

Sediment Remediation and Habitat Restoration in Great Lakes Areas of Concern

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U.S. Environmental Protection Agency

Great Lakes National Program Office

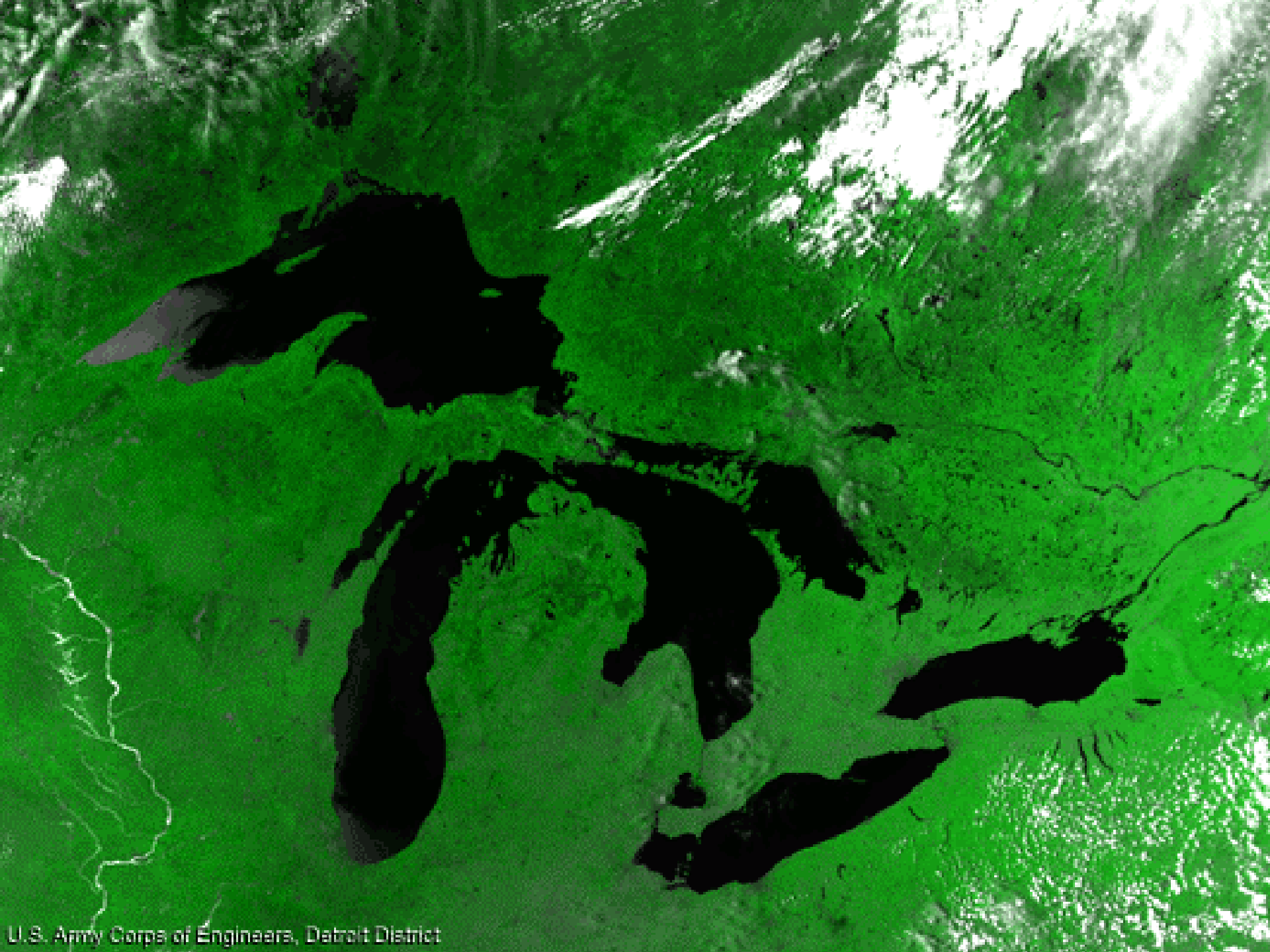
July 31, 2013

NCER 2013

Great Lakes
RESTORATION



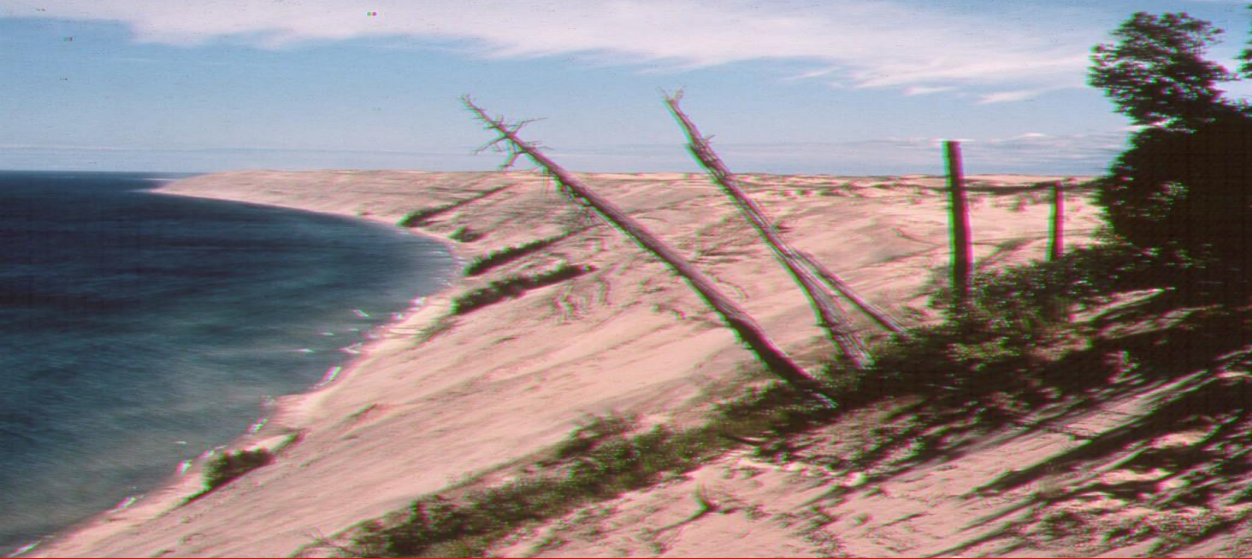
"We're committed to creating a new standard of care that will leave the Great Lakes better for the next generation."



