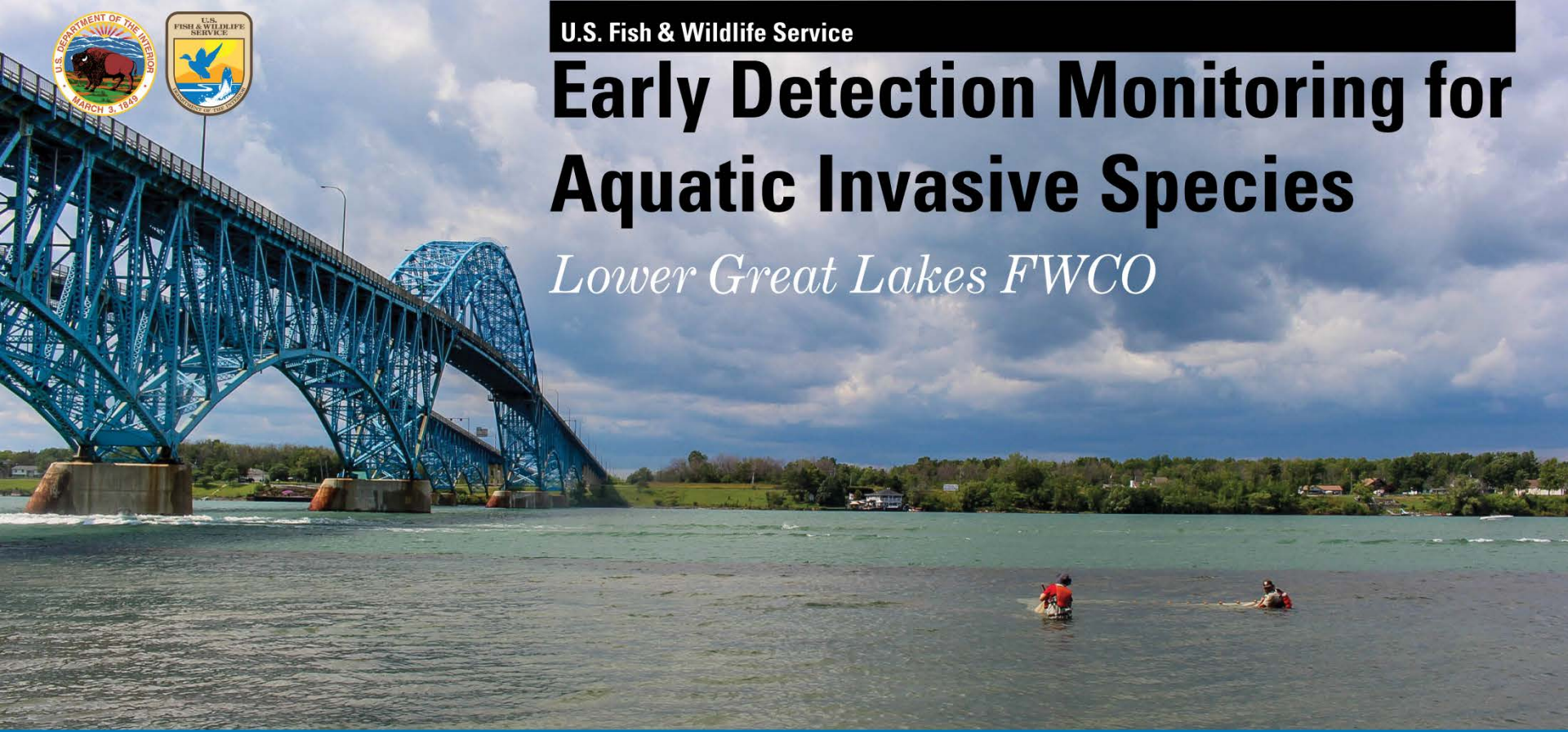
U.S. Fish & Wildlife Service

Early Detection Monitoring for Aquatic Invasive Species

Lower Great Lakes FWCO

