Great Lakes RESTORATION

Great Lakes Restoration Initiative
Report to Congress and the President

Fiscal Years 2010–2014

July 20, 2015

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About This Report

This report presents an overview of Great Lakes Restoration Initiative progress. It includes information on funding, project accomplishments and performance on Action Plan measures of progress through Fiscal Year 2014. Data on direct spending are taken from U.S. 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:

> Beginning in 2011 and each year thereafter, the Agency is directed to provide detailed yearly program accomplishments and compare specific funding levels allocated for participating Federal agencies from fiscal year to fiscal year.

This report also satisfies the reporting requirements of the Great Lakes Restoration Initiative Action Plan:

> Annual reports to the President, beginning in 2011, will describe accomplishments to date, action planned for the coming year, and progress toward meeting ecosystem goals and targets.

MESSAGE FROM THE CHAIR OF THE GREAT LAKES INTERAGENCY TASK FORCE

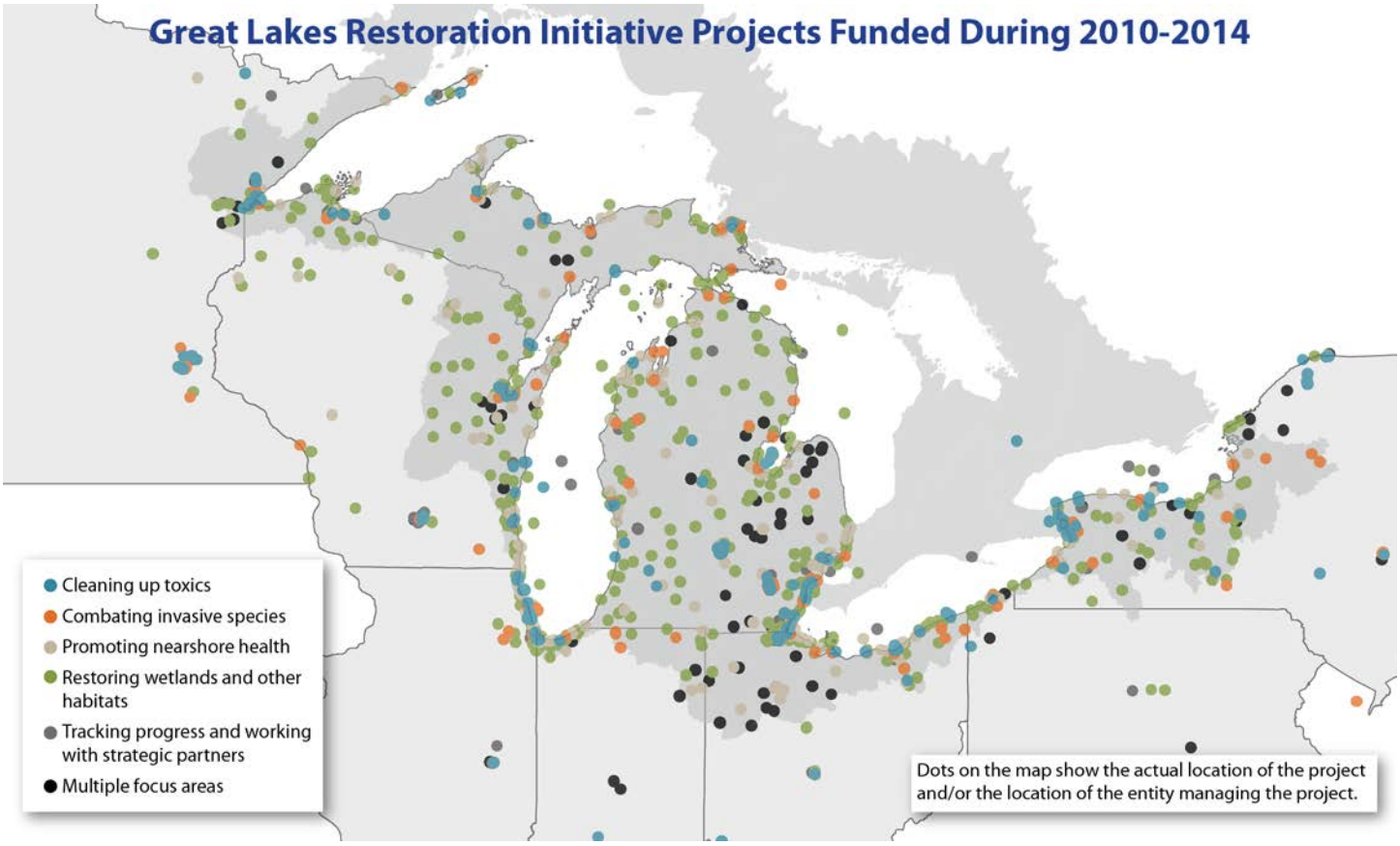
From Ashtabula to Zeeland, communities in the Great Lakes basin rely on their proximity to the largest fresh water system on Earth for recreation, jobs and a remarkable quality of life.

Federal agencies and their state, tribal, municipal, business, civic, academic and other partners are leading the charge through the Great Lakes Restoration Initiative (GLRI), which was launched in 2010 to revitalize this critical ecosystem after over a century of degradation.

This Report to Congress and the President shows steady progress over the relatively short five years of this program. This progress takes the form of measurable results that make a real difference to Great Lakes communities. For example, in the five years covered by this Report, federal, state and local partners completed cleanups in several Areas of Concern, reduced runoff that contributes to harmful algal blooms, and increased fish and wildlife habitat. These actions produced healthier Great Lakes and stronger local economies. Simply put, the GLRI program has accelerated the improvement of Great Lakes health more than any other coordinated interagency effort in U.S. history.

Though this report by its nature looks back at what we have achieved together, it also lays the groundwork for future results. With continued commitment from all GLRI partners, we can improve the health of the Great Lakes ecosystem — and the communities that depend upon that ecosystem — for generations to come.

Gina McCarthy
Chair, Great Lakes Interagency Task Force
Administrator, U.S. Environmental Protection Agency

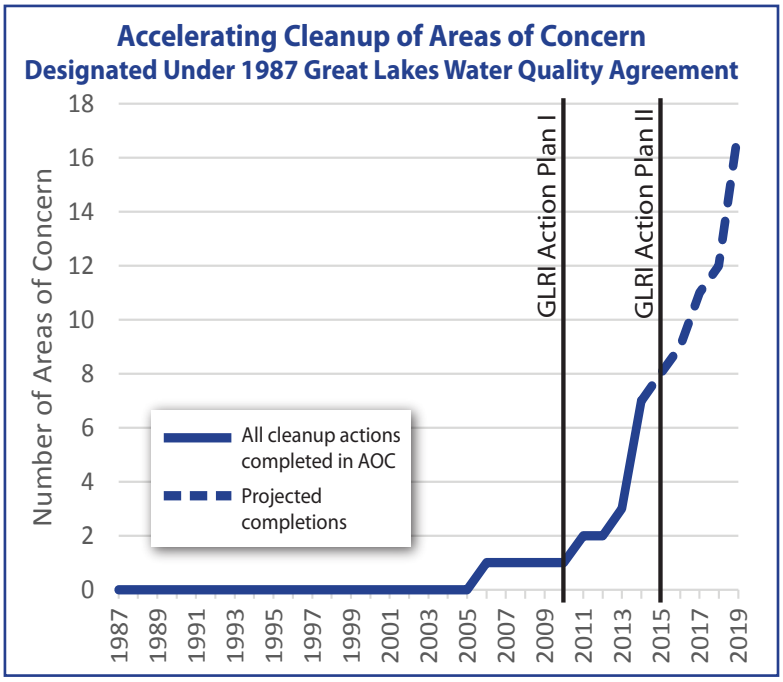


SECTION I — EXECUTIVE SUMMARY

The Great Lakes Restoration Initiative was launched in 2010 to accelerate efforts to protect and restore the largest system of fresh surface water in the world — to provide additional resources to make progress toward the most critical long-term goals for this important ecosystem.

The Great Lakes Restoration Initiative has been a catalyst for unprecedented federal agency coordination — through the Interagency Task Force and the Regional Working Group, which are led by EPA. This coordination has produced unprecedented results. Great Lakes Restoration Initiative resources have supplemented agency base budgets to fund over 2,500 projects to improve water quality, to protect and restore native habitat and species, to prevent and control invasive species and to address other Great Lakes environmental problems.

The Great Lakes Restoration Initiative Action Plan (http://glri.us/pdfs/glri_actionplan.pdf) identifies the most significant ecosystem problems, and ways to solve them, in five major focus areas.

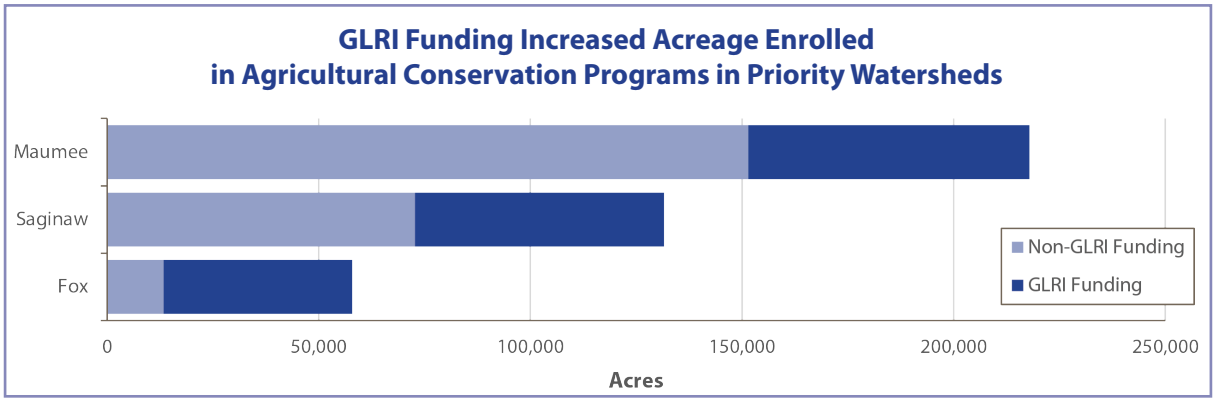


Toxic Substances and Areas of Concern

During the first five years of the Great Lakes Restoration Initiative, federal agencies and their partners completed all of the cleanup actions required to delist five Great Lakes Areas of Concern and to formally delist the Presque Isle Bay Area of Concern — a major change from the 25 years before the Initiative, during which only one Area of Concern was cleaned up and delisted.

Invasive Species

During the first five years of the Great Lakes Restoration Initiative, federal agencies and their partners engaged in an unprecedented level of activity to prevent new introductions of invasive species in the Great Lakes ecosystem. The Great Lakes Restoration Initiative provides support to the Asian Carp Regional Coordinating Committee to prevent bighead and silver carp from becoming established in the Great Lakes ecosystem. Agencies and their partners also controlled over 84,000 acres of property for invasive species such as Japanese knotweed, Phragmites and purple loosestrife.



Nearshore Health and Nonpoint Source Pollution

During the first five years of the Great Lakes Restoration Initiative, federal agencies and their partners targeted activities to reduce the largest nonpoint source of phosphorus runoff —agricultural lands — which contributes to harmful algal blooms in western Lake Erie, Saginaw Bay and Green Bay. Federal agencies used Great Lakes Restoration Initiative support to increase the number of acres of farmland enrolled in agricultural conservation programs in Great Lakes Restoration Initiative priority watersheds by more than 70 percent.

Habitat and Wildlife Protection and Restoration

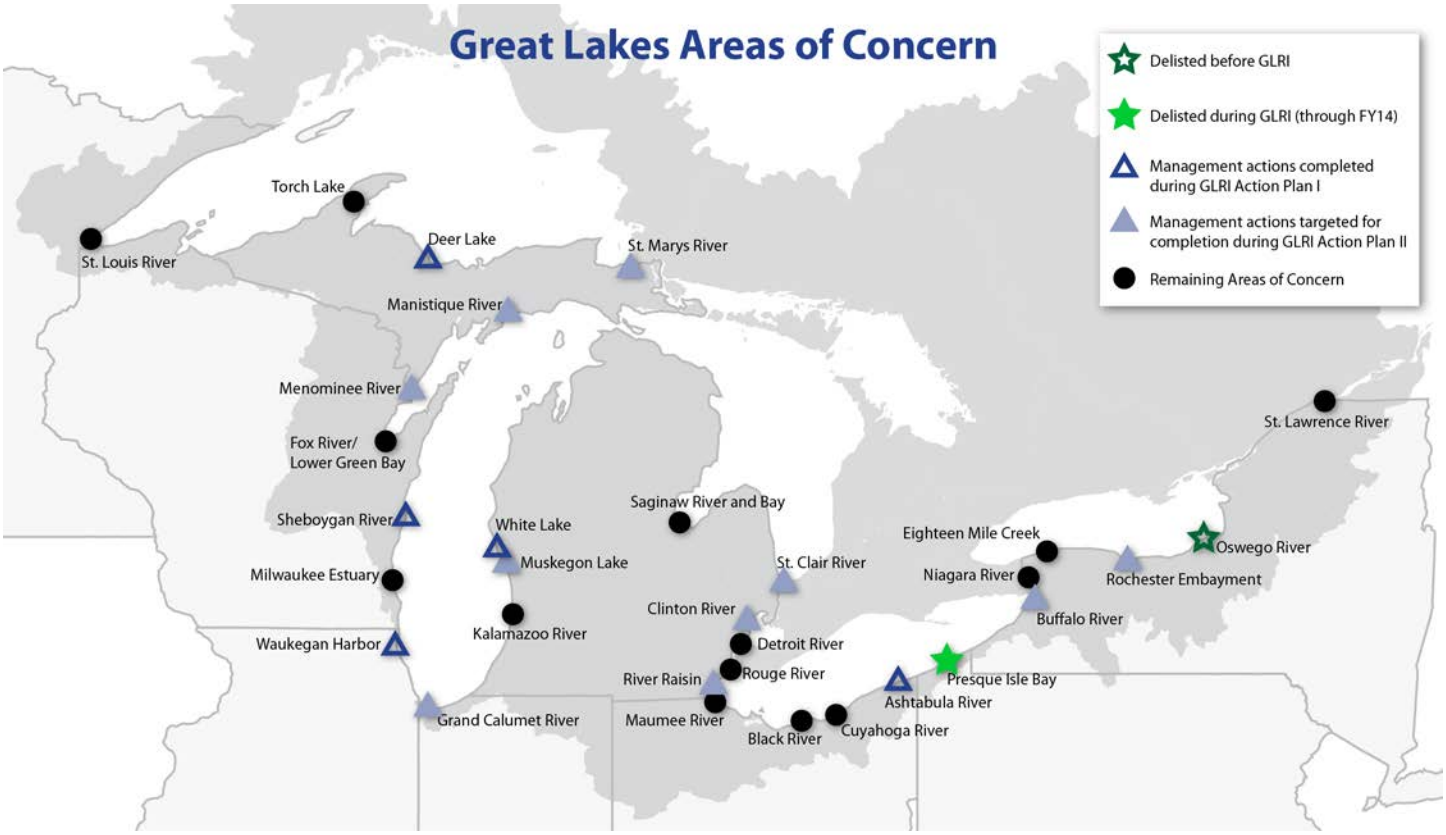
During the first five years of the Great Lakes Restoration Initiative, more than 100,000 acres of wetlands and 48,000 acres of coastal, upland, and island habitat were protected, restored and enhanced. Over 500 barriers were removed or bypassed in Great Lakes tributaries, enabling access by fish and other aquatic organisms to over 3,400 additional miles of river.

Accountability, Education, Monitoring, Evaluation, Communication and Partnerships

During the first five years of the Great Lakes Restoration Initiative, over 1,500 educational institutions incorporated Great Lakes specific material into their broader environmental education curricula. It is estimated that more than 175,000 students have participated in these classes.

This report provides an overview of progress over the past five years for each focus area. It also includes detailed information on funding, project accomplishments and performance on Action Plan measures of progress, objectives and long-term goals for the first five years of the program, including fiscal years 2013 and 2014.

SECTION II — PROGRAM ACCOMPLISHMENTS



FOCUS AREA 1: TOXIC SUBSTANCES AND AREAS OF CONCERN

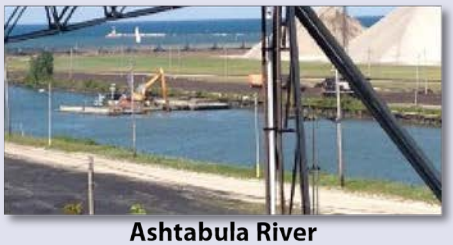
During the first five years of the Great Lakes Restoration Initiative, federal agencies and their partners completed all of the management actions required to remove five Areas of Concern from the list of contaminated Great Lakes areas designated by the United States and Canada pursuant to the 1987 Great Lakes Water Quality Agreement.

The Presque Isle Bay Area of Concern was also delisted in 2013 — only the second delisting on the U.S. side of the border since Areas of Concern were designated pursuant to the 1987 Great Lakes Water Quality Agreement.

During the first five years of the Great Lakes Restoration Initiative, federal agencies and their partners removed 42 Beneficial Use Impairments in 17 Areas of Concern — quadrupling the number of Beneficial Use Impairments removed in the preceding 22 years. These Beneficial Use Impairments — benchmarks of environmental harm — include beach closings, restrictions on drinking water consumption, nuisance algal blooms, restrictions on dredging, fish and wildlife deformities, restrictions on fish and wildlife consumption and loss of fish and wildlife habitat.

During the first five years of the Great Lakes Restoration Initiative, federal agencies and their partners implemented projects to protect human health from contaminants in Great Lakes fish while cleanup efforts continued. Federal agencies and their partners updated fish consumption advisories and provided improved public information on the health risks and benefits of Great Lakes fish consumption.

GLRI Funding Used to Complete Cleanups at Six Areas of Concern



Ashtabula River
Ohio

Deer Lake
Michigan

Presque Isle Bay
Pennsylvania

Sheboygan River
Wisconsin

Waukegan Harbor
Illinois

White Lake
Michigan

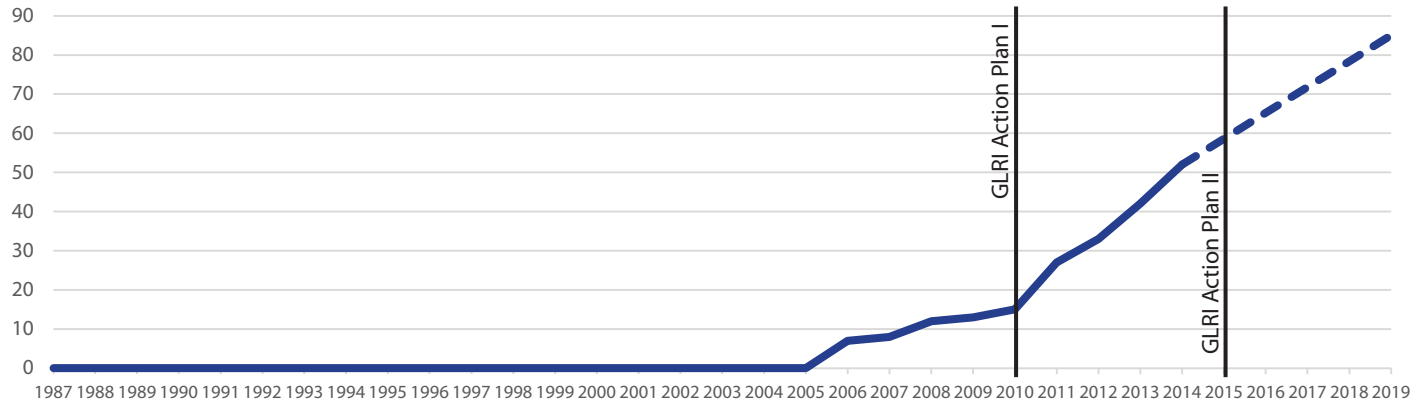
Federal agencies and their partners focused outreach on those populations with the highest risk of contaminant exposure, including:

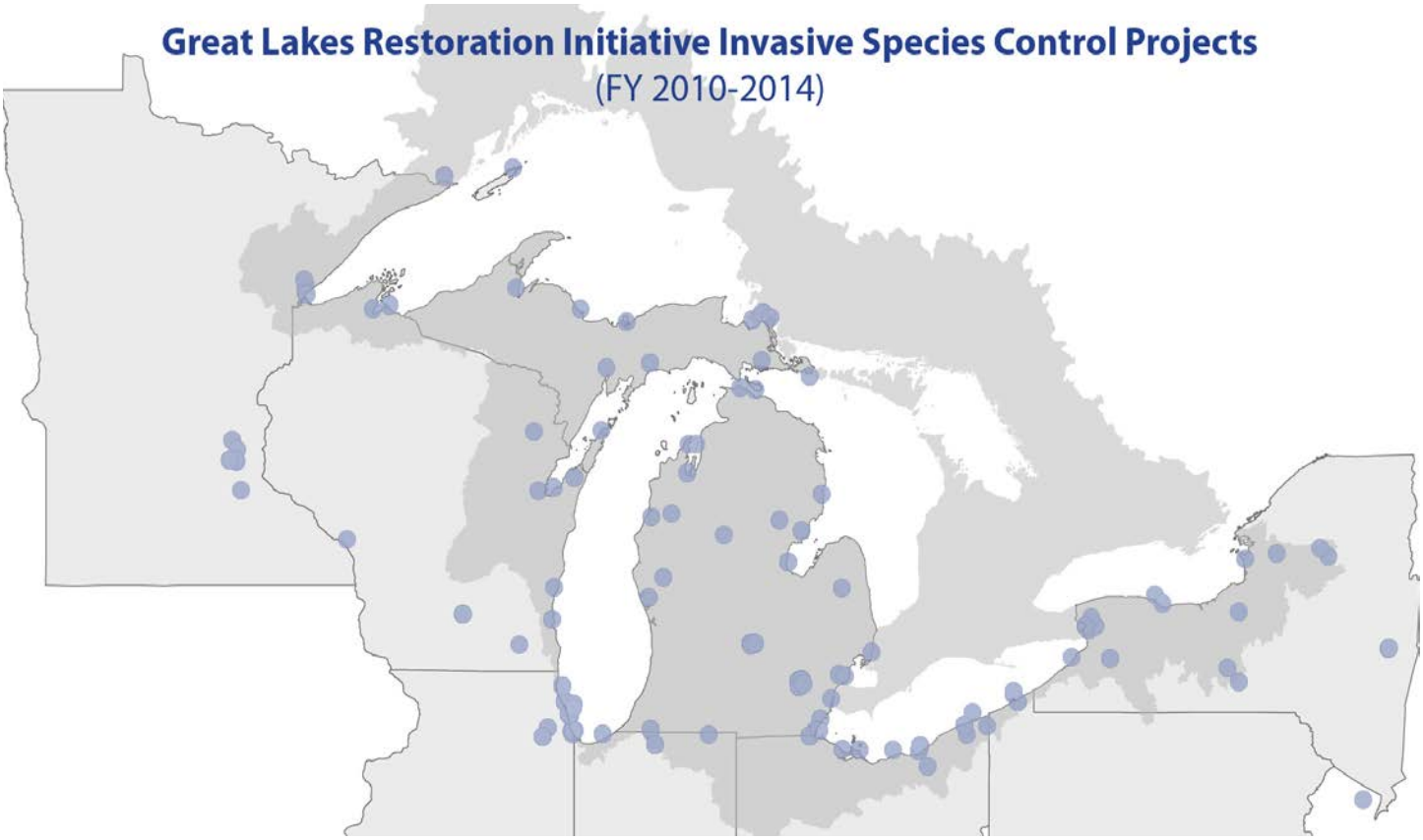
- women who may become pregnant
- children
- urban anglers
- tribal communities
- people who rely heavily on Great Lakes fish in their diets

Federally funded research documented elevated blood mercury levels in some newborns in the western Lake Superior basin. Additional Great Lakes Restoration Initiative funding was provided to train healthcare professionals to advise patients about safe fish consumption choices (e.g. testing the effectiveness of fish consumption advisories; working with healthcare providers to "screen" patients for fish consumption practices and blood contaminant levels).