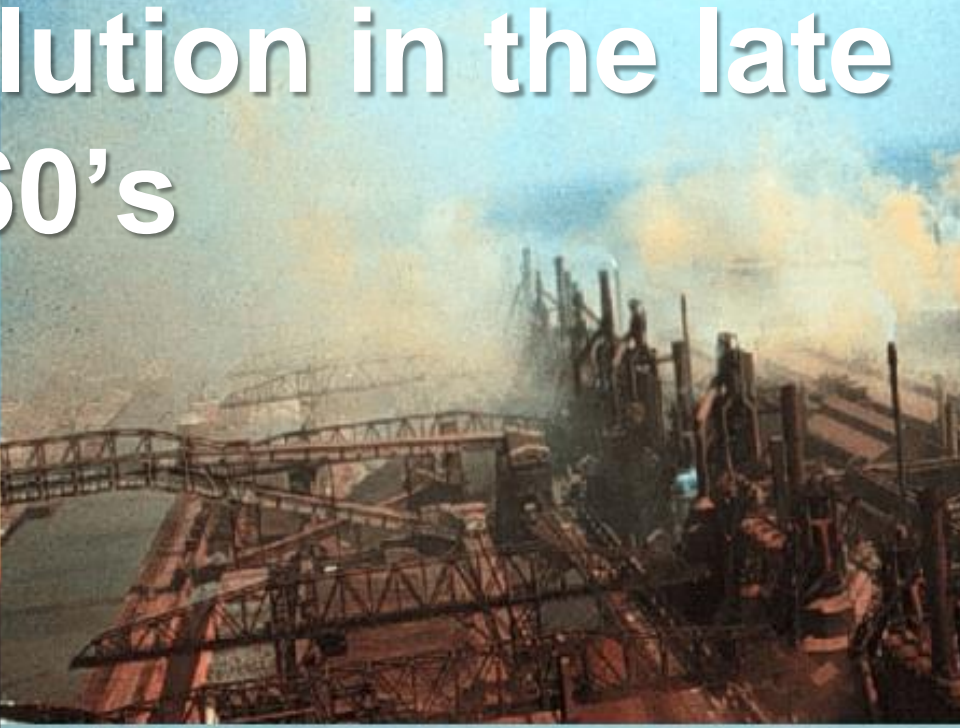








Great Lakes Pollution in the late 1960's





Great Lakes National Program Office

- EPA's first geographically-based program office.
- Established in 1978 to oversee U.S. efforts to implement Great Lakes Water Quality Agreement with Canada.
- EPA's focal point for Great Lakes coordination and information.
- Coordinates within EPA and with other federal and state agencies' Great Lakes ecosystem protection and restoration efforts.
- Implements Great Lakes monitoring program.
- Provides grants for innovative projects.
- Implements contaminated sediment cleanups under Legacy Act authority and funding.
- Implements the Great Lakes Restoration Initiative



TREATY BETWEEN THE UNITED STATES AND GREAT BRITAIN RELATING TO BOUNDARY WATERS, AND QUESTIONS ARISING BETWEEN THE UNITED STATES AND CANADA

ARTICLE IV

“It is further agreed that the waters herein defined as boundary waters and waters flowing across the boundary shall not be polluted on either side to the injury of health or property on the other.”



Signing the Great Lakes Water Quality Agreement of 1972



GREAT LAKES WATER QUALITY AGREEMENT GOAL

- **The Great Lakes Water Quality Agreement (GLWQA) is an agreement between Canada and the United States which commits the two countries to restore and maintain the chemical, physical and biological integrity of the waters of the Great Lakes Basin Ecosystem.**



Agreement Review and Negotiation



- **2005 to 2007: Review of 1987 Agreement**
- **June 2009: Announcement of Negotiations**

