Great Lakes RESTORATION

Great Lakes Restoration Initiative
Report to Congress and the President

Fiscal Year 2015

June 16, 2016

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About This Report

This report presents an overview of the Great Lakes Restoration Initiative progress. It includes information on funding, project accomplishments and success stories, and performance on Action Plan Measures of Progress through Fiscal Year 2015. Data on direct spending is taken from the US Environmental Protection Agency financial systems. Information on Great Lakes Restoration Initiative projects and activities is available at http://glri.us.

The U.S. Environmental Protection Agency is required by the 2010 Appropriations Conference Report, 111-316, to submit this report to Congress on behalf of the Great Lakes Interagency Task Force. The Conference Report directs the Agency to provide detailed yearly program accomplishments and compare specific funding levels allocated for participating federal agencies from fiscal year to fiscal year.

The report also satisfies the Action Plan II Measure of Progress for issuance of annual GLRI reports to Congress and the President.

MESSAGE FROM THE CHAIR OF THE GREAT LAKES INTERAGENCY TASK FORCE

The Great Lakes are our "H.O.M.E.S." - Huron, Ontario, Michigan, Erie and Superior – not to mention all of their rivers and connecting waterways. These are precious places that define where tens of millions of Americans live, work, and play.

Like any home, the Great Lakes require upkeep. If we do not maintain them over time, we will diminish their ability to provide for us, including by supplying clean drinking water, recreation opportunities, jobs, and other essentials.

The Great Lakes Restoration Initiative (GLRI) is meant to do just that. Thanks to bipartisan support in Congress, the GLRI provides funds to 11 federal departments and agencies, as well as states, municipalities, tribes, businesses, public interest organizations, academia and others to reinvest in the Great Lakes, a binational treasure.

This Fiscal Year 2015 Report to Congress and the President highlights continued progress by the GLRI to sustain a healthy and productive Great Lakes ecosystem. Under this Initiative, agencies and their partners have continued to restore Areas of Concern, educate people about the public health risks and benefits of fish consumption, rebuild habitat, combat invasive species such as Asian carp, reduce nutrient runoff that causes harmful algae, and work on many other imperatives.

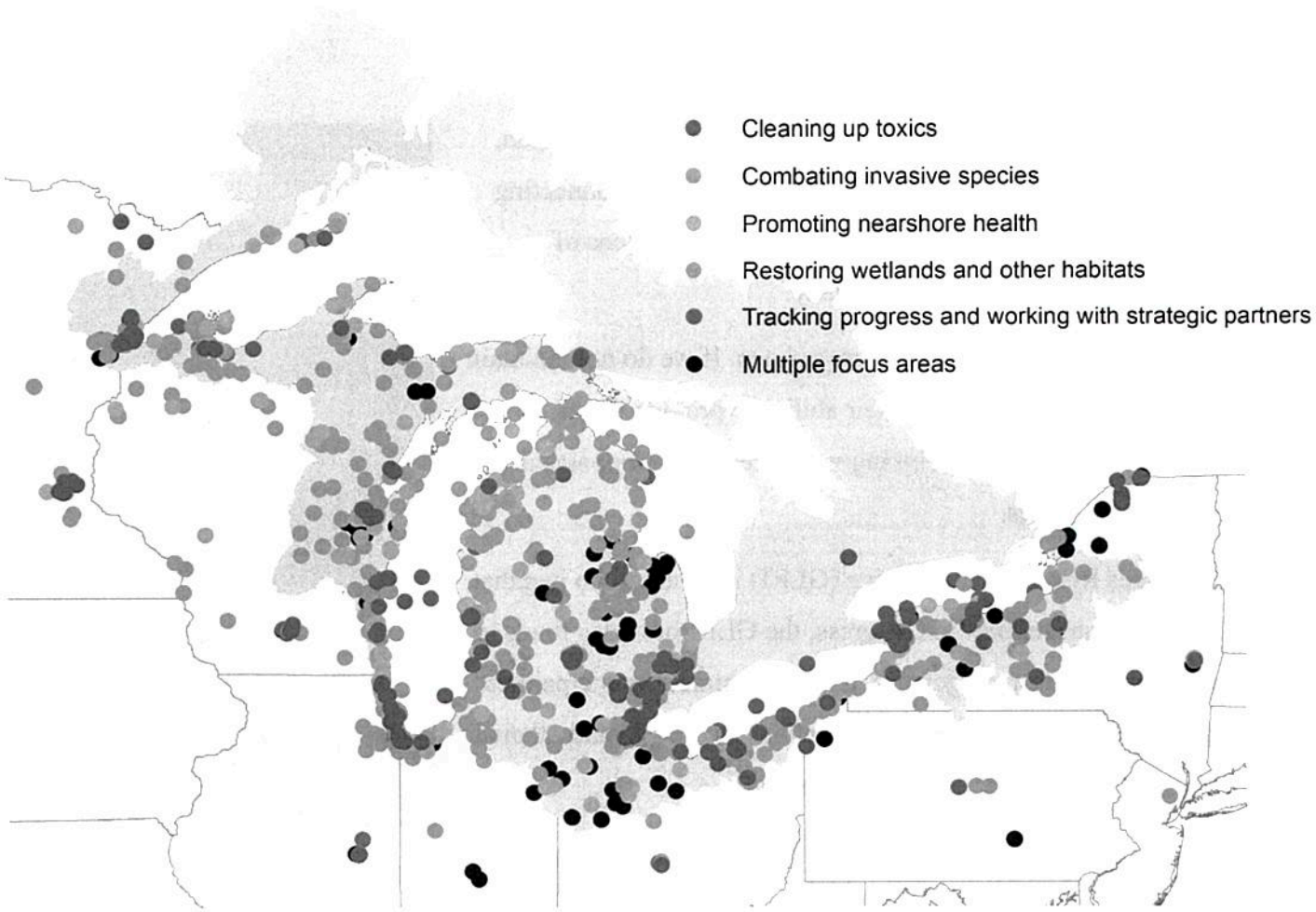
Through this work, we are continuing to maintain our H.O.M.E.S. so that they, in turn, can keep providing for us and future generations.

Gina McCarthy

Chair, Great Lakes Interagency Task Force

Administrator, U.S. Environmental Protection Agency

Great Lakes Restoration Initiative Projects from FY 2010 – FY 2015



Section 1 –Executive Summary

The Great Lakes Restoration Initiative, or the GLRI, was launched in 2010 to accelerate efforts to protect and restore the largest system of fresh surface water in the world, the Great Lakes. The GLRI is critical to addressing the most persistent and challenging environmental problems facing this important ecosystem.

The GLRI has been a catalyst for unparalleled federal agency coordination – through the Interagency Task Force (IATF) and the Regional Working Group (RWG), which are led by the EPA. This coordination has produced unprecedented results. GLRI resources have supplemented agency base budgets that have funded over 2,900 projects that improve water quality, protect and restore native habitats and species, prevent and control invasive species, and address other Great Lakes environmental problems.

The Great Lakes Restoration Initiative Action Plan II, released in September of 2014 (http://greatlakesrestoration.us/actionplan/pdfs/glri-action-plan-2.pdf), identifies in five major focus areas, the most significant ecosystem problems that exist in the Great Lakes Basin, and ways to solve them. This report provides an overview of progress during FY 2015 for each Focus Area. It also includes select success stories, detailed information on funding, and performance information for Action Plan II Measures of Progress.

GLRI Action Plan II Focus Areas

Toxic Substances and Areas of Concern

During FY 2015, federal agencies and their partners completed all of the cleanup actions and steps necessary to formally delist two Great Lakes Areas of Concern. The Deer Lake and White Lake Areas of Concern were both delisted in FY 2015 as a result of GLRI funded projects. Three Areas of Concern have been formally delisted since the inception of the GLRI. Federal agencies and their partners removed eight Beneficial Use Impairments from Areas of Concerns during FY 2015, and a total of 60 Beneficial Use Impairments were removed since 1987.

Invasive Species

During FY 2015, 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. Federal agencies and their partners engaged in an extraordinary level of activity in FY 2015 to prevent new introductions of invasive species in the Great Lakes ecosystem on over 16,000 acres of land. Since the inception of the GLRI, federal agencies and their partners have taken actions to control invasive species on over 100,000 acres.

Nonpoint Source Pollution Impacts on Nearshore Health

The GLRI implemented focused conservation activities to reduce sources of phosphorus loadings that threaten the Great Lakes nearshore regions. During FY 2015, federal agencies and their partners worked collaboratively to reduce nonpoint sources of phosphorus runoff that contribute to harmful algal blooms around the Great Lakes in priority watersheds such as Lake Erie, Saginaw Bay, and Green Bay. Federal agencies estimate that over 160,000 pounds of phosphorus will be prevented from entering the Great Lakes annually as a result of GLRI funded projects in targeted watersheds.

Habitat and Species

During FY 2015, federal agencies and their partners protected, restored and enhanced habitats and native species throughout the Great Lakes basin. More than 50 projects were implemented during FY 2015, adding to the more than 875 habitat and species projects undertaken over the course of the GLRI. Through these projects, more than 150,000 acres of habitat have been protected, restored, or enhanced. Federal agencies and their partners protected, restored and enhanced over 300 miles of Great Lakes shoreline and riparian corridors in FY 2015 and over 7,000 acres of coastal wetlands.

Foundations for Future Restoration Actions

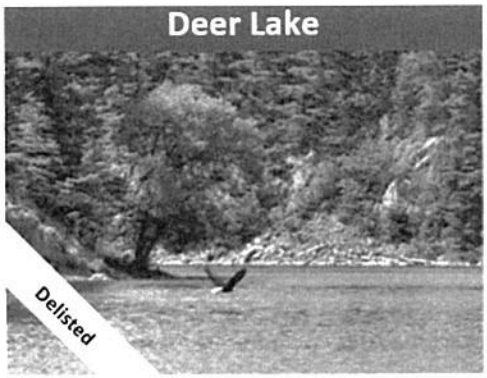
In order to improve transparency and fiscal stewardship, the GLRI has established accountability mechanisms, management practices, and third party oversight for effective management. During FY 2015 the GLRI educated people residing in the Great Lakes basin, reaching over 330 educators who then incorporated Great Lakes specific material into their broader environmental education curricula. More than 50,000 students are estimated to have participated in these classes.

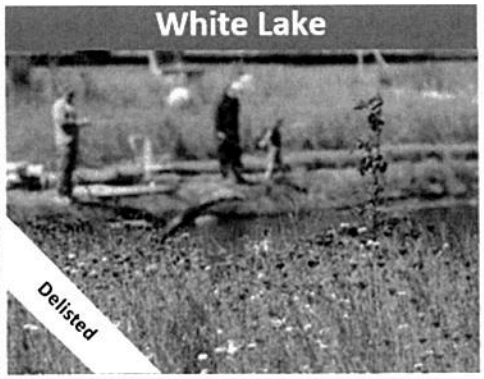
Section 2 – Program Accomplishments

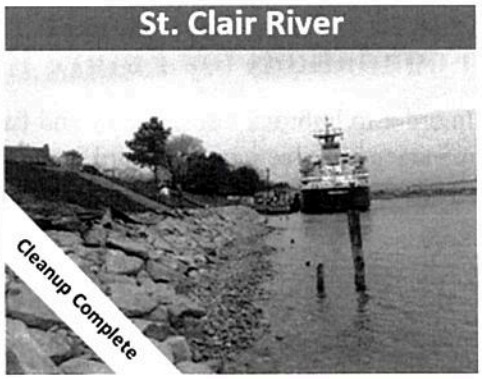
FOCUS AREA 1: Toxic Substances and Areas of Concern

Areas of Concern (AOC), defined in the 1987 Great Lakes Water Quality Agreement, are the areas of the Great Lakes basin that are most heavily contaminated with legacy pollutants and show signs of environmental degradation such as habitat loss and fish consumption advisories. Federal agencies and their partners have completed all management actions required to delist seven Areas of Concern in the Great Lakes Basin.

During FY 2015, two of these Areas of Concern were formally delisted: White Lake and Deer Lake, both in Michigan. This brings the total number of Areas of Concern formally delisted to four, three having been delisted since the start of the GLRI. Federal agencies and their partners also completed all cleanup actions required to delist the St. Clair River Area of Concern. Through GLRI efforts Waukegan Harbor, Sheboygan River, St. Clair River, and Ashtabula River are now have all cleanup actions complete, and will be delisted once all of their Beneficial Use Impairments (BUI) have been removed.



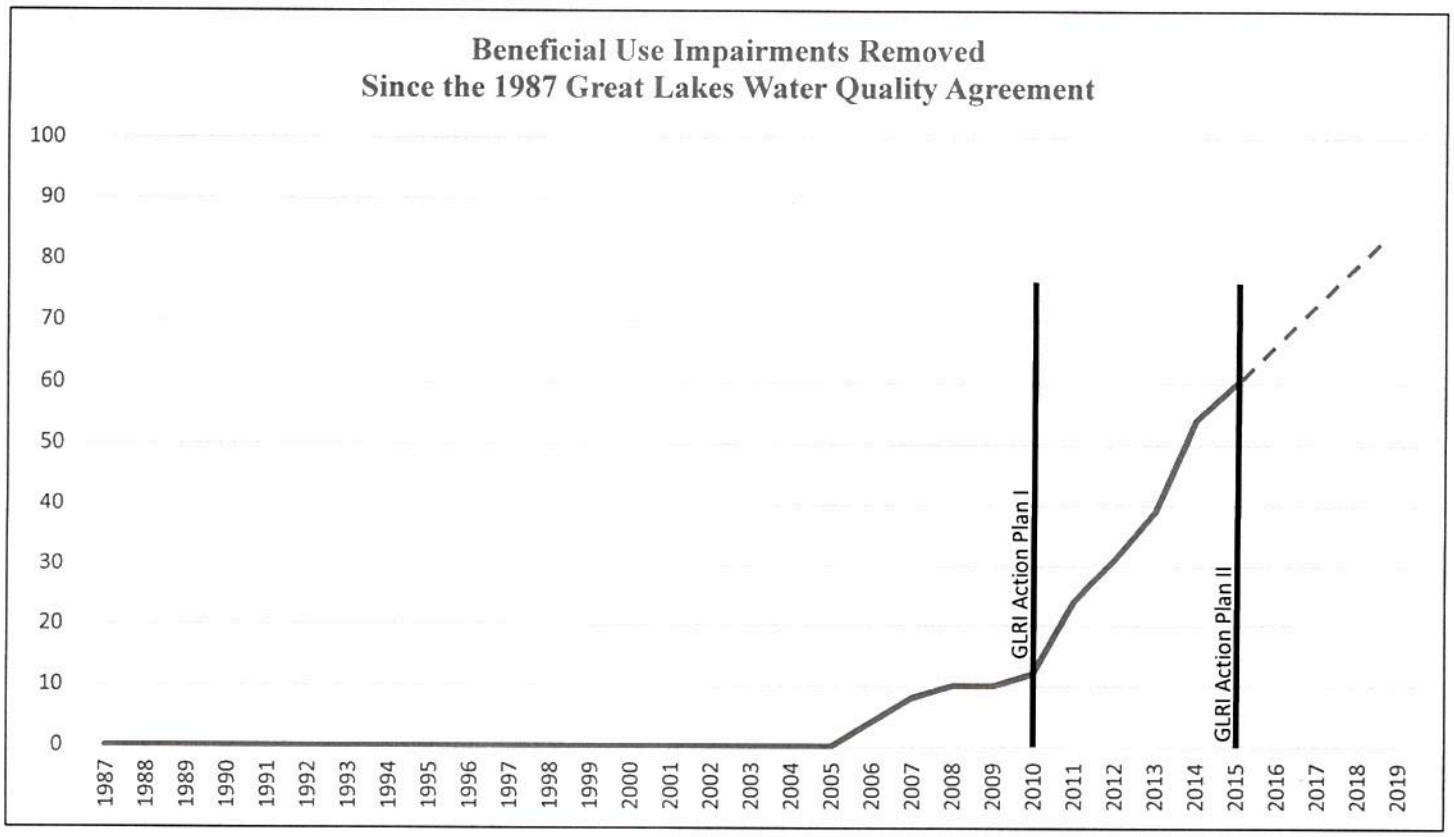




Federal agencies and their partners removed eight Beneficial Use Impairments from Areas of Concerns during FY 2015, and a total of 60 Beneficial Use Impairments were removed since 1987.