During the first five years of the Great Lakes Restoration Initiative, federal agencies and their partners characterized and assessed risks that emerging contaminants may pose to Great Lakes fish and wildlife. Agencies and their partners were able to gain a better understanding of the presence and distribution of emerging contaminants, potential routes of exposure and potential impacts on fish and wildlife.

Beneficial Use Impairments Removed Since 1987 Great Lakes Water Quality Agreement





FOCUS AREA 2: INVASIVE SPECIES

During the first five years of the Great Lakes Restoration Initiative, federal agencies and their partners engaged in an unprecedented level of activity to prevent new introductions of invasive species in the Great Lakes ecosystem. Efforts by agencies and their partners helped prevent bighead and silver carp from becoming established in the Great Lakes ecosystem. Surveillance programs formed the foundation for a multi-species early detection network. Partner agencies responded to several detections, including red swamp crayfish in Wisconsin, grass carp in Michigan, Hydrilla in New York and eDNA for silver and bighead carp in the Chicago Area Waterway System.

Federal agencies and their state partners have reduced the risk of invasive species entering the Great Lakes from ballast water discharges. No new introductions have been detected through the ballast water pathway since 2006. Federal agencies and their partners have conducted species risk assessments for organisms posing threats to the Great Lakes ecosystem. Public education efforts have helped boaters, anglers and other resource users to prevent the spread of invasive species.

Protecting the Great Lakes from Asian Carp

The Great Lakes Restoration Initiative 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.

Controlling Invasive Species in the Great Lakes Basin

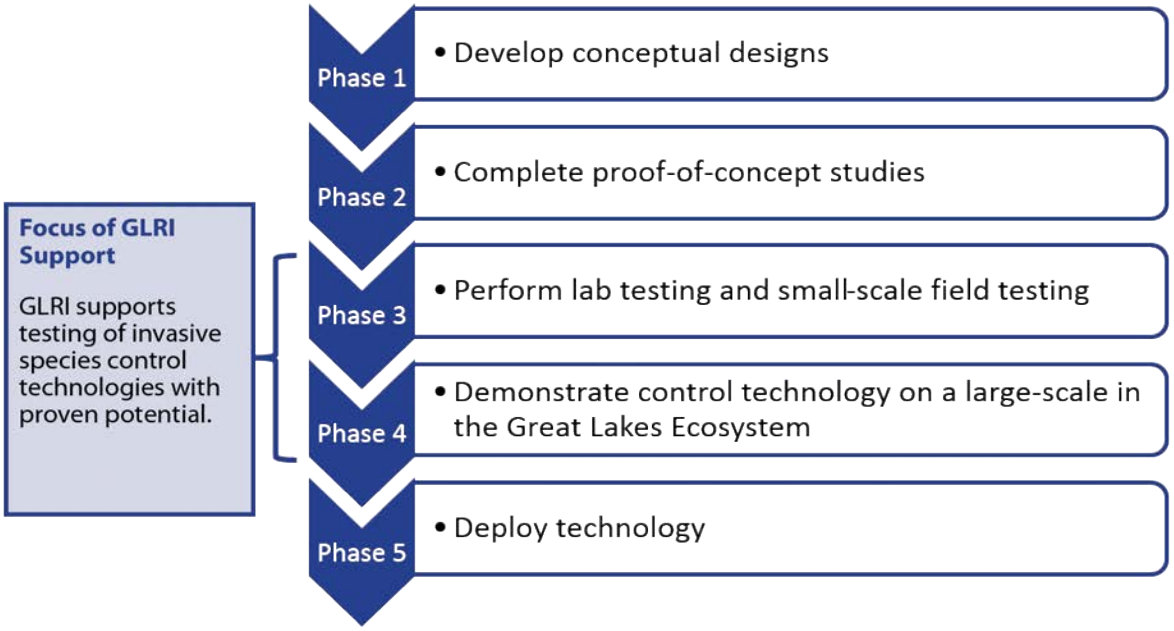
During the first five years of the Great Lakes Restoration Initiative, federal agencies and their partners — through their efforts to control and reduce the migration of invasive species — have achieved target levels for controlled populations of invasive species including:

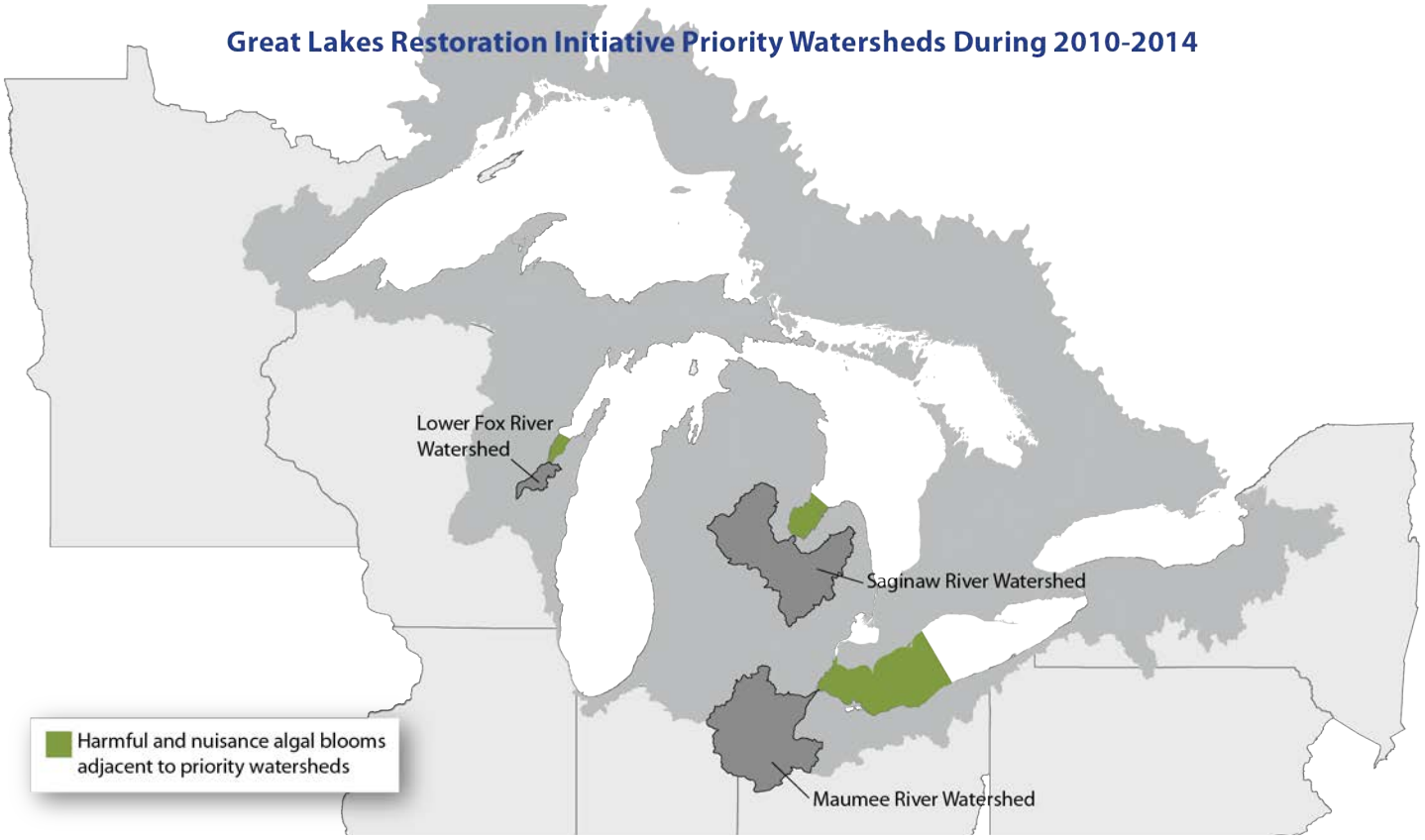
- baby's breath
- bighead carp
- buckthorn
- emerald ash borer
- Eurasian watermilfoil
- garlic mustard
- grass carp
- Japanese barberry
- Japanese knotweed
- lyme grass
- invasive strains of Phragmites
- purple loosestrife
- silver carp
- sea lamprey
- wild parsnip

No new invasive species have been established since 2009. These control projects were implemented with partners who will continue maintenance and stewardship beyond the duration of the federally funded projects.

During the first five years of the Great Lakes Restoration Initiative, federal agencies and their partners worked to develop and enhance several invasive species control technologies. Researchers worked to develop control techniques that target Asian carp while minimizing harm other fish species and worked to develop techniques to detect, attract and remove Asian carp to improve the effectiveness of control methods. For example, seismic pressure (aka, "waterguns") and carbon dioxide have been demonstrated to act as barriers that prevent the movement of Asian carp and may also be used to herd invasive fish to increase the effectiveness of other control technologies. Sea lamprey pheromones were synthesized and field-tested to assess whether pheromones can be used to improve trapping efficiency. New procedures were developed and refined for testing the efficacy of ballast water treatment systems in the Great Lakes and several promising ballast water management systems were performance tested. Researchers also investigated the use of a common soil bacterium to limit the spread of zebra mussels in a manner that has minimal impacts on native mussels and other organisms. Researchers also tested "gene silencing" technology to control the spread of invasive Phragmites. The timeframe for demonstration and deployment is unknown.

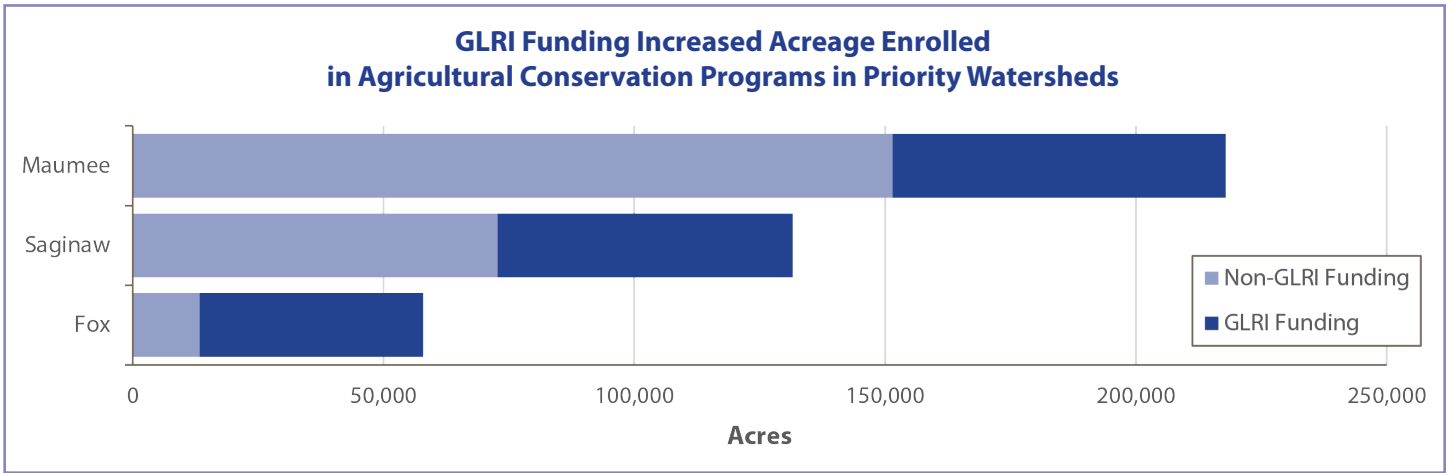
Developing Invasive Species Control Technology for the Great Lakes Ecosystem





FOCUS AREA 3: NEARSHORE HEALTH AND NONPOINT SOURCE POLLUTION

During the first five years of the Great Lakes Restoration Initiative, federal agencies and their partners targeted activities to reduce the largest human-caused nonpoint source of phosphorus inputs to Great Lakes nearshore areas: nutrient runoff from agricultural lands. Excess phosphorus loadings threaten the Great Lakes ecosystem by contributing to harmful algal blooms that can cause human health effects, drinking water impairments, beach closures, exacerbate dead zones and result in loss of recreational opportunities. In the summer of 2014, EPA provided almost $12 million to protect public health by targeting harmful algal blooms in Western Lake Erie. Federal agencies and their partners provided farmers with financial and technical resources to implement conservation systems to reduce nutrient runoff and to control soil erosion. Federal agencies and their partners targeted 720,000 acres of agricultural lands, increasing by over 70 percent the number of acres under conservation practices across all three GLRI priority watersheds.



These programs help producers reduce phosphorus in runoff that impacts Great Lakes nearshore waters, contributing to nuisance and harmful algal blooms and hypoxia. Great Lakes Restoration Initiative partners conducted edge-of-field monitoring to evaluate the impact of various agricultural conservation measures on water quality. Water quality baseline data was collected downstream of fields to be used in later studies to gauge long-term changes in water quality associated with nutrient reduction activities.

During the first five years of the Great Lakes Restoration Initiative, federal agencies and their partners identified gaps in the capacity of state and federal agencies to assess risks that waterborne contaminants may pose to the people and animals living, working and recreating on the Great Lakes. Federal agencies and their partners responded by implementing projects to gain a better understanding of the presence and distribution of harmful algal blooms, potential routes of exposure to blooms and the health impacts of harmful algal bloom exposures in order to protect human and animal health while continuing nearshore health and nonpoint source reduction efforts.

During the first five years of the Great Lakes Restoration Initiative, federal agencies and their partners also implemented projects in urban areas to reduce sediment, nutrient, toxic contaminant and pathogen loadings to Great Lakes tributaries and nearshore waters. The Great Lakes Restoration Initiative funded green infrastructure projects in Great Lakes shoreline cities to reduce untreated stormwater runoff and to improve nearshore water quality. These green infrastructure projects reduce flooding, increase green space in urban areas and return vacant properties to productive use. Watershed management projects were also implemented to stabilize stream banks, increase forest cover, restore wetlands and improve water quality at beaches in urban areas.

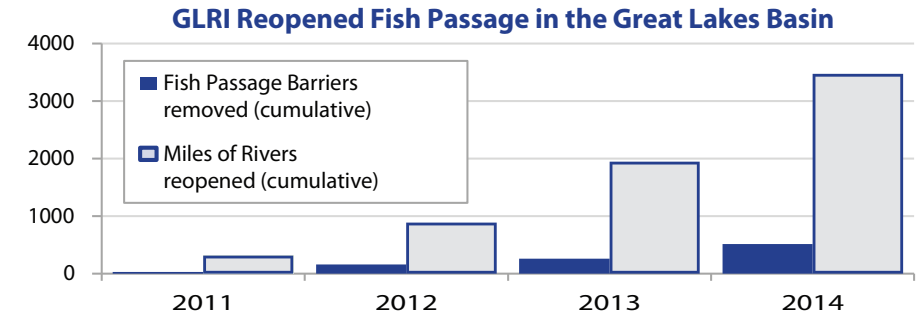
Green Infrastructure Captures and Filters Urban Runoff

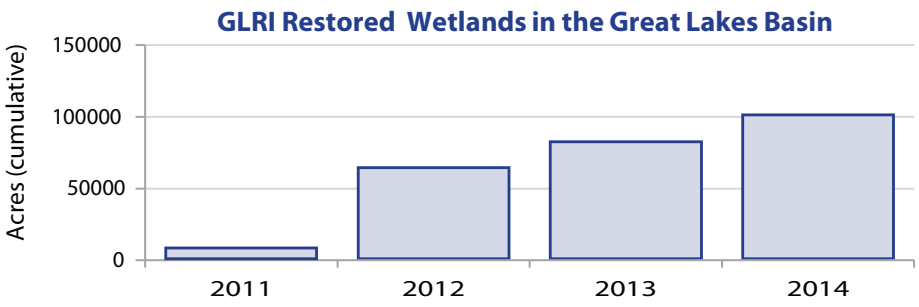
Image courtesy of Chicago Department of Transportation

FOCUS AREA 4: HABITAT AND WILDLIFE PROTECTION AND RESTORATION

During the first five years of the Great Lakes Restoration Initiative, federal agencies and their partners worked to protect, restore and enhance habitat in the Great Lakes basin. Projects were implemented to maintain healthy populations of native species in aquatic and terrestrial habitats. More than 875 habitat protection, restoration and enhancement projects were implemented throughout the Great Lakes basin by federal agencies and their partners.

More than 100,000 acres of wetlands and 48,000 acres of coastal, upland, and island habitat were protected, restored and enhanced. Over 500 barriers were removed or bypassed in Great Lakes tributaries, enabling access by fish and other aquatic organisms to over 3,400 additional miles of river. Data were also collected to document baseline conditions for fish, amphibians, invertebrates, birds, plants and water quality for all coastal wetlands in order to inform protection and restoration decisions.

