

U.S. Fish & Wildlife Service

Restoring the Great Lakes

*Success stories about the Great
Lakes Restoration Initiative*

Spring 2024





Collaboration is the foundation of Great Lakes conservation

For decades, the Great Lakes were in peril, neglected and polluted. Thankfully, they were not beyond hope, and ongoing efforts to clean up and restore these incredible natural resources were supercharged with the creation of the Great Lakes Restoration Initiative in 2010. The initiative significantly accelerated and amplified conservation actions across the Great Lakes basin.

Since the initiative's inception, the U.S. Fish and Wildlife Service has been entrusted with more than \$575 million through interagency agreements with the U.S. Environmental Protection Agency. We've put that money to work across all the Great Lakes states, leveraging those investments by working with Tribes, federal, state, private, and nonfederal partners.

In 2023 alone, we completed 93 projects that restored over 4,000 acres of fish and wildlife habitat, reduced threats from invasive species, contributed to improving fish and wildlife populations, and generated critical information for future strategic actions. These actions ensure stewardship of natural resources while also investing in the region's fishing, hunting and wildlife watching economy, which generates \$18 billion in annual revenue.

The Great Lakes Restoration Initiative has been a catalyst for unprecedented coordination and innovation, with our agency playing an enormous role. By working with communities, respecting public input, and sustaining dozens of partnerships, we've developed a shared vision for addressing the biggest threats to the world's largest freshwater ecosystem.

Our projects have garnered wide-spread public support, rekindled cultural connections, and benefited local communities, all while improving fish and wildlife populations. By improving the resiliency of freshwater habitats and delivering landscape-level habitat conservation on both public and private lands, we can ensure a strong future for the Great Lakes region.

Collectively, we have made great strides, but our work is not done. We will continue working with integrity and in collaboration to restore this precious irreplaceable resource. We hope you enjoy reading about a few of these incredible accomplishments in this booklet and on our website.



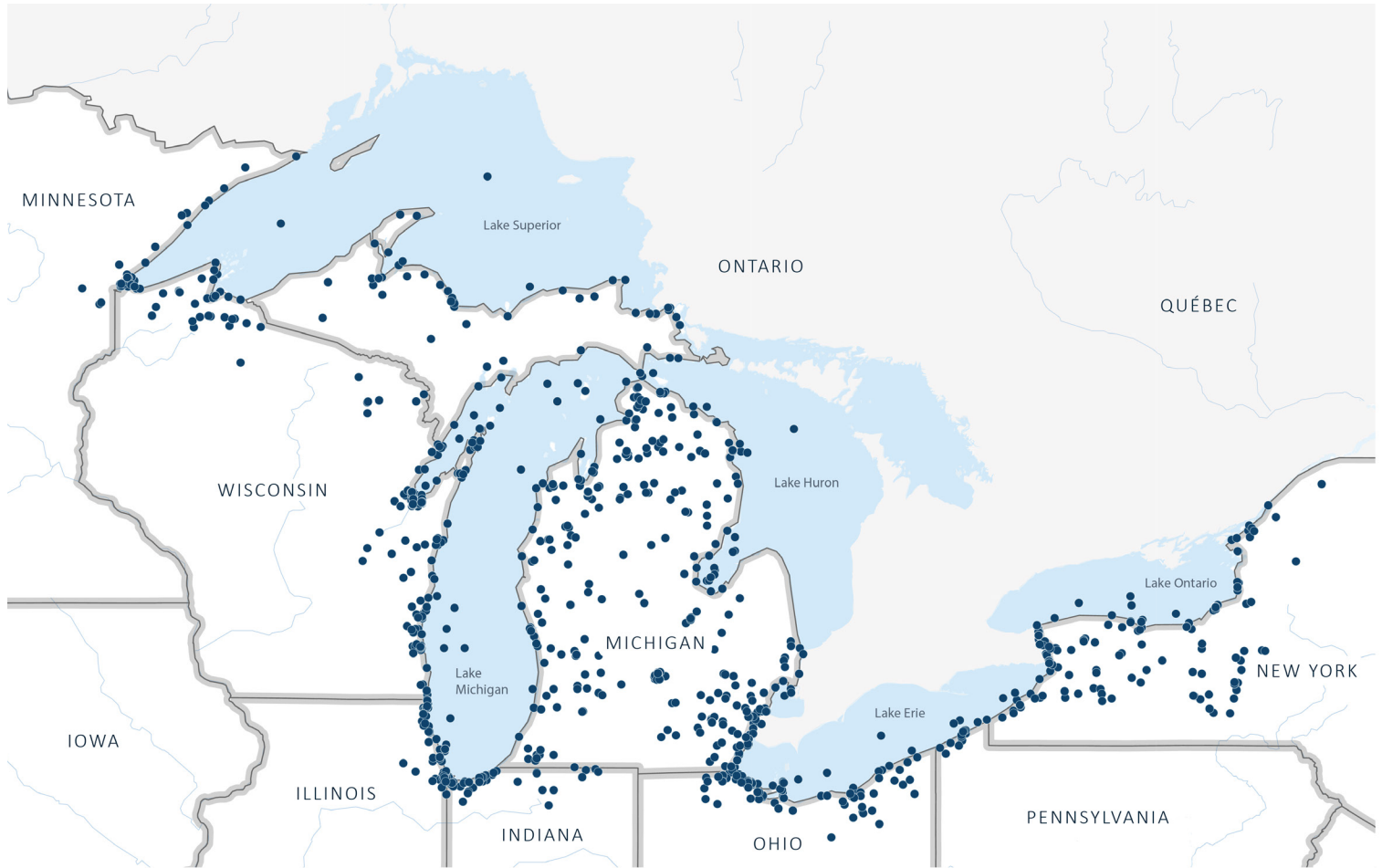
Will Meeks
Regional Director
Midwest Region



Wendi Weber
Regional Director
Northeast Region

*A bed of Federally
Threatened Dwarf
Lake Iris on Bois
Blanc Island,
Michigan.*
Dani Fegan/USFWS

Great Lakes Restoration Initiative's impact



● Blue dots represent most of the Great Lakes Restoration Initiative projects that have been completed or are currently supported by our agency.

