Recent restoration efforts have focused on turning that around and returning the Great Lakes spotted musky to a healthy population.

About the Great Lakes Spotted Muskellunge in Green Bay

The Great Lakes spotted musky has a distinct and beautiful pattern of small spots on its silvery scales. These fish are freshwater predators who can travel up to 30 miles per hour. They help balance the ecosystem and food web by preying on smaller fish, as well as frogs, snakes, birds, and other small animals. Musky lurk in and along stones on the floor of rivers or bays, making their way to deeper water when the shallow areas become warm. As the largest in the pike family, weighing up to 70 pounds, the musky is often sought out by fishing enthusiasts. The Great Lakes spotted musky was once common in Green Bay and its tributaries. The population has been severely affected by contaminants, overfishing, and habitat degradation and loss.



USFWS staff hold an adult spotted musky (photograph by USFWS)

Returning to a Healthy Environment

The Fox River Trustees have supported three projects focused on the study and conservation of the spotty musky, which are described in more detail below. These efforts build on previous musky spawning and restocking efforts previously supported by the Trustees (see Projects 4.2 and 4.8 in the [2013 Restoration Progress Report for the Lower Fox River and Green Bay Natural Resource Damage Assessment](#), which can be found on our website).



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Understanding the Spotted Musky Habitat in Green Bay and Tributaries

To better understand the habitats best suited for musky spawning and the conditions of those habitats, researchers at the University of Wisconsin Stevens Point are capturing adult musky in the Lower Green Bay area and implanting them with acoustic transmitters. To date, 20 adult fish have been tagged. Tracking the movement and activities of the musky will help inform fisheries managers about the locations of spawning habitat and the condition of that habitat, which will guide future musky restoration activities.

Rearing and Releasing Musky (two projects)

To help improve the success of musky spawning and to enhance the genetic diversity of the local population of musky, the Wisconsin Department of Natural Resources is renovating, repairing, and maintaining a coolwater-rearing facility at the C.D. Buzz Besadny Fish Facility in Kewaunee. Initial improvements to the pond have been made, and subsequent improvements and adjustments are projected for the future. Musky are collected in the lower Fox River, artificially spawned and the fertilized eggs brought back to the facility to hatch. To date, a total of 3,240 young musky have been raised at the C.D. Buzz Besadny Facility and released into the Lower Fox, Peshtigo, and Menominee rivers; Little Sturgeon Bay; Lake Winnebago; and Little Lake Butte des Morts. Production

of Large Fingerling Spotted Muskies at the Besadny Fisheries Facility will continue in future years to help establish a self-sustaining population in Green Bay and the Fox River. The project also supports Yearling rearing at the Wild Rose State Fish Hatchery with fish imported from Michigan.

About this Effort

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"A Fishy Situation" is a fact sheet about projects that will improve efforts to better understand and conserve the Great Lakes spotted musky NRDA Projects (11, 22, 88, 88b, 124, 187, 187b, and 208); it was produced by Abt Associates under contract to the U.S. Fish and Wildlife Service (USFWS).



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Restoration Snapshot

Activity:	Track musky to better understand their spawning habitats, and raise and release spotted musky in various locations throughout Green Bay and its tributaries.
Funding:	NRDA funds: \$1,260,986 (\$615,400 of which were previously reported in the 2013 RPR) Leveraged funds: \$456,719 (\$76,379 of which were previously reported in the 2013 RPR)*
Size:	Not applicable
Status:	The first phase of spotty musky projects are complete (Projects 11, 22, 88, 124, and 187); the other projects are in progress.
Location:	Various waterbodies in Green Bay and its tributaries

* Data regarding project size and leveraged funding are provided only for restoration projects that were completed by the end of 2017



Reclaiming a Fishery on the Oneida Reservation

The Design and Restoration of Oneida Lake

The Oneida Nation has a cultural connection to the waterways and wetlands of the Lower Fox River and Green Bay area. For almost 200 years, Tribal members have fished in the streams, gathered medicinal plants along stream banks, hunted on adjacent lands, and conducted ceremonies related to the waters. However, the release of contaminants into the Fox River and Green Bay greatly impaired Tribal members' traditional use of local waterways and wetlands. A variety of restoration efforts have focused on helping the Tribe reclaim its access to fishing and traditional activities on Oneida land. The Fox River Trustees are supporting Tribal efforts to create a new fishing lake on the Oneida Reservation, called Oneida Lake, to restore access to clean, safe fishing.

About Oneida Lake

An earlier grant to the Oneida Nation supported the siting and design of Oneida Lake, which was referred to as "Phase I" of the project (see Project 3.19 in the [2013 Restoration Progress Report for the Lower Fox River and Green Bay Natural Resource Damage Assessment](#), which can be found on our website). After evaluating sites, the Tribe determined that an 18-acre decommissioned sand quarry would be the best location to create a fishing lake and new natural space. The Oneida Nation acquired the land with its own funding in 2006 and undertook some regrading and restoration around the existing sand quarry, with Oneida Lake opening to the community in 2014. In recent years, the Tribe continues to improve the amenities around the lake, including adding trails for fishing access, restrooms, a basic fishing pier, and parking lots. The Tribe also wanted to expand the size of the original lake from 18 acres to support a larger, sustainable fishery for the community.



Oneida Lake

Returning to a Healthy Environment

With Trustee support, the Oneida Nation is now completing the design of Phase II of the Oneida Lake fishery restoration project. Phase II will expand the 18-acre lake into a 30-acre lake that will include about 30 acres of open water, enhanced riparian habitat, meandering shorelines, additional fishing piers, boat landings, fishing trails, fish camps, parking lots, and southern and northern access roads. Once the design is completed, the Tribe will use additional funding sources to implement the design.

Once the Tribe completes the lake expansion and the lake is deemed ready for stocking, the Oneida Nation will rely on an annual Fishery Management Plan to stock and monitor the fish. The ultimate goal for Oneida Lake



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is to support a safe, healthy fishery that can successfully sustain the community. To that end, the system will be designed to optimize fish biomass, with walleye and largemouth bass serving as apex predators; and forage fish, such as fathead minnows and shiners, serving as prey. Once completed, the lake will help preserve the Oneida people's cultural practice of taking care of family and community through sharing fish. In addition, the Tribe expects a wide variety of wildlife, such as mink, wood turtles, waterfowl, and bald eagles, to benefit from the habitat within and along the lake's shoreline.

In addition to supporting the Phase II design, the Trustees provided funding for the construction of an adaptive kayak and canoe launch on Oneida Lake. Every summer, the Oneida Adventures program hosts numerous recreational kayaking, canoeing, and fishing events at the lake. However, due to a variety of health issues, many community members lack the mobility to independently get in and out of watercraft. The addition of an adaptive launch will greatly enhance community engagement with

the Oneida Lake fishery, ensuring that even those with physical challenges can safely and easily access the lake by boat.

About this Effort

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Birds	Fish	Turtles	Mammals
Birds of prey <i>bald eagle</i> Waterfowl <i>mallard</i> <i>mergansers</i>	Walleye Northern pike Musky Bass	Wood turtles	Mink
			

EXAMPLES OF WILDLIFE BENEFITING FROM RESTORATION

"Reclaiming a Fishery on the Oneida Reservation" is a fact sheet about Oneida Lake (NRDA Project Numbers 182 and 236); it was produced by Abt Associates under contract to the U.S. Fish and Wildlife Service.







Restoration Snapshot

Activity: Design and partial restoration of fishery in Oneida Lake and the installation of an ADA accessible canoe and kayak launch

Funding: NRDA funds: \$72,000 for Phase II design, and \$20,000 for kayak/canoe launch*
Leveraged funds: None as of 2017**

Size: None as of 2017**

Status: Phase II and kayak/canoe launch are in progress

Location: Oneida Reservation, Wisconsin

* Phase I of the project is complete and \$400,000 in NRDA funding were allocated to this phase. Acreage restored was estimated at 40 acres in the 2013 RPR, but 18 acres were actually restored in Phase I of the project. Phase I of the project also leveraged \$2,797,200, which was not reported in the 2013 RPR.

**Data regarding project size and leveraged funding are provided only for restoration projects that were completed by the end of 2017

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The Drum Beat of Keshena Falls

Making Plans to Improve Spawning Habitat to Call Sturgeon Home

Keshena Falls is a water fall on the Wolf River, which flows into Lake Winnebago. Keshena Falls was historically one of the most-important spawning areas for sturgeon on the Wolf River system. Sturgeon are culturally significant to the Menominee Nation, who selected this area for their reservation in 1954 largely because of the historical connection to sturgeon that is necessary as part of their spring "Sturgeon Spawning Place" celebration and other ceremonies. Sturgeon were also the inspiration behind the Menominee Fish Dance.

