

Restoring the Great Lakes

Success Stories from the 2013 Field Season



Welcome!

Dear Reader,

Another field season has arrived, marking the fourth year that the Great Lakes Restoration Initiative has enhanced priority research and restoration in the Great Lakes Basin. Core to our mission, the U.S. Fish and Wildlife Service takes great pride in working with others. In what continues to be a challenging economic climate, the Great Lakes Restoration Initiative allows us to continue to build and support important partnerships that benefit the Great Lakes and the surrounding region.

This year the Service received over \$40.5 million through an interagency agreement with the U.S. Environmental Protection Agency to reduce toxic substances, restore critical habitat, protect wildlife and prevent the movement of invasive species into and throughout the Great Lakes. Our total GLRI funding from the past four years now exceeds \$190 million. In this edition of Restoring the Great Lakes, many of our stories recognize that it is with the help of our valued partners that the reach of these dollars is being extended and transformed into meaningful on-the-ground projects.

As always, we are excited to share with you a sampling of our GLRI project accomplishments in the Midwest and Northeast Regions. We challenge the readers of this year's booklet to think about these stories in a larger context. Our work and the work of our partners over the past few years have contributed to what is quickly becoming the largest Great Lakes restoration effort in our lifetime. More than simply a funding mechanism, the Great Lakes Restoration Initiative has jumpstarted a legacy of Great Lakes stewardship.

If seeing nesting migratory birds or pulling a lake trout out of the water gives you a thrill, you might be surprised to learn about the role of the U.S. Fish and Wildlife Service and Great Lakes Restoration Initiative in safeguarding these natural resources for your enjoyment. We invite you out to our national wildlife refuges and national fish hatcheries to learn more not only about our work with the fish and wildlife of the Great Lakes, but also the people who depend on the Great Lakes as a source of income and way of life. We are already anticipating our 2014 field season and we look forward to sharing our ongoing Great Lakes Restoration Initiative accomplishments.

Warmest Regards,




Tom Melius
Regional Director, Midwest Region



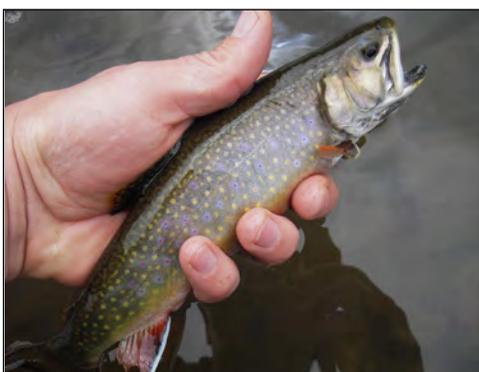
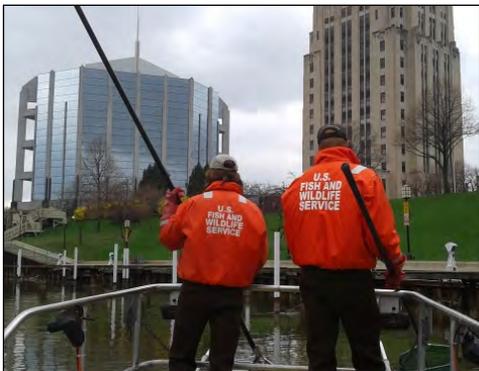

Wendi Weber
Regional Director, Northeast Region



Great Lakes RESTORATION



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Great Lakes Restoration Initiative (GLRI)



Bird and bat radar unit

Credit: USFWS



Lake trout restoration.

Credit: USFWS



Lake sturgeon streamside rearing unit

Credit: USFWS



Mobile eDNA lab.

Credit: USFWS

Why save the Great Lakes?

Comprised of more than 10,000 miles of coastline and 30,000 islands, the Great Lakes provide drinking water, transportation, power and recreational opportunities to the 30 million citizens who call the Great Lakes Basin “home.” Fishing, hunting, and wildlife watching in the Great Lakes generate almost \$18 billion in annual revenue. As the largest group of fresh water lakes on Earth, the Great Lakes hold 95 percent of the United States’ surface fresh water. Unfortunately, years of environmental degradation has left the Great Lakes in need of immediate on-the-ground action to save this precious resource for generations to come.

What is the Great Lakes Restoration Initiative?

The Great Lakes Restoration Initiative (GLRI) is a driver for environmental action in the Great Lakes. Building upon strategic recommendations for how to improve the Great Lakes ecosystem presented in the Great Lakes Regional Collaboration Strategy of 2005, President Obama’s FY 2010 budget invested \$475 million for GLRI. Funding decreased to \$300 million in FY 2011, FY 2012 and FY 2013. GLRI represents a collaborative effort on behalf of the U.S. Environmental Protection Agency and 15 other federal agencies, including U.S. Fish and Wildlife Service, to address the most significant environmental concerns of the Great Lakes.

What is the USFWS’s role in the Great Lakes Restoration Initiative?

