NOAA GREAT LAKES

Improving NOAA's service to the Nation through collaboration

NOAA and the GLRI:
Summary Presentations of all current NOAA projects

January 22, 2020

For additional information contact:

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Great Lakes RESTORATION

Focus Area 1: Toxic Substances and Areas of Concern

- 3 Components:
  - AOCs (NOAA)
  - Health
  - Chemicals of Mutual Concern (NOAA)

Objective 1.1 -- AOCs

Objective	Commitment
1.1. Remediate, restore, and delist Areas of Concern.	• Implement management actions necessary to remove Beneficial Use Impairments and delist Areas of Concern.

Measures of Progress

- 1.1.1.*# Areas of Concern where all management actions necessary for delisting have been implemented.
- 1.1.2.*# Beneficial Use Impairments removed in Areas of Concern.
- 1.1.3.* Areas of Concern with a complete and approved list of all management actions necessary for delisting.

Objective 1.3 – Chemicals of Mutual Concern

Objective

1.3. Increase knowledge about (1) "Chemicals of Mutual Concern" identified pursuant to the Great Lakes Water Quality Agreement's Annex 3; and (2) other priority chemicals that have negatively impacted, or have the potential to negatively impact, the ecological or public health of the Great Lakes.

Commitment

- Fill critical data gaps for Annex 3 and other priority chemicals in the Great Lakes through discrete monitoring and assessment activities.

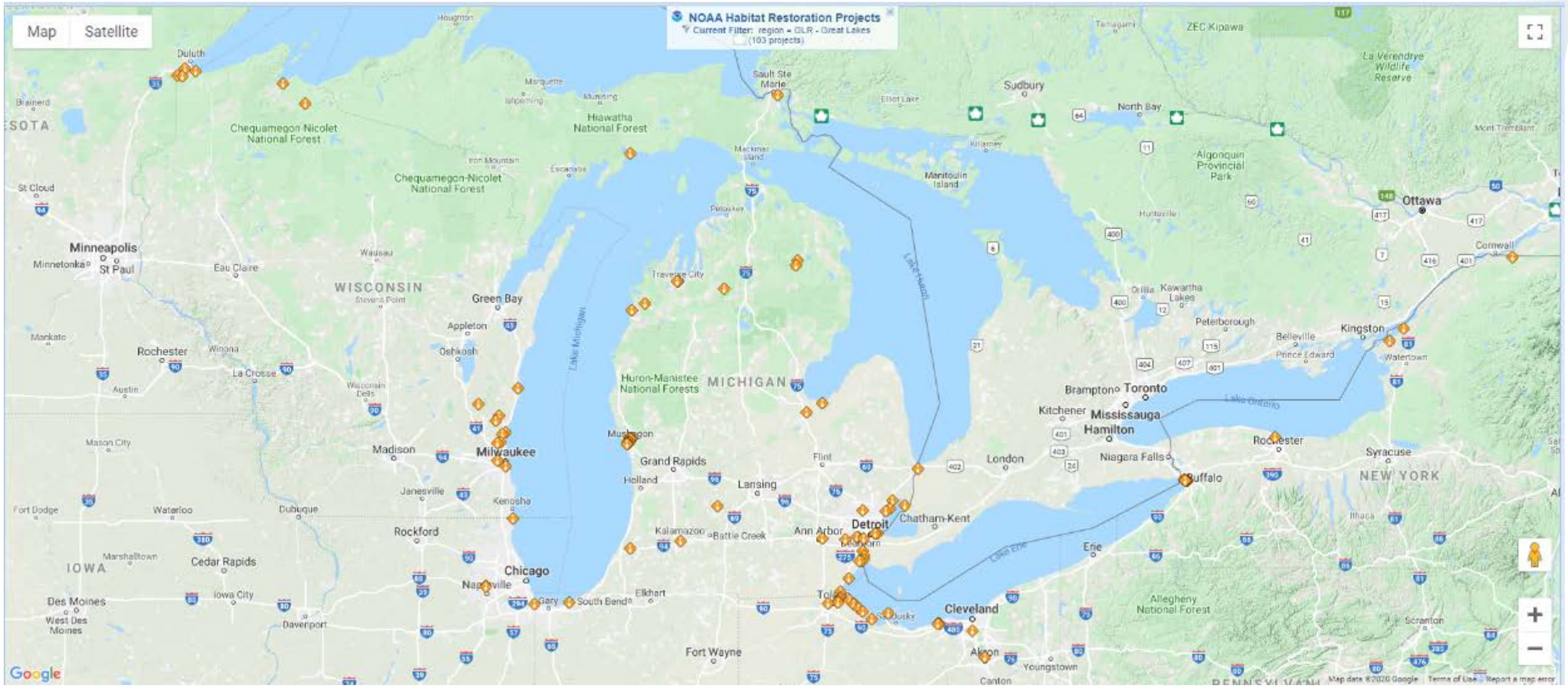
Measures of Progress

- 1.3.1. Discrete chemical monitoring and assessment activities conducted.

Toxic Substances and AOCs Projects

Project	Presenter
Moving the Needle towards Delisting through habitat restoration in Great Lakes Areas of Concern	Ryan Darnton and Cassie Lovall, NMFS Restoration Center
St Louis River Data System	Robb Wright, NOS OR&R
Great Lakes Mussel Watch - Using mussels for contaminants of emerging concern in the Great Lakes	Ed Johnson, NOS NCCOS

NOAA Restoration Center - Habitat Restoration Projects



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Moving the Needle towards Delisting through Habitat Restoration in Great Lakes Areas of Concern