Protecting and improving stream habitat is an effective way to ensure that local sturgeon populations are stable or increase over time. In this project, the Menominee Tribe is developing a plan for a community gathering place that also includes removing obsolete infrastructure that is degrading sturgeon spawning habitat. This gathering place will also make it easier for tribal members and the community to safely access the site to view spawning as it unfolds.

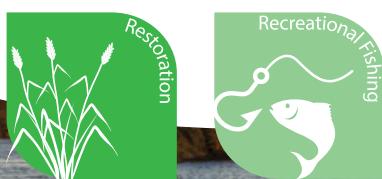
About Sturgeon and Keshena Falls

Sturgeon are large, bottom-dwelling fish that first appeared about 100 million years ago, at about the same time dinosaurs went extinct. Individual sturgeon tend to grow slowly and live a long time (e.g., a fish caught in the Wolf River in 2012 was estimated to be between 100 and 125 years old). The waters of Wisconsin support the largest self-sustaining populations of sturgeon worldwide.



Keshena Falls

Sturgeon migrate to their spawning grounds each spring, and they prefer to spawn in shallow, rocky areas along river banks. This is the type of habitat found below Keshena Falls, which helps explain why this has been a historically important spawning site. In fact, the Menominee Tribe believes that there is a drum under Keshena Falls that calls the sturgeon back to the area each spring from Lake Winnebago. Improving stream habitat at this site will thus help ensure that the area remains a naturally and culturally important sturgeon spawning area for many generations to come.



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Returning to a Healthy Environment

The Fox River Trustees have provided funding to help the Menominee Tribe design a community gathering space at Keshena Falls that will improve sturgeon habitat, and also provide improved and safe access to the area. The plan will specifically include the removal of an abandoned powerhouse that is obstructing the stream flow adjacent to a known sturgeon spawning area. The plan will also include the development of a parking area and trail that will allow tribal members and the public to view sturgeon spawning.

About this Effort

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Birds	Native Fish	Native Plants
Waterfowl Shorebirds Waterbirds	Sturgeon	Wild rice

EXAMPLES OF WILDLIFE AND PLANTS BENEFITING FROM RESTORATION

"The Drum Beat of Keshena Falls" is a fact sheet about a project that will develop a plan for a park that will improve sturgeon spawning habitat and improve tribal access to the area (NRDA Project 233); it was produced by Abt Associates under contract to the U.S. Fish and Wildlife Service.



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Restoration Snapshot

Activity: Develop a plan for a community gathering space and improve sturgeon habitat

Funding: NRDA funds: \$159,270
Leveraged funds: \$10,000

Size: Not applicable

Status: Completed

Location: Keshena Falls in Menominee County, Wisconsin



Spawning Support for Sturgeon

Improving Sturgeon Spawning Success by Raising Eggs and Improving Stream Habitat

The Great Lakes have long been home to lake sturgeon, a fish that is important not only to the fishing community but also to the cultures of local Native American Tribes. Sturgeon can live to be 150 years old and grow to over 8 feet long. They have low reproductive rates because they take 15 to 25 years to reach spawning age, and the females only spawn once every 4 to 6 years. Sturgeon are a migratory fish that inhabit large rivers and lakes. Lake sturgeon were once abundant throughout Green Bay and its major tributaries. Populations declined due to historical overfishing, pollution, past logging practices, dam construction, and habitat loss. Many of these issues have been addressed with state conservation laws and state and Federal environmental protection laws (e.g., Clean Water Act). There has also been a great deal of restoration work focusing on habitat, research, and propagation. These combine efforts have resulted in recovering populations of sturgeon in Green Bay but continued actions focusing on spawning and rearing habitat restoration are necessary to restore the lake sturgeon populations to the abundance they once saw in Green Bay.

About the Need for Adult Spawning Sturgeon and Sturgeon Spawning Habitat

Historically, lake sturgeon would have traveled and spawned throughout the major Green Bay tributaries, including the Menominee, Peshtigo, Oconto and Fox rivers. Currently spawning and rearing habitat is limited to river reaches below the first dam. In the Peshtigo River, management agencies estimate that 500 sturgeon spawn below the Peshtigo Dam. However, the river does not have sufficient habitat to support the spawning sturgeons, which limits the river's ability to help sustain and grow the sturgeon population. In other Michigan Upper Peninsula Green Bay tributaries, sturgeon spawning habitat is available but adult populations are not stable.



Sturgeon close-up (photograph by Michael Donofrio, Wisconsin DNR).

Returning to a Healthy Environment

With funding support from the Fox River/Green Bay Trustees, partners have taken actions to improve sturgeon populations and sturgeon spawning habitat in Green Bay tributaries through three projects. These activities build on previous Trustee efforts to evaluate and prioritize sturgeon habitat restoration opportunities (see project 4.3 in the [2013 Restoration Progress Report for the Lower Fox River and Green Bay Natural Resource Damage Assessment](#), which can be found on our website).

Improving Spawning Habitat on the lower Peshtigo River
As noted above, the spawning habitat below the Peshtigo Dam is limited, reducing the capacity and success of spawning that occurs in the area. To address this issue, the Wisconsin Department of Natural Resources (DNR) installed additional rocky substrate at 2 sites downstream of the dam for a total of 600 linear feet of shoreline. The goal of this additional habitat is to increase available



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spawning habitat and ultimately contribute to overall sturgeon population growth in the area. Biologists will monitor the restored areas to determine whether spawning activity and hatching success have increased.

Repairing an Eroding Stream Bank on the lower Peshtigo River

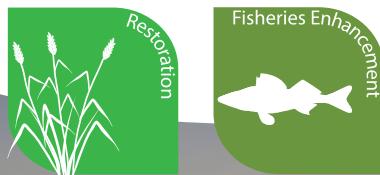
Marinette County has received funding to repair a segment of a badly eroding streambank located 1.4 miles downstream of the Peshtigo Dam. The project installed layers of rocks that start in the stream and be built up the bank until the highest layer is more than 1 foot above the floodplain, creating approximately 440 linear feet of spawning habitat for sturgeon, muskellunge, walleye, redhorse, and salmonids. This project will also help turtles access nesting habitat near the river. Currently, the sides of the stream are too steep for turtles to climb up its banks to reach the upland habitat where they nest. To fix this issue, 140 feet of stream was regraded so that turtles can more easily reach the nesting habitat. Marinette County will enter into agreements with landowners to ensure the protection and maintenance of the project area for a minimum of 15 years.

Building Streamside Sturgeon-Rearing Facilities in Michigan's Upper Peninsula Tributaries

In some tributaries there are not enough adult spawning

Native Fish	Turtles
Sturgeon Walleye	Wood turtle Blanding's turtle

EXAMPLES OF WILDLIFE BENEFITING FROM RESTORATION



sturgeon for the available habitat. To increase adult spawning sturgeon numbers, the Michigan DNR constructed two streamside-rearing facilities that will raise wild-caught sturgeon larvae along the stream in which they were caught. Because the facilities will use local water, sturgeon that are released from the facilities will be "imprinted" with the water's characteristics and may be more likely to return to the same area to spawn as adults. The project plans to continue stocking fall fingerling sturgeon annually for five years within tributaries on the western shore of Green Bay. Michigan DNR staff will monitor sites to assess streamside-spawning success and the size of juvenile sturgeon populations to assess whether sturgeon are on track to achieve self sustained growth in the area.

About this Effort

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"Spawning Support for Sturgeon" is a fact sheet about the restoration of sturgeon habitat and using rearing facilities to raise and release wild-caught sturgeon larvae (NRDA Projects 122, 122b, 215, and 240); it was produced by Abt Associates under contract to the U.S. Fish and Wildlife Service.

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Restoration Snapshot

Activity:	Improving sturgeon spawning success by improving stream habitat
Funding:	NRDA funds: \$290,000 Leveraged funds: \$15,513*
Size:	None*
Status:	The Lake Sturgeon Habitat Restoration Project (Project 122) is complete; all other projects are in progress.
Location:	Marinette County and the western shore of Green Bay, Wisconsin

*Data regarding project size and leveraged funding are provided only for restoration projects that were completed by the end of 2017



Where Are the Sturgeon and Whitefish?

Determining Where Sturgeon and Whitefish Live and Spawn in Green Bay Tributaries

The sturgeon would not likely win a beauty contest; its bony, plated armor and four large whiskers, or “barbells,” make it more of a curiosity than a work of art. Whitefish are also not renowned for their beauty, having been named the freshwater “humpback” due to the combination of their relatively small head and large body. However, both fish have been prized by locals for decades. Sturgeon are valued for their unique role in the ecosystem, and they are the oldest and largest native fish species in the Great Lakes. The whitefish is harvested both recreationally and commercially in the Great Lakes because of its delicious flavor. Many organizations are working together to better understand, and more effectively help, these two valued fish species.