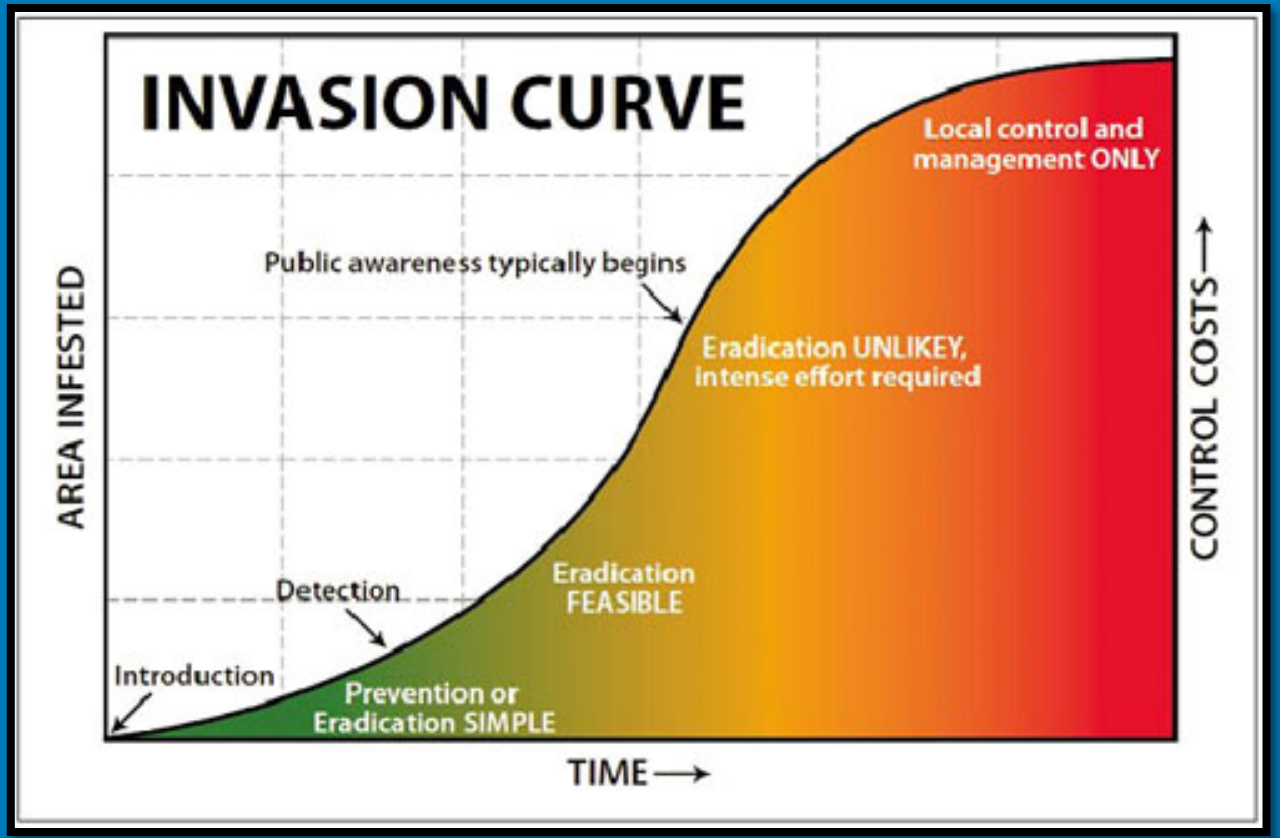


CONSERVING AMERICA'S fisheries

Great Lakes RESTORATION

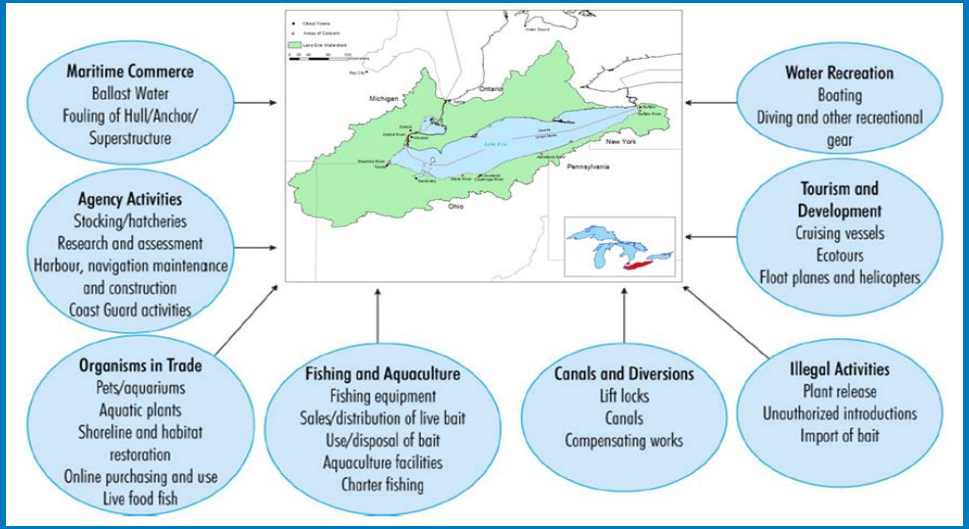
Why Early Detection?