The Great Lakes Restoration Initiative is a driver for environmental action in the Great Lakes basin, building upon strategic recommendations presented in the Great Lakes Regional Collaboration Strategy of 2005. The initiative is a collaborative effort of the U.S. Environmental Protection Agency and 15 other federal agencies, including the U.S. Fish and Wildlife Service, to address the most significant environmental concerns of the Great Lakes. The importance of the Great Lakes is evident when we look at the numbers:

- 30 million people in the Great Lakes basin rely on this important resource for drinking water, transportation, power, and recreational opportunities.
- 10,000 miles of coastline (more than 4,500 miles in the U.S.) and 30,000 islands.
- 95% of surface water in the U.S. and the largest group of freshwater lakes on Earth.

Initiative funding has enabled the Service and our partners to:

- Restore, protect, and enhance more than 80,000 acres of coastal wetland and other habitats.
- Reopen more than 1,000 miles of Great Lakes tributaries.
- Implement projects on more than 11,500 acres of land and water to help control invasive species.

Role of the U.S. Fish and Wildlife Service in the Great Lakes Restoration Initiative

Through an interagency agreement with the U.S. Environmental Protection Agency, the Service is allocated funding for projects in the following focus areas:

Toxic Substances and Areas of Concern

The areas of the Great Lakes basin most severely impacted by toxic substances and pollutants are known as Areas of Concern. We work to restore and protect aquatic ecosystems from the threat of persistent pollutants.

Invasive Species

More than 180 non-native species are established in the Great Lakes and the most invasive spread rapidly, ultimately degrading habitat, out-competing native species and disrupting food webs. Service activities are working to control and eradicate harmful, non-native species.

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 work to identify, restore and protect important habitat for the area's fish and wildlife.

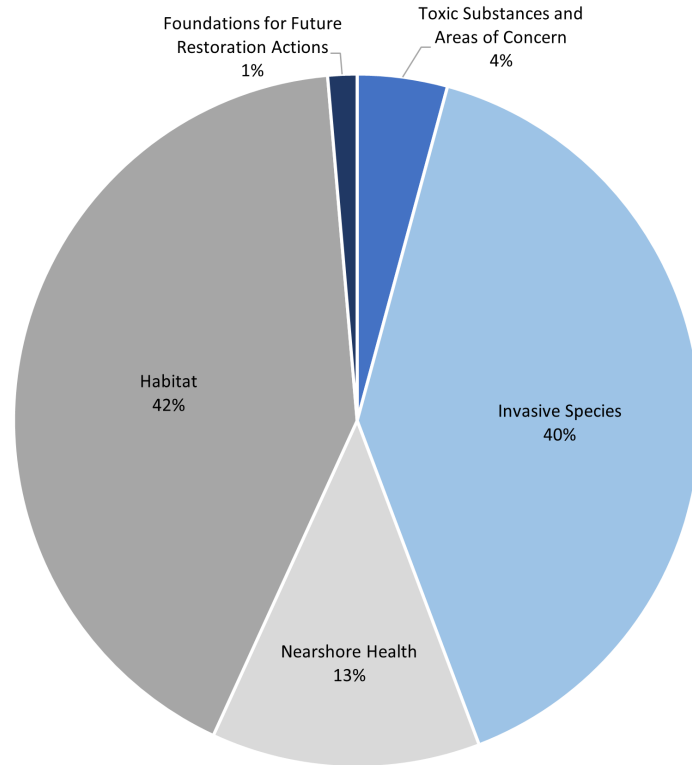
Nonpoint Source Pollution Impacts on Nearshore Health

This work includes funding provided to the National Fish and Wildlife Foundation to support projects aimed at reducing environmental impacts from contaminated stormwater runoff in urban areas.

Foundations for Future Restoration Actions

Our agency fosters climate resiliency in initiative-funded projects; educate the next generation about the importance of the Great Lakes to fish, wildlife, plants and people; and continue a science-based adaptive management approach for new and ongoing projects.