About Sturgeon and Whitefish Habitat in Green Bay and the Fox River

The sturgeon is one of the largest freshwater fish in North America, and it was a common occupant of most inland rivers and lakes in the Midwest, including in Green Bay and its tributaries. However, in the late 19th century, global demand for sturgeon meat and caviar led to dramatic declines of sturgeon populations. Sturgeon have also been harmed by pollution, habitat degradation, and dams and culverts that have prevented them from reaching their spawning grounds. Whitefish, which are important commercially harvested fish, have also suffered declines in Green Bay and its tributaries due to overfishing, pollution, habitat loss, and a loss of access to spawning habitat. While efforts are underway to restore



Sturgeon

productive populations of both species in the Green Bay region, such efforts can be challenging because so little is known about which habitats are the most important to protect and restore.

Returning to a Healthy Environment

With Fox River Trustee support, the University of Wisconsin – Green Bay is conducting a study of sturgeon and whitefish habitat and spawning in the Lower Green Bay-Fox River ecosystem. More specifically, researchers are completing three main tasks. First, they are surveying,



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describing, and mapping spawning and larval habitat in relevant sections of the Fox, Oconto, Peshtigo, and Menominee Rivers and lower Green Bay. Second, they are sampling river and lake waters to detect the presence and abundance of sturgeon and whitefish larvae. Finally, they are tagging and tracking juvenile sturgeon in the lower Fox River below the DePere Dam to document the habitats that these young sturgeon prefer. These efforts will collectively improve understanding of the location, quality, and accessibility of sturgeon and whitefish spawning and rearing habitat, which will help focus restoration efforts. This work will complement other studies of whitefish, muskellunge, and walleye spawning in Green Bay and its tributaries (see the "A Fishy Situation" and "Where are the Walleye?" fact sheets).

About this Effort

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"Where are the Sturgeon and Whitefish?" is a fact sheet about studies that will help improve understanding of where sturgeon and whitefish live and spawn in Green Bay tributaries (NRDA Project 207); it was produced by Abt Associates under contract to the U.S. Fish and Wildlife Service.



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Restoration Snapshot

Activity: Conducting studies to determine where sturgeon and whitefish spawn in Green Bay and its tributaries

Funding: NRDA funds: \$304,015
Leveraged funds: None as of 2017*

Size: None as of 2017*

Status: In progress

Location: Green Bay and Fox, Menominee, Oconto, and Peshtigo Rivers

*Data regarding project size and leveraged funding are provided only for restoration projects that were completed by the end of 2017



Where Are the Walleye?

Determining Where Walleye Spawn in the Fox River and Green Bay

Walleye, named for their outward-facing eyes, are an important fish in Wisconsin both culturally and economically. Green Bay supports one of the most productive recreational fisheries for walleyes in North America, attracting anglers from across the continent; harvest in Wisconsin waters in recent years has been just under 100,000 fish annually. A recent study by a local university estimated that recreational fishing in Green Bay contributed \$264 million to Wisconsin's economy. Identifying and protecting high-quality walleye habitat will continue to be a priority for both anglers and conservationists.



Walleye

About Walleye Spawning Habitat in Green Bay and the Fox River

The walleye is a native species that is both ecologically and economically important to the Lower Fox River and Green Bay system. However, properly managing the species in Green Bay is challenging because walleye spawn in many locations within Green Bay and its tributaries, and very little is known about which locations support the most productive spawning habitat.

Returning to a Healthy Environment

With Fox River Trustee support, the University of Wisconsin – Stevens Point is conducting a study of walleye reproduction in the Lower Fox River and Green Bay system. The project is tagging adult walleye, releasing them back into the bay, and tracking them for at least four years to understand the types and locations of habitat they use. Tributary spawning will be monitored using receivers



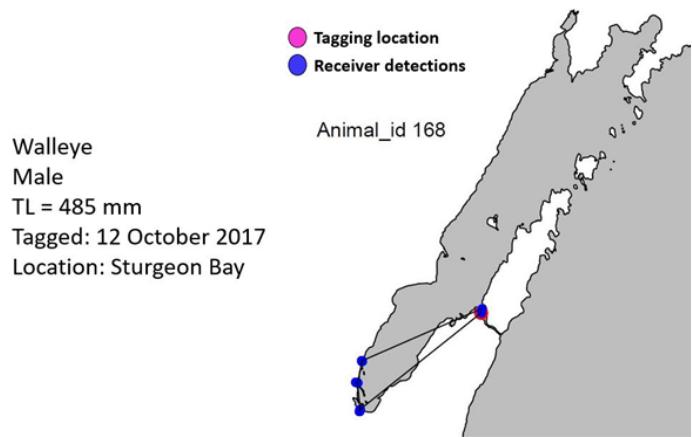
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deployed in nine tributaries that comprise the largest runs of walleye (see Figure 2). Tracking walleye movement and reproduction will help fish managers better understand where additional projects may be needed to maintain walleye populations. This work will coincide with and complement similar telemetry-based studies of whitefish and muskellunge spawning in Green Bay and its tributaries (see the "A Fishy Situation" fact sheet).

About this Effort

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Acoustic receiver detections for walleye 168, a 485 mm male that was tagged in Sturgeon Bay on 12 October 2017 and detected in three different tributaries on the west shore of Green Bay. Detection history is for the period up to August 2018.

"Where Are the Walleye?" is a fact sheet about studies that will help improve understanding of where walleye spawn in Green Bay (NRDA Project 216); it was produced by Abt Associates under contract to the U.S. Fish and Wildlife Service.




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Restoration Snapshot

Activity: Conducting studies to determine where walleye spawn in Green Bay

Funding: NRDA funds: \$105,500
Leveraged funds: None as of 2017*

Size: None as of 2017*

Status: In progress

Location: Green Bay, the Fox River, and other west-shore tributaries



*Data regarding project size and leveraged funding are provided only for restoration projects that were completed by the end of 2017



Getting to Know Tributaries

An Assessment of Water Quality, Habitat Availability, and Fish in Small Tributaries of Green Bay

The rivers and streams in lower Green Bay – also known as tributaries – provide critical habitat to a wide array of native fish, including musky, northern pike, and trout. Healthy streams and fish populations are also crucial for the birds and mammals that live or forage along stream corridors, including bald eagles and mink. However, decades of development and pollution have led to the degradation of tributaries across Green Bay, and a loss of wildlife, fishing, and recreation in these areas. In response, over the past decade there has been a concerted regional effort to restore key habitats and wildlife populations in the tributaries of Green Bay. To better focus these efforts, scientists at various organizations are trying to better understand the types of habitat that allow fish to successfully reproduce and survive.

About Small Tributaries in Green Bay

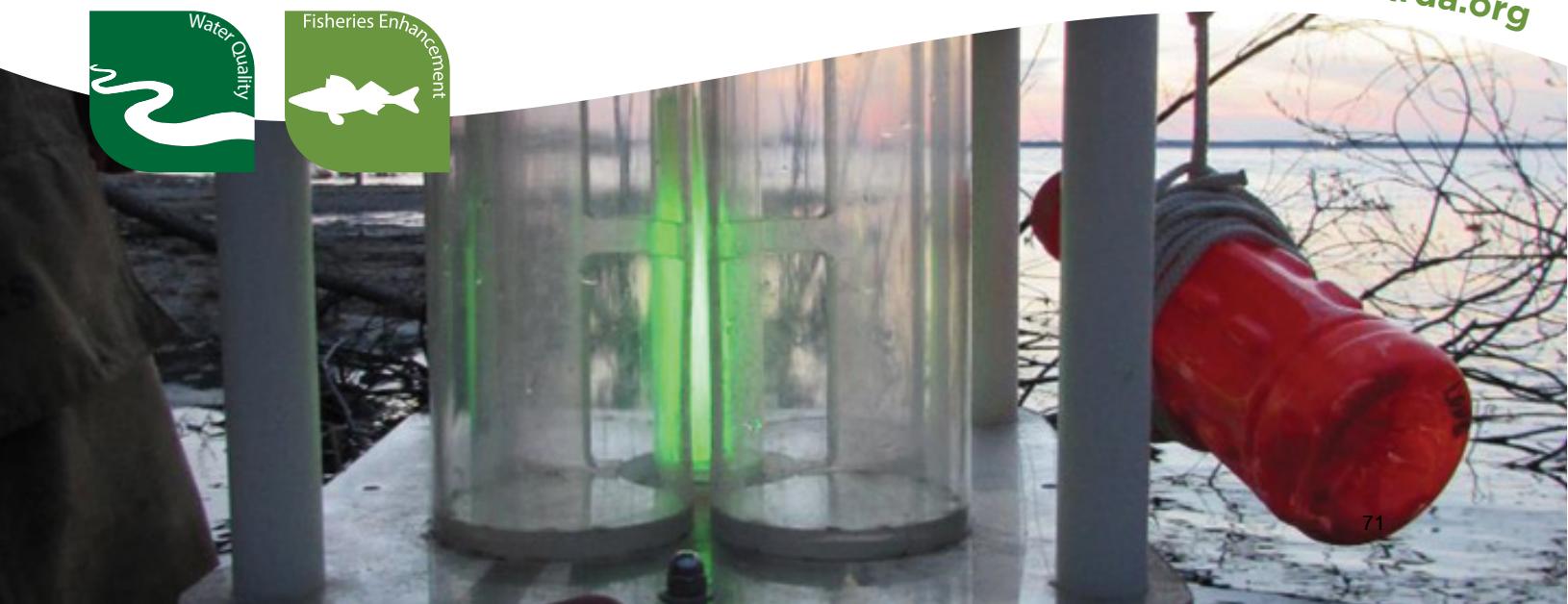
Around 3,000 tributaries have direct connections to the Great Lakes, and these tributaries play an important role in providing pathways for nutrients and sediment to flow downstream. They also provide critical habitat for native fish, many of which migrate upstream to small streams and ponds to spawn. However, few studies have carefully examined the conditions of smaller tributaries in Green Bay, and little is known about which tributaries – and which water quality or habitat characteristics in those tributaries – best support different fish species.