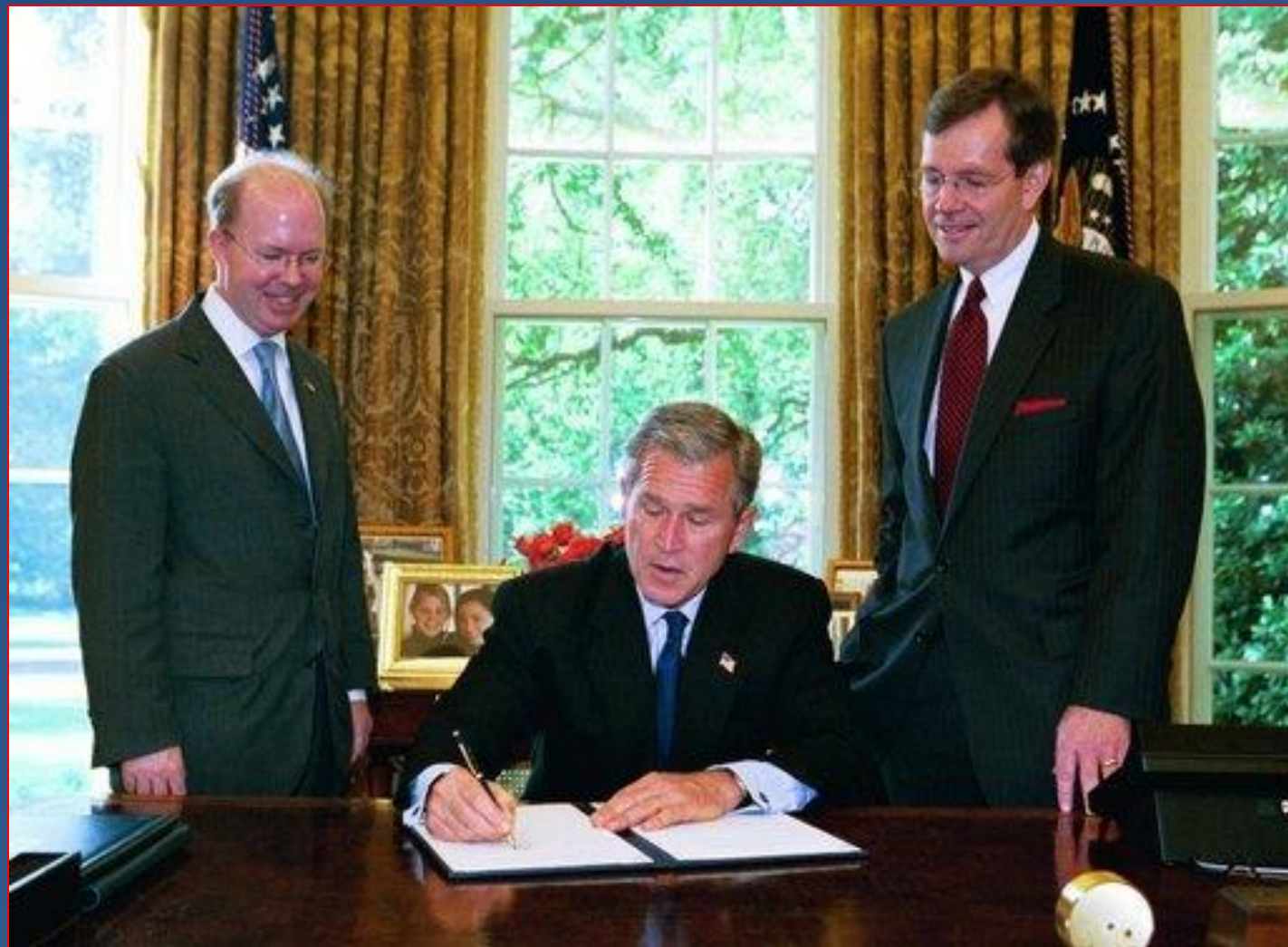


Signing of Amended Agreement

September 7, 2012



Executive Order 13340



Great Lakes Regional Collaboration Strategy



To Restore and Protect the Great Lakes



December 2005



GLRC 



Great Lakes Restoration Initiative (GLRI)

- FY2010: \$475 million
- FY2011: \$300 million
- FY 2012 \$300 million
- FY2013 \$284 million

FY2010 – FY2014

Great Lakes Restoration Initiative Action Plan



February 21, 2010

White House Council on Environmental Quality
U.S. Department of Agriculture
U.S. Department of Commerce
U.S. Department of Health and Human Services
U.S. Department of Homeland Security
U.S. Department of Housing and Urban Development
U.S. Department of State
U.S. Department of the Army
U.S. Department of the Interior
U.S. Department of Transportation
U.S. Environmental Protection Agency