Beneficial Use Impairments are the benchmarks of environmental harm and characterize Areas of Concern. Once an Area of Concern's Beneficial Use Impairments are removed, the area becomes known as an area in recovery until monitoring shows it can be formally delisted.

During FY 2015, federal agencies and their partners implemented projects to protect human health from contaminants in Great Lakes fish. Federal agencies and their partners updated fish consumption advisories and provided public information on the health risks as well as the benefits of Great Lakes fish consumption.



During FY 2015, over 220,000 people were provided with advice regarding the risks and benefits of Great Lakes fish consumption. Federal agencies and their partners focused on populations with the highest risk of contaminant exposure, including:

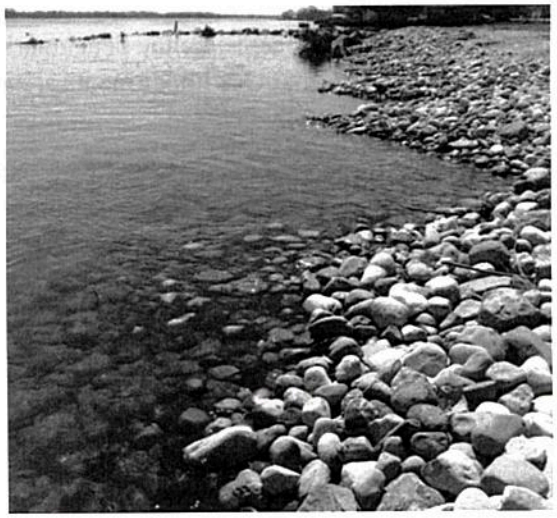
- Women of child bearing age
- Children
- Urban anglers
- Tribal communities
- Others who rely on Great Lakes fish as a significant part of their diet

Federal agencies and their partners continue to characterize and assess risks from emerging contaminants on Great Lakes fish and wildlife. Through this multi-agency effort, GLRI partners are gaining a better understanding of the presence and distribution of emerging contaminants (such as Perfluorinated compounds and Polybrominated diphenyl ethers), potential routes of exposure and potential impacts on fish and wildlife.

Focus Area 1 Success Stories

St. Clair River AOC Shoreline Restoration

Fully restoring an Area of Concern requires additional work such as habitat restoration. During FY 2015, federal agencies and their partners completed restoration on approximately 480 feet of riverfront and two acres of upland along the St. Clair River in Cottrellville Township, Michigan. The projects focused on restoring fish and amphibian habitat as well as restoring local wetlands, including 4,641 square feet of enhanced fish habitats. Additionally, two breakwaters created approximately 0.25 acres of emergent wetland habitat, and 145 boulder clusters and 26 wood log debris created habitats for additional wildlife. In order to stabilize the shoreline and reduce erosion, 137 trees and shrubs were planted, and riparian and turf grass seeding was completed on over two acres.



St. Louis River AOC Habitat Restoration

Completed in FY 2015, the Chambers Grove Park habitat restoration project is a multi-agency GLRI cooperative effort representing one of several ongoing remediation and habitat restoration projects currently taking place in the St. Louis River AOC in Minnesota. The Chambers Grove project restored 1,000 feet of river bank and created two acres of fish spawning habitat adjacent to the Chambers Grove City Park. This restoration was completed by removing hardened shoreline, contouring the river bank, planting local vegetation, and adding in-water habitat suitable for targeted fish species including lake sturgeon, walleye, and longnose suckers.

Buffalo River AOC Restoration

During FY 2015, the GLRI completed sediment remediation and habitat restoration for the Buffalo River Area of Concern in New York. As a result of the project, federal agencies and their partners removed approximately 1,000,000 cubic yards of sediments contaminated with heavy metals, and other legacy pollutants from the river. After remediation, the project partners restored more than seven acres of shallow water aquatic habitats including over 9,000 linear feet of river bank.

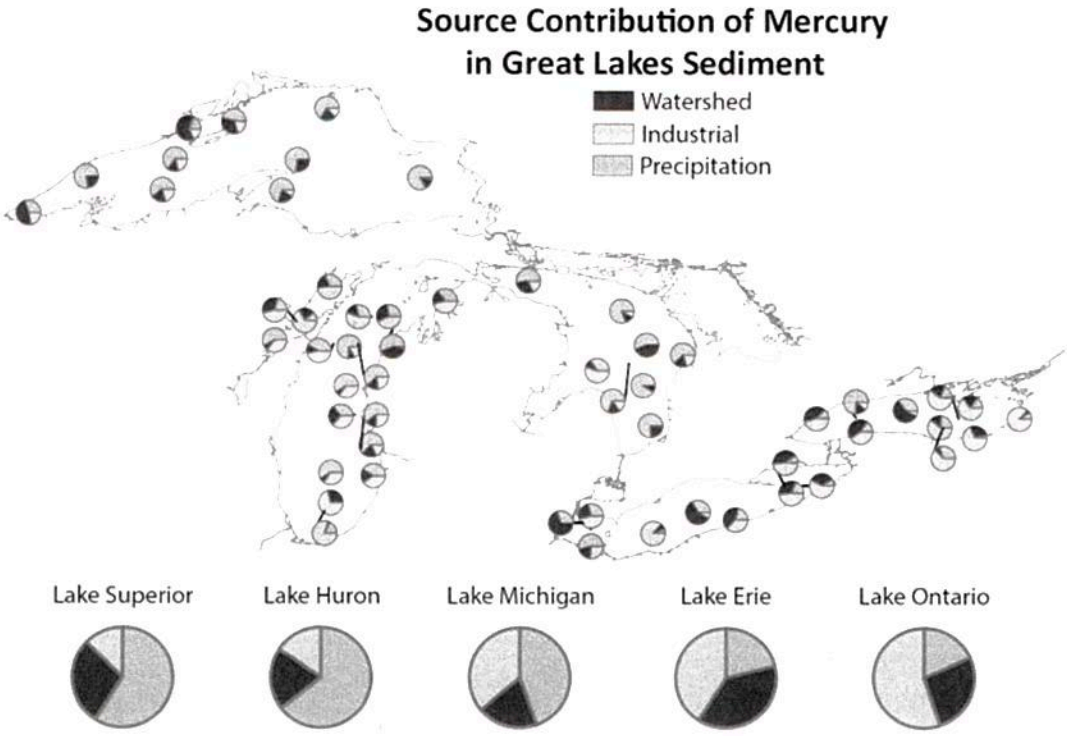
Focus Area 1 Success Stories

Creating Better Access to Fish Consumption Advisories for Non- English Speakers in Wisconsin

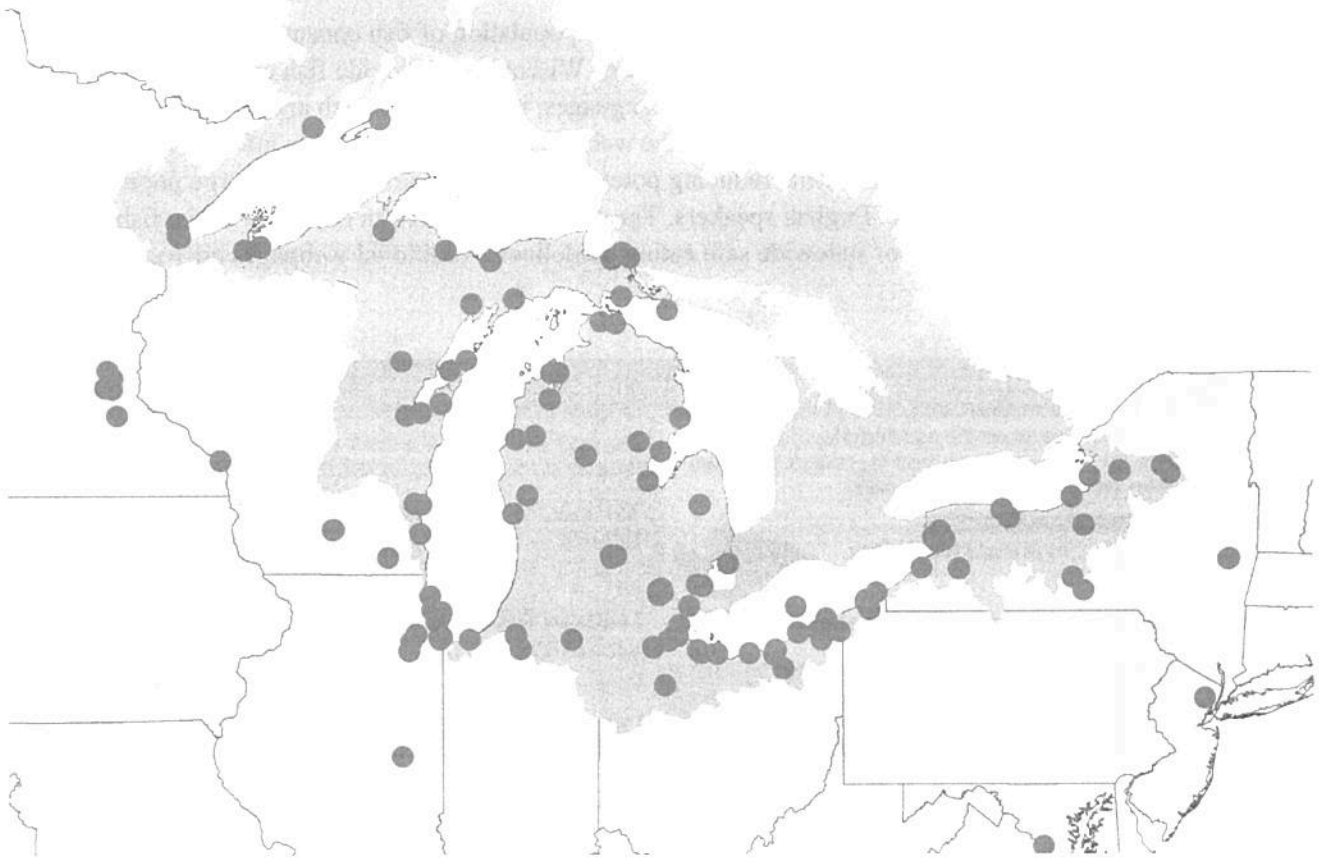
During FY 2015, to inform and protect a wider population of fish consumers from harmful exposure to contaminants, the GLRI funded the State of Wisconsin to provide fish consumption advisory information on their website in multiple languages, including Spanish and Hmong languages for the first time. The translated advisories on the web provide easily accessible information on the benefits of eating Wisconsin fish while reducing potential risks from pollutants to a large population of anglers and others who eat fish but are not English speakers. These web pages offer an overview of the fish advisory program and contain a printable graphic of statewide safe eating guidelines. Additional webpages answer frequently asked questions about contaminants in fish.

Fingerprinting Mercury Sources in the Great Lakes

During FY 2015, Great Lakes land and resource managers were provided, for the first time, an ability to identify the source of mercury, a toxic chemical of significant concern in the region, in fish and sediment. This new and emerging tool "fingerprints" the mercury to an atmospheric, industrial, or watershed source. Determining the source of a mercury contamination is vital because it helps narrow the strategies people use to deal with it. Although this fingerprinting tool was pioneered for the Great Lakes, it can be applied anywhere it is needed.



Great Lakes Restoration Initiative Invasive Species Control Projects
(FY 2010-FY 2015)



FOCUS AREA 2: Invasive Species

During FY 2015, 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.

Federal agencies and their partners conducted early detection monitoring exercises and trained for rapid responses. During FY 2015, the GLRI funded 15 early detection monitoring activities that enhance the ability to detect and respond to new invasive species introductions. Federal agencies and their partners also completed a total of twenty one exercises and responses, exceeding their target of conducting eight rapid responses and exercises in FY 2015.

Federal agencies and their partners have further reduced the risk of invasive species entering the Great Lakes watershed by funding seven projects that help block the pathways of introduction. These pathways include:

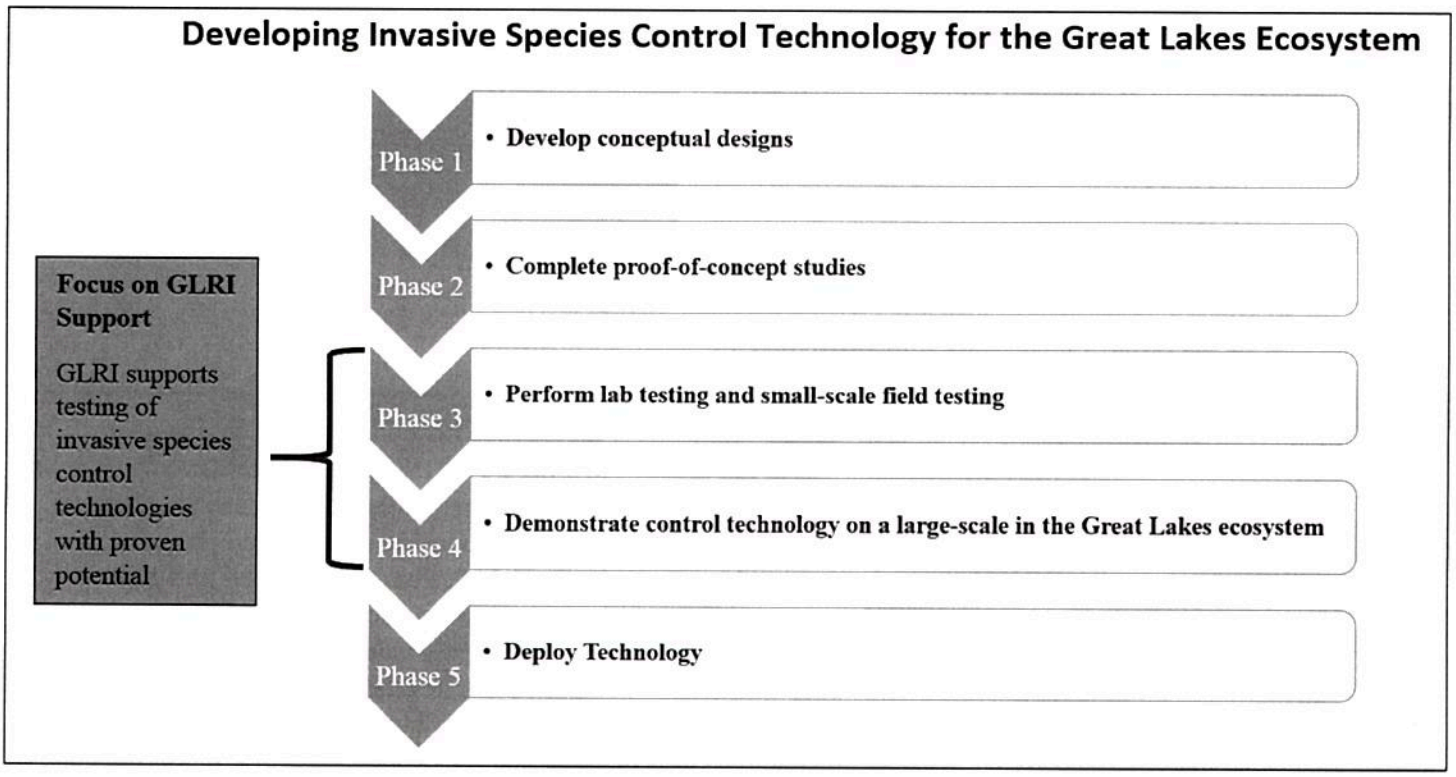
- Canals and waterways
- Recreational boating
- Commercial shipping
- Illegal Trade of banned species
- Release of aquarium species
- Release of live bait

Protecting the Great Lakes from Sea Lamprey

The GLRI provides support to the Great Lakes Fishery Commission's Sea Lamprey Control Program. This partnership has successfully implemented control techniques that have returned Lake Huron and Lake Michigan Sea Lamprey populations to historic lows, and has put Lake Ontario sea lamprey populations at target levels. Lake Superior and Lake Erie sea lamprey populations are both above target levels, but each continues to show a five-year downward trend in adult sea lamprey populations.

