



QUARTERLY

THREE LAKES ASSOCIATION

SERVING LAKE BELLAIRE, CLAM LAKE AND TORCH LAKE IN NORTHWEST MICHIGAN

WINTER 2025

Bellaire WWTP - Update

By Fred Sittel

Last summer's Education Event included a report about problems at the Waste Water Treatment Plant (WWTP) that serves the Village of Bellaire and distributes millions of gallons of effluent every year to wetlands adjacent to the Intermediate River just North of Lake Bellaire. Lapses in monitoring and reporting and emergency releases of partially treated wastewater led to the discovery of failed equipment, problems with berms of the treatment lagoons, operational mismanagement, and capacity issues. The Village of Bellaire entered an Administrative Consent Order (ACO-05873) with EGLE in July 2023 to address the violations.

After holding a public hearing, the Village applied for and was awarded financing from Michigan's Clean Water State Revolving Fund which is a low interest loan program, to make the necessary repairs. It is anticipated sewer rates will increase to service the loan.

The ACO required evaluation of the WWTP by an independent engineering firm. The first part of this evaluation was a capacity analysis submitted to EGLE on January 2, 2023. A review of Public Works records between 2012 to 2021 revealed an average inflow of 42 million gallons per year. Engineers estimated the volume would be 44 million gallons in 2023, and increase 5



-7% thereafter due to growth of the sewer system. The analysis found that during periods of high inflow the working volume of the lagoons was insufficient to safely meet a two-week holding period required to reduce bacteria levels before discharge. This led to the installation of an ultraviolet light (UV) disinfection system at the start of last year which eliminated the holding period requirement and brought the plant back into compliance.

Several extensions of the deadlines set by the ACO are being requested or have been granted. Missing and non-functional equipment in the headworks to the plant had allowed rags and other debris to clog mechanical aeration equipment which helps treat wastewater in the lagoons and they were not being repaired. The schedule proposed for 2025 by the Village and contractor is for installation of a new headworks to begin immediately after the winter no-discharge period ends in March

and for it to be operational by the end of May. A groundwater monitoring plan will be submitted by the first of June. A new lagoon aeration system will be installed to replace mechanical aerators with a blower driven bubbler system by the first of August. Repairs to lagoon berms will be completed by mid-August and a series of two-inch groundwater monitoring wells will be installed near the lagoons by the end of this year. An Asset Management Plan will be submitted by the first of December.

Between mid-May and the end of July, just short of 6 million gallons of sludge will be removed from the lagoons and disposed offsite. In 2017, TLA Quarterly reported on 3 million gallons of sludge from the same lagoons being land applied to agricultural fields adjacent to Eckhardt Road approximately three miles North of Lake Bellaire. The fields are low lying and form the headwaters of Grass Creek which flows

Sneak peek

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into the North Arm of the lake. These fields are the only ones TLA is aware of for which the Village holds a sludge disposal permit. Sludge which meets requirements for land application is called bio-solids and may be applied by permit to agricultural fields not used to grow crops for human consumption.

The final part of the engineering evaluation was submitted to EGLE on December 1, 2024.

Influent and effluent quality were compared and it was determined the level of phosphorus reduction required by the original permit is currently being met or exceeded after the final treatment step prior to discharge. That step is referred to as "tertiary treatment" and consists of adding aluminum sulfate to effluent from the lagoons which helps bind and remove phosphorus in two updraft clarifiers, followed by sand filtration. The clarifiers produce large amounts of solids high in aluminum sulfate and phosphorus which in the original permit were required to be disposed offsite. Sometime during the 1990's, the WWTP began returning these solids to the lagoons increasing sludge build-up, reducing capacity, and potentially impacting treatment level.

Lagoon based systems require periodic sludge removal every decade or so, but the practice of pumping solids from tertiary treatment back to the influent entry point of the plant resulted in a three-fold increase in the rate at which sludge needed to be removed to maintain the working capacity of the lagoons. The engineering evaluation proposes a future capital improvement project to add a handling and storage system for solids from tertiary treatment to facilitate periodic offsite disposal. There was no indication whether these solids may be land-applied under existing permits for bio-solids and no timeline or funding was identified for system construction or for solids transportation and application.