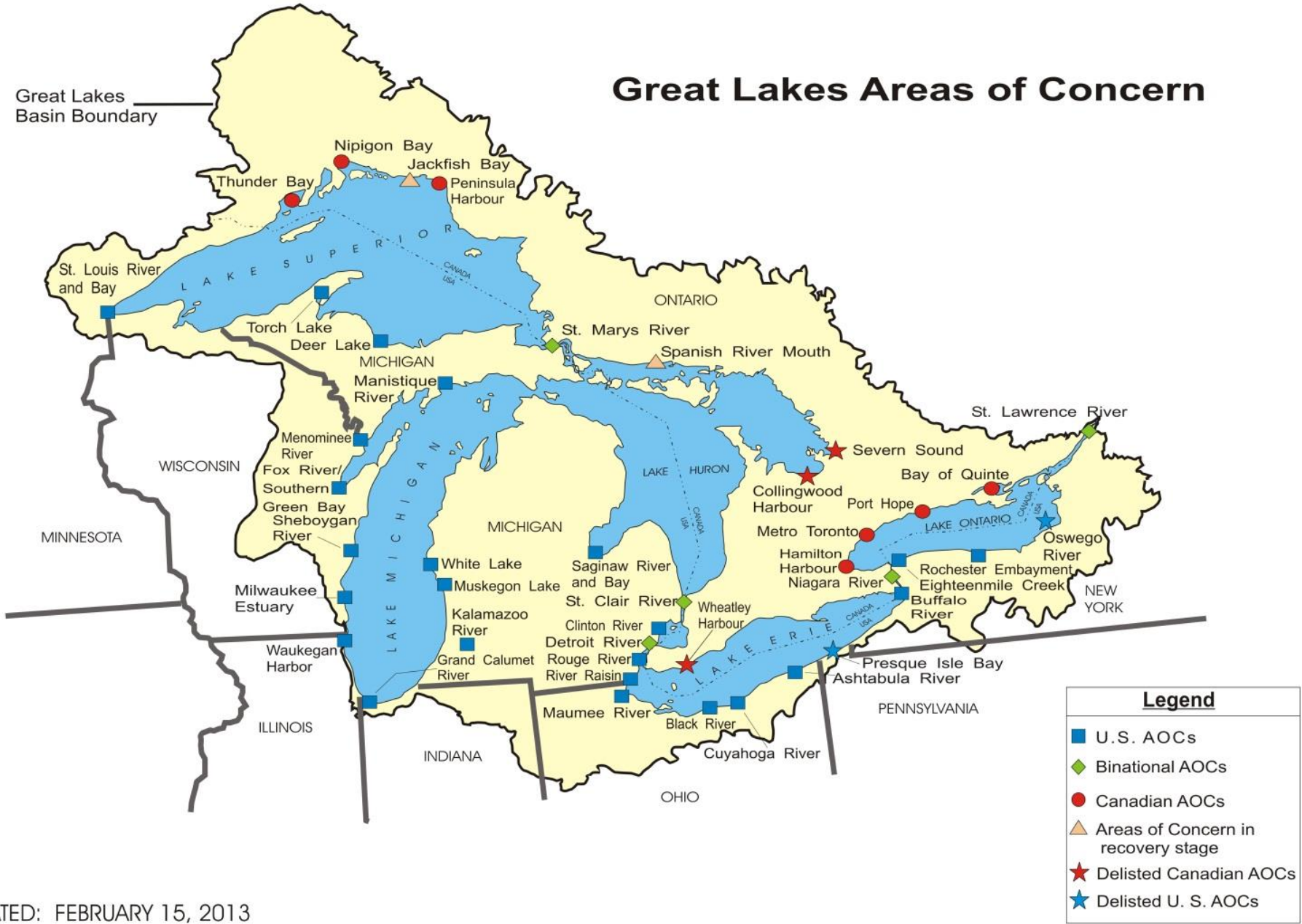


AOCs -40 years of History

- 1973 – IJC Water Quality Board (WQB) annually identified specific areas with serious water pollution problems
- 1974 – the IJC WQB identified 69 sites termed “problem areas”
- 1978 - two categories for problem areas: A = severe impairments, B = may be impaired, noting potential transboundary implications
- 1981 – WQB reported to the IJC Commissioners on “problem areas”
- 1985 - IJC WQB Report, up to 42 problem areas in the U.S. and Canada were categorized by the jurisdictions, and RAPs were to be prepared by the end of 1986
- 1987 - Protocol to the GLWQA formalized the establishment of RAPs for Areas of Concern. Restoration of “beneficial uses” within the AOCs was stated as the primary mission of RAPs (Annex 2 focused on AOCs)
- 2012 - Canada-United States Great Lakes Water Quality Agreement revised (Annex 1 focuses on AOCs)



Great Lakes Areas of Concern



Legend	
■	U.S. AOCs
◆	Binational AOCs
●	Canadian AOCs
▲	Areas of Concern in recovery stage
★	Delisted Canadian AOCs
★	Delisted U.S. AOCs

UPDATED: FEBRUARY 15, 2013



Beneficial Use Impairments

- Restrictions on Fish and Wildlife Consumption
- Tainting of Fish and Wildlife Flavor
- Degraded Fish and Wildlife Populations
- Fish Tumors or Other Deformities
- Bird or Animal Deformities or Reproductive Problems
- Degradation of Benthos
- Restrictions on Dredging Activities
- Eutrophication or Undesirable Algae
- Restrictions on Drinking Water Consumption or Taste and Odor Problems
- Beach Closings
- Degradation of Aesthetics
- Added Costs to Agriculture or Industry
- Degradation of Phytoplankton and Zooplankton Populations
- Loss of Fish and Wildlife Habitat



Tools to Address Problems

- Base Programs of state and federal agencies
- Legacy Act
- GLRI
 - EPA Programs
 - Other Federal Agency Programs



Great Lakes Legacy Act

- ⇒ **Goal**: Accelerate the pace of sediment remediation at Areas of Concern (AOCs)
- ⇒ **Mechanism**: Use partnerships as an innovative approach to conducting sediment remediation
- ⇒ **Minimum** 35% Non-Federal match required