During FY 2015, federal agencies and their partners restored sites degraded by aquatic, wetland, and terrestrial invasive species. Federal agencies also supported community efforts to control and reduce the spread of invasive species. These projects were implemented with partners who are expected to continue maintenance and stewardship beyond the duration of the federally funded projects lifespan.

In addition, federal agencies directly implemented control projects in national forests, parks, and wildlife refuges. In FY 2015, federal agencies and their partners controlled and funded projects that protected over 16,000 aquatic/terrestrial acres.



During FY 2015, federal agencies and their partners developed and refined invasive species control technologies and management techniques while effectively minimizing harm to other non-invasive fish species. The GLRI supports invasive species control technologies with proven potential but that still require additional testing. During FY 2015, in order to evaluate their effectiveness in controlling invasive species in the Great Lakes basin, federal agencies and their partners field tested seven technologies and methods, including a new ballast water management system and a new tool to detect Asian carp.

Federal agencies and their partners have developed and enhanced invasive species "collaboratives" to support rapid responses and to communicate the latest control technologies and management techniques. In FY 2015, the GLRI developed and enhanced four different collaboratives. For example, federal agencies and their partners collaborate through the Phragmites Collaborative and facilitate communication across the region through a resource center for information on phragmites management and research.

Protecting the Great Lakes from Asian Carp

The GLRI provides support to the Asian Carp Regional Coordinating Committee, which has implemented the Asian Carp Control Strategy Framework – including surveillance, response actions and testing of new control technologies. More information about the ACRCC is available at http://www.asiancarp.us.

Focus Area 2 Success Stories

Early Detection Monitoring for Invasive Species

During FY 2015, a performance evaluation of early detection monitoring surveillance programs on Lake Superior revealed opportunities to substantially increase the speed and sensitivity of detecting newly-introduced species. By focusing efforts on areas within ports known to carry rare and invasive species, and by increasing the use of sampling equipment that captures a wide diversity of organisms, port authority effectiveness at detecting invasive species has nearly doubled. US-EPA and US-FWS have implemented an adaptive cycle of surveillance assessment, refinement, and implementation.

Removing One of the Great Lakes Most Unwanted Species

The invasive species hydrilla was discovered in the Cayuga Lake Inlet and Erie Canal, New York. During FY 2015, aggressive eradication projects started at both of these locations in response to concerns about the spread of this invasive plant species throughout the Great Lakes basin. Hydrilla is an aggressive, opportunistic, aquatic nuisance plant species that if left unchecked will form thick mats that displace highly valued native plant species, and alter water chemistry and oxygen levels. In addition to ecological damages, hydrilla can have negative economic effects and diminish recreational uses of water bodies. Despite signs of a successful control, eradication may take several more years due to the propagules that lay dormant in the sediment.

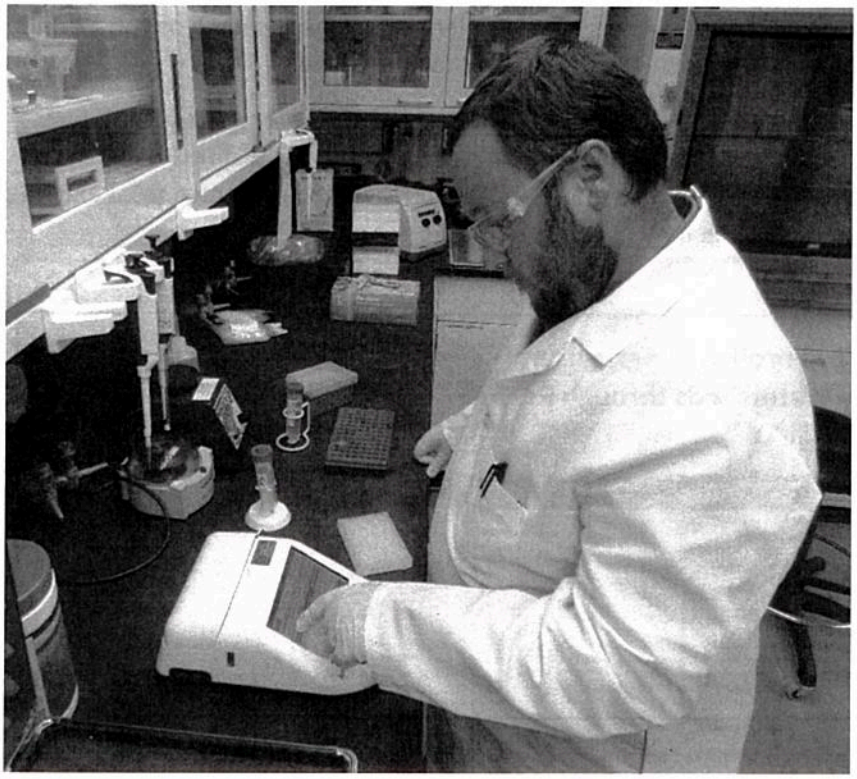
Clamping Down on an Invasive Species Pathway

During FY 2015, in partnership with non-governmental organizations (such as the Wild Rivers Invasive Species Coalition and the Western Peninsula Invasives Coalition), federal agencies and their partners established portable boat washing stations which were then deployed strategically across northern Wisconsin and the Upper Peninsula of Michigan. These stations reached large segments of recreational boaters at fishing tournaments and high-use boat ramps to both remove potential invasive species and provide educational information on prevention techniques. While boats were washed, local volunteer's reminded boat owners of good boating and fishing practices that further reduce the pathways that spread invasive species.

Focus Area 2 Success Stories

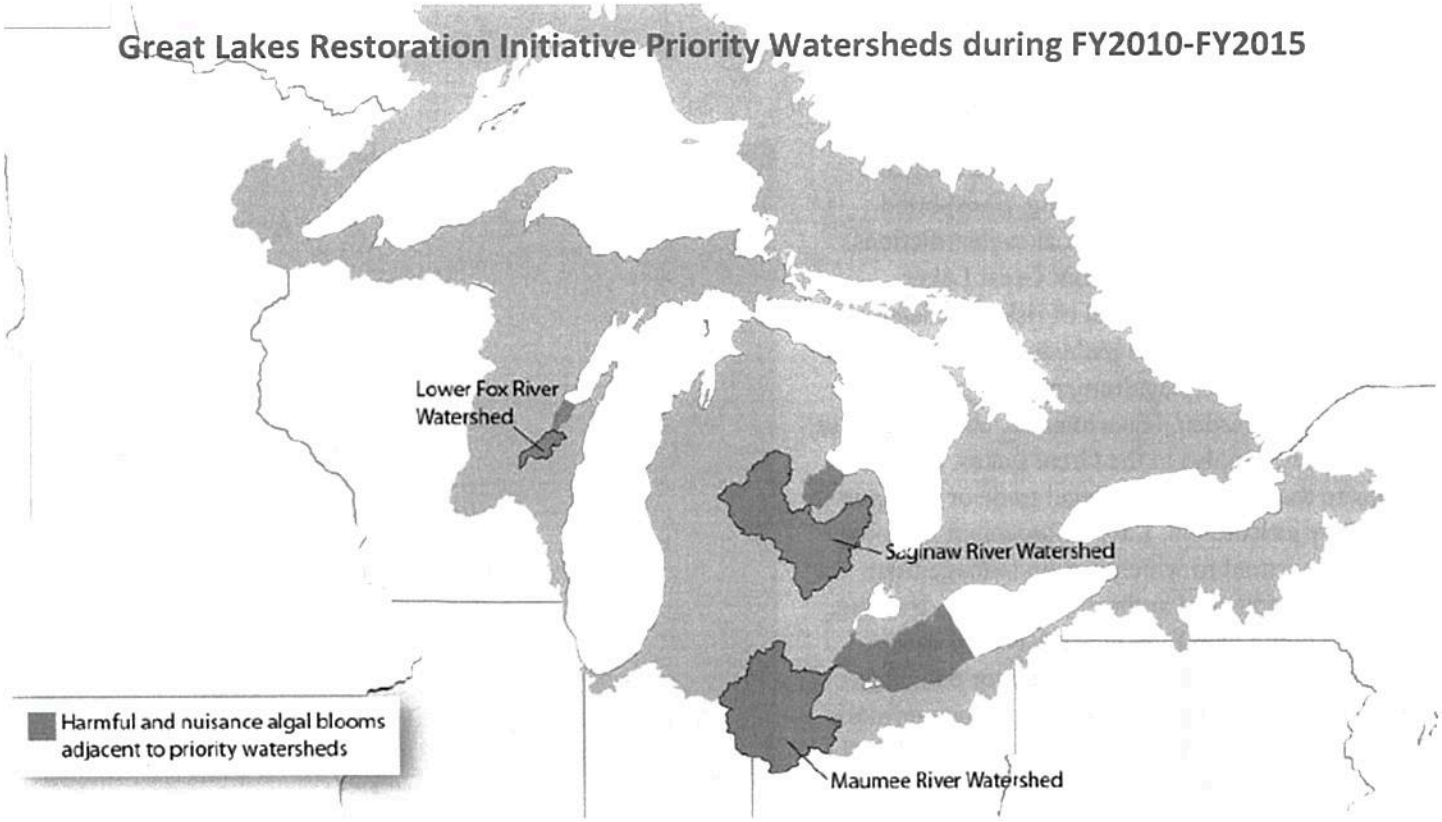
Transportation of Illegal Species

During FY 2015, the U.S. Fish and Wildlife Service and partners assessed the risk of regulated aquatic species that have been, or are being, transported and/or traded illegally in Great Lakes jurisdictions. Law enforcement personnel from Great Lakes jurisdictions assessed the level of risk associated with each of the nine major AIS pathways (internet sales, live bait, live food, aquaculture, private pond/lake stocking, water garden, aquarium/pet, cultural release, and biological supply) in the Great Lakes, as it pertains to the potential for illegal trade or transport within their jurisdiction. Law enforcement personnel assessed the extent to which certain management actions (e.g. additional authorities, staffing, training, tools, etc.) could help to reduce the risk of each pathway to zero. Eight of the nine major pathways assessed were considered 'high' risk by one or more jurisdictions. The exception was the biological supply pathway. The private pond/lake management, live food, and live bait pathways were assessed as the highest risk pathways across all jurisdictions.



eDNA: Early Hand-Held Monitoring

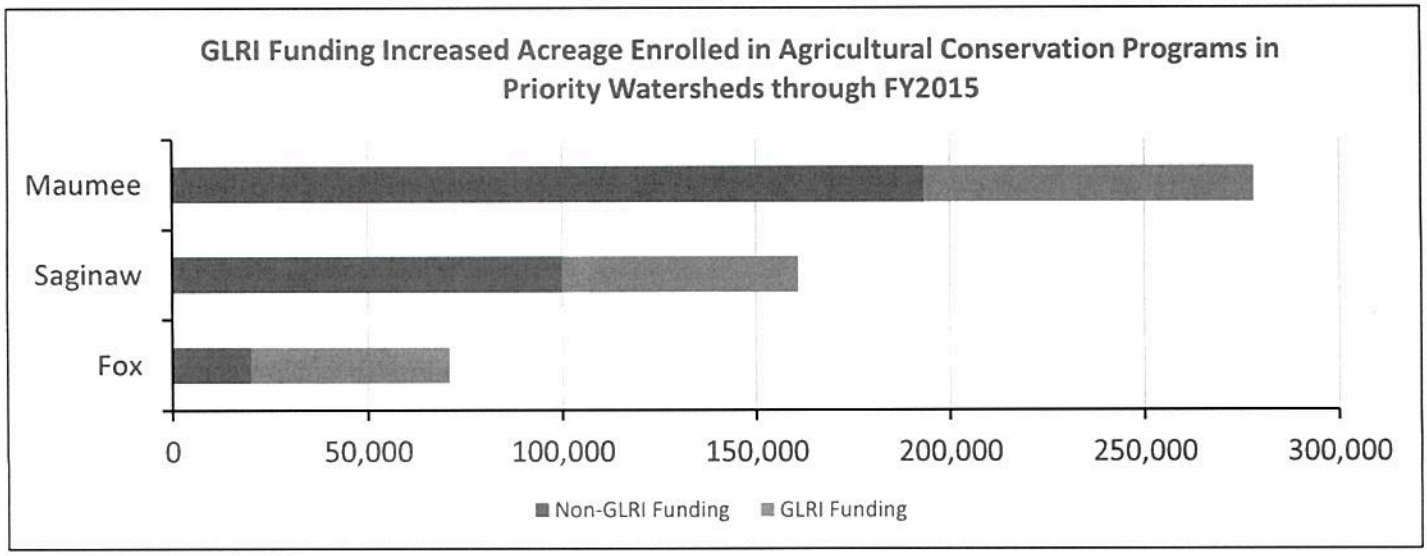
In FY 2015, federal partners validated that a new hand held, portable technology could accurately and rapidly detect Asian carp eDNA in water samples taken from fish transport tanks containing about 10,000 native minnows and zero, one, or ten silver carp. The process has been simplified so that experience in genetics or molecular techniques isn't needed to detect the DNA of Asian carp in environmental samples. Developing portable, rapid and reliable methods and kits such as this one will improve the detection of invasive species and pathogens and will improve the ability of resource managers to make timely decisions to prevent, contain, and control invasive species and pathogens. Next steps include evaluating this method under field conditions, including fish shipments that might contain invasive carps, and developing procedures needed to allow conservation officers and law enforcement agencies to use the kit to prevent illegal transport of Asian carp and other species.



FOCUS AREA 3: Nonpoint Source Pollution Impacts on Nearshore Health

During FY 2015, federal agencies and their partners reduced nutrient loads into the Great Lakes. The GLRI implemented focused conservation activities to reduce sources of phosphorus loadings that threaten the Great Lakes nearshore regions and projects have been undertaken in selected agricultural priority watersheds. The largest nonpoint source of phosphorus loadings that threaten the Great Lakes nearshore areas is the nutrient runoff from agricultural lands.

