



Great Lakes Restoration Initiative Report to Congress

Fiscal Year 2024



Contents

Section 1 – Executive Summary2

 GLRI Action Plan III Focus Areas3

Section 2 – Program Accomplishments4

 FOCUS AREA 1: Toxic Substances and Areas of Concern.....4

 FOCUS AREA 2: Preventing and Controlling Invasive Species.....8

 FOCUS AREA 3: Nonpoint Source Pollution Impacts on Nearshore Health12

 FOCUS AREA 4: Habitat and Species16

 FOCUS AREA 5: Foundations for Future Restoration Actions20

Section 3 – Regional Partner Engagement.....24

 Great Lakes Tribes24

 Great Lakes States.....24

Section 4 – Financial Reporting.....25

 Annual GLRI Appropriations25

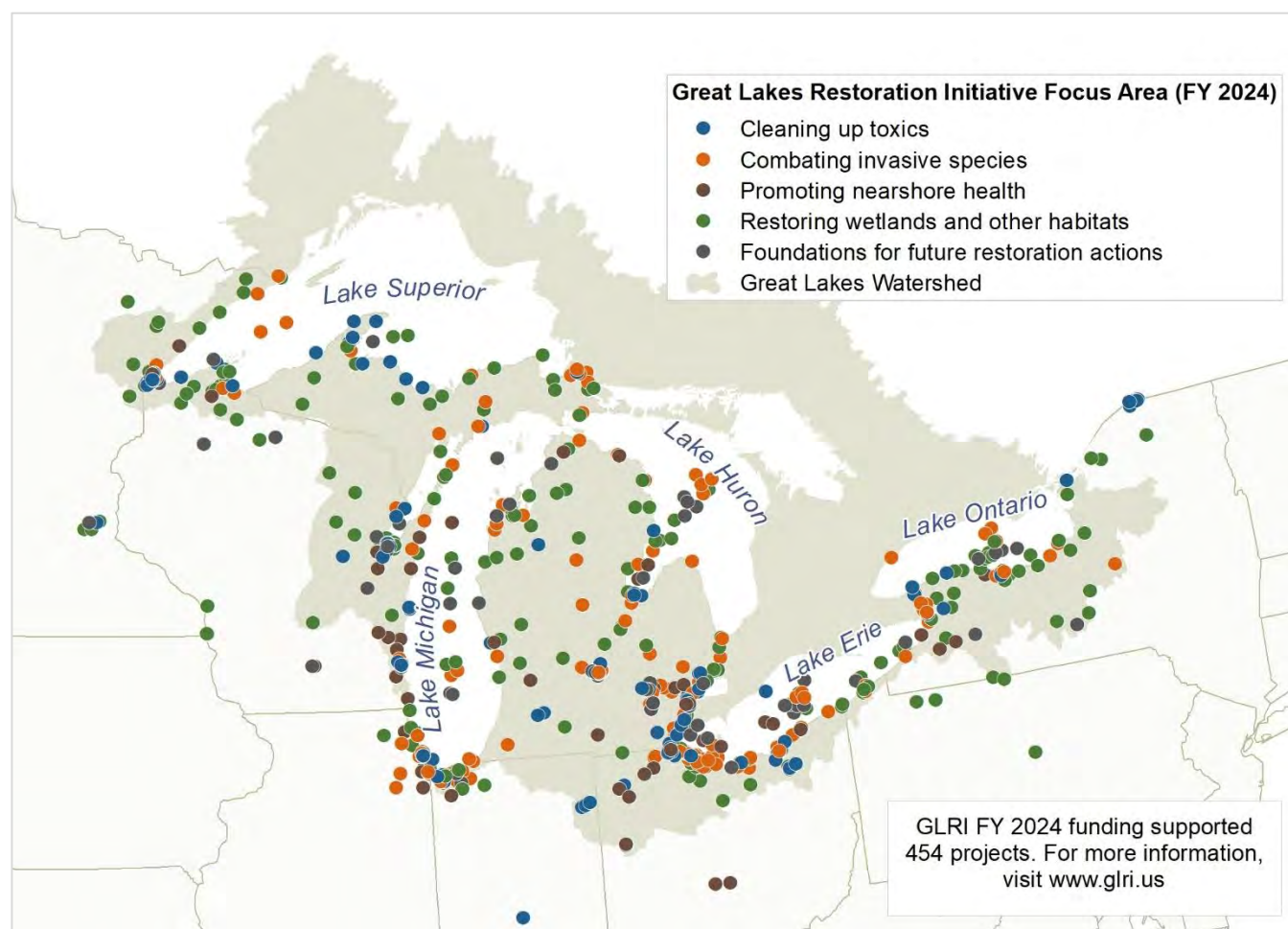
 GLRI Appropriations as Part of the Infrastructure Investment and Jobs Act27

Appendix A – GLRI Action Plan III: Measures of Progress30

About This Report

This report presents an overview of progress made under the Great Lakes Restoration Initiative (GLRI). It includes information through Fiscal Year 2024 on funding, project accomplishments, success stories and actual results compared to planned targets under GLRI Action Plan III. Data on direct spending is taken from the U.S. Environmental Protection Agency financial system. Information on GLRI projects and activities is also available at <https://glri.us>.

The U.S. Environmental Protection Agency Administrator is required by Clean Water Act Section 118(c)(7)(H)(iii) to provide this report to the House Committee on Transportation and Infrastructure and the Senate Committee on Environment and Public Works.



Section 1 – Executive Summary

The Great Lakes Restoration Initiative, or the GLRI, has greatly accelerated efforts to protect and restore the Great Lakes — the world’s largest system of fresh surface water. Since its 2010 inception, the GLRI has continued to address the historically challenging environmental problems and imminent threats facing this indispensable ecosystem.

Under the U.S. Environmental Protection Agency’s leadership, the GLRI has been a catalyst for unparalleled coordination among the federal agencies or departments that make up the GLRI Interagency Task Force and the GLRI Regional Working Group. Through Fiscal Year (FY) 2024, GLRI has funded over 8,800 projects focusing on the most important Great Lakes environmental issues, including cleaning up highly contaminated Areas of Concern (AOCs), protecting and restoring native habitat and species, and preventing and controlling invasive species.

Section 118 of the Clean Water Act (CWA) authorizes GLRI funding and directs efforts across five priority areas: (i) the remediation of toxic substances and areas of concern; (ii) the prevention and control of invasive species and the impacts of invasive species; (iii) the protection and restoration of nearshore health and the prevention and mitigation of nonpoint source pollution; (iv) habitat and wildlife protection and restoration, including wetlands restoration and preservation; and (v) accountability, monitoring, evaluation, communication and partnership activities.

The five priority areas correspond directly with the [Action Plan III](#) Focus Areas described below. This report provides an overview of progress during FY 2024 for each Focus Area within Action Plan III.

GLRI Action Plan III Focus Areas

1) Toxic Substances and Areas of Concern

During FY 2024, GLRI federal agencies¹ and their partners made significant progress in remediating contaminated sediment and restoring habitat in AOCs. Eight Beneficial Use Impairments (BUIs) were removed, bringing the cumulative total of BUIs removed to 128, which met the cumulative target set for GLRI Action Plan III. Through the end of FY 2024, GLRI federal agencies and their partners also completed all management actions necessary for delisting more than half the original number of U.S. AOCs (i.e., 17 out of 31). This increase in AOCs with Management Actions complete includes the Black River as of May 2024. The GLRI federal agencies and their partners also continued their work to protect human health from contaminants in Great Lakes fish and assess the impacts of chemicals of emerging concern on fish and wildlife populations in the Great Lakes basin.

2) Preventing and Controlling Invasive Species

During FY 2024, GLRI federal agencies and their partners continued efforts to prevent the introduction of new invasive species and to control existing invasive species throughout the Great Lakes ecosystem. Ongoing work continued to prevent the migration of silver carp, bighead carp and black carp into the Great Lakes. Since the GLRI began, federal agencies and their partners have taken actions to control invasive species on over 303,000 terrestrial and aquatic acres, including more than 42,000 acres in FY 2024.

3) Nonpoint Source Pollution Impacts on Nearshore Health

During FY 2024, GLRI federal agencies and their partners implemented conservation activities to reduce the nonpoint sources of pollution that threaten Great Lakes nearshore regions. These partners worked collaboratively to target nonpoint sources of excess phosphorus runoff that contribute to harmful algal blooms (HABs) in priority watersheds around the Great Lakes, such as the Fox River, Saginaw River and Maumee River. GLRI federal agencies estimate that GLRI-funded projects implemented since the program's inception have prevented more than 2.7 million pounds of phosphorus (including over 195,000 pounds of phosphorus in FY 2024) from leaving farms and entering the Great Lakes. In addition, GLRI federal agencies and their partners worked collaboratively in urban and suburban areas to prevent more than 83 million gallons of polluted stormwater from entering the Great Lakes in FY 2024.

4) Habitat and Species

During FY 2024, GLRI federal agencies and their partners protected, restored, and enhanced habitats and native species throughout the Great Lakes basin. Since GLRI began, these efforts have included protecting and restoring over 557,000 acres (including over 27,000 acres in FY 2024) of coastal wetland, nearshore and other habitats. These efforts benefit native fish, bird and amphibian species and include the completion of actions in FY 2024 that significantly protected and promoted recovery of the American hart's-tongue fern, dwarf lake iris, Pitcher's thistle and native prey fish, surpassing the FY24 target by two. Since the start of the GLRI, these actions have increased connectivity for aquatic organisms in more than 9,000 miles (including over 840 miles in FY 2024) of streams and rivers.

5) Foundations for Future Restoration Actions

During FY 2024, GLRI federal agencies and their partners engaged over 110,000 youth through hands-on education and stewardship projects. GLRI federal agencies and their partners also conducted comprehensive monitoring to assess and collect data on Great Lakes ecosystem status and trends. These data guided plans for projects addressing coastal resiliency and both nuisance and harmful algae.

¹ Includes U.S. Department of Agriculture (Animal and Plant Health Inspection Service, Natural Resources Conservation Service and U.S. Forest Service); U.S. Department of Commerce (National Oceanic and Atmospheric Administration); U.S. Department of Army (U.S. Army Corps of Engineers); U.S. Department of Health and Human Services (Agency for Toxic Substances and Disease Registry and Centers for Disease Control and Prevention); U.S. Department of State; U.S. Department of Homeland Security (U.S. Coast Guard); U.S. Department of the Interior (Bureau of Indian Affairs, U.S. Fish and Wildlife Service, National Park Service and U.S. Geological Survey); U.S. Department of Transportation (Federal Highway Administration and Maritime Administration); and the EPA (Great Lakes National Program Office).

Section 2 – Program Accomplishments

FOCUS AREA 1: Toxic Substances and Areas of Concern

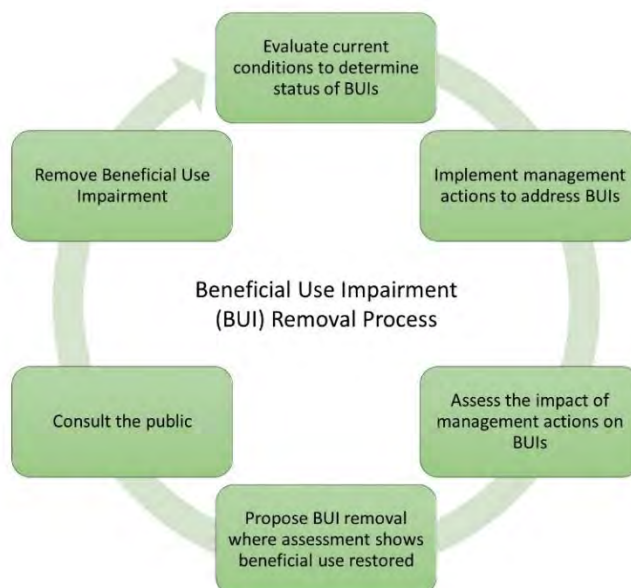
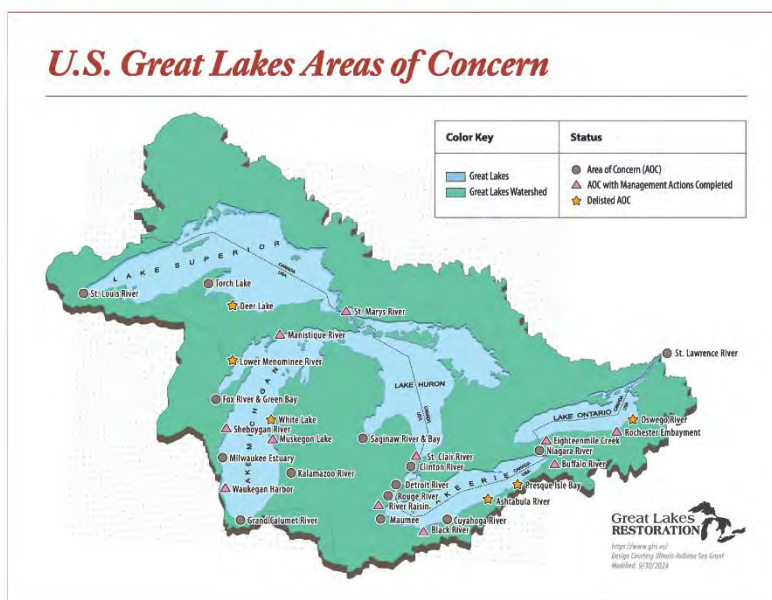
As defined in the Great Lakes Water Quality Agreement (GLWQA), AOCs are specific areas of the Great Lakes basin that are heavily contaminated with legacy pollutants and show signs of significant environmental degradation, such as habitat loss and fish consumption advisories.

