



*A Holistic Watershed Approach to Health at  
Huntington Beach*

GLRI Lake Erie Synthesis & Coordination  
Team Meeting

November 10<sup>th</sup>, 2010

Prepared By: Jill Lis, R.S., Supervisor  
Cuyahoga County Board of Health

# Collaboration

- Project Partners:
  - Cuyahoga County Board of Health
  - University of Toledo
  - Cuyahoga Soil & Water Conservation District
  - Lake Erie Nature & Science Center
  - Cities of Bay Village & Westlake
- Project Award: \$247,518
- Project Cost: \$303,758 (includes in-kind services from the University of Toledo)



# Project Goals

- Improve recreational water quality and human health at Huntington Beach by reducing pathogen inputs from the surrounding watershed (Porter Creek Watershed)
- Provide a Contamination Prevention Plan to reduce public risk to contamination by locating bacteria sources within the watershed and public education and outreach.

# Background

- This project will build upon 6 years of research between CCBH and UT
- Sampling performed at Huntington Beach and within Porter Creek
  - Dry and wet weather sampling events
- *E. coli* enumerated
- DNA extraction
- Genetic “fingerprints” were generated

# Preliminary Conclusions

- *E. coli* inputs from Porter Creek were significantly higher during wet weather than during dry weather.

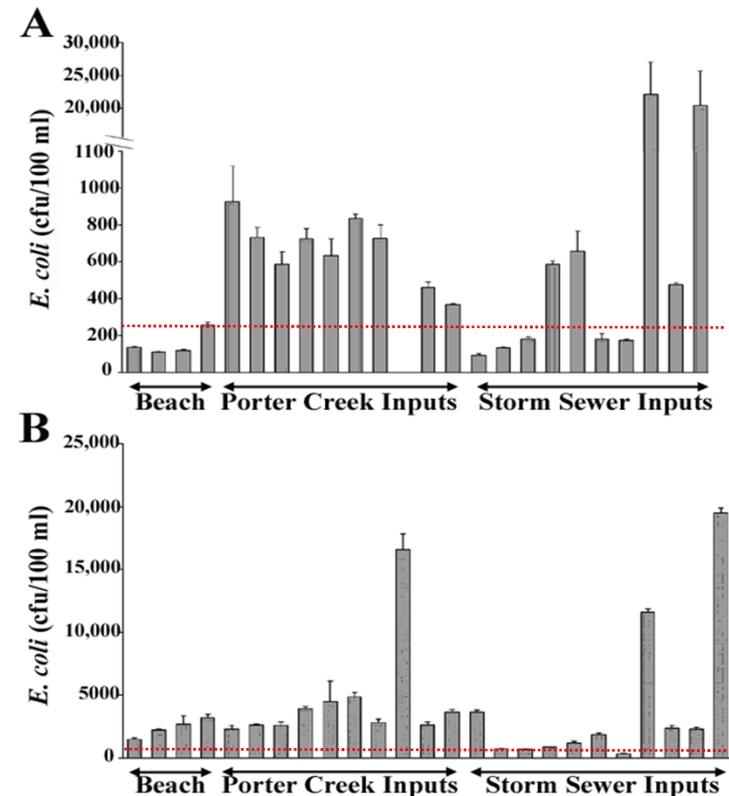


Figure 1. *E. coli* densities in water samples collected from within the Porter Creek Watershed following (A) dry weather and (B) wet weather. The horizontal dotted line represents the density above which a water quality advisory will be posted. Note the difference in the scale of the y-axes.

# Preliminary Conclusions

- *E. coli* “communities” within Porter Creek were genetically similar to the *E. coli* communities at Huntington Beach.
- Similarities were stronger during wet weather conditions.