Excess phosphorus loadings threaten the Great Lakes ecosystem by contributing to harmful algal blooms that cause human health effects, drinking water impairments, exacerbate dead zones, and cause beach closures that result in loss of recreational opportunities. GLRI agencies project that over 160,000 pounds of phosphorus will be prevented from entering the Great Lakes annually as a result of GLRI funded projects in targeted watersheds.



During FY 2015, federal agencies and their partners funded nutrient and sediment reduction projects on over 100,000 acres of targeted watershed in the Great Lakes Basin using GLRI funding.

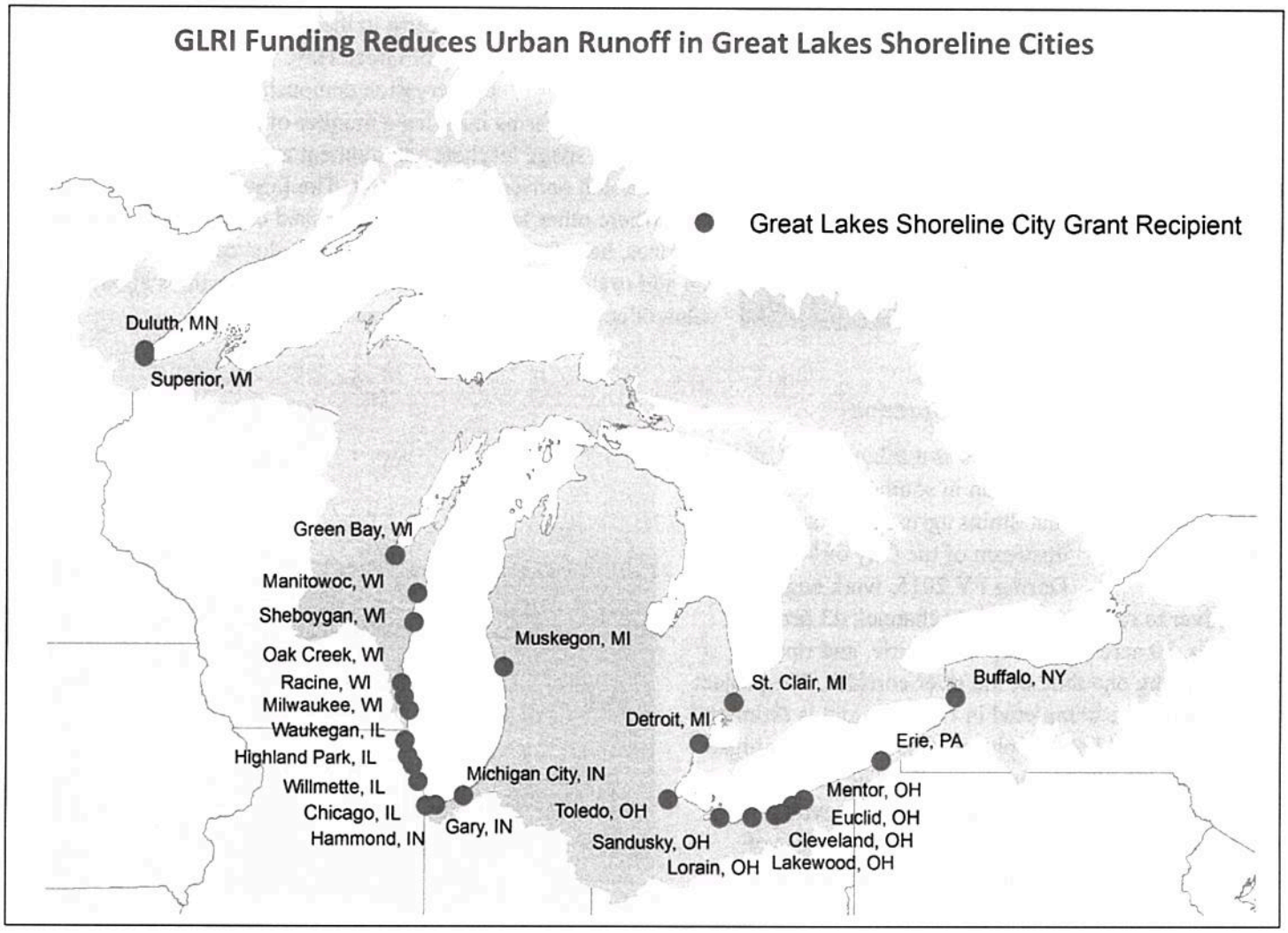
During FY 2015, federal agencies and their partners funded urban runoff projects that are anticipated to capture an average annual volume of more than 37 million gallons of untreated urban runoff per year. These projects reduce flooding, increase green space in urban areas, and return vacant properties to productive use. Federal agencies and their partners funded ten urban watershed management projects to implement best management practices that address nonpoint source pollution in urban areas. The practices implemented include:

- Bioswales
- Rain gardens
- Bioretention ponds
- Porous pavement
- Tree plantings
- Constructed wetlands

The GLRI also funded 11 green infrastructure projects in the following Great Lakes shoreline cities:

- Mentor, Ohio
- Sandusky, Ohio
- Euclid, Ohio
- Manitowoc, Wisconsin
- Oak Creek, Wisconsin
- Sheboygan, Wisconsin
- Superior, Wisconsin
- Highland Park, Illinois
- Michigan City, Indiana
- Muskegon, Michigan
- Wilmette, Illinois

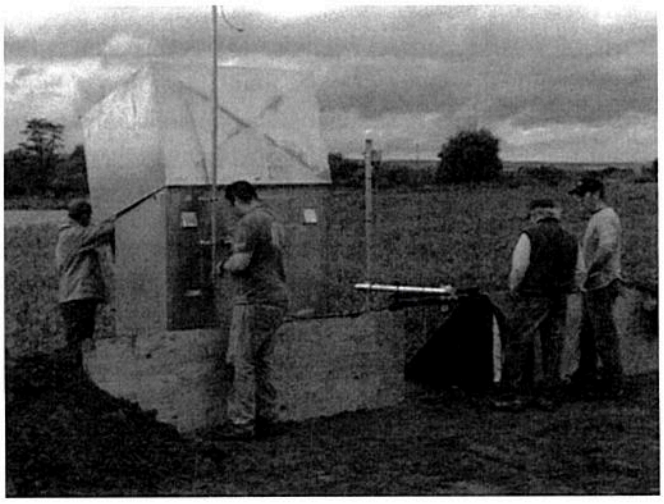
Projects in these shoreline cities will treat, slow, or capture untreated stormwater runoff, helping to improve water quality conditions within the Great Lakes basin.



Focus Area 3 Success Stories

Edge-of-field Monitoring Stations Improve Water Quality

During FY 2015, staff of the U.S. Geological Survey installed the first GLRI-funded edge-of-field monitoring stations on a farm in the Genesee River basin, New York. These stations are gathering weather data and sampling runoff during storm events. The water samples are analyzed for their phosphorus, nitrogen, and sediment content. USDA-Natural Resources Conservation Service (NRCS) staff assist the cooperating farmer with installing conservation practices in the field above the stations. This analysis helps quantify the value of conservation practices in reducing sediment and nutrient delivery from these fields, under these conditions, in order to improve water quality.



Conservation Demonstration Farms for Watershed Farmers

During FY 2015, the GLRI funded the implementation of conservation practices on a dairy farm in the Lower Fox River Watershed south of Green Bay, Wisconsin and three other conservation demonstration farms in the watershed. The farms installed a number of practices, including cover crops, silage leachate containment areas, a waste storage structure, and nutrient management. The farm is open for annual tours where other farmers in the watershed can view the installed practices, hear farmers' opinions on the value conservation practices can add to their farming operations, and ask questions about the value of conservation farming practices.

Lake Michigan Floodplain Restoration

Pike River is a tributary to Lake Michigan in southeastern Wisconsin that drains agricultural lands upstream of the City of Mt. Pleasant. During FY 2015, work began on the Pike River to restore a low-flow channel, 43 acres of wetlands, 30 acres of floodplain-prairie, and riparian habitats along one mile of the river corridor. The project is expected to be completed in FY 2016 and is estimated to reduce the loadings of phosphorus to Lake Michigan by more than 1,100 pounds annually. The river was heavily modified for agricultural drainage, with deeply sloped channel banks and a nearly complete loss of floodplain and wetland habitats which are critical to reducing nutrient loadings from agricultural runoff.

Focus Area 3 Success Stories

Permeable Paving at Rosewood Beach, Illinois

During FY 2015, the Highland Park, Illinois Park District installed 15,000 square feet of porous pavement at Rosewood Beach with funding from the GLRI. Installing the porous pavers, required the Park District to remove asphalt from the existing parking lot, complete excavating and grading work in order to accommodate the installation of gravel underlayment, and the final installation of permeable pavers. Asphalt parking lots cause rainwater to flow across hard surfaces and carry pollutants into waterways. The new surface will allow rain to soak into the ground instead of directly into nearby sensitive ravine systems and Lake Michigan. This project is expected to reduce runoff from the parking lot area by nearly 19,000 gallons per year.

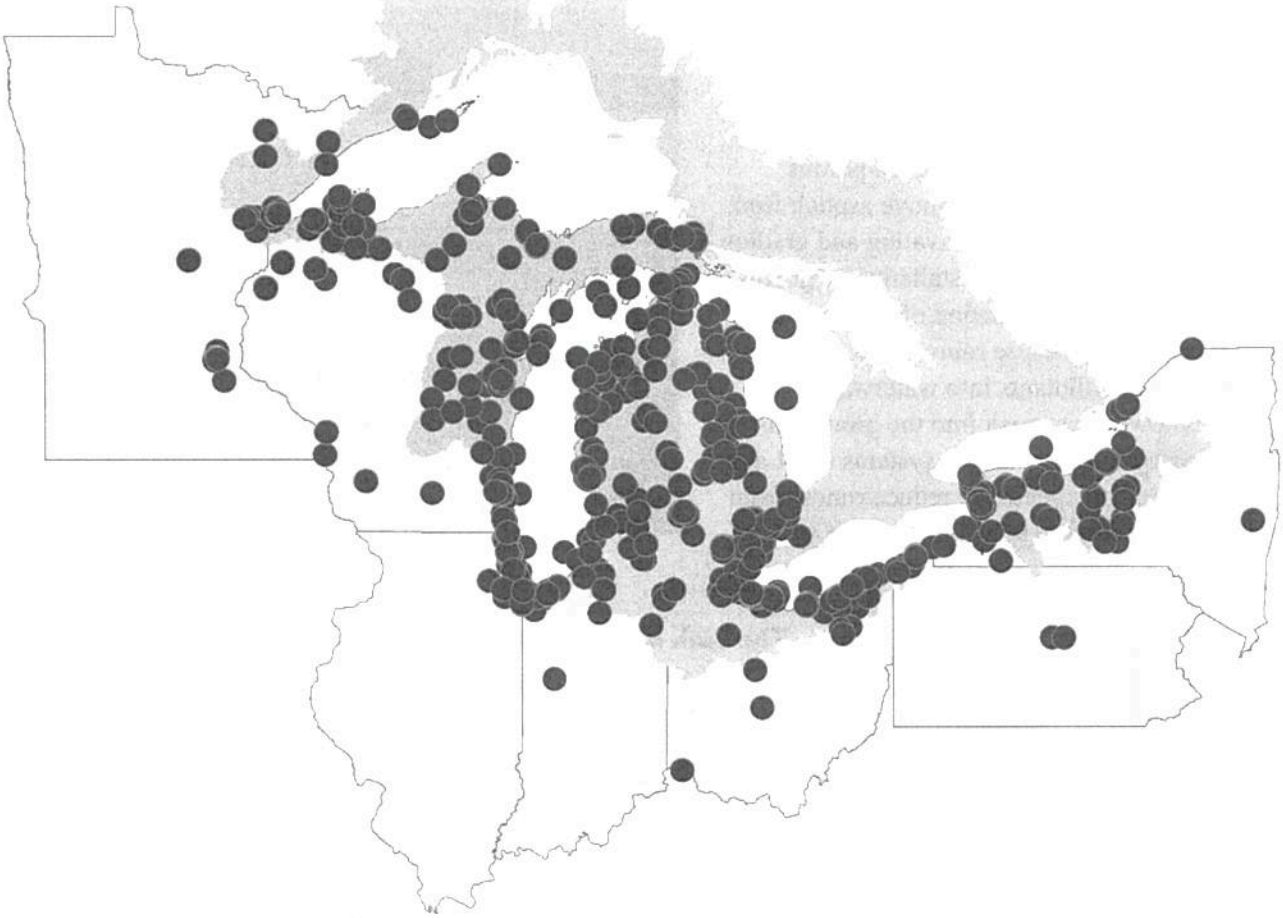
The Link between Land-Use Changes and In-Lake Algal Blooms

The National Oceanic and Atmospheric Administration's (NOAA) Great Lakes Environmental Research Laboratory (GLERL), in collaboration with partners from the University of Michigan's Cooperative Institute for Limnology and Ecosystems Research, sampled eight sites throughout the western basin of Lake Erie and four sites in Lake Huron's Saginaw Bay from June until October of FY 2015. The sampling was done to assess the impact of land use on algal bloom development. Measurements of total phosphorus, total dissolved phosphorus, and soluble reactive phosphorus will contribute to the GLRI's goal of reducing algal bloom growth through reductions in phosphorus. Measuring bloom toxicity is invaluable to regional stakeholders as GLERL distributes key information on a weekly basis through GLERL's website.

Removing Concrete-Lined Channels to Reduce Urban Runoff

Historically, many of the rivers and streams in urban areas across the country have been converted into concrete-lined "spillways" to expedite the flow of urban runoff. As a result, nonpoint pollution from the urban watershed is able to pass downstream unabated, riverine habitat is sacrificed, and fish passage is eliminated by dams. In FY 2015, GLRI partners began removing concrete lining from a mile of the Menomonee River in downtown Milwaukee. This project reduces nonpoint loadings to Lake Michigan, removes obstructions to fish passage, and supports the elimination of beneficial use impairments required to delist the Milwaukee Estuary Area of Concern.