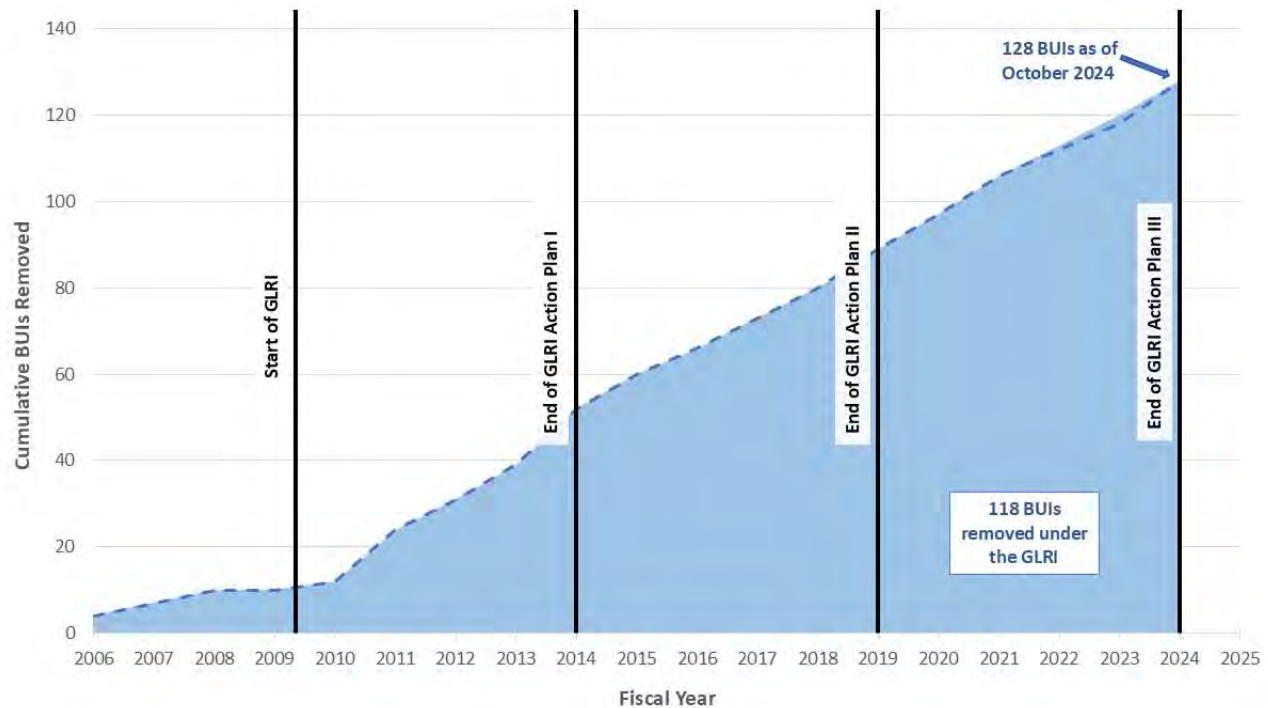
The type of environmental degradation in the AOCs is characterized by one of 14 BUIs listed in the GLWQA. The removal of these BUIs typically relies on monitoring of environmental conditions and meeting the local established criteria for restoration. Once all BUIs identified for an AOC are removed, the formal delisting process is initiated. This process, involving state and local partners, includes opportunities for a public review of the actions taken and the resulting status of the AOC. After the EPA and the Department of State concur that all impairments have been addressed, the AOC can be formally delisted in accordance with Annex 1 of the GLWQA.

Through the end of FY 2024, the EPA and their GLRI federal and state partners delisted six AOCs, and completed all management actions to ultimately delist another 11 AOCs.

In FY 2024, GLRI federal agencies and their partners removed eight BUIs — indicators of environmental harm — at seven AOCs in three states, bringing the cumulative total of BUIs removed to 128.

Between FY 2010 and FY 2024, 118 BUIs have been removed, which is nearly 12 times the total number of BUIs removed before the inception of the GLRI (see the graphic on the next page). Once all BUIs in an AOC have been removed, the AOC can proceed with delisting. The circular graphic on this page describes the BUI removal process.





The number of BUIs removed under the GLRI since 2010.

During FY 2024, GLRI federal agencies supported projects to help 12 Tribal and state organizations collect and share information with communities regarding Great Lakes fish and wildlife consumption. GLRI federal agencies and their partners conducted outreach activities targeting populations that consume high amounts of Great Lakes fish, providing the public with information on the benefits and risks of Great Lakes fish consumption. Additionally, GLRI federal agencies and their partners conducted monitoring activities to assess contaminant levels in fish collected from the Great Lakes and inland waters of the basin that Tribes and state agencies will use to establish updated safe fish consumption guidelines for mercury, perfluorooctane sulfonic acid (PFOS), and other contaminants.

GLRI federal agencies and their partners continue to implement several projects assessing chemicals of mutual concern and other priority chemicals in the Great Lakes. Through these efforts, GLRI partners are working to fill critical information gaps on contaminants such as PFAS, mercury and short-chain chlorinated paraffins. A topic of focus by GLRI partners included studies that use archived fish tissue samples to understand changes in PFAS concentrations in the aquatic food web over the past several decades.

Focus Area 1 Success Stories

Sugar Island Habitat Restoration in the Detroit River AOC



Managed by the U.S. Fish and Wildlife Service (USFWS), Sugar Island is part of the Detroit River International Wildlife Refuge and is one of the most important spawning areas for fish in western Lake Erie. This 29-acre island in the lower Detroit River is located at the mouth of Lake Erie in the Township of Grosse Ile, Michigan. The southern end of Sugar Island

experiences erosion due to exposure to high wind and wave action. This project enhanced fish and wildlife habitat through the restoration and stabilization of 1,600 feet of shoreline and the strategic construction of five habitat shoals, over 5 acres of marsh and 20 acres of submergent wetland. The National Oceanic and Atmospheric Administration (NOAA) Office of Habitat Conservation funded the project's engineering, design and construction phases through the GLRI and a regional partnership with the Friends of the Detroit River. The restored area provides habitat for native Great Lakes fish, amphibians, reptiles and birds.



Aerial image of the completed restoration work at Sugar Island in summer 2024. Image: NOAA

Final Management Action Project Completed at Black River AOC



The final Management Action project for the Black River AOC was completed, restoring more than 114 acres of uncovered steel slag and steel mill waste areas along the Black River. This project stabilized and revegetated 14 areas of steel slag piles, improving stability, reducing erosion and improving habitat for wildlife.

Completing all Management Action projects represents a significant milestone in the work and improvements made across the entire AOC. As environmental quality continues to improve after completing these Management Actions, monitoring efforts will assess conditions and the status of impairments in the AOC, with the ultimate goal of removing all BUIs and delisting the AOC.



An aerial view of post-construction restoration of steel slag and steel mill waste areas, at the beginning of the first growing season. Image: Coldwater Consulting

Kletzsch Dam Fish Passage Restoration in the Milwaukee Estuary AOC



Kletzsch Dam was one of the largest remaining barriers to fish passage on the Milwaukee River, and repairs were needed to maintain the dam's safety and functionality. To address this barrier and allow native fish to move upstream while keeping the historic dam intact, the Milwaukee Metropolitan Sewerage District (MMSD) designed and constructed a

channel that bypasses the dam to the east, creating an open stream passageway. The passageway will allow fish in the Milwaukee Estuary to move from Lake Michigan to upstream areas encompassing 25 miles of river, 29 miles of tributary streams and 2,400 acres of wetlands, thereby significantly contributing to broader efforts to improve fish passage in the AOC and the Milwaukee Estuary watershed. Construction of the channel was completed in December 2023, and fish have already begun using the channel to move upstream of the Kletzsch Dam.

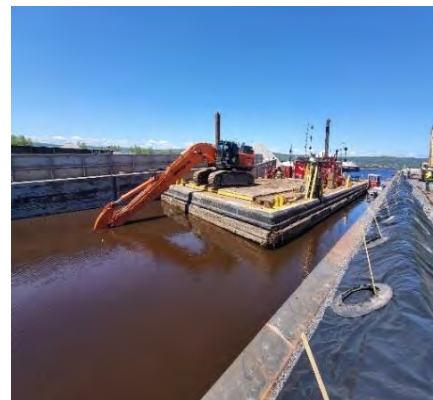


An aerial view of the Milwaukee River at Kletzsch Dam with the newly opened fish passageway. Image: Milwaukee Metropolitan Sewerage District

C. Reiss Slip Sediment Remediation in the St. Louis River AOC



Through a partnership between the EPA, the C. Reiss Company, the Wisconsin Department of Natural Resources (DNR) and the U.S. Army Corps of Engineers (USACE), contaminated sediment was remediated within the C. Reiss Slip in the St. Louis River AOC. The C. Reiss Slip, located in Superior, Wisconsin, is surrounded by active commercial docks south of the Duluth-Superior Federal Navigation Channel in the inner harbor. This slip had not been dredged in many years, and contaminated sediments accumulated and persisted over time. In 2024, USACE completed a design review, awarded a construction contract, and managed construction for sediment remediation activities in the slip. Using GLRI funding under the EPA's Great Lakes Legacy Act Authority, approximately 20,000 cubic yards of contaminated sediment were removed from the slip.



Active dredging within C. Reiss Slip during the remediation project. Image: USACE

Ralph C. Wilson, Jr. Centennial Park in Detroit, Michigan



Under the authority of the Great Lakes Legacy Act, the EPA and the Detroit Riverfront Conservancy partnered to revitalize the Ralph C. Wilson, Jr. Centennial Park, located in the Corktown neighborhood of Detroit, Michigan.

Through a cost-sharing partnership, approximately 30,000 cubic yards of contaminated sediment were remediated, and over one-third of a mile of aquatic habitats within the Detroit River were restored on the 22-acre site. The project's components included placing an engineered cap along a 2,100-foot stretch of the Detroit River adjacent to the park, installing a soft shoreline to stabilize the edge of the park and prevent subsidence into the river, placing spawning reefs in the river, and constructing a 1.35-acre water garden with connected wetlands surrounded by an additional 2.75 acres of native vegetated habitat.



The completed Ralph C. Wilson, Jr. Centennial Park project as seen from above. Image: Detroit Riverfront Conservancy

Evaluating the Contribution of Mercury from Peatlands in the St. Louis River



The St. Louis River in Minnesota is an economically and culturally important ecosystem, with a history of mercury contamination. In 2024, the U.S. Geological Survey (USGS) and the EPA assessed the role of upstream peatlands in mercury cycling to the St. Louis River. Peatlands are important ecosystems that play a role in maintaining high water quality and are home to a diverse array of plant and animal species. The restoration of degraded peatlands in northern Minnesota, led by federal, state and private partners, is actively occurring to preserve and improve peatland habitat. Preliminary results indicate that peatlands serve as a sink for mercury, and restoring these peatlands can modulate the release of mercury into the St. Louis River.



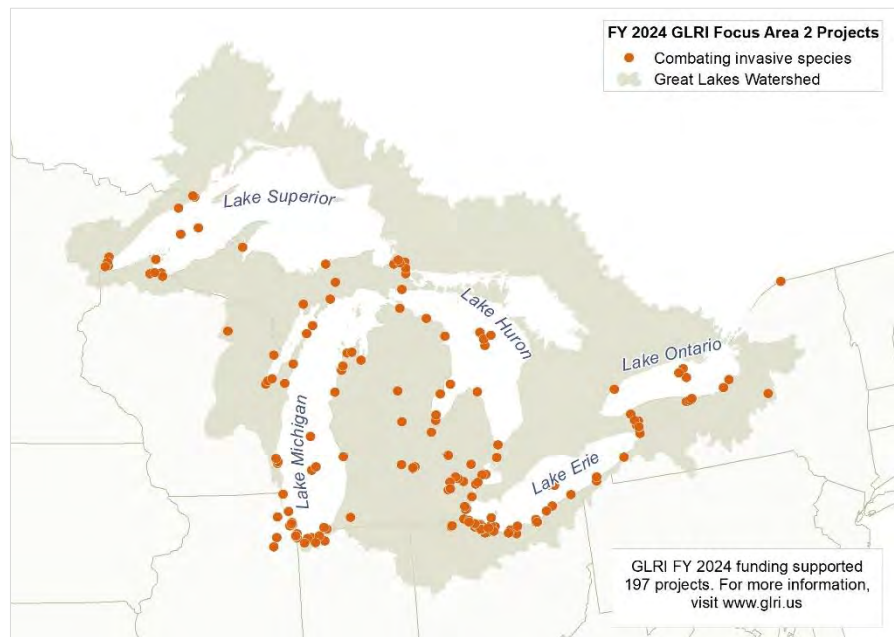
USGS staff training researchers from the University of Minnesota on mercury sampling in the St. Louis River peatlands. Image: USGS

FOCUS AREA 2: Preventing and Controlling Invasive Species

During FY 2024, GLRI federal agencies and their partners continued efforts to prevent the introduction of new invasive species and control existing invasive species populations in the Great Lakes ecosystem. GLRI investments in Focus Area 2 in FY 2024 continued to prioritize the prevention of new introductions of nonnative and invasive species into the Great Lakes. This proactive approach allows for greater efficiency and cost savings.

Key investments during FY 2024 included continuing critical prevention activities, such as maintaining a comprehensive invasive species tracking and reporting system (the Great Lakes

Aquatic Nuisance Species Information System, or GLANSIS); conducting targeted monitoring of high-risk sites for introductions of new invasive species; completing risk assessments for invasive species not currently present, but which could become established if introduced; and developing and applying genomic tools to aid in the early detection of aquatic nuisance species.



For such a small fish, the round goby has a big impact on the Great Lakes. The USFWS is working to mitigate the effects of these invasive fish that feed on native lake trout eggs and larvae. Dozens of invasive species, including the round goby, are causing ecosystem harm in the Great Lakes and contributing to damages that total an estimated \$200 million annually. Image: USFWS

During FY 2024, GLRI funded 27 early-detection monitoring activities that enhanced the ability of GLRI federal agencies and their partners to detect and respond to the introduction of new invasive species. GLRI federal agencies and their partners also completed training in response to new species detections, and they conducted nine tabletop exercises, field responses and/or drills — exceeding the GLRI Action Plan III target of eight rapid responses and exercises in FY 2024.

GLRI federal agencies and their partners have further reduced the risk of invasive species entering the Great Lakes watershed by funding 26 projects in FY 2024 that help block the pathways of introduction. These pathways include canals and waterways, recreational boating, commercial shipping, the illegal trade of banned species, the release of aquarium species and the release of live bait.

GLRI federal agencies and their partners also restored sites degraded by aquatic, wetland, and terrestrial invasive species. GLRI federal agencies supported community efforts to control and reduce the spread of invasive species. These projects were implemented with local partners, who are expected to continue maintenance and stewardship beyond the duration of the federally funded project's lifespan. In FY 2024, GLRI-funded projects controlled aquatic and terrestrial invasive species on over 42,000 acres in national forests, parks, wildlife refuges and other important habitats, bringing the cumulative total to more than 303,000 acres since the inception of GLRI.

In FY 2024, GLRI federal agencies and their partners maintained or increased support to seven species-specific "collaboratives," which help communicate the latest control technologies and management techniques to their members. Collaboratives that received continued funding focus on invasive carp, *Phragmites*, invasive mussels, invasive crayfish, monoecious hydrilla, European frog-bit and forest health. These collaboratives are actively involved in invasive species prevention and control efforts under the GLRI. For example, efforts by the Invasive Carp Regional Coordinating Committee (ICRCC) to prevent the establishment of invasive carp in the Great Lakes continue to show success. In FY 2024, no bighead or silver carp were captured or observed in the Chicago Area Waterway System during the weeks-long spring or fall seasonal intensive monitoring efforts.

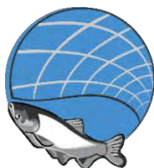


A multiagency team of biologists from the USGS, USFWS, and the Illinois Natural History Survey collaborates to surgically implant acoustic transmitters into native and invasive fish species for the evaluation of experimental invasive carp deterrents. Deterrents are one tool used to prevent the establishment of invasive carp in the Great Lakes. Image: USGS

Protecting the Great Lakes from invasive carp

The GLRI provides support to the Invasive Carp Regional Coordinating Committee (ICRCC).