GLLA Appropriations

\$10 M appropriated in FY2004

\$22 M in FY 2005

\$29 M in FY 2006

\$30 M in FY 2007

\$35 M in FY 2008

\$37M in FY 2009

FY 2010 as part of GLRI \$16M

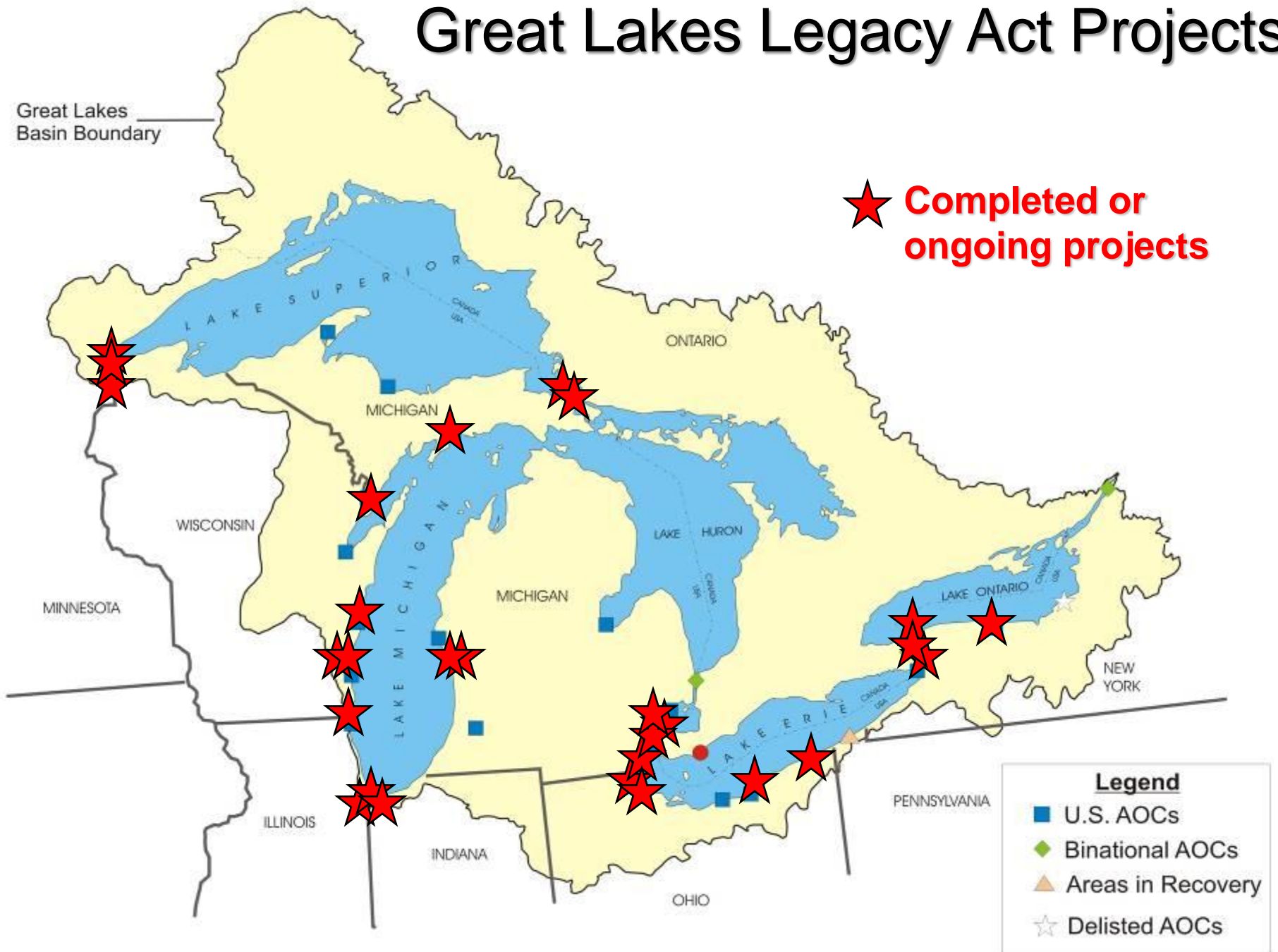
FY 2011 as part of GLRI \$50M

FY 2012 as part of GLRI \$50M

FY 2013 as part of GLRI \$50M



Great Lakes Legacy Act Projects



R/V Mudpuppy II



GLLA Remediation Projects

15 Projects Completed:

- ✓ Black Lagoon – Trenton, MI
- ✓ Hog Island Inlet & Newton Creek – Superior, WI
- ✓ Ruddiman Creek & Pond – Muskegon, MI
- ✓ St. Marys River – Tannery Bay – Sault Ste Marie, MI
- ✓ St. Marys River – MGP Site, Phase 1 & 2 – Sault Ste Marie, MI
- ✓ Ashtabula River – Ashtabula, OH
- ✓ Kinnickinnic River – Milwaukee, WI
- ✓ St. Louis River SLRDT site – Duluth, MN
- ✓ Ottawa River – Toledo, OH
- ✓ Grand Calumet River – West Branch Reaches 3,4,5 – Hammond, IN
- ✓ Grand Calumet River – Roxana Marsh - Hammond and East Chicago, IN
- ✓ Lincoln Park Phase 1 – Milwaukee, WI
- ✓ Division Street Outfall – Muskegon, MI
- ✓ Sheboygan River – Sheboygan, WI
- ✓ River Raisin – Monroe, MI



Industries (35) Involved in Voluntary GLLA Projects

- ◆ DuPont Co.
- ◆ GenCorp Inc.
- ◆ Honeywell International Inc.
- ◆ Illinois Tool Works, Inc.
- ◆ United Technologies
- ◆ Allied Waste Industries, Inc.
- ◆ Phelps Dodge (Now Freeport-McMoRan)
- ◆ Cabot Corp
- ◆ Detrex Corp
- ◆ XIK Corp
- ◆ Consumers Energy
- ◆ Varta Microbattery, Inc.
- ◆ The Mosaic Co.
- ◆ BP-Husky Refining
- ◆ BASF Corp.
- ◆ Arkema Corp
- ◆ Wisconsin Public Service
- ◆ PRS
- ◆ Cleveland Illuminating Co.
- ◆ Mallinckrodt Inc
- ◆ Millennium Inorganic Chemicals
- ◆ Ohio Power
- ◆ Olin Corp
- ◆ Occidental Chemical
- ◆ RMI Titanium Co
- ◆ Sherwin Williams
- ◆ Union Carbide
- ◆ CBS Operations (Viacom Intl)
- ◆ Elkem Metals
- ◆ Perstorp Polyols, Inc.
- ◆ Chevron USA
- ◆ Sunoco, Inc
- ◆ Pilkington North America
- ◆ U.S. Steel
- ◆ Ford



West Branch Grand Calumet River Roxana Marsh

- Non-Federal partners:
 - Indiana Dept. of Environmental Management
 - Indiana Dept. of Natural Resources
- Project Cost: \$52 M
- Source of Match: Natural Resource Damage (NRD) Settlement money
 - \$18.2 M – non-federal funds
 - \$33.8 M – federal funds (GLLA)
- 598,000 cubic yards remediated
 - 232,000 cy excavated
 - 366,000 cy sequestered
- Approximately 25 acres of Marsh restored