Summer technicians beginning to sample a 20 meter reach in Baird Creek. Note the block nets at their feet and in the background.

Returning to a Healthy Environment

With Trustee support, the University of Wisconsin Green Bay (UWGB) is filling key knowledge gaps about the water quality, habitat availability, and fish use of small tributaries through an assessment of six tributaries in lower Green Bay. More specifically, the project is documenting:



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1. What patterns appear in water temperature, river discharge, nutrient (phosphorous and nitrogen) concentrations, suspended solids, and other water quality metrics over time in these tributaries
2. How tributaries are used by different fish for spawning and nursery habitat
3. Which characteristics of tributaries best predict the fish that use it.

UWGB plans to share the information gathered from this project with other scientists, decision-makers, and stakeholders to help identify where and what restoration actions will most help fish and water quality in Green Bay. Both undergraduate and graduate students are assisting with data collection and analysis and are preparing reports with the information generated from this project.

About this Effort

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"Getting to Know Tributaries" is a fact sheet about efforts to assess the conditions of small tributaries throughout the Green Bay Watershed (NRDA Project 209); it was produced by Abt Associates under contract to the U.S. Fish and Wildlife Service.



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Restoration Snapshot

Activity: Conduct an assessment of small tributaries in the Green Bay Watershed

Funding: NRDA funds: \$247,260
Leveraged funds: None as of 2017*

Size: None as of 2017*

Status: In progress

Location: Various tributaries throughout the lower Green Bay Watershed

*Data regarding project size and leveraged funding are provided only for restoration projects that were completed by the end of 2017



Rocking Reefs in the South Bay

Planning Fishery Habitat Restoration near the South Bay Marina

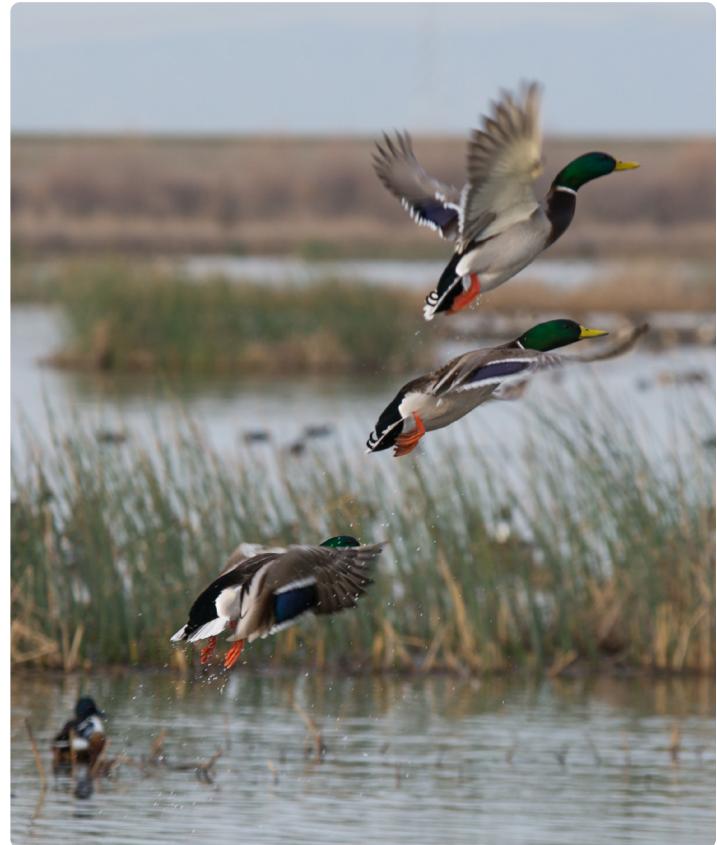
If you were looking for a place for small, juvenile fish to survive and thrive, you might not think of a developed marina with lots of boat traffic. However, we now know that if marinas use the right kinds of materials when they build breakwaters to protect boats and docks from waves, they can provide critical, high-quality habitat for a wide array of fish species. Efforts are now underway throughout the country, including in Green Bay, to make marinas a great place for young fish to grow up.

About Fish Habitat in South Green Bay

The southern end of Green Bay, as well as multiple tributaries that flow into the area, provides critical spawning and rearing habitat for a wide variety of fish, including the Great Lakes spotted musky, smallmouth bass, walleye, and panfish. However, the aquatic habitat in the region has been significantly degraded by pollution, development, and habitat loss through wind- and wave-driven erosion. This loss of habitat has resulted in the decline of local fish species, many of which are important both culturally and economically. An array of local organizations have been working together to restore fish habitat in the bay so that fish can more successfully reproduce and sustain their populations.

Returning to a Healthy Environment

The South Bay Marina lies at the mouth of the Fox River along the southern shore of Green Bay, and the marina had previously created fingers of rock reefs to provide



Mallard ducks

wave protection as well as fish habitat. However, those reefs were recently degraded by high waters and waves. With Fox River Trustee support, the owner of the marina



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(the McDonald Company) is exploring a phased project to restore key habitat surrounding the marina. The Trustees have contributed funding for Phase I of the project, which entails the development of a "concept study" for fisheries habitat restoration and enhanced public use at and adjacent to the marina. This study will explore, with stakeholder input, different restoration options and will select a recommended path for further design and implementation. As currently envisioned, the restoration will include the construction of rock reefs to support fish spawning, the restoration of foraging habitat for shorebirds and waterfowl, shoreline protection, and public access for fishing.

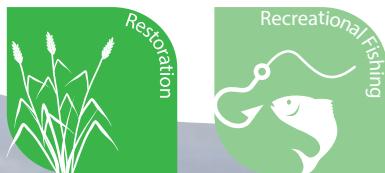
About this Effort

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Birds	Native Fish
Mallard duck	Great Lakes spotted musky
	

EXAMPLES OF WILDLIFE BENEFITING FROM RESTORATION

"Rocking Reefs in the South Bay" is a fact sheet about planning rock reef restoration to provide fish habitat in the areas surrounding the South Bay Marina (NRDA Project 229); it was produced by Abt Associates under contract to the U.S. Fish and Wildlife Service.



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Restoration Snapshot

Activity: Develop a conceptual plan for fisheries habitat enhancement at the South Bay Marina

Funding: NRDA funds: \$54,802 (for Phase I)
Leveraged funds: None as of 2017*

Size: None as of 2017*

Status: In progress

Location: Green Bay, Brown County, Wisconsin

*Data regarding project size and leveraged funding are provided only for restoration projects that were completed by the end of 2017



Complements for Fishing

Enhancing Fishing Opportunities in the lower Fox River and Winnebago Pool Lakes

Fishing is a way of life for many Wisconsinites. However, many people have been unable to fish in favorite fishing spots for many years due to pollutant contamination of the Fox River and resulting fish consumption advisories. In addition, development and growth in the greater Green Bay area has made it harder for people to go fishing even in the places that aren't restricted because of contamination. Many different efforts are now underway to help make up for this loss by improving habitat to support local fish and by enhancing public access to fishing.

About Fishing in the Winnebago Pool Lakes

The Winnebago Pool Lakes are a series of interconnected, shallow lakes fed by both the Fox and Wolf rivers in Wisconsin. The waters in the Pool Lakes provide habitat for a wide range of fish, including walleye, northern pike, largemouth bass, bluegill, crappie, and perch, which make it a popular destination for anglers. Wetlands in the Pool Lakes are also well known for the critical support they provide to migrating and breeding birds, including waterfowl and shorebirds. However, high wind and waves have degraded extensive areas of fish habitat over the past few decades, which has resulted in the decline in some local fish populations. In addition, the growth of the greater Fox Valley area has put pressure on existing public access points for fishing, making it important to improve the infrastructure that supports this popular activity.