The Service facilitates the implementation of GLRI Action Plan priority programs, projects and activities to protect, restore, and maintain the Great Lakes ecosystem. Through an interagency agreement with the U.S. Environmental Protection Agency, the Service was allocated approximately \$69 million in FY 2010, \$37.4 million in FY 2011, \$43.6 million in FY 2012 and \$40.5 million in FY 2013 to work on projects in the following focus areas:

- **Toxic Substances and Areas of Concern (AOCs):** Years after pollution stops persistent pollutants can remain in the environment, often trapped in sediments below the surface of the water. The areas of the Great Lakes Basin most severely impacted by these pollutants are known as Areas of Concern (AOCs). Service will work to restore and protect aquatic ecosystems in the Great Lakes from the threat of persistent pollutants. In addition, the Service is initiating an effort to address the looming threat of emerging contaminants, such as hand sanitizers, pharmaceuticals, and personal care products, in the Great Lakes.
- **Invasive Species:** More than 180 non-native species are established in the Great Lakes. The most invasive of these reproduce and spread, ultimately degrading habitat, out-competing native species, and disrupting food webs. Service activities will work to control and eradicate harmful non-native species in the Great Lakes. In FY 2013 \$3.4 million in GLRI funding was allocated to the Service to work specifically on Asian carp control and management, with an additional \$5.3 million allocated for state projects.
- **Habitat and Wildlife Protection and Restoration:** From climate change to increasing development activities along the shores of the Great Lakes, a multitude of threats are affecting the health of the Great Lakes habitats and native wildlife. Service projects will work to identify, restore, and protect important habitat for the area’s fish and wildlife.

- **Accountability, Education, Monitoring, Evaluation, Communication, and Partnerships:** The Service will foster coordination of management activities to create synergy with project partners.

(From the top) The Service is working to identify ecologically important areas for birds and bats in the Great Lakes. Millions of lake trout are tagged and stocked into the Great Lakes through the mass marking program. In the streamside rearing unit juvenile lake sturgeon are raised in their natal waters. The mobile eDNA lab provides a sterilized environment to process water samples at remote locations.

Want more information?
Go to <http://www.fws.gov/GLRI>



Piping plover species recovery

Credit: USFWS



Asian carp education and outreach

Credit: USFWS



Contaminants of emerging concern research

Credit: USFWS

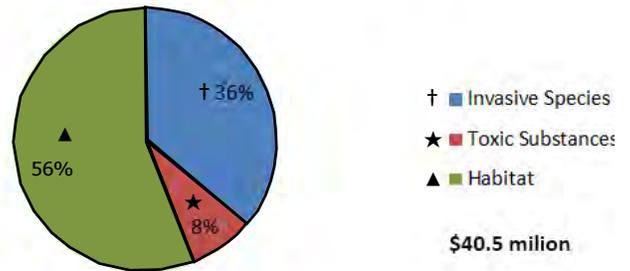
GREAT LAKES RESTORATION INITIATIVE

Proud Partner

The U.S. Fish and Wildlife Service is a proud partner in the implementation of the Great Lakes Restoration Initiative. Working with our conservation partners and utilizing our field based organization; we help to bring positive environmental change to the Great Lakes region.



FY 2013 Distribution of USFWS GLRI Funds by Focus Area



Diversity and the Great Lakes: GLRI represents the collaborative efforts of a diverse group of stakeholders. Pictured above are State, Federal and Tribal representatives who participated in the Great Lakes Regional Collaboration Conveners Meeting held in Chicago, IL in December of 2004. This group is just a sub-set of the more than 1,500 stakeholders who helped identify needed priority actions in the Great Lakes, many of which are now being implemented through the Great Lakes Restoration Initiative.

Want more information?
Go to <http://www.fws.gov/GLRI>

Environmental DNA “Lab on Wheels” Rolls Forward



The eDNA Trailer set-up and ready to filter water samples. USFWS

*By Chris Olds and Scott Koproski,
Midwest Region Fisheries*

Invasive species can threaten Great Lakes fisheries, which bring vital social and economic benefits to many communities in the area. Once an invasive species becomes established it can be difficult to control its spread and minimize its impact to native species. Thus, the early detection of invasive species plays an important role in protecting native fish populations and the Great Lakes fisheries. With the support of the Great Lakes Restoration Initiative, the U.S. Fish and Wildlife Service’s Great Lakes Fish and Wildlife Conservation Offices have developed and implemented an early detection program for the invasive Asian carp, utilizing a technique that detects the presence of environmental DNA in water.

First used in the Chicago Area Waterway System to determine the presence or absence of Asian carp DNA, the technique of extracting eDNA from water is now being utilized by the U.S. Fish and Wildlife Service on tributaries of the Great Lakes as part of a broad-scale invasive species monitoring initiative. These tributaries take up thousands of miles and possess suitable habitat for spawning of Asian carp species.

Given time and personnel limitations, selecting sampling locations along the tributaries was the most challenging aspect of developing this study. Substantial coordination among numerous Fish and Wildlife Conservation Offices, as well as academic, federal, and state partners was required to choose the optimal sites for study. A second significant challenge was identifying a laboratory facility in close proximity to the tributary being sampled. According to established protocols designed to prevent the contamination of eDNA samples, the lab needed to be simultaneously

usable and disinfected, which was logistically challenging. The Alpena office solved this problem by pioneering a cutting-edge mobile filtering lab for eDNA processing.

GLRI funds were utilized to design and develop a custom-built, mobile filtering lab that could be towed to any eDNA collection site. The mobile trailer allows biologist to filter samples near targeted collection sites, reducing the time and expense associated with sampling. The unit can also be easily disinfected according to established methodology and protocols. The trailer has since been used to process field samples from tributaries to lakes Superior, Michigan, Erie, and Huron, as well as at the waterway system.



Fish biologists Chris Olds and Steve Gambicki outside the mobile eDNA lab. USFWS

The trailer was also designed to be completely self-sufficient if water and electricity are not available onsite. The trailer has an on-board generator capable of running all required electrical equipment, a built-in fresh water storage tank for cleaning and disinfecting equipment, and an on-demand deionized water system, which is required for eDNA processing. The trailer’s heating

and cooling system allows biologists to work in any weather condition. A separate dry lab houses all the consumables needed for the filtering process, while the wet lab is utilized as a sterile and clean environment for extracting eDNA from the water samples. The wet lab has a drain in the floor to allow the entire lab to be sprayed down with water or disinfectant and banks of ultraviolet lights provide an added level of certainty that the lab area is fully sterilized. These extra measures help biologist uphold the highest standards in quality assurance and efficiency.