More ICRCC information is available at <https://icrcc.fws.gov/>.



During FY 2024, GLRI federal agencies and their partners developed and refined invasive species control technologies and management techniques while minimizing harm to other noninvasive fish, wildlife and plant species. To evaluate their effectiveness in controlling invasive species, GLRI federal agencies and their partners field-tested 25 different technologies and methods.

Continuing in FY 2024, the GLRI supported the implementation of a Great Lakes Ballast Water Research and Development Plan to address the unique challenges faced by commercial ships operating solely within the Great Lakes. This comprehensive research-focused plan includes extensive collaboration with states, port authorities, nongovernmental organizations, industry, academics and other stakeholders. It is accelerating shipboard- and land-based testing of ballast water management systems to identify technologies and practices capable of reducing ship-mediated transfers of organisms within the Great Lakes. The research and technology development effort is being led by the Great Waters Research Collaborative operating out of the University of Wisconsin-Superior's Lake Superior Research Institute through an agreement with the U.S. Department of Transportation's Maritime Administration.

Focus Area 2 Success Stories

Developing Dreissenid Mussel Water Control Technologies in Lake Michigan



The NOAA Great Lakes Environmental Research Laboratory is partnering with the University of Wisconsin-Milwaukee and other partners on a multiyear study on the use of underwater vehicles for invasive dreissenid mussel control in deeper, soft substrate environments. In July 2024, the team operated a tracked remotely operated vehicle (ROV) in small test plots at a depth of 45 meters in Lake Michigan. They monitored the plots before and after treatment using multibeam sonar, video surveys and physical grab samples. The team learned several lessons from this initial stage of the study, which was the first time this type of vehicle had been used for invasive mussel control (see images). Adding implements to the ROV that were designed to displace and/or damage the mussels increased sediment disturbance and reduced maneuverability, and the preliminary results reveal fewer live mussels in those plots six weeks post-treatment. None of the methods tested appeared to negatively impact nontargeted benthic organisms. The team will use these findings to refine the implements for further testing in 2025.

They monitored the plots before and after treatment using multibeam sonar, video surveys and physical grab samples. The team learned several lessons from this initial stage of the study, which was the first time this type of vehicle had been used for invasive mussel control (see images). Adding implements to the ROV that were designed to displace and/or damage the mussels increased sediment disturbance and reduced maneuverability, and the preliminary results reveal fewer live mussels in those plots six weeks post-treatment. None of the methods tested appeared to negatively impact nontargeted benthic organisms. The team will use these findings to refine the implements for further testing in 2025.



(Left) Tracked ROV deployed underwater at a 45-meter depth study location in Lake Michigan that is covered with extensive invasive mussel beds. (Right) Forward-looking multibeam image of the 100-square-meter plot cleared using the "water jet" implement pulled behind the tracked ROV. Image: NOAA

Preventing Invasive Carp from Entering the Great Lakes through the Illinois River



Monitoring invasive carp populations and implementing control efforts in the Illinois River is critical for preventing the spread of Invasive Carp into the Great Lakes basin. On the Illinois River and throughout the Great Lakes basin, USFWS is conducting sampling to screen for the presence of invasive carp.

The USFWS, Illinois DNR and other partners are monitoring the population of invasive carp in the Illinois River to gather crucial information on the invasive carp's life cycle, abundance, congregating habits and movement. These partners also support the removal of about 8 million pounds of invasive carp annually from the Illinois River. All the data gathered and analyzed help to improve the effectiveness of removal efforts, develop deterrents and assess the effects of different management actions.



Continued GLRI support has made it possible to fortify, improve and accelerate our collective efforts to defend the health of the Great Lakes against the threat of invasive carp. Image: Ryan Hagerty, USFWS

Great Lakes Coastal Wetland Revitalization on Ohio's Lake Erie Shoreline



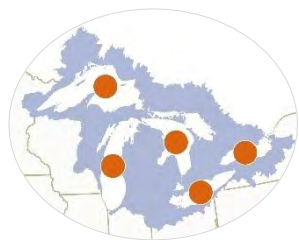
Flowering rush (*Butomus umbellatus*) is an emergent aquatic invasive plant that has invaded numerous wetland, lake and riverine systems in the Great Lakes. It can establish in high densities, eliminating native plant communities. The USACE conducted a GLRI-funded study on the growth habits of the flowering rush within the Great Lakes to identify the most effective management

strategies for controlling this invasive species. USACE applied the results of this study, in partnership with the Cleveland Museum of Natural History, to institute a control program at Mentor Marsh in Ohio, a significant natural Marsh along Lake Erie and a vital breeding and migratory habitat for fish, waterfowl, songbirds and butterflies. The partnership for control work in Mentor Marsh uses USACE Aquatic Plant Control base program funding, a powerful example of how the GLRI-funded study to improve management and control strategies can be leveraged with other programs within the Great Lakes to result in more effective invasive species control and restoration of vital Great Lakes ecosystems.



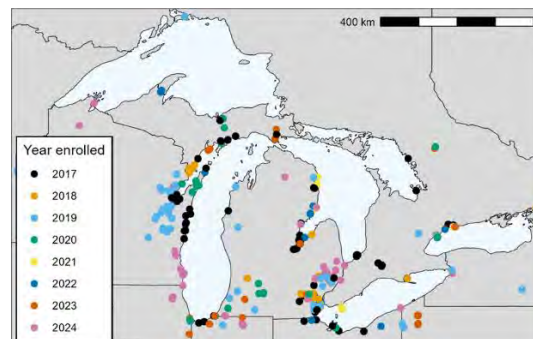
Collecting flowering rush plant material using a sediment corer for a phenology study. Image: USACE

Phragmites Adaptive Management Framework



Invasive *Phragmites australis* is difficult to control, and the effectiveness of management techniques varies. GLRI federal agencies, led by USGS, and project partners, use the *Phragmites* Adaptive Management Framework (PAMF) to collect data and update a predictive model, offering yearly

management guidance based on what techniques work best. To speed model learning, GLRI federal agencies and partners developed a small grants program that provides funding to locations using underutilized but promising management techniques. More than \$239,000 was awarded to 17 organizations across six Great Lakes states. In 2024, the total number of active management units participating in PAMF increased to 174 across the Great Lakes, 70 of which were enrolled by the grant recipients.



Total management units enrolled in the Phragmites Adaptive Management Framework (PAMF) each year since 2017. Image: Great Lakes Commission

USDA Wildlife Services Minimizes Feral Swine Threats to the Great Lakes



Feral swine are a highly destructive invasive species with populations that have expanded across several Great Lakes states and throughout the country in recent years, resulting in damage to a wide range of important habitats. The U.S. Department of Agriculture's (USDA) Wildlife Services program and

its partners use GLRI funds to implement on-the-ground control activities and promote education to prevent new introductions of feral swine in New York, Michigan, Ohio and Wisconsin. Increased monitoring efforts, coupled with rapid detection and early response, have lowered feral swine densities in Michigan and Wisconsin and have eliminated feral swine from New York. In Ohio, Wildlife Services has removed one emergent feral swine population and prevented two others from establishing. Thorough surveillance, including the use of camera traps and helicopters, and public education continues to be employed with the goal of eliminating invasive swine from the Great Lakes basin. Dedicated wildlife damage management efforts like these by USDA Wildlife Services remain important to the conservation of habitat and promotion of native species biodiversity in the Great Lakes ecosystem.



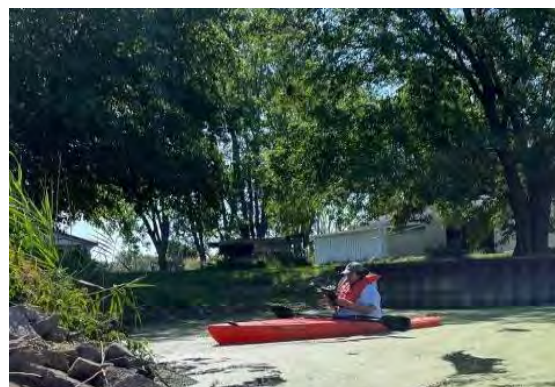
Feral swine feeding along a ridgetop. Image: USDA Wildlife Services

Forest Service Grant Supports Invasive Species Control in the Saginaw Bay Watershed



With support from the U.S. Forest Service (USFS), the Saginaw Bay Cooperative Invasive Species Management Area (CISMA) has monitored over 700 acres for invasive plants and treated over 250 acres to control the introduction and spread of Phragmites, Japanese knotweed and

European frog-bit populations. Two shoreline sites, one just south of Au Gres and another just north of Sebawaing, were treated for Phragmites using GLRI funds. Japanese knotweed treatments were also conducted in multiple locations. Invasive plants were either sprayed with herbicide or pulled from the water during the treatments. The CISMA and the Michigan Department of Transportation coordinated and shared their data to treat Japanese knotweed on public highways, corridors that allow invasive plant species to spread quicker.



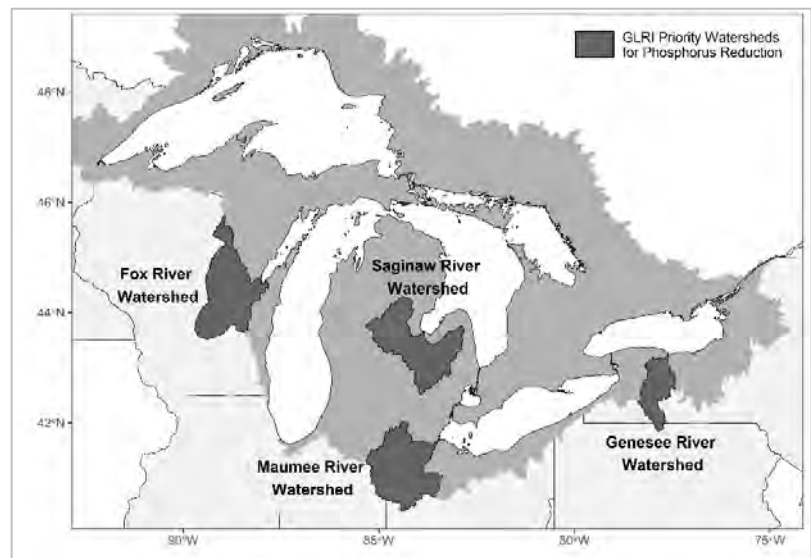
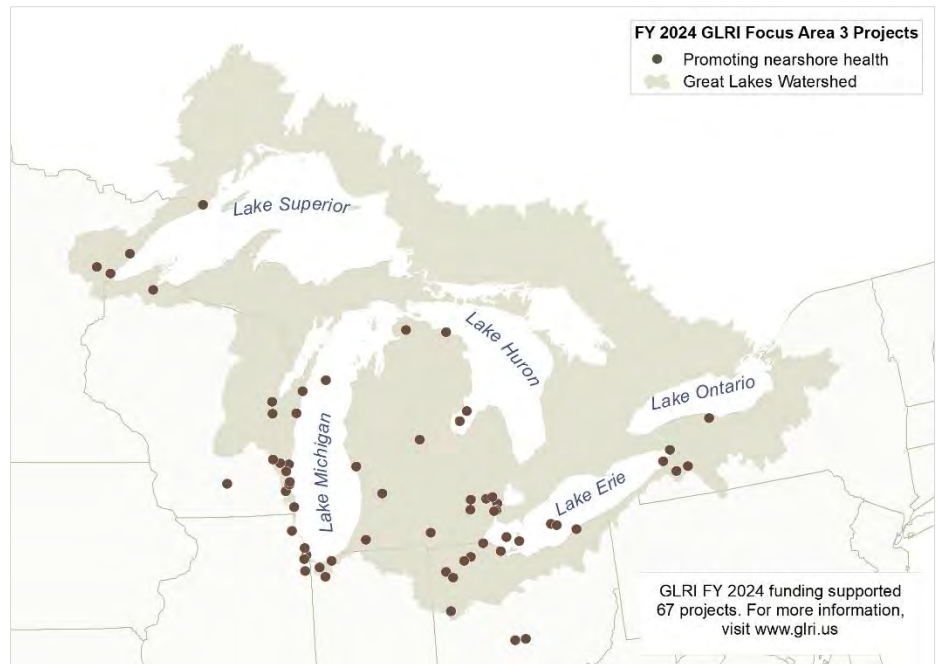
A scientist maps European frog-bit and Phragmites in the Quanicasee River using a tablet and kayak. This method of on-the-ground monitoring provides details to be used for treatment and follow-up work. Image: James Rogers, Saginaw Bay CISMA

FOCUS AREA 3: Nonpoint Source Pollution Impacts on Nearshore Health

Polluted runoff, also known as nonpoint source pollution, threatens the Great Lakes ecosystem by contributing to HABs, nuisance algae, drinking water impairments, ecological dead zones and beach closures that result in lost recreational opportunities. Runoff carries nutrients from fertilizer, sediment, bacteria, road salts and other land-applied chemicals, such as herbicides and pesticides. The pollutant carried by runoff that most significantly impacts the Great Lakes' nearshore areas is phosphorus, as it is the primary nutrient that drives algal growth.

GLRI federal agencies and partners are working to reduce phosphorus loadings from agricultural watersheds in several ways. GLRI funding is used to supplement other prominent agricultural conservation programs, such as the USDA's Natural Resources Conservation Service (NRCS) Environmental Quality Incentives Program, which provides technical and financial assistance to agricultural producers to plan and install conservation practices. In addition, GLRI federal agencies partner with and provide grants to support nongovernment programs and projects at the state and local levels, such as demonstration farms. Phosphorus reduction efforts to help prevent excess algae growth in the Great Lakes are prioritized in the four GLRI agricultural priority watersheds: the Lower Fox River, the Saginaw River, the Maumee River and the Genesee River.

GLRI agencies estimate that projects funded in FY 2024 will prevent more than 195,000 pounds of phosphorus from entering the Great Lakes. These project efforts include a renewed focus on improving on-farm nutrient management through technical and financial assistance to farmers on more than 53,500 acres. Many of the conservation practices being adopted also reduce other pollutants, such as nitrogen and sediment.



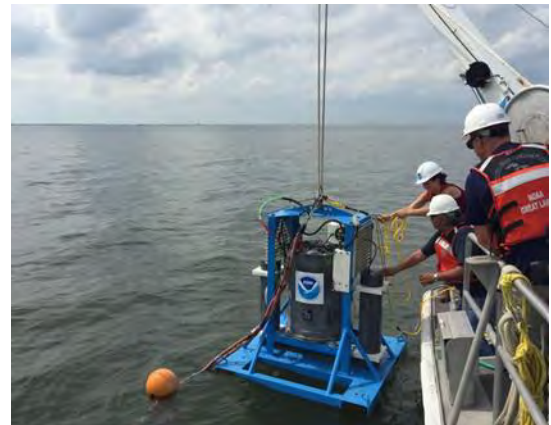
Phosphorus reduction efforts are prioritized in these four GLRI agricultural priority watersheds to help prevent excess algae growth in the Great Lakes.