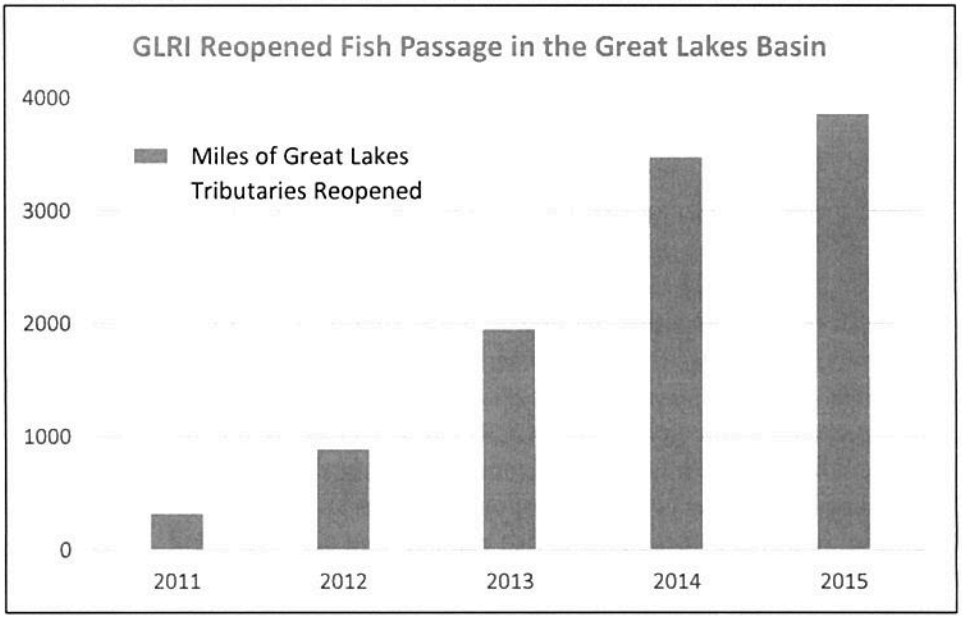
Great Lakes Restoration Initiative Habitat Restoration and Species Protection Projects (FY 2010-FY 2015)



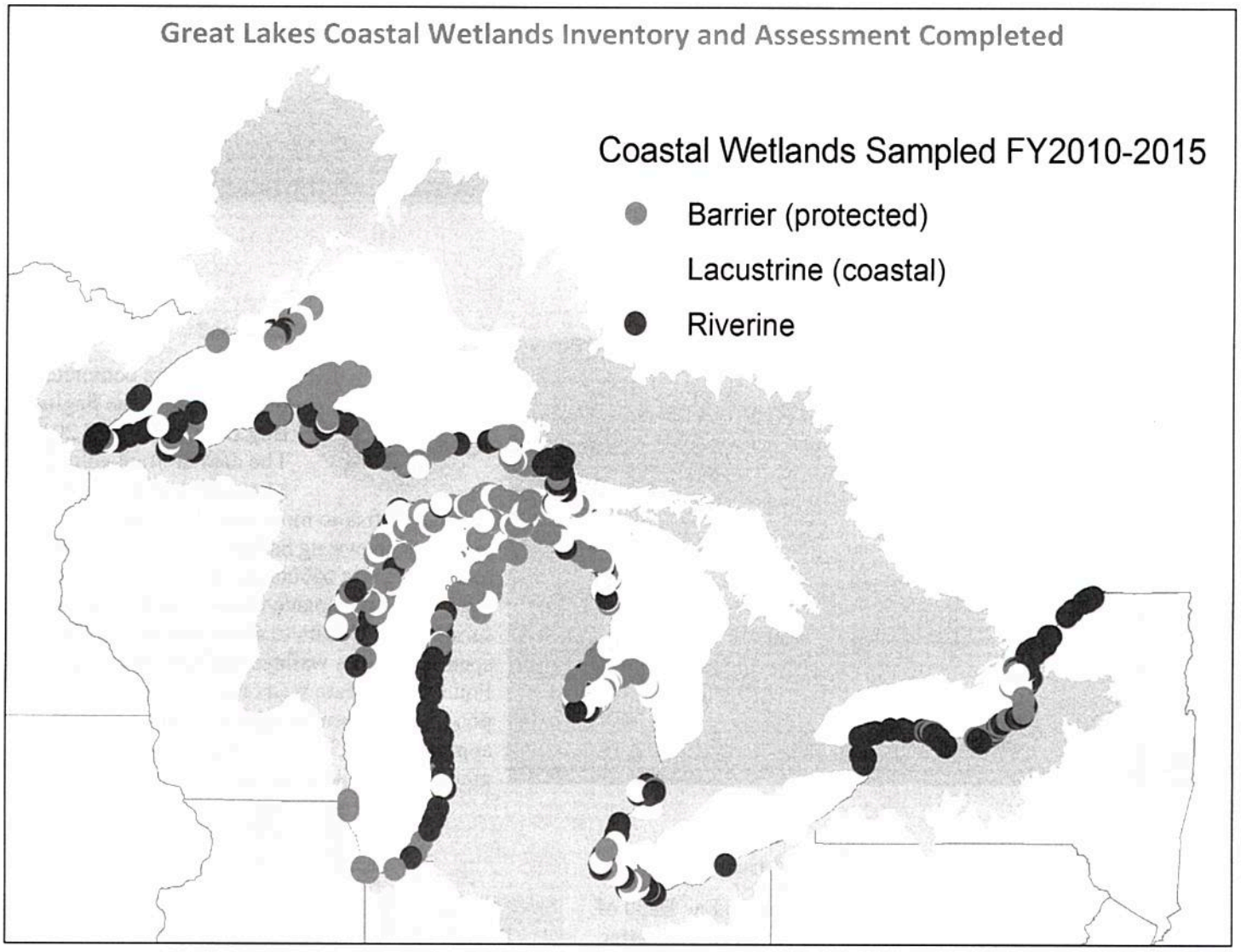
FOCUS AREA 4: Habitat and Species

During FY 2015, federal agencies and their partners protected, restored and enhanced habitats and native species throughout the Great Lakes basin. In FY 2015, GLRI agencies and their partners implemented 57 habitat and species projects adding to the more than 875 habitat and species projects underway or completed by federal agencies and their partners since the inception of the GLRI.

During FY 2015, federal agencies and their partners, implemented protection, restoration and enhancement projects that have reopened over 3,800 miles of Great Lakes tributaries, and increased aquatic connectivity for numerous fish species. In FY 2015, more than 36,000 acres of habitat in targeted watersheds were protected, restored and enhanced in order to sustain Great Lakes habitats and species populations.



The Great Lakes Restoration Initiative Action Plan II identified a measure to protect, restore and enhance coastal wetlands. Great Lakes coastal wetlands are ecologically significant in part because more than 80 species of fish rely directly on coastal wetland habitat during some part of their life cycles and over fifty separate species depend entirely on coastal wetlands. In FY 2015, federal agencies and their partners protected, restored and enhanced over 300 miles of Great Lakes shoreline and riparian corridors and protected, restored and enhanced over 7,000 acres of Great Lakes coastal wetlands.



Great Lakes aquatic and terrestrial habitats are better integrated as a result of GLRI efforts, and the species that depend on coastal habitats can now use them to their full capacity. Projects focusing on the Great Lakes aquatic and terrestrial species are leading to the recovery of federally endangered species such as:

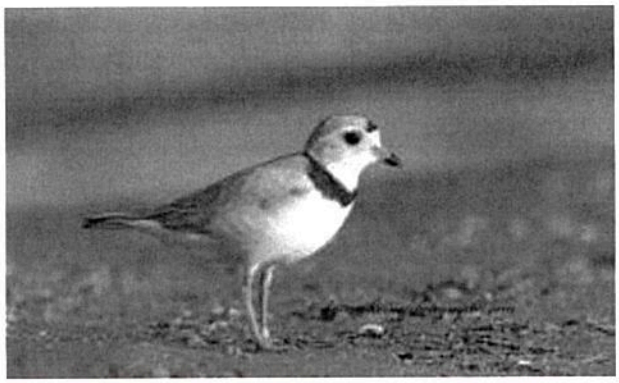
- Eastern prairie fringed orchid
- Houghton's goldenrod
- Chittenango ovate amber snail
- Snuffbox mussel
- Mitchell's satyr butterfly
- Piping plover

Ten of the FY 2015 projects were directed towards protecting, restoring and enhancing piping plover populations in the Great Lakes Basin and over 40 projects have improved conditions for numerous federally and non-federally listed species in the Great Lakes such as lake sturgeon.

Focus Area 4 Success Stories

Endangered Piping Plover Returns to Lake Ontario

Basin wide, the 55 pairs of piping plover observed in 2011 have risen to 75 pairs during FY 2015, a remarkable 36% increase in five years and a record since the species was listed as an endangered one. For the first time since 1984, two pairs of federally endangered Piping Plover nested on the shore of eastern Lake Ontario, with one pair successfully fledging a chick. This success is due to protection and restoration efforts put forth by federal agencies and their partners using GLRI funding. Similar success is reported in Lake Michigan and Lake Superior, where restoration projects are providing for the needs of these shorebirds as well as other native species.



Saginaw Bay Dam Removal

GLRI partners completed the removal of the Saginaw Bay Dam during FY 2015. The dam at Frankenmuth, Michigan had blocked the passage of fish to more than 1,700 miles of upstream spawning habitat on the Cass River and connecting tributaries since it was built in the 1850s. In its place is now a rock ramp with a series of rock weirs to allow passage of fish species, such as walleye and lake sturgeon. Fourteen separate weirs and adjacent "resting pools" have been constructed over a span of approximately 350 feet, to provide a roughly 3% grade for non-jumping targeted species.

Restoring and Enhancing Manoomin (wild rice) Habitats

During FY 2015, the Fond du Lac Band of Lake Superior Chippewa developed better ways to control water levels and protect sustainable wild rice populations. Projects include water control structures, beaver dam removals and channel obstruction removal that resulted in the protection of 855 acres of ecologically and culturally important wild rice habitat on the Fond du Lac Reservation in northeastern Minnesota. Federal partners and local Chippewa removed 97 acres of competing aquatic plant species from Big Rice Lake and 59 acres of aggressive perennial vegetation from Perch Lake. In the St. Louis River Estuary partners reseeded 121 acres with wild rice. During FY 2015 federal agencies and their partners restored and protected a total of 1,132 acres of wild rice habitat in Fond du Lac waters.

Focus Area 4 Success Stories

RAMSAR Wetlands of International Importance

The 15-mile Lake Michigan coastal landscape called the Chiwaukee Prairie-Illinois Beach Lake Plain was designated "wetland of international importance" by the Ramsar Convention (formally, the Convention on Wetlands of International Importance), an international treaty for the conservation and sustainable utilization of wetlands. Thanks in part to this designation and the efforts of the GLRI, the restored wetlands and the tributaries flowing through them are now better protecting Lake Michigan water quality, providing habitat for over 300 migratory bird species, and protecting more than 1,200 native plant species.

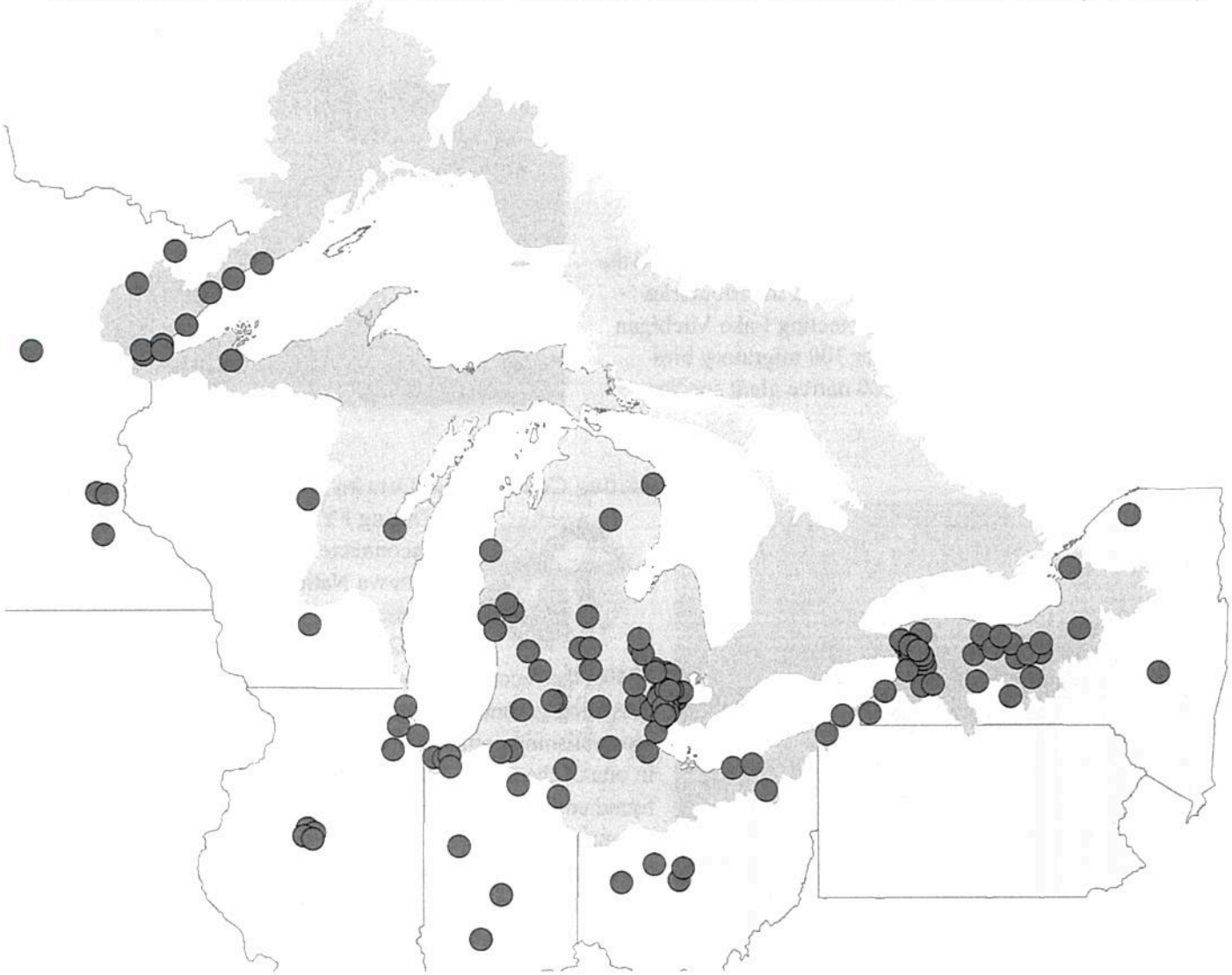
Getting Connected at Ottawa National Wildlife Refuge

During FY 2015, GLRI partners reconnected two previously isolated Ottawa National Wildlife Refuge wetlands to Crane Creek and Lake Erie in Ohio. For the first time since the 1940s, the reconnected wetlands now function as a productive spawning ground and nursery area. Less than one week after reestablishing connectivity, longnose gar were found spawning in one of the pools. Thirteen species of fish not previously found entered through the structure and actively use the reconnected wetlands. Maintaining a hydrologic connection between the diked wetlands, Crane Creek, and Lake Erie allows fishes to use vegetated habitats regularly, reduces the concentration of nutrients in coastal waters, and maintains productive wetlands for birds and other biota.

Chicago's Lakefront Multiple Habitat Laboratory

Northerly Island was built as part of the 1933 Chicago World's Fair, and was later modified into an airport. In FY 2015, due in part to the efforts of the GLRI, Northerly Island completed a transformation into a 40-acre urban oasis with multiple types of native habitat, including 18 acres of oak savanna, ten acres of mesic prairie, 3.3 acres of wet prairie, 2.2 acres of emergent marsh, 4.1 acres of pond, and 1.7 acres of lacustrine littoral habitat. This project provides unique educational and recreational opportunities for residents and visitors along the Lake Michigan shoreline.

Great Lakes Restoration Initiative Trained Educators across the Great Lakes (FY 2015)



FOCUS AREA 5: Foundations for Future Restoration Actions

In order to improve transparency and fiscal stewardship, federal agencies have established accountability mechanisms, management practices, and third party oversight to effectively manage the GLRI.

The Great Lakes Restoration Initiative Action Plan II commits agencies to develop and incorporate climate resiliency criteria in project selection, planning, and implementation. During FY 2015, federal agencies and their partners began to develop a standardized set of climate resiliency criteria. The criteria will ensure that projects factor in likelihood of future climate impacts including the increased frequency of more intense storms and shifts in ranges of particular species. The criteria will be finalized in FY 2016. Starting in FY 2017, GLRI projects will include climate resiliency criteria in planning and implementation.