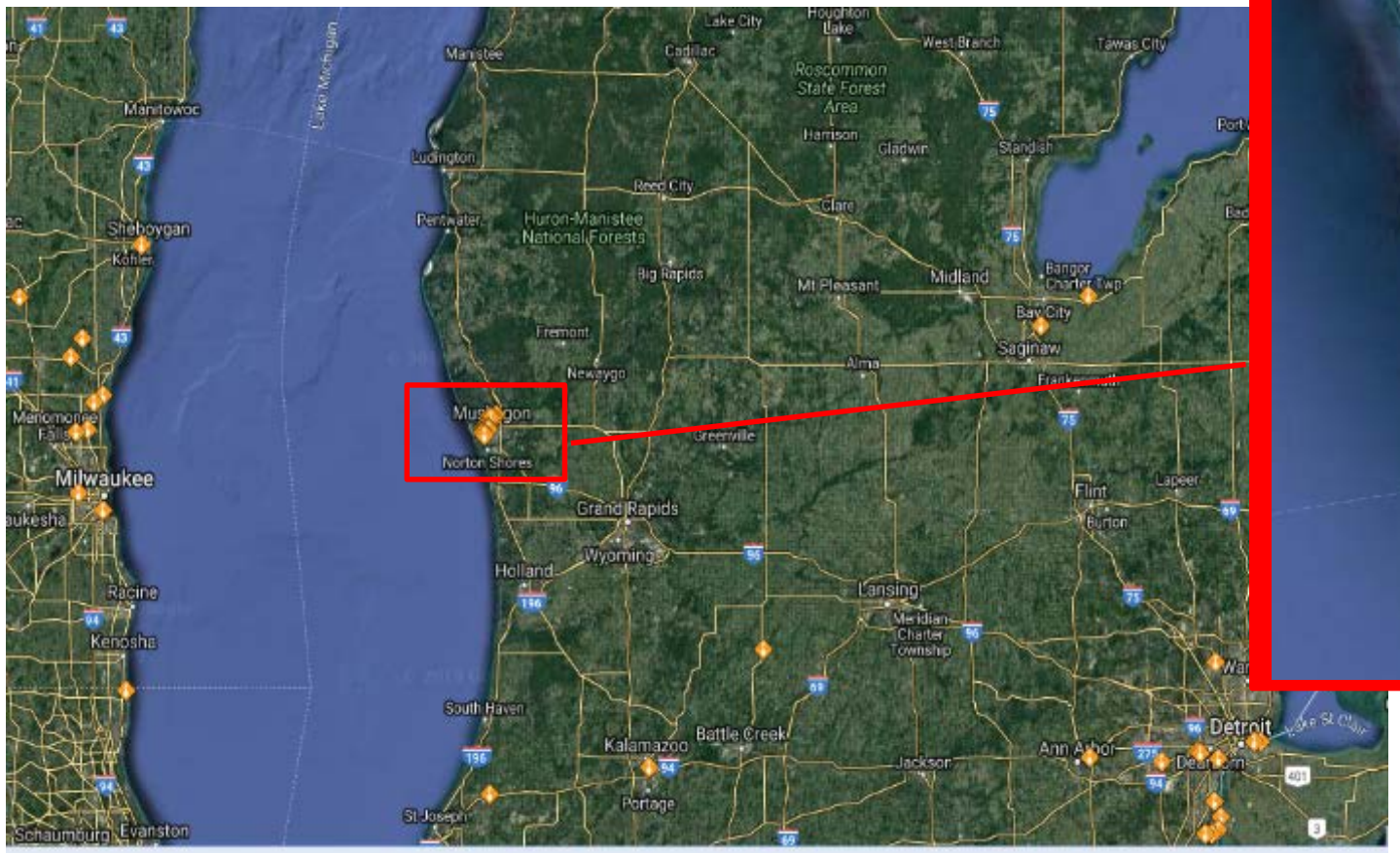
Ryan Darnton and Cassie Lovall,
NMFS Restoration Center

