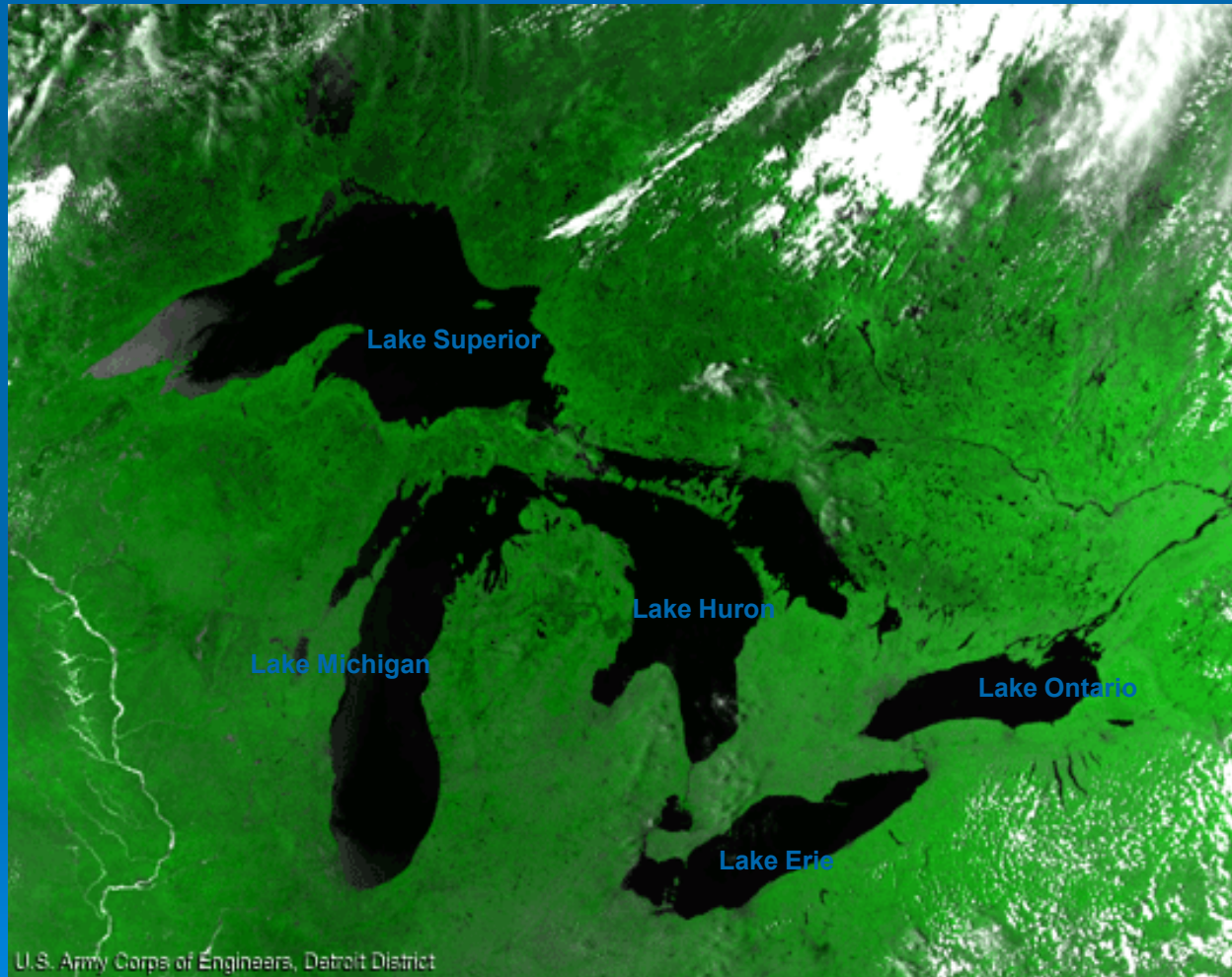


# Monitoring to Support Great Lakes Restoration

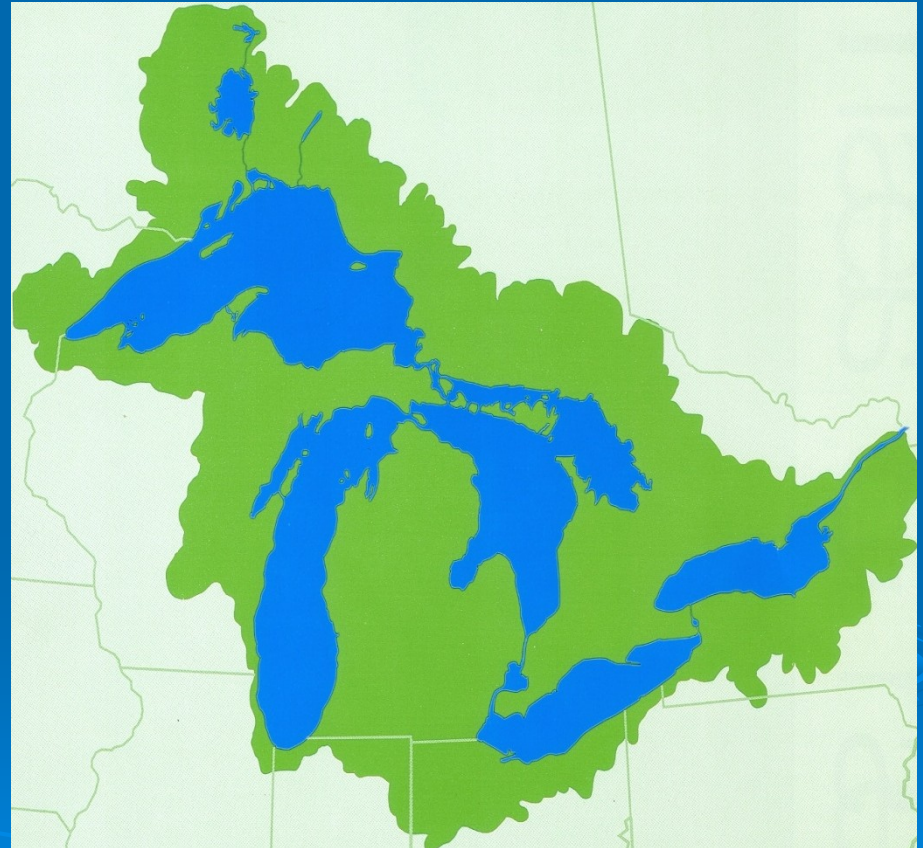
December 2013

# The Great Lakes



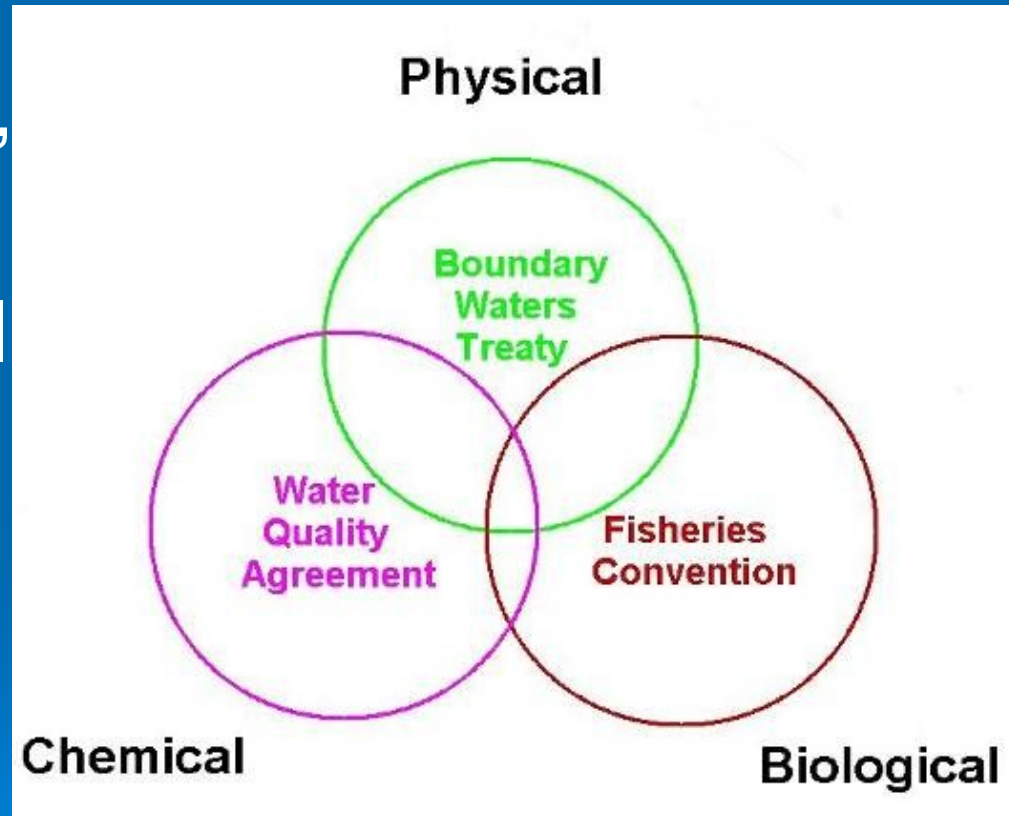
# The Great Lakes Basin

- Volume of water:  
5,473 mi<sup>3</sup>
- Drainage Basin Area:  
196,520 mi<sup>2</sup>
- Shoreline Length:  
10,054 mi
- Drinking water for 30  
million people
- Fishery valued at  
more than \$5 billion



# Organization

- Managed by 2 countries, 8 states, 2 provinces
