

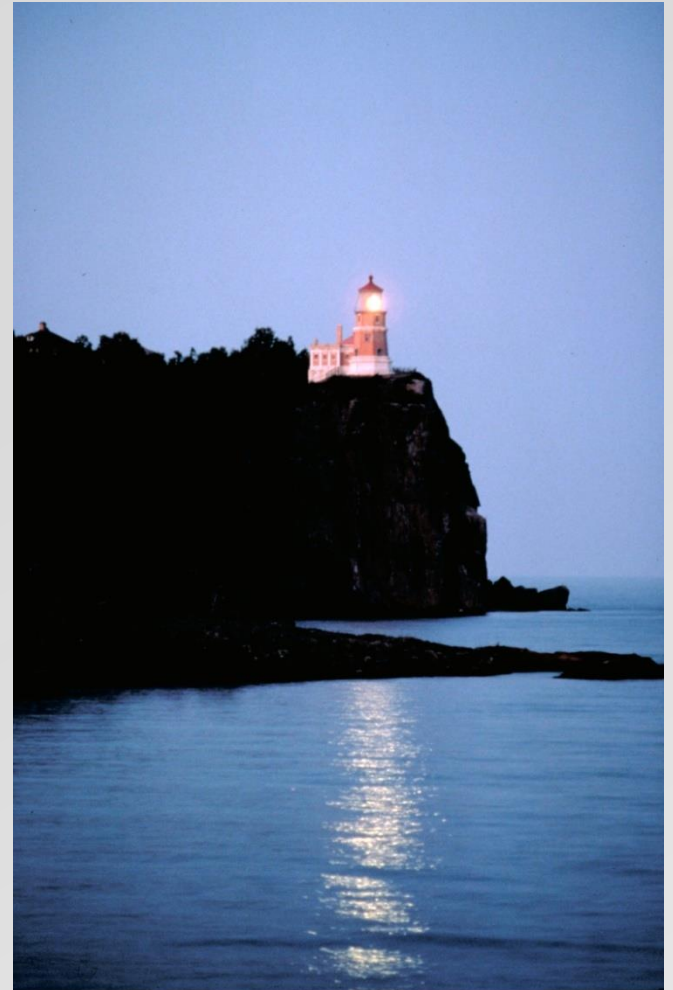
A light blue map of the Great Lakes basin is centered on a dark blue background. The map shows the outlines of the five Great Lakes (Superior, Michigan, Huron, Erie, and Ontario) and the surrounding landmasses in a light tan color. The text is overlaid on this map.

Working under the Updated Agreement: The Great Lakes Restoration Initiative

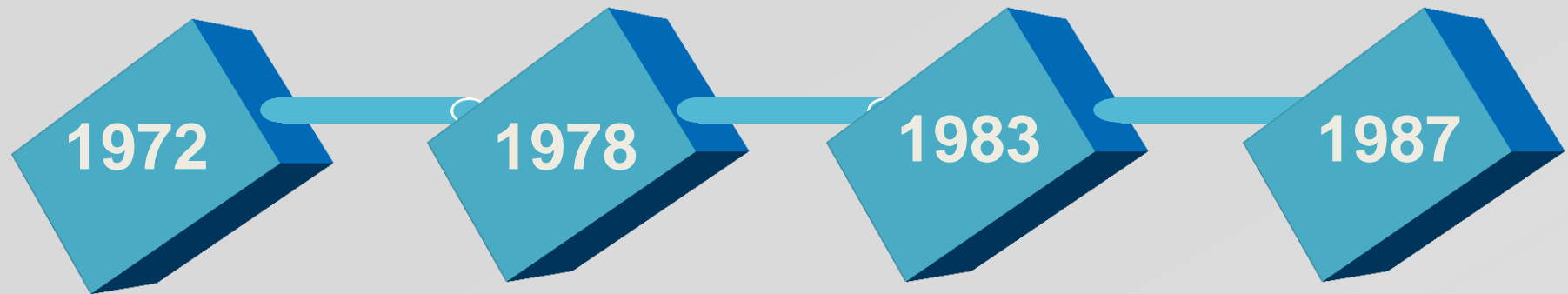
National Conference on Ecosystem Restoration
July 31, 2013

The Great Lakes Water Quality Agreement

1972: “...to restore and maintain the chemical, physical and biological integrity of the waters of the Great Lakes Basin Ecosystem.”