“Grand Calumet” dredge

06.27.2011 13:37





“Fox River” dredge in Wetland





10.06 2011 11:23





Roxana Marsh Restoration

- Restore approximately 25 acres of marsh
- Increase habitat diversity, targeting wading birds and migrating waterfowl
 - Reshape marsh (center pond, mudflats, emergent vegetation)
 - Use native emergent and submerged plant species
- Long-term maintenance: Indiana DNR – invasive species



Photo credits: USFWS.gov



Marsh Excavation



11.16.2011 15:14

May, 2012



October 6, 2011



10.06.2011 11:21

February 20, 2012



September, 2012

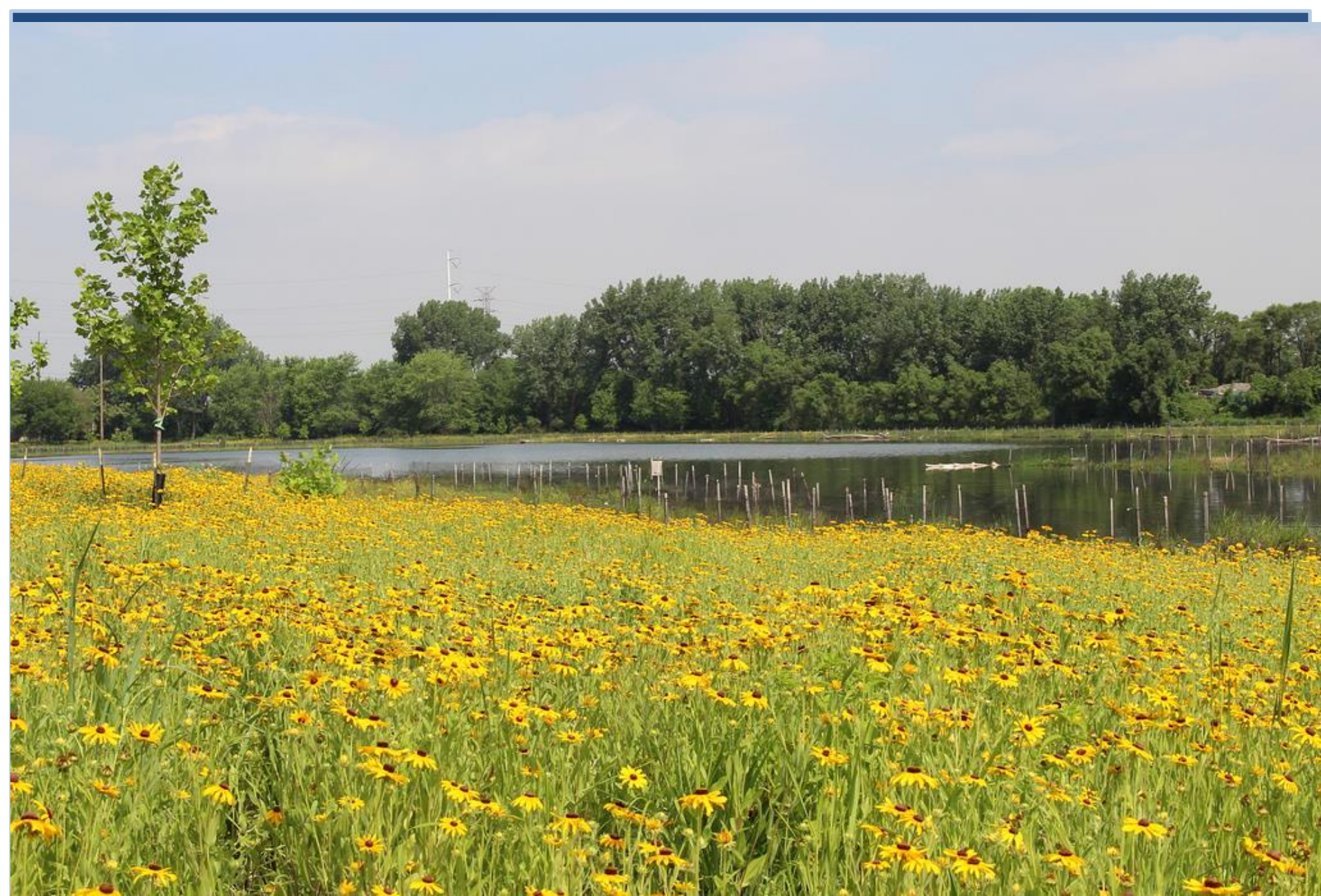


June, 2012



June, 2013

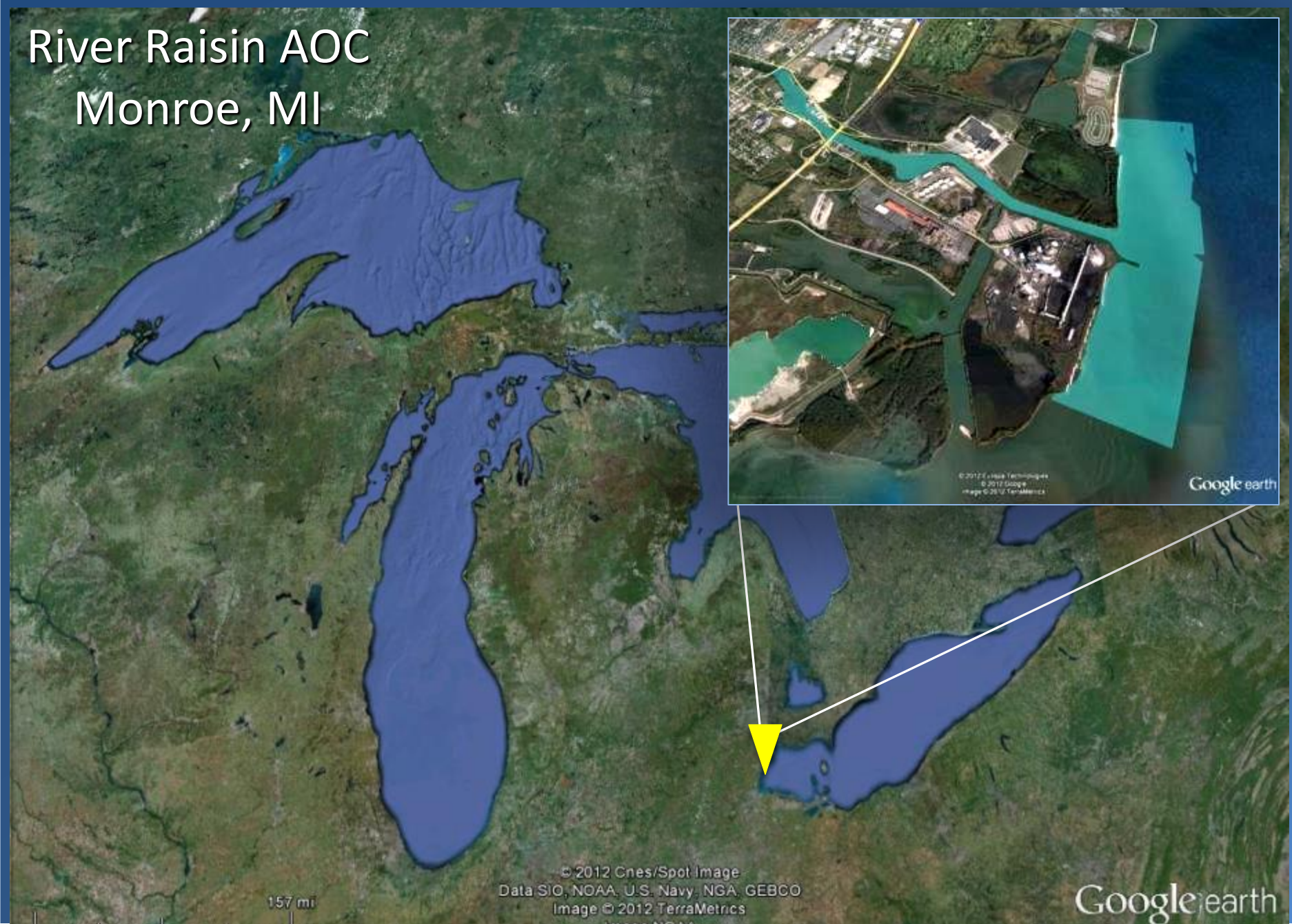




July, 2013



River Raisin AOC Monroe, MI



River Raisin Costs and Project Partners

- **Total Cost: \$17.3 M**
- **GLLA: 65% / Non-Federal partners: 35%**