- Three international agreements form the basis for most water-resources management





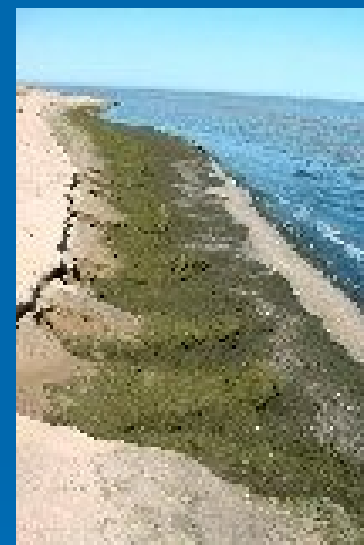
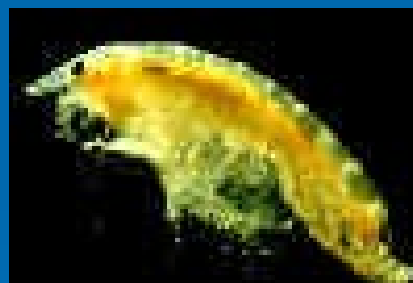
# Collaborative Efforts in the Great Lakes Basin

- Flows and lake levels
  - Boards of Control
  - GL Compact
- Water quality
  - LAMPs and CSMI
  - Restoration Initiative
  - Clean Water Act, etc.
- Fisheries management
  - Council of Lake Committees



# Management Issues

- Aquatic invasive species
- Nutrient enrichment
- Beach Health
- Contaminants – in Sediments, Fish and Drinking Water
- Toxic and nuisance algal blooms
- Habitat degradation
- Loss and Alteration of Coastal Wetlands
- Fisheries and food web changes



# Great Lakes Restoration Initiative Major Issues

- Toxic Substances and Areas of Concern
- Invasive Species
- Nearshore and Nonpoint Source issues
- Habitat and Wildlife
- Science & Monitoring, Climate Change, Outreach