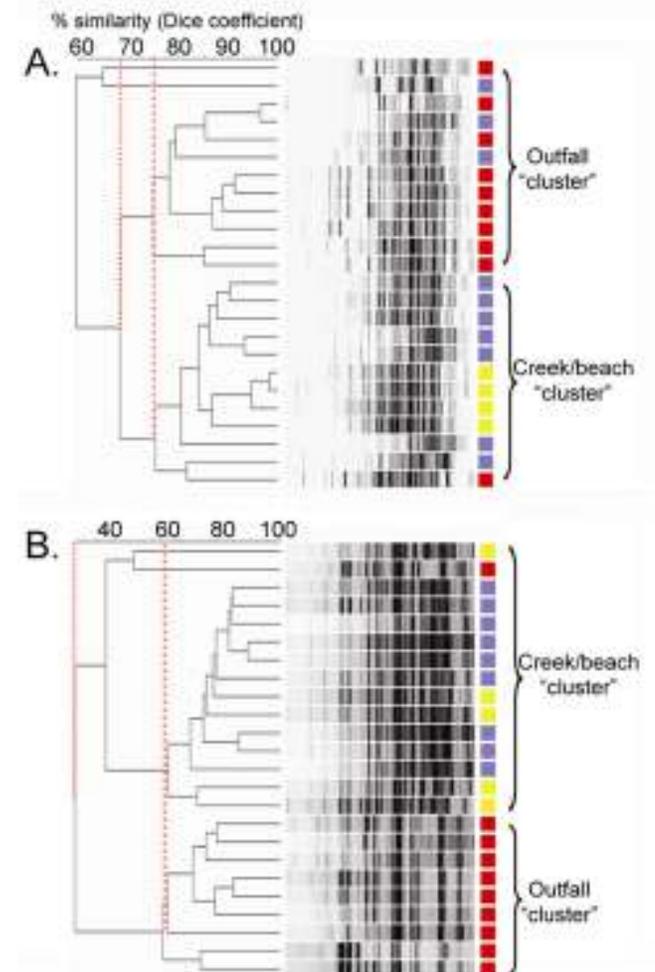


Figure 2. DGGE analysis of *E. coli* communities collected from within the Porter Creek Watershed following (A) dry weather and (B) wet weather. Under both weather scenarios, Porter Creek and the storm sewer network appear to influence the *E. coli* at Huntington Beach. However, Porter Creek appears to provide greater contribution during wet weather, as noted by the difference in cluster branching depth (shown by the horizontal distance between the vertical dotted lines).

# Project Timeline

- 2 year project
- April 2011 thru March 2013
  - Due to timing of award notification, and the nature of the field component of the project, the start date needed to be pushed back

# Year 1

- Identification of the specific storm sewer outfalls that contribute significant amounts of *E. coli* to Porter Creek (“target outfalls”)
- Sampling of ~100 outfalls
  - Outfalls will be divided into 5 groups of 20
  - Water will be collected from 10 random outfalls from each of the 5 groups during each sampling event
- This will allow for the determination of the most statistically significant group of outfalls that contribute *E. coli* to Porter Creek

# Year 1 cont...

- Sampling will be conducted under the following conditions:
  - Rainfall greater than 0.5 inches within 24 hours
  - April thru September
  - 2 liters of water will be collected from outfall
- 2 teams of 2 people
- Samples will be preserved and delivered to UT for analysis
- ~250 samples are anticipated to be collected

# Year 2

- Additional sampling
  - Including grab samples from overland flow areas (parking lot runoff, street curbs, etc..)
  - ~350 samples are anticipated to be collected
- DNA fingerprinting of *E. coli*
  - Link *E. coli* from identified land-based sources to the target outfalls and Huntington Beach

## Year 2 cont...

- Results will allow for the development of a Contamination Prevention Plan (CPP)
  - Will include strategies and best management practices to minimize exposure hazards for beach visitors
  - Will serve as a “guide” for remediation strategies for bacteria inputs within the watershed

# Education and Outreach

- Year 1 and Year 2
- Involvement of citizens, multiple stakeholders, and local schools
- Homeowner education
- Teacher Education
  - Project WET Curriculum
  - Rain barrel workshops
- World Water Monitoring Day event
  - International education and outreach program
  - Builds public awareness and involvement of the protection of water resources
- Concluding Seminar

# Status

- Formal, full grant application included the project Work Plan in a QAPP format
  - QAPP has been approved
- Assistance Agreement has been signed
- Project Team Meeting scheduled for November 16<sup>th</sup>, 2010

Questions?

An aerial photograph of a coastal region, showing a large body of water in the foreground and a city with a grid street pattern in the background. The water appears somewhat turbid or brownish, possibly due to runoff or pollution. The city is situated along the coast, with buildings and roads visible. The overall scene suggests a focus on environmental and public health issues related to coastal water quality.

# Nearshore Health & Nonpoint Source Pollution

Selective, Multiplexed, Real-time Detection of  
Bacteria

Weidong Zhao

(Northeast Ohio University College of Medicine)



# Nearshore Health & Nonpoint Source Pollution

North Central Ohio Sediment Reduction Project

Cary Brickner  
(Huron SWCD)

An aerial photograph of a river watershed, showing a network of waterways and surrounding land. The text is overlaid on the image in a semi-transparent black box.

# Nearshore Health & Nonpoint Source Pollution

TMDL for Ottawa River (Lima) Watershed

Gail Hesse  
(OEPA)

An aerial photograph of a coastal area, likely Cuyahoga County, Ohio. The image shows a mix of green land, brownish water, and urban areas. The text is overlaid on the top half of the image.