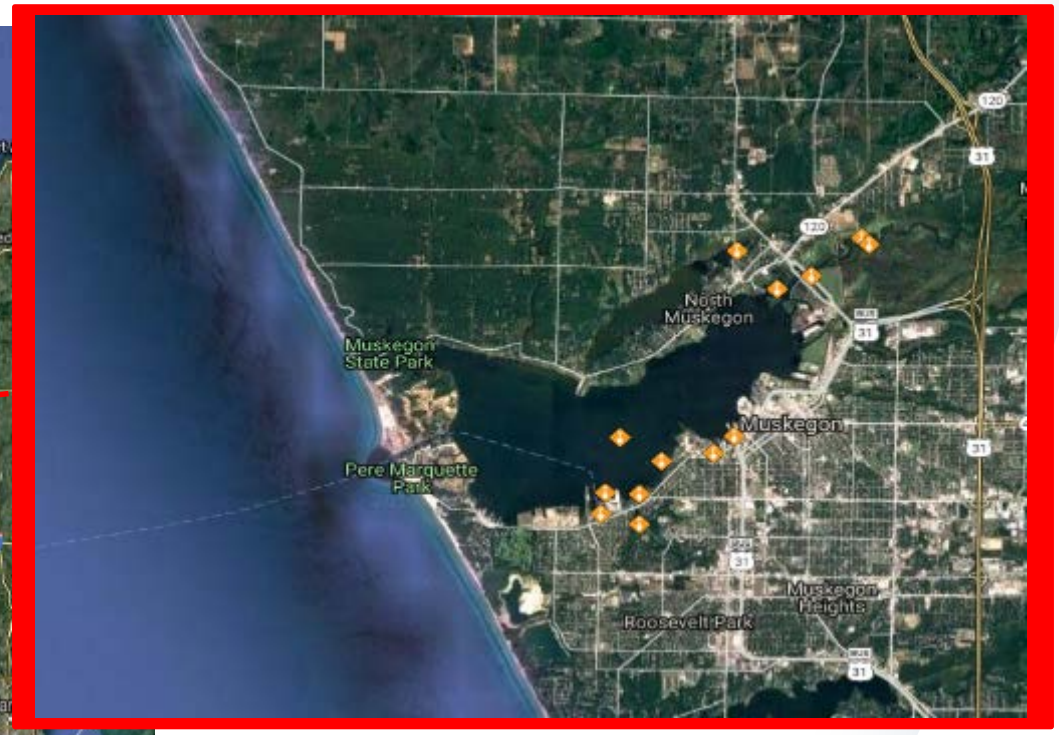
NOAA GLRI Webinar

January 22, 2020

Great Lakes RESTORATION

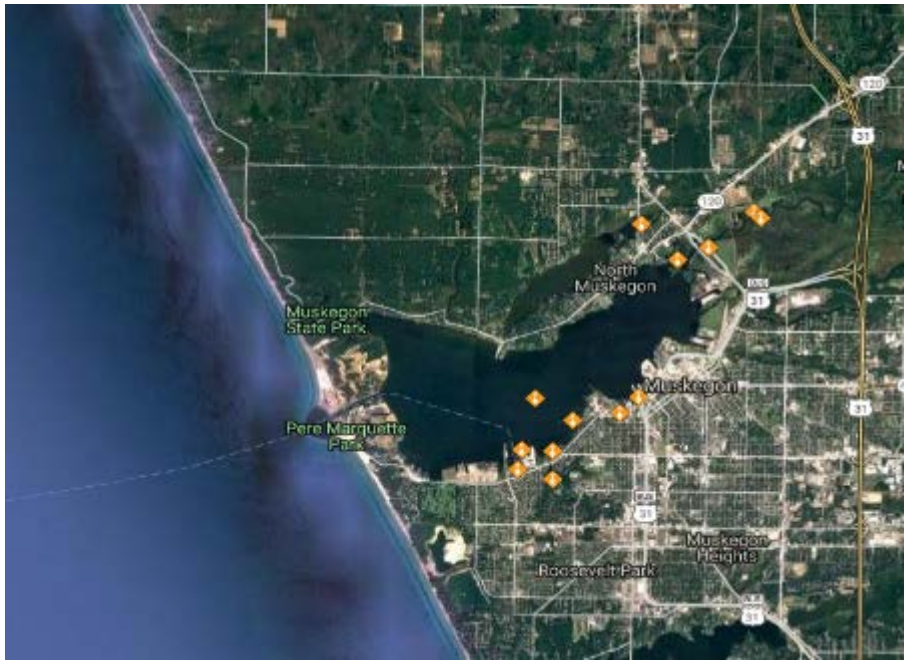
Muskegon Lake AOC





Total NOAA RC funding invested in Muskegon Lake AOC: $25M+

Muskegon Lake AOC



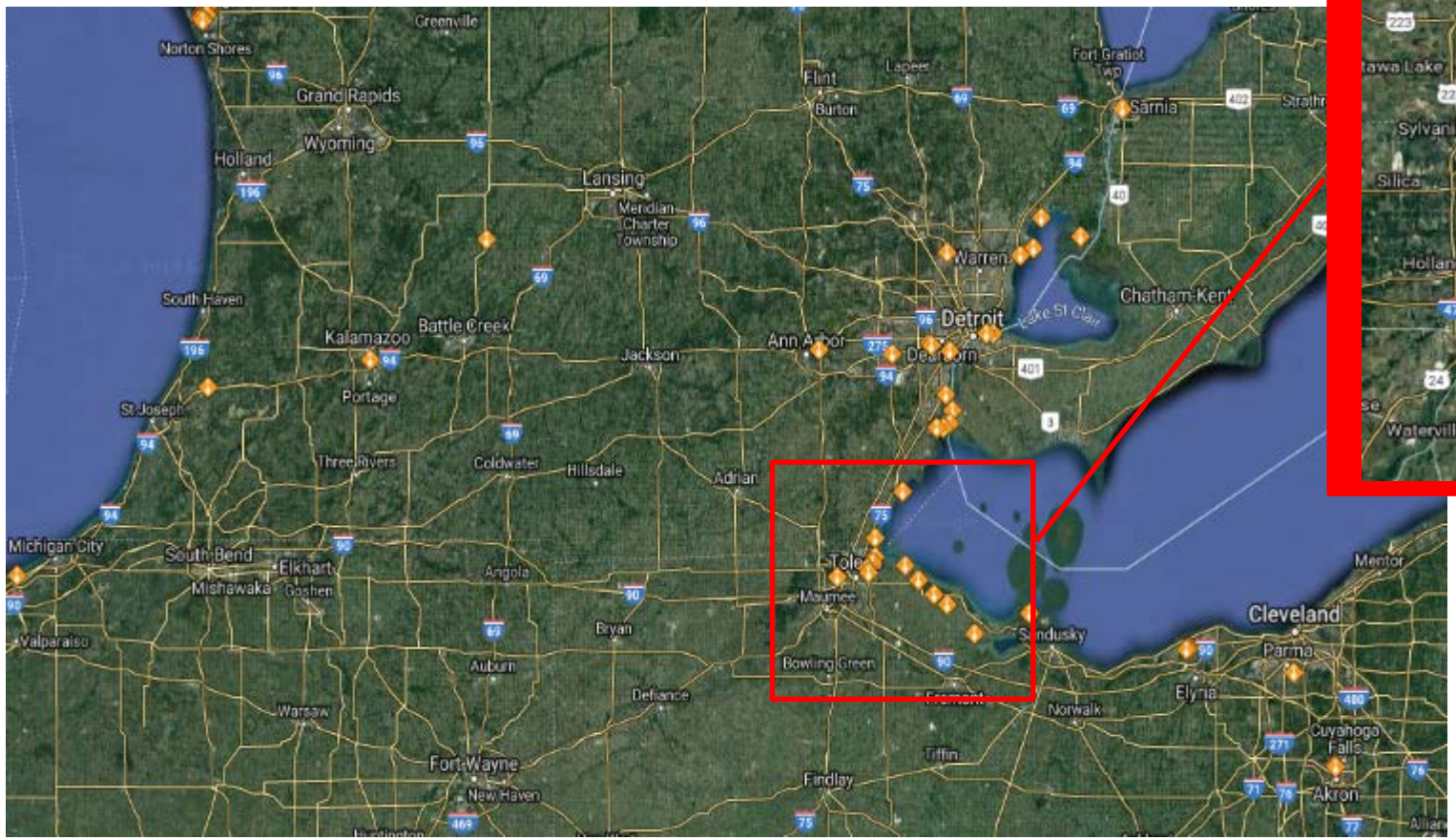
Beneficial Use Impairments

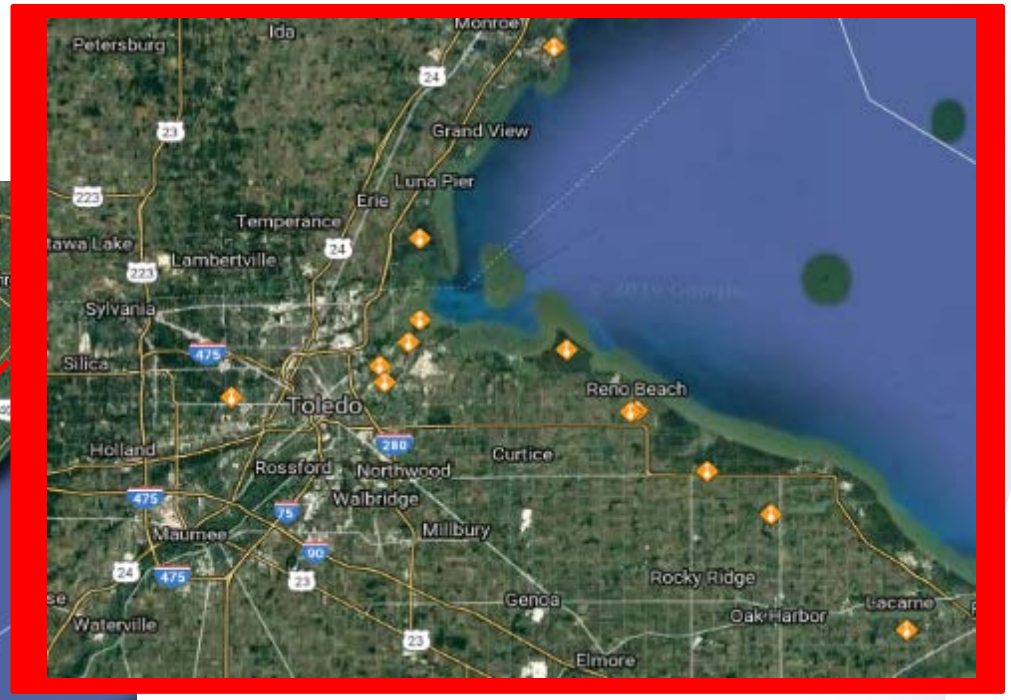
- Beach closings - **Removed 2015**
- Restrictions on Fish and Wildlife Consumption – **Removed 2013**
- Eutrophication or Undesirable Algae
- Restrictions on Drinking Water Consumption, or Taste and Odor – **Removed 2013**
- Degradation of Fish and Wildlife Populations
- Degradation of Aesthetics
- Degradation of Benthos
- Restrictions on Dredging Activities - **Removed 2011**
- Loss of Fish and Wildlife Habitat

Muskegon Lake AOC

- The removal of Mill Debris at four sites restored open water conditions and benthos to improve habitat
- The Bear Creek project restored a previously diked and disconnected wetland, providing habitat and improving the nutrient function of the former floodplain wetland (~36 acres)
- The Veterans Memorial Park project restored 15.4 acres of habitat and 3,645 feet of shoreline, and replaced an aging water control structure