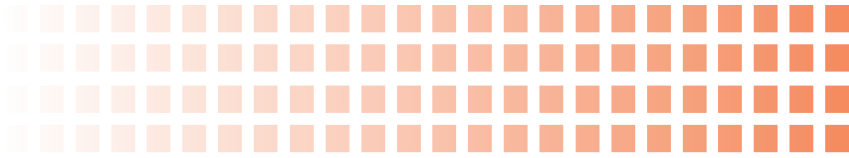
Fiscal Year 2023 distribution of U.S. Fish and Wildlife Service funding by focus area



<i>Focus Area</i>	<i>Funding Amount</i>
Toxic Substances and Areas of Concern	\$3,351,331
Invasive Species	\$31,596,978
Habitat and Wildlife Protection and Restoration	\$32,988,313
Nonpoint Source Pollution Impacts on Nearshore Health	\$10,000,000
Foundations for Future Restoration Actions	\$1,088,958



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Prairie Smoke in Wisconsin.
Jim Lutes/USFWS

Shoring up hope and restoring Areas of Concern

By Janet Lebson

Focus area

Toxic Substances and Areas of Concern

Project description

A major goal of the Great Lakes Restoration Initiative is delisting Areas of Concern, also known as “toxic hotspots” that have experienced environmental degradation. These comprehensive cleanup and restoration efforts involve federal agencies, the Great Lakes states, Tribes, municipalities, thousands of citizens, and other partners. Years of hard work have yielded impactful results for people and wildlife.

The lush wetlands on the southern edge of Wisconsin’s Green Bay were once one of the largest, most biologically rich habitats in the Great Lakes and because of the Great Lakes Restoration Initiative, their distinctive values are returning.

Wildlife abounds along the lower bay’s Cat Islands. Shorebirds stealthily dip their way through marsh grasses in search of prey. Flocks of ducks and geese spiral down from the sky, finding rest-stops on their long migrations. Groups of white pelicans glide low over the shallows and the hoots of snowy owls can be heard at nightfall. Meanwhile, yellow perch and walleye wend their way along the weedy shoreline, foraging on plentiful insects and settling into protective coves to spawn.

Restoration takes time, but the shared commitment of scores of partners, bolstered by sustained investments from Congress, is bringing the Cat Islands back to life.

A shot in the arm

The Cat Islands are just one part of the Lower Green Bay and Fox River region designated as an Area of Concern by the

United States and Canada in the 1980s.

Areas of Concern are “toxic hotspots” dotting the shorelines of the Great Lakes and their designation is the starting point for restoration. They are technically defined as geographic areas where significant impairment of beneficial uses has occurred because of human activities at the local level.

Fast-tracking progress toward delisting Areas of Concern is one goal of the Great Lakes Restoration Initiative, providing a significant infusion of resources for restoration since 2010.

The first phase of reconstruction for the Cat Islands, for example, began in 2012 with a \$1.5 million Great Lakes Restoration Initiative grant, giving a shot in the arm for restoration plans that went as far back as the late 1980s. Back then, high-water levels, severe storms and erosion wiped out nearly all the islands’ habitats. Without the island barriers, coastal wetlands weren’t protected from high-energy wave and storm effects. Damaged further by contaminants entering the environment upriver—from industry, agriculture and urban

Cedar Point National Wildlife Refuge is a centerpiece of restoration for the Maumee Area of Concern. With ingenuity, we improve habitat for migrating waterfowl and songbirds like the Kirtland’s warbler.



Rebecca Hinkle/USFWS



USFWS

Thanks to partners' perseverance, a variety of birds abound once again, including the iconic Great Lakes piping plover.

development—the lush wetlands that once thrived with life became more like a dead zone.

Since then, a massive mobilization of partners—a common element of all Areas of Concern—has provided additional investments for the Cat Islands project, and also provided the local knowledge, ecological expertise, and manpower to guide the way.

In an extraordinary spirit of public-private partnership, Areas of Concern bring together federal agencies like the U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, agencies in eight Great Lakes states, dozens of American Indian Tribes, scores of community groups, and thousands of citizens.

Perseverance pays

Out of a full menu of 14 markers of environmental degradation, or “beneficial use impairments,” each Area of Concern has identified certain ones that partners use to guide restoration.

For every marker identified, partners have specific restoration targets they must reach before an Area of Concern can be delisted. When they reach the restoration target for a specific marker, partners move one step closer to delisting.

We at the U.S. Fish and Wildlife Service have a leading role in restoring Areas of Concern across the board, lending our expertise on markers related to fish and wildlife populations; the presence of tumors and deformities in fish, birds, and other wildlife; and loss of habitat.

For example, for many years we've supported partners' cleanup and monitoring efforts in Ohio's Cuyahoga River Area of Concern, where certain fisheries showed persistently high rates of tumors and deformities. Last year we determined there was enough evidence that the restoration target for that marker was reached, one clear sign of river renewal.

It's all connected

On the shores of western Lake Erie, the mouth of the Maumee River was once the gateway for a vast network of swamps, marshes and forests known as the Great Black Swamp. Stretching for 1,500 square miles, these prime habitats pulsed with all kinds of fish and wildlife.

As the Great Black Swamp was gradually settled, drained, cleared and degraded by industry and agriculture, its biological bounty eventually became the Maumee Area of Concern.

Today, the Cedar Point National Wildlife Refuge on the shores of western Lake Erie is a centerpiece of restoration. With ingenuity, we use tools and techniques that mimic historic habitat conditions, trying to make smaller pieces of the landscape capable of supporting fish and wildlife in abundance once again.

One example is a new, specially engineered water control structure that allows local drainage water to flow in and out of restored wetlands, filtering runoff and assisting in cleaning Lake Erie. Our work with partners also has improved more than 150 acres of coastal wetlands and restored a connection to Lake Erie.

Just like Green Bay's Cat Islands, Ohio's Cuyahoga and so many other parcels within Areas of Concern, the rebirth of healthy habitats and the comeback of critters tell the restoration story best.