Evolution of the Great Lakes Water Quality Agreement



Reduce Phosphorus Loading

Reduction of visible pollution

Persistent Toxic Substances

Ecosystem approach to management

(Phosphorus Supplement)

Updated phosphorus reduction targets

Remedial Action Plans for Areas of Concern

Lakewide Management Plans



Evolution of the Great Lakes Water Quality Agreement

June 13, 2009
U.S., Canada agree to update
GLWQA in face of new challenges



September 7, 2012
Amended GLWQA signed



GLWQA Annexes

1. Areas of Concern
2. Lakewide Management
3. Chemicals of Mutual Concern
- 4. Nutrients**
5. Discharges from Vessels
6. Aquatic Invasive Species
7. Habitat and Species
8. Groundwater
9. Climate Change Impacts
10. Science

Protecting cherished water bodies like the Great Lakes is not only about environmental conservation. It's also about protecting the health of the families--and the economies--of the local communities that depend on those water bodies for so much, every day.

Lisa P. Jackson, US EPA Administrator



Subcommittee Organization

Annex 4

Diane Johnston, EC, Co-Chair

Tinka Hyde, US EPA, Co-Chair

Agricultural
Programs

Urban and Rural
Municipal Programs

Objectives
Development



Annex 4 Commitments

- Establish binational phosphorus objectives, loading targets and allocations for the open waters and nearshore areas of each lake

Retain open water concentrations and use loads from 1983 GLWQA on an interim basis until loading targets are updated



Interim Total Phosphorus Concentrations in Open Waters

Lake Basin	TP (ug/L)* Spring means	Lake Ecosystem Objectives for Trophic State
Superior	5	Oligotrophic
Michigan	7	Oligotrophic
Huron	5	Oligotrophic
Saginaw Bay	15	Mesotrophic
Erie Western Basin	15	Mesotrophic
Erie Central Basin	10	Mesotrophic
Erie Eastern Basin	10	Oligotrophic
Ontario	10	Oligotrophic



1978 Agreement Goals for Phosphorus Control

- Lakes Superior and Huron
 - “maintenance of the oligotrophic state and relative algal biomass”
- Lake Michigan
 - “substantial elimination of algal nuisance growths; restoration to oligotrophic state”
- Lakes Erie and Ontario
 - “(substantial) reduction in present levels of algal biomass to below that of a nuisance condition”
- Central Lake Erie Basin
 - “restoration of year-round aerobic conditions in the bottom waters of the Central Basin of Lake Erie”

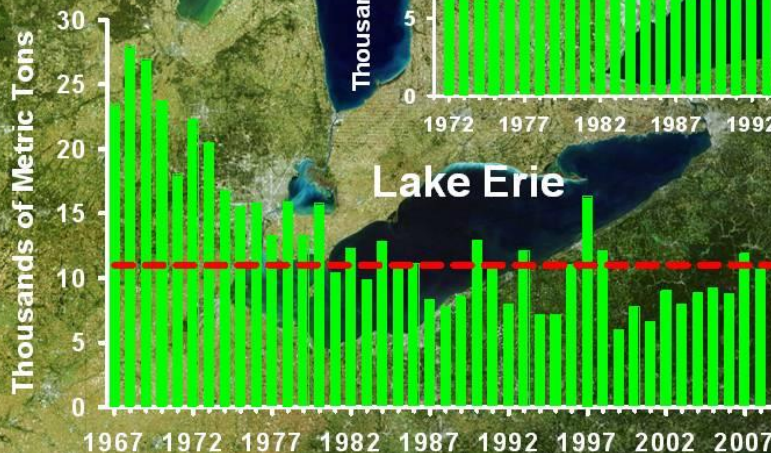
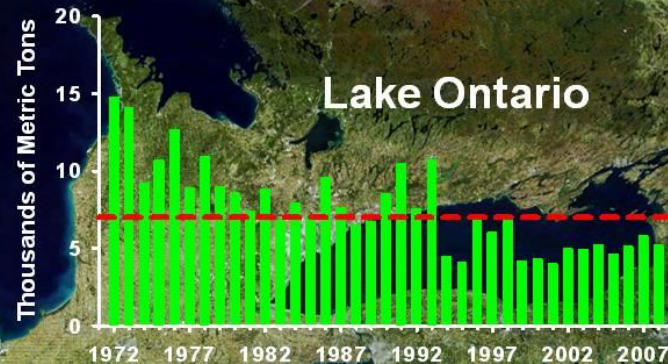
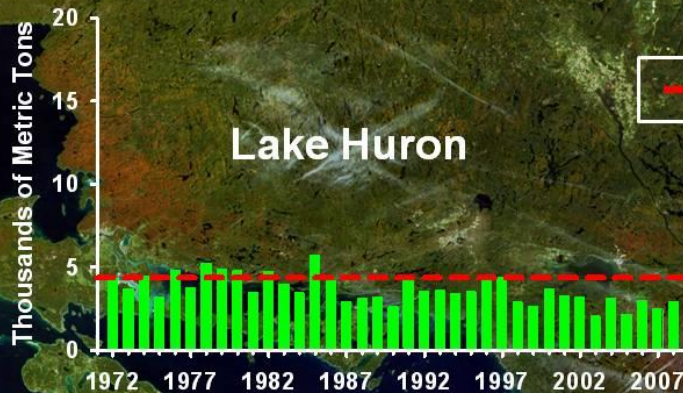