Largemouth bass

Returning to a Healthy Environment

The Fox River Trustees have supported four efforts to enhance the ability of the public to enjoy fishing in the Winnebago Pool Lakes, described in more detail below.

Arrowhead Park Improvements (2 projects)

With Trustee support, the City of Neenah received funding to restore aquatic, near-shore, and riparian habitat at Arrowhead Park on Little Lake Butte des Morts (LLBM). The project will install log structures and woody habitat along the shoreline, plant native plants and shrubs throughout the park, and construct an osprey



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platform; these improvements will reduce shoreline erosion and enable the recovery of nearshore fish habitat. Trustees have also provided funding to construct a 500-foot long boardwalk and fishing pier at the western edge of the park, adjacent to the Neenah Slough, improving public access to the LLBM fishery.

Improving Fish Habitat and Fishing in Lake Butte des Morts and Lake Winnebago (2 projects)

In Lake Winnebago and Lake Butte des Morts, Wisconsin's Department of Natural Resources (DNR) plans to construct approximately 15 woody fish habitat structures. Each structure will be made of three to five trees anchored to the bottom of the lake, providing valuable spawning and refuge habitat for a variety of fish. Near each installation site, DNR will also incorporate shoreline fishing access to enhance recreational fishing opportunities for the public. The Trustees also provided funding to DNR to repair a damaged fishing pier and

construct an additional one in Asylum Bay on Lake Winnebago. Both piers will be Americans with Disabilities Act (ADA) accessible, and fish habitat structures will also be placed near the new piers.

About this Effort

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Native Fish

Walleye	Crappie
Northern pike	Perch
Largemouth bass	Panfish
Bluegill	



EXAMPLES OF WILDLIFE BENEFITING FROM RESTORATION

"Complements for Fishing" is a fact sheet about improving fishing opportunities in the Winnebago Pool Lakes (NRDA Projects 221, 223, 224, and 238); it was produced by Abt Associates under contract to the U.S. Fish and Wildlife Service.



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Restoration Snapshot

Activity:	Improving fishing opportunities in the lower Fox River and Winnebago Pool Lakes
Funding:	NRDA funds: \$508,500 Leveraged funds: None as of 2017*
Size:	None as of 2017*
Status:	All projects are in progress
Location:	Lake Winnebago, Lake Butte des Morts, and Little Lake Butte des Morts, WI

*Data regarding project size and leveraged funding are provided only for restoration projects that were completed by the end of 2017



Bringing People Closer to Nature

Improving Public Access to Natural Areas around Green Bay

As development has increased in coastal areas and along rivers near Green Bay, the public has had a harder time accessing the water for fishing or other recreational activities. Improving public access to local rivers and lakes helps people use and enjoy nature. And if it's easy and fun for people to hike, fish, and view wildlife, they are more likely to be invested in protecting and restoring the places in which they do those activities. People who are able to access nature regularly, particularly those who live in urban environments, are also likely to experience health benefits from their exposure to outdoors. For all of these reasons, there has been increasing interest in helping people get closer to nature.

About Public Access to Natural Resources

Wisconsinites are outdoor enthusiasts – more than 95 percent of residents report participating in fishing, boating, picnicking, hiking, and other outdoor activities. However, pollutant contamination of the Fox River and resulting fish consumption advisories greatly reduced the ability of the public to enjoy these activities in many areas of Green Bay and the Fox River for decades. In addition, private development around the Green Bay area, combined with population growth, has increased the need for additional capacity in locations where the public already has access to local waterways. Many organizations have been working together over the last decade to help repair this connection between people and nature in the Green Bay area.



Improvements in public access facilities at Bomier Boat Launch

Returning to a Healthy Environment

The Fox River Trustees have supported a range of efforts to help the public more easily access, enjoy, and appreciate nature in the greater Green Bay area. Four of these efforts are described in more detail below.

Fox Point and Bomier Boat Launch Improvements (2 projects)

The Fox Point and Bomier Boat Launches are popular facilities that provide public access to the Fox River, and they are particularly busy during spring fish runs. However, the Fox Point Boat Launch has been deteriorating from heavy use, and at the Bomier Boat Launch, parking and launching areas were often



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congested, reducing the ability of the public to enjoy easy access to the Fox River. To address these issues, the Trustees are supporting renovations at both boat launches, including renovations of the docks at the Fox Point Boat Launch and expanding parking and launching capacity at the Bomier Boat Launch. A handicapped-accessible canoe and kayak launch will also be installed at the Bomier site.

East River Recreational Fishing Enhancements

This project will construct a canoe and kayak launch along the East River on property recently acquired by the city of Green Bay. This effort is part of a larger project connecting three major waterfront trails: the Fox River State Recreational Trail, the East River Trail, and the Baird Creek Trail. Once fully connected, these trails will make 40 contiguous miles of trail available from downtown Green Bay to the surrounding communities. The constructed launch area will include a launch ramp, parking lot, trails, an open shelter overlook, a plaza, a shoreline wall, a waterfront dock area, kayak storage, a picnic area, landscaping, and stormwater management.

Bay Beach Fishing Pier

Bay Beach Amusement Park is a 73-acre park with amusement rides in it and is currently the ninth oldest amusement park in the country. The site is located at the southern end of Green Bay, and it has nearly 4,000 feet of water frontage along the bay. With Trustee support, the city of Green Bay is building a large wildlife viewing platform near the park. The platform will be placed at the base of a newly installed Ferris wheel, which is likely to

ensure that the platform has high visibility and is used by many visitors. Local residents will be able to experience the coastal wetlands on the bay and view ducks, egrets, and other birds that frequent the area. Fish and wildlife habitat and public amenities at the site will also be improved by the city in the future.

About this Effort

The Fox River Trustees support the long-term recovery, protection, and enhancement of the natural resources of the Lower Fox River and Green Bay system. Starting in the mid-1950s, paper companies and other entities released polychlorinated biphenyls (PCBs) into the Lower Fox River and Green Bay. These releases resulted in injuries to fish, wildlife, surface water, and sediments. Through a process known as Natural Resource Damage Assessment (NRDA), the Trustees assessed these injuries and entered into settlement agreements with the parties responsible for the PCB releases. Since 2002, the Trustees have recovered \$90 million for restoration projects that compensate for PCB-related injuries to natural resources.

"Bringing People Closer to Nature" is a fact sheet about multiple projects that will improve the ability of the public to access and enjoy natural resources in the Lower Fox River Basin and Green Bay (NRDA Projects 213, 214, 217, and 241); it was produced by Abt Associates under contract to the U.S. Fish and Wildlife Service.



Restoration Snapshot

Activity:	Improve public access to and enjoyment of natural resources
Funding:	NRDA funds: \$654,000 Leveraged funds: None as of 2017*
Size:	None as of 2017*
Status:	All projects are in progress
Location:	Brown County, Wisconsin

*Data regarding project size and leveraged funding are provided only for restoration projects that were completed by the end of 2017

foxrivernrda.org

Progress Summary & Conclusions

Summary of Restoration Progress Overall

During the almost 20 years the Fox River Natural Resource Trustees have been implementing restoration projects, there has been significant progress in remediation and restoration within the Lower Fox River/Green Bay ecosystem.

This section of the report briefly describes the restoration progress made by the Trustees from three perspectives. First, the restoration progress is summarized with regard to accomplishment of the goals set forth in the Restoration Plans. Next, progress is summarized geographically by comparing the locations of the restoration projects to the geographic priorities set forth by the Trustees. Finally, progress is summarized financially by reporting on funding obtained and expenditures made from that funding. Following the discussion of restoration progress, this section then describes Trustee management of NRDA restoration and how restoration for this NRDA case contributes to landscape-level conservation activities in the Great Lakes.

Summary of Accomplishments towards Restoration Plan Goals

The Trustees have completed restoration projects in each of the restoration categories described in the Restoration Plans (i.e., Preservation of Wetlands and Associated Upland Habitat; Wetlands and Associated Upland Habitat Restoration; Aquatic, Nearshore, and Riparian Habitat Quality Improvement; Fishery Resource Enhancement; and Natural Resource-based Public Use Enhancement). Thus they have made progress toward the initial goals set forth in the Restoration Plan and have further refined these goals based on priorities set in the Update.