Recognizing the advantage of the mobile eDNA lab, other Midwest Region Fish and Wildlife Conservation Offices plan to procure additional units prior to the 2014 field season. Expanding this technology will allow the Midwest Region to enhance the eDNA surveillance program and magnify its impact on the upper Great Lakes. 🐟



A fish biologist demonstrates filtering a collected water sample. USFWS



The mobile filtering lab is a new tool to help in the early detection of silver carp (left) and bighead carp (right). USFWS

Preventing the Spread of Avian Botulism in Piping Plover

By Jack Dingledine, Midwest Region Ecological Services

Over the past 10 years several piping plover individuals from the endangered population of the Great Lakes have died as a result of exposure to Type E Botulism. Equivalent to food poisoning, Type E Botulism is caused by a toxin that when ingested by birds results in paralysis and ultimately death.

Although the exact cause of death was not determined in each case, evidence suggests at least six piping plovers have died over the last decade. With a population of approximately 60 breeding pairs,

the loss of even a small number of birds is significant.

The Great Lakes Restoration Initiative has allowed the U.S. Fish and Wildlife Service's East Lansing Field Office in Michigan—the lead for Great Lakes piping plover recovery—to coordinate monitoring efforts with our partners at the National Park Service and the U.S. Geological Survey. Great Lakes Restoration Initiative funding has provided for education of plover monitors, preparation of outbreak response

protocols and on-the-ground efforts at early outbreak detection, including the removal of carcasses, which can provide a potential pathway for the toxin. 🐦



GLRI has helped support Great Lakes piping plover species recovery efforts implemented by the U.S. Fish and Wildlife Service, National Park Service and U.S. Geological Survey. USFWS



Trained plover monitors look for piping plovers at Sleeping Bear Dunes National Lakeshore. USFWS.



Fish biologists Greg Jacobs and Betsy Trometer take a blood sample from the tail of a lake sturgeon captured in the lower Niagara River. USFWS

Fishing for Answers in the Niagara River

By Meredith Barton, Northeast Region Fisheries

In order to assess the population of lake sturgeon in the Niagara River, it is important to know the number of males and females present during the spawning season and the proportion that are ready to spawn. However, this is challenging because there is no reliable method for telling male and female sturgeon apart using external characteristics. In collaboration with the U.S. Fish and Wildlife Service Lower Great Lakes Fish and Wildlife

Conservation Office, biologists at the Service's Northeast Fishery Center and the Bozeman Fish Technology Center are assessing the health and status of lake sturgeon in the lower Niagara River through development of a method to identify fish sex and reproductive maturity from the concentration of hormones in blood. In 2012 and 2013, biologists took blood samples from sturgeon captured before the spawning season. They measured hormone levels and checked these results against small biopsy samples from sex organs to verify gender

and reproductive stage. By the end of this summer, this tool will be refined so that biopsies from lake sturgeon will no longer be needed. Biologists will simply take blood samples to determine sex and reproductive condition. This data will ultimately be incorporated into models to better understand the lake sturgeon population in the Niagara River. 🐟

Protecting Migrant Birds and Bats Using Radar

By Nathan Rathbun,
Midwest Region Ecological Services

Monitoring bird and bat migration at night has long been a challenge for biologists. During the day migrant birds like hawks can be seen with simple human observation, but most birds and bats migrate at night, making it difficult to evaluate migration patterns. Understanding when, where, and how migrations occur is important when determining placement of wind energy farms. Many studies conducted indicate that wind farms interfere with and kill many migrating species, making this an important topic to further investigate. By implementing avian radar systems purchased with Great Lakes Restoration Initiative funding, the U.S. Fish and Wildlife Service can monitor migration twenty-four hours a day. The radar systems have improved the Service's understanding of bird and bat migrations along the Great Lakes shorelines, where migrants appear to be especially vulnerable to wind turbines.

The Service has operated two mobile avian radar systems along the shorelines of the Great Lakes since the spring of 2011. The units have produced data regarding duration of migration, pulsed pattern of migration, and what conditions may promote or inhibit migration. Data is also collected continuously and at much higher rates than human observation is able, eliminating observer bias. The radar units allow for comparisons to be more readily made between various sites, such as lake shores and inland locations, to help determine the ideal width of the migration corridor along the lake, and thus the area where migrants may be most at risk.

With the use of these radar units, the Service has found that the numbers of birds and bats moving at night are magnitudes higher than those that move during the day, that these migrants generally move in the same direction, and that migration

movements start almost immediately after sunset. The Service also found that migration occurs in pulses, where significant migration occurs in the span of a few nights, which are separated by a few nights of little to no movement. All of the sites studied so far have showed high migrant activity.



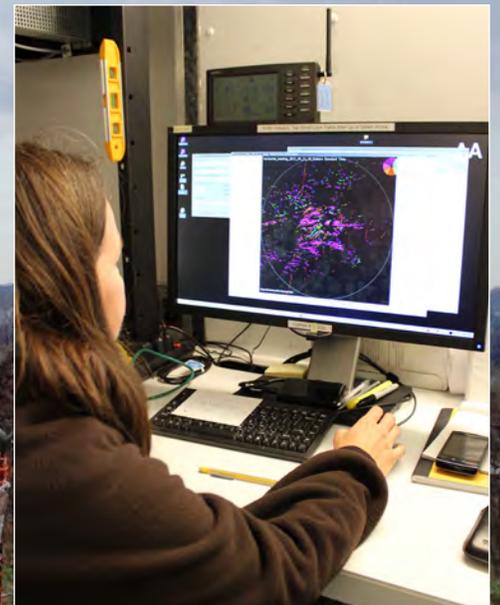
U.S. Fish and Wildlife Service personnel with the mobile avian radar system. USFWS





Thus far, the results of this study support the Service's recently released Land-Based Wind Energy Guidelines and nationwide recommendations for wind energy developers. Additionally, the Service better understands the challenges associated with studying migration using radar and will create guidelines for evaluating additional studies. Under the partnership approach involving state and federal agencies and wind energy companies, the Service is better prepared to work with wind energy developers in order to protect migrants without hindering the economy or renewable energy industry. 🐦

For more information on this project, go to www.fws.gov/radar.