GLRI federal agencies and their partners also use GLRI funding to support watershed-based projects to address nonpoint source pollution in urban areas. Projects started in FY 2024 will capture over 83 million gallons of untreated urban runoff per year and protect approximately 24 miles of streams and shoreline. These projects reduce flooding, increase green space in urban areas, reduce bacterial contamination and return vacant properties to productive use. The types of best management practices implemented include tree planting, bioretention ponds and bioswales.

Tracking toxic algal blooms in Lake Erie

In 2023 and 2024, the NOAA Great Lakes Environmental Research Laboratory (GLERL) deployed a network of 2nd-Generation “Environmental Sample Processors” (2G ESPs) in Lake Erie to monitor HABs and provide near-real time measurements of microcystin, the toxin often present in these blooms. The ESPs are sophisticated instruments that can collect and analyze water samples on the spot. A network of three 2G ESPs were deployed to continually collect data across the lake’s western basin, where the annual blooms each summer are most intense. The ESP can measure the severity of the bloom as it develops; for example, the 2G ESP deployed near Monroe, Michigan, captured a 650% increase in microcystin concentration over a 48-hour period. This is important information for various stakeholders, including people swimming or boating in the lake and the managers of drinking water treatment intakes. The data collected also support the latest HABs research and predictive models. Data can be accessed through GLERL’s HABs data site:

https://www.glerl.noaa.gov/res/HABs_and_Hypoxia/esp-data/



NOAA researchers deploying a 2nd Generation ESP in Lake Erie. Image: NOAA GLERL

GLRI federal agencies conduct more than 30 nutrient monitoring and assessment activities annually to evaluate the effectiveness of nutrient and stormwater reduction practices. These include an [edge-of-field monitoring network](#) in the agricultural priority watersheds and [urban stormwater monitoring](#) in Gary, Indiana; Detroit, Michigan; Buffalo, New York; and Milwaukee, Wisconsin. In addition, GLRI leverages partnerships like the [NRCS Conservation Effects Assessment Project \(CEAP\)](#) to document the outcomes of conservation practices being implemented in the western Lake Erie basin.

Focus Area 3 Success Stories

Measuring Water Quality Benefits of Innovative Farming Practices in Wisconsin



A GLRI Demonstration Farm in northeast Wisconsin is providing a unique opportunity to measure the impacts of two innovative practices applied as a system designed to remove dissolved phosphorus and nitrates. Working with NRCS in FY 2024, Kinnard Farms was the first demonstration farm in the nation to install

a [denitrifying bioreactor](#) and a [Phosphorus Removal System](#) built in-line on the same tile system within a field. Over the next several years, USGS will monitor the system at three different points, collecting data that will help tell a more complete story about the impact of pairing these two technologies on subsurface water quality. Stacking multiple conservation practices together magnifies the positive impact on soil health and water quality. Demonstration farms like Kinnard Farms not only receive operational benefits, but they also generate a ripple effect across the region. As a member of the [Door-Kewaunee Demonstration Farms Network](#), established under GLRI in 2017, Lee Kinnard says keeping soil and nutrients out of Green Bay and Lake Michigan is what drives him to try new practices on his farm.



Installation of the water control structure for the Phosphorus Removal System at Kinnard Farms. Image: NRCS

Cattle Fencing on National Forest Grasslands Helps Protect Water Quality in the Finger Lakes



The Finger Lakes National Forest is home to one of the largest grazing programs East of the Mississippi, consisting of 5,085 acres of grasslands. When grazing is administered responsibly, it can be a cost-effective management tool to help maintain the quality of these open lands for cattle and wildlife. However, cattle

grazing in riparian areas can be a significant source of nutrients and sediment in receiving waterbodies. GLRI supports projects to reduce the impact of cattle grazing and, specifically, to reduce nutrient loads to the Great Lakes. In 2024, the USFS completed a project to protect a headwaters stream in the 50-acre South Wilkens pasture, which grazes 25 cow-calf pairs. Water from this pasture eventually ends up in Seneca Lake on its way to Lake Ontario. USFS installed exclusionary fences around the riparian areas to prevent cattle from accessing them and planted native plants in the riparian area. As the banks revegetate, they will provide a variety of wildlife habitat and stabilize the riparian area.



The armored spillway and eroded bank, starting to recover in the fenced riparian area. Image: USFS

Farmers Advocate for Conservation to Protect Lake Erie



Regenerative agriculture is a way of farming that is focused on soil health and ecosystem benefits. For many farmers, conserving soil health is a big shift from traditional agriculture and is not the norm in their community. With funding from the GLRI, The Nature Conservancy (TNC) Ohio launched a successful new

farmer engagement program to advance regenerative agriculture in the Maumee River watershed. From 2020 to 2024, TNC recruited and trained 26 conservation-minded farmers to serve as [mentors](#) to other farmers in their communities. The purpose of the training was to elevate the work of these farmers by helping them develop effective communication skills to be able to share their experiences



Farmer Advocates for Conservation demonstrate soil health with a simple water infiltration test. Image: The Nature Conservancy Ohio

with other farmers. The mentors, who manage 28,590 acres themselves, directly engaged over 11,680 farmers through workshops, field days and one-on-one interactions. Farmers trust and rely on other farmers for information, and peer-to-peer mentorships give farmers the confidence necessary to try something new. Building a culture of conservation will help transition farmers to more sustainable practices that protect water quality.

USFS GLRI Grant Supports Six Strategic Tree Planting Projects in Michigan and Indiana



ReLeaf Michigan, the Michigan DNR, the Indiana DNR, the St. Joseph River Basin Commission, and the Davey Resource Group, Inc. collaborated with six communities to expand the tree canopy in the St. Joseph River watershed and reduce runoff to Lake Michigan. Project participants included the Indiana towns of

Middlebury and Syracuse, the Indiana city of Angola, and the Michigan cities of Buchanan, Coldwater and Sturgis. The [project](#) partners worked closely with each community to conduct tree canopy assessments, prioritize planting locations and implement local volunteer-led planting events. At the completion of the project in

2024, about 50 trees were planted in each community, with the combined benefit of intercepting an average of 18,290 gallons of runoff annually for the next 20 years. In total, these communities' combined tree canopy provides over \$4 million each year in ecosystem benefits. Without trees, the communities would have to invest significantly more in stormwater infrastructure to handle the water flow that would otherwise have been intercepted by trees.



Volunteers planting trees in Middlebury, Indiana. Image: USFS

Green Stormwater Infrastructure Improvements at Hartley Park in Duluth, Minnesota



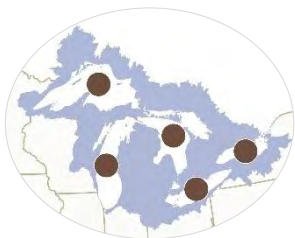
Tischer Creek, a tributary to Lake Superior, is a high-quality trout stream facing significant water quality threats. A recently completed green infrastructure project in Duluth, Minnesota, slows runoff and reduces erosion in Tischer Creek to protect water quality. St. Louis County led the

project in partnership with the EPA and USACE. Prior to construction, drainage from 117 acres of untreated suburban area was collected by a large storm sewer and discharged directly to the creek. By diverting runoff to an underground pretreatment vault, a stormwater pond and a series of vegetated basins, the runoff now recharges wetlands and groundwater instead. In addition, the project removed a significant amount of invasive wetland plants and improved recreational access to a nature preserve. This GLRI project reduces nonpoint source pollution to Lake Superior and treats approximately 2.3 million gallons of stormwater annually.



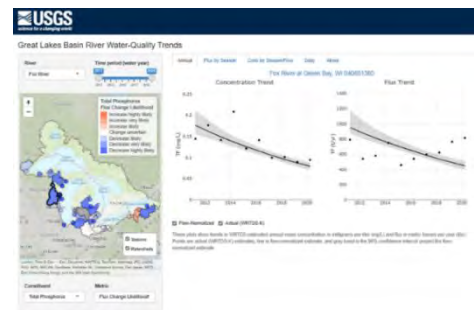
Aerial view during construction at Hartley Park. Image Minnesota Pollution Control Agency

Great Lakes Tributary Water Quality Dashboard



USGS has been monitoring water quality in 24 U.S. tributaries to the Great Lakes since 2011 with GLRI funds. The monitoring data were recently used to evaluate changes in phosphorus, nitrogen and suspended sediment from 2011 to 2020 and to factor out the influence of streamflow variability on these changes using a method called

flow-normalization. This method reduces year-to-year variation caused by weather and flow rates. One highlight of the results is that flow-normalized total phosphorus loads have decreased or remained steady in most (21 of the 24) of the monitored tributaries, indicating widespread progress toward the nutrient reduction goals of the GLRI and the GLWQA. All the results of this analysis are published on an interactive, web-based [dashboard](#) and will be regularly updated as new data become available.



Example screenshot of the Great Lakes Tributary Water Quality Dashboard showing water quality trends

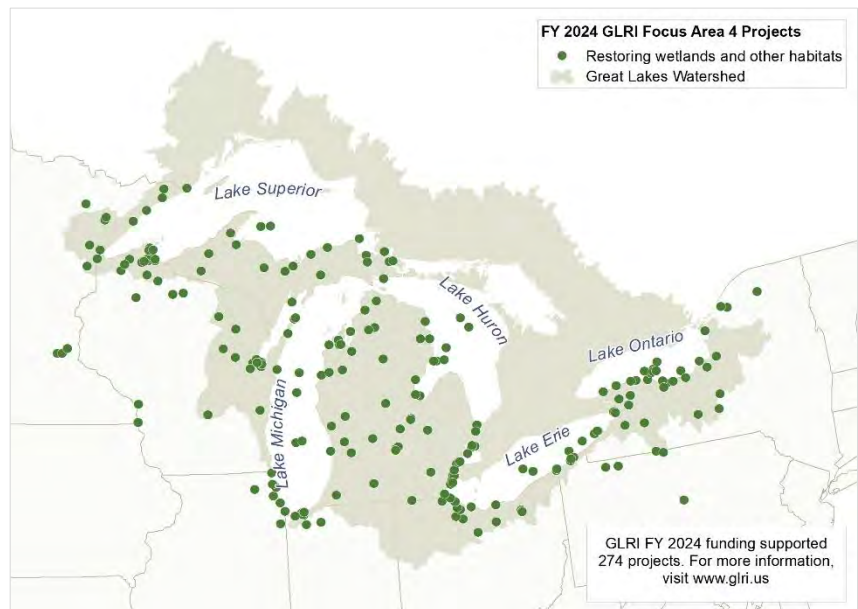
FOCUS AREA 4: Habitat and Species

During FY 2024, GLRI federal agencies and their partners implemented projects to protect, restore and enhance Great Lakes habitats and native species. GLRI-funded projects have led to the reopening of nearly 9,000 miles of Great Lakes tributaries, increasing the aquatic connectivity for numerous fish species. Projects that addressed aquatic connectivity in FY 2024 supported continued restoration of native fish species, including brook trout and lake sturgeon.

Since the GLRI began in 2010, the EPA has highlighted the importance of efforts to protect, restore and enhance Great Lakes coastal wetlands. These wetlands provide residents of the Great Lakes with many environmental and economic benefits, including protecting property from high water levels and wave action, removing nutrients from rivers and the nearshore areas of the Great Lakes before they feed harmful and nuisance algae, and supporting fish nursery habitats necessary to support recreational and commercial fisheries. Over 88,000 acres of coastal wetlands have been protected, restored and enhanced.

Restoration and protection efforts continued to be assisted and informed by the Great Lakes Coastal Wetland Monitoring Program. This program continues to provide a comprehensive assessment of the coastal wetland status and trends across the five Great Lakes.

States, Tribes and their local partners continued to play critical roles in advancing important projects across the Great Lakes basin that benefited fish and wildlife and neighboring communities. For example, in Minnesota, a fish passage project restored connectivity to critical native brook trout spawning and wintering habitat and thermal refugia in Hockamin Creek, a tributary to the Baptism River, which flows into Lake Superior in Minnesota. Two undersized culverts were replaced with a bridge designed for aquatic organism passage, restoring habitat connectivity for 8 miles upstream and opening an additional 6 miles for brook trout and other aquatic life. Replacing these culverts restored access to the highest quality cold-water habitat in the Hockamin Creek watershed.



Shoreline of Thunder Bay Island. Image: Chris Engle and Huron Pines



After: New bridge at Hockamin Creek Ramstad crossing (note moose crossing on the left!). Image: Jeff Jaspersen, MPCA

In Traverse City, Michigan, the Grand Traverse Band of Ottawa and Chippewa Indians (GTB) hosted their first annual Sturgeon Release Ceremony, where members of the community gathered along the shores of the Boardman-Ottaway River to hand-release hundreds of juvenile lake sturgeon. It was a monumental and emotional event, with attendees celebrating the return of a species that was extirpated from a river where it was once abundant. Reductions of sturgeon populations throughout the Great Lakes has not only impacted the health of the rivers, but also Tribal culture. GLRI funding has allowed the removal of three dams along the Boardman river, which reconnected 28 miles of river, providing lake sturgeon renewed access to valuable habitat. The return of Nmé (lake sturgeon) to the Boardman-Ottaway will help revive the cultural identity and the strong ecological connection inherent to the Anishinaabek people. The fish were reared at GTB's Streamside Rearing Facility.



7th and 8th graders from TCAPS Montessori releasing juvenile sturgeon into the Boardman River. Image: Traverse City Record Eagle, Jan-Michael Stump



Dwarf lake iris. Image: Joel Trick, USFWS

The GLRI continues to emphasize, protect and restore Great Lakes species through comprehensive approaches that are not possible through agency base-funded programs. These efforts benefit native fish, bird and amphibian species and include the completion of actions in FY 2024 that significantly protected and promoted the recovery of the American hart's-tongue fern, dwarf lake iris, Pitcher's thistle and native prey fish. The dwarf lake iris is federally listed as a threatened species and, thanks to effective recovery actions taken with GLRI funding, the species is now being considered for delisting.

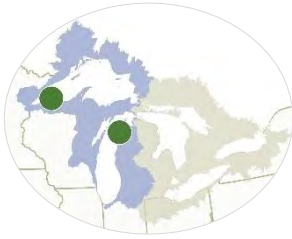
In FY 2024, the Great Lakes Pollinator Task Force restored and enhanced more than 2,130 acres of pollinator habitat across the Great Lakes basin on both federal and private lands. This benefits species such as the rusty patched bumble bee (RPBB), which is federally endangered. Once widespread across the Midwest and Eastern United States, its historical range has been reduced by 87% to 99%. Although the number of RPBB detections has increased since 2017 in and around cities, research shows RPBB in the Great Lakes Region and the Midwest are static or decreasing. Using model predictions, USGS discovered over 50 new populations of RPBBs between 2022 and 2024 in rural areas, expanding the known range of the species by more than 2,300 square miles. This work suggests RPBBs may be more widespread than previously realized; however, more monitoring in rural areas is needed to confirm this.