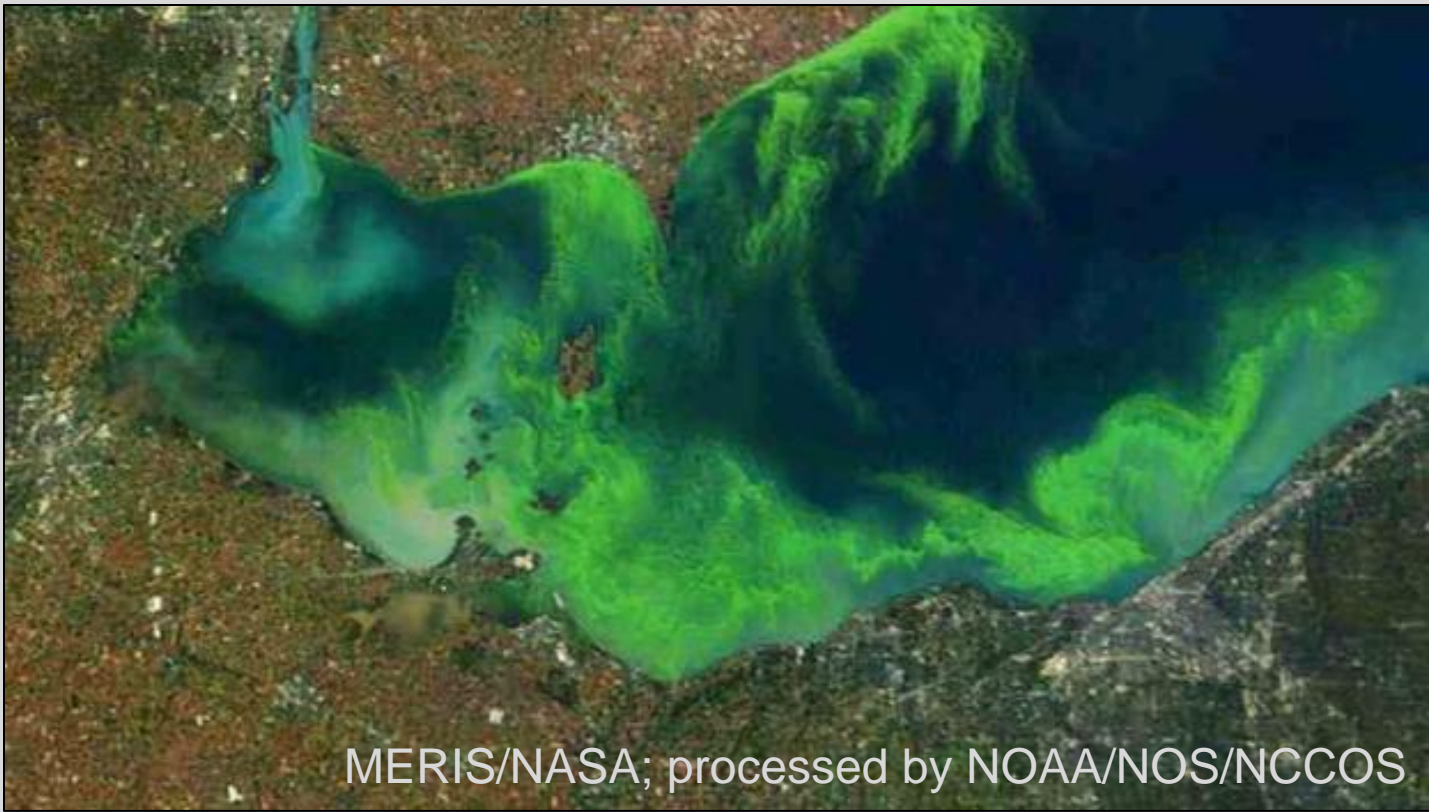
Interim Total Phosphorus Load Targets

Basin	Target Load (metric tonnes/yr)
Superior	3,400
Michigan	5,600
Huron	2,800
Georgian Bay	600
North Channel	520
Saginaw Bay	440
Erie	11,000
Ontario	7,000



Great Lakes Annual Phosphorus Loads (Thousands of Metric Tons/Year - MTA)