# Nearshore Health & Nonpoint Source Pollution

Cuyahoga County Surface Water Improvement  
Fund

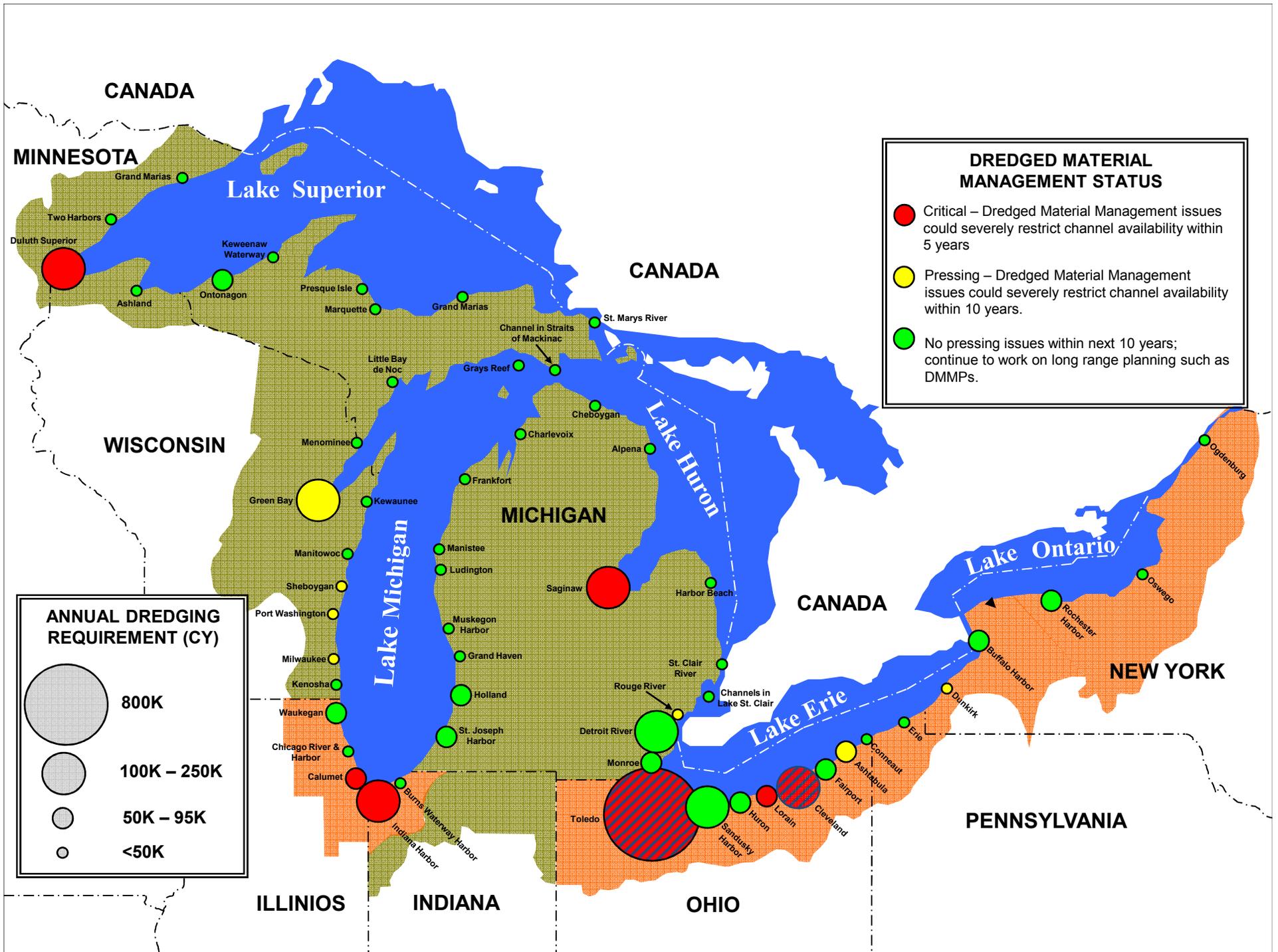
Russ Gibson  
(OEPA)

An aerial photograph of a large body of water, likely a harbor or bay, showing a significant sediment plume extending from the shore. The water is a mix of green and brown, indicating turbidity. The shoreline is visible with some buildings and infrastructure.

# Nearshore Health & Nonpoint Source Pollution

Toledo Harbor Sediment Management and  
Reuse

Ed Hammett  
(Ohio Lake Erie Commission)



CANADA

MINNESOTA

Lake Superior

CANADA

WISCONSIN

MICHIGAN

Lake Huron

CANADA

**ANNUAL DREDGING REQUIREMENT (CY)**

800K

100K – 250K

50K – 95K

<50K

Lake Ontario

NEW YORK

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Focus: Nearshore Health & Nonpoint Source Pollution

- Toledo Harbor Sediment Management and Reuse (OLEC) \$250K
  - Develop a Sediment Management Plan for Toledo Harbor to reduce sediment and pollutant loading by a minimum of the annual average contribution of the Maumee River- the largest single sediment source to Lake Erie. Plan will be prepared by a Task Force of agencies with recommended short and long term options to eliminate nearshore disposal of dredged sediment, restore aquatic and upland habitat, provide alternatives for the reuse of dredged sediments, incorporate sediment reductions, and assure environmentally responsible dredging. Some options will be designed to be immediately fundable.

# Project Priorities

- Finalize and Implement short term plan
- Finalize a 30 yr Sediment Management Plan
- Initiate the long term beneficial use options
- Goal is to complete the plan in one year

# Toledo Harbor Dredging Task Force

Local, State and Federal Cooperation to:

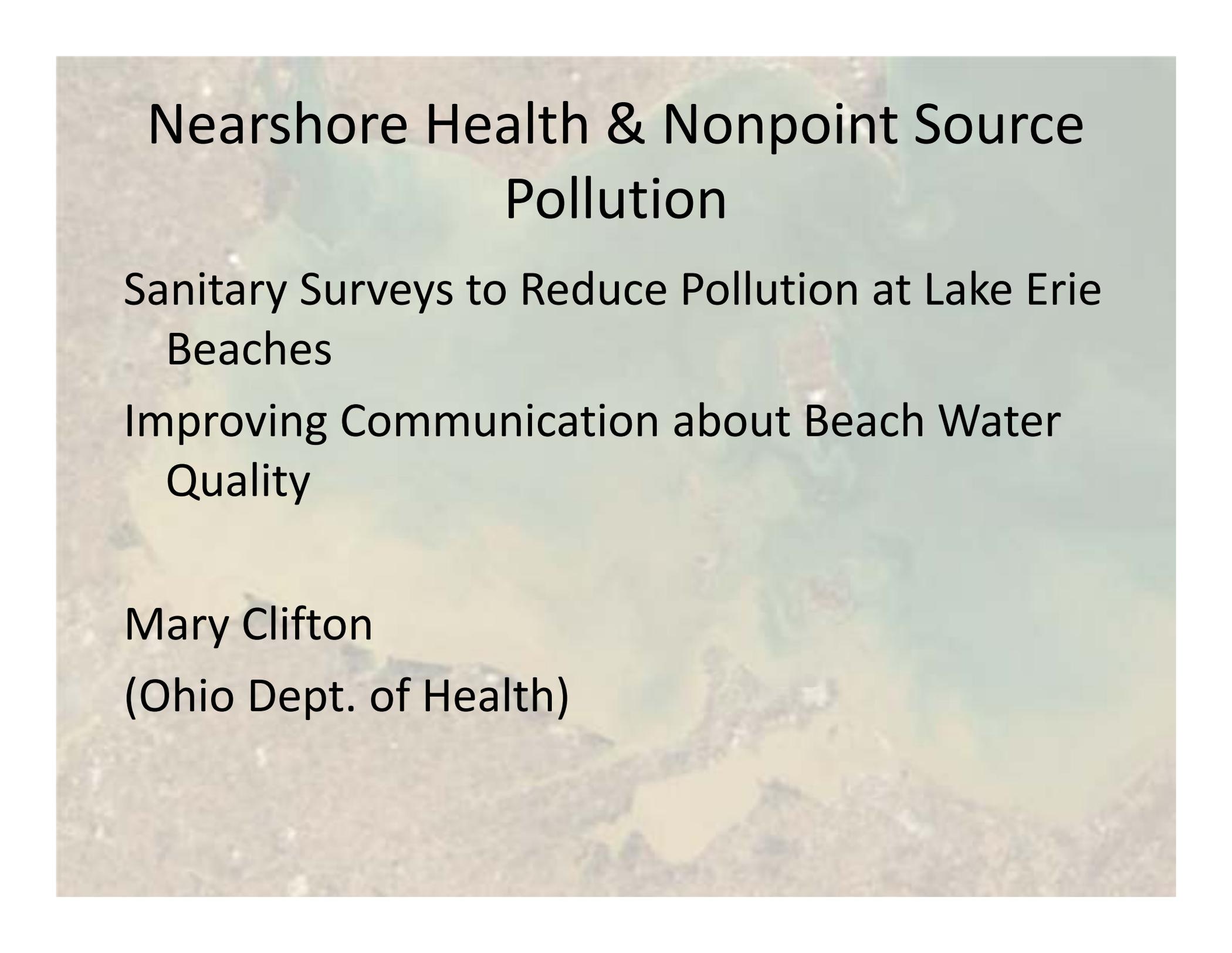
- Maintain Toledo Harbor Channel to authorized depths
- Environmentally responsible dredging
- Beneficial use of sediments

An aerial photograph of a coastal region, likely Lake Erie, showing a large body of water with varying shades of green and blue, surrounded by land with some urban and agricultural areas. The text is overlaid on this image.

# Nearshore Health & Nonpoint Source Pollution

Phosphorus Reduction: Variable Rate  
Technology Program

Gail Hesse  
(Ohio EPA)



# Nearshore Health & Nonpoint Source Pollution

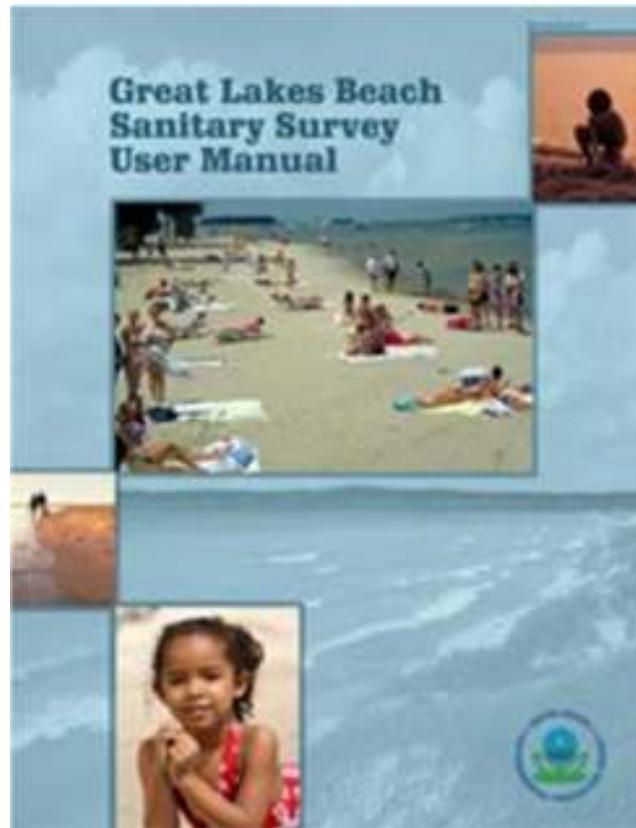
Sanitary Surveys to Reduce Pollution at Lake Erie  
Beaches

Improving Communication about Beach Water  
Quality

Mary Clifton

(Ohio Dept. of Health)