The GLRI continues to promote Great Lakes-based ecosystem education and stewardship. During FY 2015, federal agencies and their partners trained over 330 educators (see map above) through the Center for Great Lakes Literacy (CGLL) program. The CGLL is a GLRI - funded collaborative effort throughout the Great Lakes watershed. The center provides hands-on experiences, educational resources and networking opportunities to promote Great Lakes literacy among an engaged community of educators, scientists and citizens. It is estimated that over 50,000 students will benefit from the training of these educators throughout the end of the Great Lakes Restoration Initiative Action Plan II in FY 2019.

During FY 2015, federal agencies and their partner's educated almost 25,000 people about the Great Lakes ecosystem through place based experiential learning activities on federally managed lands primarily through interpretative programs at national parks and lakeshores.

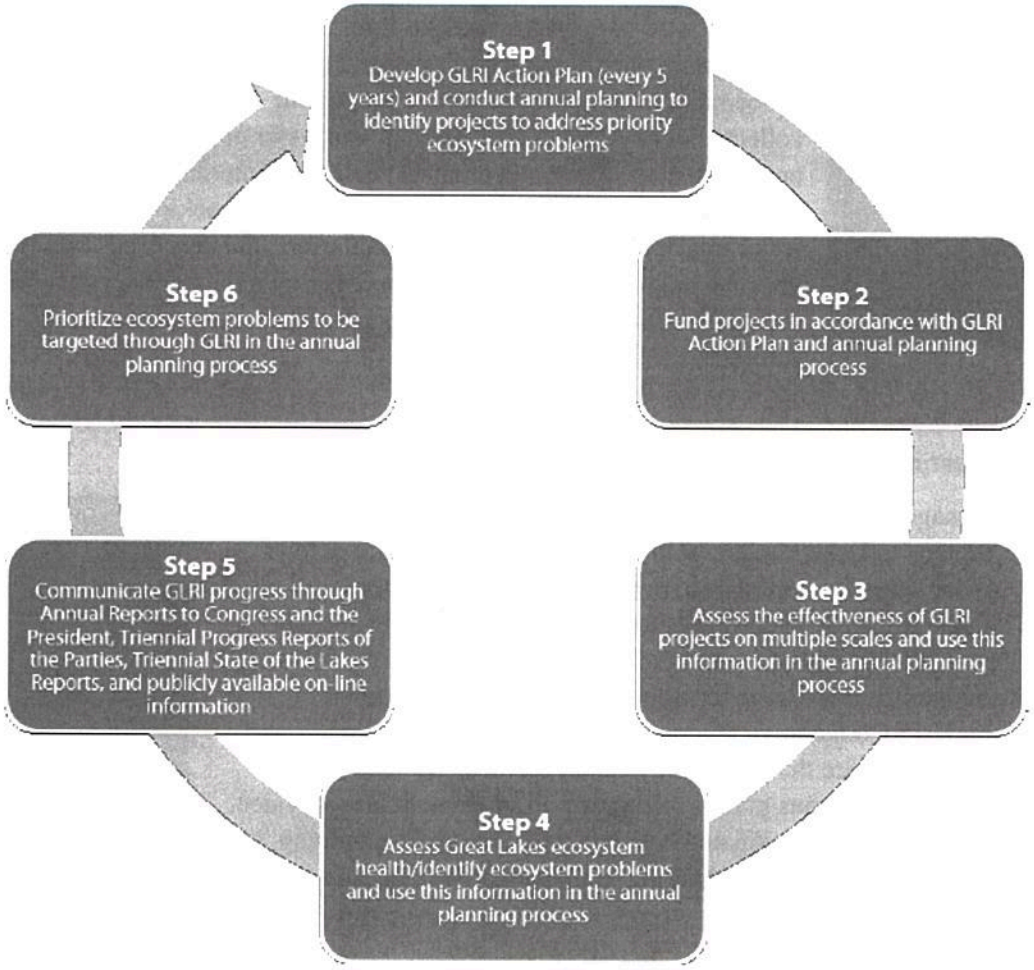
The Great Lakes Restoration Initiative Action Plan II incorporates a science-based adaptive management framework that is being used to prioritize ecosystem problems, to select projects that address those problems, and to assess the effectiveness of GLRI projects. During FY 2015, federal agencies and their partners developed a draft Science-Based Adaptive Management Process. This document provides a conceptual framework that supplements the adaptive management process presented in the Great Lakes Restoration Initiative Action Plan II. This draft will be finalized in 2016 and will incorporate comments from the Great Lakes Advisory Board (GLAB).

During FY 2015, federal agencies and their partners conducted comprehensive monitoring to assess the status and trends of environmental indicators in of the Great Lakes ecosystem. The monitoring data is used to prioritize future GLRI-funding decisions by identifying the most significant ongoing and emerging problems in the ecosystem.

During FY 2015, federal agencies and their partners evaluated the effectiveness of GLRI-funded projects. GLRI partners implemented in FY 2015 a new accountability system, Environmental Accomplishments in the Great Lakes (EAGL), to track the effectiveness of GLRI-funded projects in meeting the Measures of Progress defined in the GLRI Action Plan II. In FY 2105, agencies continued assessment efforts designed to evaluate the effectiveness of GLRI-funded projects.

GLRI agencies and partners also identified watersheds, habitats, and species to be targeted for potential additional restoration activities. GLRI partners used monitoring data, assessments, models, and other decision support tools to identify watershed, habitats and species for targeting. The Great Lakes Advisory Board, states, tribes, and other stakeholders also provided input to the GLRI agencies on how to best use GLRI resources.

The Great Lakes Restoration Initiative Science-Based Adaptive Management Cycle

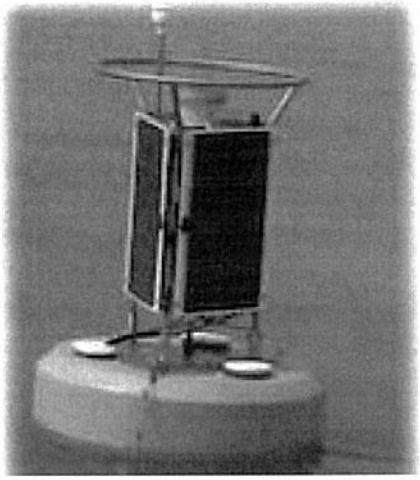


Focus Area 5 Success Stories

Educating the Next Generation through Great Teachers

Two high school teachers from East Palestine, Ohio, spent a week aboard the US EPA *R/V Lake Guardian* on Lake Erie in July 2014 as part of the Center for Great Lakes Literacy (CGLL) program. Over the past year, they have taken the lessons learned from the CGLL program and infused the Great Lakes into their classrooms. The teachers took their students to a field trip on Lake Erie arranged by scientists they worked with on the *R/V Lake Guardian* CGLL program. They created an outdoor classroom at their school through an invasive species removal project with their newly-formed science club. This classroom became the setting for a summer science camp for elementary students with their science club students serving as the educators and sharing what they have learned with the younger kids. This teacher team exemplifies what great teachers can do when provided with GLRI training and resources to augment their teaching.

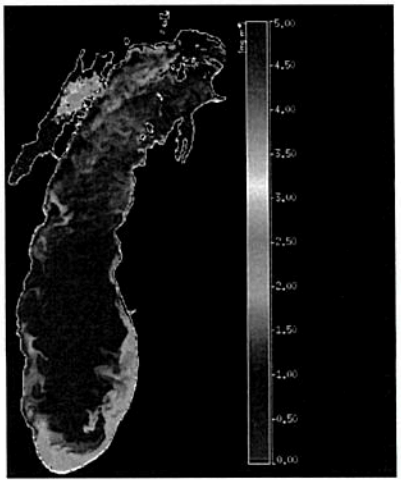
Real-Time Continuous Water Quality Observation Buoys



During FY 2015, GLRI partners established a network of four real-time continuous observing buoys to track detailed water quality conditions to support modeling, forecasting, and public warnings of Harmful Algal Bloom (HAB) conditions throughout western Lake Erie. The observing buoys are capable of tracking water quality and bloom conditions and measuring dissolved phosphorus concentrations at hourly intervals. During the 2015 bloom season, these buoys collected over 7,000 in-lake nutrient and water quality measurements, providing unprecedented spatial and temporal details of internal lake dynamics and bloom development. In addition to providing real-time tracking of HABs conditions for water intake managers and recreational users, the observing data will be used to improve ongoing forecasting efforts covering a range of spatial and temporal scales including seasonal HABs forecasts, 5-day forecasts, and vertical distribution forecasts.

Lake Michigan Contrasting Habitats

Managers are concerned by contrasting nearshore and offshore habitats in Lake Michigan. In the nearshore, tributaries deliver phosphorus from nutrient rich watersheds that increases planktonic growth and leads to fouled beaches. In the nutrient poor offshore, invasive mussels deprive plankton of nutrients, leading to concerns about sufficient forage to support economically important fisheries. As part of the 2015 Cooperative Science and Monitoring Initiative in Lake Michigan, GLRI helped investigate the problem by sampling these two contrasting habitats. Using four ships, autonomous gliders, sonar, towed instrument arrays, video, nets, and bottles, agency scientists investigated how and why the lake is changing, so that managers will have an improved understanding of the key drivers in each of these habitats.



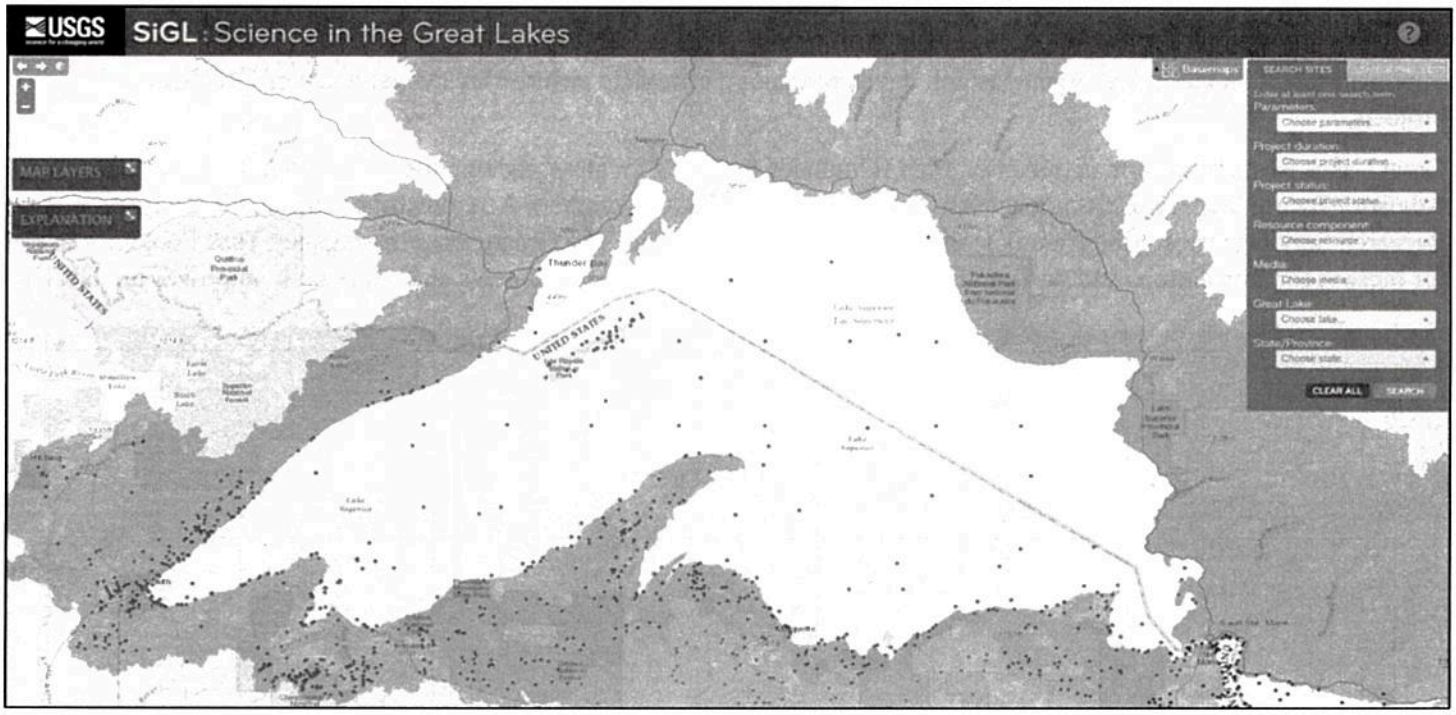
Focus Area 5 Success Stories

National Coastal Condition Assessment

The GLRI added 150 embayment, 34 Lake Erie, and 115 connecting channel sites to EPA's National Coastal Condition Assessment (NCCA) during FY 2015. NCCA enhancements increase the information available to decision-makers on nearshore conditions and potential watershed disturbances. Sampling algal toxins assists in identifying areas vulnerable to harmful cyanobacteria blooms, especially in Lake Erie. Underwater video documents habitat changes often related to invasive species such as zebra and quagga mussels. Monitoring activities now include environmental assessments of the St. Marys, the Detroit, and the St. Clair river as well as Lake St. Clair for the first time because these corridors' tremendous economic and environmental value.

Lake Superior Environmental Monitoring Collaborative

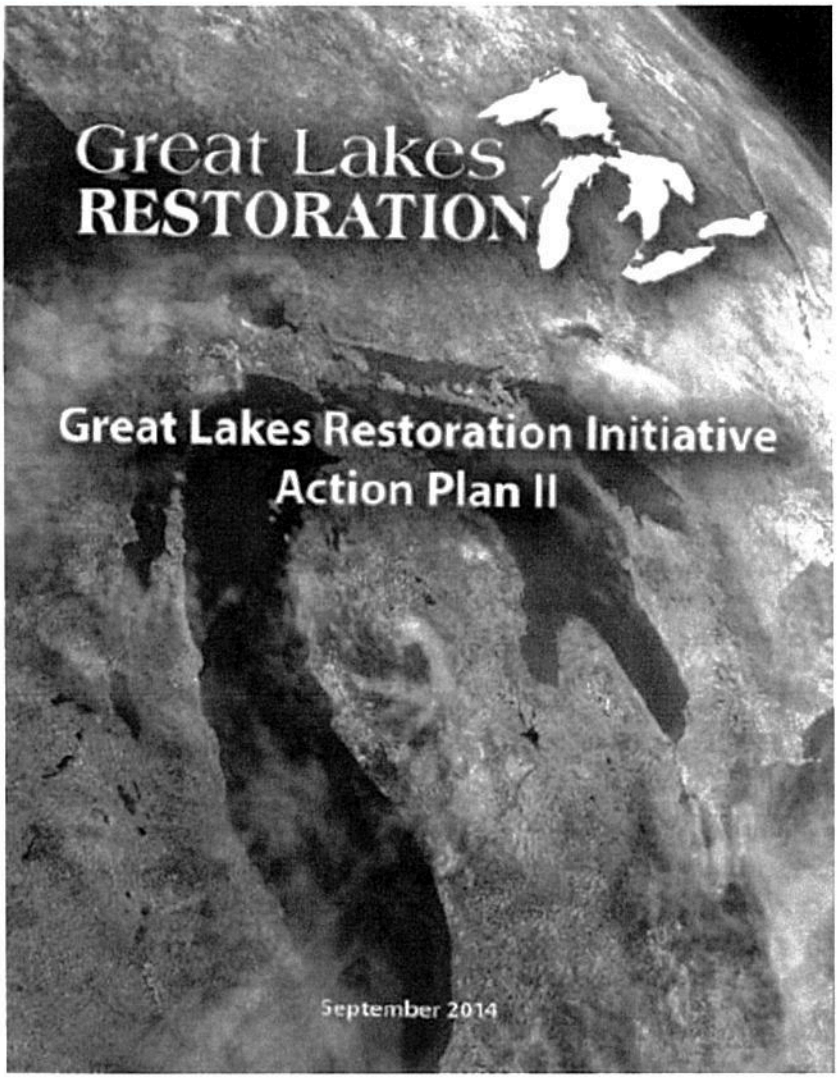
The Lake Superior Environmental Monitoring Collaborative (LSEMC) is working to improve access to multi-disciplinary monitoring data that can help prioritize environmental protection and restoration work, facilitate environmental assessments of proposed projects in the Lake Superior Basin, and identify data gaps. The Collaborative will address these goals by providing an easy-to-access catalog of relevant monitoring projects and data through the Science in the Great Lakes Mapper and GreatLakesMonitoring.org. In FY 2015, based on feedback from a user group comprised of federal, state, and tribal LSEMC partners, GLRI agencies implemented significant enhancements to the Science in the Great Lakes Mapper and Data Management System.