A U.S. Fish and Wildlife Service employee reviews the data gathered by the avian radar system. USFWS

An avian radar system scans the sky for migrant birds and bats on the shore of Lake Erie. USFWS

The Fisheries Information System: A Tool for Accountability

By David Radloff
Midwest Region Fisheries

The Fisheries Information System is used to communicate the needs and accomplishments of the Fisheries Program of the U.S. Fish and Wildlife Service. The system is a database that provides a central point of access to Fisheries Program information, and facilitates data exchange and sharing among offices through common data fields. One level of accountability captured in system is through performance measures.

Performance measures are indicators of the work performed and the results achieved in an activity, process, or organizational unit. Performance measures enable periodic comparisons and benchmarking.

The Government Performance and Results Act of 1993 requires federal agencies to establish standards measuring their performance and effectiveness, and to develop strategic plans describing overall goals and objectives, annual performance plans with quantifiable measures of their progress, and reports describing their success in meeting standards and measures.

One of our GPRA measures is “Percent of populations of native aquatic non-threatened and endangered species self-sustaining in the wild.” A baseline was set for the Great Lakes Restoration Initiative funded project at 214 self-sustaining populations with emphasis on lake trout and lake sturgeon. The Fisheries Program is committed to returning one of these baseline populations to self-sustaining status each year with the dollars provided through GLRI.

Numerous other performance measures are captured in the GLRI Action Plan that identifies goals, objectives, measurable ecological targets, and specific actions for five focus areas. The Action Plan is used by federal agencies in the development of the federal budget for Great Lakes restoration, and serves as guidance for collaborative restoration work with participants to advance restoration.

Fisheries Program Great Lakes Restoration Initiative performance measures are tracked in the Fisheries Information System by project. Each project supports performance measures for key mission responsibilities such as restoration of native species, habitat restoration, and monitoring of invasive species in the Great Lakes. 🐟



John Beckman (left) nets fish into the sorter while Allen Lane monitors the progress of the mass marking auto trailer on the monitors at the Iron River NFH. USFWS

Project Update: Fish Passage Planning and Construction in Progress on the Menominee River

By Nick Utrup, Midwest Region
Ecological Services

Lake sturgeon numbers have dwindled in Lake Michigan and access to suitable habitat is partly to blame. To address this problem, the U.S. Fish and Wildlife Service is working in partnership with North American Hydro, Michigan Department of Natural Resources, Wisconsin Department of Natural Resources, River Alliance of Wisconsin and Michigan Hydro Relicensing Coalition, to design and construct a way for lake sturgeon to



access their much needed and ideal habitat. The partnership is currently finalizing designs and beginning construction on a Great Lakes Restoration Initiative funded fish passage project at the Menominee and Park Mill Hydroelectric Dams located on the Menominee River in northern Wisconsin. The Partners have been working together since 2004 and are now starting construction on facilities designed to provide upstream and downstream passage for lake sturgeon around the dams. Construction is expected to be completed by 2015. 🐟



Divers inspect the river bottom as workers install a de-watering system that will allow access and construction of a fishway for lake sturgeon at a hydropower dam located on the Menominee River in northern Wisconsin. Rory Alsberg, North American Hydro.

Analyzing Emerging Contaminants in Great Lakes Waterways



Collecting fish samples in the Raquette River. USFWS

By Bethany Holbrook, Northeast Region Ecological Services

The Great Lakes are home to many different fish species, which support a major fishing industry within the region. Unfortunately, there is a legacy of pollution from point and non-point sources. The pollution has restricted people in the use of these great waterways because contamination has caused fish consumption advisories in every Great Lakes state. New classes of chemical compounds are now being found in the environment. With funding from the Great Lakes Restoration Initiative, the U.S. Fish and Wildlife Service in New York is working to identify how abundant these emerging contaminants of concern are and how much damage they have caused fish and wildlife resources.

Service contaminants specialists at the New York Field Office have evaluated contaminants in the New York Great Lakes Basin since 2010. These specialists are collecting fish, water, and sediment samples to evaluate contaminants of emerging concern and their effect on local fish

species within the New York State Great Lakes Basin, which includes streams and rivers within New York state that discharge into the St. Lawrence River, the Niagara River or Lake Ontario. Contaminants of Emerging Concern, or CECs, include pharmaceuticals, hormones, fragrances, newer pesticides and herbicides, wastewater indicators, and flame suppressants and retardants.

Between 2010 and 2012, samples were taken in or near the Rochester Embayment Area of Concern. Currently, sampling is being conducted in the Raquette River between Colton and Tupper Lake. The Service is working with biologists from St. Cloud State University and the U.S. Geological Survey to evaluate CECs, as well as the health of fish in this ecosystem. The Service will be collecting fish and water samples, and St. Cloud University will be exposing fathead minnows to the water to test for any unusual behavior, such as reduced ability to avoid predators. This type of research is extremely important since altered behavior can impact



Collecting tissue and blood samples from captured fish. USFWS

a fish's ability to find food, avoid predators, or reproduce.