- Improves control chances
- Reduces long-term costs and ecological damage



Early Detection Monitoring Methods

Vector targeted vs Species Targeted



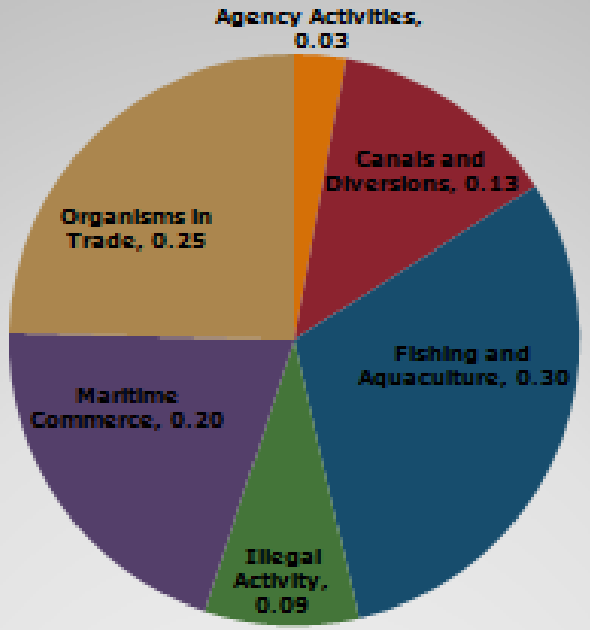
Great Lakes Restoration Initative

"A comprehensive program for detection and tracking newly identified invasive species in the Great Lakes that provides up-to-date critical information needed by decision makers for evaluating potential rapid response actions."

Great Lake Restoration Initiative EDM

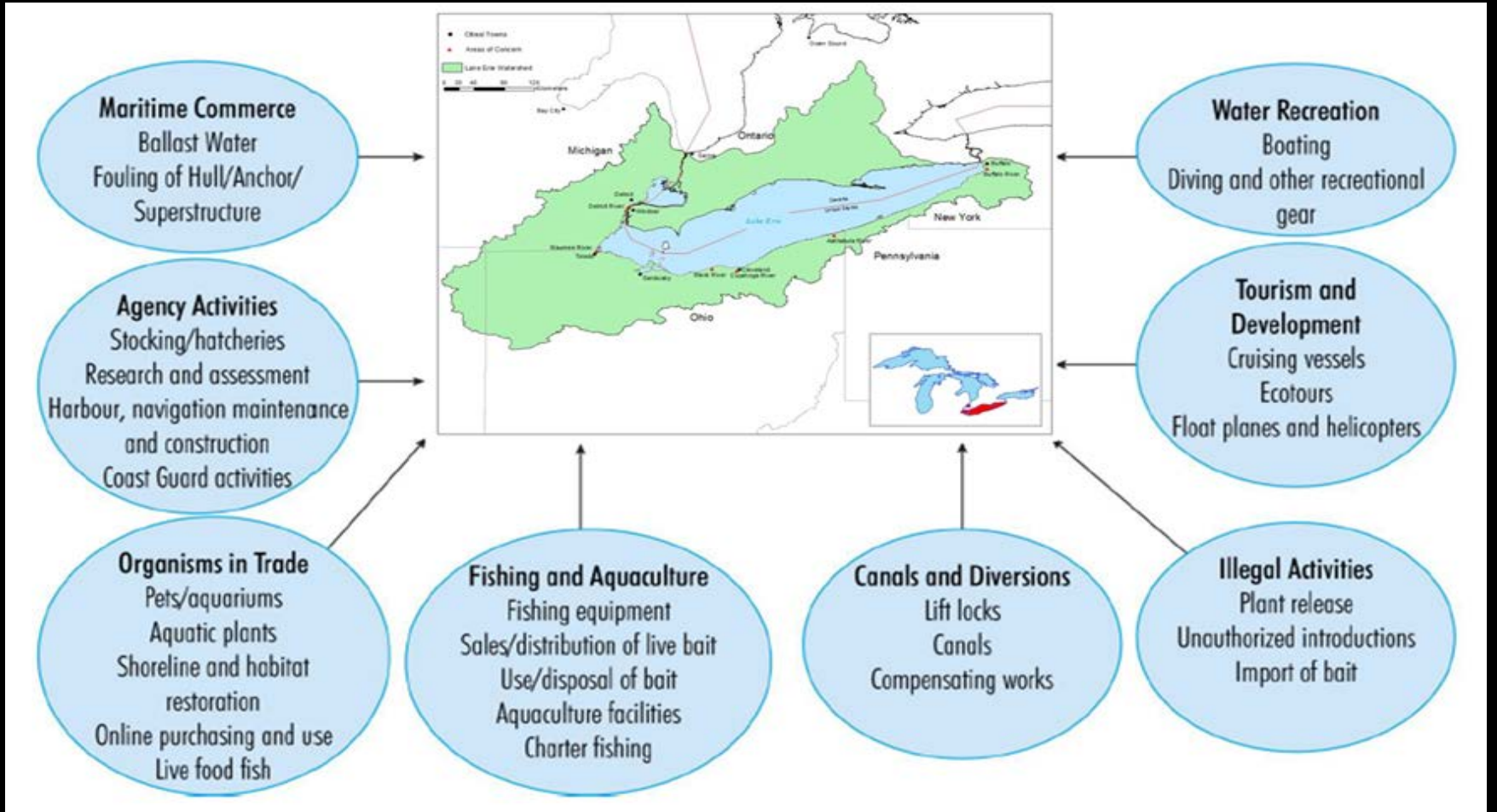
- Began in 2012
- Basin-wide EDM
- Focus on fish, bivalves, and amphipods
- Lake implementation plans
- Sample areas selected based on vector risk