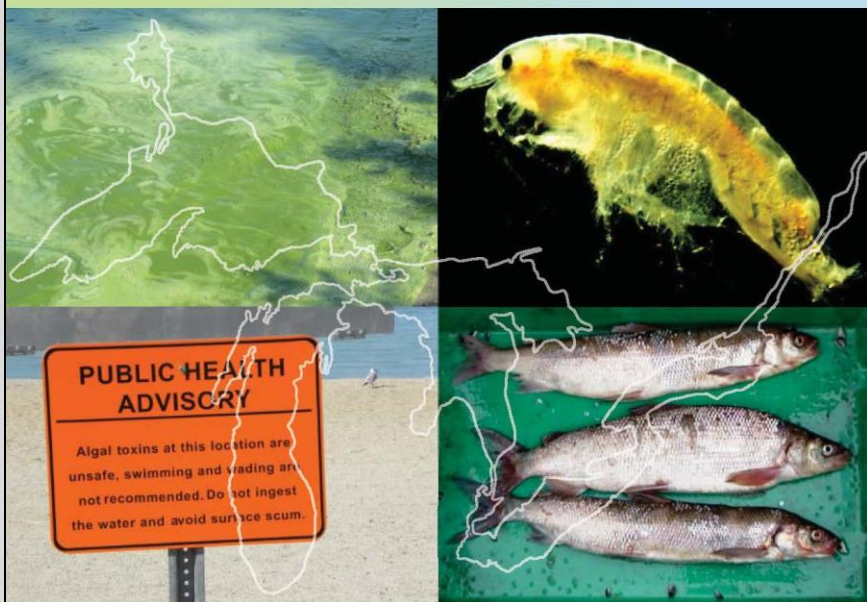
MERIS/NASA; processed by NOAA/NOS/NCCOS





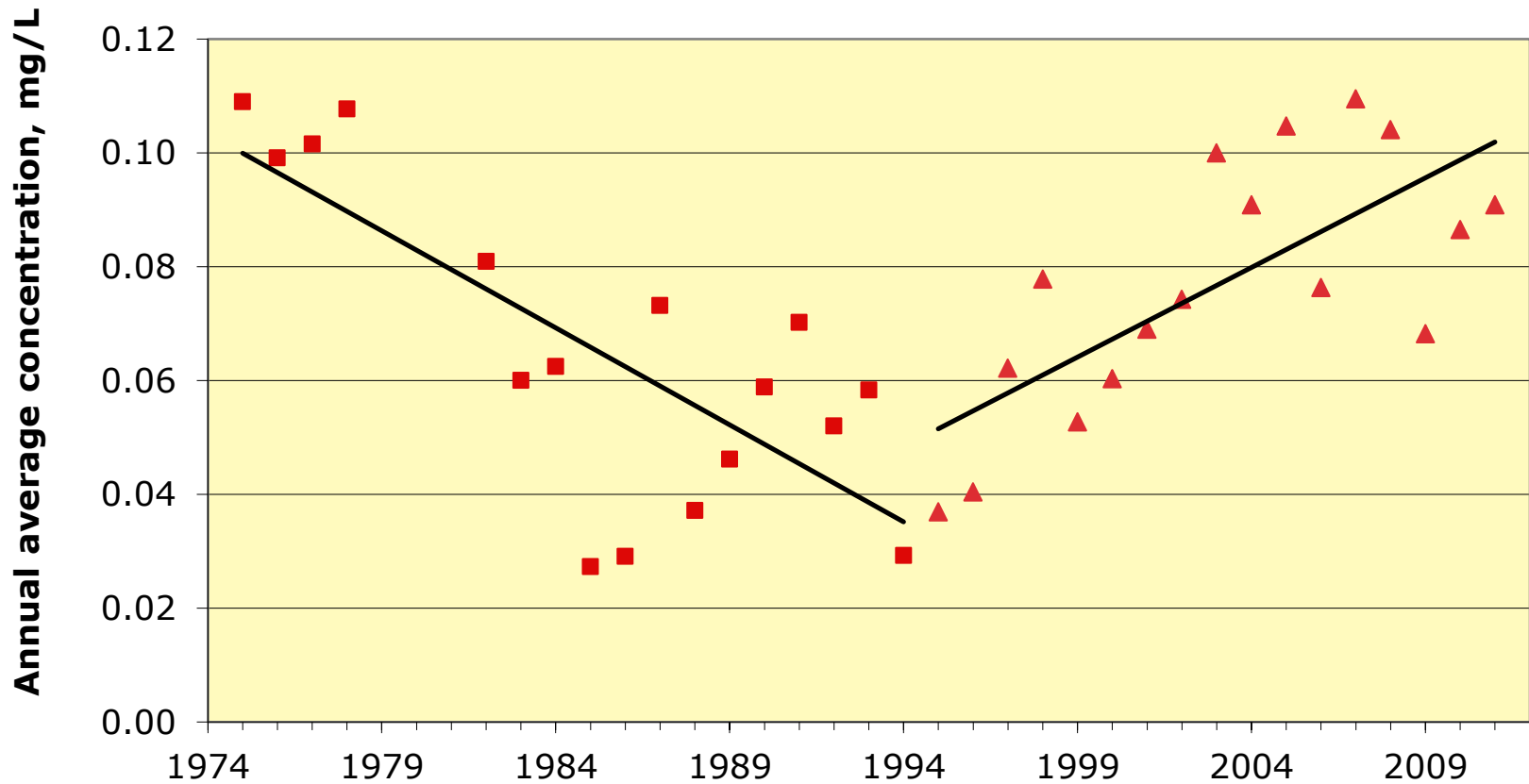
FEAST AND FAMINE IN THE GREAT LAKES

How Nutrients and Invasive Species Interact to Overwhelm the Coasts and Starve Offshore Waters



Role of changes in Dissolved Reactive Phosphorus concentrations?

Maumee River at Waterville, OH



Heidelberg University



2012 GLWQA Lake Ecosystem Objectives

- Lakes Superior, Michigan, Huron and Ontario (open waters)
 - “maintain an oligotrophic state, relative algal biomass, and algal species consistent with healthy aquatic ecosystems”
- Lake Erie (open waters)
 - “maintain mesotrophic conditions in Western and Central Basins, and oligotrophic conditions in Eastern Basin”
- Minimize extent of hypoxic zones
- Maintain algal species consistent with healthy aquatic ecosystems in nearshore waters
- Maintain cyanobacteria biomass at levels that do not produce concentrations of toxins that pose a threat to human or ecosystem health



Annex 4 Commitments

- Assess and where necessary implement new regulatory and non-regulatory programs and other measures to reduce phosphorus loadings from point and non-point sources
- Develop phosphorus reduction strategies and domestic action plans to meet new nearshore and open water phosphorus objectives and loading targets for Lake Erie
- Identify watersheds that are a priority for nutrient control and develop and implement management plans, as appropriate
- Undertake the necessary research to establish, report and assess Substance Objectives



Great Lakes Restoration Initiative (GLRI)

- Obama Administration Initiative
 - FY10: \$475 million
 - FY11: \$300 million
 - FY12: \$300 million
 - FY13: \$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*



GLRI Focus Areas

1. Toxics Substances and Areas of Concern
2. Invasive Species
3. Nearshore Health and Nonpoint Source Pollution
4. Habitat and Wildlife Protection and Restoration
5. Partnerships, Communication, Education, and Accountability