USGS will be analyzing the fish tissue and water samples for CECs. Upon completed analysis, the outcome of the study will be a valuable means of identifying CECs present in the waterways. The study will also assist in prevention of additional contaminants from entering the Great Lakes Basin by influencing future control or elimination programs at waste water treatment plants. 🐟

Improved Health and Functionality in Degraded Wetlands within the Rochester Area

By Bethany Holbrook, Northeast Region Ecological Services

The U.S. Fish and Wildlife Service's New York Field Office is assessing wetland quality and size in water bodies that are nearby or within the Rochester Embayment Area of Concern. This Great Lakes Restoration Initiative funded wetland evaluation and restoration project is all encompassing. It will identify, rank, and prioritize wetlands for restoration and protection, fixing the most significant habitat impairments in the highest priority wetlands as well as provide a blueprint for future restorations. Once completed, the wetland evaluation and restoration project will help improve water quality in the Rochester Embayment AOC. The Rochester Embayment wetlands will be ranked according to the United States Environmental Protection Agency's Rapid Assessment Method, Bird Studies Canada's Marsh Monitoring



U.S. Fish and Wildlife Service biologists taking plant samples in the Rochester Embayment AOC. USFWS

Program indices, and water quality values. These assessments will determine the wetland's level of degradation. Characteristics that will be evaluated will include plant diversity, invasive species cover, bird and herptile community presence, dissolved oxygen in water, nutrients, conductivity, and water temperature.

Wetlands are very important natural buffers that help control flooding in times of high precipitation, improve water quality by filtering out pollutants, reduce the amount of sediment in lakes, and decrease the likelihood of algal blooms. Wetlands also provide habitat for a diverse range of species. The Rochester Embayment AOC once boasted successful wetlands, but increased development, agriculture, and deforestation in the area eventually degraded these wetlands, affecting water quality within the embayment. By restoring wetlands in the Rochester Embayment AOC, biologists believe the area will once again notice many of the benefits listed above. 🐾



U.S. Fish and Wildlife Service biologist taking water samples. USFWS

Agencies Combat Hydrilla Invasion in New York State Canal System

By Michael Goehle, Northeast Region Fisheries

Since 2011, the U.S. Fish and Wildlife Service's Lower Great Lakes Fish and Wildlife Conservation Office has worked with federal, state and local organizations to respond to the discovery of hydrilla in the western end of the New York State Canal System. Hydrilla is an invasive plant that entered U.S. waterways after release from an aquarium in the 1960s. Current work is focused on methods to more accurately determine where the plants are located and to estimate their density in the canal system. 🐾



Biological science technician, Kelly McDonald, uses a GPS to measure the abundance of hydrilla. USFWS

Great Lakes Restoration Initiative Supports Efforts to Address New Risk to Threatened Plant

By Georgia Parham,
Midwest Region External Affairs

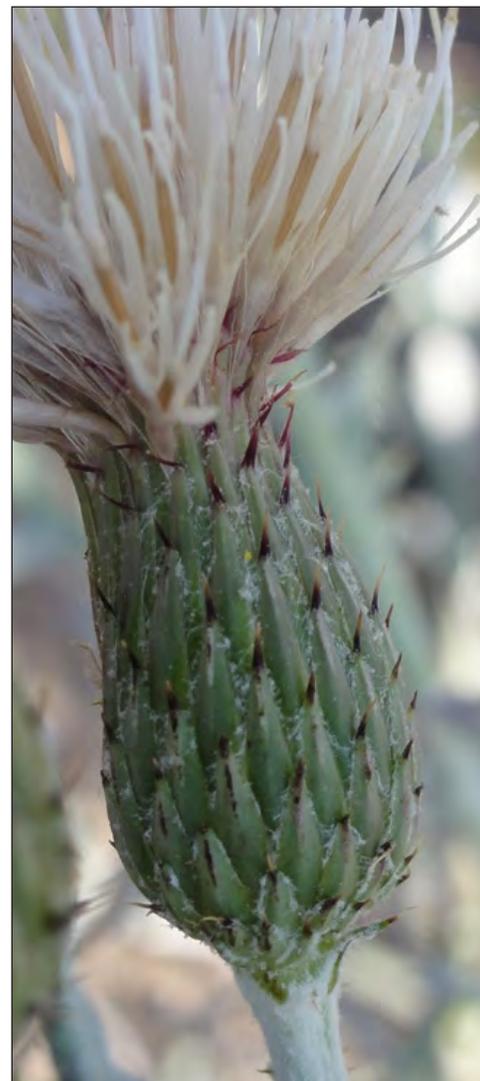
The Great Lakes are home to the largest freshwater beach-dune system in the world. Found only in this ecosystem are rare plants that depend upon the health of the Great Lakes. The Great Lakes Restoration Initiative is addressing several invasive species that have the potential to significantly undermine Great Lakes protection and restoration, including these unique native coastal plant communities.