An RPBB visits a butterfly milkweed in eastern Minnesota. Image: Clint Otto, USGS

Focus Area 4 Success Stories

Great Lakes Piping Plover Record Pair Numbers at National Lakeshores in 2024



Each season, GLRI supports work to locate and identify critically endangered Great Lakes piping plover pairs and nests, then put protections around the nests and monitors each for the full breeding season. With this dedicated effort, monitors can increase nest success, quickly identify abandoned nests if they fail, and rescue

eggs that can be raised in captivity to help supplement the population. With support from university partners, each Great Lakes piping plover is banded, which has increased knowledge about the species and improved management outcomes. In FY 2024, a record 81 pairs of Great Lakes piping plovers were discovered and protected in the basin. Of these 81 pairs, nearly half (39) bred at National Park Service (NPS) sites. With the help of dedicated NPS and partner monitors, Sleeping Bear Dunes National Lakeshore (SLBE) fledged 40 chicks in the wild, and Apostle Islands National Lakeshore (APIS) fledged eight chicks (48 out of 124 total for the Great Lakes population). Thanks to the diligence of the SLBE monitors, an additional 10 chicks were fledged through captive-rearing efforts with other Great Lakes piping plover partners.



Piping plover captive release at Sleeping Bear Dunes National Lakeshore. Image: Vince Cavalieri, NPS

Great Lakes Coastal Wetland Revitalized on Ohio's Lake Erie Shoreline



In FY 2024, USACE partnered with the City of Port Clinton, Ohio, to restore 12 acres of coastal wetland habitat in the Western Basin of Lake Erie. This collaborative restoration effort provides significant large-scale ecological benefit, considering that the Western Basin of Lake Erie has experienced a 95% loss of

its historic coastal wetlands. The wetland in Port Clinton contributes to habitat connectivity for two major bird migration flyways — the Atlantic and Mississippi, while improving biodiversity for a multitude of aquatic species. Restoration work included treating invasive *Phragmites* and planting native wetland species. Small-scale channel excavation was also undertaken to establish important microhabitat features. GLRI funding was leveraged through the USACE Great Lakes Fishery and Ecosystem Restoration Program, with state and local funding providing nonfederal cost share. Partners, including the Ohio Environmental Protection Agency, the Ohio Division of Natural Resources, the Ohio Lake Erie Commission, the USFWS and the Great Lakes Fishery Commission, contributed to this success.



USACE contractors perform native planting surveys to ensure success of coastal wetland habitat. Image: USACE

Poweshiek Skipperling Butterflies Population Increase From Record Low in the Midwest



Poweshiek skipperling butterflies were once widespread and abundant throughout the U.S. Midwest. However, this species is known to only remain in a single Michigan county. The USFWS used GLRI funds to collaborate with the Minnesota Zoo, the Haddad Lab at the University of Michigan, the John Ball Zoo and other partners to captively rear and breed Poweshiek skipperling butterflies and optimize their survival into

adulthood. This work resulted in the release of over 1,400 butterflies into Michigan prairies in 2024, which followed releases of more than 600 butterflies between 2022 and 2023. A record low of nine wild butterflies were observed in the U.S. in 2022. However, a total of 194 wild butterflies were observed in 2024; this significant increase in population is likely a direct result of the butterfly releases in previous years.



Poweshiek skipperling sipping nectar. Image: Vince Cavalieri, USFWS

Lakeview Wildlife Management Area Restoration Project in Northern New York



In FY 2024, a regional partnership between NOAA Fisheries and the Great Lakes Commission improved habitat for fish and wildlife at Lakeview Wildlife Management Area in northern New York. Prior artificial manipulation of water levels resulted in a less-diverse habitat, with dense

mats of cattails and encroaching invasive species. This project utilized “channeling and potholing,” a wetland enhancement technique to restore 180 acres of coastal wetlands, create 5,000 linear feet of 8-foot-wide channels, and improve 7 acres of open water habitat. This project improved the hydrology, water depths, the amount of open water and the habitat connectivity, which allows access to shallow water areas for spawning and nursery habitat for fish and breeding habitat for migrating birds. The project was managed locally by Audubon Great Lakes and Audubon New York in collaboration with the New York State Department of Environmental Conservation (the landowner) and Ducks Unlimited.



Aerial photo of the Lakeview Wildlife Management Area project site post-restoration. Image: NYSDEC

Restoration of Wetland Habitat at Shiawassee National Wildlife Refuge, Michigan



An ongoing USFWS wetland restoration project at the Shiawassee National Wildlife Refuge (NWR) reconnected over 1,000 acres of floodplain wetlands (recently converted from agricultural land) to the adjacent Shiawassee River for the first time in more than a century. Through critical partnerships with groups like Ducks Unlimited, the USGS Great Lakes Center

and the University of Michigan, the reconnection work has enabled fish to use the shallow floodplain for spawning and nursery habitat and promotes establishing wetland vegetation that is important to other wildlife species. In FY 2024, an additional phase restored 100 acres and reconnected 80 acres to the Shiawassee River. Overall, this project has enhanced 2,632 acres at the Shiawassee NWR.



Common gallinule at Shiawassee NWR. Image: Mike Budd, USFWS

USFS Takes a Partnership-based Approach to Aquatic Habitat Restoration in Cadillac, Michigan



Restoration projects across the Huron-Manistee National Forests require a collaborative approach due to mixed land ownership. In Cadillac, Michigan, the Wexford County Road Commission, Trout Unlimited, the USFS and other partners are tackling watershed-scale restoration in an

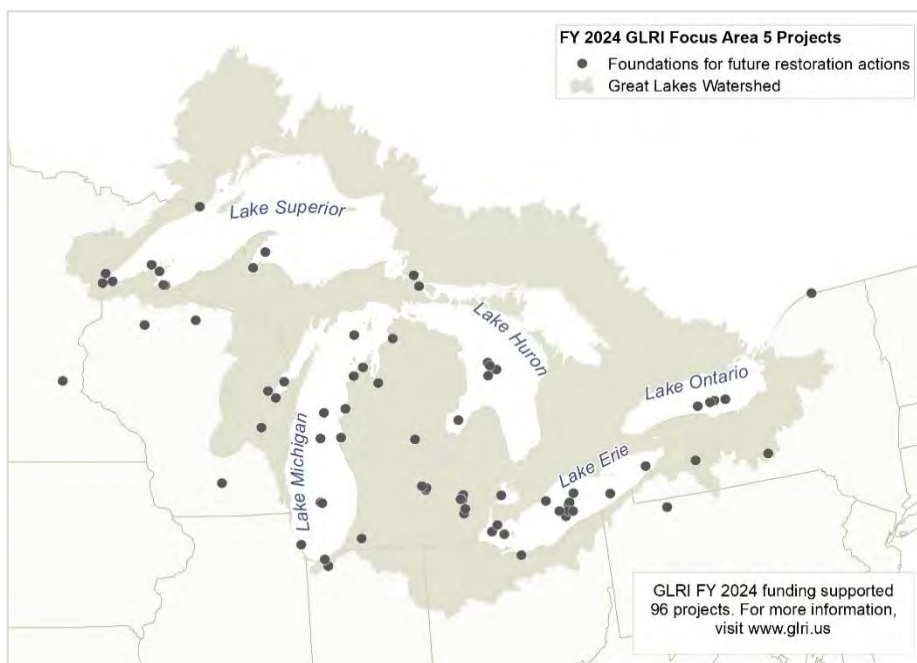
example of a successful partnership. Replacing undersized culverts with larger “stream simulation” culverts and bridges to restore fish passage and natural stream flows is an aquatic habitat management priority for the USFS. In FY 2024, the partnership completed the last of the 12 aquatic organism passage restoration projects within the Hinton Creek watershed, fully reconnecting the mainstem of Hinton Creek with its fish-bearing tributaries and enhancing the resiliency of the wild brook trout population and other native species. The initial partnership successes near Cadillac helped encourage the Trout Unlimited Great Lakes Stream Restoration Program to expand its work more broadly across Michigan and Wisconsin, where it now completes watershed restoration projects in partnership with three other national forests and many local organizations.



National Aquatic Organism Passage Road-Stream Crossings Training attendees (including USFS, NRCS, NOAA, state agencies and Tribal members) stop at this “stream simulation” crossing over Hinton Creek. Image: Luca Adelfio, USFS

FOCUS AREA 5: Foundations for Future Restoration Actions

As a foundation for future restoration, the GLRI continues to promote Great Lakes-based ecosystem education and stewardship. During FY 2024, GLRI federal agencies and their partners educated over 110,000 youth through NOAA's Great Lakes Bay Watershed Education and Training Program, USFWS wildlife refuge-based youth programs, NPS interpretive programs, the Great Lakes Sea Grant's Center for Great Lakes Literacy, and state educational programs led by the Ohio DNR, the Michigan DNR, and the Michigan Department of Environment, Great Lakes, and Energy. These programs provide hands-on experiences for youth, and networking opportunities to promote Great Lakes literacy among an engaged community of educators, students and citizens.



High school biology students learn about stream health and water quality monitoring, led by their teacher and natural resource professionals in a creek near their school in Brimley, Michigan. Image: Luke Evans, National Marine Sanctuary Foundation

The GLRI promotes Great Lakes ecosystem education and stewardship by engaging youth through place-based experiential learning. NOAA's Great Lakes Bay Watershed Education and Training (B-WET) in the Great Lakes region supports meaningful watershed educational experiences for students and professional development for teachers. In FY 2024, the Lake Superior State University B-WET project, "Supporting Data-centered 3P (Place, Problem, and Project-Based) Student Learning Through Teacher and Student Scaffolded Experiences Using MiWaterNet Stream Monitoring," completed stream health and water quality monitoring with high school students and teachers in the eastern upper peninsula of Michigan. Students and teachers at Brimley, Pickford, Rudyard and Les Cheneaux Community schools all worked to strengthen their data and freshwater literacy skills to better prepare them to critically use and evaluate data from local watersheds that drain into both Lake Superior and Lake Michigan.

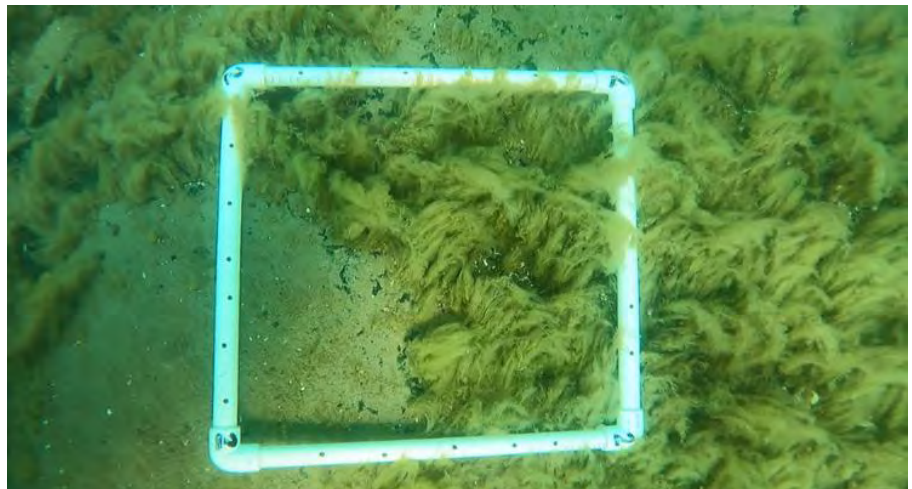
Science is another key piece of the GLRI activities in this focus area. During FY 2024, GLRI federal agencies and their partners conducted comprehensive monitoring to assess the status and trends of the Great Lakes ecosystem. GLRI federal agencies and their partners monitored coastal wetlands, contaminants, nutrients, hypoxia, HABs, zooplankton, phytoplankton, benthic communities and prey fish, among many other components of the Great Lakes ecosystem. This monitoring supports the EPA's statutory obligation specified in Clean Water Act Section 118(c)(1)(B) to establish a Great Lakes system-wide surveillance network to monitor the water quality of the Great Lakes. Monitoring data are used to prioritize future GLRI-funding decisions by identifying the ecosystem's most significant ongoing and emerging problems.

The GLRI Action Plan III incorporates science-based adaptive management to guide restoration and protection actions by using the best available science and lessons learned from GLRI investments. In FY 2024, GLRI federal agencies continued to implement projects addressing cross-focus area science priorities, including HABs/nuisance

algae and the need for coastal resilience. There has also been a continued focus on understanding ecological processes occurring in the winter months, including diatom blooms in Lake Erie and the status of lower food webs in the lakes. These priorities were identified in coordination with Tribal, state, and Lakewide Action and Management Plan partners. These priorities, along with results of annual science and monitoring, are used to guide GLRI project planning.

In FY 2024, the USGS continued its Great Lakes *Cladophora* assessment, collecting data on the status, trends and drivers of benthic algal growth in the nearshore waters of the Great Lakes. Overgrowth of benthic algae can cause shoreline fouling. Understanding the relationship between nutrient loading and algal growth will help resource managers determine the best way of managing the algal growth. This USGS work informs how to control nuisance algae before it washes up on beaches in large mats and becomes an issue for the public and wildlife, as it is linked to botulism outbreaks in birds and limits recreation on beaches and in nearshore waters. USGS's work is critical to providing data that allow for decision-making to protect public health.

In FY 2024, GLRI federal agencies and their partners continued tracking the progress of GLRI-funded projects. GLRI federal agencies used an improved relational database, Environmental Accomplishments in the Great Lakes 2 (EAGL2), which serves as an accountability system to track results from GLRI-funded projects against the GLRI Action Plan III Measures of Progress. To evaluate and improve the quality of reporting, the EPA conducts annual systemwide audits of the accountability system in accordance with the EAGL2 implementation manual.



Abundant Cladophora algae, covered in epiphytic diatoms at a depth of 3 meters in Lake Erie. Image: Madeleine Giordano, USGS

Focus Area 5 Success Stories

Michigan Students Become Future Stewards Through Salmon in the Classroom



Michigan DNR's Salmon in the Classroom Program engages 3rd- to 12th-grade students across the state in raising and releasing young salmon into approved waterways. Each participating class receives 150 chinook salmon eggs, which students help hatch and raise to fry

before releasing them into local waterways, where their journey toward the Great Lakes begins. In FY 2024, 298 classrooms and over 30,000 students participated in the program. Students learned about aquatic ecosystems and Michigan's fishing heritage through hands-on activities, such as maintaining tanks, fishing, studying macroinvertebrates and identifying native species. Local community members and groups contributed by supplying equipment and volunteering during classroom release-day events. The program has fostered hands-on engagement with Michigan's natural resources, enabling students to actively participate in place-based ecological stewardship of Great Lakes waterways.