Section 3 – Planned Activities

The Great Lakes Restoration Initiative Action Plan II summarizes the actions federal agencies have worked to implement during FY 2015 and summarizes what actions federal agencies plan to implement through FY 2019 using GLRI funding. These actions will build on restoration and protection work carried out under the first Great Lakes Restoration Initiative Action Plan, with a major focus on:

- Cleaning up Great Lakes Areas of Concern
- Preventing and controlling invasive species
- Reducing nutrient runoff that contributes to algal blooms
- Restoring habitat to protect native species
- Supporting Great Lakes resilience, education, and adaptive management.



Great Lakes Restoration Initiative Action Plan II incorporates a science based adaptive management framework that will be used to prioritize ecosystem problems, to select projects to address those problems, and to assess the effectiveness of those projects. The federal partnership has developed Measures of Progress to track all actions implemented under Action Plan II.

Great Lakes Restoration Initiative Action Plan II commits agencies to develop and incorporate climate resiliency criteria in project selection processes. Agencies will develop standard criteria to ensure climate resiliency of GLRI-funded projects.

Great Lakes Restoration Initiative Action Plan II includes feedback for strengthening the GLRI from the Great Lakes Advisory Board, the U.S. EPA Science Advisory Board, the U.S. Government Accountability Office, the Congressional Research Service, states, tribes, municipalities, and the general public. The Great Lakes Interagency Task Force is grateful for these recommendations and will continue to actively seek input as it implements and continually improves the GLRI.

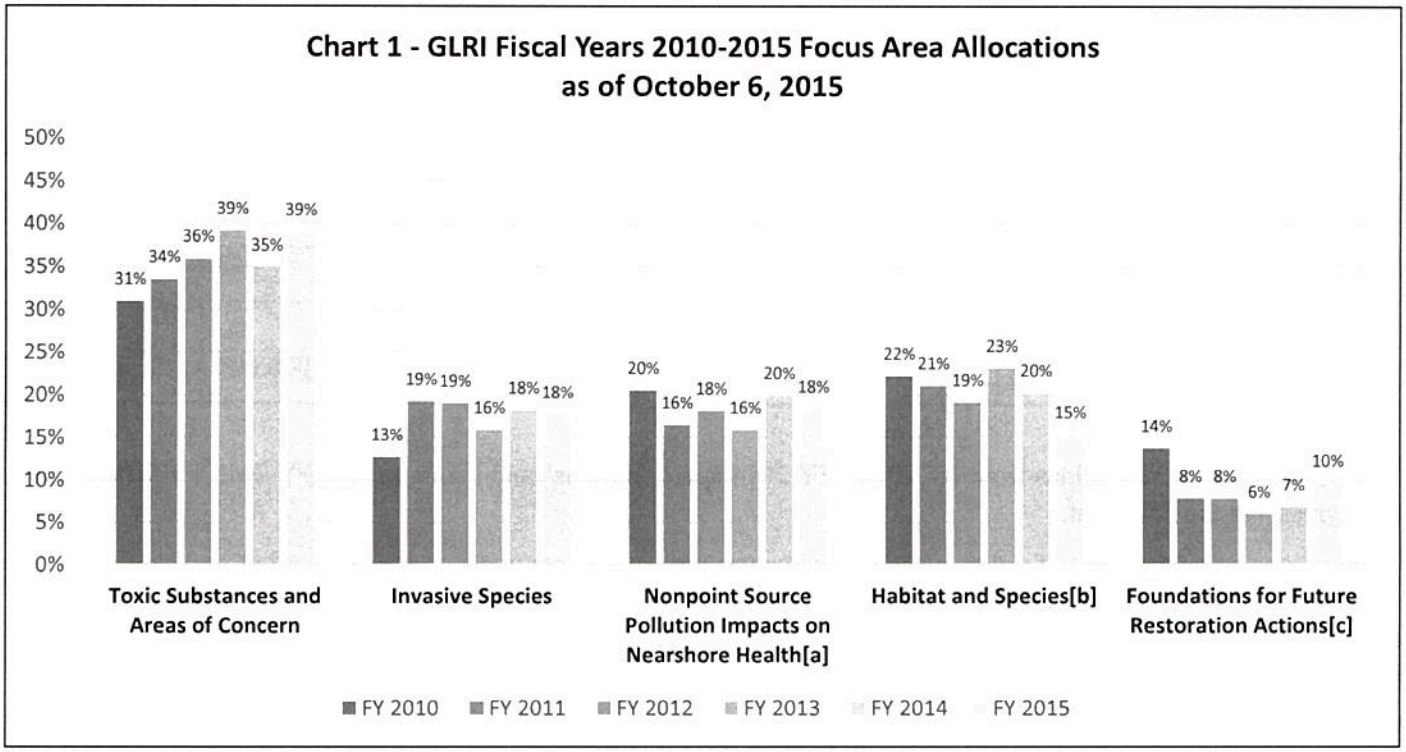
Section 4 – Financial Reporting

From FY 2010 to FY 2015, the U.S. Environmental Protection Agency has been appropriated approximately $1.957 billion in GLRI funds. The agencies that receive GLRI funds use multiple funding mechanisms, including interagency agreements, fund transfers, competitive grants, and capacity-building grants to states and tribes in order to support effective project implementation.

Table 1 and Chart 1 provide information on FY 2010 – FY 2015 GLRI funding by focus area, rounded to the nearest hundred thousand. Table 2 provides summary information for FY 2010 – FY 2014 GLRI funding by agency (more detailed information for these years can be found in the Great Lakes Restoration Initiative Report to Congress and the President for FY 2010-FY 2014). Table 3 provides more detailed information for FY 2015 by agency.

Table 1 - GLRI FY 2010-FY 2015 Focus Area Allocations as of October 6, 2015 (Dollars in Thousands)

Focus Area	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Toxic Substances and Areas of Concern	$146,946	$100,400	$107,500	$111,000	$104,600	$117,000
Invasive Species	$60,265	$57,500	$56,900	$45,000	$54,600	$53,000
Nonpoint Source Pollution Impacts on Nearshore Health[a]	$97,331	$49,250	$54,300	$45,000	$59,700	$55,000
Habitat and Species[b]	$105,262	$63,000	$57,200	$65,500	$60,600	$46,000
Foundations for Future Restoration Actions[c]	$65,196	$29,250	$23,500	$17,000	$20,500	$29,000
TOTAL	$475,000	$299,400	$299,500	$283,500	$300,000	$300,000



[a] Nearshore Health and Nonpoint Source Pollution in FY 2010-FY 2014.

[b] Habitat and Wildlife Protection and Restoration in FY 2010-FY 2014.

[c] Accountability, Education, Monitoring, Evaluation, Communication, and Partnerships in FY 2010 – FY 2014.

Table 2 - Summary Information for FY 2010 – FY 2014 Great Lakes Restoration Initiative Funding by Agency as of October 6, 2015

Agency[1]	Obligations[2]					
	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	Total
DHS-USCG	$6,350,000	$2,724,700	$2,710,000	$2,450,986	$1,278,326	$15,514,012
DOC-NOAA	$30,536,774	$18,289,090	$16,242,588	$25,504,538	$35,170,162	$125,743,152
DOD-USACE	$49,272,025	$30,663,366	$35,448,705	$31,607,995	$28,654,846	$175,646,937
DOI-BIA	$3,416,000	$6,316,027	$4,718,840	$3,985,077	$3,949,629	$22,385,573
DOI-NPS	$10,479,525	$4,861,269	$3,527,109	$3,012,927	$3,176,525	$25,057,355
DOI-USFWS	$69,348,690	$48,690,188	$45,699,986	$40,000,560	$49,037,576	$252,777,000
DOI-USGS	$23,717,195	$14,531,602	$13,051,766	$12,661,690	$19,832,266	$83,794,519
DOT-FHWA	$2,500,000	$1,218,000	$1,221,000	$973,156	$964,500	$6,876,656
DOT-MARAD	$4,000,000	$2,694,600	$2,446,927	$2,311,345	$1,790,785	$13,243,657
HHS-ATSDR/CDC	$5,500,000	$2,195,661	$2,200,000	$1,415,500	$1,739,134	$13,050,295
USDA-APHIS	$1,884,727	$636,724	$1,134,000	$903,815	$1,245,775	$5,805,041
USDA-NRCS	$34,092,000	$16,787,976	$27,185,426	$20,529,452	$24,280,233	$122,875,087
USDA-USFS	$15,458,000	$8,889,772	$6,718,080	$6,028,545	$6,401,390	$43,495,787
IA Totals:	$256,554,937	$158,498,975	$162,304,427	$151,385,586	$177,521,147	$906,265,072
EPA, GLFC, IJC, and Misc. IAs	$213,968,498	$135,982,735	$135,812,912	$130,585,033	$122,478,805	$738,827,984
Total Obligated	$470,523,434	$294,481,710	$298,117,339	$281,970,620	$299,999,952	$1,645,093,055
Returned[3]	$4,476,566	$4,918,290	$1,402,661	$1,727,460	$48	$12,525,024
GLRI Grand Totals:	$475,000,000	$299,400,000	$299,520,000	$283,698,079	$300,000,000	$1,657,618,079

[1] Individual Agency allocations from FY 2010 - FY 2014 appropriations can be found in the FY 2013 FY 2014 Report to Congress and the President.

[2] Obligations are the amount of orders placed, interagency agreements, contracts or grants awarded, and similar transactions by EPA. The amount also reflects de-obligations. De-obligation generally results from events such as completing a project under budget, contract termination, changes in project scope or focus, or other unforeseeable circumstances.

[3] Returned funds are determined by subtracting obligations as of October 6, 2015 from appropriated funds. Returned funds generally result from de-obligating 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 Anti Deficiency Act.

Table 3 - Great Lakes Restoration Initiative FY 2015 Funding by Agency as of October 6, 2015

Agency	FY 2015 Initial Allocation[a]	FY 2015 Actual Allocation[b]	FY 2015 Total Obligations
DHS-USCG	$2,006,000.00	$2,006,364.00	$2,006,364.00
DOC-NOAA	$26,584,000.00	$19,692,678.00	$19,692,678.00
DOD-USACE	$34,609,000.00	$47,448,655.00	$43,009,161.00
DOI-BIA	$3,950,000.00	$3,949,710.00	$3,949,710.00
DOI-NPS	$3,142,000.00	$3,142,389.00	$3,142,389.00
DOI-USFWS	$33,374,000.00	$41,393,402.00	$41,393,402.00
DOI-USGS	$11,679,000.00	$23,432,650.00	$23,432,650.00
DOT-FHWA	$965,000.00	$964,519.00	$0.00
DOT-MARAD	$2,291,000.00	$1,290,832.00	$1,290,832.00
HHS-ATSDR/CDC	$1,738,000.00	$1,737,873.00	$1,737,873.00
USDA-APHIS	$1,246,000.00	$1,245,794.00	$1,245,794.00
USDA-NRCS	$23,281,000.00	$23,280,505.00	$23,280,505.00
USDA-USFS	$6,290,000.00	$6,289,519.00	$6,289,519.00
IA Totals:	**$151,155,000.00**	**$175,874,890.00**	**$170,470,877.00**
EPA, GLFC, and Misc. IAs	**$148,845,000.00**	**$124,125,110.00**	**$68,468,630.93[c]**
GLRI Grand Totals:	**$300,000,000.00**	**$300,000,000.00**	**$238,939,507.93[D]**

[a] Based on allocations to each Agency distributed to the Regional Working Group on January 28, 2015.

[b] Federal agencies work collaboratively to ensure that funding is used for the highest priority Great Lakes projects. The "Actual Allocations" (funding provided to each agency) reflect adjustments made to address emerging priorities (e.g., keep Asian carp from becoming established in the Great Lakes) and to maximize environmental outcomes.

[c] Components are: (i) grants totaling $25,035,764 (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 $13,616,840; and (iii) contracts and miscellaneous interagency agreements (each less than $1 million) totaling $29,816,027.

[D] EPA expects to award funding under existing request for applications, invitations to States and Tribes, and identified AOC restoration projects for outstanding unobligated funding.