Based on proportion of vector categories by which species of highest concern are likely to be introduced

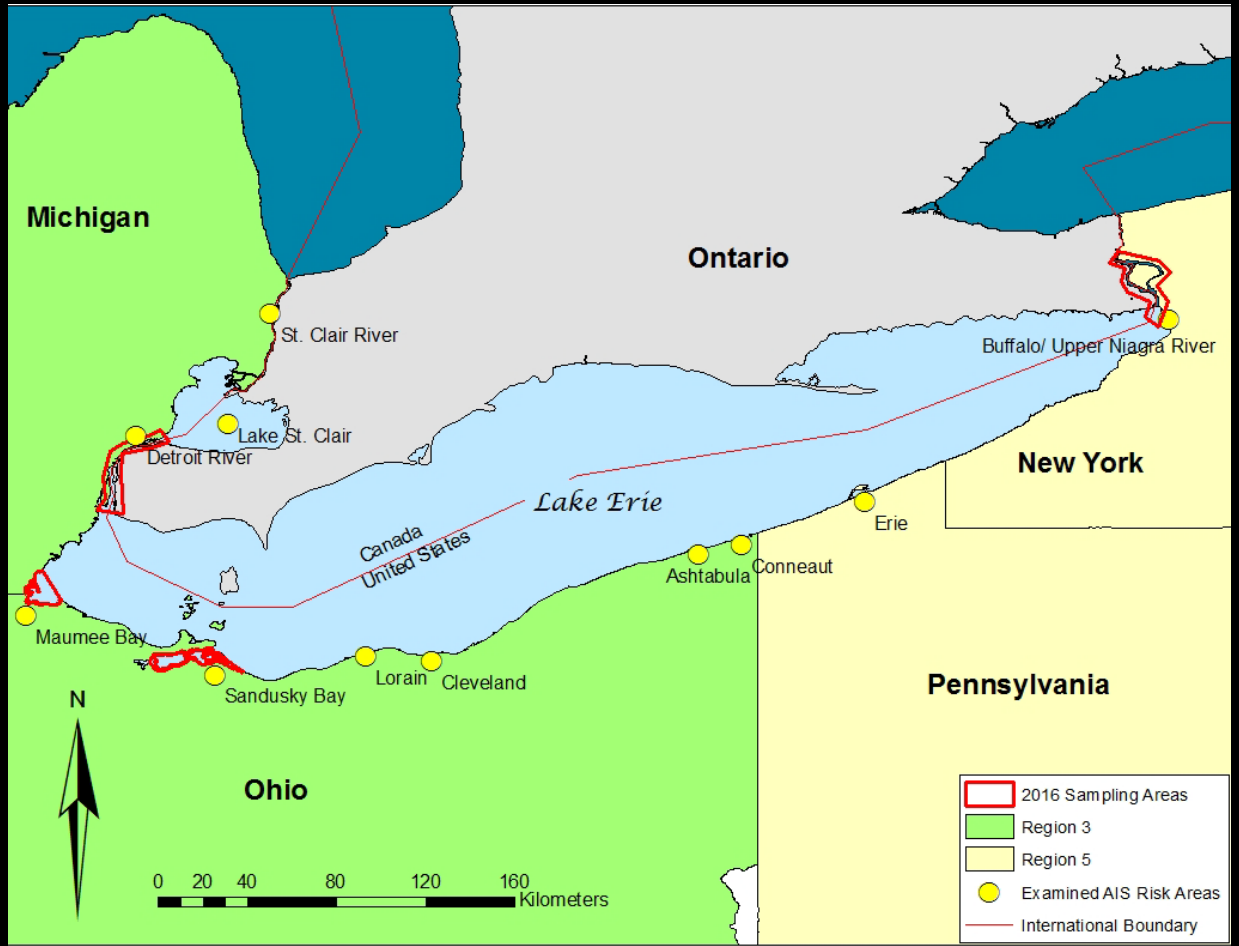


US EPA 2016