Students kayak on the Detroit River on Salmon Release Day. Image: Michigan Chronicle

Future Leaders Learn about Watershed Conservation in Northern Wisconsin



USFWS staff at Whittlesey Creek NWR and Iron River Fish Hatchery in northern Wisconsin led 658 schoolchildren from kindergarten through 6th grade in grade-appropriate immersive, place-based, hands-on activities in FY 2024. These students learned about the importance of biodiversity, wetland habitats, water quality and

watershed protection. Through collaborations with schools and local educators, the hands-on experiences during field trips significantly increased student engagement. As a result, teacher requests for programming beyond the traditional field trip have increased, demonstrating USFWS' success in building sustained Great Lakes literacy and strengthening long-term partnerships with educators.



USFWS Park Ranger Arianna London teaches students about Lake Superior and the Whittlesey Creek NWR. Image: Mitch Baalman, USFWS

With a Hydrolab, Student Scientists Study their Environment



Hydrolabs are in-situ, real-time instruments equipped with sensors that scientists use to monitor water quality. Hydrolabs are available for educators to borrow through Illinois-Indiana Sea Grant and the

EPA Limno Loan Program. Since 2011, 103 educators have engaged 15,649 students in collecting and analyzing data from their local lakes, creeks and rivers. As a result, educators have reported spending up to 2.5 weeks more per year with their students on aquatic science topics, with the students more engaged because the data are relevant and applicable to real-world scenarios. A Crown Point, Indiana, high school student's experience and initiative with a Limno Loan Hydrolab led her to an independent study project; when she graduated and moved on to Purdue University, she brought the project with her and later published about it in the university's undergraduate research journal.



High school students deploy water quality sampling equipment in Lake Michigan. In FY 2024, the Limno Loan Program helped 21 schools bring real-world science and enhanced water quality lessons to 977 students. Image: Alan Allmen, Whitney Young Magnet High School

Monitoring Harmful Algal Blooms in Muskegon Lake using Aerial Imagery



In 2024, NOAA's Great Lakes Environmental Research Laboratory, in partnership with the Cooperative Institute for Great Lakes Research, monitored cyanobacteria HABs in Lake Muskegon using high-resolution imagery (1-meter scale) taken from aircraft flyovers. Planes with hyperspectral cameras captured images of the lake on two occasions during the bloom season. Images were

used to alert drinking water managers and other stakeholders of the location, size and movement of the cyanobacteria bloom. The flyovers are an important tool for monitoring HABs in the Great Lakes, as cloud cover can often interfere with satellite monitoring of the blooms. With this information in hand, resource and drinking water managers can ensure the water is safe for drinking and recreation.



HABs in Muskegon Lake can cause unsafe conditions for recreation activities like swimming. Image: Bopaiah Biddanda, Grand Valley State University

Understanding How Lake Winnebago and the Fox River Harmful Algal Blooms Impact Green Bay Water Quality



In FY 2023 and FY 2024, USGS scientists monitored water quality and the composition of cyanobacterial algal blooms throughout Lake Winnebago, the Fox River and Green Bay (in Lake Michigan) in Wisconsin to determine if algal blooms in Lake Winnebago are moving downstream and contributing to

cyanobacterial blooms in Green Bay. Algal bloom samples were collected during the summer months along the Fox River, and four boat surveys were conducted in Lake Winnebago, the Fox River and lower Green Bay to assess aquatic conditions, including dissolved oxygen, nitrate concentrations, algal pigments and algal toxin production. Shipboard measurements using high-frequency sensors indicated that pigments of all types of algae, including cyanobacteria, varied across locations and months. These preliminary results indicate that distinct blooms form throughout the Lake Winnebago-Fox River-Green Bay corridor during the summer months, suggesting that blooms in different locations may be promoted by different factors. This helps resource managers understand drivers of HABs in Green Bay and informs best management approaches for addressing the blooms.



An algal bloom within a lock on the Fox River, Wisconsin, in August 2024. Image: Luke Loken, USGS

Mapping Millions of Acres of Great Lakes Wetlands



In 2024, the USFWS National Wetlands Inventory (NWI) successfully mapped more than 3 million acres of wetlands in Western Lake Erie Basin, including the Lower Maumee River. Great Lakes wetlands are important because they protect and improve water quality, provide habitats for fish and wildlife, and store

floodwaters. Wetland maps are shared with the public through the NWI online wetland mapping tool. These maps are used extensively by resource managers and private property owners to plan wetland restoration projects and inform bird migration assessments.



The USFWS NWI generates critical information for resource managers regarding the locations and types of Great Lakes wetlands (above) to inform restoration and protection of important ecosystems. Image: Courtney Celley, USFWS

Section 3 – Regional Partner Engagement

The federal agencies that make up the GLRI collaborate and coordinate extensively with numerous entities each fiscal year to address the challenging ecosystem problems that affect the Great Lakes. Below are a few examples of this engagement with Great Lakes Tribes and states.

Great Lakes Tribes

GLRI support for Tribal nations within the Great Lakes basin has created and enhanced valuable partnerships and resulted in the implementation of important restoration and protective actions, including controlling invasive species, reducing nutrient and phosphorous loadings into waterways, reopening tributaries to restore fish passage, protecting Lake Superior coastal wetlands, and restoring several culturally significant species such as lake sturgeon, moose and wild rice.

In FY 2021, the EPA and BIA, working with Great Lakes Tribes, finalized the GLRI Distinct Tribal Program Framework. This Framework describes how the GLRI federal agencies will work with Tribal governments in the spirit of self-determination, maximum flexibility, and consistent with Federal Indian trust responsibilities to support Tribal priorities that are consistent with GLRI goals and objectives. The EPA continues to work with Tribal governments and the Bureau of Indian Affairs (BIA) to implement this program.

Accompanying the GLRI's FY 2024 enacted appropriation (Public Law [PL] 118-42) was explanatory language providing direction to fund the "GLRI Distinct Tribal Program at no less than \$16,500,000." The GLRI funded the Distinct Tribal Program at \$20.9 million in FY 2024.

Since GLRI's inception in FY 2010, Tribes have received a total of over \$183 million in GLRI funding, including over \$22 million directed to Tribes in FY 2024. This funding has been key in building Tribal resource management capacity and contributing to protecting and restoring treaty-reserved resources and culturally significant habitats and species that support Tribal lifeways.

Great Lakes States

GLRI federal partners are committed to working with all eight states within the Great Lakes basin. These states — Minnesota, Wisconsin, Illinois, Indiana, Michigan, Ohio, Pennsylvania and New York — play a critical role in restoring and protecting the health of the Great Lakes to ensure the quality of their economies and the health of their citizens. The partnership between the Great Lakes states and the GLRI continues to result in important work activities, including controlling invasive species, protecting fisheries, reducing nutrient and phosphorus loadings into waterways, capturing and treating urban runoff, and delisting AOCs. Since GLRI's inception in FY 2010, over \$677 million of GLRI funds have been awarded to Great Lakes states through the end of FY 2024, including over \$26 million from the FY 2024 appropriation.



Section 4 – Financial Reporting

Annual GLRI Appropriations

From FY 2010 to FY 2024, the EPA has been appropriated approximately \$4.9 billion in GLRI funds. The agencies that receive GLRI funds use multiple funding mechanisms to distribute the funds, including interagency agreements, fund transfers, competitive grants, and capacity-building grants to Tribes and states.

Table 1 and Chart 1 provide information on FY 2020 – FY 2024 GLRI funding by focus area. Table 2 provides summary information for FY 2021 – FY 2024 GLRI funding by individual agency.

Table 1. FY 2020 – FY 2024 Annual GLRI Appropriations Focus Area Allocations as of September 30, 2024 (Dollars in Thousands)

Focus Area	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
Toxic Substances and Areas of Concern	\$115,800	\$121,400	\$64,300	\$79,700	\$106,600
Invasive Species	\$62,900	\$65,700	\$78,500	\$67,800	\$71,700
Nonpoint Source Pollution Impacts on Nearshore Health	\$51,000	\$53,000	\$82,600	\$80,800	\$76,300
Habitat and Species	\$54,500	\$56,500	\$81,400	\$83,400	\$72,100
Foundations for Future Restoration Actions	\$35,800	\$33,400	\$41,200	\$56,300	\$41,300
Totals: ^a	\$320,000	\$330,000	\$348,000	\$368,000	\$368,000

Notes:

^a FY 2024 Focus Area allocations reflect planned targets and are not final. Prior FY Focus Area allocations are based on final allocations made within the fiscal year funding two-year obligation window.

Chart 1. FY 2020 – FY 2024 Annual GLRI Appropriations Focus Area Allocations as of September 30, 2024 (Dollars in Thousands)

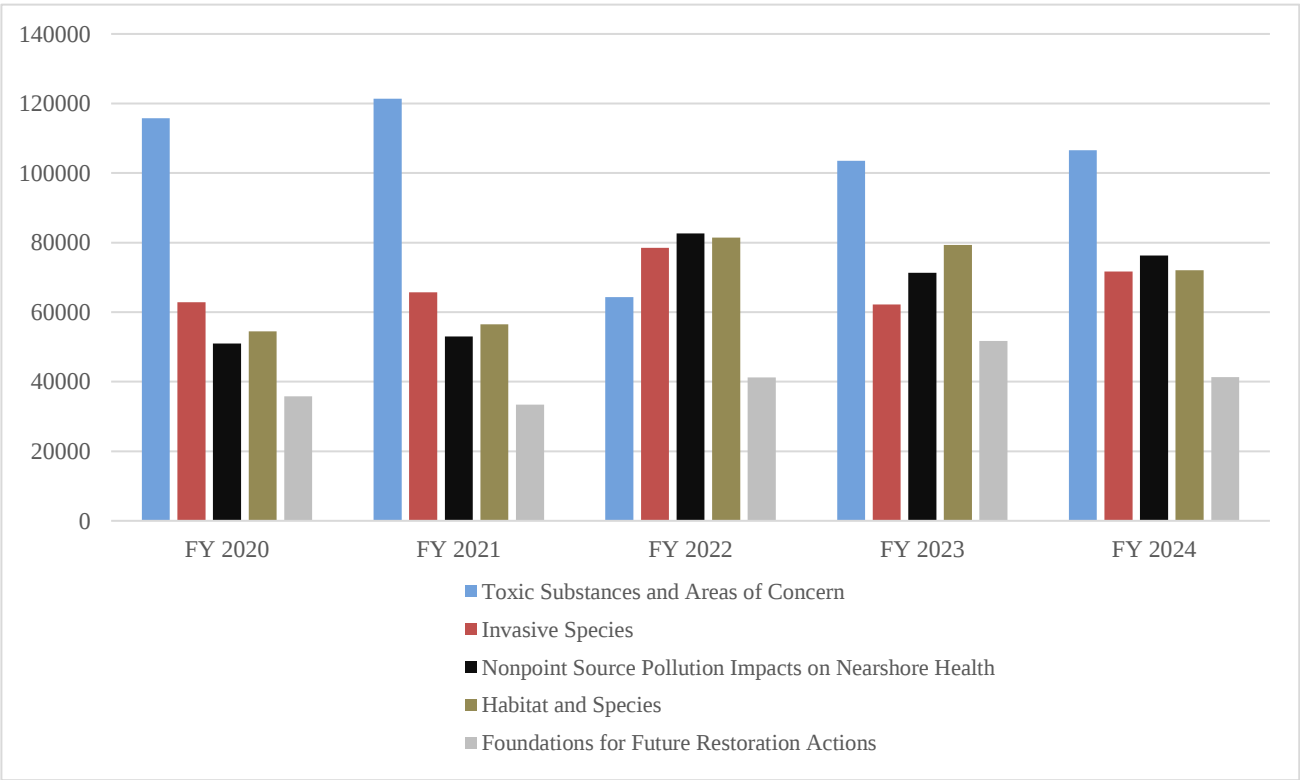


Table 2. FY 2020 – FY 2024 Annual GLRI Obligations by Agency as of September 30, 2024 (Dollars in Thousands)

Agency	Obligations ^a				
	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
DHS-USCG	\$1,250	\$1,300	\$1,200	\$1,300	\$1,300
DOC-NOAA	\$28,163	\$16,621	\$30,361	\$23,877	\$5,469
DOD-USACE	\$30,558	\$42,595	\$29,067	\$11,570	\$38,458
DOI-BIA	\$15,840	\$15,765	\$19,724	\$21,244	\$21,140
DOI-NPS	\$3,794	\$4,968	\$7,816	\$7,615	\$8,298
DOI-USFWS	\$53,523	\$59,288	\$88,082	\$79,327	\$76,097
DOI-USGS	\$19,780	\$19,790	\$24,980	\$23,862	\$22,569
DOT-MARAD	\$5,500	\$8,000	\$6,500	\$2,126	\$0
HHS-ATSDR	\$0	\$0	\$0	\$0	\$0
USDA-APHIS	\$1,362	\$1,459	\$1,832	\$2,138	\$2,469
USDA-NRCS	\$22,239	\$24,374	\$31,824	\$33,091	\$29,927
USDA-USFS	\$9,921	\$12,464	\$12,958	\$14,148	\$12,887
IA totals:	\$191,931	\$206,623	\$232,343	\$220,298	\$218,614
EPA, GLFC and miscellaneous IAs^b	\$126,910	\$121,473	94,813	\$147,119	\$61,936
Total obligated	\$318,840	\$328,096	\$347,156	\$367,417	\$280,550
Returned^c or remaining^d	\$1,160	\$1,904	\$844	\$583	\$87,450
GLRI grand totals:	\$320,000	\$330,000	\$348,000	\$368,000	\$368,000

Notes:

DHS = U.S. Department of Homeland Security; USCG = U.S. Coast Guard; DOC = U.S. Department of Commerce; NOAA = National Oceanic and Atmospheric Administration; DOD = U.S. Department of Defense; USACE = U.S. Army Corps of Engineers; DOI = U.S. Department of the Interior; BIA = Bureau of Indian Affairs; NPS = National Park Service; USFWS = U.S. Fish and Wildlife Service; USGS = U.S. Geological Survey; DOT = Department of Transportation; MARAD = Maritime Administration; HHS = U.S. Department of Health and Human Services; ATSDR = Agency for Toxic Substances and Disease Registry; USDA = U.S. Department of Agriculture; APHIS = Animal and Plant Health Inspection Service; NRCS = Natural Resources Conservation Service; USFS = U.S. Forest Service; GLFC = Great Lakes Fishery Commission; IA = interagency agreement

^a Obligations are the dollar amount of orders placed; interagency agreements, contracts or grants awarded; and similar transactions by the EPA. The amount also reflects deobligations, which generally result from events such as completing a project under budget, contract termination, changes in project scope or focus, or other unforeseeable circumstances.