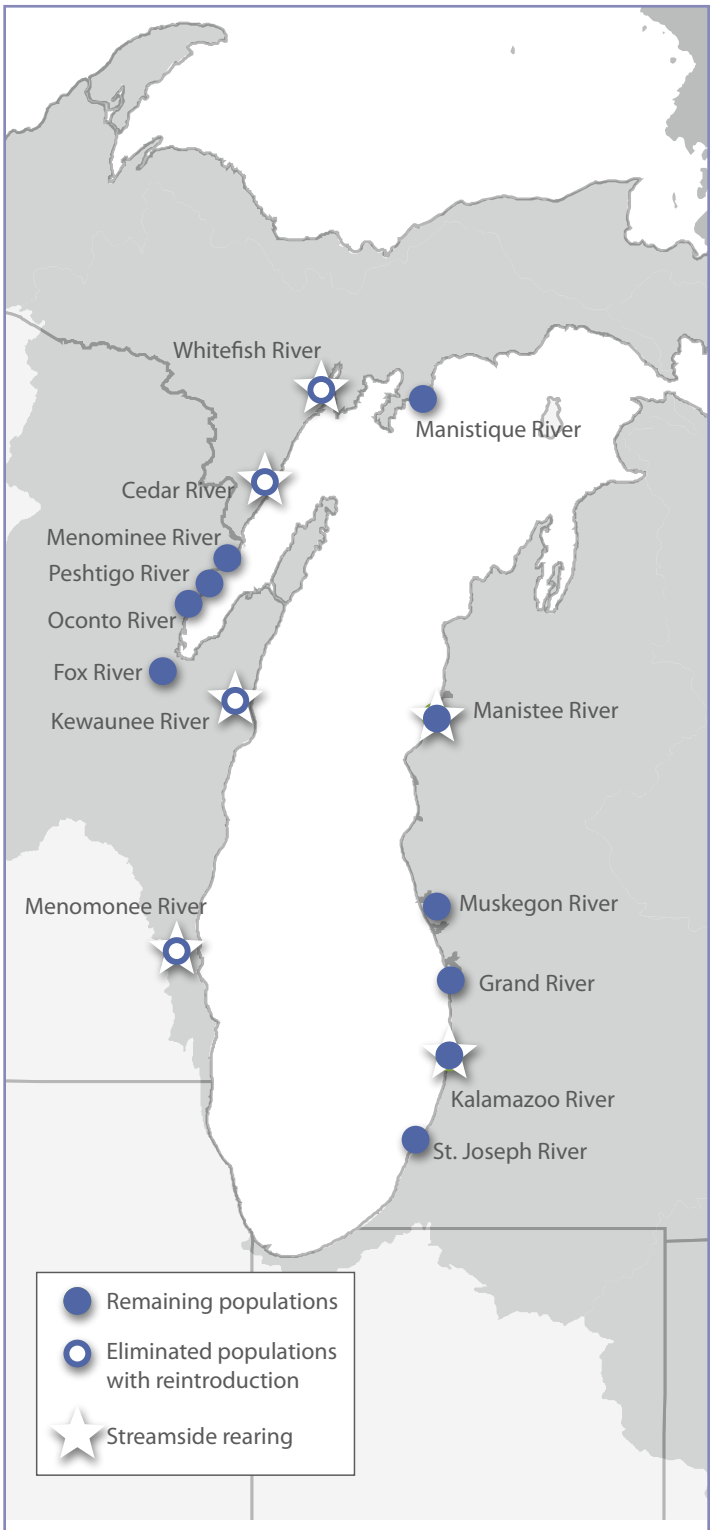




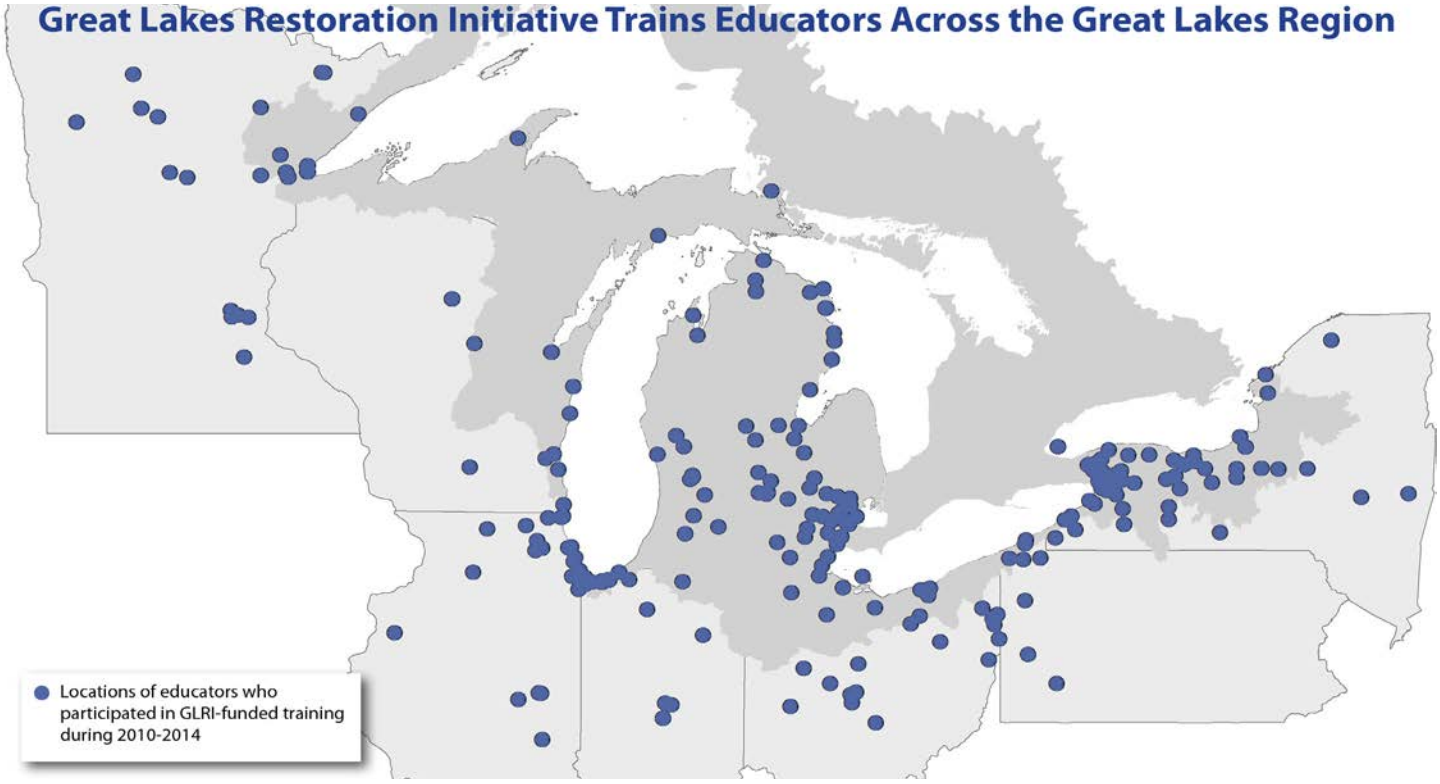
During the first five years of the Great Lakes Restoration Initiative, federal agencies and their partners worked to maintain, restore and enhance populations of native fish and wildlife species. The following actions were taken to conserve native species that were once broadly distributed across the lakes:

- assisting with the delisting of the federally endangered Lake Erie water snake;
- improving conditions for the following endangered and threatened species: bog turtle, Canada lynx, copperbelly water snake, Eastern Massasauga rattlesnake, Hines emerald dragonfly, Karner blue butterfly, Kirtland's warbler, lakeside daisy, Mitchell's satyr butterfly, piping plover, and Pitcher's thistle; and
- implementing projects that led to an additional 13 populations of managed native aquatic non-threatened and non-endangered species becoming self-sustaining in the wild.

The Great Lakes Restoration Initiative is supporting projects to protect endangered populations of **piping plover** in the Great Lakes region. At Wilderness State Park in Michigan, recovery efforts were implemented to support 3–6 pairs of piping plover. At Sleeping Bear Dunes National Lakeshore, federal agencies and their partners are protecting and monitoring the largest concentration of breeding piping plover in the Great Lakes region.



Lake sturgeon declined dramatically in the late 1800s due to overfishing, pollution and habitat loss. Though many populations were wiped out long ago, lake sturgeon still persist in ten rivers around Lake Michigan at a small fraction of their historic abundance. GLRI is supporting stream-side rearing units around the Lake to reintroduce or supplement juvenile lake sturgeon in Lake Michigan rivers.



FOCUS AREA 5: ACCOUNTABILITY, EDUCATION, MONITORING, EVALUATION, COMMUNICATION, AND PARTNERSHIPS

In response to the Administration's goals for improved transparency and fiscal stewardship, federal agencies established accountability mechanisms, management practices, and third-party oversight to effectively manage the Great Lakes Restoration Initiative. Section IV includes more information on efforts to ensure accountability.

Great Lakes Restoration Initiative funding continues to enhance existing programs that assess the physical, biological and chemical integrity of the Great Lakes. These programs, in coordination with complementary state and Canadian programs, help to evaluate the effectiveness of restoration efforts and to assess the overall health of the Great Lakes ecosystem using the best available science. The Great Lakes Restoration Initiative has been able to leverage resources and establish a large community of partners to ensure that these efforts are efficient and effective.

During the first five years of the Great Lakes Restoration Initiative, federal agencies and their partners implemented a number of efforts to promote Great Lakes-based environmental education and stewardship, including:

- The Center for Great Lakes Literacy was established by the Great Lakes Sea Grant Network to develop a community of Great Lakes-literate educators, students, scientists, environmental professionals and citizen volunteers dedicated to improved Great Lakes stewardship.
- The Great Lakes Bay Watershed Education and Training Program was created to promote hands-on environmental activities that are aligned with academic learning standards.

Collectively, Center for Great Lakes Literacy, Great Lakes Bay Watershed Education and Training Program and other education projects have resulted in over 1,500 educational institutions incorporating Great Lakes specific material into their broader environmental education curricula. It is estimated that more than 175,000 students have participated in these classes.

SECTION III — PLANNED ACTIVITIES

The Great Lakes Restoration Initiative Action Plan II (www.glri.us/actionplan/) summarizes the actions federal agencies plan to implement during Fiscal Years 2015 through 2019 using Great Lakes Restoration Initiative 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; and
- supporting Great Lakes resilience, education and adaptive management (how we make even better investment decisions over time).

Great Lakes Restoration Initiative Action Plan II incorporates a science-based adaptive management framework that will be used to prioritize ecosystem problems to be targeted with Great Lakes Restoration Initiative resources, to select projects to address those problems and to assess the effectiveness of Great Lakes Restoration Initiative projects. Measures of Progress have been developed 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 Great Lakes Restoration Initiative-funded projects.

Great Lakes Restoration Initiative Action Plan II includes feedback for strengthening the Great Lakes Restoration Initiative that was contributed by 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 through in-person meetings, webinars and conference calls. 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 Great Lakes Restoration Initiative.

Ashtabula River Area of Concern

SECTION IV — FINANCIAL REPORTING

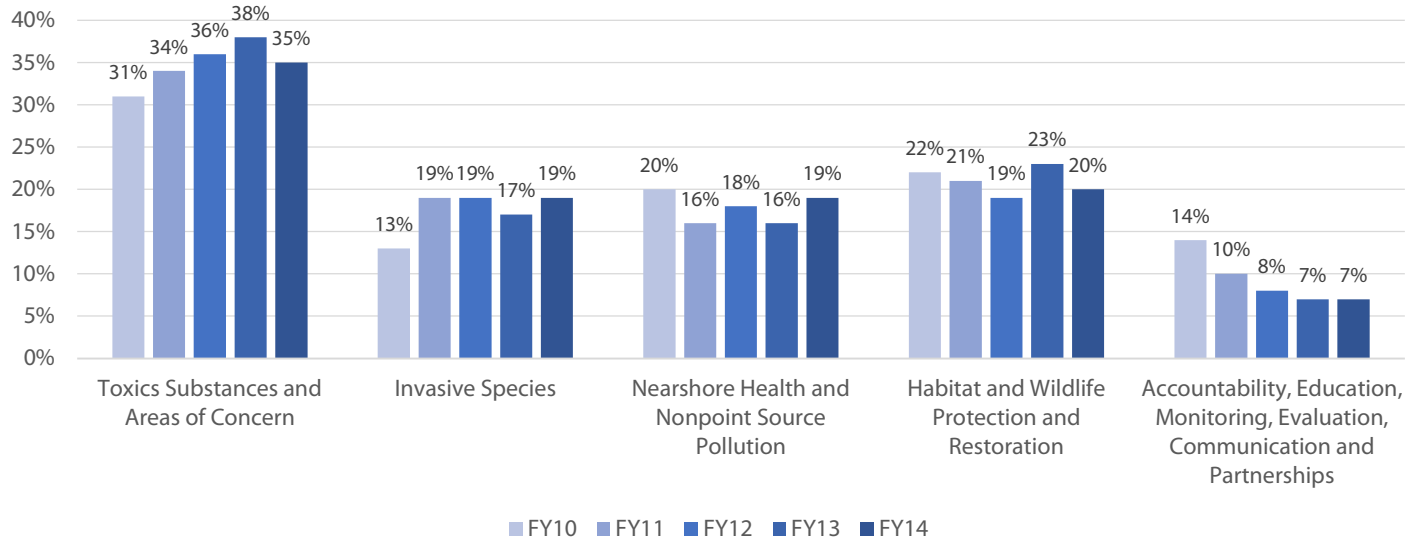
From Fiscal Year 2010 to Fiscal Year 2014, the U.S. Environmental Protection Agency has been appropriated approximately $1.657 billion in Great Lakes Restoration Initiative funds. The agencies that receive Great Lakes Restoration Initiative funds use multiple funding mechanisms, including interagency agreements, fund transfers, competitive grants and capacity-building grants to states and tribes to support effective project implementation.

Table 1 and Chart 1 provide information on Fiscal Years 2010–2014 Great Lakes Restoration Initiative funding by focus area. Tables 2–6 provide information for the same fiscal years by agency.

Table 1 — Great Lakes Restoration Initiative Fiscal Years 2010–2014 Focus Area Allocations (as of October 1, 2014)

Focus Area	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014
Toxic Substances and Areas of Concern	$146,946,000	$100,400,000	$107,500,000	$111,000,000	$106,000,000
Invasive Species	$60,265,000	$57,500,000	$56,900,000	$45,000,000	$57,000,000
Nearshore Health and Nonpoint Source Pollution	$97,331,000	$49,250,000	$54,300,000	$45,000,000	$56,000,000
Habitat and Wildlife Protection and Restoration	$105,262,000	$63,000,000	$57,200,000	$65,500,00	$60,500,000
Accountability, Education, Monitoring, Evaluation, Communication and Partnerships	$65,196,000	$29,250,000	$23,600,000	$17,000,000	$20,500,000
TOTAL	$475,000,000	$299,400,000	$299,500,000[1]	$283,500,000[2]	$300,000,000

Chart 1 — Great Lakes Restoration Initiative Fiscal Years 2010–2014 Focus Area Allocations (as of October 1, 2014)



1. *Rounded from the actual FY 2012 appropriation of $299,520,000*
2. *Rounded from the actual FY 2013 appropriation of $283,698,000.*

Table 2 — Great Lakes Restoration Initiative Fiscal Year 2010 Funding by Agency (as of October 1, 2014)

Agency	FY 2010 President's Budget	FY 2010 Actual Allocation[3]	FY 2010 Total Obligations
DHS-USCG	$6,850,000	$6,350,000	$6,350,000
DOC-NOAA	$32,170,000	$30,536,774	$30,536,774
DOD-USACE	$45,896,000	$49,586,678[4]	$49,455,027[4]
DOI-BIA	$3,000,000	$3,416,000	$3,416,000
DOI-NPS	$10,450,000	$10,505,000	$10,479,525
DOI-USFWS	$57,501,000	$69,348,690	$69,348,690
DOI-USGS	$14,980,000	$23,717,195	$23,717,195
DOT-FHWA	$2,500,000	$2,500,000	$2,500,000
DOT-MARAD	$3,000,000	$4,000,000	$4,000,000
HHS-ATSDR	$5,500,000	$5,500,000	$5,500,000
USDA-APHIS	$3,000,000	$1,884,768	$1,884,727
USDA-NRCS	$33,642,000	$34,092,000	$34,092,000
USDA-USFS	$15,058,000	$15,458,000	$15,458,000
Subtotal	$233,547,000	$256,895,105	$256,737,938
EPA, DOS-GLFC, DOS-IJC, and Misc. IAs	$241,453,000	$218,104,895	$214,577,960[5]
Fiscal Year 2010 GLRI Total	$475,000,000	$475,000,000	$471,315,898[6]

3. *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.*
4. *A direct transfer to DOD-USACE for Asian carp is included in the actual allocation ($7,250,000) and total obligations ($7,232,457) for DOD-USACE.*
5. *Components are: (i) grants totaling $161,844,653 (including grants to the Great Lakes Fishery Commission and the International Joint Commission, organizations identified in the FY 2010 President's Budget); (ii) Great Lakes National Program Office support costs (payroll, travel, general expenses, and working capital) totaling $13,195,819; and (iii) contracts and miscellaneous interagency agreements (each less than $1 million) totaling $39,537,487.*
6. *The difference between actual allocations and total obligations is $3,684,102, which includes deobligated funds and applicable reserves. Deobligation generally results from events such as completing a project under budget, contract termination, changes in project scope or focus, or other unforeseeable circumstances. Reserves may be established to provide for contingencies or to effect savings under the Antideficiency Act.*

Table 3 — Great Lakes Restoration Initiative Fiscal Year 2011 Funding by Agency (as of October 1, 2014)

Agency	FY 2011 President's Budget	FY 2011 Actual Allocation[7]	FY 2011 Total Obligations
DHS-USCG	$2,216,867	$2,724,700	$2,724,700
DOC-NOAA	$15,426,627	$18,289,090	$18,289,090
DOD-USACE	$23,615,181	$31,424,680	$31,424,680
DOI-BIA	$2,771,084	$6,316,032	$6,316,027
DOI-NPS	$4,659,855	$4,861,269	$4,861,269
DOI-USFWS	$32,488,747	$48,690,188	$48,690,188
DOI-USGS	$10,282,386	$14,531,602	$14,531,602
DOT-FHWA	$1,385,542	$1,218,000	$1,218,000
DOT-MARAD	$2,632,530	$2,694,600	$2,694,600
HHS-ATSDR	$3,048,193	$2,195,661	$2,195,661
USDA-APHIS	$1,662,651	$636,724	$636,724
USDA-NRCS	$18,312,434	$16,787,976	$16,787,976
USDA-USFS	$8,160,843	$8,889,772	$8,889,772
Subtotal:	$126,662,940	$159,260,294	$159,260,289
EPA, DOS-GLFC, and Misc. IAs	$173,337,060	$140,139,706	$137,564,756[8]
Fiscal Year 2011 GLRI Total	$300,000,000	$299,400,000	$296,825,046[9]

7. *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.*

8. *Components are: (i) grants totaling $56,105,989 (including funding for the Great Lakes Fishery Commission, an organization identified in the FY 2011 President's Budget); (ii) Great Lakes National Program Office support costs (payroll, travel, general expenses, and working capital) totaling $14,403,433; and (iii) contracts and miscellaneous interagency agreements (each less than $1 million) totaling $67,055,334.*

9. *The difference between actual allocations and total obligations is $2,574,954, which includes deobligated funds and applicable reserves. Deobligation generally results from events such as completing a project under budget, contract termination, changes in project scope or focus, or other unforeseeable circumstances. Reserves may be established to provide for contingencies or to effect savings under the Antideficiency Act.*

Table 4 — Great Lakes Restoration Initiative Fiscal Year 2012 Funding by Agency (as of October 1, 2014)

Agency	FY 2012 Initital Allocation[10]	FY 2012 Actual Allocation[11]	FY 2012 Total Obligations
DHS-USCG	$2,700,000	$2,710,000	$2,710,000
DOC-NOAA	$13,300,000	$16,242,588	$16,242,588
DOD-USACE	$44,000,000	$35,647,194	$35,614,564
DOI-BIA	$4,200,000	$4,718,840	$4,718,840
DOI-NPS	$3,400,000	$3,527,109	$3,527,109
DOI-USFWS	$44,600,000	$45,699,986	$45,699,986
DOI-USGS	$10,700,000	$13,051,766	$13,051,766
DOT-FHWA	$1,200,000	$1,221,000	$1,221,000
DOT-MARAD	$2,400,000	$2,446,927	$2,446,927
HHS-ATSDR	$2,200,000	$2,200,000	$2,200,000
USDA-APHIS	$1,100,000	$1,134,000	$1,134,000
USDA-NRCS	$24,200,000	$27,185,426	$27,185,426
USDA-USFS	$6,700,000	$6,718,080	$6,718,080
Subtotal:	$160,700,000	$162,502,916	$162,470,285
EPA, DOS-GLFC, DOS-IJC, and Misc. IAs	$138,820,000	$137,017,084	$135,998,139[12]
Fiscal Year 2012 GLRI Total	$299,520,000	$299,520,000	$298,468,425[13]

10. *These figures are from the Fiscal Year 2013 President's Budget. The Fiscal Year 2012 President's Budget did not identify proposed agency funding levels.*
11. *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.*
12. *Components are: (i) grants totaling $48,806,105 (including funding for the Great Lakes Fishery Commission and the International Joint Commission, organizations identified in the President's Budget); (ii) Great Lakes National Program Office support costs (payroll, travel, general expenses, and working capital) totaling $14,101,276; and (iii) contracts and miscellaneous interagency agreements (each less than $1 million) totaling $73,090,759.*
13. *The difference between actual allocations and total obligations is $1,051,575, which includes deobligated funds and applicable reserves. Deobligation generally results from events such as completing a project under budget, contract termination, changes in project scope or focus, or other unforeseeable circumstances. Reserves may be established to provide for contingencies or to effect savings under the Antideficiency Act.*

Table 5 — Great Lakes Restoration Initiative Fiscal Year 2013 Funding by Agency (as of October 1, 2014)

Agency	FY 2013 Initial Allocation[14]	FY 2013 Actual Allocation[15]	FY 2013 Total Obligations
DHS-USCG	$1,872,986	$2,450,986	$2,450,986
DOC-NOAA	$23,542,538	$25,504,538	$25,504,538
DOD-USACE	$31,188,125	$31,621,663	$31,621,663
DOI-BIA	$3,985,077	$3,985,077	$3,985,077
DOI-NPS	$3,012,927	$3,012,927	$3,012,927
DOI-USFWS	$39,500,560	$40,000,560	$40,000,560
DOI-USGS	$11,751,010	$12,661,690	$12,661,690
DOT-FHWA	$973,156	$973,156	$973,156
DOT-MARAD	$2,311,345	$2,311,345	$2,311,345
HHS-ATSDR/CDC	$1,415,500	$1,415,500	$1,415,500
USDA-APHIS	$903,815	$903,815	$903,815
USDA-NRCS	$23,929,452	$20,529,452	$20,529,452
USDA-USFS	$6,028,545	$6,028,545	$6,028,545
Subtotal:	$150,415,036	$151,399,254	$151,399,254
EPA, DOS-GLFC, DOS-IJC, and Misc. IAs	$133,282,964	$132,298,746	$132,152,271[16]
Fiscal Year 2013 GLRI Total	$283,698,000	$283,698,000	$283,551,525[17]

14. These figures are the amounts allocated for each agency as of July 1, 2013, based on allocations to each agency from the enacted budget.