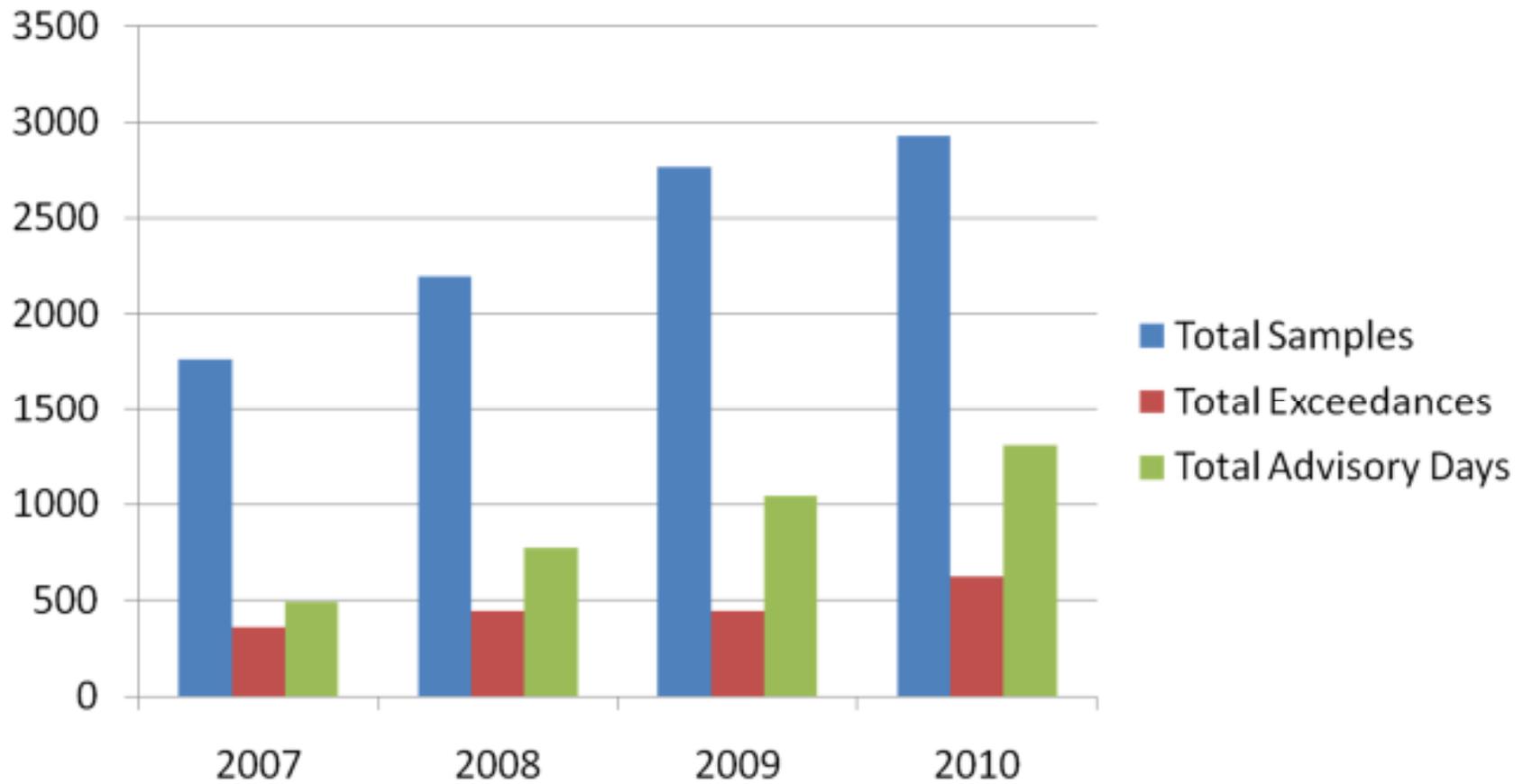
# Sanitary Surveys to Reduce Pollution at Lake Erie



# Sanitary Surveys cont.

- The National Resources Defense Council annually publishes Testing The Waters
- In the 2007 report Ohio ranked 1<sup>st</sup> in the % of beach water samples that exceed the standard (2006 season)
- 2008 report Ohio ranked 2<sup>nd</sup>
- 2009 report Ohio ranked 2<sup>nd</sup>
- 2010 report Ohio ranked 3<sup>rd</sup>

# The last 4 swim seasons



# Sanitary Surveys cont.

- Training on conducting a sanitary survey
- Data collection
- Web based entry of information

# Improving Communication about Beach Water Quality



# Improving Communication cont.

- Increase web based communication
  - Update program website
  - Facebook
  - Smartphone  applet
- Children's Poster Contest
  - 9 counties
  - Prizes
- Development of a Press Packet

# Improving Communication cont.

- Quarterly Meetings
  - Involve interested parties
  - Help facilitate better communication
  - Information sharing

An aerial photograph of a large body of water, likely a lake, with a prominent brownish, turbid area along the shoreline, indicating pollution or sediment runoff. The water in the center is a clear, light blue-green color.

# Nearshore Health & Nonpoint Source Pollution

The Lake Erie Nearshore and Offshore Nutrient  
Study

Darren Bade  
(Buffalo State University)

# **THE LAKE ERIE NEARSHORE AND OFFSHORE NUTRIENT STUDY (LENONS)**

Chris Pennuto – Buffalo State College

Darren Bade – Kent State Univ.

Gerald Matisoff – Case Western Reserve Univ.