- The Lower Muskegon River project will remove three dikes from a former celery farm to restore 57.5 acres of former floodplain wetland
- Work underway at the Muskegon Environment, Research, and Education Society's (MERES) Muskegon Lake Nature Preserve will restore approximately 9 acres of coastal wetland habitat
- Design plans for the former Amoco/BP oil distribution terminal are expected to restore 9.8 acres of habitat and 575 feet of shoreline, and remove 1,700 feet of concrete wall surrounding the property
- **ALL MANAGEMENT ACTIONS ON TRACK TO BE COMPLETE BY 2020**

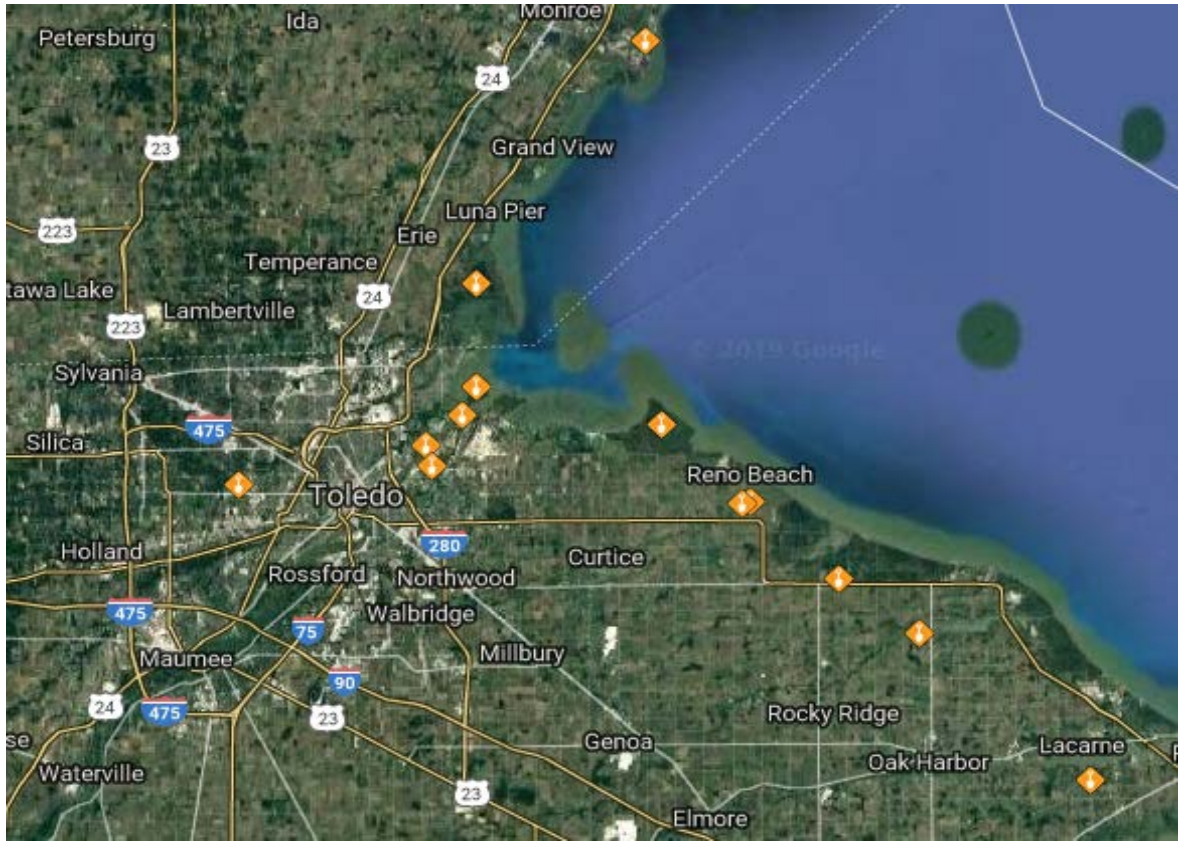
Maumee AOC





Total NOAA RC funding invested in Maumee AOC: $8M

Maumee AOC



Beneficial Use Impairments

- Added Costs to Industry and Agriculture - **Removed 2015**
- Restrictions on Fish and Wildlife Consumption
- Eutrophication or Undesirable Algae
- Degradation of Fish and Wildlife Populations
- Beach Closings
- Fish Tumors or Other Deformities
- Degradation of Aesthetics
- Degradation of Benthos
- Restriction on Dredging Activities
- Loss of Fish and Wildlife Habitat

Maumee AOC

- Restoration at the Penn 7 former confined disposal facility will restore 15.2 acres of wetland habitat on the lower Maumee River. These coastal wetland habitats will become nursery areas for juvenile migratory fish.

