

# Investigating Redirection of Detroit River Flow to Reduce Harmful Algal Blooms in Western Lake Erie Basin

Lead: Tim Calappi, Detroit District, Timothy.J.Calappi@usace.army.mil

## USACE Harmful Algal Bloom Research & Development Initiative



*Delivering scalable freshwater HAB prevention, detection, and management technologies through collaboration, partnership, and cutting-edge science.*

### Problem

Harmful algal blooms (HABs) in the Western Lake Erie Basin (WLEB) pose a significant threat to the ecosystem and human health. Approximately 12 million people in the US and Canada utilize the WLEB as a source of drinking water. HABs have increased significantly over the past 15 years in the WLEB in large part due to nutrient inputs delivered from the Maumee River.

### Objective

Diverting nutrient-poor Detroit River water towards the Maumee River outlet has potential to dilute nutrient concentrations in the WLEB and thereby reduce HAB severity and extent. The objective of this project is to use computer models to simulate Detroit River water diversion and assess predicted range of nutrient dilution factors that could theoretically be achieved in the WLEB.

### Approach

Circulation in the WLEB will be investigated using a combination of new and existing hydrodynamic models. Due to the shallow nature of the WLEB, waves are an important part of determining large scale circulation patterns. A Coastal Modeling System (CMS) Wave grid will be developed and used in combination with the circulation model to evaluate three alignment alternatives that would divert Detroit River water towards the Maumee River outlet.

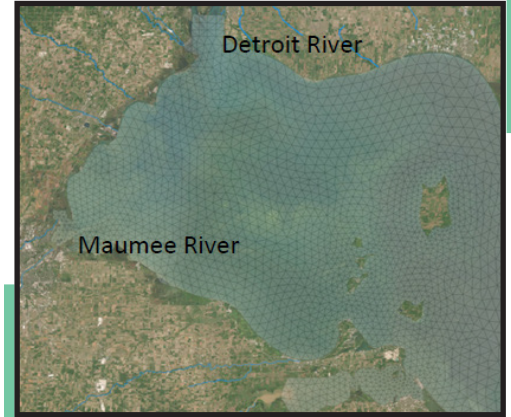


Figure 1. Satellite image of the study area.

### Partnership/Leveraging Opportunities

USACE is interested in partnerships and research that advances the reduction of HABs in the WLEB and the Great Lakes. This study examines a unique approach that could be used in conjunction with existing management efforts to reduce HAB impacts to the WLEB and inform strategic investments in the region. Many of the current HAB management efforts are focused on nutrient reduction within the watershed. While those efforts are vitally important to reducing HABs, this study looks at another innovative approach to address HABs by redirecting flow via a physical structure to dilute nutrient concentrations in the WLEB. In addition, the modeling efforts conducted can be shared with other stakeholders and modified for the needs of future project proposals that require an understanding of water movement and waves.

### Major Milestones

Date	Milestone
Jun 2023	Bathymetric data processing
Jul 2023	Develop existing conditions model and increase resolution
Aug 2023	Model calibration
Sep 2023	Wave modeling
Nov 2023	Develop alternative alignments
Dec 2023	Modeling results analysis; focused cost analysis
Jan 2024	Final report complete and shared with stakeholders

### Value to USACE Mission

The Environmental Lab has a variety of ongoing research and development efforts nationwide to evaluate and deliver scalable HAB management solutions. This study will provide stakeholders in the WLEB important information that can be used to inform future research and HAB management decisions moving forward.