- **Non-Federal Sponsor: *State of Michigan***
- **75,000 cubic yards PCB sediments remediated**
 - 72,000 cy non-TSCA in CDF
 - 3,000 cy TSCA in TSCA licensed landfill



Summary

- Up to 9,600 ppm PCBs in surface layers
- Maximum concentration of 24,000 ppm
- Approximately 12,000 to 15,000 CY impacted
- Approximately 1.3 acres impacted
 - 0.6 acres heavily impacted
- Contamination is Primarily in Weathered Bedrock Layer
- Area of Impact Extends into adjacent Federal Navigation Channel



River Raisin Habitat Projects

Fish Passage
Phases 1 and 2

Marsh and Prairie
Restoration Project

Wetland
Enhancement Project

Sterling Island
Habitat Restoration

Image © 2012 TerraMetrics
© 2012 Google

Image NOAA

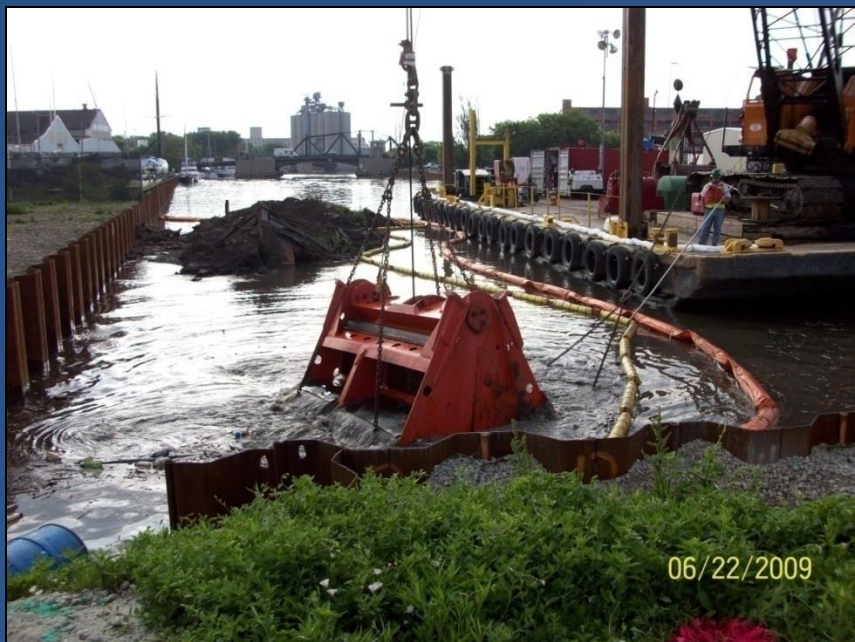
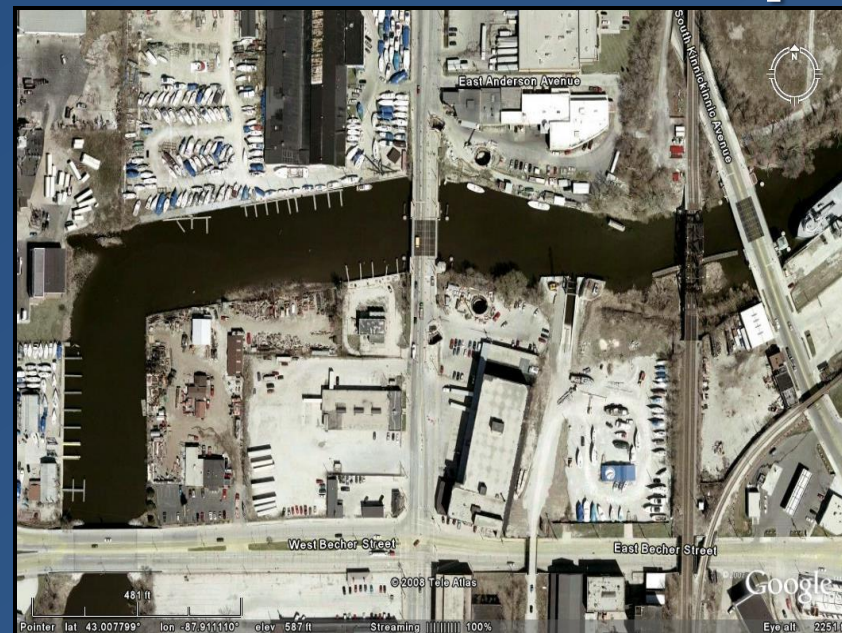
Google earth