- NOAA and partners have worked since 2013 to restore Howard Marsh, an agricultural property near the shore of Lake Erie. Phase I restored over 560 acres of coastal wetland and 100 acres of upland. Phase II (underway) will restore an additional 210 acres of coastal wetlands and 25 acres of upland forest and native grass and will reconnect the wetland to Lake Erie through a seasonal fish passage structure.

- Formerly a waterfowl hunt club, wetlands at the Toussaint Wildlife Area were divided by dikes into five separate units with no connection to the Toussaint River. This project – currently in its final phase – will restore 125 acres of wetlands in two units, and both units will be reconnected to the river through water control structures that allow for seasonal fish passage.

- **PROJECTED TO IMPLEMENT ALL MANAMGEMENT ACTIONS BY 2024**

Detroit River AOC

Shoals constructed at Stony and Celeron Islands near the mouth of Lake Erie provide habitat and protect the islands from strong waves, helping prevent erosion and reform previously lost wetland areas.

Detroit River AOC

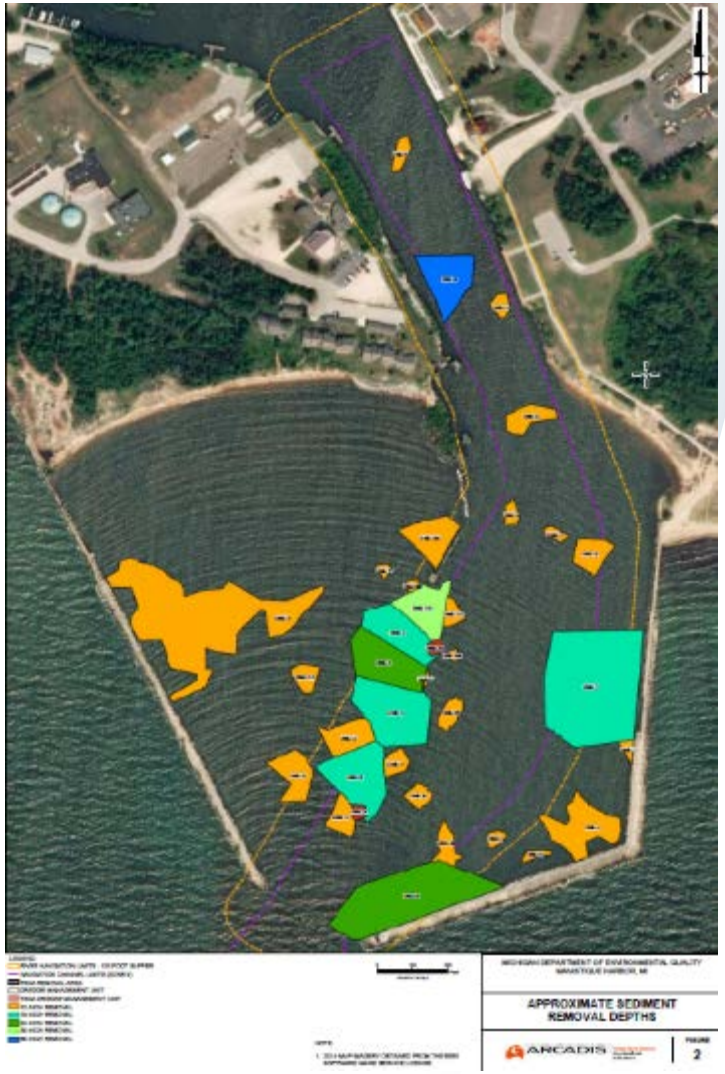
Lake Okonoka and the Belle Isle internal waterways and wetlands are being reconnected to the river, providing spawning and nursery habitat for juvenile fish.

Detroit River AOC

Design plans are underway to restore offshore habitat shoals to enhance habitat at Sugar Island. The area near Sugar Island serves as an important spawning habitat, but exposure to high wind and waves have resulted in severe erosion.

Manistique River AOC

- The Manistique River flows through heavily forested land in Michigan's Upper Peninsula to its mouth on Lake Michigan.
- The City of Manistique is located at the mouth of the river and historically served as a significant lumber port.
- Pollution from local industry, particularly PCBs from a paper mill, resulted in contamination of sediments in the river.



Manistique River AOC

- The Manistique River was originally designated as an AOC in 1987 with 5 BUIs. USEPA performed several dredging activities 1993-2001.
- 3 of the BUIs were removed 2006-2009, leaving 2 remaining: (1) restrictions on fish and wildlife consumption, and (2) restrictions on dredging activities.
- Since 2013, NOAA has lead a multi-phase effort to address these final two BUIs, with the goal of removing the AOC designation for the Manistique River.

Manistique River AOC

- In 2013, NOAA awarded an initial grant to MDEQ (now EGLE) to develop and implement a dredging plan. Feasibility Study and Modeling were performed.
- OU1 (2016) Dredging of 9,500 cy of sediment in the north bay area (Zones 3 and 4) and placement of a sand cover.
- OU2 (2019) Removal of 42,500 cy of sediment in the lower river mouth. Placement of a sand and activated carbon cover to bind remaining PCBs to limit bioavailability.