15. 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.

16. Components are: (i) grants totaling $49,489,933 (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 $13,002,760; and (iii) contracts and miscellaneous interagency agreements (each less than $1 million) totaling $69,659,578.

17. The difference between actual allocations and total obligations is $146,475, which includes deobligated funds and applicable reserves. Deobligation generally results from events such as completing a project under budget, contract termination, changes in project scope or focus, or other unforeseeable circumstances. Reserves may be established to provide for contingencies or to effect savings under the Antideficiency Act.

Table 6 — Great Lakes Restoration Initiative Fiscal Year 2014 Funding by Agency (as of October 1, 2014)

Agency	FY 2014 Initial Allocation[18]	FY 2014 Actual Allocation[19]	FY 2014 Total Obligations
DHS-USCG	$1,856,326	$1,278,326	$1,278,326
DOC-NOAA	$25,407,550	$24,270,162	$24,270,162
DOD-USACE	$21,358,564	$24,069,026	$24,069,026
DOI-BIA	$3,949,629	$3,949,629	$3,949,629
DOI-NPS	$3,142,325	$3,176,525	$3,176,525
DOI-USFWS	$38,527,535	$48,480,576	$48,480,576
DOI-USGS	$9,866,397	$18,037,916	$18,037,916
DOT-FHWA	$964,500	$964,500	$964,500
DOT-MARAD	$2,290,785	$1,790,785	$1,790,785
HHS-ATSDR/CDC	$1,737,837	$1,739,134	$1,739,134
USDA-APHIS	$1,245,775	$1,245,775	$1,245,775
USDA-NRCS	$23,280,233	$23,280,233	$23,280,233
USDA-USFS	$6,289,390	$6,401,390	$6,401,390
Subtotal:	$139,916,846	$158,683,977	$158,683,977
EPA, DOS-GLFC, DOS-IJC, and Misc. IAs	$160,083,154	$141,316,023	$90,275,209[20]
Fiscal Year 2014 GLRI Total	$300,000,000	$300,000,000	$248,959,186

18. *These figures are the amounts allocated for each agency as of April 6, 2014, based on allocations to each agency distributed to the Regional Working Group March 25, 2014.*

19. *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.*

20. *Components are: (i) grants totaling $28,600,781 (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 $12,589,101; and (iii) contracts and miscellaneous interagency agreements (each less than $1 million) totaling $49,085,327.*

APPENDIX A — GLRI ACTION PLAN I: MEASURES OF PROGRESS

Overview

The table below provides an overview of the results achieved for each of the 28 measures of progress in GLRI Action Plan I. Targets for measures of progress were established under assumptions contained in Action Plan I; in some cases adjustments were made to measures of progress that were also measures under the Government Performance and Results Act. Results for 17 of the measures were achieved through a combination of GLRI funding and base funding appropriated to partner agencies. Most of the GLRI Action Plan I targets were achieved. More detailed information is provided in the following pages.

Focus Area	Great Lakes Restoration Initiative Action Plan I Measures of Progress	Result / Target			
		2011	2012	2013	2014
Toxic and AOCs	1.1 AOC management actions.	2 / 1	2 / 3	3 / 4	7 / 5
	1.2 AOC BUIs removed	26 / 26	33 / 33	41 / 41	52 / 46
	1.3 BUI delisting project starts	88 / 80	151 / 110	213 / 140	274 / 170
	1.4 Contaminated sediment remediated (million)	8.4 / 8	9.7 / 9.1	11.5 / 10.3	13.3 / 12
	1.5 Pollution prevention / waste minimization (lbs)	182.5 / 15	394.9 / 25	665.7 / 35	995.9 / 45
	1.6 Fish PCB concentration decline (trend)	44% / 37%	42.8% / 40%	45.9% / 43%	49.5% / 46%
Invasive Species	2.1 Rate of nonnative detections.	.83 / 1.0	.77 / .80	.71 / .80	.67 / .80
	2.2 Acres managed / controlled to a target level	13,045 / 1,500	31,474 / 15,500	35,924 / 34,000	4,500 / 38,000
	2.3 Plans and response exercises and actions	8 / 4	23 / 12	30 / 26	46 / 35
	2.4 Recreation / resource users contacts	129.5 / 1.75	230.5 / 4.75	256.4 / 7.25	314.7 / 9.75
Nearshore Health and Nonpoint Source Pollution	3.1 Phosphorus loadings from targeted watershed tributaries	DNA / 0%	DNA / .5%	DNA / DNA	DNA / DNA
	3.2 Beaches meeting bacteria standards > 95% beach days	NA / NA	93.5% / 90%	94% / 90%	96.7% / NA
	3.3 Extent (sq. miles) of harmful algal blooms	344.3(0%) / 169.3(4%)	85.2(52%) / 164.1(7%)	260.9(0%) / 162.3(8%)	181.5(0%) / 126.8(12%)
	3.4. Beaches closed from nuisance algae (days)	DNA / 192	DNA / 186	DNA / 184	DNA / 176
	3.5 Sediment deposition in harbors (improved)	11% / 1%	15% / 1%	3% / 2%	12% / 2.5%
	3.6 Acres with USDA conservation practices	268.1(62%) / 168.3 (2%)	279.7 (70%) / 178.2 (8%)	263.4 (60%) / 198 (20%)	277.7 (68%) / 214.5 (30%)
Habitat and Wildlife Protection and Restoration	4.1 Miles of rivers reopened for fish passage	315 / 1,500	890 / 2,500	1,947 / 3,500	3,475 / 4,500
	4.2 Fish passage barriers removed or bypassed	31 / 150	162 / 250	258 / 350	513 / 450
	4.3 Species delisted due to recovery	1 / 0	1 / 1	1 / 2	1 / 2
	4.4 Recovery actions implemented for priority listed species	15.7% (65) / 33% (138)	22% (92) / 51% (211)	34% (142) / 67% (277)	45% (187) / 82% (338)
	4.5 Non-threatened and endangered species self-sustaining in the wild	31% (46) / 33% (48)	33% (48) / 33% (48)	34% (50) / 34% (50)	35% (52) / 35% (52)
	4.6 Wetlands and associated uplands protected, restored and enhanced (acres)	9,624 / 5,000	65,640 / 11,000	83,702 / 68,000	102,349 / 88,000
	4.7 Coastal, upland, and island habitats protected, restored and enhanced (acres)	12,103 / 15,000	28,030 / 15,000	33,250 / 33,000	48,711 / 38,000
	4.8 % of coastal wetlands assessed	19.6% / 40%	40% / 60%	60% / 80%	80% / 100%
	4.9 Habitat-related BUIs removed	3 / 12	3 / 18	4 / 24	9 / 30
AEMECP	5.1 Improvement in Great Lakes 40-point scale	21.9 / 23.4	23.9 / 21.9	24.7 / 23.4	24.5 / 23.4
	5.2 Priority LaMP projects completed	16 / 12	17 / 15	26 / 18	24 / 20
	5.3 Educational institutions incorporating Great Lakes protection criteria	52 / 2	351 / 6	578 / 10	1,597 / 16
Totals	Met Target	16	20	18	19
	Did Not Meet Target	9	6	8	6
	Not Applicable or Data Not Available	3	2	2	3

Key: Results are to the left of the / and targets are to the right. For example, the measure 1.1 result in FY 2014 was completion of 7 Management Actions and the target was 5. Green shading indicates that the target was met, red shading indicates that the target was not met, and gray indicates that the target or result was either not applicable or not available for reasons described in the following pages.

GLRI Action Plan I: Measures of Progress – Detailed Information

Of the 28 Action Plan measures of progress, 15 are also measures under the Government Performance and Results Act, which has a process to adjust performance targets collaboratively with the Office of Management and Budget. Any adjustments resulting from this process are indicated in the U.S. Environmental Protection Agency's annual Performance Plan, Performance Reports, and Congressional Justification; they are indicated below as updates to the targets in the Action Plan. The remaining 13 Action Plan measures of progress have not been adjusted and are measured against the original targets in the Action Plan. Explanations provide further detail about the measures, targets and results. FY 2010 results are not included because Great Lakes Restoration Initiative funding generally only began to affect results in FY 2011 and later years.

Measure	Targets	Results	Explanation/Additional Information
1.1 Number of Areas of Concern in the Great Lakes where all management actions necessary for delisting have been implemented (cumulative). [1,2]	FY14: 5 FY13: 4 FY12: 3 FY11: 1 FY10: 1 Baseline: 1	FY14: 7 FY13: 3 FY12: 2 FY11: 2	Cumulative: 7 AOCs in 6 states FY14: 4 AOCs: Ashtabula River AOC (OH), Deer Lake AOC (MI), White Lake AOC (MI), Waukegan Harbor AOC (IL) FY13: 1 AOC: Sheboygan River AOC (WI) FY11: 1 AOC: Presque Isle Bay AOC (PA) Baseline: 1 AOC: Oswego River AOC (NY) in FY06

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 Measure of Progress in the Action Plan is also a measure under the Government Performance and Results Act.*
3 *This target has been adjusted from the Action Plan.*
4 *Original baseline from the Action Plan has been updated. An intensive review of this metric conducted during the preparation of GLRI Action Plan II in FY 2014 determined that the number of beneficial use impairments removed prior to the implementation of the GLRI was overstated by two. The 2014 review determined that the delisting of the Oswego Area of Concern in 2006 resulted from the removal of four BUIs, not six. Consequently, the number of "actual" BUIs reported in the table for FY 2009–2013 included the six BUIs believed to have been removed at the Oswego Area of Concern. For FY 2014, the number of actual BUIs reported as removed has been corrected to reflect the true number of BUIs removed at the Oswego Area of Concern. However, the number of actual BUIs reported in FY 2010 is accurate since the intensive review also revealed that two BUIs had been removed in FY 2010 but had not been reported until FY 2011.*

GLRI Action Plan I: Measures of Progress (cont.)

Measure	Targets	Results	Explanation/Additional Information
1.2 Area of Concern Beneficial Use Impairments removed (cumulative). [1,2]	FY14: 46 FY13: 41 FY12: 33[3] FY11: 26 FY10: 20 Baseline: 12[4]	FY14: 52 FY13: 41 FY12: 33 FY11: 26	Cumulative: 52 BUIs at 19 AOCs in 8 states FY14: 13 BUIs: 'Restrictions on Dredging' BUI at Waukegan Harbor AOC, IL (7/16/14); 'Degraded Fish and Wildlife Populations' BUI at White Lake AOC, MI (4/2/12), and Ashtabula River AOC, OH (5/5/14); 'Loss of Fish and Wildlife Habitat' BUI at White Lake AOC, MI (4/2/14), Ashtabula River AOC, OH (5/5/14), and Saginaw Bay AOC, MI (5/6/14); 'Aesthetics' BUI at St. Louis River AOC, MN/WI (8/14/14), St. Marys River AOC, MI (1/27/14), and White Lake AOC, MI (3/11/14) ; 'Restrictions on Fish and Wildlife Consumption' BUI at Deer Lake AOC , MI (2/19/14), and Ashtabula River AOC, OH (5/5/14); 'Restrictions on Drinking Water' BUI at White Lake AOC, MI (3/11/14); 'Bird or Animal Deformities' BUI at St. Marys River AOC, MI (3/11/14). FY13: 8 BUIs: 'Restrictions on Fish and Wildlife Consumption' BUI at Muskegon Lake AOC, MI (2/25/13), and White Lake AOC, MI (2/25/13); 'Restrictions on Drinking Water' BUI at Muskegon Lake AOC, MI (2/20/13); 'Fish Tumors and Other Deformities' BUI at Presque Isle Bay AOC, PA (2/8/13); 'Loss of Fish and Wildlife Habitat' BUI at Waukegan Harbor AOC, IL (8/12/13); 'Tainting of Fish and Wildlife' BUI at Detroit River AOC, MI (8/22/13); 'Beach Closing' BUI at River Raisin AOC, MI (9/24/13); and 'Eutrophication' BUI at River Raisin AOC, MI (9/24/13). FY12: 7 BUIs: 'Restrictions on Drinking Water' BUI at Grand Calumet River AOC, IN (5/5/12); 'Aesthetics' BUI at Kalamazoo River AOC, MI (5/15/12), River Raisin AOC, MI (5/15/12), and St. Clair River AOC, MI (7/2/12); 'Eutrophication' BUI at White Lake AOC, MI (4/24/12); 'Added Costs to Agriculture or Industry' BUI at St. Clair River AOC, MI (6/5/12); 'Degradation of Benthos' BUI at White Lake AOC, MI (6/5/12). FY11: 12 BUIs: 'Restrictions on Drinking Water' BUI at Rochester Embayment AOC, NY (11/3/10), and Detroit River AOC, MI (7/9/11); 'Beach Closing' BUI at Kalamazoo River AOC, MI (3/3/11), Lower Menominee AOC, MI/WI (3/3/11), and Waukegan Harbor AOC, IL (9/28/11); 'Restrictions on Dredging' BUI at St. Clair River AOC, MI (3/3/11), Muskegon Lake AOC, MI (9/26/11), and White Lake AOC, MI (9/30/11); 'Added Costs to Agriculture or Industry' BUI at Rochester Embayment AOC, NY (7/9/11), and Grand Calumet River AOC, IN (9/30/11); 'Eutrophication' BUI at Deer Lake AOC, MI (9/26/11); and 'Bird or Animal Deformities' BUI at Deer Lake AOC, MI (9/26/11). FY10: 2 BUIs: 'Tainting of Fish and Wildlife' BUI at St. Clair River AOC, MI (11/17/09), and 'Beach Closing' BUI at Manistique River AOC, MI (5/5/10). Baseline: 10 BUIs: 'Restrictions on Fish and Wildlife Consumption' BUI at Oswego River AOC, NY (7/21/06); 'Tainting of Fish and Wildlife' BUI at Saginaw Bay AOC, MI (6/30/08); 'Degraded Fish and Wildlife Populations' BUI at Oswego River, NY (7/21/06); 'Eutrophication' BUI at Oswego River AOC, NY (7/21/06); 'Loss of Fish and Wildlife Habitat' BUI at Oswego River AOC, NY (7/21/06), and Manistique River AOC, MI (9/15/08); 'Degradation of Benthos' BUI at Manistique River AOC, MI (11/6/06); 'Restrictions on Dredging' BUI at Presque Isle Bay AOC, PA (3/16/07); 'Fish Tumors and Other Deformities' BUI at Torch Lake AOC, MI (4/5/07); 'Restrictions on Drinking Water' BUI at Saginaw Bay AOC, MI (6/30/08).
1.3 Beneficial Use Impairment delisting project starts at Areas of Concern (cumulative).	FY14: 170 FY13: 140 FY12: 110 FY11: 80 FY10: 60 Baseline: 0	FY14: 274 FY13: 213 FY12: 151 FY11: 88	BUI removal projects have started throughout the Great Lakes basin in every state with an Area of Concern remaining (Illinois, Indiana, Ohio, Michigan, Minnesota, New York and Wisconsin).

GLRI Action Plan I: Measures of Progress (cont.)

Measure	Targets	Results	Explanation/Additional Information
1.4 Cubic yards (in millions) of contaminated sediment remediated in the Great Lakes (cumulative). [1,2]	FY14: 12[3] FY13: 10.3[3] FY12: 9.1[3] FY11: 8.0[3] FY10: 6.3 Baseline: 5.5	FY14: 13.3 FY13: 11.5 FY12: 9.7 FY11: 8.4	From 1997 through calendar year 2013, the EPA and its partners have remediated approximately 13.3 million cubic yards (cy) of contaminated sediment from the Great Lakes basin. In calendar year 2012 and 2013 (for FY13–14 reporting), approximately 1.7 million cubic yards and 1.8 million cubic yards, respectively, were remediated through various federal authorities: *Great Lakes Legacy Act (2013)* • Buffalo River and City Ship Canal; Buffalo River AOC (New York); 102,311 cy • North Slip; Ashtabula River AOC (Ohio); 10,965 cy • East Branch Grand Calumet River; Grand Calumet River AOC (Indiana); 173,216 cy *Great Lakes Restoration Initiative (2013)* • Ashtabula River; Ashtabula River AOC (Ohio); 82,133 cy • White Lake; White Lake AOC (Michigan); 8,629 cy *Resource Conservation and Recovery Act (2013)* • Tyco/Ansul Site; Menominee River AOC (Wisconsin); 233,046 cy* *Superfund (2013)* • Allied Paper/Portage Creek/Kalamazoo River; Kalamazoo River AOC (Michigan); 9,856 cy • WPSC Campmarina; Sheboygan River AOC (Wisconsin); 14,032 cy • Tittabawassee River – Segment 1; non-AOC (Michigan); 15,580 cy • WPSC Marinette Manufactured Gas Plant Site; Menominee River AOC (Wisconsin); 2,475 cy • Outboard Marine Corporation; Waukegan Harbor AOC (Illinois); 114,509 *Superfund/Natural Resource Damage Assessment (Federal and State) (2013)* • Fox River; Lower Green Bay and Fox River AOC (Wisconsin); 628,483 cy *Rivers and Harbors Act (Operations and Maintenance Dredging) (2013)* • Indiana Harbor and Canal; Grand Calumet River AOC (Indiana); 399,884 cy* *Volumes not reported in calendar year 2012 were added to calendar year 2013 total (913 cy from Tyco/Ansul site and 93,937 cy from Indiana Harbor and Canal). *Great Lakes Legacy Act (2012)* • Lincoln Park Phase 1; Milwaukee Estuary AOC (Wisconsin); 25,556 cy • River Raisin; River Raisin AOC (Michigan); 72,354 cy • Sheboygan River; Sheboygan River AOC (Wisconsin); 147,822 cy • West Branch Grand Calumet River Phase 2; Grand Calumet River AOC (Indiana); 461,296 cy *Great Lakes Restoration Initiative (2012)* • Ashtabula River; Ashtabula River AOC (Ohio); 43,443 cy • Buffalo River; Buffalo River AOC (New York); 41,632 cy • Sheboygan River; Sheboygan River AOC (Wisconsin); 154,273 cy *RCRA (2012)* • Tyco/Ansul Site; Menominee River AOC (Wisconsin); 26,000 cy *Superfund (2012)* • Allied Paper/Portage Creek/Kalamazoo River; Kalamazoo River AOC (Michigan); 12,970 cy • Fields Brook; non-AOC (Ohio); 135 cy • Sheboygan River; Sheboygan River AOC (Wisconsin); 43,278 cy • Tittabawassee River – Segment 1; non-AOC (Michigan); 2,840 cy • WPSC Marinette Manufactured Gas Plant Site; Menominee River AOC (Wisconsin); 12,900 cy *Superfund/Natural Resource Damages (2012)* • Fox River; Lower Green Bay and Fox River AOC (Wisconsin); 693,621 cy

GLRI Action Plan I: Measures of Progress (cont.)