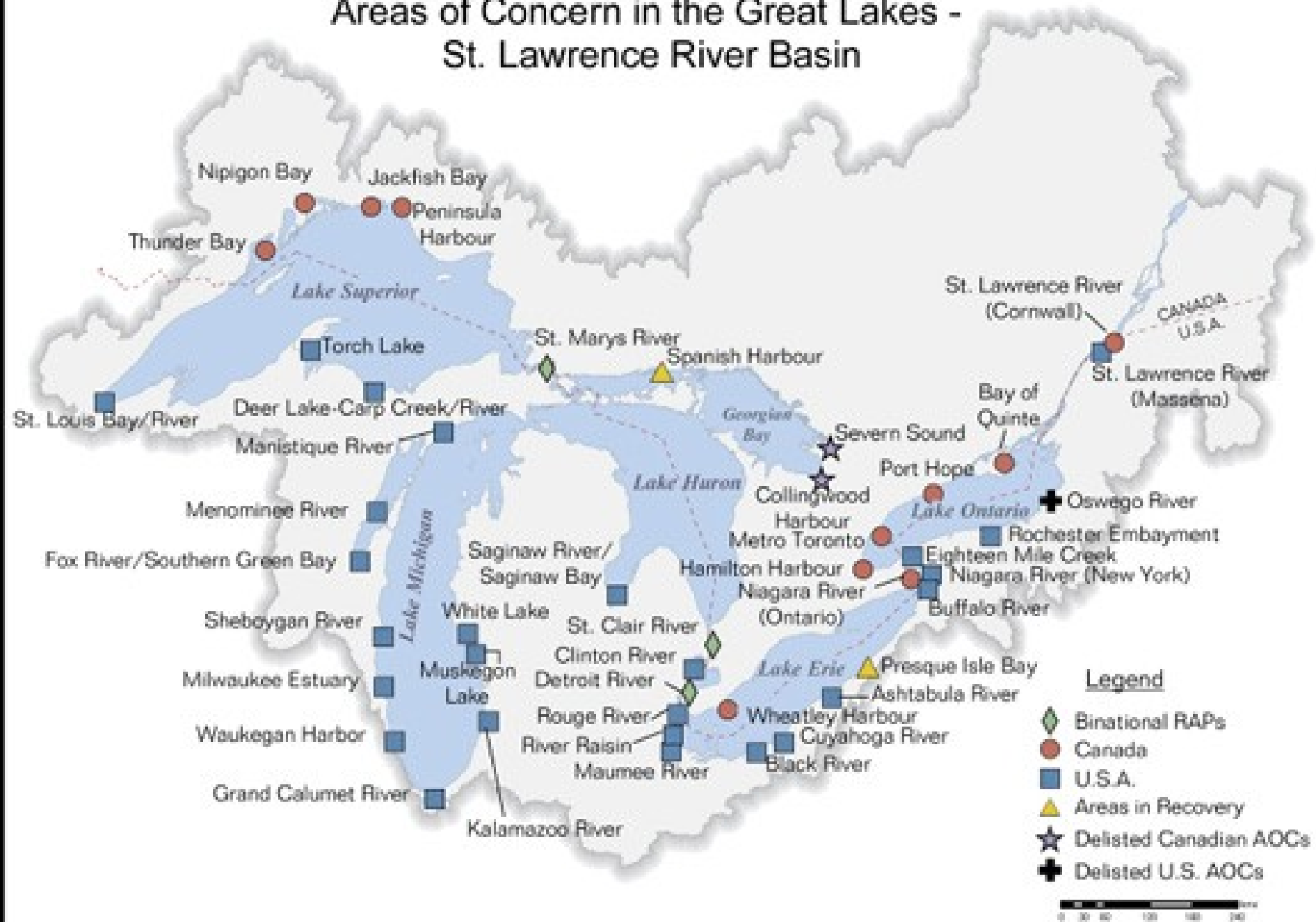


# Cuyahoga River Fire

- Fire started on June 22, 1969
- Important event to begin restoration
- GL Water Quality Agreement signed 1972



# Areas of Concern in the Great Lakes - St. Lawrence River Basin



# Invasive Species

- Chemical tools to control dreissinid mussels and Asian carp
- Phragmites Control Strategies





# Algae in the Great Lakes

- Nuisance algae has been increasing
- Related to dreissenid mussels – light penetration in water
- USGS research on Cladophora and beach closure issues