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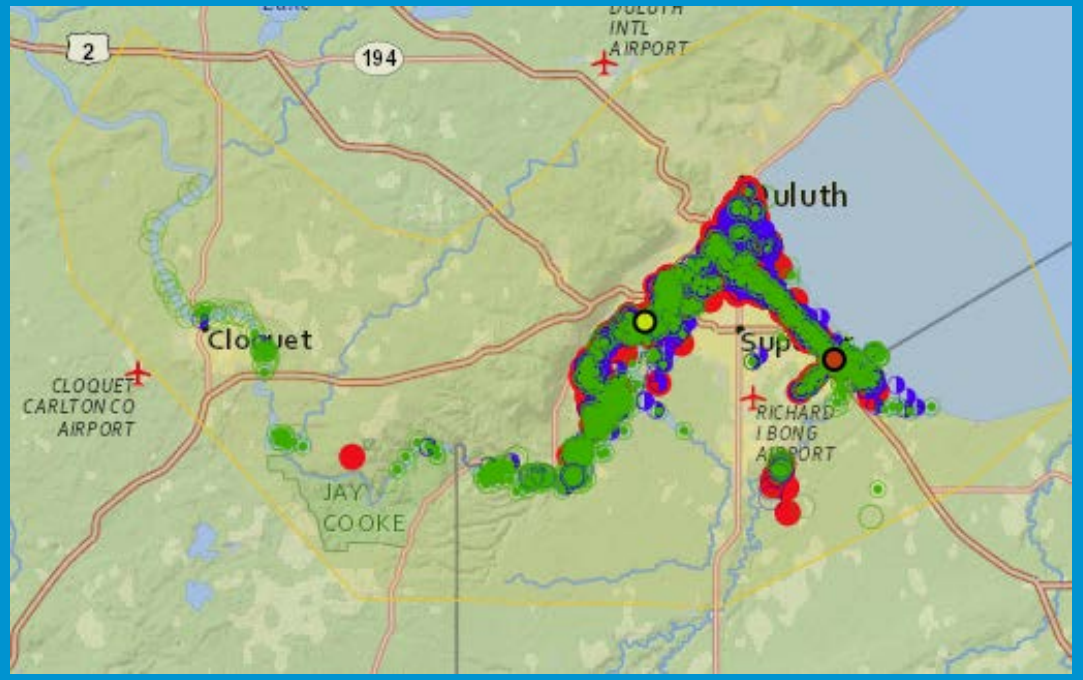
St. Louis River AOC DIVER Data Systems



Robb Wright
Ben Shorr

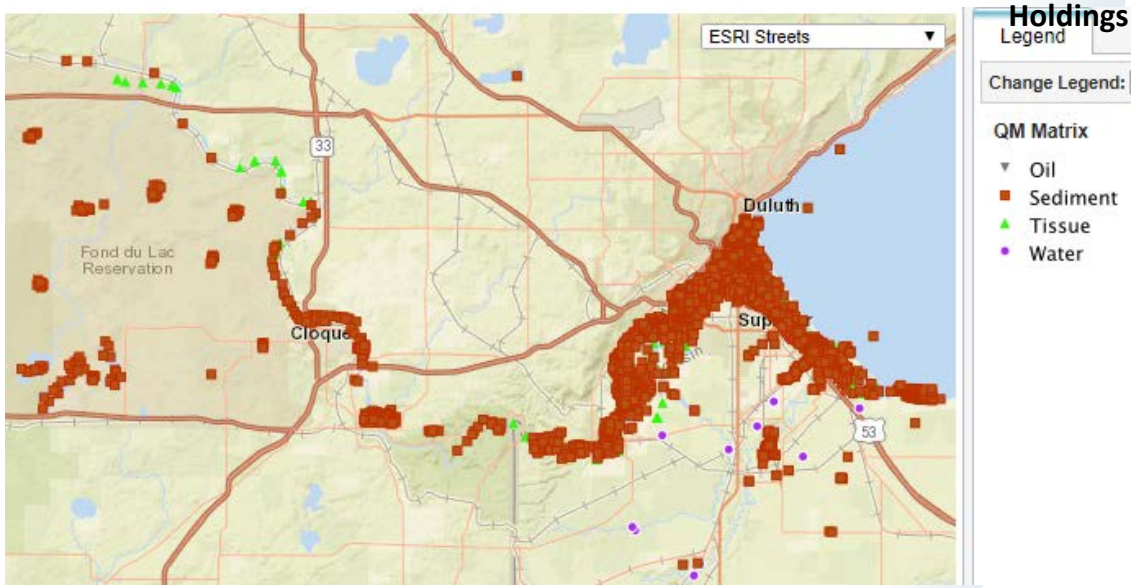
NOAA GLRI Webinar
January 22, 2020

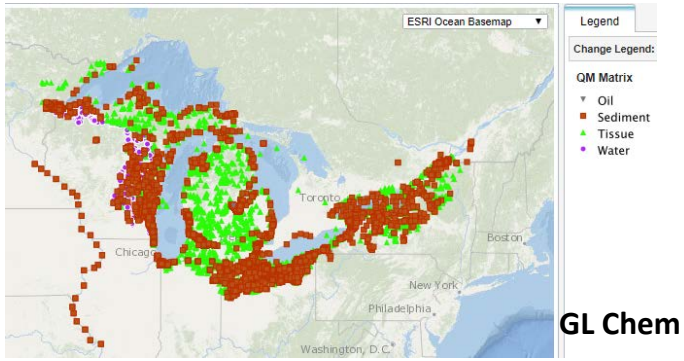
Great Lakes RESTORATION

SLR DIVER Data Systems

- Focus Area 1 – Toxics
- The Great Lakes DIVER data warehouse and related tools provide data in a standardized, reliable and accessible format to support a BUI delisting package.
- PIs: Ben Shorr, Robb Wright
- Work has evolved over time. SLR DIVER Data Systems received funding in FY17 ($260k) and FY18 ($240k), building on work from related GLRI FY13/14 funding
- 1200+ chemistry and non-chemistry studies now integrated and publicly available for query/display/export in the Great Lakes DIVER