GLRI is funding work to assess impacts of non-native Eurasian weevils on threatened Pitcher's thistle. Pitcher's thistle occurs only in the Upper Great Lakes and is found in Michigan, Indiana, Wisconsin, Illinois and some sites in Canada. Listed as threatened in 1988, Pitcher's thistle has declined due to loss or modification of its habitat, which includes sand dunes

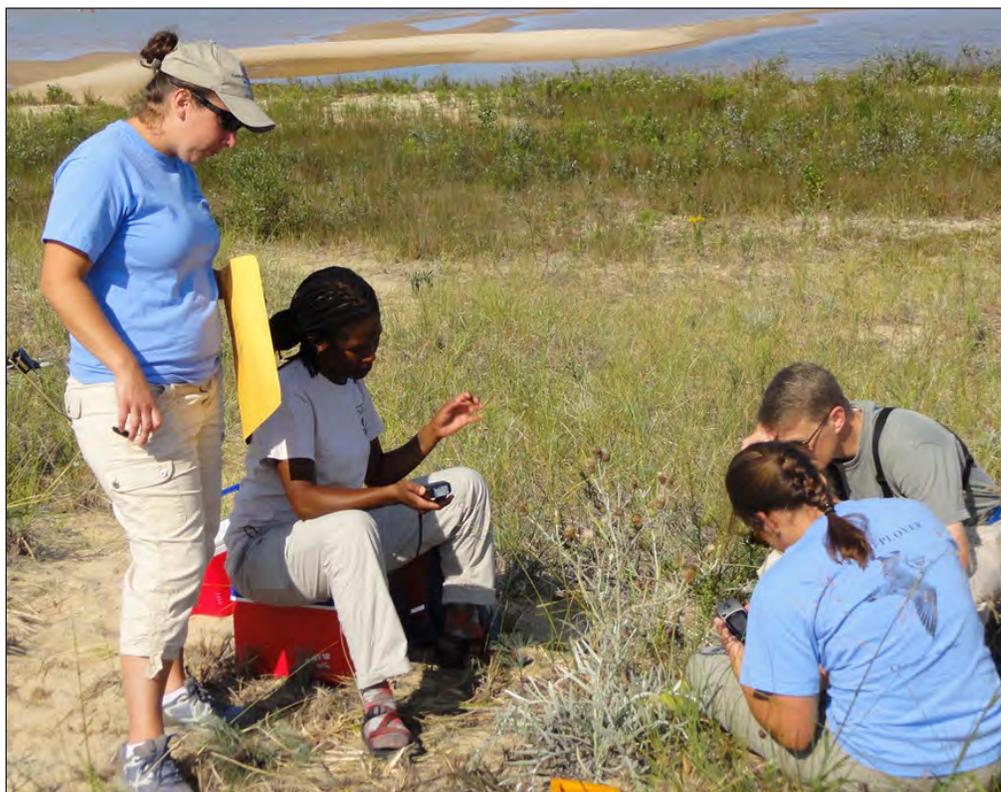
and open sand ridges along the shorelines of Lake Michigan, Lake Huron and Lake Superior.

Recovery efforts were progressing well for many Pitcher's thistle populations, when evidence of the weevils was discovered in Wisconsin in 2010. The weevils, originally introduced to control invasive non-native thistles, destroy the seed head of the Pitcher's thistle. This can reduce the output of seed by up to 95 percent. Weevils have now been discovered in Michigan, where they are affecting one of the species' most robust populations.

GLRI funds began supporting investigations of the weevils in 2011 and 2012. In 2013, funds are being used to further assess the threats and to look for ways to control the weevils. Some of the work includes monitoring Pitcher's thistle populations severely affected by weevils, such as those in Wisconsin,



The Pitcher's thistle is a threatened plant found only in the Upper Great Lakes and faces threats from an invasive weevil. USFWS



Biologists from the East Lansing Field Office, with help from participants in the Pathways student program, conduct a survey of weevil damage to Pitcher's thistle. USFWS

and studying less affected sites in Michigan, as well as surveying for the weevils across the plant's range.

If you think about the weevil as a new battle in the conservation of Pitcher's thistle, finding out the status of your troops is a key first step, and that is exactly what GLRI has enabled the U.S. Fish and Wildlife Service to do. GLRI is helping the Service learn more about what this new threat may actually mean and what can be done to ensure that Pitcher's thistle continues to be part of the Great Lakes beach-dune ecosystem. 🐦

Project Update: Lake Trout are Back at Allegheny National Fish Hatchery!



*Assistant Hatchery Manager, Dave Blick, stocks lake trout in the Lower Great Lakes. USFWS
By Larry Miller, Northeast Region Fisheries*

Allegheny National Fish Hatchery, in Warren, Pennsylvania, is in its first full hatchery production cycle since shutting down in 2005 as a result of a fish disease outbreak. With the support of Great Lakes Restoration Initiative funds, the hatchery completed much needed repairs and updates last year. This year the hatchery exceeded its production goals for lake trout restoration for Lakes Erie and Ontario. Excess production resulted in stocking a total of 240,000 fall fingerlings, and 640,000 spring yearlings. At 6.9 inches, the yearlings were the largest ever produced at the hatchery! 🐟

Restoration of Detroit and St. Clair Rivers Catalyzed By Great Lakes Restoration Initiative Funding



Artist's rendering of Restored Refuge Gateway in Trenton, Michigan that is the future home of the visitor center. LHB Corporation

By John Hartig, Detroit River IWR and James Boase, Midwest Regional Fisheries

With the help of the Great Lakes Restoration Initiative, the U.S. Fish and Wildlife Service has amplified its restoration efforts, both in the water and on the land that cradles the Great Lakes. In collaboration with partners, the Service has made positive impacts on the health of Detroit River International Wildlife Refuge and ecosystem.

The refuge is unique because it is the only international refuge in North America and one of only a handful of urban refuges in the nation. With seven million people living within a 45 minute drive of the refuge, the Service is proud to focus restoration dollars on habitats that benefit both people and the wildlife supported in the area. The refuge focuses on conserving, protecting, and restoring habitat for 29 species of waterfowl, 23 species of raptors,

31 species of shorebirds, more than 100 species of fish, as well as more than 300 species of birds.