Last year, during a tour of the facility by a representative from EGLE's Permit Section, it was discovered that only one of four outlet headers of the wetland discharge piping system were being used due to damaged pipes. Concentrated discharges could overload localized areas of the wetlands encouraging runoff to the Lower Intermediate River. The engineering

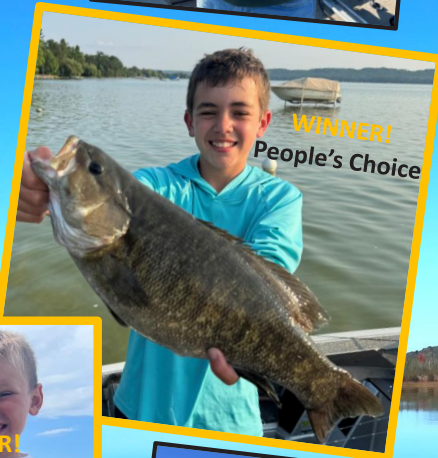
evaluation proposes repair of the damaged pipes and continued use of above ground distribution. Containment berms in the wetlands will be rebuilt to assure infiltration to groundwater and a new groundwater discharge permit for plant operation is suggested. It is not clear if discharge to groundwater from the ground surface will be permitted by EGLE and no timeline or funding was identified.

Under oversight by EGLE in 2023 and 2024, the monthly Discharge Monitoring Reports submitted show around 27 million gallons needed to be discharged each year to maintain lagoon levels within permit limits. That volume appears at odds with the historical inflows identified by the capacity analysis and the 44 million gallon inflow predicted for 2023 which prompted installation of the UV system. Wastewater evaporates from the nine surface acres of the lagoons but for bodies of water in Antrim County, annual precipitation roughly equals annual evaporation. Total precipitation for the County in 2023 equates to almost 8 million gallons falling directly on the surface of the lagoons.

It is possible significant amounts of wastewater are exfiltrating to groundwater directly from the lagoons, bypassing phosphorus reduction by tertiary treatment. The oldest lagoon was constructed in 1972 and may be clay lined while the others, constructed in the late 1980's and 2000, are reportedly polymer lined. It is not clear if EGLE will require action on exfiltration indicated by differences between measured inflows and outflows unless samples from the newly required groundwater monitoring wells exceed yet to be identified limits. The first groundwater sample results will likely not be available until very late this year or later.

Questions about past treatment levels led TLA to begin monitoring nitrogen and phosphorus concentrations in the surface water of the Lower Intermediate River, both upstream and downstream of the discharge wetland. Ten samples for each analyte were collected between July 2023 and October 2024. So far, every result has come back below a level of concern. However, the spread between upstream and downstream results trended greater for some samples collected within fifteen days after a reported discharge, so this monitoring will be continued by TLA in 2025.

2024 fishing photo contest!



SNAP A PHOTO OF YOUR GREAT CATCH!

*Three Lakes
Association's Third
Annual Great Catch
Fish Photo Contest*



Show us your 2025 fishing victories on Clam, Torch and Lake Bellaire! Send photos of you, your family and friends landing the big ones, the little ones and everything in between.

We will share entries and announce winners in the categories of President's Choice, People's Choice and Young Champion (children under 10). And, drum roll please, this year it has been cold enough to hopefully get our first Best Ice Fishing submissions.

LET'S SEE YOURS!!

We will accept admissions through September 8, 2025.

Follow the link: <https://www.3lakes.com/great-catch-fish-photo-contest-2025/>

GOOD LUCK!

The winners of the 2024 Great Catch Fish Photo Contest are:

Jonas, Best Child with a Fish,
from Canton Michigan. Jonas caught (and released)
his fish using a live worm, late in the afternoon in July.

Will earned President's Choice and People's Choice
with two of his great catches. Will is local to our area and caught
his fish on Lake Bellaire in a water depth of 40 feet.