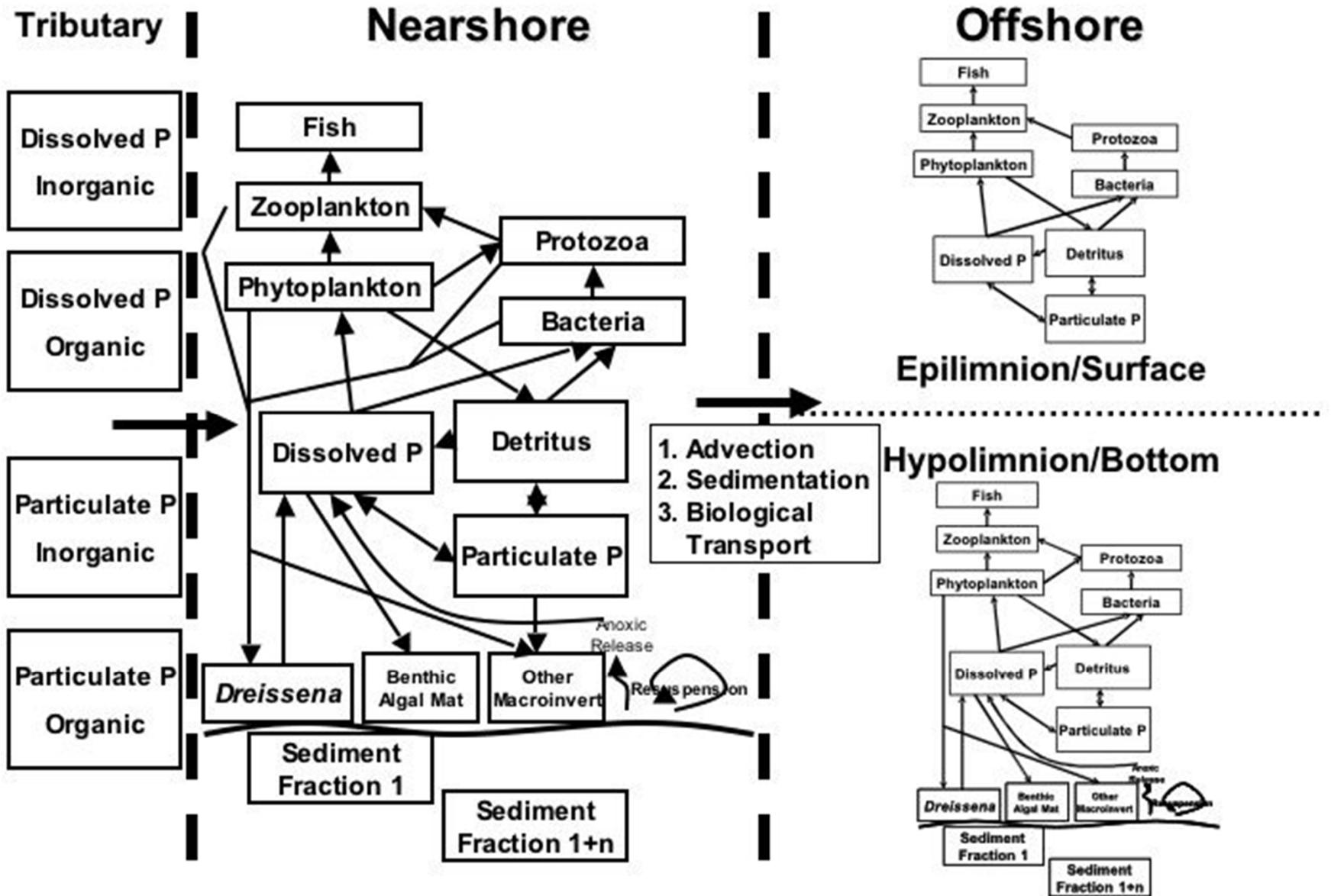
Jack Kramer – Heidelberg Univ.