Research reveals hope for managing invasive red swamp crayfish

By Gigi Otten

Focus area

Invasive Species

Project description

This project will increase capacity in Michigan to implement the red swamp crayfish response plan, developed by Michigan Department of Natural Resources and Michigan State University. The outcomes will also inform future invasive crayfish control work with findings that can be used throughout the country.

Originally from the southeastern U.S., the red swamp crayfish has become an unwelcomed world traveler. They have drained wetlands in Europe and ruined rice crop in Asia. These invasive crayfish are highly aggressive and mobile. Here in the U.S., they are commonly spread by unsuspecting aquarium-hobbyists or biology teachers releasing the unwanted pet into their backyard ponds and rivers.

As economies and ecosystems around the world struggle to contain this invasive, researchers funded by the Great Lakes Restoration Initiative (GLRI) in Michigan are leading the charge to develop practical eradication techniques.

In 2017, the red swamp crayfish initially found its first Michigan home in a hotel retention pond. The Michigan Department of Natural Resources spent three years trapping and removing more than 100,000 crayfish from the pond without ever reaching eradication.

Michigan has been trying to control booming populations of invasive red swamp crayfish for six years, and intensive efforts have only made a dent in

their numbers. Thankfully, Michigan is no longer in the fight alone.

We at the U.S. Fish and Wildlife Service are partnering with Michigan DNR, Michigan State University, Auburn University and the U.S. Geological Survey to develop invasive crayfish control technologies. Serving as a hub for innovative eradication techniques, the GLRI-funded partnership creates a direct research-to-management pathway.

If Michigan can learn to control invasive crayfish, innumerable ecosystems could be saved.

“They’re just so prolific,” said Kathleen Quebedeaux, an invasive crayfish biologist for the Michigan Department of Natural Resources. “They make so many eggs and are extremely hardy. It seems like they can live anywhere.”

Quebedeaux works with her team on the ground to manage and monitor the invasive populations. She said that even though these crayfish are native to the southern U.S., they are surviving and even thriving here in the Midwest.

Red swamp crayfish.



Michigan Department of Natural Resources

Brian Roth, an associate professor at Michigan State University, works in the lab and in the field, searching for solutions to invasive crayfish issues. He said that this GLRI-funded project is different from any other he has been a part of. A major barrier to successful invasives management is the extensive time it takes to learn new techniques and apply them. Roth stressed that a good idea in the lab doesn't always translate to the field.

"It is our rapid integration," Roth said, explaining what makes this program so unique. "I'm not talking 10 years here, I'm saying in the next year we'll find a way to scale a lab project up to the field."

Michigan has been trying to control booming populations of invasive red swamp crayfish for six years, and intensive efforts have only made a dent in their numbers. Thankfully, Michigan is no longer in the fight alone.

Efforts to control red swamp crayfish have included daily trapping, filling burrows, sound baiting, biological predation control, and X-ray sterilization, among other efforts. All of these approaches take a significant amount of time, money and scientific expertise. The team is excited to be developing techniques that bypass trapping and



Michigan Department of Natural Resources

Red swamp crayfish being collected in Michigan.

culling all together. They hope to find the most efficient and effective methods of management.

If red swamp crayfish numbers were to spiral out of control, their effects would be devastating to our waters. Red swamp crayfish are more aggressive than native crayfish, outcompeting them for food and space. The invasive is quick to disperse and has more stamina to travel. At infected retention ponds, the invaders have been found inside drainage pipes, meaning they have access to the greater watershed.

Furthermore, unlike native species, the invasive's burrowing habits are so intense they can collapse underground infrastructure as the sediments supporting piping shift and erode. Their burrows form unwanted drainage from wetlands. If left unchecked, these effects will ruin water quality, erase wetlands, collapse riverbanks and dry up beds of manoomin or wild rice.

"People are paying attention because it's not just Michigan, it's the entire Great Lakes basin," said Roth.

With the constant stream of invasive species into our waterways – such as the recent invasion of signal crayfish into Minnesota – the need to control invasive crayfish populations and protect native species is greater than ever.

"This invasive," said Quebedeaux, "can be really harmful to all of our amazing resources in Michigan, things like water clarity which impact our native species abundance. If you like to get outdoors and see clean water, then you should care about this."

The freshwater filter that feeds Saginaw Bay sees further recovery

By Ashley Peters

Focus area

Habitats and Species

Project description

A 10,000-acre national wildlife refuge in Michigan is the site of impressive habitat restoration projects that have reconnected rivers to floodplains.

Additionally, researchers and biologists are studying how aquatic species use the coastal ecosystem and also, measuring improved water quality from the wetland's filtration.

Shiawassee National Wildlife Refuge has undergone a dramatic transformation over the past decade, thanks to funding from the Great Lakes Restoration Initiative. Habitat restorations have reconnected rivers that were cut off from diked floodplains for more than 100 years.

Eric Dunton, a refuge biologist for the past 13 years, has been an integral part of that transformation and works with partners to restore the marsh and floodplain areas. The refuge is the site of a 1,000-acre wetland restoration project, which aims to provide high-quality habitat for wildlife and cleaner water.

“We have worked hard to prove this is a coastal system,” said Dunton. “Despite being 20 miles in-land, the Shiawassee Flats are directly connected to Saginaw Bay and the southern end of Lake Huron.”