Nearshore Health and Nonpoint Source Pollution Focus Area

Targeting Watershed Plan Implementation

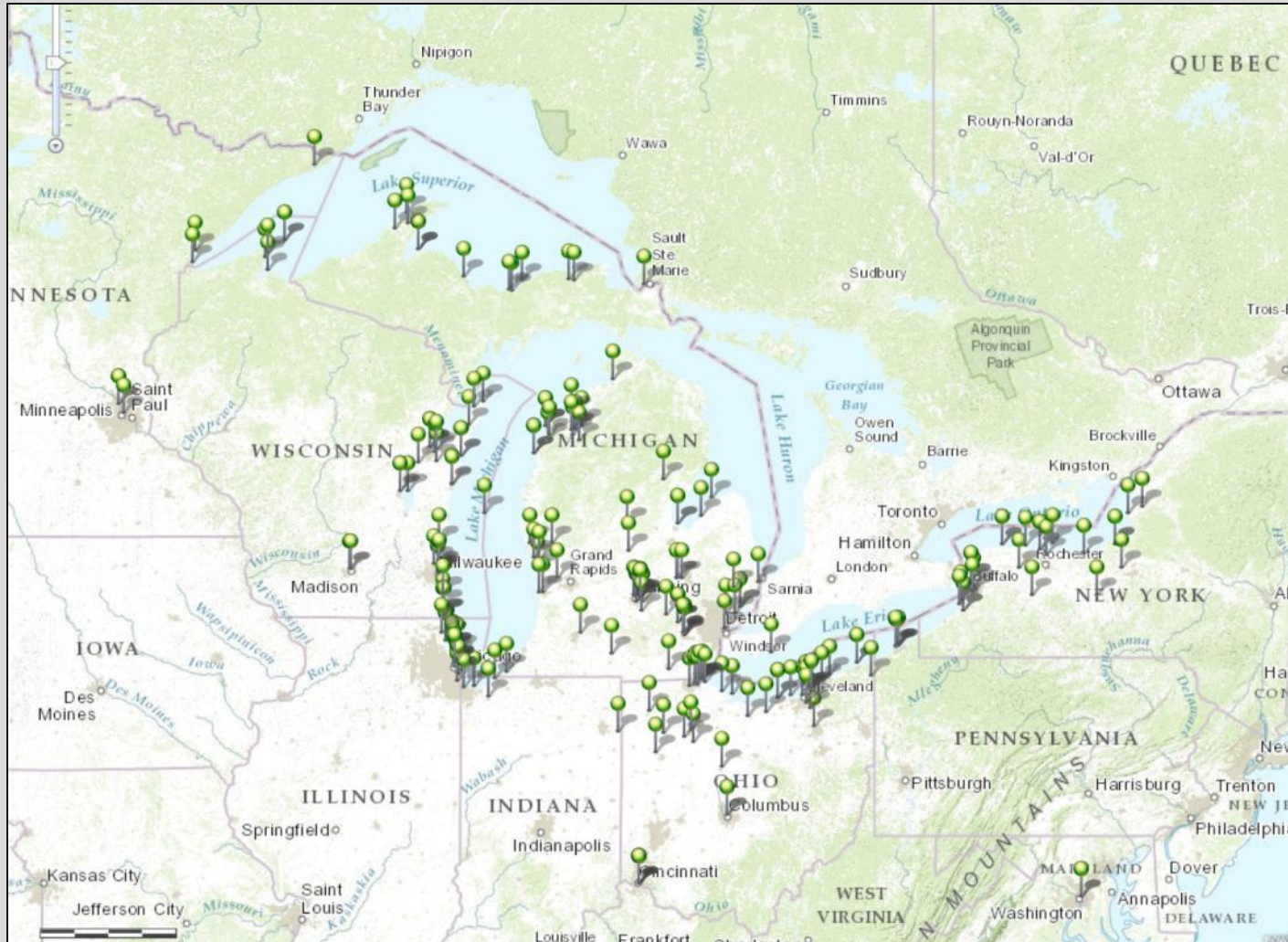
Identify Sources and Reduce Loadings of Nutrients and Soil Erosion

Protect Public Health and Beaches

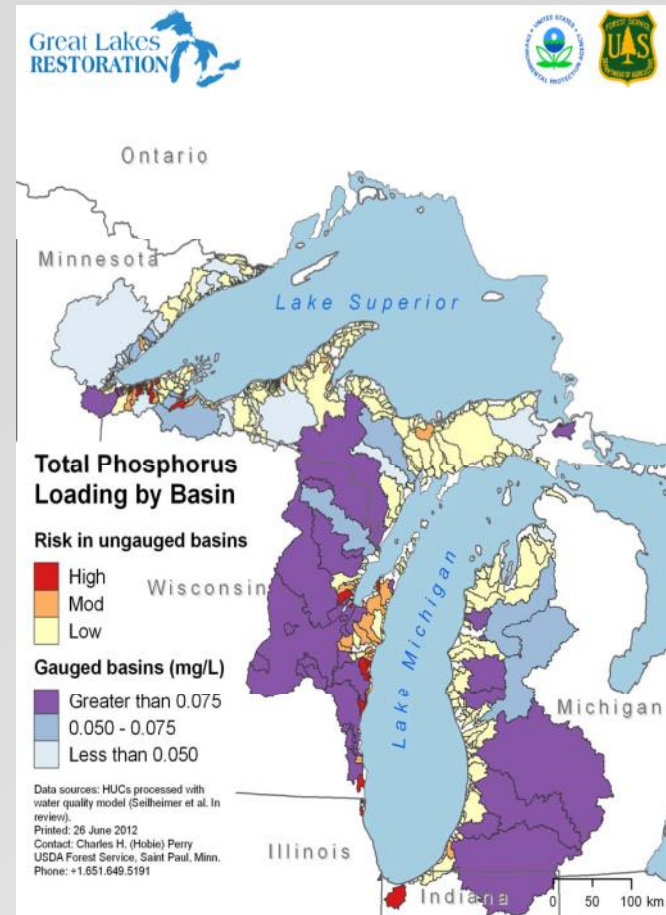
Generate Critical Information for Protecting Nearshore Health



