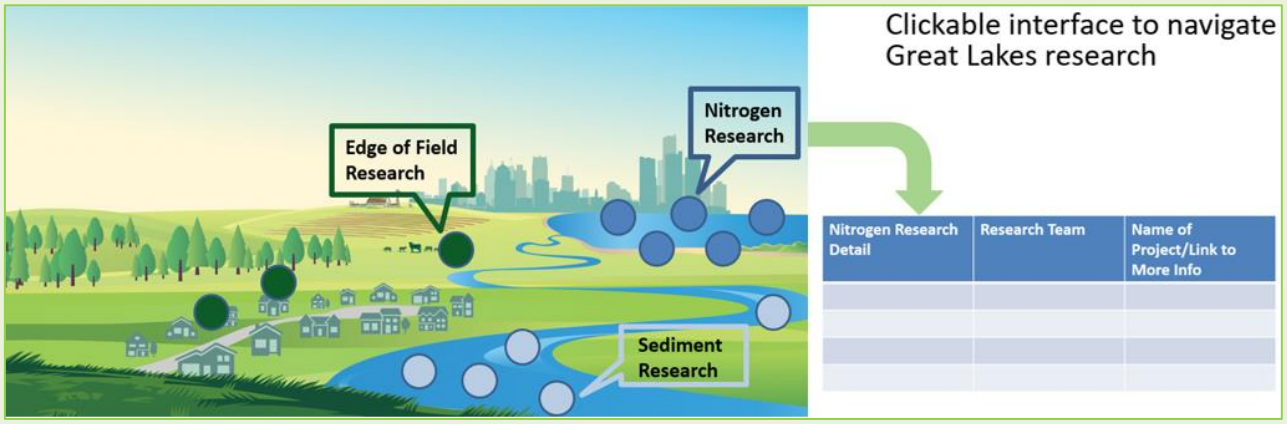
Great Lakes HABs Collaborative
NEWSLETTER
LINKING SCIENCE AND MANAGEMENT TO REDUCE HARMFUL ALGAL BLOOMS
Fall 2020

What's happening with the HABs Collaborative Steering Committee?

Development of a Research Dashboard and Request for Input

Starting in 2021, the Collaborative is looking to upgrade its current website to include features benefitting the Great Lakes HABs research and management community. One addition is a **Great Lakes Research Dashboard,** which is envisioned to be a centralized repository that briefly highlights the various HABs research efforts occurring around the binational Great Lakes basin. The current mock-up envisions a generalized landscape with various clickable dots across the landscape. Each dot would highlight a certain area of research. When clicking a dot, it will open a table that will contain information about the ongoing research occurring within that area. The table will also contain links, which will be able to go to external websites to learn more about the research. An alternative, map-based view may also be incorporated to orient website visitors to where HABs are occurring in the basin relative to various research efforts.



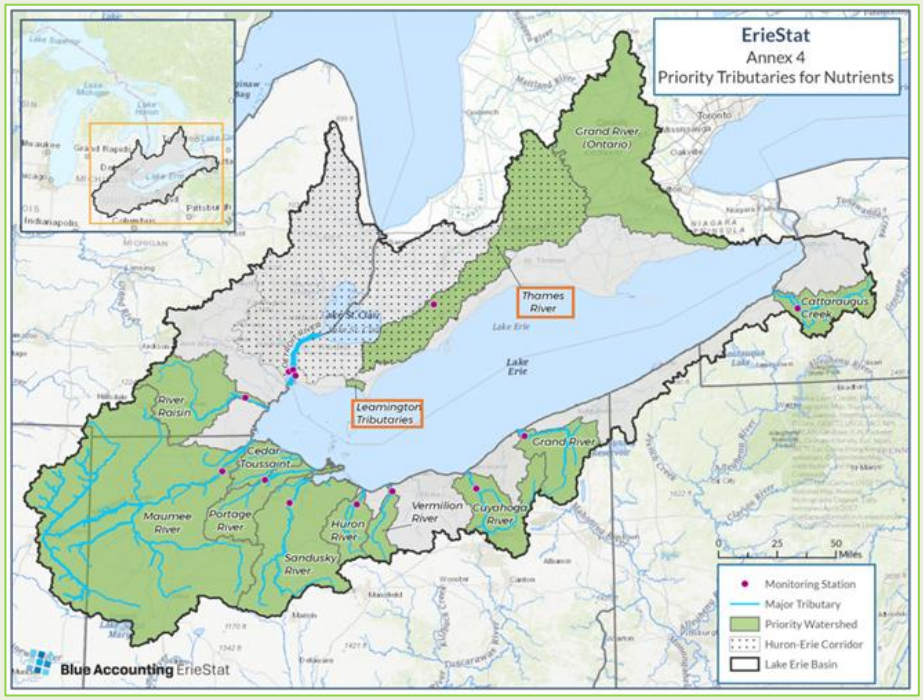
As we begin this effort, **we would like input from the Collaborative** on what research topics should be used to organize the dashboard (dots to be clicked on e.g. Edge of Field Research) and what content should be included in the table. **To provide input, please participate in our Request for Feedback by January 5, 2021.**