Measure	Targets	Results	Explanation/Additional Information
1.5 Pollution (in million pounds) collected through prevention and waste minimization projects in the Great Lakes basin (cumulative).[1]	FY14: 45 FY13: 35 FY12: 25 FY11: 15 FY10: 10 Baseline: 0	FY14: 995.9 FY13: 665.7 FY12: 394.9 FY11: 182.5	All states in the Great Lakes basin (with the exception of Ohio) have now passed e-waste recycling laws that require manufacturers to accept used electronic equipment. The passage of these laws (after the development of the Action Plan) has resulted in achievements for this measure far exceeding targets. The Action Plan Objectives related to this measure have also been met.
1.6 Cumulative percentage decline for the long term trend in average concentrations of PCBs in Great Lakes fish.[1,2]	FY14: 46% FY13: 43% FY12: 40% FY11: 37% FY10: 34% Baseline: 0%	FY14: 49.5% FY13: 45.9% FY12: 42.8% FY11: 44.0%	The cumulative percentage decline for the long term trend in average concentration of total PCBs in Great Lakes whole fish, using the year 2000 as a baseline for each Great Lake is: • Lake Superior: 58.9% • Lake Michigan: 51.9% • Lake Huron: 35.9% • Lake Erie: 52.5% • Lake Ontario: 53.6% Percent decline based on an exponential trend. Each Great Lake is a unique environment with distinct species growth rates, food webs, and chemical integrity. This creates unique lake trout and walleye communities between and within each Great Lake, which results in year to year variability in the data. Even/odd year data by lake are not comparable over a 2 year period. Additional information is available at: http://www.epa.gov/glnpo/monitoring/fish/
2.1 Rate of nonnative species newly detected in the Great Lakes ecosystem (species/year). [1,2]	FY14: 0.8[3] FY13: 0.8[3] FY12: 0.8[3] FY11: 1.0[3] FY10: 1.3 Baseline: 1.0[4]	FY14: 0.67 FY13: 0.71 FY12: 0.77 FY11: 0.83	No new species have been established in FY13–14. Ten species have been detected over the 15 year period (2000–2014) resulting in the invasion detection rate of 0.67 species/year. Note that since the Action Plan was published, NOAA scientists reclassified the detection dates of 3 species based on a reassessment and categorization of available data. This alters the pre-GLRI baseline rate of invasion from 1.3 species per year (13 species from 2000–2009) to 1.0 species per year (10 species from 2000–2009).
2.2 Acres managed for populations of invasive species controlled to a target level (cumulative).[2]	FY14: 38,000[3] FY13: 34,000[3] FY12: 15,500[3] FY11: 1,500 FY10: 1,000 Baseline: 0	FY14: 84,500 FY13: 35,924 FY12: 31,474 FY11: 13,045	The unprecedented level of funding for invasive species work continued to capitalize on a backlog of projects. Invasive species for which acreage is managed include: Japanese knotweed, lyme grass, invasive strains of Phragmites, purple loosestrife and spotted knapweed, among others.
2.3 Number of multi-agency plans established, mock exercises to practice rapid responses carried out under those plans, and/or actual rapid response actions (cumulative).[2]	FY14: 35[3] FY13: 26[3] FY12: 12[3] FY11: 4[3] FY10: 4 Baseline: 0	FY14: 46 FY13: 30 FY12: 23 FY11: 8	By the end of FY14, state plans that included rapid response capabilities had been completed by all eight Great Lake states and a total of thirty-eight responses or exercises had been completed. Most of the responses and exercises were part of the effort to keep Asian Carps from becoming established in the Great Lakes (a cumulative total of eighteen in FY13 and twenty-three in FY14). In FY13, six state plans had been updated to include rapid response capabilities and a cumulative total of twenty-four responses or exercises had been conducted.

GLRI Action Plan I: Measures of Progress (cont.)

Measure	Targets	Results	Explanation/Additional Information
2.4 Number of recreation and resource users (in millions) contacted on best practices that prevent the introduction and spread of invasive species (cumulative).	FY14: 9.75 FY13: 7.25 FY12: 4.75 FY11: 1.75 FY10: 1 Baseline: 0	FY14: 314.7 FY13: 256.4 FY12: 230.5 FY11: 129.5	This overarching measure was developed to track overall progress toward the innovative work of improving invasive species education/outreach, which is still in the early stages of development for addressing most invasive species vectors. Many of these efforts are funded through competitive grant offerings and include a combination of the best-designed projects that maximize both the breadth of public reached (typically non-interactive outreach such as billboards, radio, TV, etc.) and also directly target the more active resource users. The number of contacts is derived from recipient reports based on industry standards for applicable media. Results for this measure have greatly exceeded targets because of a number of successful projects that have employed non-interactive techniques such as billboards, radio and TV, which have reached wide numbers of potential recreation and resource users.
3.1 Five year average annual loadings of soluble reactive phosphorus from tributaries draining targeted watersheds (percent reduction). [1,2]	FY14: N/A[3] FY13: N/A[3] FY12: 0.5%[3] FY11: 0%[3] FY10: 0% Baseline: N/A	Data Not Available	Data do not exist to determine whether targets are being met; however, improved phosphorus data are now being collected in all five targeted watersheds (Fox, Saginaw, Maumee, St. Louis, and Genessee) to better estimate annual average loadings of soluble reactive phosphorus (SRP). Sufficient historical data does not exist to allow for calculation of 5-year averages through the 2010 water year for the Saginaw, Genessee, and St. Louis Rivers. Assessment of the historical data for the Fox and Maumee Rivers illustrates the inherent problems with tracking changes to SRP loadings from tributaries, given the yearly variability of rainfall and other climatic factors; therefore, results of this measure may not indicate a trend from year to year. For example, when comparing the 2003–2007 baseline from the Maumee River to the 5-year rolling averages from 2005–2009 and 2006–2010, SRP loadings changed from a 3.8% increase to a 3.4% reduction. Similarly, when comparing the 2003–2007 baseline from the Fox River to the 5-year rolling averages from 2004–2008 and 2005–2009, SRP loadings changed from a 3.6% increase to a 15.8% reduction. Phosphorus reduction will be reported differently under Great Lakes Restoration Initiative Action Plan II.
3.2 Percent of days of the beach season that the Great Lakes beaches monitored by state beach safety programs are open and safe for swimming.[1,2] [Original Action Plan language: 'Percentage of beaches meeting bacteria standards 95% or more of beach days.']	FY14: N/A[3] FY13: 90%[3] FY12: 90%[3] FY11: N/A[3] Baseline: 92%[3]	FY14: 96.7% FY13: 94% FY12: 93.5% FY11: N/A	The measure language, beginning with FY12 reporting, has been updated from the original Action Plan language to better capture the health of monitored beaches, and is consistent with the national coastal and Great Lakes beach measure. A target for FY14 reporting was not established because Beach Act funding (necessary for reporting on compatible data) had been proposed for elimination. FY14 / FY13 / FY12 / FY11 Illinois 95.9% / 94.3% / 90.2% / 87.7% Indiana 88% / 87.0% / 85.4% / 82.5% Michigan 99.8% / 98.7% / 96.8% / 96.8% Minnesota 94.4% / 92.4% / 96.2% / 98.9% Ohio 66.7% / 80.4% / 82.4% / 82.3% Wisconsin 96.3% / 93.8% / 94.4% / 92.2% Pennsylvania 94% / 94.9% / 98.5% / 98.9% New York 90.5% / 93.7% / 91.1% / 88.5% Basin-wide 96.7% / 94.0% / 93.5% / 92.0% To calculate, the number of beach days not under an action (monitored beaches) is divided by the number of swim season beach days (monitored beaches). Data is only available and reported in the year after it is collected. The states' data (used for FY13 and FY14 reporting) can be accessed at: http://water.epa.gov/type/oceb/beaches/2012_season.cfm and http://ofmpub.epa.gov/apex/beacon2/f?p=103:4:3686219353939:::::, respectively.

GLRI Action Plan I: Measures of Progress (cont.)

Measure	Targets	Results	Explanation/Additional Information
3.3 Extent (sq. miles) of Great Lakes Harmful Algal Blooms (percent reduction). [1]	FY14: 126.8 sq. mi (12% red.) FY13: 132.6 sq. mi (8% red.) FY12: 134.0 sq. mi (7% red.) FY11: 138.3 sq. mi (4% red.) FY10: 144.1 sq. mi (0% red.) Baseline: 144.1 sq. mi. (2002–2012 mean)	FY14: 181.5 (0% red.) FY13: 337.8 (0% red.) FY12: 76.4 (47% red.) FY11: 252.9 (0% red.) FY10: 153.7 (0% red.)	The average HAB extent in Western Lake Erie Basin in 2014 was the third largest from 2002-present, with 2013 having the largest average extent and 2011 having the second largest. For perspective, however, the average western basin extent declined 46% during 2014 from 2013 levels, attributed to reduced water temperatures. Maumee River discharge and dissolved phosphorus loads for March-June 2014 were slightly higher than March-June 2013 values, likely due to increased runoff from rainfall. The average total HAB extent in 2013 was the largest average documented from 2002-present, with 2011 having the second largest average extent. Maumee River discharge and phosphorus loads for March–June 2013 were slightly above average compared to the previous 10 year average (2003–2012). Spring phosphorus loads in 2013 were lower than spring 2011 loads and substantially higher than spring 2012 loads (Heidelberg University data). The reason for the reduced HAB extent in 2012: The area experienced a severe drought; there was reduced spring discharge that resulted in drastically reduced amount of phosphorus loads to the Western Basin as compared to 2011 (GLC Phosphorus Reduction Task Force Report 2012). A long-term, decreasing trend in harmful algal bloom extent does not yet exist. Biological responses to nutrient loadings are dependent on many other factors such as water temperature, timing and intensity of precipitation, and in-lake hydrodynamic features such as surface currents and waves. Year-to-year variability in these factors may mask the nutrient reduction benefits occurring in the watershed via local improvements in nutrient management. GLRI funding is being used to increase the availability of contracts for agricultural conservation practices to reduce phosphorus runoff on thousands of acres. Over the long term, these management actions will lead to lower phosphorus levels being discharged into the lakes, which will limit the extent of such algal blooms. These results indicate the total extent (including surface mats and subsurface blooms) of harmful algal blooms in the Western Basin of Lake Erie. Data for other Great Lakes locations (Fox, Green Bay) and data that quantiFYthe extent of algal surface mats exist; however we believe examining trends in total extent (including surface mats and subsurface blooms) of harmful algal blooms in the Western Lake Erie Basin (the area of the Great lakes most severely impacted) offers robust, ecologically meaningful information for this metric.
3.4 Annual number of days U.S. Great Lakes beaches are closed or posted due to nuisance algae.[1]	FY14: 176 (12% imp.) FY13: 184 (8% imp.) FY12: 186 (7% imp.) FY11: 192 (4% imp.) FY10: 200 (0% imp.) Baseline: 200	Data Not Available	At the time this metric was developed, there was no formal mechanism in place for reporting beach closures or advisories issued due to the presence of nuisance algae. Efforts to develop a formal mechanism resulted in a voluntary reporting field in the national monitoring database which has not resulted in sufficient data. Because Beach Act requirements only specify monitoring and reporting on bacterial levels, it has not been possible to include a mandatory field concerning nuisance algae in the national monitoring database.

GLRI Action Plan I: Measures of Progress (cont.)

Measure	Targets	Results	Explanation/Additional Information
3.5 Annual volume of sediment deposition in defined harbor areas (Toledo Harbor) in targeted watersheds (millions of cubic yards).[1]	FY14: 2.5% imp. FY13: 2% imp. FY12: 1% imp. FY11: 1% imp. FY10: 0% imp. Baseline: N/A	FY14: 12% imp. FY13: 3% imp. FY12: 15% imp. FY11: 11% imp.	Modeling issues have been resolved, allowing results for this measure to be reported for all years for the first time. Because sediment delivery by the Maumee River into Toledo Harbor is dependent on rainfall and other highly variable climatic factors, the results of this modeled measure may not indicate a trend from year to year. In addition, results are not solely caused by Maumee River sediment delivery. Maumee Bay has a large surface area and a relatively shallow mean depth that causes wind-driven sediment re-suspension, re-distribution, and re-deposition of existing Maumee Bay sediments. For example, model results show that Maumee River sediment delivery for the 2009–2012 period is responsible for roughly half of the total deposition in Maumee Bay, with the remaining deposition attributable to other sources such as sediment re-suspension and re-deposition. The modeled result is for the previous calendar year, thus the modeled "Result" designated as "FY14" is for calendar year 2013. Modeling outputs can be directly compared to the percentage improvement targets in the Action Plan, but are not readily comparable to the targeted volume estimates due to model methodology.
3.6 Acres (in thousands) in Great Lakes watershed with USDA conservation practices implemented to reduce erosion, nutrients and/or pesticide loading under Farm Bill Programs.[1,2]	FY14: 214.5 (30% imp.)[3] FY13: 198 (20% imp.)[3] FY12: 178.2 (8% imp.)[3] FY11: 168.3 (2% imp.)[3] FY10: 168.3 (2% imp.) Baseline: 165	FY14: 277.7 (68% imp.) FY13: 263.4 (60% imp.) FY12: 279.7 (70% imp.) FY11: 268.1 (62% imp.)	The results column identifies acres in the Great Lakes watershed that were put into USDA conservation practices each year to reduce erosion, nutrients and/or pesticide loadings under Farm Bill programs. The percentage indicates the increase for each year over the baseline of 165,000 acres (based on FY08 data). The increases are a combined result of greater funding (base USDA programs and GLRI) and increased participation in NRCS programs. It is important to note that the acres tracked in this measure are not cumulative, rather, this measure tracks new conservation practices implemented in a given fiscal year. Therefore, the percent increase will vary considerably from year to year due to funding, total acres available for conservation and the difficulty of implementing conservation practices.
4.1 Miles of rivers reopened for fish passage (cumulative).	FY14: 4,500 FY13: 3,500 FY12: 2,500 FY11: 1,500 FY10: 1,000 Baseline: 0	FY14: 3,475 FY13: 1,947 FY12: 890 FY11: 315	GLRI federal partners (APHIS, BIA, EPA, FHWA, FS, FWS, GLFC, NOAA, NPS, USACE, and USGS) funded 138 "miles of rivers reopened for fish passage" and "fish passage barrier" projects across the Great Lakes basin over the last five years to improve aquatic connectivity. Projects have thus far resulted in 3,475 miles of rivers reopened. Over the next couple of years, as the last of these projects are completed, an additional 4,128 miles of rivers are expected to be reopened for fish passage. The delay in achieving targets can be attributed to not fully factoring a pre-implementation design phase into initial development of targets for this measure. For example, a dam removal project will not claim river miles reopened until deconstruction of the dam is fully complete, which will often not occur in the first phase of the project.
4.2 Number of fish passage barriers removed or bypassed (cumulative).	FY14: 450 FY13: 350 FY12: 250 FY11: 150 FY10: 100 Baseline: 0	FY14: 513 FY13: 258 FY12: 162 FY11: 31	GLRI federal partners (APHIS, BIA, EPA, FHWA, FS, FWS, GLFC, NOAA, NPS, USACE, and USGS) funded 138 "miles of rivers reopened for fish passage" and "fish passage barrier" projects across the Great Lakes basin over the last five years to improve aquatic connectivity. Projects have thus far resulted in 513 fish passage barriers removed or bypassed. Over the next couple of years, as the last of these projects are completed, an additional 66 fish passage barriers are expected to be removed or bypassed. The delay in achieving targets can be attributed to not fully factoring a pre-implementation design phase into initial development of targets for this measure. For example, a dam removal project will not claim river miles reopened until deconstruction of the dam is fully complete, which will often not occur in the first phase of the project.

GLRI Action Plan I: Measures of Progress (cont.)

Measure	Targets	Results	Explanation/Additional Information
4.3 Number of species delisted due to recovery (cumulative). [1,2]	FY14: 2[3] FY13: 2[3] FY12: 1 FY11: 0[3] FY10: 0 Baseline: 0	FY14: 1 FY13: 1 FY12: 1 FY11: 1	In 2011, the Lake Erie Water Snake was removed from the Federal List of Endangered and Threatened Wildlife. The GLRI accelerated the species' recovery and has assured that conservation partners can keep the snake population healthy. The species is no longer endangered or threatened with extinction or likely to become so within the foreseeable future. Achieving the FY14 target was dependent on recovery of the federally threatened Pitcher's Thistle in the Great Lakes (targeted for delisting in the GLRI Action Plan). Pitcher's Thistle recovery is dependent on controlling a recently discovered pest (a weevil, Larinus planus) which feeds on the seeds of the Pitcher's Thistle. Research is ongoing to assess the ecological impacts of the weevil on Pitcher's thistle populations and will provide valuable information for the plant's management and recovery.
4.4 Percent of recovery actions implemented for priority listed species (cumulative).[1]	FY14: 82% (338/414) FY13: 67% (277/414) FY12: 51% (211/414) FY11: 33% (138/414) FY10: 16% (68/414) Baseline: 0	FY14: 45% (187/414) FY13: 34% (142/414) FY12: 22% (92/414) FY11: 15.7% (65/414)	To protect threatened, endangered and candidate species, the USFWS, in collaboration with partners, implements recovery actions identified in species-specific recovery plans. Recovery actions include a range of conservation tools, including habitat protection and acquisition, removing introduced animal predators or invasive plants, conducting surveys, monitoring individual populations, and breeding species in captivity and releasing them into their historic range. Nearly 200 recovery actions have been completed to date through the GLRI and additional actions, already funded, will be completed in the next few years, including some 50 actions expected to be completed in FY15. Efforts focused on accelerating recovery of the Piping plover and Pitcher's thistle while also implementing actions for species such as the Mitchell's satyr butterfly, the eastern massasauga rattlesnake and the Hine's emerald dragonfly. A principal reason for the shortfall in achieving the targeted 414 recovery actions by the end of FY14 was a delay in completing recovery actions for the Pitcher's Thistle. Funds originally targeted to support the execution of numerous landowner agreements for Pitcher's thistle were applied to addressing new threats to the species which required an investment in multi-year research efforts.
4.5 Percent of populations of native aquatic non-threatened and endangered species self-sustaining in the wild (cumulative).[1,2]	FY14: 35% (52/147)[3] FY13: 34% (50/147)[3] FY12: 33% (48/147)[3] FY11: 33% (48/147)[3] FY10: 33% (48/147) Baseline: 27% (39/147)	FY14: 35% (52/147) FY13: 34% (50/147) FY12: 33% (48/147) FY11: 31% (46/147)	Two populations of Lake Whitefish in Lake Huron have reached self-sustaining levels. Enhanced fisheries assessments supported through the GLRI have provided additional biological data to determine that these Lake Huron whitefish populations are self-sustaining. Actions have been taken which we believe will increase the percentage of populations self-sustaining in the wild; however, this environmental indicator will require additional time for the impacts to affect some species populations. Populations are making significant progress, but the full impacts of our efforts may not be fully known for several years.
4.6 Number of acres of wetlands and wetland-associated uplands protected, restored and enhanced (cumulative).[2]	FY14: 88,000[3] FY13: 68,000[3] FY12: 11,000[3] FY11: 5,000[3] FY10: 5,000 Baseline: 0	FY14: 102,349 FY13: 83,702 FY12: 65,640 FY11: 9,624	GLRI federal partners (APHIS, BIA, EPA, FHWA, FS, FWS, GLFC, NOAA, NPS, USACE, and USGS) funded 182 "wetland and wetland-associated upland habitat protection, restoration and enhancement" projects across the Great Lakes basin over the last five years. Projects have thus far resulted in 102,349 acres of wetlands and wetland-associated uplands protected, restored and enhanced. Over the next couple of years, as the last of these projects are completed, an additional 17,877 acres of wetlands and wetland-associated uplands are expected to be protected, restored and enhanced.

GLRI Action Plan I: Measures of Progress (cont.)

Measure	Targets	Results	Explanation/Additional Information
4.7 Number of acres of coastal, upland, and island habitats protected, restored and enhanced (cumulative).[2]	FY14: 38,000[3] FY13: 33,000[3] FY12: 15,000[3] FY11: 15,000[3] FY10: 15,000 Baseline: 0	FY14: 48,711 FY13: 33,250 FY12: 28,030 FY11: 12,103	GLRI federal partners (APHIS, BIA, EPA, FHWA, FS, FWS, GLFC, NOAA, NPS, USACE, and USGS) funded 172 "coastal, upland and island habitat protection, restoration and enhancement" projects across the Great Lakes basin over the last five years. Projects have thus far resulted in 48,711 acres of coastal, upland, and island habitats protected, restored and enhanced. Over the next couple of years, as the last of these projects are completed, an additional 114,468 acres of coastal, upland and island habitats are expected to be protected, restored and enhanced.
4.8 Percent of U.S. coastal Great Lakes wetlands assessed (cumulative).	FY14: 100% FY13: 80% FY12: 60% FY11: 40% FY10: 20% Baseline: 0%	FY14: 80% FY13: 60% FY12: 40% FY11: 19.6%	Through FY14, 80% of U.S. Great Lakes coastal wetlands have been assessed. In FY11-FY13, approximately 380/628 (60.5%) had been assessed. A delay in receiving FY10 funds resulted in a corresponding delay in achieving the targets for this measure. 100% of U.S. Great Lakes coastal wetlands are expected to have been assessed by FY15 rather than FY14.
4.9 Number of habitat-related Beneficial Use Impairments removed from the 27 U.S. Areas Of Concern so impaired (cumulative).[1]	FY14: 30 FY13: 24 FY12: 18 FY11: 12 FY10: 9 Baseline: 3[4]	FY14: 9 FY13: 4 FY12: 3 FY11: 3	FY14: 5 BUIs: 'Degraded Fish and Wildlife Populations' BUI at White Lake AOC, MI (4/2/12), and Ashtabula River AOC, OH (5/5/14); 'Loss of Fish and Wildlife Habitat' BUI at White Lake AOC, MI (4/2/14), Ashtabula River AOC, OH (5/5/14), and Saginaw Bay AOC, MI (5/6/14) FY13: 1 BUI: 'Loss of Fish and Wildlife Habitat' BUI at Waukegan Harbor AOC (8/12/13) The baseline for this measure has been adjusted to three habitat-related BUIs removed at two AOCs. Significant actions and improvements are under way in removing habitat-related BUIs from AOCs across the basin. In setting the targets for this measure, the following factors were not sufficiently considered: i) the assessments required to verify improved conditions can take years to complete before BUIs can be removed and ii) sediment remediation may need to occur on some sites before habitat restoration work begins.
5.1 Improvement in the overall aquatic ecosystem health of the Great Lakes using the Great Lakes 40-point scale.[1,2]	FY14: 23.4[3] FY13: 23.4[3] FY12: 21.9[3] FY11: 23.4 FY10: 23 Baseline: 20	FY14: 24.5 FY13: 24.7 FY12: 23.9 FY11: 21.9	The Great Lakes Index score of 24.5 in FY14 is an improvement over the target of 23.4. A slight year-to-year decrease (from 24.7 in FY13) is a result of increasing scores for 3 index components (coastal wetlands, beach closures, and air toxics deposition) and declining scores for two components (drinking water quality and phosphorus concentrations). The increase in the Great Lakes Index score to 24.7 in FY13 results primarily from an increased score for one of the eight index components — beach closures. For FY12 reporting (using 2011 beach season data), Great Lakes beaches monitored by state beach safety programs were open and safe for swimming 93.5% of the beach season. For FY13 reporting (using 2012 beach season data), the higher result of 94% (see measure 3.2, above) triggered an increase to the overall Great Lakes Index score.
5.2 Number of priority LaMP projects that are completed (cumulative).	FY14: 20 FY13: 18 FY12: 15 FY11: 12 FY10: 10 Baseline: 0	FY14: 24 FY13: 26 FY12: 17 FY11: 16	Lakewide Management Plans continue to serve a critical role in protecting and restoring the Great Lakes ecosystem. FY14 projects include priorities related to the Coordinated Science and Monitoring Initiative, the development of climate change and AIS Prevention Strategies, the implementation of key recommendations and projects from the biodiversity strategies and the completion of the Lake Erie Nutrients Strategy. FY13 projects include priorities related to the Coordinated Science and Monitoring Initiative, the development of nearshore ecosystem objectives, the completion of biodiversity strategies and the concentrated efforts toward phosphorus reduction in Green Bay, the Maumee River and Saginaw Bay.