**Winners received a gift card and a certificate
with a photo of their great catch!**
We received so many awesome pictures of Great Catches.
Be sure to share yours for 2025!!

2024 TLA Summer Intern Program

Last summer TLA Interns looked for the presence of quagga mussels in the waters of the lower chain upstream of Torch Lake. Mussels produce tens of thousands of microscopic larvae called veligers which float freely for several weeks before settling in one location and developing into adult mussels. Veligers can easily be transported in bilge water and live wells of boats and since boats constantly move between Torch Lake, Clam Lake, the Grass River and Lake Bellaire during the summer, they have opportunities to move large distances upstream.

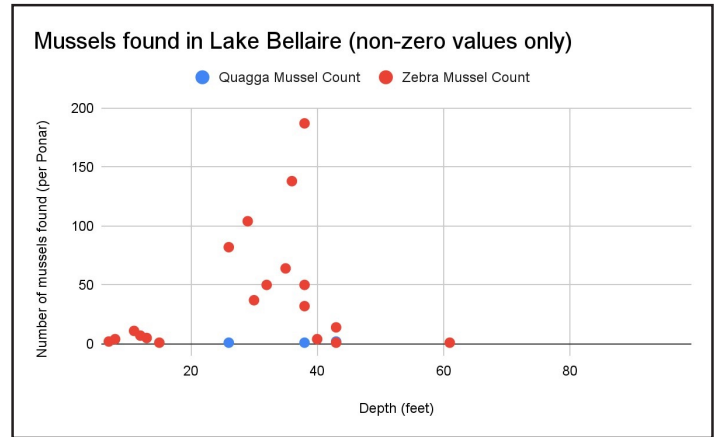
A full report on the 2024 Intern Program can be found at: <https://www.3lakes.com/wp-content/uploads/2024/10/Summary-report-2024-internship.pdf>

In 2023, TLA interns surveyed mussel populations in Torch Lake and were astounded by how many they found. Underwater video revealed the bottom of Torch Lake is carpeted with mussels at many depths. Nearly 94% of all mussels sampled in Torch Lake were quagga mussels, and they were most abundant around 75 feet. There are likely enough mussels overall in Torch Lake to influence the distribution of nutrients. A full report on the 2023 Intern Program can

be found at <https://www.3lakes.com/wp-content/uploads/2024/09/2023-Internship-Report.pdf>

Quagga mussels (*Dreissena rostriformis bugensis*) and their close relatives, zebra mussels (*Dreissena polymorpha*) filter food particles and algae from lake water at very high rates. As mussels become more abundant, their feeding activity and excretions transfer nutrients from the water column to the lake bottom which makes the lake clearer, allowing greater light penetration and encouraging plant and algae growth. The physiology of quagga mussels enables them to colonize deeper regions of the lake where the bottom sediments are mostly very soft while Zebra mussels prefer harder substrates and are often observed close to shore on rocks, woody debris, and dock posts.

During last summer's program, Zebra mussels were found abundantly upstream of Torch Lake but only four quagga mussels were found in three separate samples from Lake Bellaire. All were on the west side of the lake. No quagga mussels were found in the Grass River or Clam Lake.