Canadian Corner: HABs on the Thames River

Colin Little, Agricultural Program Coordinator, Lower Thames Valley Conservation Authority
Katie Stammler, Water Quality Scientist, Essex Region Conservation Authority

The Great Lakes Water Quality Agreement includes recommendations for phosphorus reduction from two watersheds in Ontario, Canada. The **Leamington** tributaries are a group of small watersheds in Leamington and Kingsville, Ontario where greenhouse agriculture is common. These watersheds have the highest concentration of phosphorus in the province. The **Thames River** is a large watershed that begins north of London, Ontario, and outlets into Lake St. Clair southwest of Chatham, Ontario. The Thames River watershed is predominantly agriculture, with rolling hills in the north and flat clay plains in the south. There is one large urban centre and several small and medium sized towns. Monitoring on the Thames indicates that it is a major contributor to HABs in Lake St. Clair and also adds to the phosphorus load in Lake Erie. In addition, the phosphorus load in the Thames River has led to HABs in the river itself.

From August-September 2020, a blue-green algae bloom developed throughout the Thames River. The bloom stretched from the mouth of the Thames River near Lighthouse Cove to the town of Delaware in Middlesex County. Further, during three of the last four years, the Thames River has observed the development of blue and green algae



The Leamington Tributaries and Thames River have been identified by the Annex 4 subgroup as Priority Tributaries for nutrient reduction. Phosphorus loading data can be found at **eriestat.org/progress.**

Thames River Algae Bloom at Kent Bridge on August 28, 2020.

blooms during the months of August-October. The **Ministry of Environment, Conservation and Parks (MECP)** conducted sampling of the water near the McGregor Creek area of the Thames River during August 2020. The sample results revealed low levels of harmful toxins that can be released by blue-green algae blooms. That algae blooms have developed within the Thames River at an increased frequency during the last five years is a cause for concern. Furthermore, it is a reminder that the community needs to continue to work together, with increased urgency, to implement projects and adopt Best Management Practices (BMPs) to reduce phosphorus loading within the Thames River watershed. The **Lower Thames Valley Conservation Authority** has cost-sharing programs available to farmers to implement various Best Management Practices. They are also partners in several ongoing research projects related to phosphorus reduction including the provincial **ONFARM** program and federal **Living Labs** program.

GLWQA Nutrients Annex Webinar

The annual public webinar on Annex 4 activities, including progress toward phosphorus reduction goals for Lake Erie, has been postponed to early 2021. Great Lakes Commission staff will share details via the Collaborative listserv as more information becomes available.

Member Spotlight

We know a lot of good work is happening around the Great Lakes Basin thanks to many of our Collaborative members. **Help us share that work by suggesting content for the "Member Spotlight" section of this quarterly newsletter.** Please share your ideas with Nicole Zacharda at **nzacharda@glc.org.**

New Report on Stressor Interactions

The **IJC Science Advisory Board's Science Priority Committee** recently released its report **An Evaluation of Stressor Interactions in the Great Lakes.** Recognizing that interactions among multiple stressors in the Great Lakes are poorly understood, the project undertook a review of the global literature and conducted a more detailed examination of 11 stressor pairs that are important in the Great Lakes. Four of the case studies included the interaction of phosphorus with other stressors, including **climate (warming and precipitation), dreissenid mussels, wetland loss, and persistent organics.** The SAB found that for the first three examples, outcomes are typically additive or synergistic (where the combined influence equals or exceeds the sum of individual effects), and for phosphorus and persistent organics the outcome is antagonistic (where phosphorus mitigates the effect of persistent organics). Climate change is the most pervasive stressor that merits further consideration in terms of its interaction with other stressors.

The SAB concludes that stressor interactions in the Great Lakes are important to consider and are likely to result in an overall increase in cumulative ecosystem stress, although spatial and temporal variability in the occurrence of individual stressors and long-term trends in their intensity are important contextual considerations in the evaluation of stressor

interactions. Given available scientific understandings, there is no clear resolution to the question of whether to continue traditional stressor-by-stressor management, or to adopt more holistic, integrated management of stressors within an explicit framework of interacting stressors. The report's four recommendations call for continued attention to advancing our understanding and application of interacting stressors that are most likely to impact natural environments across a range of environmental conditions and be amenable to management intervention at appropriate scales, primarily using the infrastructure, organizations and governance systems that already exist in the Great Lakes basin.