GLRI Action Plan I: Measures of Progress (cont.)

Measure	Targets	Results	Explanation/Additional Information
5.3 Number of educational institutions incorporating new or existing Great Lakes protection and stewardship criteria into their broader environment education curricula (cumulative).	FY14: 16 FY13: 10 FY12: 6 FY11: 2 FY10: 0 Baseline: 0	FY14: 1,597 FY13: 578 FY12: 351 FY11: 52	Progress has greatly exceeded targets for this measure. This success is attributed to a relatively small number of very successful projects.

APPENDIX B — GLRI ACTION PLAN I: OBJECTIVES

Action Plan Objective	Status	Explanation / Status Summary
1.1 By 2014, delist five Areas of Concern.	Not Achieved	All management actions necessary for delisting at seven AOCs have been implemented, but the monitoring required to verify these improved conditions, remove all BUIs, and formally delist the AOCS will generally take additional years to complete. As of September 2014, two AOCs have been formally delisted.
1.2 By 2014, 46 Beneficial Use Impairments (BUIs) will be removed in Areas of Concern.	Achieved	As of September 2014, 52 BUIs have been removed, quadrupling the total number of BUIs removed in the 22 years preceding GLRI.
1.3 By 2011, 15 million pounds of electronic waste and 15 million pills of unwanted medicines will be collected or their release will have been prevented.	Achieved	By 2011, over 180 million pounds of electronic waste and over 60 million pills of unwanted medicines were collected. All states in the Great Lakes basin (with the exception of Ohio) passed e-waste recycling laws that require manufacturers to accept used electronic equipment. The passage of these laws (after the development of the Action Plan) resulted in achievements for this objective far exceeding targets.
1.4 By 2014, 45 million pounds e-waste [Clause 1], 45 million pills of unwanted medicines [Clause 2], and 4.5 million pounds of household hazardous waste [Clause 3] in the Great Lakes basin will have been collected or their release will have been prevented.	Clause 1: Achieved Clause 2: Achieved Clause 3: Achieved	All states in the Great Lakes basin (with the exception of Ohio) have now passed e-waste recycling laws that require manufacturers to accept used electronic equipment. The passage of these laws (after the development of the Action Plan) has resulted in achievements far exceeding the targets established in this objective. Through FY13, over 330 million pounds of e-waste and over 80 million pills of unwanted medicine were collected. Household hazardous waste has not been separately tracked by the states; however the target has presumably been met, given the tremendous success of e-waste and unwanted medicine collections.
1.5 By 2014, 9.4 million cubic yards of contaminated sediments will be remediated.	Achieved	Through FY14 reporting (through calendar year 2013), the EPA and its partners have remediated approximately 13.3 million cubic yards of contaminated sediment from the Great Lakes basin.
1.6 Through 2014, an annual average of up to 5% annual decline will be maintained or improved for the trend (year 2000 and on) in average concentrations of PCBs in whole lake trout and walleye samples.	Achieved	Through FY14 reporting (2000–2012 data), the annual average decline in concentrations of PCBs in whole lake trout and walleye samples has been 5.5%.
2.1 By 2011, eight state ANS management plans will be established or revised to include rapid response capabilities [Clause 1]. By 2014, eight state-based, multi-agency rapid response plans will be implemented and 22 mock exercises to practice responses carried out under those plans and/or actual response actions will be completed [Clause 2].	Clause 1: Achieved (delayed) Clause 2: Achieved	All eight state ANS management plans were established or revised to include rapid response capabilities by 2014. Through 2013, six states plans (Minnesota, Wisconsin, Illinois, Indiana, Michigan, and Pennsylvania) had been established or revised to include rapid response capabilities. Results include 20 mock exercises and 18 actual rapid response actions.

GLRI Action Plan I: Objectives (cont.)

Action Plan Objective	Status	Explanation / Status Summary
2.2 Six technologies that prevent the introduction of invasive species and four technologies that either contain or control invasive species will be developed or refined and piloted by 2011 [Clause 1]. Ten technologies that prevent the introduction of invasive species and five technologies that either contain or control invasive species will be developed or refined and piloted by 2014 [Clause 2].	Clause 1: Achieved (delayed) Clause 2: Achieved	By 2011, over ten technologies that prevent the introduction of invasive species were developed, refined, or piloted and one technology that contains or controls invasive species was developed, refined, or piloted. As of 2013, over 30 prevention technologies had been developed, refined, or piloted. Advances in ballast water treatment technologies and innovative technologies resulting from Asian carp prevention activities resulted in achievements exceeding the original targets. As of 2013, five contain/control technologies had been developed, refined, or piloted as a product of enhanced sea lamprey control efforts. As of 2014, 49 prevention technologies had been developed, refined, or piloted. Advances in ballast water treatment technologies and innovative technologies resulting from Asian carp prevention activities resulted in achievements exceeding the original targets. As of 2014, six contain/control technologies had been developed, refined, or piloted as a product of enhanced sea lamprey control and an innovative control technology for zebra mussels.
2.3 By 2011, methodology and protocols will be piloted for the coordinated monitoring methodology and shared protocols for basinwide invasive species surveillance [Clause 1]. By 2014, a basinwide surveillance program with shared sampling protocols and methodologies to provide early detection of non-native species will be operational [Clause 2].	Clause 1: Achieved Clause 2: Not Achieved	Clause 1: Early GLRI funding supported several pilot monitoring and protocol development efforts in order to inform the development of a basinwide surveillance program. These efforts include: coordinated multi-agency monitoring for Asian Carp as described in the Asian Carp Framework, an EPA-ORD pilot study at Isle Royale in Lake Superior, FWS pilot projects at Whitefish Bay and the St. Louis river in Lake Superior, an EPA-ORD research project for the use molecular/genetic tools for early detection, an EPA-funded grant for Western Lake Erie/Maumee River, and an International Joint Commission workshop on binational rapid response targeting the Detroit River corridor. Findings from these cutting-edge initiatives were presented at the 18th International Conference on Aquatic Invasive Species held in Niagara Falls, Ontario, Canada, on April 21–25, 2013, and at the 56th Annual Conference on Great Lakes Research held in West Lafayette, Ind., on June 2–6, 2013. Clause 2: This ambitious objective was developed at a time when the extent of the Asian Carp invasion was still unknown. Responding to the immediate threat of Asian carp, including the detection of Asian Carp eDNA in Lake Erie in 2012, has been the highest priority. However, as noted in Clause 1 above, significant progress has been made. By leveraging the GLRI's precedent-setting efforts, the U.S. government was able to negotiate the development of a binational basinwide surveillance program with Canada, as part of the amendments to the Great Lakes Water Quality Agreement. The shared deadline for developing this binational program is "within two years of entry into force of this Agreement." The Agreement entered into force on Feb. 12, 2013, following an exchange of diplomatic notes between the two governments.
2.4 By 2014, a 40 percent reduction in the yearly average rate of invasive species newly detected in the Great Lakes ecosystem will be achieved, compared to the period 2000–2009.	Achieved	As of 2014, no new species have been detected since 2009, reducing the rate by 33% from 1.0 species per year (10 species from 2000–2009) to .67 species per year (10 species from 2000–2014). This objective is considered to be achieved since, based on no new introductions, it is the best that could possibly be achieved (even if it is less than 40 percent). The target should have been stated as a 33% reduction, reflecting the objective of no new introductions through 2014.

GLRI Action Plan I: Objectives (cont.)

Action Plan Objective	Status	Explanation / Status Summary
2.5 By 2014, invasive species populations within the Great Lakes Ecosystem will have been controlled and reduced, as measured in populations controlled to a target level in 6,500 acres of managed area [Clause 1] and by removing 5,000 pounds of invasive species [Clause 2] from the Great Lakes ecosystem.	Clause 1: Achieved Clause 2: Achieved	Through 2014, over 35,000 acres have been managed for populations of invasive species controlled to a target level within the Great Lakes ecosystem. This result is higher than anticipated. The unprecedented level of funding for invasive species work capitalized on a backlog of projects and appears to have achieved economies of scale due to significantly larger projects becoming fully operational. Additionally, management efforts involving comprehensive surveillance of large acreages with targeted treatment follow-up have come to fruition. Through 2014, the GLRI has removed well over 5,000 pounds of invasive species from the Great Lakes ecosystem. The Great Lakes Fishery Commission alone reported 3,000 pounds of sea lamprey from the Great Lakes ecosystem in a large-scale experimental phase of a sea lamprey pheromone project. GLRI funding has been used to remove hundreds of thousands of pounds of other invasive species, such as phragmites and over 300,000 pounds of water chestnuts.
2.6 By 2014, approximately 10 million recreation and resource users will be educated on best practices that prevent the introduction and spread of invasive species.	Achieved	Through 2014, the GLRI has provided over 314 million opportunities to view or hear important information about steps to prevent the introduction and spread of invasive species in the Great Lakes basin. This objective was developed to track overall progress toward the innovative work of improving invasive species education/outreach, which is still in the early stages of development for addressing most invasive species vectors. Many of these efforts are funded through competitive grant offerings and include a combination of the best-designed projects that maximize both the breadth of public reached (typically non-interactive outreach such as billboards, radio, TV, etc.) and also directly target the more active resource users. The number of contacts is derived from recipient reports based on industry standards for applicable media. Results for this measure have greatly exceeded targets because of a number of successful projects that have employed non-interactive techniques such as billboards, radio, and TV, which have reached wide numbers of potential recreation and resource users.
3.1 By 2010, EPA will compile and map the highest priority watersheds for implementation of targeted nonpoint source pollution control measures.	Achieved	The following watersheds where long-term environmental problems have been clearly identified were targeted for non-point source pollution control measures: Genesee River, Green Bay/Fox River, Maumee River, St. Louis River, and Saginaw. In FY12, the GLRI Interagency Task Force announced that reducing phosphorus runoff, which contributes to harmful algal blooms, in the following three key watersheds would be a top priority: • Lower Fox River (Wisconsin) • Saginaw River (Michigan) • Maumee River (Ohio, Michigan, Indiana)
3.2 By 2014, remediation, restoration and conservation actions in at least one targeted watershed in each Great Lake basin will control erosion, reduce nutrient runoff from urban and agricultural sources, and improve habitat to protect nearshore aquatic resources.	Achieved	Remediation, restoration, and conservation actions have occurred in multiple subwatersheds in each targeted watershed identified in Objective 3.1 to control erosion, reduce nutrient runoff from urban and agricultural sources, and improve habitat to protect nearshore aquatic resources.

GLRI Action Plan I: Objectives (cont.)

Action Plan Objective	Status	Explanation / Status Summary
3.3 By 2014, a baseline will be established for total suspended solids loadings from targeted tributaries.	Not Achieved	EPA and USGS are establishing a baseline for suspended sediment loads to the lakes, rather than for total suspended solids (TSS), under this objective in order to obtain more accurate and reproducible results. The data collection and analyses result in suspended sediment concentrations (SSC) which are coupled with streamflow to obtain suspended sediment loads. The suspended sediment loads, like those for TSS, aid in understanding the effects of future land use/land cover on water quality and help evaluate the effectiveness and efficiency of best management practices at the watershed scale. Using GLRI funds, USGS has installed automated samplers, water quality multi-sensor probes, and gage house and stage equipment at 30 of the Great Lakes National Monitoring Network sites (which include the St. Louis River, Maumee River, Fox River, Genesee River and Saginaw River). These sites, located near river mouths, are being monitored to: • provide baseline information • measure restoration progress • demonstrate the ability to reduce monitoring costs through the use of real-time sensors Water samples collected at the 30 tributary monitoring sites are analyzed for a suite of parameters including suspended sediment. Monthly samples, samples during baseflow, and multiple samples for up to 6 storms are collected at each site (total of approximately 48 samples collected annually per site) representing a number of different flow conditions. USGS has collected 3.5 years of data for these 30 tributaries. These data are adequate to describe the water quality concentrations and to compute loads for those tributaries for those years. USGS plans on calculating suspended sediment loads for these tributaries using 2011–2013 data and publishing the results in a USGS Scientific Investigations report before the end of 2015.
3.4 By 2014, a measurable decrease will be achieved in soluble phosphorus loading from 2008 levels in targeted tributaries.	Data Not Available	Only limited data presently exist, but more detailed data are being collected in 24–30 tributaries to the Great Lakes to determine whether targets are being met. Detailed phosphorus data are being collected in all five targeted watersheds (Fox, Saginaw, Maumee, St. Louis, and Genesee) to better estimate annual average loadings of soluble reactive phosphorus (SRP). Sufficient historical data do not currently exist to calculate changes in the five-year average annual loadings of SRP for the Saginaw, Genesee, and St. Louis Rivers. The historical data for the Fox and Maumee Rivers may not represent the entire year. Calculation for this measure would be affected by yearly variability in rainfall and other climatic factors such that results may not directly indicate the true trend from year to year.
3.5 By 2014, the causes of nutrient-related nearshore biological impairments will be better understood [Clause 1], and following local or watershed remedial actions, the number and severity of incidences of harmful algal blooms (HABs), avian botulism, and/or excessive Cladophora growth will be significantly reduced from 2008 levels [Clause 2].	Clause 1: Achieved Clause 2: Not Achieved	GLRI supported numerous activities that increased the understanding of the causes of nutrient-related nearshore biological impairments, including development of detailed harmful algal bloom measurements via remote sensing, which allowed the first quantification of the within-year harmful algal bloom (HAB) variability, identification of specific lake locations where HABs persist the longest, and highlighted important environmental factors responsible for HAB severity such as extreme spring rainfall events and particular climatic settings. The number and severity of incidences of harmful algal blooms (HABs), avian botulism, and/or excessive Cladophora growth have not been significantly reduced from 2008 levels. GLRI-funded projects in targeted geographic watersheds are being implemented to reduce the nutrient inputs that are ultimately causing nearshore biological impairments attributed to excessive algae; however, data for Lake Erie and other lakes suggest that there could be a delay (several years or more) in the response of nearshore ecosystems to external phosphorus load reductions. Rainfall and other climatic also factors contribute to nearshore impairments attributed to algal growths. For example, intense spring rainstorms were a major contributing factor in the record-breaking 2011 HAB in Lake Erie, and such storms are part of a long-term trend for this region that is projected to get worse in the future due to climate change. Warmer water temperatures also favor growth of cyanobacteria.

GLRI Action Plan I: Objectives (cont.)

Action Plan Objective	Status	Explanation / Status Summary
3.6 By 2014, a comprehensive nearshore monitoring program will have been established and implemented, including a publicly accessible reporting system, based on a suite of environmental indicators.	Achieved	A comprehensive nearshore monitoring program to assess the over 10,000 miles of highly varied Great Lakes shoreline has been established. Federal agencies, state agencies, and universities are performing comprehensive nearshore monitoring. One example is the U.S. EPA National Coastal Condition Assessment, which for the first time in 2010 incorporated Great Lakes assessment into the program. The NCCA utilizes a probabilistic survey design and standardized indicators to report on the condition of estuaries and coastal waters at national and regional scales. GLRI funds were used to enhance the Great Lakes NCCA by enabling 150 additional samples to be collected in embayments, at sites along National Park boundaries, and at 30 sites to test for pharmaceuticals and flame retardants in commonly consumed fish species. In addition, Ohio EPA used GLRI finds to establish an annual Ohio Lake Erie Comprehensive Nearshore Monitoring Program. Draft 2010 NCCA data were made available to state agencies in 2013. A draft 2010 National Coastal Condition report underwent U.S. EPA review in 2014 and will be made available to the public in 2015 at: http://water.epa.gov/type/oceb/assessmonitor/nccr/index.cfm.
3.7 By 2014, 50 percent of high priority Great Lakes beaches will have been assessed using a standardized sanitary survey tool to identify sources of contamination.	Achieved	As of 2014, 338 Tier 1 (high priority) Great Lakes beaches out of a total of 356 Tier 1 monitored Great Lakes beaches (94.6%) have been assessed using a standardized sanitary survey tool to identify sources of contamination. Out of a total of 572 monitored GL beaches, 490 beaches were assessed using a standardized sanitary survey tool to identify sources of contamination.
3.8 By 2014, 20 percent of high priority Great Lakes beaches will have begun to implement measures to control, manage or remediate pollution sources identified through the use of sanitary surveys.	Not Achieved	As of 2014, 59 Tier 1 (high priority) Great Lakes beaches out of a total of 356 Tier 1 monitored Great Lakes beaches have begun to implement measures to control, manage or mitigate pollution sources identified with beach sanitary surveys (16.5%). Out of a total of 572 monitored Great Lakes beaches, 79 beaches have begun (or will begin) to implement measures to control, manage or mitigate pollution sources identified with beach sanitary surveys (13.8%).
3.9 By 2014, rapid testing or predictive modeling methods (to improve the accuracy of decisions on beach postings to better protect public health) will be employed at 33 percent of high priority beaches.	Not Achieved	As of 2014, rapid testing or predictive modeling methods are being employed at 92 Tier 1 (high priority) Great Lakes beaches out of a total of 356 Tier 1 monitored Great Lakes beaches (25.8%). Out of a total of 572 monitored Great Lakes beaches, rapid testing or predictive modeling methods are being employed at 137 beaches (23.9%). Further progress on this objective depends upon a maintained level of state monitoring efforts. Rapid testing methods can increase costs for equipment, samples, and staff. Predictive modeling methods require a minimum of three years of beach monitoring data to develop a model and periodic monitoring to validate the model to ensure its effectiveness.
3.10 By 2014, the area of agricultural lands in conservation and/or utilizing conservation tillage practices will increase by 50 percent over 2008 levels.	Achieved	In FY14, 277,700 acres in the Great Lakes watershed were put into USDA conservation practices to reduce erosion, nutrients and/or pesticide loading under Farm Bill Programs, which is an increase of 68% over 2008 levels (165,000 acre baseline).
4.1 By 2014, 4,500 miles of Great Lakes rivers and tributaries will be reopened [Clause 1] and 450 barriers to fish passage will be removed or bypassed [Clause 2].	Clause 1: Not Achieved Clause 2: Achieved	See comments for measures 4.1 and 4.2.
4.2 By 2014, 82% of recovery actions for federally listed priority species will be implemented.	Data Not Available	See comments for measure 4.4.

GLRI Action Plan I: Objectives (cont.)