SLR Chem Holdings





GL Chem Holdings

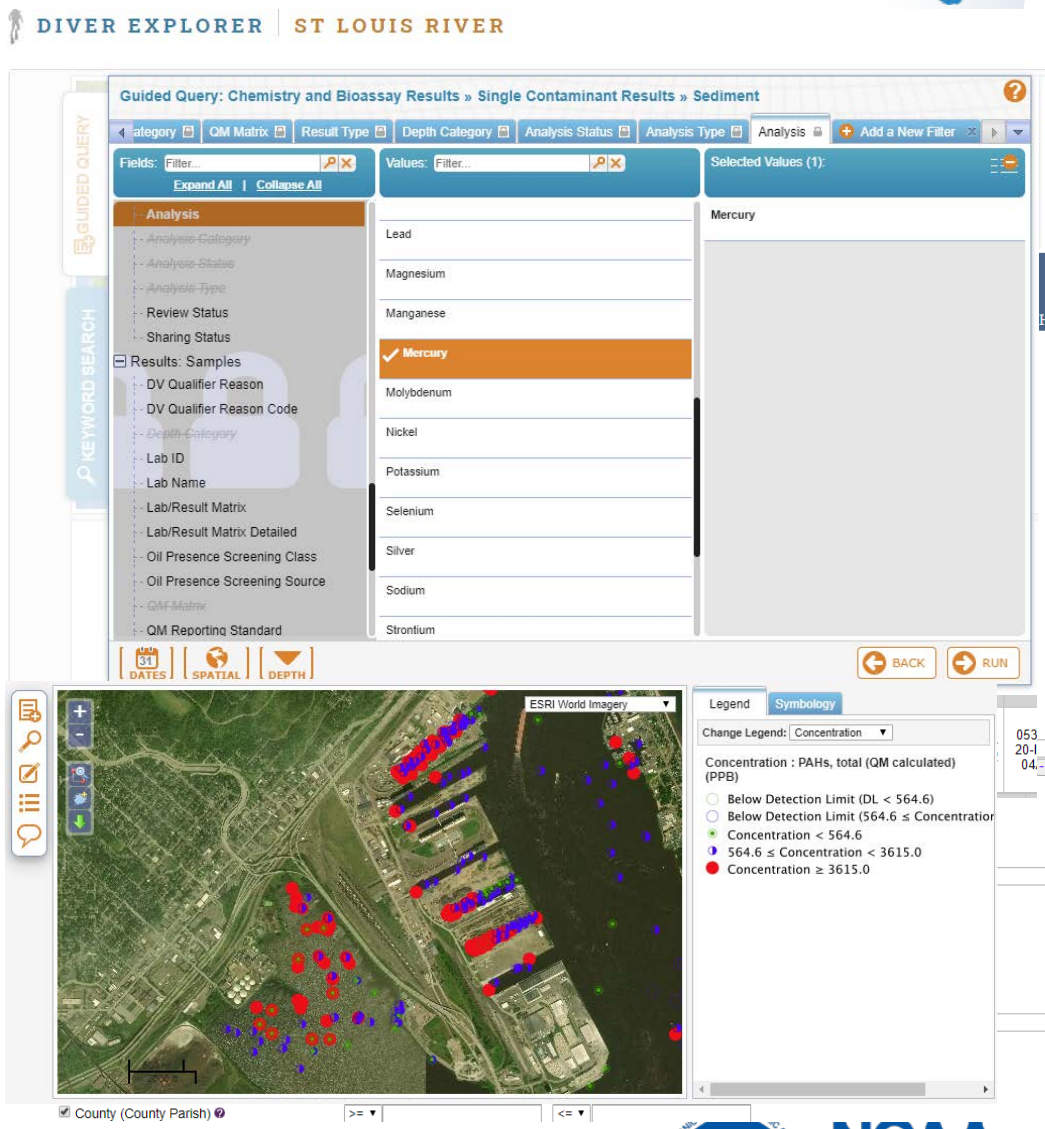
SLR DIVER Data Systems

Action Plan 1

- **Focus on contaminant sample data consolidation into Query Manager**
- Data from NOAA, EPA, CoE, GL States
- FY13/14
- QA/QC refinements across partner data holdings

Action Plan 2

- **Focus on the SLR AOC through strong partner coordination**
- FY 16/17
- Creation of a Quality Assurance Project Plan (QAPP) for the Great Lakes
- 100+ chemistry and non-chemistry SLR-specific studies in DIVER from Federal and States
- Public Website Publication of the QAPP, data specification, templates
- Data Web Services and documentation using via NOAA's ERDDAP
- Public access to GLSED data
- In-person and web DIVER training for SLR state/local partners