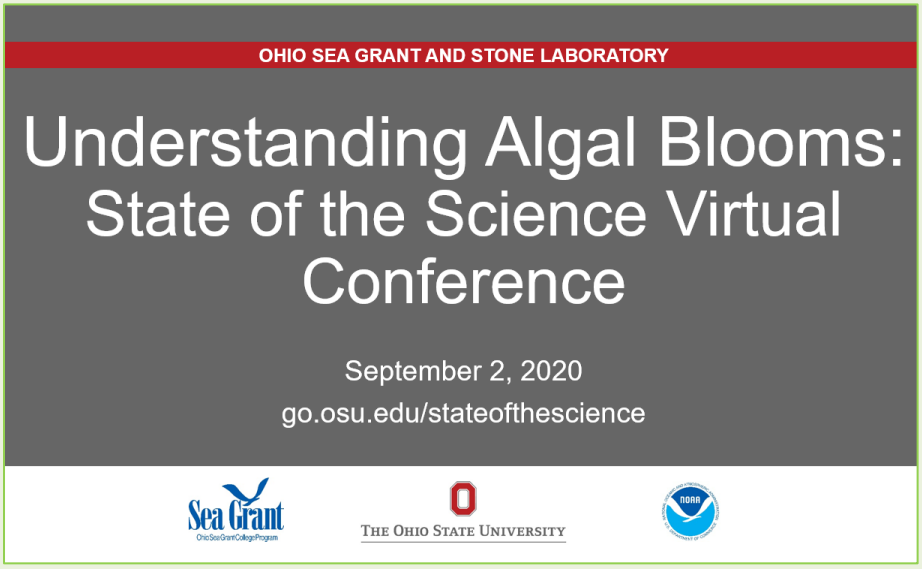
Ohio Sea Grant: State of the Science

The 5th annual **Understanding Algal Blooms: State of the Science Conference** hosted virtually on September 2 was very positively received by an audience of nearly 600 attendees. The audience included producers, students and faculty, and representation from agricultural organizations, government agencies, and environmental groups from across the U.S. Participants learned from international attendees and speakers (see the program: **https://ohioseagrant.osu.edu/news/calendar/2020/09/02/c5mvk/state-of-the-science)**

Post-conference survey results were overwhelmingly positive and include 69% of participants being "extremely satisfied" with the meeting, and 60% "strongly agreed" that the event increased their understanding of algal blooms.

Since the event was online and costs were minimal, the organizers did not request sponsorship this year, but do hope to be in person in 2021 (save this date for September 8, 2021) and receive sponsor support for this annual event. The organizers extend special thanks to Jared Morrison and ShaLise Simmons from OSUE, and Erin Monaco from Ohio Sea Grant for coordinating all aspects of the event.

The Planning Committee: Jay Martin • Chris Winslow • Kristen Fussell • Greg LaBarge • Kevin King



Jasmine Mancuso

On July 2nd, 2020, graduate student, **Jasmine Mancuso,** successfully defended her Master's thesis, titled **"Bloom or bust: Search for phytoplankton community drivers using long-term time-series observations and field measurements in a model Great Lakes estuary."**

Jasmine Mancuso

Jasmine's research had two components — a historical understanding of the trends of HABs on Muskegon Lake (2003-2019) and a focus on the phytoplankton community of the year 2019, an unusually cold and wet year. In comparing changes in environmental data to changes in the HAB community, it is clear that Muskegon Lake has made marked water quality improvements in terms of nutrient concentration reductions, which has led to a reduction in HAB abundance. Additionally, the composition of the cyanobacterial HAB community appears to be driven by nutrient ratios, nutrient forms, and temperatures, with *Microcystis* being dominant at the beginning of the study period. A group of years experiencing a diversity of nutrient forms and moderate temperatures produced a highly diverse HAB community. Though nutrient reductions have kept HABs at bay, increasing water temperatures due to climate change may make management more difficult. The year 2019, however, had a relatively cool temperature regime, especially in the spring and summer, and record-breaking rainfall amounts. The impacts on the phytoplankton community were unexpected — diatoms were dominant throughout the entire study period (April through October), and HABs were negligible. The driving forces behind this anomalous community are relatively low water temperatures, high turbidity, diluted nutrients, and frequent mixing — all of which specifically benefit diatoms and select against cyanobacterial HABs. These results demonstrate that significant regional climatic events can override the general trends of climate change and have notable effects on the phytoplankton community, with likely effects on the rest of the food web.

After graduating in summer 2020, Jasmine plans to continue to work in the Biddanda Lab at GVSU and then will pursue a job in the aquatic science field.