^b Components include: (i) grants totaling approximately \$23.5 million (including funding for the Great Lakes Fishery Commission, an organization identified in the President's budget); (ii) Great Lakes National Program Office support costs (payroll, travel, general expenses and working capital) totaling approximately \$17.0 million; and (iii) contracts and miscellaneous interagency agreements (other than those above) totaling approximately \$21.4 million.

^c Returned funds (FY 2020 – FY 2024) are determined by subtracting obligations as of September 30, 2024, from appropriated funds. Returned funds generally result from deobligating funds as a result of completing a project under budget, contract termination, changes in project scope or focus, or other unforeseeable circumstances. The amount in this line can also include reserves that have been established to provide for contingencies or to effect savings under the Antideficiency Act.

^d Remaining funds (FY 2024) have been carried over by the EPA to fund priority projects, including competitively selected projects and state projects.

GLRI Appropriations as Part of the Infrastructure Investment and Jobs Act

From FY 2022 through FY 2026, the EPA has received \$200 million each year in additional GLRI funds. The agencies that receive GLRI funds use multiple funding mechanisms to distribute these funds, including interagency agreements, fund transfers, competitive grants and capacity-building grants to Tribes and states.

Tables 3, 4 and 5 provide summary information for GLRI Infrastructure Investment and Jobs Act (IIJA) funding by AOC and by project for FY 2022, FY 2023 and FY 2024 funding, respectively.

Table 3. GLRI FY 2022 IIJA Reporting by Project as of September 30, 2024 (Dollars in Thousands)

AOC ^a	Project Name ^b	Total Spending ^c
Cuyahoga River	Boston Mills Habitat Restoration Construction	\$7,200
	E. 185th Spillway/Euclid Creek Habitat Restoration Design	\$530
	GLLA Cuyahoga River Old Channel Remedial Design	\$1,865
	GLLA Gorge Dam Post Final Remedial Design Support	\$215
	Total	\$9,810
Detroit River	Elizabeth Park Site Characterization	\$908
	Environment, Great Lakes, and Energy Sediment Sampling Sites Site Characterization	\$1,121
	Gibraltar Canals Site Characterization	\$1,362
	GLLA Upper Trenton Channel Remedial Design Finalization	\$289
	GLLA Wilson Park Remedial Action	\$15,635
	Harbortown Site Characterization	\$1,464
	Riverbend Site Characterization	\$1,482
	Rouge Ecorse Shoreline Site Characterization	\$1,225
	Total	\$23,486
Grand Calumet River	GLLA East Branch Grand Calumet Phase Two Remedial Design	\$700
	Total	\$700
Maumee River	Collins Park Stream Restoration Design	\$203
	GLLA Swan Creek Feasibility Study	\$312
	GLLA Swan Creek Site Characterization	\$331
	University of Toledo Medical Center Swan Creek Habitat Restoration Design	\$242
	University of Toledo Medical Center Swan Creek Habitat Restoration Implementation	\$346
	Total	\$1,434
Milwaukee Estuary	Dredged Material Management Facility	\$15,316
	GLLA Milwaukee Pre-Design Investigation	\$1,942
	Milwaukee Toxic Substance Control Act	\$1,200
	South Shore Beach Remedial Action	\$8,000
	Total	\$26,458
Niagara River	Cherry Farms Shore Habitat Restoration	\$261
	R.C. Wilson Park Habitat Restoration	\$12,500
	Total	\$12,761
River Raisin	River Raisin Technical Support and Design	\$234
	Total	\$234
Rouge River	GLLA Lower Rouge River Old Channel Remedial Action Oversight	\$496
	GLLA Rouge River Mainstem Feasibility Study	\$201
	Rouge Concrete Channel Habitat Restoration Design	\$1,115
	Total	\$1,812

AOC ^a	Project Name ^b	Total Spending ^c
St. Louis River	GLLA Crawford Creek Focus Feasibility Study	\$291
	GLLA Munger Landing Remedial Action	\$22,605
	GLLA Scanlon Reservoir Remedial Action	\$5,534
	GLLA Spirit Lake Remediation Action	\$51,863
	Spirit Lake Tallas Bay Remedial Design	\$615
	GLLA Thomson Reservoir Remedial Design Review	\$108
	Total	\$81,016
Torch Lake	GLLA Torch Lake Focus Feasibility Study	\$4
	Total	\$4
	Grand Total	\$157,715
	NOAA, USACE and U.S. EPA Programmatic	\$3,612
	Amount Available	\$38,673
	Budget Authority	\$200,000

Notes:

GLLA = Great Lakes Legacy Act; NOAA = National Oceanic and Atmospheric Administration; USACE = U.S. Army Corps of Engineers.

^a The U.S.-Canada Great Lakes Water Quality Agreement (Annex 1 of the 2012 Protocol) defines AOCs as “geographic areas designated by the Parties where significant impairment of beneficial uses has occurred as a result of human activities at the local level.” An AOC is a location that has experienced environmental degradation.

^b The name of each project describes the phase of the project, the site where the work is taking place and the type of work being done.

^c The dollar amount committed, obligated and expended; interagency agreements, contracts or grants awarded; and similar transactions by the EPA. The amount also reflects deobligations, which generally result from events such as completing a project under budget, contract termination, changes in project scope or focus, or other unforeseeable circumstances.

^d GLNPO programmatic costs include payroll, travel, general expenses and working capital.

^e Resources currently available for spending or allocation within a specific budgetary period. This portion represents the portion of the Total Authority that has not been committed, expended or obligated.

^f The amount of money available to a federal agency for a specific purpose. The authority to commit to spending federal funds is provided to agencies by law. The budget authority is provided to agencies through the annual appropriations process.

Table 4. GLRI FY 2023 IIJA Reporting by Project as of September 30, 2024 (Dollars in Thousands)

AOC ^a	Project Name ^b	Total Spending ^c
Non-AOCs	Benton Harbor Ox Creek Green Infrastructure Projects	\$1,059
	Buffalo Reef Coal Dock Jetty Design	\$700
	Total	\$1,759
Cuyahoga River	GLLA Gorge Dam Engineering Support for Disposal Area	\$62
	GLLA Gorge Dam Post Final Remedial Design Support	\$133
	Gorge Dam Engineering Support for Bulkhead/Restoration Habitat	\$96
	Gorge Dam Bank Stabilization Restoration	\$3,213
	GLLA Gorge Dam RA Engineering Support	\$409
	GLLA Gorge Dam Remedial Action	\$103,313
	Total	\$107,226
Grand Calumet River	GLLA East Branch Grand Calumet River Phase II Remedial Design	\$1,142
	GLLA Grand Calumet River Eastern Five Miles Site Characterization	\$1,371
	GLLA Junction Reaches Supplemental Subsurface Investigation Remedial Design	\$490
	Total	\$3,003
Maumee River	GLLA Swan Creek Feasibility Study	\$151
	Total	\$151
Milwaukee Estuary	GLLA Greater Milwaukee Estuary Focused Feasibility Study	\$412
	GLLA Milwaukee Pre-Design Investigation	\$3,572
	Milwaukee Area of Concern Communications Cooperative Agreement	\$664
	Total	\$4,648
Rouge River	GLLA Lower Rouge River Old Channel Remedial Action Oversight	\$140
	Rouge Concrete Channel Habitat Restoration Design	\$1,869
	Total	\$2,009

AOC ^a	Project Name ^b	Total Spending ^c
St. Louis River	GLLA C. Reiss Superior Slip Remediation	\$144
	GLLA Thomson Reservoir Remediation	\$23,387
	Total	\$23,531
Torch Lake	GLLA Torch Lake Drum Removal Pilot Study Focus Feasibility	\$5,099
	Total	\$5,099
	Grand Total	\$147,426
	USACE and U.S. EPA Programmatic^d	\$2,858
	Amount Available^e	\$49,716
	Budget Authority^f	\$200,000

Notes:

USACE = U.S. Army Corps of Engineers.

^a The U.S.-Canada Great Lakes Water Quality Agreement (Annex 1 of the 2012 Protocol) defines AOCs as “geographic areas designated by the Parties where significant impairment of beneficial uses has occurred as a result of human activities at the local level.” An AOC is a location that has experienced environmental degradation.

^b The name of each project describes the phase of the project, the site where the work is taking place and the type of work being done.

^c The dollar amount committed, obligated and expended; interagency agreements, contracts or grants awarded; and similar transactions by the EPA. The amount also reflects deobligations, which generally result from events such as completing a project under budget, contract termination, changes in project scope or focus, or other unforeseeable circumstances.

^d GLNPO programmatic costs include payroll, travel, general expenses and working capital.

^e Resources currently available for spending or allocation within a specific budgetary period. This portion represents the portion of the Total Authority that has not been committed, expended or obligated.

^f The amount of money available to a federal agency for a specific purpose. The authority to commit to spending federal funds is provided to agencies by law. The budget authority is provided to agencies through the annual appropriations process.

Table 5. GLRI FY 2024 IIJA Reporting by Project as of September 30, 2024 (Dollars in Thousands)

AOC ^a	Project Name ^b	Total Spending ^c
Milwaukee Estuary	GLLA Milwaukee Remedial Design	\$9,644
	Remedial Design of the Grand Trunk Slip and Wetland	\$1,500
	Milwaukee Toxic Substance Control Act	\$100
	Total	\$11,244
Non-AOCs	Building Local Capacity to Implement GLRI Projects in Communities	\$1,988
	Great Lakes Restoration Community Grant Program	\$9,642
	Lake Erie Community Grant Program	\$1,357
	Southeast Michigan Restoration Community Grant Program	\$2,242
	Western New York Restoration Community Grant Program	\$1,479
	Total	\$16,708
	U.S. EPA Programmatic^d	\$2,086
	Amount Available^e	\$169,962
	Budget Authority^f	\$200,000

Notes:

^a The U.S.-Canada Great Lakes Water Quality Agreement (Annex 1 of the 2012 Protocol) defines AOCs as “geographic areas designated by the Parties where significant impairment of beneficial uses has occurred as a result of human activities at the local level.” An AOC is a location that has experienced environmental degradation.

^b The name of each project describes the phase of the project, the site where the work is taking place and the type of work being done.

^c The dollar amount committed, obligated and expended; interagency agreements, contracts or grants awarded; and similar transactions by the EPA. The amount also reflects deobligations, which generally result from events such as completing a project under budget, contract termination, changes in project scope or focus, or other unforeseeable circumstances.

^d GLNPO programmatic costs include payroll, travel, general expenses, and working capital.

^e Resources currently available for spending or allocation within a specific budgetary period. This portion represents the portion of the Total Authority that has not been committed, expended or obligated.

^f The amount of money available to a federal agency for a specific purpose. The authority to commit to spending federal funds is provided to agencies by law. The budget authority is provided to agencies through the annual appropriations process.

Appendix A – GLRI Action Plan III: Measures of Progress

Table A-1 provides an overview of the results achieved for each of the 23 Measures of Progress in the GLRI Action Plan III. The targets for Measures of Progress were established under the assumptions contained in Action Plan III. Fourteen measures have annual targets; the rest track progress toward long-term goals that will take more than five years to reach. Detailed information is provided in the following pages (Table A-2).

Table A-1. Overview of the Results Achieved for the 23 Measures of Progress in the GLRI Action Plan III

Focus Area	Measure ¹	Baseline/ Universe ²	FY 2021 Result/Target ⁴	FY 2022 Result/Target ⁵	FY 2023 Result/Target ⁶	FY 2024 Result/Target ⁶
Toxic Substances	1.1.1. AOC management actions*	B: 12/ U: 31	15/18	16/19	16/20	17/20
	1.1.2. BUIs*	B: 80/ U: 225	106/101	113/109	120/118	128/128
	1.1.3. AOC management action lists*	B: 18/ U: 31	24/24	24/26	24/28	25/31
	1.2.1. Organizations sharing consumption information with vulnerable populations	NA	7	13	6	6
	1.3.1. Chemical monitoring and assessment activities	NA	12	11	11	11
Preventing and Controlling Invasive Species	2.1.1. Rapid responses or exercises	B: 8	57/8	47/8	13/8	9/8
	2.1.2. Projects managing pathways	B: 16.25 avg.	28	58	20	26
	2.1.3. Early detection activities	B: 12.25 avg.	32	45	44	27
	2.2.1. Aquatic/terrestrial acreage controlled* ⁷	B: 153,569	215,514/ 171,000	238,077/ 177,000	260,547/ 183,000	303,156/ 189,000
	2.3.1. Technologies and methods field tested	B: 10 avg.	7	5	5	25
	2.3.2. Collaboratives developed/enhanced*	B: 10	19	20	20	20
Nonpoint Source Pollution Impacts on Nearshore Health	3.1.1. Phosphorus reduction throughout Great Lakes watersheds* (pounds)	B: 1,113,603	2,066,521/ 1,900,000	2,334,783/ 2,200,000	2,518,432/ 2,500,000	2,713,626/ 2,800,000
	3.1.2. Nutrient management assistance in priority Great Lakes watersheds* (acres)	B: 1,614,511 U: 10,711,434	1,831,158/ 2,370,000	1,940,785/ 2,515,000	2,088,515/ 2,685,000	2,142,021/ 2,817,500
	3.2.1. Stormwater captured or treated* (millions of gallons)	B: 252	413.6/400	511.3/450	560.2/500	643.7/550
	3.2.2. Shoreline restored or protected* (miles)	B: 26	43.6/40	61.1/47	89.7/54	113.6/61
	3.3.1. Nutrient monitoring and assessment activities	B: 30	31/30	33/30	35/30	36/30
	3.3.2. Nutrient/stormwater practices or tools	B: 10	12/10	15/10	12/10	12/10
Habitats and Species	4.1.1. Habitat restored, protected, or enhanced* (acres)	B: 370,488 U: 1,550,000	479,293/ 406,000	506,113/ 418,000	529,564/ 430,000	557,508/ 442,000
	4.1.2. Aquatic connectivity* (miles)	B: 5,289	6,727/ 5,900	7,175/ 6,100	8,169/ 6,300	9,011/ 6,500
	4.2.1. Species benefited*	B: 0	2/2	4/4	6/6	10/8
Foundations for Future Restoration	5.1.1. Youth impacted through education/stewardship*	B: 377,000	627,106	685,007	775,841	886,000
	5.2.1. Annual monitoring	NA	Yes	Yes	Yes	Yes
	5.2.2. Identify and address science priorities	NA	Yes	Yes	Yes	Yes

Notes:

Shaded cells display results achieved/targets. Unmet targets are italicized in red-shaded cells. Green-shaded cells indicate targets are met. Cells without denominators show results for measures that do not have targets.

Avg. = average; B = Baseline; U = Universe; NA = not applicable

¹ Cumulative measures are indicated with an *.