Collaborating with Wayne County, the International Wildlife Refuge Alliance, and over 100 partners, the Service has been working on the restoration of a former brownfield site in Trenton, Michigan for over nine years. Known as the Refuge Gateway, this area along Detroit River has expanded the ecological buffer of Humbug Marsh, Michigan's only Wetland of International Importance, as designated under the international Ramsar Convention.

The Refuge Gateway is also the future home of the refuge's visitor center. This project has included: the restoration of 16 acres of wetlands in an area that has lost 97% of its coastal wetlands; the restoration of 25 acres of upland habitats; the control of the invasive common reed (*Phragmites australis*) along 2.5

miles of shoreline; and the control of invasive species on 50 acres of upland habitats.

This restoration project is being described as transformational for the Detroit Metropolitan area because it is helping change citizen perception of the Detroit River from a polluted "rust belt" river to one that hosts an international wildlife refuge, which reconnects people to nature, improves quality of life, showcases sustainable redevelopment, and enhances community pride.

Since 2003, the Service has also been working with partners in both the U.S. and Canada to address fisheries habitat issues in the Detroit and St. Clair Rivers. These rivers are binational Areas of Concern under the U.S. - Canada Great Lakes Water Quality Agreement, with 11 identified beneficial use impairments. These impairments

include loss of habitat and degradation of fish and wildlife populations that resulted directly from large-scale, blasting and dredging for navigational purposes. Shoreline-hardening activities in these AOCs also contributed to impairments that removed much of the spawning and nursery habitats for fish and water pollution. With improvement in water quality, conservation efforts have focused on habitat restoration, including constructing the first native fish-spawning reef in 2004 off Belle Isle in the Detroit River. Native fish populations immediately benefited from an additional reef construction off Fighting Island in 2008 in Canadian waters on the Detroit River and one in the Middle Channel of the St. Clair River in 2012.

The construction of artificial spawning reefs, targeted for native

fish species, directly addresses fishery habitat and population restoration needs in the Detroit and St. Clair Rivers. With an adaptive management model, a team of researchers took an experimental approach. They used several different types and sizes of substrate, refining their criteria for siting reefs, while improving the design and monitoring of fish spawning reef projects. Post construction assessments revealed an immediate positive response from fish populations, including increased abundance of the northern madtom, a benthic fish species considered globally rare and endangered in the State of Michigan and Province of Ontario.

Another positive change noted after these restoration efforts was the first documented spawning by lake sturgeon in Canadian

waters of the Detroit River. In addition, thousands of walleye and lake whitefish eggs were also collected on the constructed reefs. This highlighted the importance of increased spawning habitat for the recovery of important fish populations. By late fall of 2013, with continued funding through the Great Lakes Restoration Initiative, three more reefs will be completed; one in the Detroit River at Fort Wayne, Michigan and two in the St. Clair River. One of the two reefs on the St. Clair River will be located near Marine City, Michigan, with the second being located in Algonac, Michigan. In total, more than 22 acres of fish spawning habitat will be recreated in these rivers leading to the delisting of “Loss of Fish and Wildlife Habitat” and “Degradation of Fish and Wildlife Populations” in these AOCs. 🐟

“ *This restoration project is being described as transformational for the Detroit Metropolitan area because it is helping change citizen perception of the Detroit River from a polluted 'rust belt' river to one that hosts an international wildlife refuge, which reconnects people to nature, improves quality of life, showcases sustainable redevelopment, and enhances community pride.* ”



LEED-certified visitor center to be constructed at the Refuge Gateway in Trenton, Michigan. LHB Corporation

From Pollution to Partnerships: Cleaning Up Areas of Concern in the Great Lakes

By Annette Trowbridge,
Midwest Region Ecological Services

The Great Lakes Areas of Concern are locations along the Great Lakes suffering from degraded environmental conditions caused by historic and ongoing pollution. These areas were designated under the Great Lakes Water Quality Agreement between the U.S. and Canada based on the presence of one or more beneficial use impairments. A beneficial use impairment is when a body of water is so polluted it is no longer suitable for specific uses, such as loss of fish and wildlife habitat or restrictions on fish consumption. Of the 43 AOCs identified in the U.S. and Canada, to date only two Canadian and one U.S. AOC have been delisted.

The Great Lakes Restoration Initiative is making funds available to the U.S. Fish and Wildlife Service to clean up and restore these highly degraded areas. The Service is contributing its expertise to the Great Lakes-wide effort through its project, Accelerating Remediation and Restoration of Contaminated Sediment at AOCs.



Margaret Hutton and Andrew Briggs preparing to net fish. Fish sampling helps to identify the incidence rate of fish tumors and deformities found in some Areas of Concern. USFWS

The goal of the project is to remove beneficial use impairments and ultimately delist AOCs. Service projects are planned and conducted in close coordination with federal, state and local conservation partners. Work will help eliminate several impairments, including fish consumption advisories, degradation of fish and wildlife populations, and loss of fish and wildlife habitat,

bird or animal deformities or reproduction problems.

Service contaminants specialists first evaluate impairments to help identify the best opportunities for delisting. Specialists provide guidance in the removal of contaminants and design sediment removal projects to achieve the best, most efficient cleanups while preserving and restoring high quality habitat in Great Lakes AOCs. Currently, the Service has funded 25 projects that contribute to delisting impairments in a variety of ways.

Several projects in the St. Louis River in Minnesota, as well as the Kalamazoo River in Michigan, guide implementation of future remediation and restoration actions to address identified fish and wildlife population and habitat related beneficial use impairments. The results of planning projects are informed design alternatives and ultimately the implementation of targeted on-the-ground and in-the-water projects.



