Assessing Spatial and Temporal Effects of the Detroit River on Algal Bloom Distribution in Western Lake Erie

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Overview

The main cause of harmful algal blooms (HABs) in western Lake Erie is nutrient runoff from the Maumee River. While the Maumee affects bloom intensity, it is not the primary control of flow in the basin. The Detroit River has a larger influence on surface currents as it is 80% of the lake’s total inflow. However, its effect on HAB spatial extent and duration remains unknown. Here, we explore the potential role the Detroit River has on influencing summertime algal bloom spatial distribution in western Lake Erie.

Data and Methods

Along with USGS Detroit River discharge measurements, 2 types of classified satellite remote sensing imagery are used:

1. Optical Water Types (OWT)²: Categorizes different types of water masses based upon how much chlorophyll-a and colored dissolved and detrital matter is in the water (Figure 2); 7 classes (2a) have been identified.

2. Cyanobacteria Index (CI)³: Identifies presence of HABs in 10-day periods; used to determine bloom presence (Figure 3)

Using these data sources, river and bloom delineations were created and integrated with physical observations to identify river influence:

Identifying the Detroit River Plume and HABs

The Detroit River discharge has some influence on HAB intensity (Figure 6), but its influence on HAB surface area varies year to year (Figure 7).

Detroit River’s Impact on HABs

- Investigate relationship between river discharge and HAB surface area with consideration of wind
- Integrate in situ field data to continue identifying HAB presence and distribution in the western basin
- Use statistical analysis to compare surface areas with discharge and other water conditions and determine primary physical drivers of river plume and bloom variability

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