² Baselines for cumulative measures identify results through FY 2018 except for measures 1.1.1 and 1.1.2 (through FY 2009). Baselines for noncumulative measures identify regularly expected annual results. The baseline and universe for measure 3.1.2 have been updated from Action Plan III to use an FY 2018 baseline and correctly account for eligible acreage. The "universe" is not available if not provided.

³ The FY 2021 column identifies targets and results through September 30, 2021, for the GLRI Action Plan III measures.

⁴ The FY 2022 column includes targets and results through September 30, 2022, for the GLRI Action Plan III measures.

⁵ The FY 2023 column includes targets and results through September 30, 2023, for the GLRI Action Plan III measures.

⁶ The FY 2024 column includes targets and results through September 30, 2024, for the GLRI Action Plan III measures.

⁷ Reported results for this measure in FY 2021, FY 2022 and FY 2023 have been changed from the previous Report to Congress to reflect minor updates.

Table A-2. GLRI Action Plan III Measures of Progress – Detailed Information

Measure	Target/Baseline/ Universe ²	Result ³	Explanation/Additional Information
1.1.1. Areas of Concern where all management actions necessary for delisting have been implemented (Cumulative) ¹	FY 2024: 22 FY 2023: 20 FY 2022: 19 FY 2021: 18 FY 2020: 16 Baseline: 12 Universe: 31	FY 2024: 17 FY 2023: 16 FY 2022: 16 FY 2021: 15 FY 2020: 14	Management actions completed at Black River AOC in FY 2024.
1.1.2. Beneficial Use Impairments removed in Areas of Concern. (Cumulative) ¹	FY 2024: 128 FY 2023: 118 FY 2022: 109 FY 2021: 101 FY 2020: 93 Baseline: 80 Universe: 225	FY 2024: 128 FY 2023: 120 FY 2022: 113 FY 2021: 106 FY 2020: 97	<i>Fish Tumors and Other Deformities: Black River, OH - 10/16/2023; Buffalo River, NY - 9/11/2024</i> <i>Loss of Fish and Wildlife Habitat: Rochester Embayment, NY - 10/19/2023</i> <i>Eutrophication or Undesirable Algae: Muskegon Lake, MI - 3/28/2024</i> <i>Beach Closings: Black River, OH - 7/1/2024; Cuyahoga River, OH - 9/12/2024</i> <i>Restrictions on Dredging Activity: Maumee, OH - 7/27/2024</i> <i>Degradation of Fish and Wildlife Populations: Eighteenmile Creek, NY - 9/25/2024</i>
1.1.3. Areas of Concern with a complete and approved list of all management actions necessary for delisting. (Cumulative)	FY 2024: 31 FY 2023: 28 FY 2022: 26 FY 2021: 24 FY 2020: 22 Baseline: 18 Universe: 31	FY 2024: 25 FY 2023: 24 FY 2022: 24 FY 2021: 24 FY 2020: 22	Torch Lake AOC had its final two management action lists completed and approved in FY 2024.
1.2.1. State and Tribal organizations that collect and share information with vulnerable populations regarding the consumption of Great Lakes fish, wildlife and harvested plant resources.	No targets Baseline: NA Universe: NA	FY 2024: 6 FY 2023: 6 FY 2022: 13 FY 2021: 7 FY 2020: 9	The GLRI funded several Great Lakes states to help develop and enhance fish consumption advisory outreach material, including developing new fish consumption advice messaging and communication strategies for informing populations in the state of New York. The GLRI also funded contaminant monitoring, including monitoring of PFAS in waterfowl in Wisconsin, to determine if consumption advisories are warranted.
1.3.1. Discrete chemical monitoring and assessment activities conducted.	No targets Baseline: NA Universe: NA	FY 2024: 11 FY 2023: 11 FY 2022: 11 FY 2021: 12 FY 2020: 15	The GLRI has provided support to several monitoring and assessment projects focusing on priority chemicals, including chemicals of mutual concern (CMCs). This includes funding projects that are assessing how PFAS are moving throughout the Great Lakes food web, evaluating factors impacting mercury release and methylation from restored peatlands in the St. Louis River, and monitoring CMCs in Lake Huron and Lake Superior fish-eating birds and their fish prey.

Measure	Target/Baseline/ Universe ²	Result ³	Explanation/Additional Information
2.1.1. Rapid responses or exercises conducted.	FY 2024: 8 FY 2023: 8 FY 2022: 8 FY 2021: 8 FY 2020: 8 Baseline: 8 Universe: NA	FY 2024: 9 FY 2023: 13 FY 2022: 47 FY 2021: 57 FY 2020: 20	The GLRI federal agencies have committed to conducting annual training exercises but prioritize activities to respond to detections of new invasive species. Efforts include tabletop exercises, drills and field responses.
2.1.2. Projects that manage pathways through which invasive species can be introduced to the Great Lakes ecosystem.	No targets Baseline 16.25 avg. Universe: NA	FY 2024: 26 FY 2023: 20 FY 2022: 58 FY 2021: 28 FY 2020: 38	GLRI funded 26 projects intended to block invasive species' introduction pathways in places such as canals, waterways, recreational boats, commercial shipping, aquarium trade and live bait sales.
2.1.3. Early detection and surveillance activities conducted.	No targets Baseline: 12.25 avg. Universe: NA	FY 2024: 27 FY 2023: 44 FY 2022: 45 FY 2021: 32 FY 2020: 14	Early detection activities were conducted in FY 2024, including conventional monitoring techniques (nets, traps, electroshocking) and eDNA and genomic approaches.
2.2.1. Aquatic/terrestrial acreage controlled. (Cumulative) ⁴	FY 2024: 189,000 FY 2023: 183,000 FY 2022: 177,000 FY 2021: 171,000 FY 2020: 165,000 Baseline: 153,569 Universe: NA	FY 2024: 303,156 FY 2023: 260,547 FY 2022: 238,077 FY 2021: 215,514 FY 2020: 201,963	Collaborations among federal agencies, Tribes, state agencies and the public continue to protect high-value ecological and recreational sites from the establishment of invasive species while promoting the re-establishment of native species. Invasive species were controlled on more than 42,000 acres of terrestrial and aquatic environments.
2.3.1. Technologies and methods field tested.	No targets Baseline: 10 avg. Universe: NA	FY 2024: 25 FY 2023: 5 FY 2022: 5 FY 2021: 7 FY 2020: 14	Technologies included ballast water treatment systems, species-specific toxicants and behavioral fish barriers. In 2024, efforts continued to test genetic biocontrol techniques for controlling European frog-bit and <i>Phragmites</i> .
2.3.2. Collaboratives developed/enhanced. (Cumulative)	No targets Baseline: 10 Universe: NA	FY 2024: 20 FY 2023: 20 FY 2022: 20 FY 2021: 19 FY 2020: 17	Collaborations among federal agencies, Tribes, state agencies and the general public continue to advance control efforts and strategies, knowledge sharing and educational initiatives for a variety of nonnative plants and animal species. In 2024, several ongoing collaboratives were maintained, but no new collaboratives were initiated in this fiscal year.
3.1.1. Estimated pounds of phosphorus reductions from conservation practice implementation throughout Great Lakes watersheds. (Cumulative)	FY 2024: 2,800,000 FY 2023: 2,500,000 FY 2022: 2,200,000 FY 2021: 1,900,000 FY 2020: 1,600,000 Baseline: 1,113,603 Universe: NA	FY 2024: 2,713,626 FY 2023: 2,518,432 FY 2022: 2,334,783 FY 2021: 2,066,521 FY 2020: 1,784,790	Contributing agencies: BIA, USFWS, NRCS and the EPA. Results can vary each year due to the nature of voluntary conservation assistance programs. The targets for 3.1.1 were developed based on assumptions about the types of conservation practices that would be adopted by private landowners and their effectiveness. In some years, the practices adopted resulted in an exceedance of performance goals for phosphorus reduction.

Measure	Target/Baseline/ Universe ²	Result ³	Explanation/Additional Information
3.1.2. Acres receiving technical or financial assistance on nutrient management in priority watersheds. (Cumulative)	FY 2024: 2,817,500 FY 2023: 2,685,000 FY 2022: 2,515,000 FY 2021: 2,370,000 FY 2020: 2,200,000 Baseline: 1,614,511 Universe: 10,711,434	FY 2024: 2,142,021 FY 2023: 2,088,515 FY 2022: 1,940,785 FY 2021: 1,831,158 FY 2020: 1,762,484	Contributing agencies: NRCS and the EPA. This measure focuses on improving the long-term adoption of nutrient management. Ambitious targets were set based on phosphorus reduction needs in the priority watersheds. Agencies expect to institute program adjustments that will improve the results for this measure.
3.2.1. Estimated gallons (in millions) of untreated stormwater runoff captured or treated. (Cumulative)	FY 2024: 550 FY 2023: 500 FY 2022: 450 FY 2021: 400 FY 2020: 350 Baseline: 252 Universe: NA	FY 2024: 643.7 FY 2023: 560.2 FY 2022: 511.3 FY 2021: 413.6 FY 2020: 372.4	Contributing agencies: USFS, USFWS, NRCS and the EPA. Results for on-the-ground construction projects are reported at the time of award.
3.2.2. Miles of Great Lakes shoreline and riparian corridors restored or protected. (Cumulative)	FY 2024: 61 FY 2023: 54 FY 2022: 47 FY 2021: 40 FY 2020: 33 Baseline: 26 Universe: NA	FY 2024: 113.6 FY 2023: 89.7 FY 2022: 61.1 FY 2021: 43.6 FY 2020: 34.3	Contributing agencies: APHIS, USFWS, USACE, NRCS and the EPA. Results for on-the-ground construction projects are reported once implemented.
3.3.1. Nutrient monitoring and assessment activities conducted.	FY 2024: 30 FY 2023: 30 FY 2022: 30 FY 2021: 30 FY 2020: 30 Baseline: 30 Universe: NA	FY 2024: 36 FY 2023: 35 FY 2022: 33 FY 2021: 31 FY 2020: 31	Contributing agencies: USGS and NOAA. This measure tracks ongoing monitoring and assessment activities. Actual results may vary each year as new projects are added.
3.3.2. Nutrient or stormwater runoff reduction practices or tools developed or evaluated.	FY 2024: 10 FY 2023: 10 FY 2022: 10 FY 2021: 10 FY 2020: 10 Baseline: 10 Universe: NA	FY 2024: 12 FY 2023: 12 FY 2022: 15 FY 2021: 12 FY 2020: 14	Contributing agencies: USGS, NOAA, the EPA and USACE. This measure tracks multiyear projects that evaluate or develop new tools or management practices. Actual results may vary each year as new projects are added.
4.1.1. Acres of coastal wetland, nearshore, and other habitats restored, protected, or enhanced. (Cumulative)	FY 2024: 442,000 FY 2023: 430,000 FY 2022: 418,000 FY 2021: 406,000 FY 2020: 394,000 Baseline: 370,488 Universe: 1,550,000	FY 2024: 557,505 FY 2023: 529,564 FY 2022: 506,113 FY 2021: 479,293 FY 2020: 463,058	Many collaborations and projects to restore coastal wetlands have been completed or are underway. For example, in FY 2024, the Great Lakes Pollinator Task Force restored and enhanced more than 2,130 acres of pollinator habitat and a USFWS wetland restoration project at the Shiawassee National Wildlife Refuge enhanced 2,632 acres. Also, the Great Lakes Coastal Wetland Monitoring Program continued to aid and inform restoration and protection efforts.
4.1.2. Miles of connectivity established for aquatic species. (Cumulative)	FY 2024: 6,500 FY 2023: 6,300 FY 2022: 6,100 FY 2021: 5,900 FY 2020: 5,700 Baseline: 5,289 Universe: NA	FY 2024: 9,011 FY 2023: 8,170 FY 2022: 7,175 FY 2021: 6,727 FY 2020: 6,052	By the end of FY 2024, GLRI federal agencies and their partners had implemented projects that reopened more than 9,011 miles of Great Lakes tributaries, increasing aquatic connectivity for numerous fish species.

Measure	Target/Baseline/ Universe ²	Result ³	Explanation/Additional Information
4.2.1. Species benefited where actions have been completed to significantly protect or promote recovery of populations. (Cumulative)	FY 2024: 8 FY 2023: 6 FY 2022: 4 FY 2021: 2 FY 2020: 1 Baseline: 0 Universe: NA	FY 2024: 10 FY 2023: 6 FY 2022: 4 FY 2021: 2 FY 2020: 1	Projects that protected and restored coastal wetland, nearshore and other habitats in addition to species-specific actions benefited the recovery of the American hart's-tongue fern, dwarf lake iris, Pitcher's thistle and native prey fish.
5.1.1. Youth impacted through education and stewardship projects. (Cumulative)	No targets Baseline: 377,000 Universe: NA	FY 2024: 886,000 FY 2023: 775,841 FY 2022: 685,007 FY 2021: 627,106 FY 2020: 578,559	GLRI federal agencies and partners have implemented many activities to promote Great Lakes-based environmental education and stewardship that focus on engaging educators and youth using place-based experiential learning.
5.2.1. Annual Great Lakes monitoring conducted and used to prioritize GLRI funding decisions.	No targets Baseline: NA Universe: NA	FY 2024: Yes FY 2023: Yes FY 2022: Yes FY 2021: Yes FY 2020: Yes	GLRI federal agencies and partners conducted comprehensive monitoring to assess the status and trends of the Great Lakes ecosystem. Monitoring of coastal wetlands, contaminants, nutrients, hypoxia, HABs, zooplankton, phytoplankton, benthic communities and prey fish, among many other components, was conducted throughout the Great Lakes basin. The monitoring data and information from previous years were used to identify the most significant Great Lakes problems and prioritize funding decisions to address those problems.
5.2.2. Identify and address science priorities to support implementation of GLRI and the Great Lakes Water Quality Agreement.	No targets Baseline: NA Universe: NA	FY 2024: Yes FY 2023: Yes FY 2022: Yes FY 2021: Yes FY 2020: Yes	GLRI federal agencies and partners conducted several projects addressing the established science priorities under this focus area. Such projects included studying <i>Cladophora</i> nuisance algae, monitoring HABs in Lake Erie and determining drivers of HAB toxicity, mapping wetlands, and assessing the status of nutrients and lower food web organisms during the winter.

Notes:

NA = not applicable

¹ Results from this Action Plan measure are achieved through GLRI funding as well as other non-GLRI federal and/or state funding.² Baselines for cumulative measures identify results through FY 2018 except for Measures 1.1.1 and 1.1.2 (through FY 2009, the year prior to the GLRI) and Measure 3.1.1 (through FY 2017). Baselines for noncumulative measures identify regularly expected annual results. The baseline and universe for measure 3.1.2 have been corrected from Action Plan III to exclude acreage outside Great Lakes priority watersheds. The "universe" is not available if not provided.³ Results are included for FY 2020 – FY 2024.⁴ Reported results for this measure in FY 2021, FY 2022 and FY 2023 have been adjusted from the previous GLRI Report to Congress to reflect minor updates.