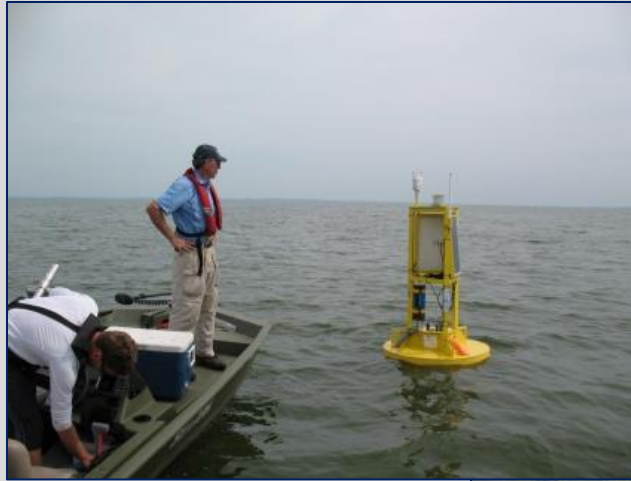
GLRI Nearshore Health and NPS Pollution Projects (FY 2010-2012)



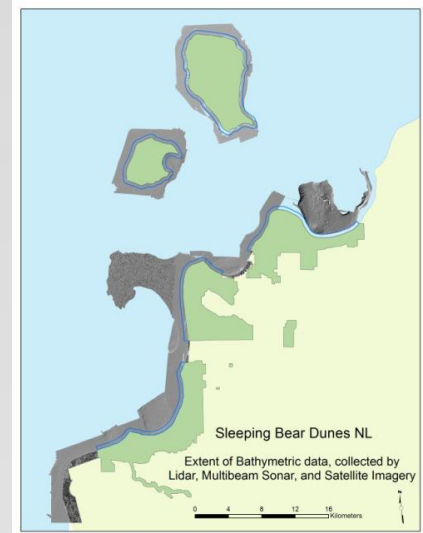
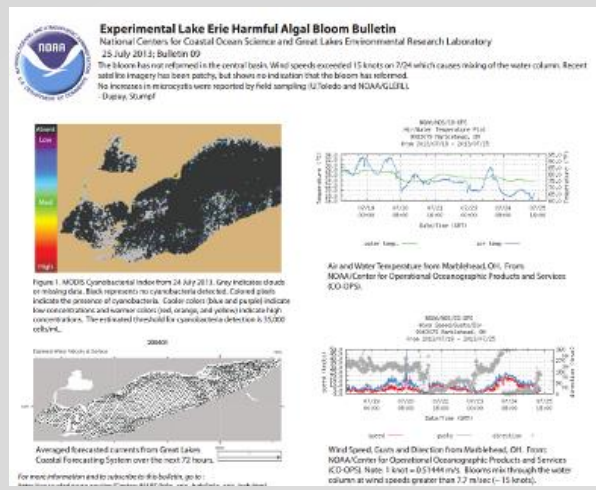
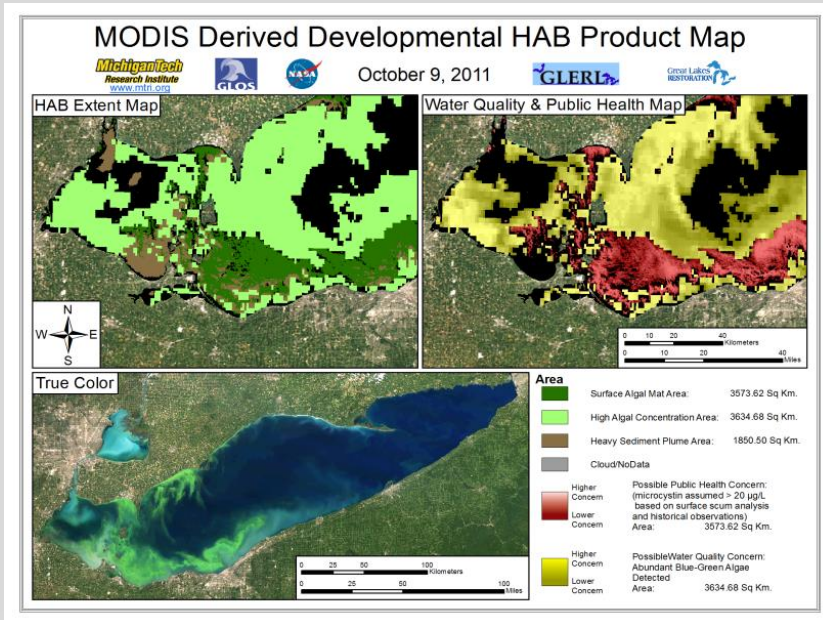
TARGETING WATERSHED PLAN IMPLEMENTATION