U.S. Fish and Wildlife Service biologists setting nets in Conneaut Creek, a tributary of Lake Erie. USFWS



U.S. Fish and Wildlife Service biologist collecting water and sediment samples near the mouth of Swan Creek. USFWS

Other projects gather data necessary to evaluate the status of “Fish Tumors and Deformities” and “Bird or Animal Deformities or Reproduction Problems” impairments. The incidence rate of tumors and deformities across AOCs is often unknown; however such information is critical to determine whether or not these impairments can be removed. Such evaluations are being conducted in AOCs throughout the Midwest, including

the St. Louis River in Minnesota and Wisconsin, Niagara River in New York, Grand Calumet River in Indiana, and Saginaw Bay, River Raisin, Detroit River, and St. Mary’s River in Michigan.

The Service is also implementing several remediation and restoration projects, such as the one on the Maumee River AOC in Ohio. This on-the-ground project is restoring, enhancing, and creating 1,900 feet

of contiguous habitat along the Ottawa River located on the main campus of the University of Toledo. Another restoration project within the Maumee AOC on the Ottawa National Wildlife Refuge restores and enhances 512 acres of wetland and upland habitats, and reconnects 127 of those acres to Lake Erie. The project includes pre- and post-monitoring, reconnection of additional wetlands, and restoration of riparian habitats.

AOCs, though only dots on a map of the Great Lakes Basin, represent important areas that serve as models for how highly contaminated and degraded areas can be restored. Only by working with others who share a common goal of restoring these areas can AOCs be delisted. The Service is proud to contribute its expertise and experience to help remove beneficial use impairments and ultimately return areas known as AOCs to a more natural, healthy and productive state. 🐦



Fish and wildlife populations, such as this nesting common tern, can be adversely impacted by the high levels of pollution found in Areas of Concern. USFWS

Hook, Line and Sinker: A landscape approach to sport fish conservation in the face of climate change impacts



Angler fishing Black Earth Creek, a popular trout stream in Dane County, Wisconsin. Agricultural practices and invasive species (like reed canary grass) are just a few of the management challenges impacting stream health in portions of Wisconsin. Dennis Franke.

By Ashley Spratt, Midwest Region External Affairs

The Great Lakes basin includes numerous rivers and freshwater streams attracting fishermen from across the globe. Popular sport fish including brook trout and small-mouth bass spend portions of their life cycle migrating to and from the Great Lakes to these freshwater streams to spawn, feed and grow.

Through the coordinated efforts of the Upper Midwest and Great Lakes Landscape Conservation Cooperative (LCC), federal, state and academic partners are working side-by-side to determine how projected warmer air temperatures and changes in precipitation in the coming century may impact fish habitat.

Researchers with U.S. Geological Survey are working alongside Wisconsin Department of Natural Resources (DNR), Michigan Institute of Fisheries Research and Michigan State University to model the potential impacts of increasing air temperatures and changes in precipitation on water temperature and flow in freshwater streams that are part of the Great Lakes

system. The models project future distributions for 14 fish species based on known fish locations, their habitat preferences, their adaptability to different water temperatures, existing and future stream conditions, and projected climatic changes.

The models show that the distribution of brook trout, which requires cold water for survival, is projected to shrink by 60 percent in some Wisconsin streams by mid-century, an impact attributed to warmer waters as a result of a changing climate. Loss of suitable freshwater habitat for this and other popular sport fish species due to climate change has economic implications as well, as recreational fishing opportunities across the Great Lakes system contribute to a multi-billion dollar tourism and recreation industry.

Aquatic resource managers are using model results to help prioritize on-the-ground conservation and restoration efforts while considering the potential impacts for the broader Great Lakes landscape. For example, the Wisconsin DNR is using the results to help make informed management decisions on easement

properties that boast more than 35,000 acres of trout and small mouth bass streams.

“We can identify streams where fish populations may have a higher or lower likelihood of changing as a result of projected climate change impacts. This means we can make better investments in groundwater and storm water protection measures or implementation of agricultural best management practices in higher priority areas,” said Paul Cunningham, Wisconsin DNR fisheries biologist.

By examining current and future fish distributions, existing opportunities for public access and weighing demands for recreational fishing, natural resources managers across the upper Midwest and Great Lakes will be equipped with the tools needed to make strategic conservation decisions, such as how habitat is managed and when and where additional land should be acquired.

Scientists are working with natural resources managers across the region to ensure they have access to this valuable scientific data that will help



guide future management decisions in the face of a changing climate.

This project is a collaborative effort by the U.S. Geological Survey, Wisconsin DNR, Michigan Institute of Fisheries Research and Michigan State University. Funding support was provided by the Great Lakes Restoration Initiative through the Upper Midwest and Great Lakes Landscape Conservation Cooperative. 🐟

Angler releases a brook trout, a popular sport fish throughout the upper Midwest and Great Lakes. New models predict brook trout distribution to decrease by as much as 60 percent in parts of Wisconsin. Matt Mitro, Wisconsin DNR.

U.S. Fish and Wildlife Service

Great Lakes Restoration Initiative



This project is funded through the Great Lakes Restoration Initiative in joint effort with the U.S. Environmental Protection Agency and federal agencies to protect and restore the Great Lakes.



For more information on Great Lakes Restoration Initiative Projects, please visit www.fws.gov/GLRI

Sign of Progress

All U.S. Fish and Wildlife Service field sites which receive Great Lakes Restoration Initiative funding will be marked by a sign similar to the one pictured above. Identifying our field sites is part of our interagency agreement with the U.S. Environmental Protection Agency. This funding requirement was designed to increase public awareness and transparency with regard to the use of GLRI funding.

To learn more about other Service GLRI projects, please visit <http://www.fws.gov/glri/>

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Printed: September 2013