Vector Risk Analysis



Sampling Locations



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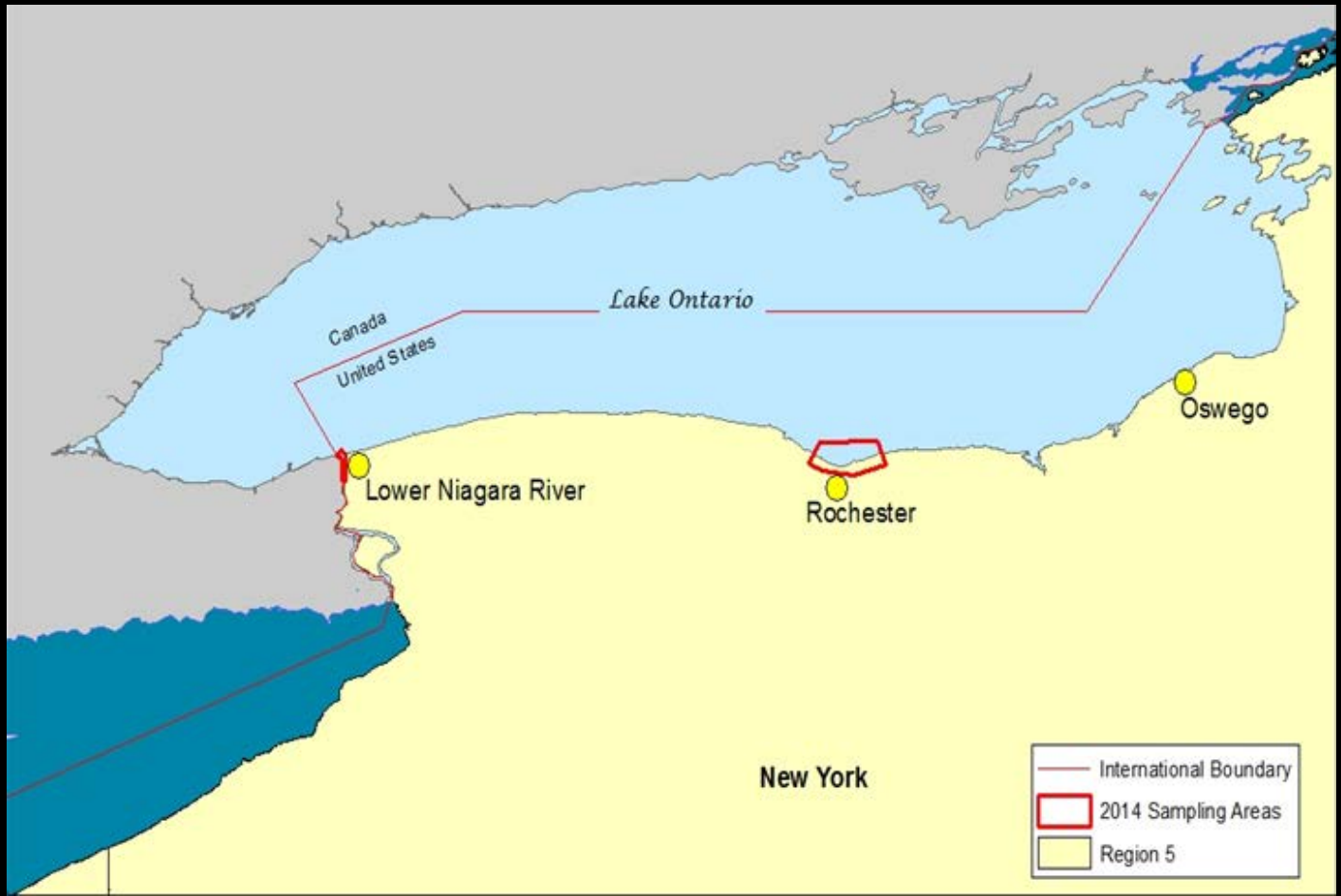
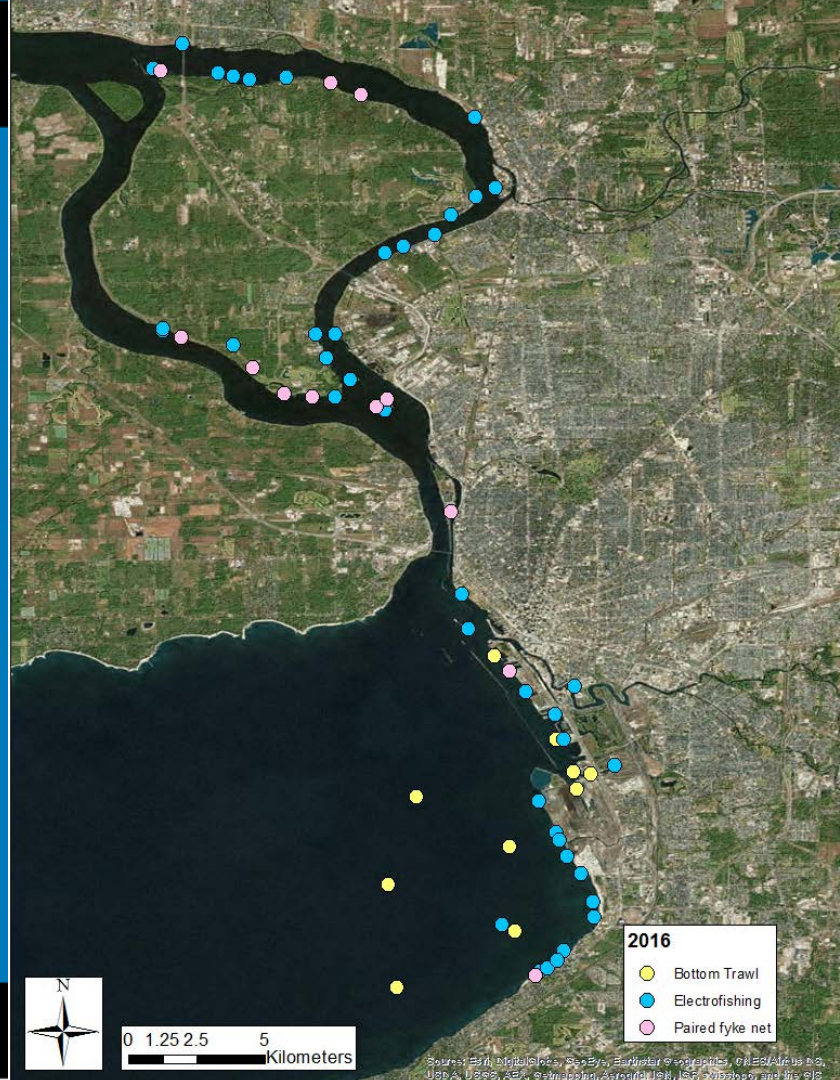