A freshwater coastal system

Michigan's lower peninsula is famously mitten-shaped, thanks to Saginaw Bay. Twenty miles south of the bay lies the refuge's impressive 10,000-acre grassland and wetland complex. That

complex is part of a larger area called the Shiawassee Flats, which act like a giant funnel where the Cass, Tittabawassee, Shiawassee, and Flint rivers all converge in this low-lying area.

The flats include the national wildlife refuge, the state game refuge, and surrounding wetland complexes. They serve as an important migratory stopover for tens of thousands of waterbirds. Fish, amphibians and other wildlife also rely on the habitat for breeding grounds, and the area is well known as a recreational paradise for bird watchers, anglers and hunters.

During normal years, an impressive 15% of the inland freshwater in the Lower Peninsula flows through the refuge. The flats act as a filter for the water, gleaning out excess nutrients and pollutants before the water flows into the Saginaw River and out to the Saginaw Bay.

“During certain times of the year,” said Dunton, “the wind pushes water inland towards the refuge instead of the more typical outflow to the bay. Because the bay and the flats share so much water, there's no doubt they share fish

*Wood duck at
Shiawassee
National Wildlife
Refuge.*



Mike Budd/USFWS



Jim Hudgins/USFWS

*Great egret at
Shiawassee
National Wildlife
Refuge.*

populations. The question is to what degree they share fish resources.”

Dunton has been working with partners to assist in surveys to better understand the fisheries population of the Saginaw River.

Our agency, the U.S. Geological Survey, and the University of Michigan School of Natural Resources and Environment have partnered to determine how many fish are in the river and are moving into the refuge. Using sonar detection, the partners have been able to see how many fish are passing through the system. This allows scientists to better understand how aquatic species use the coastal marsh, which is critical to understanding the next steps in the refuge restoration.

A wise investment

Dunton is continuing to work with partners to restore the marsh and floodplain areas within the refuge. Ducks Unlimited received \$1.5 million for the first Great Lakes Restoration Initiative project on Maankiki Marsh, which broke

ground in 2016. That first project began at Shiawassee National Wildlife Refuge and since then more than \$3.8 billion in Great Lakes Restoration Initiative projects have been awarded throughout the Great Lakes region.

Over the last eight years, partners collaborating to restore Shiawassee Flats have seen habitat improvement for birds, fish, other wildlife, and water quality benefits. Although Saginaw Bay has seen some algal blooms in recent years, natural resources managers know the restoration is working.

“The blooms would be much worse and more frequent without the refuge’s filtration,” said Dunton. He cited research data from University of Michigan graduate students Aubrey Kowalski and James Stack which showed that water had fewer nutrients after flowing through the refuge.

Dunton said there is plenty of work to continue and the magnitude of this effort takes continued dedication, patience, and

constant reassessment. On-the-ground conservation is often time-intensive, expensive and requires extensive collaboration between local communities, state and federal agencies, private landowners, and other partners.

Despite the heavy lift, the impact of these projects is an invaluable investment that ensures benefits, even those far beyond the original intentions.

In the case of the refuge, reviving the wetlands helped avoid catastrophic damage in 2020 when a dam on the Tittabawassee River failed, giving way to flood waters that rushed towards Saginaw Bay. The refuge was under almost 10 feet of water during the unexpected flood. However, refuge managers and local officials were able to avoid the displacement of thousands of residents in low-lying areas of Bay City, thanks to the flood protection provided by the wetlands.

Casting lines and connecting lives

The Detroit River Youth Fishing Team

By Makeda Nurradin

Focus area

Foundations for Future Restoration Actions

Project description

Nearly 800 participants have benefited from DRYFT, a program based in Detroit. By teaching youth to fish, this nature-focused experiential project will create opportunities to learn about local environments while developing lifelong outdoor skills.

Outside of Detroit, a city renowned for its vibrant culture and rich history, a unique program named the Detroit River Youth Fishing Team (DRYFT) has been making waves. The brainchild of Jody DeMeyere, Paige Wigren and Nicole LaFleur, DRYFT was born out of a shared passion for the outdoors and a commitment to service. They saw an opportunity to make a difference and wrote grants to fund the programming and positions that would bring DRYFT to life.

DRYFT's lifeline came through two crucial Great Lakes Restoration Initiative (GLRI) grants thanks to Jody, the visitor services manager at Detroit River International Wildlife Refuge, Paige, a former U.S. Fish and Wildlife Service employee and now the lead outdoor education program specialist for Girl Scouts of Southeast Michigan, and LaFleur, the executive director of the International Wildlife Refuge Alliance. These grants not only funded the program but also supported the hiring of three dedicated park rangers at Detroit River International Wildlife Refuge who were instrumental in facilitating the program's activities:

Maddie Drury, Alex Gilford and Erika Van Kirk. This initiative, aimed at providing positive outdoor experiences, has been a shining example and provides learning opportunities for underserved communities.

The DRYFT story is one of community, strength and the transformative power of nature. It began as a collaborative effort with organizations like the U.S. Fish and Wildlife Service, Girl Scouts of America, Detroit Outdoors, and various local schools and community groups. DRYFT's primary goals were to serve traditionally underserved communities, connect people to their local watershed, teach the importance of native versus invasive species, and foster an awareness of how human activities affect water quality.

The program has two aspects:

- **Learn to Fish Experience:** Youth learned to set up their fishing poles, understand their tackle boxes and then try fishing. This hands-on approach culminated in each participant taking home their gear, igniting a potential lifelong hobby.