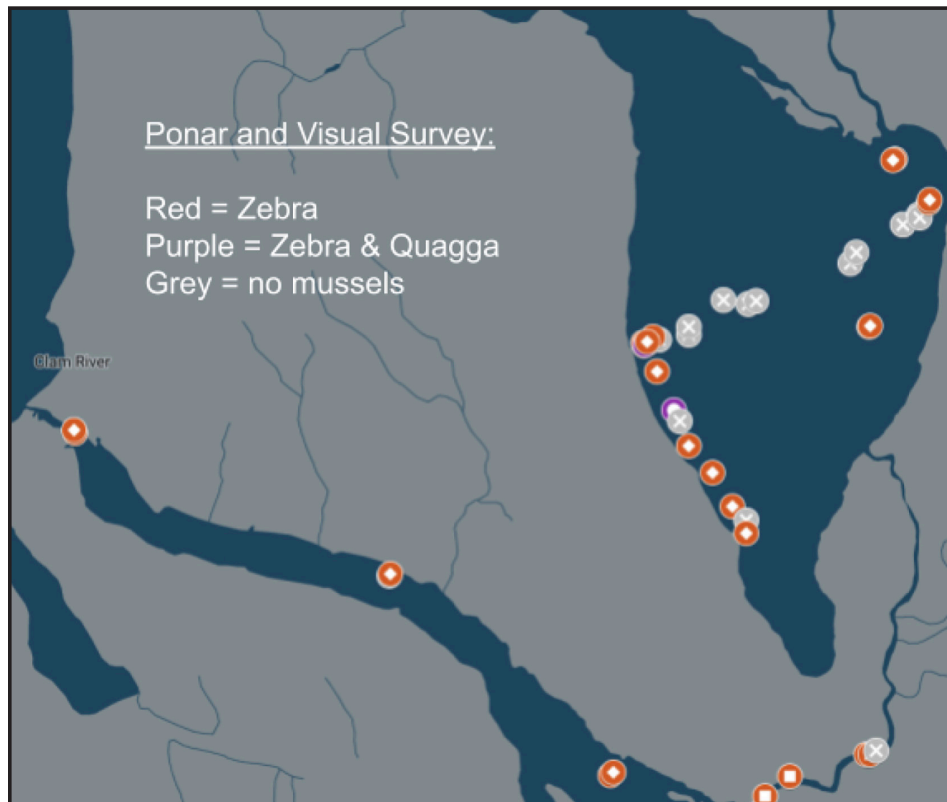


Mussels per Ponar sample by sample depth

The interns also compared underwater video to the number of mussels in samples collected from the same area by a deep-water sampling device called a Ponar. The comparison was prompted by observations on Torch Lake last year which suggested video may provide a better indication of the extent of mussel infestation in a particular lake than physical sampling alone.

While the low number of quagga mussels found in samples last summer is good news, underwater video from Lake Bellaire revealed beds of mussels at depths between 25 and 45 feet. These were confirmed by Ponar samples to consist of a high abundance of zebra mussels. This suggests that even if there are still only a few quagga mussels in Lake Bellaire, significant numbers of zebra mussels may exist beyond the shallow water zone and their collective impact on the lake may be greater than casual observation suggests.

The TLA internship program introduces young people to aquatic science and helps build a foundation of skill and experience and a deeper personal connection to water resources. We hope through this experience they will become better equipped for whatever they choose to do next in life and for some, it may be a career in conservation or environmental science.



2024 sampling locations on Clam Lake, Grass River and Lake Bellaire

Creating Lessons for Life

By Gary Bart, Education Chair

The 2024 Intern Program team, including the interns, the professional guide, boat captains and volunteers, spend time outdoors in the collection and processing of samples all the while enjoying nature, our beautiful lakes, rivers, and surrounding watershed.

The process and experience of the intern program has far reaching benefits to the students. To begin, the students must present their desire to be selected via a “competitive” application process. Once selected there is a simple meet and greet to get to know members of TLA and the rest of the team before they jump in to their one day a week for eight weeks commitment. Interns learn the importance of safety on and in the water. They gain experience in various areas of equipment use such as benthic barriers, fish shocking, the ponar grab, underwater cameras and much more. They learn to collect samples and document their findings. Once they have the data collected the work of creating a report and presentation gets underway. The interns work as a team and learn the discipline involved to produce a very detail oriented report. The final part of the program gives them an opportunity for public speaking by presenting their findings to the TLA board and to their respective school boards. Once presentations are complete the



interns receive a certificate of completion and a stipend for their work. This year the interns were presented with a throw commemorating their day snorkeling in the Grass River.

The Three Lakes Association Intern Program is a well-rounded program that benefits all involved! Several of our past interns have gone on to careers in the field of ecology. All have learned valuable life lessons that will serve them well after high school.

I look forward to working with a new

group of interns in 2025 on another exciting project.