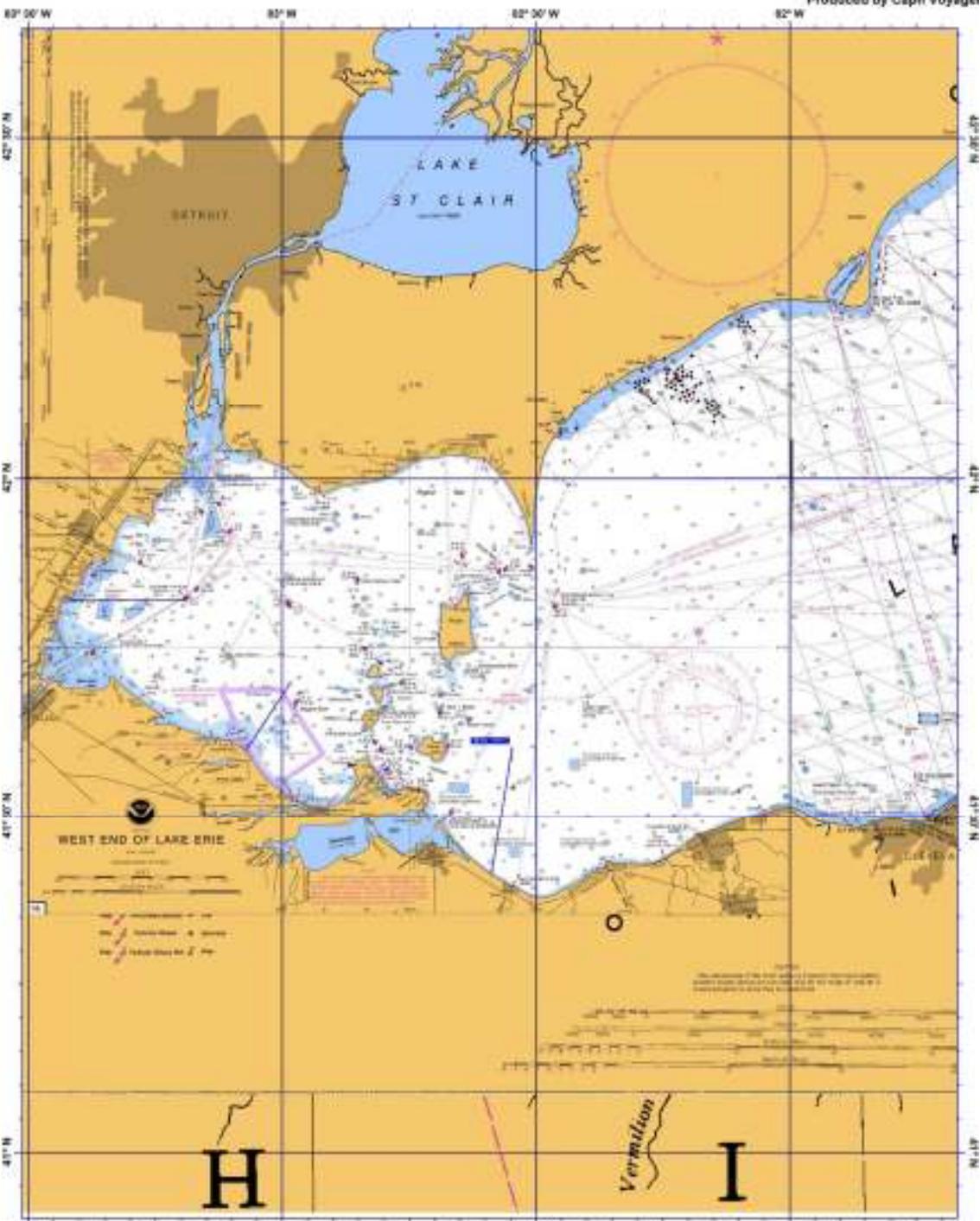
Christine Mayer – Univ. of Toledo

# Aims

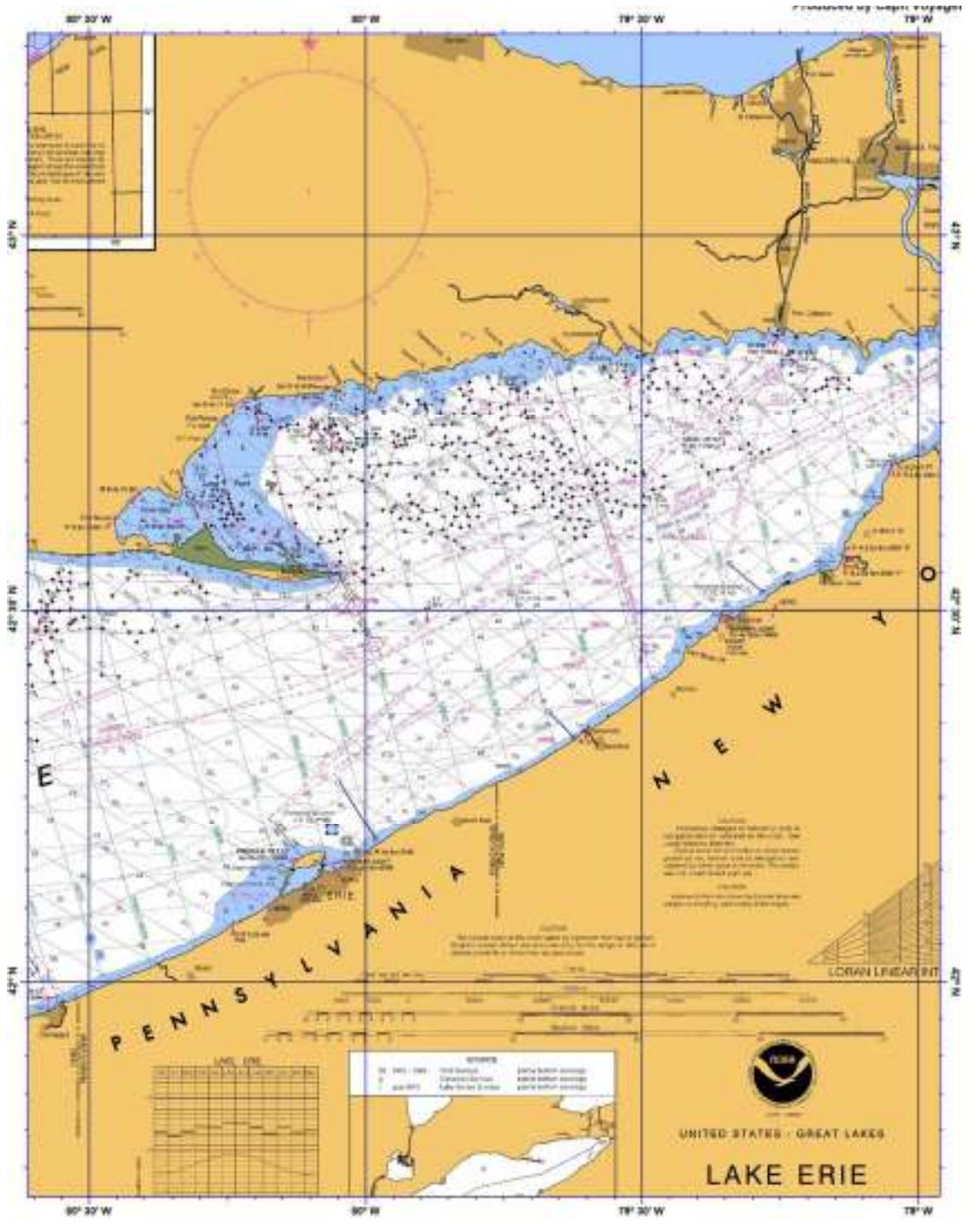
- quantify the major biotic and abiotic nutrient pools, flux rates, and trophic pathways in the nearshore and offshore regions of Lake Erie