Action Plan Objective	Status	Explanation / Status Summary
4.3 By 2014, 53 percent of populations of native aquatic non-threatened and endangered species are self sustaining.	Achieved the revised FY14 target for corresponding measure	Actions have been taken which we believe will increase the percentage of populations self-sustaining in the wild (35% through FY14); however, this environmental indicator will require additional time for the impacts to affect species populations. Populations are making significant progress, but the full impacts of GLRI efforts will not be fully known for several more years. In recognition of the complexity of this issue and the time required for the effects of restoration to be realized, the target for the corresponding measure had been changed to 35% in the federal GPRA process. That revised target has been achieved.
4.4 By 2014, 97,500 acres of wetlands, wetland-associated uplands, and high priority coastal, upland, urban, and island habitats will be protected, restored or enhanced.	Achieved	See comments for measure 4.7.
4.5 By 2014, 100 percent of U.S. coastal wetlands in the Great Lakes basin will be assessed.	Not Achieved	See comments for measure 4.8.
4.6 By 2014, 30 habitat-related beneficial use impairments will be delisted across the Areas of Concern.	Not Achieved	See comments for measure 4.9.
5.1 By 2011, opportunities for collaboration, planning, data accessibility and accountability will be increased through the expanded use of internet-based technology.	Achieved	By 2011, EPA had developed and piloted an initial version of the Great Lakes Accountability System (see following objective for more detail). EPA also had developed internet-based mechanisms to facilitate GLRI application and review processes and facilitate planning and collaboration for interagency projects. EPA also continues to improve the Great Lakes Environmental Database (GLENDA). GLENDA is the data management tool for many of the EPA Great Lakes National Program Office long-term monitoring programs including water chemistry, plankton, benthos, fish, and sediment. It provides data entry, storage, and public access. In support of the Great Lakes Restoration Initiative, the USGS is working with the Great Lakes Observing System and other data-exchange efforts to make water-resources and biological information more readily accessible as a Great Lakes Basin dataset. This information includes streamflow, groundwater, and water-quality data, as well as online access to USGS reports written for part or all of the Great Lakes Basin. The database model has been developed and is being populated with USGS GLRI data, focusing on priority watersheds and Areas of Concern.
5.2 By 2011, an Accountability System will be developed and implemented for the Initiative. The system will integrate and make transparent strategic planning, budgeting and results monitoring.	Achieved	By 2011, EPA had developed and piloted an initial version of the Great Lakes Accountability System. This system remains a work in progress and EPA plans to continually evaluate and initiate options for improving our ability to integrate and make transparent strategic planning, budgeting, and results monitoring.
5.3 By 2011, a satellite remote sensing program will be implemented to assess Great Lakes productivity and biological (e.g., algal bloom) events.	Achieved	In 2011, GLNPO started using satellite images to complement the collection and analysis of chlorophyll under its long-term Great Lakes biological monitoring program. Chlorophyll concentrations are estimated by detecting very small changes in water color of the satellite images as a result of the wavelengths of light that are absorbed or reflected by phytoplankton. The satellite measurements provide a look at a very large part of the Lakes at the same time and allow an assessment of temporal trends throughout the year and over years. The satellite-derived estimates of chlorophyll can also help identify areas rich in nutrients. Shipboard measurements are used to validate the satellite-derived observations

GLRI Action Plan I: Objectives (cont.)

Action Plan Objective	Status	Explanation / Status Summary
5.4 By 2011, outreach and education efforts are increased, including identifying and revising existing curricula to incorporate sustainable education needs for the Great Lakes that meet state and other relevant learning standards.	Achieved	See comments for measure 5.3.
5.5 By 2011, a refined suite of science-based indicators for development of a comprehensive assessment of Great Lakes ecosystem health will be identified, monitoring programs for those indicators will begin to be implemented, and restoration and protection actions tied to those assessments and programs assured.	Achieved	The 9th State of the Lakes Ecosystem Conference (SOLEC) was held in Erie, Pa., on October 26–27, 2011. The conference was the culmination of scientific information gathered from governments, academia and non-governmental organizations using a suite of indicators that were refined based on an independent scientific review completed in 2010. GLRI has supported coordinated ecosystem-level monitoring to document overall ecosystem conditions and report on indicators. Long-term ecosystem monitoring programs were enhanced to better assess conditions and trends of nutrient concentrations, phytoplankton and zooplankton populations, and benthic communities in the nearshore and open waters of the Great Lakes.
5.6 By 2011, social media access opportunities for basinwide public involvement in the Initiative will be in place.	Achieved	By 2011, EPA had created an interagency GLRI website (glri.us). By 2011, the GLRI also had a presence on Twitter, Facebook and Youtube through content produced by each agency. EPA continues to host a GLRI twitter account (@EPAGreatLakes) and both the Great Lakes Advisor and Great Lakes National Program Manager tweet on behalf of GLRI. EPA uses the agency blog "It's Our Environment" to continue the conversation on Great Lakes Issues and encourages other agencies to use the hashtag #GLRI. The Great Lakes Interagency Task Force has interacted with questions from the public by Twitter and Facebook since the first Great Lakes Week in 2011. Other agencies, such as USGS and USFWS, produce videos related to GLRI on their Midwest regional social media sites.
5.7 By 2012, education efforts under existing curricula that meet state and other relevant learning standards will be coordinated across states, and a system for tracking student and teacher outreach (quantitatively and qualitatively) for their use.	Achieved	In 2012, education specialists with the Great Lakes Sea Grant Network established the Center for Great Lakes Literacy (CGLL) with funding support from GLRI. The creation of CGLL improved coordination on educational efforts across all eight Great Lakes states. The goal of CGLL is to improve Great Lakes literacy and increase environmental stewardship by developing standards-based curricula, providing professional development training, building a community-of-practice network and facilitating stewardship opportunities. The Center for Great Lakes Literacy performs follow-up evaluations on each teacher that participates in their multi-day workshops to determine the extent to which Great Lakes protection and stewardship principles have been incorporated into their broader environmental education curricula. These numbers are reported and tracked in the Great Lakes Accountability System. GLRI also supported the Bay Watershed and Education Program (B-WET), an environmental education program that promotes locally relevant, experiential learning for K-12 school students and teachers. Projects funded through B-WET are aimed at promoting "Meaningful Watershed Education Experiences" (MWEEs): sustained, hands-on, environmental activities that are aligned with academic learning standards. The B-WET program also has an extensive evaluation program to demonstrate its effectiveness. Rigorous evaluation has shown that B-WET activities increase teachers' confidence, ability and intention to employ MWEE techniques with their students. Student experiences in turn have been shown to increase intention to take action to improve the watershed and have the potential to increase academic achievement in science.

GLRI Action Plan I: Objectives (cont.)

Action Plan Objective	Status	Explanation / Status Summary
5.8 By 2012, improved coordination with Canada will take place for programs under the Great Lakes Water Quality Agreement, particularly under the LaMPs [Clause 1], which will result in the achievement of 5–10 priority LaMP goals and actions [Clause 2].	Clause 1: Achieved Clause 2: Achieved	On Sept. 7, 2012, Canada and the United States amended the Great Lakes Water Quality Agreement (Agreement). The updated Agreement facilitates United States and Canadian action on threats to Great Lakes water quality and includes measures to prevent ecological harm. New provisions address the nearshore environment, aquatic invasive species, habitat degradation and the effects of climate change. It also supports continued work on existing threats to public health and the environment in the Great Lakes basin such as harmful algae, toxic chemicals and discharges from vessels. Both governments sought extensive input from stakeholders before and throughout the negotiation process, which started in 2009. Additionally, the revised Agreement expands opportunities for public participation in Great Lakes issues. Lakewide Action and Management Plans (LAMPs) continue to serve a critical role in protecting and restoring the Great Lakes ecosystem. Seventeen priority LAMP projects were completed in FY12. Some of these projects included completion of the Lake Superior Chemical Milestones Report (documenting the reduction of releases of toxic chemicals to Lake Superior), development of a Lake Erie LAMP Forum website, "Green Marina" projects in Lake Michigan which reduce and eliminate toxic substances released from boats and marinas into Lake Michigan, and a plankton assessment of the St. Lawrence River.
5.9 By 2014, a statistically valid and comprehensive assessment, using a probability-based design, of Great Lakes water resources, will be established. The system will integrate shipboard monitoring, remote sensing, automated sampling, and other monitoring or observing efforts [Clause 1]. By 2016, the system will be in place for all of the Great Lakes and capable of providing a scientifically justifiable assessment of Great Lakes water resources [Clause 2].	Clause 1: Achieved Clause 2: On Track	GLRI has helped to establish a statistically valid and comprehensive assessment, using a probability-based design, of Great Lakes water resources. GLRI has enhanced previously existing monitoring efforts including GLNPO's long-term open lake water quality and biological monitoring programs and EPA's National Coastal Condition Assessment (see objective 3.6 explanation). These programs use a probability-based design to assess water quality and the biological health of the Great Lakes ecosystem. As part of a more comprehensive assessment, GLRI has also enhanced remote sensing, tributary monitoring, coastal wetland monitoring, and invasive species surveillance. The comprehensive monitoring and assessment efforts are currently being performed by federal agencies, state agencies and academia. Science-based ecosystem indicators continue to be a primary reporting mechanism. These efforts will continue to be improved and refined over time as the Science Annex of the Great Lakes Water Quality Agreement is implemented. For example, the Cooperative Science and Monitoring Initiative is a binational effort coordinated under the Agreement for an enhanced science program that addresses informational needs of environmental managers of each Great Lake, their connecting channels, and the international portion of the St. Lawrence River.

GLRI Action Plan I: Objectives (cont.)

Action Plan Objective	Status	Explanation / Status Summary
5.10 By 2014, timely data and information will be provided to decision makers at multiple scales within a framework of established baselines, targets, indicators of progress, and monitoring.	Achieved	To improve decision-making at multiple scales, the United States and Canada assess and report on the state of the Great Lakes ecosystem on a three year cycle using accepted science-based indicators to assess ecosystem status and trends against established baselines. The cycle is initiated by the two governments reporting on the overall health of the Great Lakes ecosystem and announcing draft priorities for scientific investigations and management actions. This occurs at the Great Lakes Public Forum, an open meeting that provides an opportunity for any organization or stakeholder to provide comment and recommendations. Advice from the International Joint Commission, an impartial binational oversight organization, is also considered during this time. Using this feedback, the two governments finalize and begin implementing priorities for scientific investigations and management actions. After two years of implementation, the two governments publicly report on the overall health of the Great Lakes ecosystem, progress toward accomplishing the established science and action priorities, and proposed updated draft priorities, thus beginning the three-year cycle anew. A more detailed Cooperative Science and Monitoring Initiative (CSMI) is implemented on a five year cycle for each individual Great Lake. CSMI is a binational, multi-agency undertaking to investigate the health of each lake during an intensive year of cooperative science and monitoring, rotating annually through each lake. Data collected result in an updated scientific understanding of the health of each Great Lake, determination of impairments and potential threats, and the identification of appropriate management actions. CSMI monitors pollutant presence, sources, loadings, impacts and trends in various media, as well as providing necessary data to assess compliance with specific environmental targets and objectives. The monitoring under CSMI is also necessary to support modeling and predictive techniques, and to assess the success of remedial or restorative measures. The results of CSMI are reported in binational Lakewide Action and Management Plans for each Great Lake. Implementation progress and ecosystem response is assessed again in five years, which restarts the five-year cycle.

APPENDIX C — GLRI ACTION PLAN I: LONG TERM GOALS

Action Plan Long Term Goal	Statement of Progress
1.1 Areas of Concern are cleaned up, restoring the areas and removing the beneficial use impairments.	During the first five years of the GLRI, federal agencies and their partners completed all of the management actions required to remove five Areas of Concern from the list of areas designated as the most contaminated sites on the Great Lakes by the 1987 Great Lakes Water Quality Agreement. The Presque Isle Bay Area of Concern was also delisted in 2013 — only the second delisting on the U.S. side of the border since Areas of Concern were designated pursuant to the 1987 Great Lakes Water Quality Agreement.
1.2 The release of toxic substances in toxic amounts is prevented and the release of any or all persistent toxic substances (PTS) to the Great Lakes basin ecosystem is virtually eliminated.	GLRI toxics activities are achieving substantial reductions in persistent toxic substances entering the Great Lakes. Activities include Illinois Indiana Sea Grant's work with local communities and lawn care professionals to reduce the use of pesticides and fertilizers; Minnesota Pollution Control Agency's work with local businesses and communities to reduce the use of PAH containing coal tar sealants; and Great Lakes States' implementation of mercury phase down projects, both in emissions as well as in products. Starting in 2013 the GLRI increased its focus on pollution reduction and has left pollution prevention activities to base EPA programs.
1.3 Exposure to toxic substances from historically contaminated sources is significantly reduced through source reduction and other exposure reduction methods.	Since the start of GLRI, over 7 million cubic yards of contaminated sediments in the Great Lakes (15% of the total) have been remediated. The contaminants in those sediments are no longer available to the environment, thus reducing exposure to toxic substances from this historically contaminated source.
1.4 Environmental levels of toxic chemicals are reduced to the point that all restrictions on the consumption of Great Lakes fish can be lifted.	GLRI funding is supporting EPA's work with the Great Lake States, Universities and the Great Lakes Sport Fish Consortium to protect the public, especially sensitive populations, from the exposure of potentially harmful contaminants in fish. GLRI-funded activities include: improvements to the quality of fish consumption guidelines; advancements to fish consumption messaging and outreach, specifically directing effort to high risk fish consuming populations; engagement of healthcare providers to facilitate dialogue with their patients regarding the risk and benefit of fish consumption; and utilization of contaminant biomonitoring in humans as a tool for influencing positive fish consumption behavior changes.
1.5 The health and integrity of wildlife populations and habitat are protected from adverse chemical and biological effects associated with the presence of toxic substances in the Great Lake Basin.	GLRI funding is supporting EPA, USGS, NOAA, USFWS and USACE in developing an early warning system to guard against threats to fish and wildlife from new and emerging chemical toxicants. A combination of chemical monitoring in various media and biota along with advanced biological measurements are making it possible to provide more sensitive indications of toxicant stress in the basin and to devise interventions in a timely fashion.
2.1 The introduction of new invasive species to the Great Lakes basin ecosystem is eliminated, reflecting a "zero tolerance policy" toward invasives.	GLRI-supported activities by federal Agencies and their partners have established and enhanced prevention, early detection, rapid response, and control activities in the Great Lakes ecosystem. While risks do remain, the extent of work is unprecedented in the history of Great Lakes invasive species management. Partner agencies responded to several detections, including red swamp crayfish in Wisconsin, grass carp in Michigan, Hydrilla in New York and eDNA for silver and bighead carp in the Chicago Area Waterway System. In the first five years of GLRI, there were no new invasive species formally established in the Great Lakes; however, Federal Agencies and their partners are concerned about evidence of Grass Carp reproduction in the Sandusky River basin in Ohio. Ongoing work continues to reflect a "zero tolerance policy" toward invasives.
2.2 The risk of introduction of species, which are imported for various uses, into the Great Lakes is minimized.	GLRI-supported activities by federal Agencies and their partners have significantly reduced the risk of both intentional and accidental introductions. Federal Agencies and their partners established the scientific tools for assessing risks of organisms in trade and screened over 2,000 species and identified species of high risk to the Great Lakes. In addition, partner agencies conducted multiple investigations of aquarium trade, bait trade, sales through internet commerce, as well as illegal possession and sale of invasive species. The information generated by this work supported the formal identification by the leadership of the Great Lakes Governors and the Premiers of Ontario and Québec of sixteen "least wanted" aquatic invasive species and an announcement of joint action to block these species.

GLRI Action Plan I: Long Term Goals (cont.)

Action Plan Long Term Goal	Statement of Progress
2.3 The spread of invasive species, by means of recreational activities, connecting waterways, and other vectors, beyond their current range is prevented.	GLRI-supported activities by federal agencies and their partners have reduce the spread of invasive species expanded outreach to resource users. The "Stop Aquatic Hitchhikers" outreach campaign, with its key message of "Clean, Drain, Dry," is now well-known among the recreational boating community. Partner agencies working together on the "Great Lakes and Mississippi River Interbasin Study" have identified potential connections between the Great Lakes and Mississippi River basins and have mobilized to reduce the risk of interbasin transfers. Federal Agencies and their partners have worked with the Great Lakes community to reduce behaviors and pathways that can move invasive species beyond their current range.
2.4 A comprehensive program for detection and tracking newly identified invasive species in the Great Lakes is developed and provides up-to-date critical information needed by decision makers for evaluating potential rapid response actions.	Supported by GLRI, federal agencies and their partners have initiated early detection programs in a number of regions of the Great Lakes and in 2014 conducted the first basinwide survey for Asian Carp. In addition, partner agencies have piloted several innovative techniques to detect organisms at low population levels, including statistical approaches and the development of eDNA monitoring tools. This work supported the U.S. government's successful negotiations with Canada for the development of a binational early detection network by 2015. In the first five years of GLRI, Federal Agencies and their partners have worked with expanded surveillance programs and are working to increase the effectiveness of surveillance methodologies.
2.5 An effective, efficient and environmentally sound program of integrated pest management for invasive species is developed and implemented, including program functions of containment, eradication, control and mitigation.	Federal agencies and their partners have begun the development of integrated management programs for invasive species, with a special focus on Asian Carps. The Asian Carp integrated program includes all aspects of containment, eradication, control, and mitigation. In addition, a "Great Lakes Phragmites Collaborative" was develop to improve professional communications on best management practices of invasive Phragmites. Development of containment and control techniques continues for other high-risk species. In the first five years of GLRI, Federal Agencies and their partners have expanded capabilities to mitigate the effects of invasive species through integrated management programs.
3.1 Nearshore aquatic communities consist of healthy, self-sustaining plant and animal populations dominated by native and naturalized species.	Since 2010, GLRI funds were used to improve nearshore water quality in many areas throughout the Great Lakes basin in order to support healthy, self-sustaining plant and animal populations dominated by native and naturalized species. The GLRI jump-started efforts to better understand and address nearshore eutrophication and contamination problems resulting from contaminant concentrations in the nearshore. GLRI agencies made progress through the following activities: • GLRI agencies invested in agricultural conservation practices in targeted agricultural watersheds that drain into areas of the Great Lakes experiencing the worst harmful algal bloom problems. Enhanced monitoring in these locations is validating the effectiveness of a targeted conservation approach, which can then be applied at larger scales to affect harmful algal bloom development over the long term. • GLRI agencies implemented watershed management activities, including green infrastructure, in urban and suburban areas that reduced contamination that forces the closure of Great Lakes beaches. • GLRI agencies supported improved determination of effective remedial actions by furthering the understanding of how nutrients and pollutants move through the watershed and interact with other stressors such as invasive species and climate change to exacerbate nearshore problems. The GLRI also advanced invasive species prevention and control, which will help ensure that nearshore aquatic communities are dominated by native and naturalized species, and reduced sources of pollution at Great Lakes beaches, including provision of critical habitat for wildlife (see also beach related goal statement 3.4).

GLRI Action Plan I: Long Term Goals (cont.)

Action Plan Long Term Goal	Statement of Progress
3.2 Land use, recreation and economic activities are managed to ensure that nearshore aquatic, wetland and upland habitats will sustain the health and function of natural communities.	GLRI funds were used to develop tools and approaches to guide sustainable management of land use, recreation and economic activities. Example activities include: • The GLRI responded to a large unmet need for nonpoint source control in the major agricultural landscapes across the Great Lakes basin and demonstrated the significant acceleration of activities that occurs following increased financial investment and landowner outreach. Funding supported more than a doubling of contracted acreage enrolled in agricultural conservation practices to reduce phosphorus runoff from select watersheds with receiving waters impacted by nuisance or harmful algal blooms. In 2012, GLRI agencies began prioritizing subwatersheds in the Lower Fox, Saginaw, and Maumee Rivers to accelerate conservation practices that reduce phosphorus losses, with enhanced monitoring to track progress. This approach increased cost efficiency of GLRI investments, accumulated lessons learned, and multiplied benefits to neighboring watersheds through education and communication. • GLRI partners encouraged innovative approaches to nutrient reduction. For example, GLRI partners engaged fertilizer application businesses in the Lake Erie Basin to better target nutrient application, which led to an average phosphorus application reduction of 21 pounds per acre while saving farmers $13–16 per acre in fertilizer costs. With GLRI support, the Great Lakes Commission, Wisconsin Department of Natural Resources, and the Natural Resources Conservation Service initiated an innovative water quality trading framework in the Lower Fox River watershed. Stakeholders will use this framework to investigate options for providing greater financial incentives for phosphorus reduction. • In order to measure phosphorus reductions achieved through implementation of conservation practices, the U.S. Geological Survey used GLRI funding to install eight new monitoring devices at the edge of farm fields to quantify phosphorus losses before and after implementation of agricultural conservation practices. The GLRI also initiated projects to synthesize available science and generate new information on the complex interaction that farm practices, nutrient loads, extreme weather events, hydrology, and federal/state regulatory policies have on Great Lakes water quality and harmful algal bloom development.
3.3 The presence of bacteria, viruses, pathogens, nuisance growths of plants or animals, objectionable taste or odors, or other risks to human health are reduced to levels in which water quality standards are met and beneficial uses attained to protect human use and enjoyment of the nearshore areas.	Since 2010, GLRI funded projects to reduce risks to human and ecological health by implementing projects to reduce runoff and associated inputs of nutrient, sediment, pathogen, and other pollutants to improve water quality in streams, embayments, and the nearshore areas of the Great Lakes. GLRI funding was used to implement watershed management practices that addressed nonpoint source pollution: restoration of river mouths and wetlands; re-vegetation and forestation; green infrastructure; development and implementation of Total Maximum Daily Loads for nutrients, sediments, and pathogens; integrated wildlife management along shorelines and other innovative actions and approaches. These practices typically involve efforts to retain water on the landscape, slow the flow of runoff, and filter out sediments, nutrients, pathogens, and other pollutants prior to reaching receiving waters.

GLRI Action Plan I: Long Term Goals (cont.)