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Great Lakes Mussel Watch

Ed Johnson

NOAA GLRI Webinar

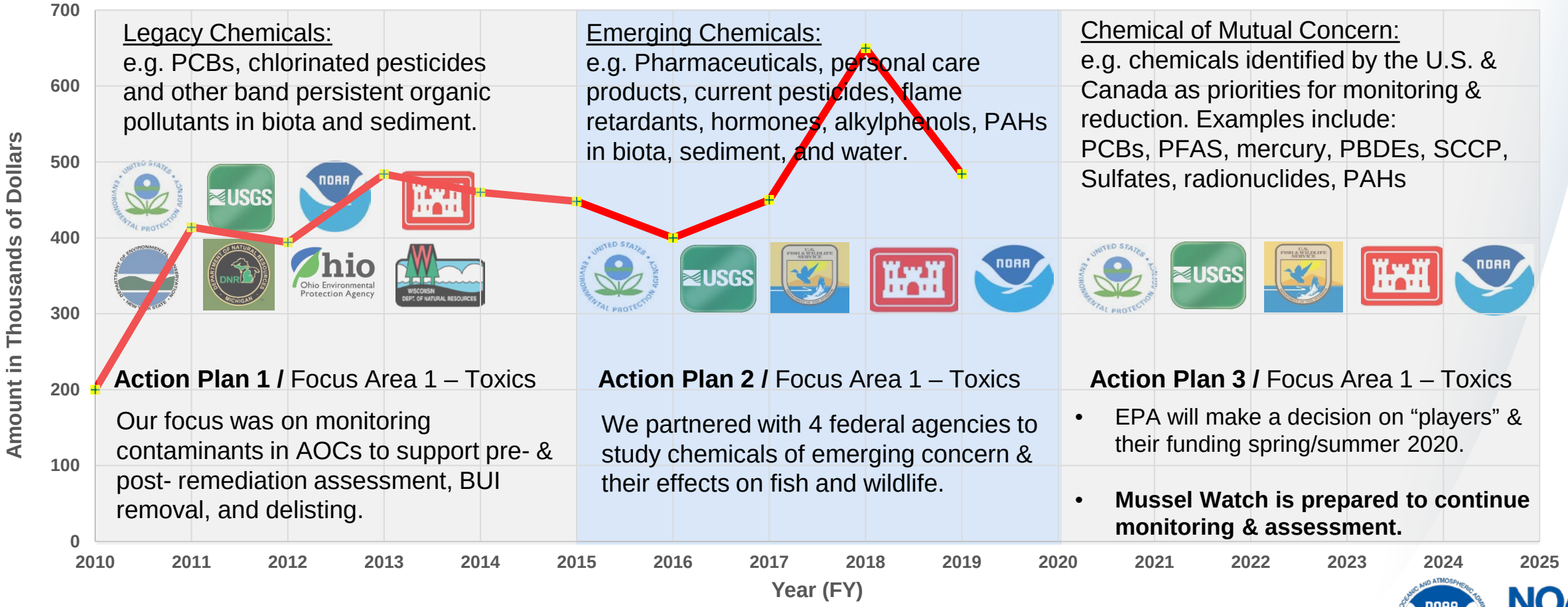
January 22, 2020

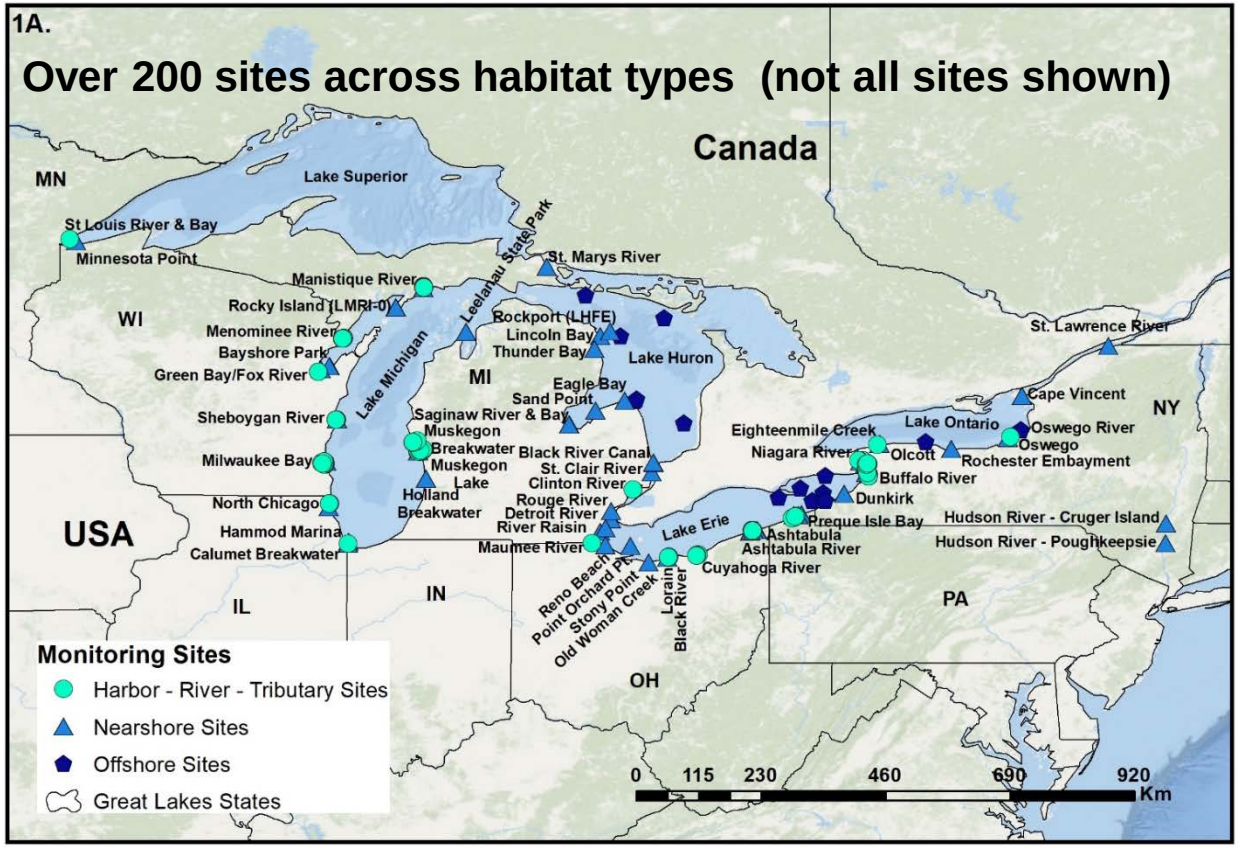
Great Lakes RESTORATION

Project Introduction

Project Lead and Co-PI: Ed Johnson and Kimani Kimbrough

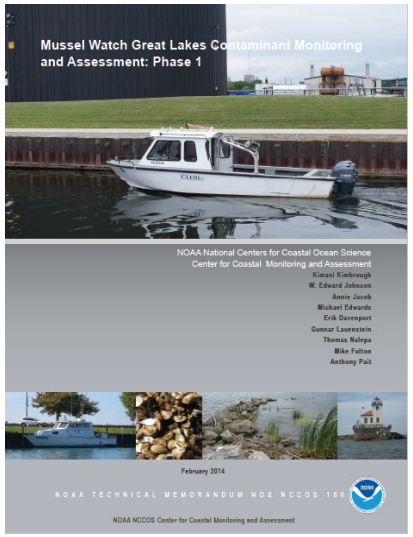
GLRI Funding Amount (Total to Date: $4.4 million) / federal & state collaborating partner logos

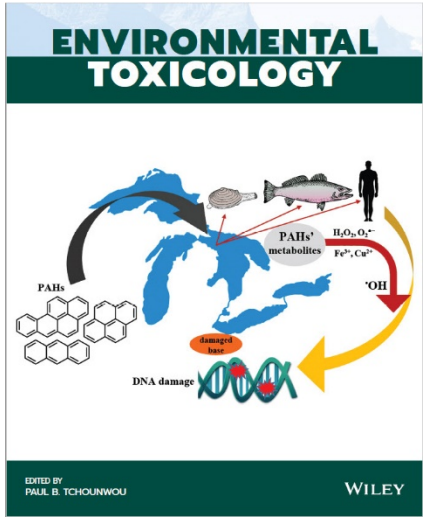




- **Annual Contaminant Monitoring since 1992;**
- **Data for Tissue, Sediment, and Water;**
- **Sample Archive for Retrospective Analysis;**
- **Basin Wide Mussel Metabolomics & DNA damage.**

Selected Publications:





Publications in preparation:

- Basin wide assessment of PAHs;
- Maumee River contaminant assessment;
- Mussel metabolomics: basin wide site comparisons;
- Mussel metabolomics: temporal comparisons;
- Milwaukee Estuary assessments;
- Cellular biomarkers in contaminants exposed mussels;
- Microplastics in dreissenid mussels.

Toxic Substances and AOCs Q&A

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