Ultimately, the Trustees identified a combination of qualitative and quantitative goals for each remaining restoration category within the Update to reflect the expected benefits. The Trustees specifically identified a quantitative ecological goal to measure progress in aquatic, nearshore, and riparian restoration (i.e., 2,100 acres restored). The qualitative goal related to fishery enhancements was modified in the Update to include more specific parameters that could be measured to assess progress (e.g., diversity and sustainability of fish populations). And the quantitative metric remained from the original Restoration Plan, to use no more than ten percent of available funding for public use improvements, but was refined to be focused exclusively on access to fishery resources. The updated goals reflect the remaining restoration necessary to compensate the public for PCB-related injuries to natural resources in the Lower Fox River and Green Bay. The Trustees believe that these updated goals are achievable with the available settlement funds.

Table 1 – Progress toward Trustee restoration goals.

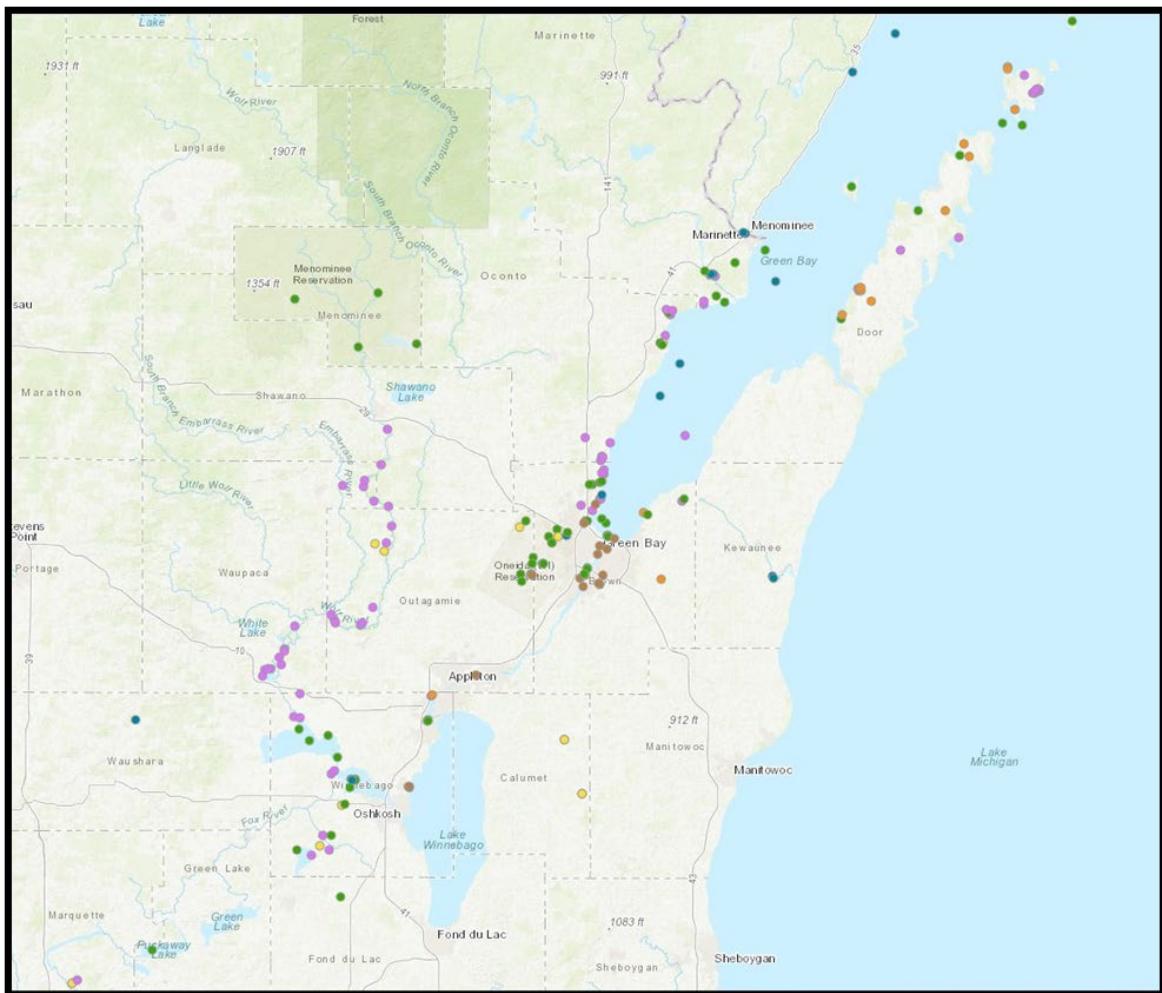
RESTORATION PLAN CATEGORIES (2003)	RESTORATION PLAN GOALS (2003)	PROGRESS TOWARD GOALS (2002-2014)	UPDATE CATEGORIES (2016)	UPDATE GOALS (2016)	PROGRESS TOWARD RESTORATION GOALS (2002-2018)
Wetland/upland habitat preservation	9,900 acres preserved	6,085 acres 15 projects	Achieved		
Wetland/upland habitat restoration	3,300 acres restored	3,961 acres 11 projects	Achieved		
Aquatic, nearshore, riparian habitat improvement	12,000 acres improved	1,747 acres	Aquatic, nearshore, riparian habitat improvement	Improved water quality and aquatic, nearshore, and riparian habitat health: 2,100 additional NRDA acres preserved or restored	80 projects 2,082 acres (with 335 additional acres to reach updated goal)
Fishery resource enhancement	Self-sustaining fisheries	\$8.4 M allocated	Fisheries enhancements	Enhanced diversity and sustainability of fish populations	27 projects \$9.2 M funds spent
Outdoor public use enhancement	Utilize less than 10% of total settlement funds	5.7% of available funds spent	Public Use Improvements	Increased public access to fishery resources	17 projects \$3.9 M funds spent



Summary of Projects with Regard to Geographic Priorities

In addition to presenting the initial goals for each of the restoration categories, the Restoration Plan also defined a restoration area in the Lower Fox River and Green Bay area and the Update further refined the geographic priorities:

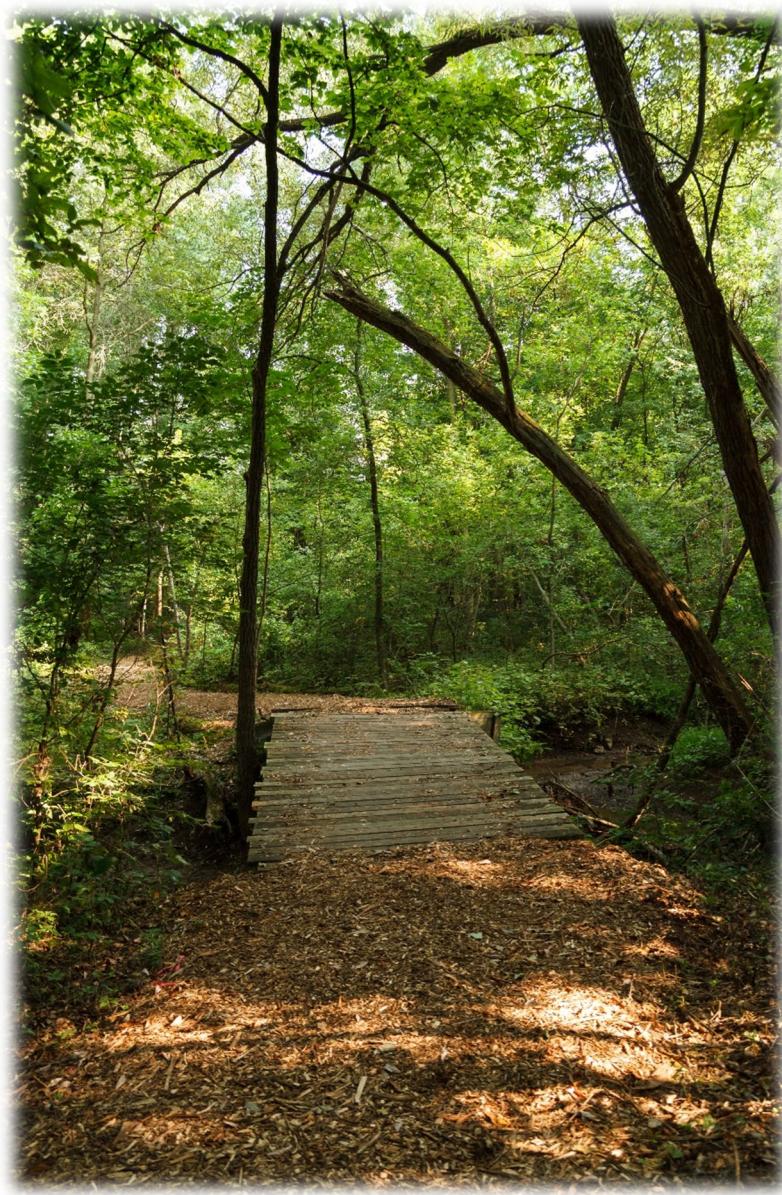
- Aquatic, Nearshore, and Riparian improvements focused in Green Bay coastal wetlands and islands; Green Bay tributaries (both east and west shore); Rush Lake area; the Pool Lakes; Wolf River and associated bottomlands; Duck Creek and tributaries; and the Fox River and Green Bay Area of Concern.
- Fisheries enhancements focused along the 39 miles of the Lower Fox River; tributaries to the Lower Fox River and Green Bay up to the first impoundment; Green Bay; and the Pool Lakes, Wolf River, Oneida and Menominee Reservations.
- Public use enhancements focused along the 39 miles of the Lower Fox River; in tributaries to the Lower Fox River and Green Bay up to the first impoundment; along the shores of Green Bay; and within the Oneida and Menominee Reservations.