# Problem



# Phragmites





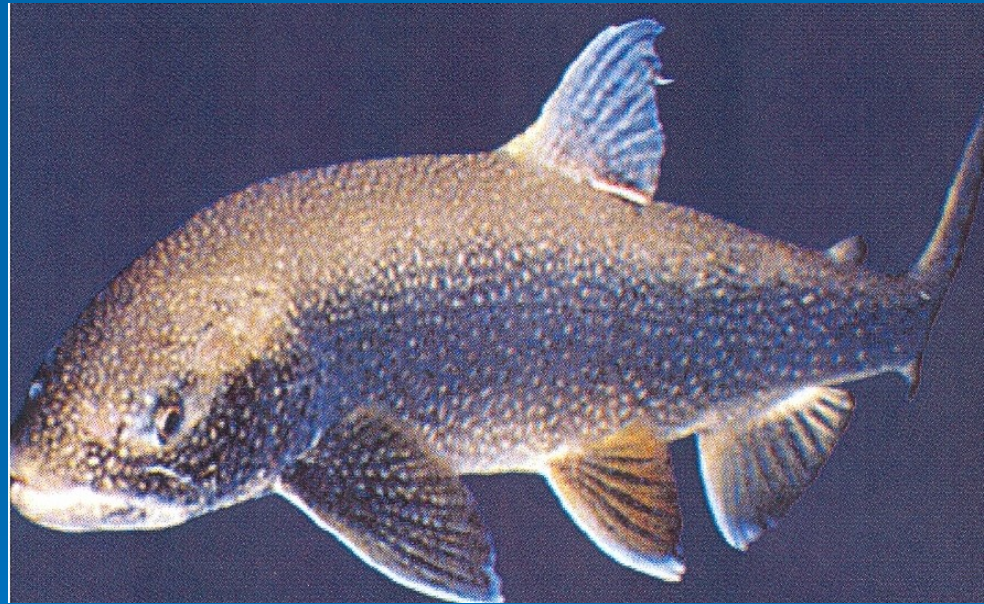
# Habitat and Wildlife

- New strategies for restoring coastal wetland function
  - Demonstrate techniques and value of reconnecting coastal wetlands to lakes



# Habitat and Wildlife

- Endangered/threatened species restoration
  - Science based techniques for high probability of success to restore native fish species
  - Huron-Erie Corridor
  - Lake Ontario



# Habitat and Wildlife

- Assess the role of changing foodwebs/nutrient transfer
- Seasonal sampling of prey fish, sport fish, and their diets
  - Coordinated with EPA sampling of lower trophic level





# Nearshore Health and Nonpoint Sources of Contamination

- Beach Health forecasts/nowcasts of nearshore water quality and beach closures
  - Expand beach health projects to more beaches
  - Coordinated with EPA and NOAA and State Health Departments



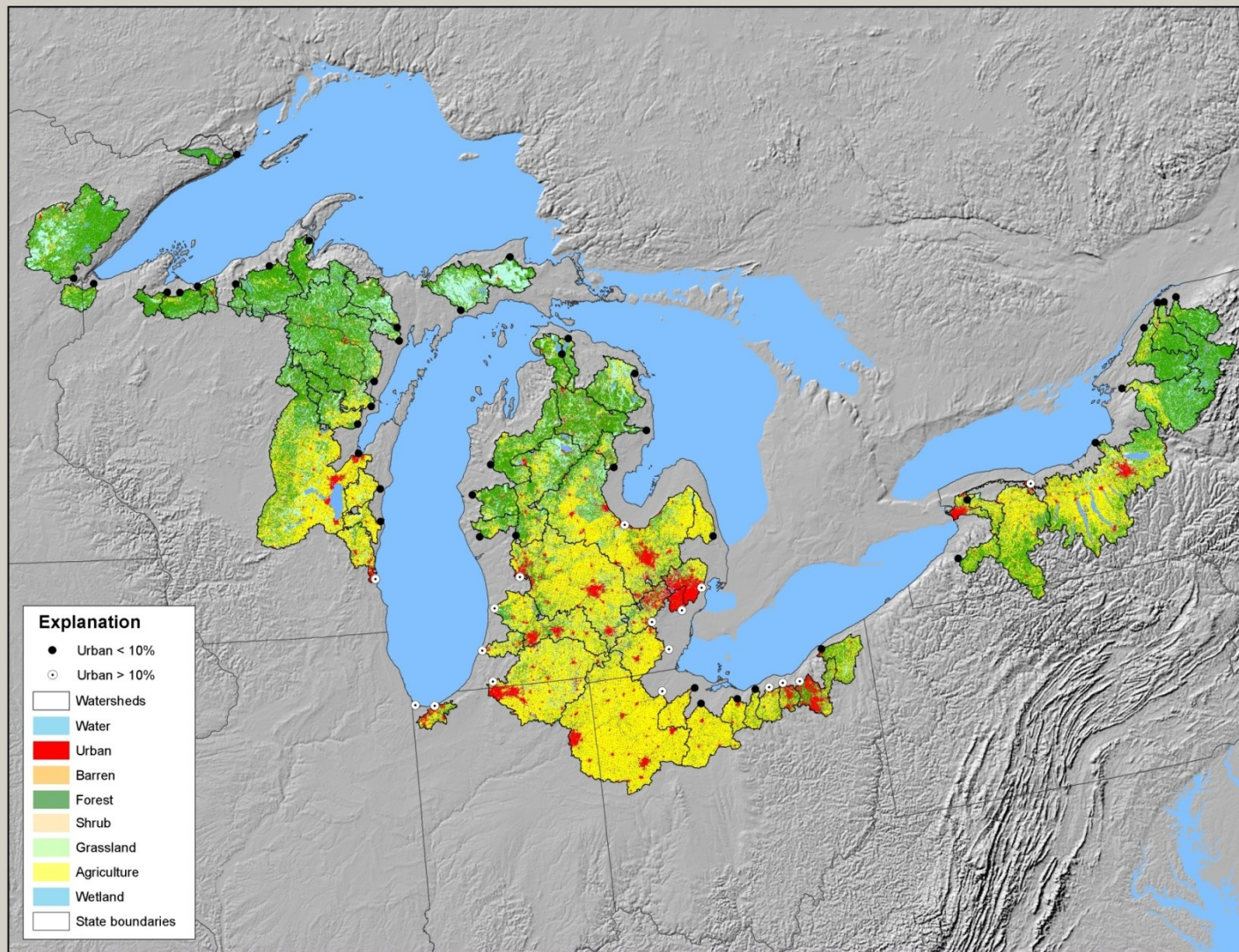
# Nearshore Health and Nonpoint Sources of Contamination

