



Disturbance Ecology: Effects on Great Lakes HABs and Phycology

September 26-28, 2023

Stone Lab, Put-In-Bay, Ohio

Concept: Building upon the paper, *Paradox versus paradigm: A disconnect between understanding and management of freshwater cyanobacterial harmful algal blooms* (Bramburger et al., 2022), this summit aimed to (re)integrate key concepts of limnology, community ecology, phycology, and molecular ecology into a more holistic paradigm for HABs management. Hosted by the Great Lakes HABs Collaborative in partnership with the Cooperative Institute of Great Lakes Research and the Ohio State University, the summit brought together university- and agency-based scientists and resource managers from the Great Lakes region and beyond.

Objectives:

1. Determine the sources of uncertainty in predictions of HAB occurrence, severity, and toxicity.
2. Characterize data/knowledge needed to address key gaps in regional understanding of HABs dynamics and identify existing datasets that can be used to reduce uncertainty.
3. Establish a set of science priorities to help fill associated data/knowledge gaps and identify potential participants for a collaborative working group to lead targeted research programs.

Activities: The summit included a presentation highlighting the concepts from Bramburger et al. (2022), a roundtable for agency representatives to share comments on observed changes and science needs for management, participants creating a list of possible factors which are changing the Great Lakes system to potentially affect cyanobacterial proliferation/toxicity, and facilitated group discussions for participants to organize this list into distinct groups of related factors and questions for further study.

Outcomes (to be produced in 2024):

1. Peer reviewed paper. The paper will build upon Bramburger et al. (2022) and address the following:
 - o Critical review of HAB drivers in lake systems, with emphasis on factors that do not conform to the generally accepted paradigm of high nutrient inputs and high temperatures as drivers of HAB occurrence.
 - o Identification of poorly understood processes related to HAB formation.
 - o Characterization of needed datasets and description of appropriate techniques to fill data gaps related to HABs management.
 - o Recommend research priorities to address knowledge gaps and improve management of HABs on both short and long timescales.
2. White paper. Led by GLC staff with input from summit participants, the white paper will summarize the findings and recommendations from the peer reviewed paper for a policy-oriented audience eager to understand the state of science with respect to HABs (such as a Great Lakes Commissioners and members of legislative bodies).
3. Common Agenda. Summit outcomes and resource needs will also be shared with the Steering Committee of the [Great Lakes HABs Collaborative](#) for inclusion in the Collaborative's "Common Agenda," currently under development as a roadmap for future work by the Collaborative.



Summit Participants

Andy Bramburger	Environment and Climate Change Canada
Tom Bridgeman	University of Toledo
Ruth Briland	Ohio Environmental Protection Agency
Cal Buelo	U.S. EPA GLNPO
George Bullerjahn	Bowling Green State University
Justin Chaffin	Ohio State University
David Depew	Environment and Climate Change Canada
Greg Dick	University of Michigan and CIGLR
Reagan Errera	NOAA - GLERL
Mary Anne Evans	USGS-GLSC
Chris Filstrup	University of Minnesota Duluth
Rebecca Gorney	USGS
Todd Howell	Ontario Ministry of the Environment, Conservation and Parks
Benjamin Kramer	NOAA-GLERL and CIGLR
Elena Lichtman	Carnegie Institution (formerly with Michigan State University)
Heath Mash	U.S. EPA/ORD
Kevin Meyer	U.S. Army Corps of Engineers
Chris Nietch	U.S. EPA/ORD
Heather Raymond	Ohio State University
Euan Reavie	University of Minnesota Duluth
Connor Roessler	Great Lakes Commission
Cody Sheik	University of Minnesota Duluth
Katie Stammler	University of Windsor and Essex Region Conservation Authority
Steven Wilhelm	University of Tennessee
Nicole Zacharda	Great Lakes Commission