DRYFT program mobile unit.



Erika Van Kirk/USFWS



Maddie Drury/USFWS



Erika Van Kirk/USFWS

Left: A program participant inspects a native crayfish species during “A Day in the Life of a Fisheries Biologist.”

Right: Park Ranger Maddie Drury teaching youth how to tie a knot.

- **A Day in the Life of a Fisheries Biologist:** This program delved into career pathways, fish identification and practical fieldwork, enabling participants to step into the shoes of a fisheries biologist for a day. Uniquely, our agency’s refuges and fisheries programs worked together to create this program, with participants learning alongside a fisheries biologist and park ranger.

Participants were from Hamtramck High School, Cesar Chavez Academy and local Girl Scouts. Each brought their unique background and perspective but shared a common curiosity about fish and wildlife.

The participants learned to rig fishing lines, tie knots and cast. The moment a youth felt the tug of their first catch, a sense of achievement and connection to nature was evident. Success was measured not just by participation numbers and geographic reach but also by the personal stories and progress of the participants. The program’s impact has been encapsulated by moments like a child’s excitement at catching a fish as

big as her torso or the joy of a participant ‘flossing’ after finally catching a fish.

“The power of DRYFT programming lies within the small experiences: touching a worm, releasing a fish, feeling that first tug on the line,” said Erika, one of the driving forces behind the program.

These moments are the building blocks of a deeper connection with nature and a gateway to greater confidence in exploring the outdoors. Each member was given their own fishing equipment, symbolizing a new skill and a newfound responsibility.

DRYFT’s reach extends beyond their local neighborhood. Utilizing a mobile trailer funded by the GLRI, the program touches lives in a 100-mile radius. With a GLRI grant of \$301,275 for the first year and an additional \$300,000 GLRI grant for the second year, the program has been able to expand and flourish. In Ecorse, Michigan, the participants, now more confident and skilled, became ambassadors of the program, sharing their knowledge and enthusiasm with others.

The story of DRYFT is not just about fishing. It’s about building community ties and nurturing future stewards of the environment. As the program looks forward to expanding its reach, the bonds formed and the lessons learned by its participants stand as a testament to the power of community-based initiatives.

In Detroit, a city that has faced its share of challenges, DRYFT has had nearly 800 participants since its inception and the program stands as a shining example of what a community can achieve when it invests in its youth and its natural resources. It’s a story of casting lines and connecting lives and it’s a narrative that continues to unfold with each new group of participants.

Monitoring America's first sport fishery

By Cody Anderson

Focus area

Habitats and Species

Project description

Brook trout populations across the Great Lakes basin have drastically declined and our agency's monitoring projects are essential to understanding the effectiveness of habitat investments. Our agency has been working with partners to improve water quality and habitat for brook trout, ensuring a future for this incredible species. Monitoring fish helps to track progress and determine next steps.

The Great Lakes Restoration Initiative Brook Trout Monitoring Program is helping restore brook trout populations by providing information critical to assessing management strategies and habitat restoration projects for brook trout.

Brook trout are often referred to as America's first sport fishery. In the late 19th and early 20th centuries, people traveled to the United States from all over the world to fish for brook trout. By the mid-1900s, however, brook trout populations had severely declined across their native range — from the Great Lakes basin to the eastern U.S. Those declines were caused by a multitude of threats, including degraded habitats, fragmentation from dams and culverts, invasive species and poor water quality.

The U.S. Fish and Wildlife Service and our partners have been working together for years to improve water quality, reduce habitat fragmentation and restore habitats for brook trout. Monitoring is essential to understanding the effectiveness of these habitat investments, therefore, the Brook Trout

Monitoring Program was launched to provide funding to monitor fish populations and determine how habitat restoration has benefited brook trout.

We made great strides in 2023, our first full field season, by completing monitoring at 23 sites across the Great Lakes basin.

We established monitoring sites upstream and downstream of proposed stream crossing replacement projects and dam removal projects to measure differences above and below the project site. When evaluating a stream channel restoration or habitat enhancement project, we established monitoring sites upstream of and directly within the area being restored. Using a standardized monitoring protocol that allows for the direct comparison and analysis of data collected by all field offices, all projects were evaluated at least one year pre-construction. Projects will continue to be monitored for at least two years post-construction and the data for each monitoring period compared to evaluate changes in fish communities and habitat condition.

Brook trout caught by the Green Bay Fish and Wildlife Conservation Office.



Emma Lundberg/USFWS

During monitoring, the fish community species diversity and overall condition of the habitat is evaluated and scored at each monitoring site. Brook trout and other salmonids, such as brown or rainbow trout, captured during the survey were individually measured for length and weight prior to release. All other species were identified, counted and weighed as a group to determine relative abundance within the system. Habitat and stream channel conditions were evaluated at each project site based on several components including substrate, habitat diversity, and riparian buffer composition and width.

We made great strides in 2023, our first full field season, by completing monitoring at 23 sites across the Great Lakes basin.

Additionally, we are conducting surveys in historical brook trout rivers and evaluating the habitat to help us identify where future restoration will have the greatest ecological value for brook trout.

Each stream and geographical area present unique challenges due to terrain, stream size, access or a combination of factors. Despite these challenges, we are well prepared for the field seasons ahead. Our offices are currently analyzing the data collected in 2023 and will be summarizing the impacts to brook trout across watersheds that drain into the Great Lakes. The data obtained through the monitoring program will be used to learn more about the status of species and help guide restoration efforts.