The Trustees have funded projects within each of these geographic priority areas and will continue to prioritize future projects based on these locations.

Summary of Financial Progress

As of the December 31, 2018 reporting period, the Trustees have allocated over \$50 M in settlement funds for restoration, of which \$40.5 M have been spent. An additional \$47 million in leveraged funds have been contributed by partner organizations, resulting in a cumulative impact of over \$87.5 M invested in restoration projects. Additional funds were spent to support administrative costs and outreach efforts with these costs remaining below 3% of the overall settlement total. \$34.3 in settlement funds remained at the end of the reporting period. These remaining settlement funds are invested in interest bearing accounts such as treasury notes and bonds through the Department of Interior Business Center.



Looking Forward

Through monitoring and adaptive management, the Trustees and restoration project partners continue working together to ensure that projects are implemented and managed to meet the goals and deliverables identified. The Trustees have prepared a publicly-available document that describes, in greater detail, a [standard monitoring and adaptive management framework](#) for the Lower Fox River and Green Bay NRDA. In this document, the Trustees provide information on performance standards, approaches to monitoring, and data management considerations. The Trustees have rolled this plan out to NRDA funding recipients to begin collecting more standardized data across projects in 2021.

The Trustees thoughtfully plan for future restoration actions that reflect the current conservation landscape in the restoration area and will continue to fund projects according to the goals outlined in the Restoration Plan and Update. Restoration will focus on sensitive aquatic, nearshore, and riparian habitats, as well as fishery resources, to ultimately improve water quality and fisheries within the entire restoration area. The Trustees will also continue to implement projects that restore cultural resources, and increase opportunities for the public to access and benefit from an enhanced fishery in the Lower Fox River and Green Bay system.

Landscape Scale Restoration and Partnerships

The Restoration Plan and Update provide a framework for addressing landscape-scale conservation issues within the Lower Fox River and Green Bay system. The geographic scope of restoration was expanded from the RCDP-defined assessment area to include adjacent uplands and watersheds that feed into the Lower Fox River and Green Bay. This preference for broad-scale conservation within northeastern Wisconsin set the stage for cooperation between Trustees and other public partners. These partnerships have contributed to the successful landscape-scale restoration achieved in the Lower Fox River and Green Bay. Regional programs within the Lake Michigan Basin with overlapping objectives also complement the restoration achieved by the Trustees and their partners.

The Trustees have conducted on-the-ground restoration within this restoration area since 2002. During this time, remedial actions have reduced the PCB load within the system by removing and capping PCB-laden sediments from the Lower Fox River. The [Fox River Cleanup Project](#) officially began in the late 1990's with several demonstration projects. The multi-decade cleanup effort includes dredging, capping, and covering over a 39-mile stretch of the Lower Fox River, designed to reduce risk to human health and the environment due to the presence of PCBs in Fox River in Fox River sediment. In 2020, the Wisconsin DNR announced the completion of the majority of the remedial project. Long term monitoring of water, fish, and sediment will continue for decades until goals are achieved.

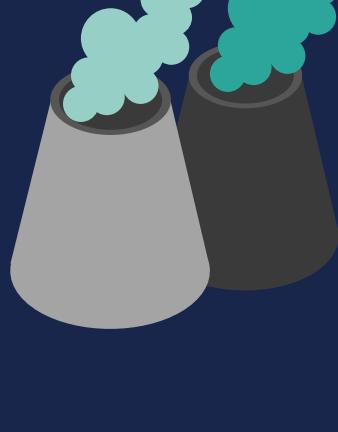
By considering the related conservation initiatives with a strong presence in north-eastern Wisconsin, the Trustees will maximize the ecological benefits of NRDA-related restoration to injured resources. The overlapping goals between continued NRDA restoration and these conservation initiatives, in addition to goals set forth in species-specific and topical management plans, present opportunities to achieve broader, landscape scale conservation.

The Trustees' collaborative approach to restoration has resulted in a coalition of conservation partners (Appendix B). The Trustees have actively invited non-Trustee government agencies and municipalities, local non-profit groups, university scientists, sport fishing and hunting groups, and conservationists to participate in restoration initiatives. This coalition of partners brings together a community of natural resource restoration practitioners who engage on conservation issues within the watershed. This collaborative approach has enabled efficient identification and implementation of restoration projects that address overlapping conservation issues within the greater watershed and increase engagement in landscape scale conservation across the Lower Fox River and Green Bay.

The collaborative approach adopted by the Trustees has resulted in an additional \$47 million in leveraged funds, which have increased the scope of restoration beyond what could be achieved with NRDA settlement funding alone. Projects benefited from matching contributions, as well as in-kind donations of time and services from restoration partners. In addition to matching and in-kind funding, conservation partners have contributed restoration ideas, technical expertise, long-term goal identification, and on-the-ground activities necessary for project completion. The Trustees acknowledge that restoration efforts have been greatly enhanced by partnerships, and are committed to continuing these relationships in the future. Moving forward, the Trustees envision the same direct, hands-on approach to engage conservation partners in completing rehabilitation and restoration of the Lower Fox River and Green Bay.



REGIONAL CONSERVATION PROGRAMS



Green Bay/Fox River Area of Concern (AOC)

The Wisconsin DNR, with input from local conservation stakeholders, directs efforts to improve the Green Bay and Fox River AOC. Eleven Beneficial Use Impairments (BUIs) are listed for the area such as:

“restrictions on fish and wildlife consumption” and “loss of fish and wildlife habitat”.

Great Lakes Restoration Initiative (GLRI)

A restoration program, launched in 2010 that utilizes federal funding to accelerate Great Lakes restoration.

The action plan prioritizes cleaning up the Great Lakes AOCs. The GLRI prioritizes mitigating invasive species;

reduction in nutrient runoff; restoration and protection of coastal wetlands; and restoration of habitat to

protect native species.

Landscape Conservation Design (Blueprint Project)

Led by the USFWS, this project coordinates actions to

achieve a collaborative conservation community’s

shared missions, mandates, and goals. Partners and

stakeholders use these determinations to plan and

implement conservation actions within the Lower Fox

River and Green Bay watersheds.

Water Quality Improvements

Innovative water quality improvement projects are

being implemented by a variety of partners. Projects

seek to increase sustainable farming practices,

develop a trading program for phosphorous in runoff,

coordinate land preservation projects, and implement

best management practices to improve water quality.



Public Involvement

Public participation and review is an integral part of the restoration planning process. The Trustees coordinated with the public throughout this NRDA and will continue to encourage active public participation. The Trustees made the Restoration Plan and Update available for review and comment before finalizing these documents, in accordance with 43 CFR § 11.32(c)(1). The Trustees value the support and contributions of everyone that took the time to read and respond throughout the restoration planning process. Members of the public are encouraged to continue following the Trustees progress at foxrivenrda.org.

We express our continued appreciation for the support of the public and would like to take this opportunity to highlight the ways the community can benefit from these completed restoration actions. With few exceptions, NRDA funded projects are open for public enjoyment and can provide a variety of recreational opportunities such as hunting, fishing, hiking, wildlife viewing, kayaking/boating, etc. The fact sheets in this progress report describe the project site, location, and opportunities in detail; more information on projects can be found on our website at: [Visit NRDA Project Sites](#).



Sensiba State Wildlife Area. Photo Credit: Tom Romanowski.