# Box & Arrow Phosphorus Pools in Nearshore and Offshore Lake Erie









80° 30' W

80° W

79° 30' W

78° W

43° N

N. 43° N

42° 30' N

N. 42° 30' N

42° N

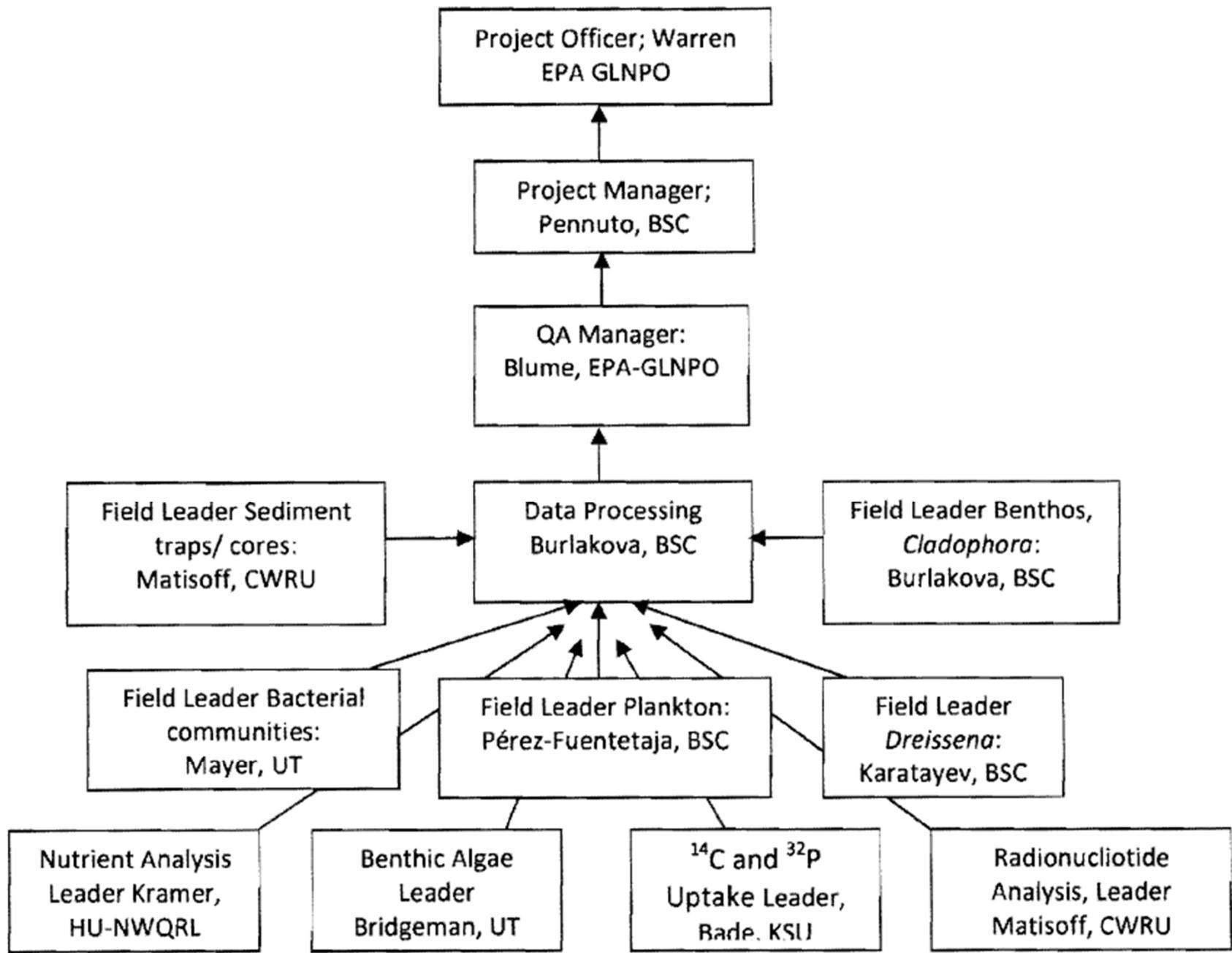
N. 42° N

80° 30' W

80° W

79° 30' W

78° W



**Figure 1. Organization of the project team.**