APPENDIX A – GLRI ACTION PLAN II: MEASURES OF PROGRESS

The table below provides an overview of the results achieved for each of the 34 Measures of Progress in the Great Lakes Restoration Initiative Action Plan II. Targets for Measures of Progress were established under assumptions contained in Action Plan II. Ten Measures of Progress have annual targets. The remaining Measures of Progress will be reported annually to track progress towards long term goals that will take more than five years to reach. Detailed information is provided in the following pages. *In the table below red indicates the target was not met, green indicates the target was met, and gray indicates that the target was not applicable.*

Focus Area	GLRI Action Plan II Measures	Target	Result
Toxic Substances	1.1.1 AOC Management Actions	8	7
	1.1.2 BUI's	60	60
	1.2.1 People Provided Fish Consumption Information	NA	220,843
	1.2.2 Fish/Wildlife Emerging Contaminant Projects	NA	14
Invasive Species	2.1.1 Rapid Response Exercises	8	21
	2.1.2 Projects Blocking Pathways	NA	8
	2.1.3 Early Detection Activities	NA	15
	2.2.1 Aquatic /Terrestrial Acres	94,500	101,392.75
	2.2.2 Invasive Tributary Miles	NA	0
	2.3.1 Invasive Technologies	NA	62
	2.3.2 Invasive Collaboratives	NA	4
Nonpoint Source Pollution Impacts on Nearshore Health	3.1.1 Agricultural Phosphorus Reduction Projected	130,000	160,117.40
	3.1.2 Nutrient/Sediment Ag. Acres	NA	101,574.75
	3.1.3 Nutrient/Sediment Reduction	NA	NA
	3.2.1 Urban Runoff Projected	30	37.18
	3.2.2 Urban Runoff Projects	NA	18
	3.2.3 Urban Runoff Captured of Treated	NA	NA
Habitats and Species	4.1.1 Habitat Tributary Miles	2,200	3,855.8
	4.1.2 Shoreline Miles	75	313.43
	4.1.3 Coastal Wetland Acres	7,000	7,033.78
	4.1.4 Other Habitat	127,000	146,815.92
	4.2.1 Federally-Listed Species Projects	NA	10
	4.2.2 Self-Sustaining Species Projects	NA	47
Foundations for Future Restoration Actions	5.1.1 Climate Resiliency Criteria (2016)	NA	NA
	5.1.2 Climate Resiliency Criteria (2017)	NA	NA
	5.2.1 Trained Educators	NA	331
	5.2.2 People Educated	NA	24,785
	5.3.1 Evaluations	NA	Completed
	5.3.2 Annual Monitoring	NA	Conducted
	5.3.3 Targeted Watersheds, Habitats, Species to prioritize Funding	NA	Identified
	5.3.4 Annual GLRI Reports	NA	Issued
	5.3.5 Triennial GLWQA Reports	NA	NA
	5.3.6 Triennial State of the Lakes Report	NA	NA
	5.3.7 Online Information	NA	Updated

GLRI Action Plan II Measures of Progress – Detailed Information

	Measure	Target	Result	Explanation/Additional Information
1.1.1	Areas of Concern in the Great Lakes where all management actions necessary for delisting have been implemented (cumulative)[1]	Baseline: 7 FY 15: 8 FY 16: 9	FY 15: 7	The program expects to report a cumulative total of eight AOCs (the target) at which management actions have been completed by the end of calendar year 2015. This target was missed for the fiscal year because construction season goes beyond the end of the fiscal year. Management actions for the St. Clair AOC (the 8th AOC) were implemented at the end of calendar year 2015.
1.1.2	Area of Concern Beneficial Use Impairments Removed (cumulative)[1]	Baseline: 52 FY 15: 60 FY 16: 65	FY 15: 60	In FY 2015: Degradation of Benthos - St. Clair River, MI (11/24/2014) Fish Tumors and other Deformities - Rochester Embayment, NY (12/10/2014) Restrictions on Dredging – Sheboygan, WI (8/10/2015) Beach Closing - Muskegon Lake, MI (8/10/2015) Degradation of Fish and Wildlife Populations - River Raisin, MI (8/26/2015) Loss of Fish and Wildlife Habitat - River Raisin, MI (8/26/2015) Degradation of Phytoplankton and Zooplankton Populations - St. Lawrence River, NY (8/19/2015) Added Costs to Industry and Agriculture - Maumee River, Ohio (9/23/2015)
1.2.1	Number of people provided information on the risks and benefits of Great Lakes fish consumption by GLRI-funded projects	Not applicable	FY 15: 220,843	Information was provided by HHS-ATSDR and EPA.
1.2.2	Number of GLRI-funded projects that identify and/or assess impacts of emerging contaminants on Great Lakes fish and wildlife	Not applicable	FY 15: 14	Projects were funded by US-FWS, DOC-NOAA, DOD-USACE, and DOI-USGS.

2.1.1	Number of GLRI-funded Great Lakes rapid responses or exercises conducted	Baseline: NA FY 15: 8 FY 16: 8	FY 15: 21	The 8 Great Lakes States have committed to conducting annual training exercises, but prioritize activities to respond to detections of new invasive species. In FY 2015 multiple state agencies and others completed two training exercises and 19 actual responses. The responses helped prevent establishment of self-sustaining populations of invasive species, such as Asian Carp and Red Swamp Crayfish, in the Great Lakes.
2.1.2	Number of GLRI-funded projects that block pathways through which aquatic invasive species can be introduced to the Great Lakes ecosystem	Not applicable	FY 15: 8	Projects were funded in FY 2015. Projects included work to reduce the spread of invasive species by hunters, anglers, and the recreational boat pathways.
2.1.3	Number of GLRI-funded early detection monitoring activities conducted	Not applicable	FY 15: 15	Early detection activities were conducted in FY 2015. Activities included both conventional monitoring techniques (nets, traps, electroshocking) as well as environmental DNA sampling.
2.2.1	Number of aquatic/terrestrial acres controlled by GLRI-funded projects	Baseline: 36,000 FY 15: 94,500[2] FY 16: 60,000	FY 15: 101,392.97	Target was previously raised to 94,500 during FY 2016 budget development because the FY 2014 end-of-year result exceeded the previously set cumulative target for FY 2016. Result exceeds actual target by about 7.5%.
2.2.2	Number of tributary miles protected by GLRI-funded projects	Not applicable	0	Protected tributary miles are reported once a project is complete and the barrier is in use. While no projects were completed in FY 2015, projects for the exclusion of sea lamprey are currently underway and slated for completion in later years.
2.3.1	Number of technologies and methods field tested by GLRI-funded projects	Not applicable	FY 15: 62	Technologies were field tested by federal agencies and their partners. Technologies included ballast water management systems and a new tool for detecting Asian Carp.
2.3.2	Number of collaboratives developed or enhanced with GLRI funding	Not applicable	FY 15: 4	Invasive species collaboratives counted under this Measure include the Asian Carp Regional Coordinating Committee lead by USFWS, the Monoecious Hydrilla Collaborative lead by USACE, the Mussels Collaborative lead by USGS, and the Phragmites Collaborative also lead by USGS.

3.1.1	Projected phosphorus reductions from GLRI-funded projects in targeted watersheds (measured in pounds)	Baseline: NA FY 15: 130,000 FY 16: 310,000	FY 15: 160,117.4	Projected phosphorus reductions are from USEPA and NRCS (Farm Bill Programs for Reducing Ag Nonpoint Source Loading). Projects were implemented in the following watersheds: Genesee, Green Bay-Lower Fox, Saginaw Bay-Saginaw, Western Lake Erie-Maumee, Lake Michigan-Wisconsin, Blanchard, Black-Macatwa, Kawkawlin-Pin, Sandusky, Western Lake Erie, Lower Maumee, and Lower Fox.
3.1.2	Number of GLRI-funded nutrient and sediment reduction projects in targeted watersheds (measured in acres)	Not applicable	FY 15: 101,574.86	Contributing agencies: NRCS, EPA, APHIS, USACE. Practices planned or implemented in FY 2015 include: cover crops, conservation tillage, filter strips, drainage water management, nutrient management, constructed wetlands, waste storage facilities, contour buffer strips.
3.1.3	Measured nutrient and sediment reductions from monitored, GLRI-funded projects in targeted watersheds (measured in pounds)	Not applicable	Not applicable	Results are reported for this Measure after a reduction has been measured and quantified through the implementation of standardized USGS monitoring and statistical designs. As quantification of these results requires long-term monitoring, results are not anticipated until FY2017 at the earliest. USGS will provide preliminary results in FY 2017 and final results at the end of FY 2019.
3.2.1	Projected volume of untreated urban runoff captured or treated by GLRI-funded projects (measured in millions of gallons)	Baseline: NA FY 15: 30 FY 16: 70	FY 15: 37.18	Result includes USEPA Shoreline cities grants in: Wilmette, IL; Michigan City, IN; Highland Park, MI; Muskegon, MI; Euclid, OH; Mentor, OH; Sandusky, OH; Sheboygan, WI; Oak Creek, WI; Manitowoc, WI; Superior, WI. Green infrastructure planned or implemented in FY2015 includes: storm water trees, drainage water management, porous pavement, bio-swales, constructed wetlands, rain gardens, and greenways. Result is above the FY 2015 target.
3.2.2	Number of GLRI-funded projects implemented to reduce the impacts of untreated urban run-off on the Great Lakes	Not applicable	FY 15:18	Practices planned or implemented in FY 2015 include: bioswales, rain gardens, bioretention ponds, porous pavement, tree plantings and constructed wetlands.
3.2.3	Measured volume of untreated urban runoff captured or treated by monitored GLRI-funded projects	Not applicable	Not applicable	Results for this Measure are reported after a measured reduction has been quantified through USGS monitoring and statistical designs. As monitoring and statistical designs are still under development by USGS, results are not anticipated until FY 2016 at the earliest.

4.1.1	Number of miles of Great Lakes tributaries reopened by GLRI-funded projects	Baseline: 1,900 FY 15: 2,200 FY 16: 2,500	FY 15: 3,855.8	Projects to remove dams and impediments to fish passage. Projects were completed in FY 2015 and contributed to surpassing the target of tributary miles reopened.
4.1.2	Number of miles of Great Lakes shoreline and riparian corridors protected, restored and enhanced by GLRI-funded projects	Baseline: 0 FY 15: 75 FY 16: 100	FY 15: 313.43	In FY 2013 and FY 2014 RWG agencies funded additional projects that contribute results for the measure, in anticipation that results from previously funded projects would be insufficient to meet targets. The additional projects more than made up for earlier projected shortfalls.
4.1.3	Number of acres of Great Lakes coastal wetlands protected, restored and enhanced by GLRI-funded projects	Baseline: 0 FY15: 7,000 FY16: 15,000	FY15: 7,033.78	FY 2015 results represent the work of 41 projects funded by six different agencies: BIA, EPA, FWS, NPS, NOAA and USACE.
4.1.4	Number of acres of other habitats in the Great Lakes basin protected, restored and enhanced by GLRI -funded projects	Baseline: 117,000 FY 15: 127,000 FY 16: 147,000	FY 15: 146,815.92	In FY 2013 and FY 2014 RWG agencies funded additional projects that contribute results for the measure, in anticipation that results from previously funded projects would be insufficient to meet targets. The additional projects more than made up for earlier projected shortfalls.
4.2.1	Number of GLRI-funded projects that promote recovery of federally-listed endangered, threatened, and candidate species	Not applicable	FY 15: 10	Federally-listed endangered, threatened, and candidate species promoted by GLRI-funded projects in FY 2015 include: lake sturgeon, Atlantic salmon, piping plover, prairie fen butterflies, snuffbox mussel, eastern prairie fringed orchid, and Hine's emerald dragonfly.
4.2.2	Number of GLRI-funded projects that promote populations of native non-threatened and non-endangered species self-sustaining in the wild	Not applicable	FY 15: 47	Projects focused efforts on protecting native turtle species, moose, elk, fingerlings, cisco, wolves, lake sturgeon, wild rice, brook trout, lake trout, monarch butterfly, and deepwater coregonid.
5.1.1	By 2016, a standardized set of climate resiliency criteria will be developed for GLRI projects	Not applicable	Not applicable	Development of climate resiliency criteria is currently underway and will be completed in FY 2016.

5.1.2	Starting in 2017, projects will include climate resiliency criteria in planning and implementation	Not applicable	Not applicable	Development of climate resiliency criteria is currently underway and will be completed in FY 2016. Agencies will begin incorporating the criteria into project planning and implementation starting in FY 2017.
5.2.1	Number of educators trained through GLRI-funded projects	Not applicable	FY 15: 331	Over 50,000 students are expected to benefit from the training of these 331 educators throughout the life of the GLRI Action Plan II.
5.2.2	Number of people educated on the Great Lakes ecosystem through GLRI-funded place-based experiential learning activities	Not applicable	FY 15: 24,785	In FY 2015, the GLRI also educated over 24,785 people on the Great Lakes ecosystem through GLRI-funded place-based experiential learning activities through National Park Service interpretative programs.
5.3.1	Project evaluations completed and used to prioritize GLRI funding decisions each year	Not applicable	Completed and used	FY 2015 GLRI-funded projects were routinely evaluated to ensure that they will be implemented as proposed. Progress in achieving measures for existing projects was used to prioritize GLRI-funding decisions. A new accountability system (the Environmental Accomplishments in the Great Lakes system) was implemented in FY 2015 to track the progress of GLRI-funded projects in meeting the Measures of Progress in the GLRI Action Plan II. In FY 2015, the agencies and partners also continued many other assessment efforts that were designed to evaluate the effectiveness of GLRI-funded projects. For example, new edge of field monitoring stations were installed in the Genesee River Basin - supplementing the stations already in place in the Lower Fox, Saginaw and Maumee River basins. The edge of field monitoring will help assess the effectiveness of differing conservation practices under those specific field conditions at reducing phosphorus losses from farm fields. Similarly, monitoring continues in strategic coastal wetlands as part of the long-term monitoring program to determine the long-term ecosystem outcomes of ongoing and future restoration actions.
5.3.2	Annual Great Lakes monitoring conducted and used to prioritize GLRI funding decisions each year	Not applicable	Conducted and used	In FY 2015, federal agencies and partners conducted comprehensive monitoring to assess the status and trends of the Great Lakes ecosystem. Long-term monitoring of coastal wetlands, contaminants, nutrients, zooplankton, phytoplankton,

				harmful algal blooms, benthic communities, and prey fish among many other components was conducted throughout the basin. The monitoring data and information from previous years was used to identify the most significant Great Lakes problems and prioritize funding decisions to address those problems. Examples include the use of FY 2015 funding for removal of beneficial use impairments at Areas of Concern, activities to keep Asian Carp out of the Great Lakes, reducing phosphorus loadings, and emphasizing coastal wetland protection. To support future prioritization, intensive FY 2015 monitoring on Lake Michigan as part of the Cooperative Science and Monitoring Initiative focused on the contrasting productivity in nearshore and offshore waters. The Lake Michigan intensive sampling will also provide a statistically valid and precise estimate of lake-wide (both near and offshore) and habitat-specific benthic invertebrate abundance and biomass (defined by depth and substrate type), with special attention on the invasive dreissenid mussels and Diporeia populations. In Lake Erie, a network of four real-time continuous observing buoys tracked water quality conditions to support modeling, forecasting, and public warnings of Harmful Algal Bloom conditions throughout western Lake Erie.
5.3.3	GLRI-targeted watersheds, habitats and species identified and used to prioritize GLRI funding decisions	Not applicable	Identified and used	GLRI agencies and partners identified watersheds, habitats, and species to be targeted in FY 2015 and beyond. The Great Lakes Advisory Board, states, tribes, and other stakeholders provided input to the agencies on how best to target GLRI resources. As part of efforts in all five focus areas, GLRI continues to prioritize work to accelerate the cleanup of Areas of Concern, reduce harmful algae, and prevent the introduction of new invasive species. Monitoring data, assessments, models, and other decision support tools were also used to identify watershed, habitats and species for targeting. For example, watershed models and other relevant research were used to target the locations for implementation of agricultural

				conservation practices. A decision support tool is being developed and used for Great Lakes coastal wetland conservation managers based on the long-term Great Lakes coastal wetland monitoring program data. Similarly, an optimization model that identifies and helps prioritize barrier removal projects that would increase upstream connectivity against cost is being used to integrate lake sturgeon restoration efforts with sea lamprey control. In FY 2015, GLRI also updated the Great Lakes Lake Level Viewer to enable managers to visualize and quantify areas of lake-level change (both rise and fall) using best-available, LIDAR-based topographic and bathymetric data.
5.3.4	Issue Annual GLRI Reports to Congress and the President	Not applicable	Issued	The Great Lakes Restoration Initiative Report to Congress and the President: FY 2010 – FY 2014 was announced in July, 2015.
5.3.5	Issue Great Lakes Water Quality Agreement Triennial Progress Reports of the Parties	Not applicable	Not applicable	The Great Lakes Restoration Initiative Report to Congress and the President: FY 2010 – FY 2014 was announced in July, 2015.
5.3.6	Issue triennial State of the Lakes reports	Not applicable	Not applicable	The first Triennial State of the Lakes Report under the 2012 Great Lakes Water Quality Agreement will be issued in 2016.
5.3.7	Periodically update publicly available online information about the GLRI	Not applicable	Updated	Updates included: publication of the FY 2010-FY 2014 GLRI Report to Congress and the President; project updates; Great Lake Advisory Board information: and links to information from other agencies.

[1] Results from this Action Plan measure are achieved through GLRI funding as well as other non-GLRI federal and/or state funding.

[2] This target has been adjusted from the Action Plan