Payton Hanssen/USFWS

Brook trout caught during a survey in the lower Great Lakes basin.

We are also working with Trout Unlimited and the U.S. Forest Service on monitoring brook trout at their habitat restoration projects. These partners are following the same protocol and collecting comparable data at each project. Additional collaboration with partner organizations provides even greater insight into how these projects affect brook trout across the basin. The collaborative nature of this program highlights an essential part of the Service's mission—working with others—and ensures one of the Great Lakes region's most beloved fish continues to exist for future generations.

Coregonid restoration

By Larry Dean

Focus area

Habitats and Species

Project description

This multi-agency program supports restoration for deep and shallow water coregonine species, like cisco and bloater. Restoration projects are generated through the Lake Committees of the Great Lakes Fishery Commission and Lake-wide Management plans for each of the Great Lakes.

Multiple fisheries projects received funding to advance research

Several fisheries projects including U.S. Fish and Wildlife Service stations from both the western and eastern Great Lakes will move forward thanks to \$1.3 million in Great Lakes Restoration Initiative funding.

Three projects will be supported this year which will aid in restoration of sustainable populations of coregonines in Lake Ontario to reestablish their historical roles as forage for predators.

The first project at Alpena Fish and Wildlife Conservation Office in Michigan will support researching coregonine populations, including fish like cisco and bloaters, in the Great Lakes in 2024. Research will include a focus on Lake Huron and will continue to collect baseline information on lake herring communities, including the assessment of the post-stocking survival, growth and maturity of these cultured cisco. This will allow staff to assess reproduction.

A second project, led by the Green Bay Fish and Wildlife Conservation Office in Wisconsin, will examine the genetics representation of wild lake

herring for Saginaw Bay Restoration. The conservation office will evaluate a proof-of-concept process for collecting wild juvenile fish for development into future broodstock. Currently, these fish collections involve hazards to access offshore winter spawning aggregations and other serious logistical challenges, including achieving high capture efficiencies and personnel safety. The work will test a fundamentally different approach of capturing juvenile fish to determine rates of survival during capture of the fish, subsequent isolation through the rearing process, and whether this new method is feasible.

For a third project, Great Lakes Restoration Initiative funding will also be used by the Allegheny National Fish Hatchery, and the Northeast Fishery Center, both in Pennsylvania, in partnership with the U.S. Geological Survey Tunison Lab, in New York, the New York Department of Environmental Conservation and the Ontario Ministry of Natural Resources.

In addition to the projects described above, work will include developing a better understanding of how these fish play a role in the food web. Planned work

U.S. Fish and Wildlife Service is leading a cisco reintroduction effort that has included stocking of approximately one million fingerlings into Saginaw Bay every year since 2018. One of the objectives of the cisco stocking is to assess whether stocked cisco return to stocking locations during the spawning season.



Jose Bonilla-Gomez/USFWS

will also improve health and quality of juvenile bloater, fish health monitoring, assessment and monitoring of wild populations and hatchery production, spawning habitat evaluations, population viability analysis, and development of technical capabilities. This also includes evaluation and analysis of using eDNA to monitor populations and help focus traditional fisheries survey efforts. Lastly, work will also include infrastructure enhancements to increase production of coregonines.

“The Great Lakes Restoration Initiative has been very instrumental in supplementing our ability to support reintroductions of native prey species to the Great Lakes. We could not do this amount of work without it,” Midwest Region Hatchery Program Supervisor Kurt Schilling said.

Great Lakes funding gives a boost to fish isolation facility in Pennsylvania

The U.S. Fish and Wildlife Service’s Northeast Fishery Center in Lamar, Pennsylvania received \$2.5 million from GLRI to modify an existing building into a fish isolation facility. The building adjustments will benefit coregonine fish, also known as freshwater whitefish, including bloater and cisco.

The Center currently includes a health center, fish hatchery and technology center. The inclusion of an isolation system allows separation of incoming fish from the rest of the facility. The facility will also include treatment of incoming and outgoing rearing water to maintain the integrity of the watershed. This is especially important for filtering water to prevent pollutants from entering public water and to keep invasive species from spreading.

Fish isolation plays an important role in getting fish back into the Great Lakes including those that serve as food for fish like lake trout. By modifying the Center’s



Jose Bonilla-Gomez/USFWS

Alpena Fish and Wildlife Conservation Office staff set nets for their 2022 fall spawning survey in Lake Huron’s Saginaw Bay. A total of 29 sites were sampled near stocking locations as well as other nearby sites known to contain nearshore cisco spawning habitat.

existing building into an isolation facility, staff can house wild-sourced eggs from the Great Lakes, with an emphasis on coregonines. Isolation of wild-sourced eggs allows for fish health inspections and clearances before incorporating them into a hatchery for production, research, or distribution to other facilities.

A recirculation system within this isolation facility will also minimize discharge, reduce water consumption needs, and allow for greater temperature control, which is believed to be increasingly important for hatching conditions for bloaters, a deepwater coregonid. Partitioning of systems within the isolation facility will also allow for concurrent use and multiple species rearing, which is important due to the use of hatchery propagation within the Great Lakes for restoration.

“Transformation of existing infrastructure at the Northeast Fishery Center provides a unique opportunity for much needed isolation capacity to support fisheries restoration in the Great Lakes,” said Meredith Bartron, Project Leader, Northeast Fishery Center. “We’re excited that to provide support for Great Lakes restoration through this new capacity.”