- Emphasis on Priority Watersheds related to agricultural practices
- Fox – Green Bay (WI), Saginaw Bay (MI), Maumee Bay (OH)
- Tributary Monitoring using National Monitoring Network design
- Edge-of-Field monitoring



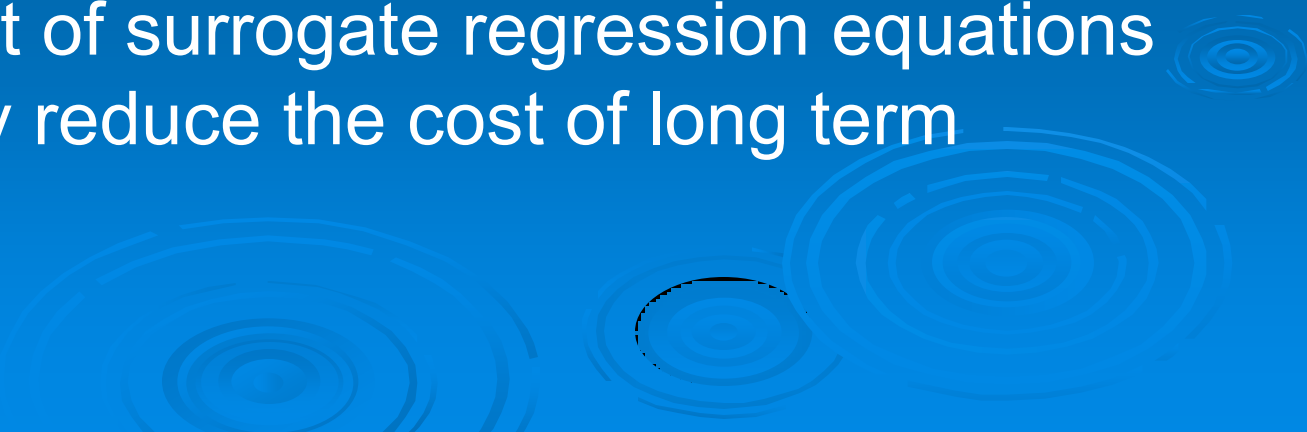


# National Monitoring Network for Coastal Waters (NMN) Tributary Sites






# Monitoring Objectives

- Expand tributary monitoring throughout the Great lakes Basin to provide baseline information, provide support for measuring restoration progress, assess new contaminant threats, support contamination effects efforts, and model loads and potential load changes.
  - Will include the use of real-time sensors and the development of surrogate regression equations to potentially reduce the cost of long term monitoring.
- 

# Monitoring Approach

- Will sample water column and sediment chemistry, and install integrated passive organic bio-concentrating samplers (POCIS/SPMD).
- May include the use of Chromophoric dissolved organic matter sensors (CDOM) and autonomous underway vehicles (AUV) to relate tributary impacts to embayments and the near shore.
- Analytes of interest include suspended sediment, and nutrients, chemicals of emerging concern, legacy contaminants, human and animal viruses.

# Water Column

- Sample at stream gage location at about half of the NMN sites.
  - Collect monthly and storm event samples.
  - Use automated samplers when feasible.
  - Add multi-sensor probe at most sites.
  - Physical Parameters, Nutrients, Major Ions, Suspended Sediment, Pharmaceuticals and Personal Care Products
- 



# Great Lakes Restoration Initiative

- Initiative funding for first 4 years about \$1.3B
- Led by EPA with funds distributed to other agencies by IA
- Planning time frame is 2010 to 2014
- Plans underway for 2015 to 2019



Thank you



Questions?