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Kinnickinnic River Sediment Cleanup

- Great Lakes Legacy Act
- \$22 million sediment cleanup
- Wisconsin Dept. of Natural Resources
- Urbanized part of Milwaukee
- Dredging completed in 2009



- Removal of contamination
 - Dredging and disposal of 167,000 cy of sediment
 - PCB / PAH contamination
- Restoration of full navigation depths
- Stabilized Shoreline



Aerial Map of Project Area



After Sediment Cleanup

- Removal of Stigma of Contamination
- Fully Restored Navigation
- Upgraded Shoreline Infrastructure
- Aesthetic Improvement
- Redevelopment potential

09/25/2009

Community involvement & support critical to project success

Before projects:

- Communities help bring projects to GLNPO
- Public information/feedback meetings

During and after projects:

- Press events, news releases, public meetings, newsletters, presentations, awards
- Collect info on site uses, restoration, recovery, economics

Muskegon Chronicle
MAY 18, 2006 • MUSKEGON, MICHIGAN • 22 PAGES • 50 CENTS

A cleaned-up dream come true

Ceremony to mark end of biggest job at Ruddiman Creek

By Jeff Alexander
FRONT PAGE STAFF WRITER

The first time Theresa Bernhardt suggested Muskegon residents campaign for a cleanup of Ruddiman Creek she said a neighbor dismissed the idea as a "pipe dream."

That was nearly a decade ago.

Today, Bernhardt will join a group of local residents, scientists and politicians who will celebrate a dream come true.

Government contractors have finished dredging 29,830 cubic yards of contaminated bottom sediment from Ruddiman Creek and Lagoon. The sediment removal was the centerpiece of the \$133-million creek cleanup and restoration project.

"This shows that a small group of people can accomplish big things," said Bernhardt, who chairs the Ruddiman Creek Task Force.

"This project is so much more for our community than getting rid of some contaminated sediments in Ruddiman Creek," she said. "It's like a stepping stone — this could be the foundation for other projects to restore the beauty of the community to what it was before mankind took advantage of nature's ecologicalization."

The project was the first sediment cleanup funded by the U.S. Environmental Protection Agency's Great Lakes Legacy Act program. The EPA contributed \$60 million toward the Ruddiman Creek cleanup. The Michigan Department of Environmental Quality paid the other \$47 million.

Government contractors are still removing cleanup equipment and planting vegetation in areas hit hard during the project.

The project will end on schedule around June 1, but will come in nearly \$2 million over budget. The only work remaining is planting vegetation along the creek banks and placing a layer of sand on the bottom of Ruddiman Lagoon.

The project's cost soared because contractors had to dredge more contaminated sediment than originally estimated to meet the project's cleanup criteria, said Marc Tuchman, manager of the U.S. Environmental Protection Agency's Great Lakes Legacy Program.

"We feel like we've done a pretty good job; we've cleaned up the bad mud on the bottom, and restored the creek's meandering channel near Barclay Street."

■ **Cost:** \$135 million, nearly \$2.9 million over budget.

■ **Achievements:** Removed 29,830 cubic yards of contaminated bottom sediment from creek and lagoon; placed a one-foot-thick layer of clean sand and stones on the bottom; and restored the creek's meandering channel near Barclay Street.

■ **Checks, please:** The U.S. Environmental Protection Agency contributed \$60 million toward the project, the Michigan Department of Environmental Quality paid the other \$47 million.

■ **Signs of change:** Salmon, great blue heron and other plants have returned to the restored creek.

■ **What's next:** Finding and eliminating the sources of ongoing habitat pollution that often make the creek unsafe for swimming or drinking.



Geoil Gowin secures one of five 60-inch concrete pipes Thursday before it is removed from Ruddiman Creek. The pipes were put in to allow a continued flow of water during the 10 months of construction and cleanup.

Construction photo - Amanda Prusky



Theresa Bernhardt, who began her crusade to help clean up Ruddiman Creek in 1995, said, "This shows that a small group of people can accomplish big things."

File photo - The Chronicle



Adam Beggs cleans concrete blocks that had been used to line the banks of the Ruddiman cleanup site. The blocks will be used again in other projects.

Construction photo - James Peck

Please see RUDDIMAN 4A ▶





A satellite-style map of the Great Lakes region in North America, showing the five Great Lakes (Superior, Michigan, Huron, Erie, and Ontario) and the surrounding landmasses. The text is overlaid on the map.

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