The Northeast Fishery Center has been engaged in fish production for the Great Lakes, producing cisco and now bloater for Lake Ontario for the past six years. No other isolation facilities support coregonid wild broodstock and gamete collections to support the Lower Lakes.

Restoration of prey fish is clearly expressed as a priority in GLRI Action Plans. The isolation facility better positions us to meet prey fish production targets aligned with the goals identified in GLRI Action Plan 4. Without the isolation facility, production targets and restoration goals would not be met. Our ability to respond to partner requests for will be expanded thanks to the development of this facility.

Tails from the deep

Searching for sturgeon

By Laura Vachula

Focus area

Habitats and Species

Project description

Lake sturgeon populations in Lake Erie and Lake Ontario have drastically declined and sturgeon have been slow to recover. Despite environmental challenges like invasive species, which can inhibit recovery of sturgeon populations, our agency is monitoring improvement and seeing positive trends for these gentle giants.

Lake sturgeon could easily be mistaken for one of the mysterious, mythical lake monsters of the Great Lakes. Monstrously large fish, sturgeon can weigh up to 300 pounds and measure seven feet long! Seeing their bony body-armor and whisker-like barbels dangling from their snouts might make your knees shake, and as bottom-dwellers, they lend themselves well to tall tales.

But perhaps what they have most in common with fabled lake monsters, like Bessie of Lake Erie, Kingstie of Lake Ontario or Mishipeshu of Lake Superior, is that they are rare to spot. Even so, finding lake sturgeon is exactly what our U.S. Fish and Wildlife Service biologists have set out to do. We're helping New York State assess the size of the current sturgeon populations in Lake Erie and Lake Ontario to determine how the species is doing: thriving or barely surviving?

Once upon a time

Lake sturgeon cruised through waters when dinosaurs roamed the earth, and scientists estimate that Lake Erie once held hundreds of thousands of them.

Habitat degradation, pollution, over-fishing and dams all contributed to their steep decline in the 1800s. Eventually, they were nearly impossible to find.

Even as conditions have improved, sturgeon populations are slow to recover. Females reach sexual maturity in their 20s and do not spawn every year, so it can take decades to see a rebound.

In 1983, New York added lake sturgeon to their list of threatened species and developed recovery plans. Their goal is to meet population benchmarks — more than 750 spawning adults and greater than three naturally reproduced year classes (fish born in the same year) in a five-year period — in at least six of the seven management units that span Lake Erie, Lake Ontario and Lake Champlain. With years of effort, working in partnership with multiple agencies, they're getting close.

Tracking lake giants

In eastern Lake Erie, our agency's biologist Dr. John Sweka and his team have been using acoustic telemetry to track lake sturgeon movement and estimate population size.

Dr. Gorsky at diver training.



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Working collaboratively with partners monitoring other sections of Lake Erie, they deploy receivers along the lake bottom that record each transmitter-equipped fish's location as it swims past. This information is uploaded to a shared database.

“We found that most of the sturgeon tend to hang around Buffalo year-round,” Sweka said. “We did have a couple individuals that migrated across the lake, but the majority returned to their spring spawning grounds at the headwaters of the upper Niagara River.”

Learning that sturgeon have an affinity for their birthplace affirmed counts — they weren't inflated by wanderers from other areas of the lake. The biologists estimated 900 adults in eastern Lake Erie, which exceeded New York's goal. Other teams found that population objectives were met in western Lake Ontario and along the upper and lower St. Lawrence River as well.

Do they exist?

In western Lake Ontario, data collected since 2010 show a healthy adult lake sturgeon population, but one that is aging — most were born 20 to 30 years ago.

This leads to questions about natural reproduction. Are adults reproducing, and if so, are their offspring surviving?

Sturgeon in Lake Ontario and Lake Erie share the Niagara River but are divided into two unique populations by the jaw-droppingly large Niagara Falls. For three years, agency biologist Dr. Dimitry Gorsky has been trying to capture juvenile lake sturgeon in both sides of the river, with zero luck.

“We may not have any juveniles anywhere. That's what we're trying to figure out,” Gorsky said.



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Releasing tagged lake sturgeon in the Niagara River.

Last summer, he coordinated a team of 15 divers to train in swift water — the preferred habitat of juvenile sturgeon — in hopes of spotting the young fish. Though the divers didn't see any juveniles, the exercise uncovered a potential clue to explain their absence: invasive zebra mussels and their shells were littered across the river bottom.

“We think this has probably led to some habitat degradation, because they're sharp and don't create a good substrate for some of the invertebrates that the juveniles would eat,” Gorsky said.

Though the team hasn't caught any juveniles in the river yet, they're optimistic. In 2013, they saw mature females coming into the lower Niagara River from Lake Ontario to spawn and found lake sturgeon eggs there for the first time. This spring, those offspring should be turning 10 years old — the age and size when they become easier to catch. If they survived, this is the year those fish might appear in surveys!

A living legend

As lake sturgeon near New York's recovery goals, we're hopeful they will continue to delight those who glimpse their large bodies meandering throughout the Great Lakes. And though they share many similarities with mythical lake monsters, one main difference is that the mighty, resilient lake sturgeon will live on in our waters, not only through stories or in our imaginations. With care, they'll be living legends for millions of years more.

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