Site Locations

- Within sample locations, sites selected to maximize species richness
- Mix of random and targeted sampling
- Depth determines gear choice

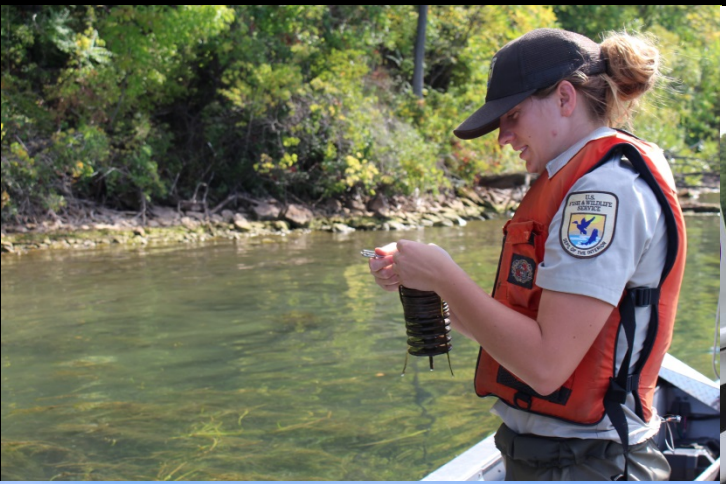


CONSERVING AMERICA'S Fisheries

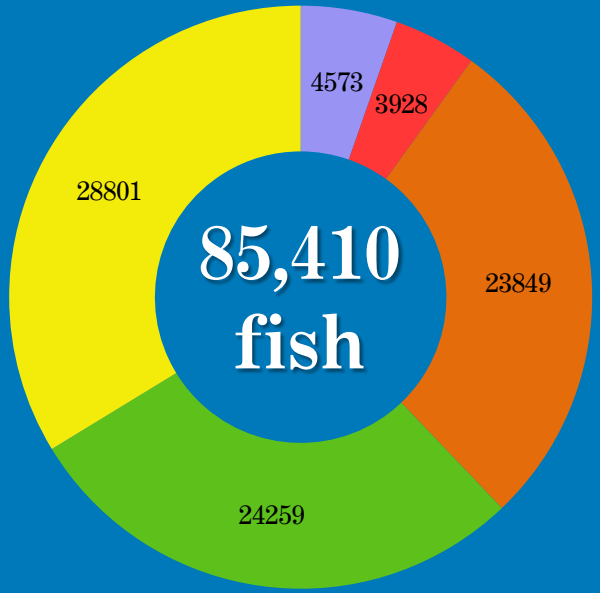
Adult and Juvenile Fish Gear

Icthyoplankton Gear

Benthic Invertebrate Gear



2016 Catch Summary for GLRI EDM



- Buffalo/Upper Niagara River
- Lower Niagara River
- Oswego Harbor
- Presque Isle Bay
- Rochester/Irondequoit Bay

Species Richness	
Buffalo/Upper Niagara River	44
Lower Niagara River	36
Oswego Harbor	26
Presque Isle Bay	30
Rochester/Irondequoit Bay	43

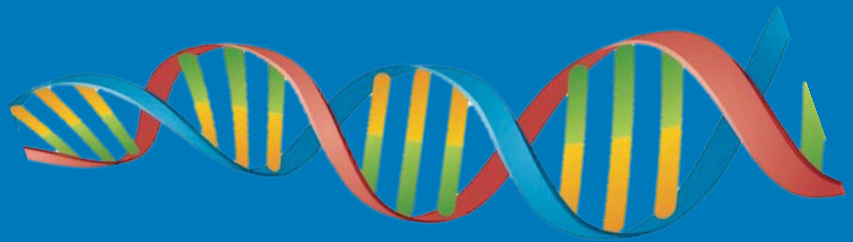
- June-December
- 5 vector hotspots
- 247 different sites
- No new non-native detected

Species Specific EDM

- Targets high priority species
- Specific vector used
- Use biological information to target
  - –Spawning time
  - –Preferred temperature, habitat

Environmental DNA (eDNA)

- Test for genetic material in water
- 48 hour window
- Positive hit does not guarantee presence of fish



Asian Carp eDNA

- Targeting Sliver and Bighead
- Sampling occurs at likely spawning times
- Chosen river need to meet criteria
  - –Conditions suitable for spawning
  - –Proximity to invasion front
  - –State agency priorities