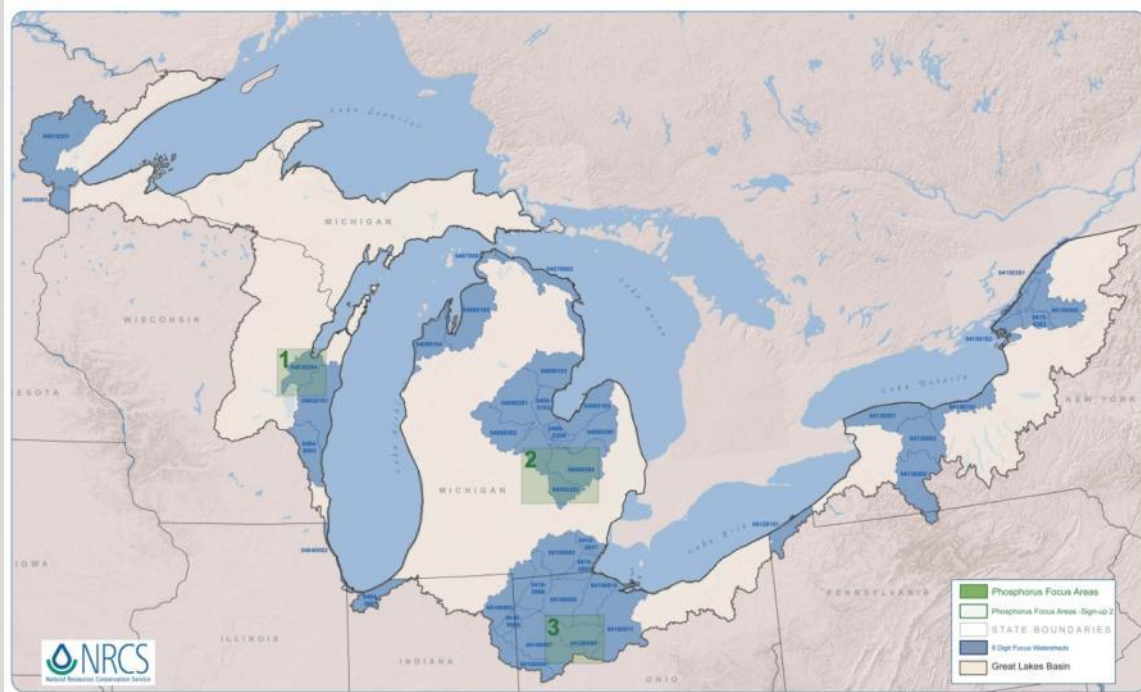
IDENTIFY SOURCES & REDUCE LOADINGS OF NUTRIENTS AND SOIL EROSION



GENERATE CRITICAL INFORMATION FOR PROTECTING NEARSHORE HEALTH



FY2012 GLRI Priority Watersheds



GLRI 2012 8 digit Priority Watershed Locations



Lower Fox River 12 digit HUC Phosphorus Reduction Focus Areas



Saginaw River 12 digit HUC Phosphorus Reduction Focus Areas



Maumee River 12 digit HUC Phosphorus Reduction Focus Areas



Diversity of Voluntary, Incentive, Regulatory, Innovative Implementation Approaches

- Lower Fox
 - EPA (*Regulatory* – Approved TMDL)
 - NRCS (*Voluntary/Incentive* – Farm Bill Programs)
 - Great Lakes Commission & Wisconsin DNR (*Incentive/Regulatory* – P Trading)
 - Land and Water Conservation Dept. (*Voluntary/Incentive* – Buffers Initiative)
 - Land and Water Conservation Dept. (*Innovative* – Feasibility Study for Biodigester Plant)



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 - Michigan Department of Ag. & Rural Development (*Voluntary* - Michigan Ag Certainty Program)
 - Michigan State University (*Innovative* - Field Scale Targeting of Practices)
 - Great Lakes Commission (*Innovative* – Gypsum Soil Amendments)



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 - EPA (*Regulatory* – Support of Phosphorus Standards/Target Setting)
 - Ohio EPA (*Regulatory/Voluntary* – TMDL Implementation Plan)
 - Ohio State Extension (*Innovative* - Training Workshops for Fertilizer Dealers)
 - The Nature Conservancy/ACOE (*Innovative* – Two-Stage Ditches)



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Coordinated Science and Monitoring Initiative (CSMI)

- Binational effort (U.S. and Canada)
- 2014 field year = Lake Erie
- Priorities:
 - Quantification of internal nutrient loads (P, N, carbon) to the waters of the Western Basin
 - Role of river hydrology and/or seasonality of P loads to HAB formation and dynamics in the Western Basin
 - Development of a nutrient mass budget (P, N, carbon) for the Western Basin



Questions?

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