[Supporting Figures](#)

[List of Acronyms](#)

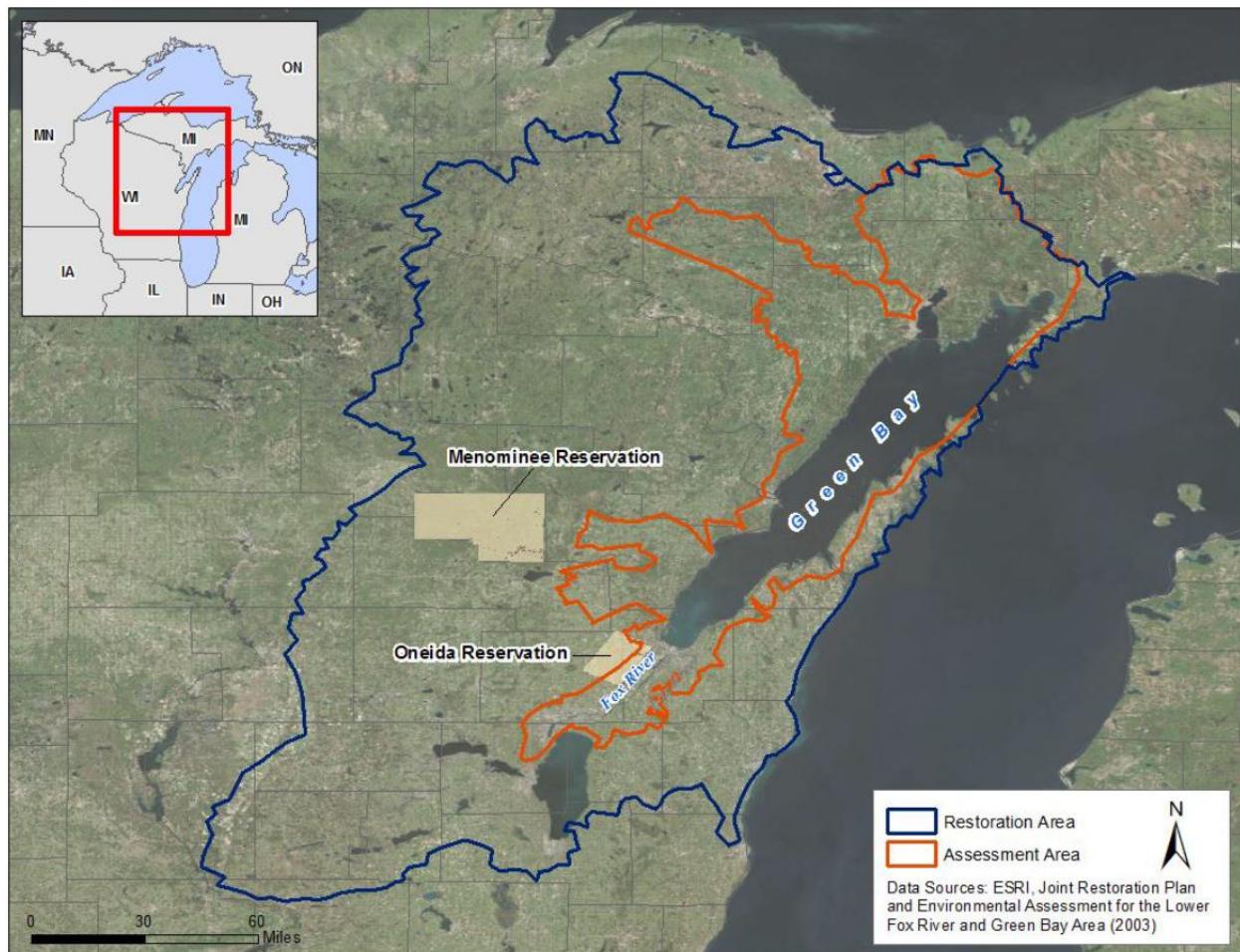
[Partners](#)

[Preparers and Contributors](#)



APPENDIX A | SUPPORTING FIGURES

Figure 1: The assessment and restoration areas within the lower Fox River and Green Bay system



APPENDIX B | LIST OF ACRONYMS

A/N/R Aquatic / Nearshore / Riparian Restoration

AOC (Great Lakes) Area of Concern

CERCLA Comprehensive Environmental Response, Compensation, and Liability Act

DOI U.S. Department of Interior

EPA U.S. Environmental Protection Agency

FWS Fish and Wildlife Service

GLRI Great Lakes Restoration Initiative

MOA Memorandum of Agreement

NEPA National Environmental Policy Act

NRDA Natural Resource Damage Assessment

PCB Polychlorinated biphenyl

RCDP Restoration Compensation and Determination Plan

RP/EA Restoration Plan and Environmental Assessment

RPR Restoration Progress Report

T&E Threatened and Endangered

TMDL Total Maximum Daily Load

WDNR Wisconsin Department of Natural Resources

APPENDIX C | PARTNERS

Federal

US-Fish and Wildlife Service – Fisheries

US-Fish and Wildlife Service – Partners for Fish and Wildlife

US-Fish and Wildlife Service – Endangered Species

US-Fish and Wildlife Service – Refuges

Pendills Creek National Fish Hatchery

Iron River National Fish Hatchery

Natural Resources Conservation Service

US-Environmental Protection Agency

US-Army Corp of Engineers

US- Geological Survey

US-Forest Service

National Oceanic and Atmospheric Administration

Bureau of Indian Affairs

State

MI-Department of Natural Resources – Fisheries Division

MI-Department of Natural Resources – Wildlife Division

MI-Department of Environmental Quality

WI-Department of Natural Resources – Wildlife Program

WI-Department of Natural Resources – Fisheries Program

WI-Department of Natural Resources – Endangered Species Program

WI-Department of Natural Resources – Fish Propagation Program

Wild Rose Fish Hatchery

Native American Tribes

Menominee – Environmental Services Department

Oneida Environmental, Health and Safety Division

Oneida Conservation Department

Oneida Nation Farms

Oneida Division of Land Management

Oneida Department of Public Works

Not-For-Profit Organizations

The Nature Conservancy

Door County Land Trust

Northeast Wisconsin Land Trust

Gathering Waters Conservancy

Groundswell Conservancy

Ducks Unlimited

Pheasants Forever

Walleyes for Tomorrow

Wild Ones, Inc.

Baird Creek Preservation Foundation

WI Wetlands Association

Rush Lake Watershed Restoration, Inc.

Natural Resources Foundation of Wisconsin

Ice Age Trail Foundation

Wisconsin Friends of John Muir

The Prairie Enthusiasts

John Muir Chapter Sierra Club

Trout Unlimited

Fox-Wolf Watershed Alliance

Heckrodt Wetland Reserve

Lake Poygan Sportsman's Club

Green Bay Area Great Lakes Sport-Fishermen Club

Butte des Morts Conservation Club

Brown County Conservation Alliance

Titletown Musky, Inc.

Musky Club Alliance of Wisconsin

Counties

Brown County Land and Water Conservation Department
Brown County Port and Resource Recovery
Brown County Parks
Outagamie County Land and Water Conservation Department
Oconto County Land Conservation Department
Marinette County Land & Water Conservation Department
Winnebago County Land and Water Conservation Department
Winnebago County Parks Department
Green Lake County Land Conservation Department

Municipalities

City of Neenah
City of Green Bay
City of Green Bay - Parks, Recreation, and Forestry
City of DePere - Parks, Recreation, & Forestry
Town of Menasha
Town of Poygan
Eaton Township
Humboldt Township
Village of Suamico
Village of Howard - Parks Department
Village of Allouez - Parks, Recreation, & Forestry
Village of Ashwaubenon - Parks, Recreation, & Forestry
Village of Bellevue - Parks, Recreation, & Forestry
Village of Kimberly - Parks, Recreation, & Forestry
Village of Wrightstown
Town of Pittsfield
Algoma Sanitary District
Peshtigo Chamber of Commerce

Others

UW-Green Bay (Cofrin Center for Biodiversity)

UW-Stevens Point

Green Bay Packers

Shedd Aquarium

Green Bay Northeast Wisconsin Lions Club

Purdue University

Ontario Ministry of Natural Resources

Lake Puckaway Protection and Rehabilitation District

Lake Puckaway Association

Chambers Island Landowner Association

Brown County Golf Course

McDonald Lumber Companies

MATCHING FUND PROGRAMS

Federal

US-Fish and Wildlife Service - Program Funds

US-Fish and Wildlife Service - Challenge Cost Share & Cooperative Conservation Initiative

US-Fish and Wildlife Service - Duck Stamp Funds

US-Fish and Wildlife Service Coastal Program

National Fish & Wildlife Foundation Grant

North American Wetlands Conservation Act

US-Environmental Protection Agency

US-Army Corp of Engineers Program funds

US-Forest Service

National Oceanic and Atmospheric Administration - Coastal Grant

Bureau of Indian Affairs Circle of Flight Program

Natural Resources Conservation Service Programs

Great Lakes Restoration Initiative Funds

Migratory Bird Joint Venture Funds

State

WI-Department of Natural Resources - Program Funds

WI-Department of Natural Resources - Duck Stamp Funds

WI-Department of Natural Resources - Trail Development Grant

WI-Department of Natural Resources - Knowles-Nelson Stewardship Fund

WI Waterways Commission Grant

WI Coastal Management Fund

Michigan Natural Resources Trust Fund

Tribal

Oneida Nation Funds

Menominee Tribal Funds

Others

Sustain Our Great Lakes

Fund for Lake Michigan

NEW Water

Lake Michigan Fishery Trust

Village of Kimberly

Purdue University

Private Donations and In-Kind Services

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