Asian Carp eDNA

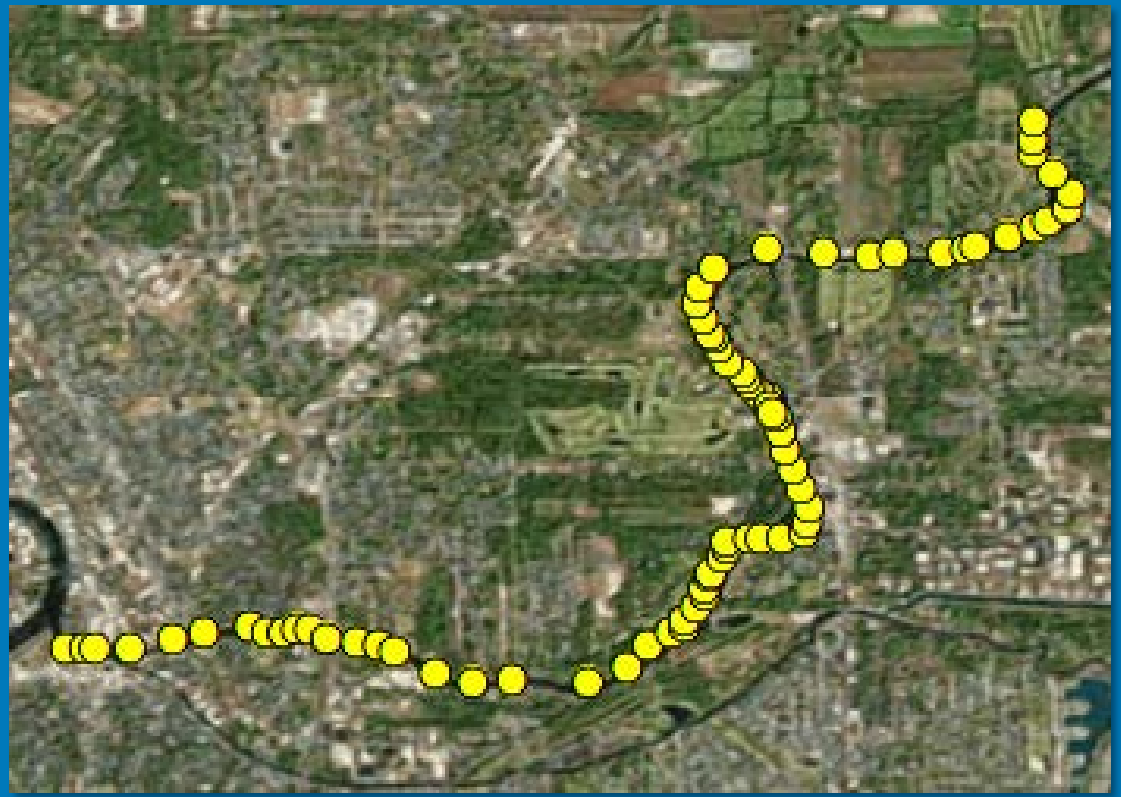
Step 1: Water collection

Step 2: Mobile lab processing

Step 3: Whitney Lab

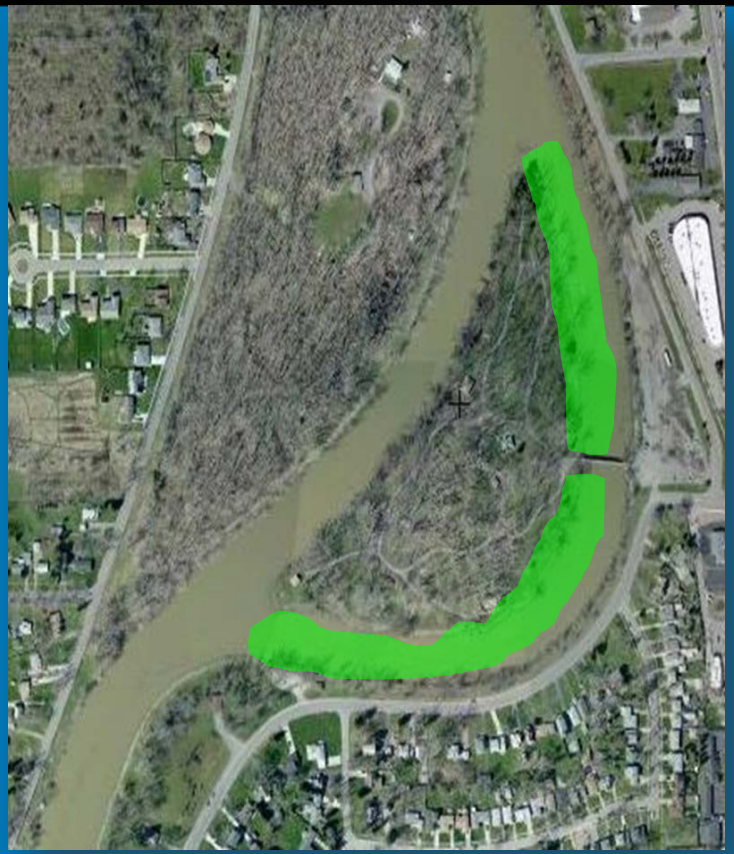
Asian Carp eDNA

- WNY sample areas
  - –Buffalo River
  - –Cattaraugus Creek
  - –Tonawanda Creek/Erie Canal
  - –Presque Isle Bay
- 194 Samples collected
  - –All Negative



Water Chestnut

- Native to China
- Popular water garden plant
- Found in Ellicott Creek Park June 2008
- Original patch 6 acres



Water Chestnut

- 1 acre produces seed to colonize 100 acre the next year
- When it takes over
  - –Waterways are impassable
  - – Alters water temperature and chemistry
  - –Seeds hazardous to humans and pets

Water Chestnut

- 2008 response
  - 1-day hand pulling event, 1,900lbs of plant
- 2009
  - Multi-day hand-pulling events, 2,500lbs of plant
  - Fist year of dedicated surveillance
- 2010 and 2011
  - Hand-pulling of near shore plants by Buffalo Niagara RiverKeeper

Water Chestnut

- 2010 and 2011
  - –Mechanical harvester used
  - –Removed >100,000lbs of plant material
- 2012-2017
  - –Plants removed by hand-pulling
  - –Continued surveillance
- This year we only found 115 plants

Water Chestnut

"An ounce of prevention is worth a pound of cure."

Questions?