Action Plan Long Term Goal	Statement of Progress
3.4 High quality bathing beach opportunities are maintained by eliminating impairments from bacterial, algal and chemical contamination; effective monitoring for pathogens; effective modeling of environmental conditions, where appropriate; and timely communications to the public about beach health and daily swimming conditions.	GLRI activities have helped maintain high quality bathing beach opportunities in the Great Lakes. GLRI agencies found sources of pollution and environmental factors that could contribute to increased unhealthy bacteria or viruses threats to public health. Actions included: • 356 out of 377 (94.6%) high priority Great Lakes beaches were assessed using a standardized sanitary survey tool to identify sources of contamination, beach characteristics, and possible management actions to improve beach health. At 59 of these beaches, measures have been implemented to control, manage or mitigate pollution sources using the sanitary survey tool, resulting in improved water quality and reduced beach closures. • GLRI partner agencies are developing rapid water quality assessment approaches and decision-making tools that provide timely and accurate information to beach managers and the public on daily swimming conditions and beach health. - Rapid testing or predictive modeling methods developed with GLRI funding are currently being employed at 92 high priority Great Lakes beaches. - The EPA Virtual Beach model was improved and widely distributed through training and agency support, allowing beach managers to create specific beach predictive models at multiple locations. - Web tools were created that allow beach managers easy access to relevant beach-related data from numerous agencies across the Great Lakes region (http://cida.usgs.gov/enddat/). The Great Lakes Beach Health Database was constructed to provide a common and flexible system to input, store and export beach water-quality and sanitary survey monitoring information. - GLRI partner agencies are evaluating and improving models to accurately and rapidly forecast E. coli levels in nearshore waters — ensuring that decision makers have appropriate information to protect beach goers when bacteria levels are elevated and avoid closing beaches unnecessarily. - Real-time information on beach water quality advisories, weather and water conditions are available on mobile phones for beaches in the eight Great Lake states via a free smartphone application (myBeachCast app http://glin.net/beachcast/) that provides convenient, public access to swim advisories and other environmental conditions information for 1,900 beaches in the Great Lakes region. - EPA and partner agencies provided numerous training opportunities for beach managers in the use of rapid methods and predictive modeling. • GLRI partner agencies improved the understanding of the factors influencing Great Lakes beach water quality. Agencies: - Initiated use of an experimental harmful algal bloom (HAB) bulletin (http://www.glerl.noaa.gov/res/projects/lake_erie_hab/lake_erie_hab.html) that provides a weekly forecast for Microcystis blooms in western Lake Erie. - Developed new sampling methods and analysis tools to understand pathogen sources and distribution at Great Lakes beaches and the relationship between fecal indicator bacteria and pathogens. - Enhanced microbial source tracking methods to support the identification of pollution sources and provide beach mangers with information to prioritize pollution mitigation. - Studied the effects of wave height and resuspension of sediments in the near shore to improve model predictions of beach water quality. - Increased public health capacity to monitor, coordinate resources, conduct outreach, and respond to waterborne diseases and HAB events in seven Great Lakes states.
3.5 A significant reduction in soil erosion and the loading of sediments, nutrients and pollutants into tributaries is achieved through greater implementation of practices that conserve soil and slow overland flow in agriculture, forestry and urban areas.	Since 2010, federal state, local, academic, and non-governmental partners implemented on-the-ground GLRI-funded projects to significantly reduce sediment, nutrient and pollutant runoff throughout the Great Lakes basin. Example successes from GLRI funding include: • A cumulative total of 1.36 million acres in the Great Lakes watershed were put into USDA conservation practices to reduce erosion, nutrients and/or pesticide loadings under Farm Bill programs. • GLRI Watershed Implementation grant projects accelerated nonpoint source pollution control and prevented more than 468,000 lbs of total phosphorous, 920,000 lbs of nitrogen, and 14,700 tons of sediment from entering the Great Lakes. • Soil erosion and sedimentation was prevented on over 30,000 acres through supplementing Great Lakes Basin Program for Soil Erosion and Sediment Control funding. • Shoreline Cities grants were issued to 16 cities to install rain gardens, bioswales, green roofs, porous pavement, greenways, constructed wetlands, stormwater tree trenches and other green infrastructure on public property. • Through the Restoration of Urban and Community Forests program, communities planted and maintained tree canopy cover (that will reduce storm water runoff and improve water quality) and plant vegetation (that sequesters toxic substances and restores green infrastructure to reduce storm-water runoff). Since 2010, 67 projects have been awarded to plant more than 71,247 trees. These trees are estimated to intercept more than 4.2 million gallons of stormwater annually for their first five years.

GLRI Action Plan I: Long Term Goals (cont.)

Action Plan Long Term Goal	Statement of Progress
3.6 High quality, timely and relevant information about the nearshore areas is readily available to assess progress and to inform enlightened decision making.	Because of the GLRI and other programs, more, high quality, timely and relevant information about the nearshore areas is readily available to assess progress and to inform enlightened decision making is available in 2014 than was available before GLRI. GLRI supported an enhancement, reporting on shallow embayments and harbors every 5 years, to the EPA Office of Water National Coastal Conditions Assessment. The enhancement supported the capacity of States to report comprehensively on their coastal water resources. The GLRI funded additional sampling, along National Park boundaries and 30 additional sites, for commonly consumed fish to be tested for pharmaceuticals and flame retardants. GLRI funding supported the development of additional nearshore Great Lakes information to assess the effectiveness of restoration activities. To inform enlightened decision-making, GLRI funding also supported the development new tools and information, on-line and in some cases via cell phone app, that provide timely and accurate information to coastal managers and the public on nearshore conditions.
4.1 Protection and restoration of Great Lakes aquatic and terrestrial habitats, including physical, chemical, and biological processes and ecosystem functions, maintain or improve the conditions of native fish and wildlife.	Since 2010, more than 875 habitat protection, restoration and enhancement projects throughout the Great Lakes basin have been initiated by GLRI agencies and implemented by federal state, local, academic, and non-governmental partners. These projects have protected, restored or enhanced more than 102,000 acres of wetlands and wetland-associated uplands and 48,000 acres of coastal, upland and island habitats. In addition, 513 barriers have been removed or bypassed in Great Lakes tributaries, enabling access by fish and other aquatic organisms to over 3,400 additional miles of river. In the selection and completion of these habitat restoration efforts, GLRI partners have emphasized restoring ecosystem resiliency by: reconnecting habitats through corridors to enhance biological diversity, reducing sediment and nutrient inputs, restoring natural hydrological processes, and improving water quality. Examples of projects include: • A project in the Watertown and Alexandria Bay, New York area of the St. Lawrence River has restored the hydrology and reconnected 110 acres of marsh ecosystem and fish spawning habitat to the benefit of a diversity of fish and wildlife species. • At the Indiana Dunes National Lakeshore in Northwest Indiana, more than 450 wetland acres including rare intradunal wetlands and the Great Marsh, the largest wetland complex associated with southern Lake Michigan, have been restored. • The 1,493-acre Bete Grise wetland complex, one of the highest quality dune and swale wetland systems remaining in the Upper Great Lakes located on Lake Superior's Keewenaw Peninsula, is now permanently protected and open to the public year round for non-invasive outdoor recreation, education, and scientific research. • In Milwaukee and Cleveland, aging traditional breakwall structures were replaced by irregular rocky structures that are providing habitat for walleyes, smallmouth bass, yellow perch and other wildlife. • A Riverwatch Academy was established in the Niagara River Watershed to train residents, teachers, students, professionals and community leaders in watershed management and restoration. Academy volunteers participated in restoring 3.5 miles of streambank and 35 acres along three degraded Niagara River tributaries: Buffalo River, Scajaquada Creek and Cayuga Creek. • More than 700 acres of important coastal and island habitats have been acquired through public-private collaboration, thus protecting Great Lakes ecologically unique habitats into perpetuity. An acquisition of 286 acres of privately owned property along the Lake Erie shoreline in Pennsylvania now connects to more than 3,600 acres of protected land that includes 136 acres of wetlands and 780 feet of shoreline. Land purchases such as this one will protect critically important habitat for migratory birds and other wildlife, including rare or endangered species. These areas are safeguarded from residential and commercial development, and many will provide public access for fishing and recreational opportunities.

GLRI Action Plan I: Long Term Goals (cont.)

Action Plan Long Term Goal	Statement of Progress
4.2 Critical management activities (such as stocking native fish and other aquatic species, restoring access of migratory fish species at fish passage barriers, and identifying and addressing diseases) protect and conserve important fish and wildlife populations.	In 2011, the Lake Erie Water Snake was removed from the Federal List of Endangered and Threatened Wildlife. The GLRI accelerated the species' recovery and has assured that conservation partners can keep the snake population healthy. The species is no longer endangered or threatened with extinction or likely to become so within the foreseeable future. Populations of native aquatic non-threatened and non-endangered species are showing progress as well. For example, fish passage and habitat improvement projects in the Saginaw River watershed have contributed significantly to the now self-sustaining walleye populations in Saginaw Bay, Michigan. GLRI partners installed a fish bypass structure to convey Lake Sturgeon downstream and around the lower dam near the mouth of the Menominee River in Marinette, Wisconsin and Menominee, Michigan. The long-term outcome of this project is the reconnection of 21 river miles for Lake Sturgeon passage between Lake Michigan and historic spawning and rearing habitats upstream. This restoration of connectivity for sturgeon is expected to increase the Lake Michigan lake sturgeon population from 3,000 adults to as many as 20,000 adults within 50 to 100 years. A water-control structure (opened in March 2011) restored hydrologic connection for the first time in nearly 40 years between a 99-acre diked coastal wetland and Crane Creek, a tributary to Lake Erie. This control structure allows exchange of water, fish, mussels, and other wildlife and provides a unique opportunity to quantify the response of reconnected wetlands through field sampling of fish, birds, invertebrates, plants, water quality, and water levels. Intense data collection by GLRI partners has led to an unprecedented look at the wetland ecosystem response to a large restoration action, implementation of adaptive management practices, and recognition of water-quality improvements associated with habitat restoration in the Maumee River Area of Concern. The reconnection has improved fish diversity and abundance in the restored wetland has increased dramatically since reconnection. Sixteen new fish species were found to be using the restored wetland.

GLRI Action Plan I: Long Term Goals (cont.)

Action Plan Long Term Goal	Statement of Progress
4.3 Sound decision making is facilitated by accessible, site specific and landscape-scale baseline status and trend information about fish and wildlife resources and their habitats.	Several examples illustrate how establishing baseline ecosystem status and trend data for Great Lakes habitats and species leads to sound decision making. GLRI partners initiated a comprehensive assessment of the quality and characteristics (invertebrates, plants, birds, amphibians, fish and water quality) of all 217,000 hectares of Great Lakes coastal wetlands. In addition to establishing baseline data, this project is evaluating wetlands before, during, and after restoration to establish trends and to help identify and refine best management practices to improve future restoration projects. GLRI partners have been conducting interdisciplinary studies of the St. Clair-Detroit River System fish populations and habitat to help resource managers determine where to add new reef and shoreline habitats as well as develop implementation priorities. The river system once provided spawning habitat for numerous sport and commercial fishes including Lake Whitefish, Lake Sturgeon, Walleye, and White Bass. The effects of invasive species and over-fishing have impaired the ability of the system to produce and support sustainable fish populations. Based on the studies, new reefs have been built and Lake Sturgeon immediately began to utilize them as spawning habitat. Scientists have learned that avian botulism is the main cause of bird mortality in northern Lake Michigan. Links between type-E botulism outbreaks, lake levels, and surface-water temperatures in Lake Michigan indicate that avian botulism outbreaks occur most frequently in years with low water levels and high surface-water temperatures. GLRI partners have developed a new method to detect the botulinum toxin which is faster and cheaper than the traditional method and is a major step forward in the study of botulism. Scientists are creating a food web "roadmap" for each Great Lake that details the feeding linkages between species. These maps are decision support tools that allow scientists to explore how impacts of environmental threats spread through each lake's ecosystem by way of connections between species. For example, USGS scientists are using food web maps to understand how spiny water fleas — an invasive zooplankton found in all the Great Lakes—and other invasive species affect native fish. Scientists are currently using the Lake Michigan map to study how native predators such as lake trout and prey fishes such as bloater are affected by invasions of species lower in the food web, such as zebra mussels, quagga mussels, spiny water fleas, and round gobies. In addition, this project is generating a geographically and seasonally extensive database of Great Lakes species and feeding relationships for all of the lakes. This information allows scientists to assess the current health of the Great Lakes, and it also serves as a valuable baseline from which future ecosystem changes can be monitored. Through the coordinated efforts of the Upper Midwest and Great Lakes Landscape Conservation Cooperative (LCC), federal, state and academic partners are working side-by-side to determine how projected warmer air temperatures and changes in precipitation in the coming century may impact fish habitat. Great Lakes aquatic resource managers are applying baseline data to various climate models to help prioritize on-the-ground conservation and restoration efforts while considering the potential impacts to fish and wildlife across the broader Great Lakes landscape. These analyses have helped target restoration actions and protection measures for aquatic resources.

GLRI Action Plan I: Long Term Goals (cont.)

Action Plan Long Term Goal	Statement of Progress
4.4 High priority actions identified in strategic plans (such as state and federal species management, restoration and recovery plans, Lakewide Management Plans, Remedial Action Plans, and others) are implemented, lead to the achievement of plan goals, and reduce the loss of fish and wildlife and their habitats.	At the federal, state/tribal, and local levels, plans provide roadmaps for reducing the loss of fish and wildlife and their habitats. GLRI has enabled implementation of plans and produced new plans as shown in the examples below. For the third year in a row (2012–2014), the federally endangered Great Lakes piping plover population has increased. The recovery plan calls for monitoring and research of populations to inform recovery efforts that include a captive rearing program, locating and protecting nests, putting up nest exclosures, and volunteer monitors alerting biologists of potential issues at nesting sites along Great Lakes beaches. Seventy breeding pairs produced over 1.5 chicks per pair in 2014 thereby meeting one of the most important recovery goals that should keep the plover population headed in the right direction. In addition, abandoned eggs and chicks were taken into captivity, reared by volunteer zookeepers from around the country, and released into the wild once able to fly. Many banded plovers are being sighted at their wintering grounds on the southern Atlantic and Gulf coasts of the United States. In accordance with Annex 7 of the Great Lakes Water Quality Agreement, Biodiversity Conservation Strategies have been developed for each Great Lake by Lakewide Management and Action Plan binational teams. These Strategies define a vision of biodiversity conservation for each lake, outline shared strategies for protecting and restoring critical biodiversity areas, describe the ways in which conservation strategies can benefit people by protecting and restoring important ecosystem services, and promote coordination of biodiversity conservation in the basin. Area of Concern remedial action plans contain numerous proposed actions to address habitat-related beneficial use impairments. The GLRI federal partners worked with states and local RAP groups to determine actions needed to remove habitat-related BUIs. Projects were then implemented. In the Sheboygan River AOC, for example, riparian restoration followed sediment remediation resulting in habitat-related BUI removal.
4.5 Development activities are planned and implemented in ways that are sensitive to environmental considerations and compatible with fish and wildlife and their habitats.	Resource management actions regarding fish and wildlife and their habitats have been implemented using an adaptive management approach. This structured approach emphasizes what management options are available to decision makers, what outcomes are desired, how much risk can be tolerated, and how best to choose among a set of alternative actions. As an example, federal partners have deployed mobile radar units across the basin to collect better information regarding shoreline migration corridors and stopover habitat utilization for birds and bats. This information has identified areas where renewable energy projects may be developed safely in a manner that is protective of aerial migrants in the Great Lakes. A series of maps have also been developed showing present and projected urban area growth for the year 2040. The "Projected 2040" map shows increases in urban and suburban growth. Lower Michigan, Northwest Indiana, Southeast Wisconsin and Northwest Ohio are prominent areas of change; however, northern rural parts of the Great Lakes basin show signs of growth as well. These northern rural areas are primarily forest, oak savanna, tallgrass prairie, and inland wetland habitats that provide important ecosystem services such as storing and exchanging nutrients and controlling erosion. The maps are providing important information to community planners. Information includes: • Baseline distributions and status of relevant physical, chemical and biological processes; • Habitats and populations at local, regional and basinwide scales; • Gap analyses that identify priority protection and restoration project needs; • Inventories and monitoring of project-level effectiveness; and • Monitoring of systems-level effectiveness that measures the collective project beneficial impacts.
5.1 A cooperative monitoring and observing system provides a comprehensive assessment of the Great Lakes ecosystem.	GLRI enhancements to previously existing monitoring programs (including GLNPO's long-term open lake water quality and biological monitoring programs) are supporting a more comprehensive assessment of the Great Lakes ecosystem. These programs use a probability-based design to assess water quality and the biological health of the Great Lakes ecosystem. GLRI has provided enhancements to activities such as remote sensing, tributary monitoring, coastal wetland monitoring, and invasive species surveillance. Federal agencies, state and tribal agencies, and academia contribute to the comprehensive Great Lakes monitoring and assessment, using science-based ecosystem indicators as a primary reporting mechanism. Additional improvements will result from implementation of the Science Annex of the Great Lakes Water Quality Agreement through mechanisms such as the Cooperative Science and Monitoring Initiative (a binational effort coordinated under the Agreement for an enhanced science program that addresses informational needs of environmental managers of each Great Lake, their connecting channels, and the international portion of the St. Lawrence River).

GLRI Action Plan I: Long Term Goals (cont.)

Action Plan Long Term Goal	Statement of Progress
5.2 The necessary technology and programmatic infrastructure supports monitoring and reporting, including Great Lakes Restoration Initiative project deliverables by all agencies and participating stakeholders. Data and information are provided in reports that are public friendly, timely and available on the Internet. Reports present integrated and scaled data from watersheds to lakes to Great Lakes basinwide.	GLRI has established and enhanced technology and programmatic infrastructure to support monitoring and reporting. EPA's Great Lakes Accountability System supplements EPA systems to collect key information regarding individual GLRI projects. EPA developed internet-based mechanisms to facilitate GLRI application and review processes and facilitate planning and collaboration for interagency projects. EPA also continues to improve the Great Lakes Environmental Database (GLENDA). GLENDA is the data management tool for many of the EPA Great Lakes National Program Office long-term monitoring programs including water chemistry, plankton, benthos, fish, and sediment. It provides data entry, storage, and public access. The USGS is working with the Great Lakes Observing System and other data-exchange efforts to make water-resources and biological information more readily accessible as a Great Lakes Basin dataset. This information includes streamflow, groundwater, and water-quality data, as well as online access to USGS reports written for part or all of the Great Lakes Basin. To improve decision-making at multiple scales, the United States and Canada assess and report on the state of the Great Lakes ecosystem on a three year cycle using accepted science-based indicators to assess ecosystem status and trends against established baselines. Examples include the State of the Great Lakes Reports at http://binational.net/2011/10/16/sogl-edgl-2011/
5.3 Increase outreach and education for the Great Lakes, and provide ongoing K-12 education for students to understand the benefits and ecosystem functions of the Great Lakes so they are able to make decisions to ensure that restoration investments are enhanced over time.	GLRI supported efforts are promoting Great Lakes-based environmental education and stewardship. Under the GLRI Action Plan I, more than 1,500 educational institutions incorporated new or existing Great Lakes protection and stewardship criteria into their broader environment education curricula. The Center for Great Lakes Literacy (CGLL) was established by the Great Lakes Sea Grant Network to develop a community of Great Lakes-literate educators, students, scientists, environmental professionals and citizen volunteers dedicated to improved Great Lakes stewardship. See statement of progress under Objective 5.7 for more details.
5.4 Expand the range of opportunities for Great Lakes stakeholders and citizens to provide input to the governments and participate in Great Lakes issues and concerns.	EPA established the Great Lakes Advisory Board (GLAB). The GLAB provides advice and recommendations to the EPA Administrator, who serves as chair of the federal Interagency Task Force. The federal agencies considered candidates from a broad range of interests including business, agriculture, foundations, environmental justice groups, education organizations, environmental groups, academia and state, local and tribal representatives. EPA hosts an interagency GLRI website (glri.us) to provide information to the public on GLRI. The GLRI also had a presence on Twitter, Facebook and Youtube through content produced by each agency to continue the conversation on Great Lakes Issues and encourages the use of hashtag #GLRI. The Great Lakes Interagency Task Force has interacted with questions from the public by Twitter and Facebook since the first Great Lakes Week in 2011. Other agencies, such as USGS and USFWS, produce videos related to GLRI on their Midwest regional social media sites. Opportunities for Great Lakes stakeholders and citizens to provide input to the governments and participate in Great Lakes issues and concerns has also been enhanced through the updated Great Lakes Water Quality Agreement (see goal 5.5), including the Annex Subcommittees, the Great Lakes Public Forum, and International Joint Commission input.
5.5 Work under the goals and objectives of the Great Lakes Water Quality Agreement is coordinated between the U.S. and Canada through Lakewide Management Plans (LaMP) and other binational processes, programs, and plans.	On Sept. 7, 2012, Canada and the United States amended the Great Lakes Water Quality Agreement (Agreement). The updated Agreement facilitates United States and Canadian action on threats to Great Lakes water quality and includes measures to prevent ecological harm. New provisions address the nearshore environment, aquatic invasive species, habitat degradation and the effects of climate change. It also supports continued work on existing threats to people's health and the environment in the Great Lakes basin such as harmful algae, toxic chemicals and discharges from vessels. Both governments sought extensive input from stakeholders before and throughout the negotiation process, which started in 2009. Additionally, the revised Agreement expands opportunities for public participation in Great Lakes issues. Lakewide Action and Management Plans (LAMPs) continue to serve a critical role in protecting and restoring the Great Lakes ecosystem.