

2023 Three Lakes Association Aquatic Science High School Summer Internship

Distribution and Density of Quagga and Zebra Mussels in Torch Lake

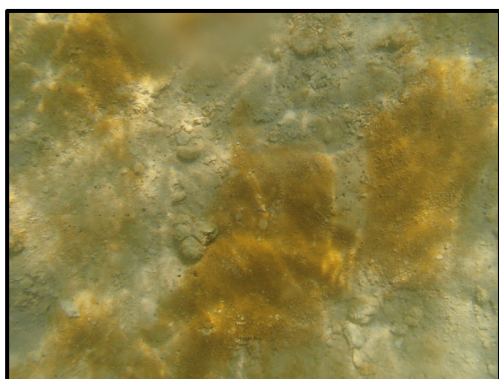
Each summer Three Lakes Association studies some aspect of our watershed with ambitious high school students. Our objectives are to monitor and improve water quality and to help young people gain experience with aquatic science and build their connection to the water bodies that define the landscape they live in. This year TLA interns will survey Torch Lake to quantify the number of quagga and zebra mussels living in it.

Quagga and zebra mussels are invasive species that have caused great ecological change in the Great Lakes and in the hundreds of freshwater lakes and streams they have invaded across the United States. Zebra mussels have been known residents of Torch Lake for some time, but quagga mussels were presumed absent until recently. In 2022, TLA interns discovered high densities of quagga mussels in several locations, and over the winter residents found mounds of quagga mussel shells washed up on the beach.



Quagga (left) and Zebra (right) mussels

In addition to high densities of invasive mussels, there is another prominent ecological shift occurring in Torch Lake. In the mid 2010s, folks started to note a brownish-colored algae growing on the lake bottom. Torch Lake is known for its brilliant turquoise hue, so when it started to appear drab brown, we knew something must have changed. This change is worrying from an aesthetic perspective, but it might also presage some serious ecological shifts that could further change the character the lake. TLA started investigating immediately and over the past 7+ years we have learned quite a bit about the algae and what might be causing it.



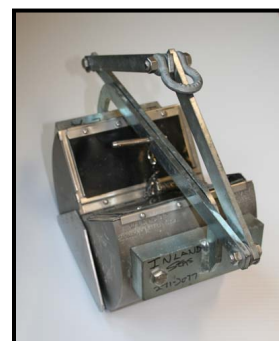
Golden-brown Algae (GBA)

Golden-brown algae (GBA), as it is known locally, contains a distinctive taxonomic combination of benthic diatoms and cyanobacteria. It can accrue loosely in depressions in the sand or form resilient mats composed of layers of algae, sand, and calcium carbonate deposits.

We don't know if GBA growth is caused by more nutrients, or by fewer nutrients. Both are possible, and it is possible that quagga and zebra mussels are responsible for both. This summer we will begin the process of surveying Torch Lake for quagga mussels and getting an accurate count of their abundance in an effort to understand how much influence the mussels might have.

June and July will involve weekly boat trips to collect, identify and count mussels. Sampling will be done with a PONAR grab that can be lowered from TLA volunteer boats, and triggered to grab a scoop of sediment from the bottom of the lake. This scoop of mud will be rinsed through a sieve and the mussels in the sample will be counted, identified and preserved. On land we will measure shell length on a selection of the mussels and enter our observations into spreadsheets.

August will be being reserved for compiling the data, looking for patterns, writing a report and preparing a presentation to the TLA board and the students' school boards. The report and presentation will be part of the TLA archives. School board presentations will be arranged for September and October.



PONAR Grab

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How to apply

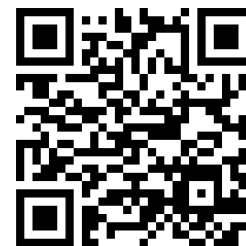
Apply online at 3lakes.com/summer-internship-program-2023/

Only online applications are accepted.

Deadline is May 12 at 5PM.

Successful Applicants will be notified by May 19

Open to ambitious Sophomores, Juniors, and Seniors



Application is here

Summer Schedule

Students will be required to attend a 1-hour orientation on June 1 (time TBD, but likely about 4PM)

- Bring with you a signed Student Agreement; given when accepted to the program

The program will begin on Thursday June 8 at 8AM

- We will meet every Thursday morning from 8AM-Noon, and occasionally longer with advance notice. Conditions for boating are better in the morning, which is why we are starting so early.
- Meeting location will change weekly, depending on where we are sampling.
- Reliable transportation required.
- Communication and updates via email and text.

In August, we will use our full time on Thursday mornings to compile data and write the report. We might start a little later!

About the Program Lead

Jeanie Williams is the former Executive Director of Three Lakes Association. She has a master's degree in environmental science, a bachelor's degree in biology, and has been certified as a secondary science teacher. She has worked with teens in numerous field research programs, including five years of Great Lakes data collection and teen science experiences with Inland Seas Education Association, where she collected and studied quagga and zebra mussels extensively.

She will be assisted by TLA volunteers, including Gary Bart, and MSU Environmental Studies and Sustainability undergraduate, Alyssa Cogan.



To contact us

Intern Program Lead, Jeanie Williams at jwilliams.threelakes@gmail.com or 231-429-0492

TLA Executive Director, Lois MacLean at 3lakes.info@gmail.com or 231- 412-7551



The mission of the Three Lakes Association is to provide leadership to preserve, protect, and improve the environmental quality of the Elk River Chain of Lakes Watershed for all generations with emphasis on Lake Bellaire, Clam Lake, Torch Lake and their tributaries.