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Where Are They Now? An Intern Program Follow Up



My name is Donovan Stone and I was fortunate to be part of the Three Lakes Association summer internship of 2016! During that summer I was involved in several projects. Construction of the Large Woody Debris (LWD) project on the Grass River, monitoring and combating the spread of eurasian water milfoil with benthic barriers, monitoring water quality with the Hydrolab, E. Coli sampling, and fish shocking.

The variety of projects I was exposed to gave me a clear understanding of not only the importance of environmental research, but also how it is actually done. It served as both a learning opportunity, and a chance to really get physically involved. I spent my fair share of time in the water and the elements, as well as processing the data we gathered, which is equally as important!

After I graduated high school I enlisted in

the Army National Guard. When I wasn't on orders I worked in Fire/EMS. Now that I am out of the army, I have moved to Sault Ste. Marie and am a student at Lake Superior State University. I am majoring in Criminal Justice with a concentration in Conservation Officer.

This means, in addition to my criminal justice classes at LSSU, I am also taking numerous environmental and natural resource courses. I have been actively involved in volunteering with our schools fisheries program, fish and wildlife club, and helping the Bay Mills Indian Community fisheries department with what is the largest telemetric whitefish study that has ever been done on the great lakes. My future career plan is to work law enforcement in the natural resources field, whether it is with the state as a conservation officer, or a federal agency like the US Fish and Wildlife Service.

Reaching the Students of our Local Schools

By Steve Laurenz, Education Chair

The Science and Education Outreach Program (SEOP) is having another fantastic year and we are well underway in preparing for the next grant cycle.

The goal of SEOP, which began in 2011, is to cultivate a sense of stewardship of the lakes, streams and land in young people who will be part of the next generation living within the watersheds of Torch, Bellaire, and Clam Lakes. Our strategy for achieving this goal is to collaborate with science teachers and students in the school districts of Central Lake, Bellaire, Kalkaska, and Mancelona.

Our program continues to grow! For the 2024-2025 school year, we received 15 grant applications from local teachers and were able to fund 13 of them. Below is a brief description of each funded project:

Bellaire Elementary School System

- **Rebecca Molski:** Field trip to the Grass River Natural Area.
- **Raven Ziebarth:** Hartwick Pines field trip.



Central Lake Elementary School System

- **Donavan Eggleston:** Upgrades to the school garden.

Kalkaska Elementary School System

- **Stephanie Gustafson:** Field trip to the Grass River Natural Area.
- **Lauren Klafft:** Field trip to the Grass River Natural Area.
- **Kevin Malbouef:** Field trip to the Grass River Natural Area.
- **Janet Steinhoff:** Field trip to the Grass River Natural Area.
- **Kelly Wodehouse:** Field trip to the Grass River Natural Area.
- **Michelle Zamaites:** Leelanau Learning Center camp and Raven Hill Discovery Center.

Mancelona Elementary School System

- **Mary Morris:** Raven Hill Discovery Center.
- **Jessica Schepperly:** Field trip to the Grass River Natural Area.



- **Celeste Johnson:** Field trip to the Grass River Natural Area (GRNA). Earth Roots Community Co-op
- **Cara Gill:** Group camping at Sleeping Bear Dunes National Lakeshore.

Our youth are the environmental stewards of the future, and these programs play a critical role in fostering their commitment to preserving our natural resources!

As this program continues to expand, the need for support grows. Our partner, GRNA, is working with us to make visits more affordable for our groups! For the 2025-2026 school year, we look forward to further growth thanks to donations, local businesses that contribute to our silent auction and a generous donation from Gordy Shaffer.

2025-2026 Grant Cycle will be announced here in the next couple weeks: <https://www.3lakes.com/seop-grants-overview/>



Safe and simple, Auto Renewal is available by popular request!

If your membership is current for 2025, you can activate auto renewal using our secure website here: <https://member.3lakes.com/i4a/ams/amslogin.cfm>. Even if your membership has lapsed in the last couple years you can renew online and then set up the auto renewal.

Activate your auto-renewal by logging in to your account, select the drop down next to your name in the upper right corner, select Profile, select the Settings tab, then Renewal Settings. Use your saved payment method or

create a new one. Select Enable Auto Renewal.

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- Water Quality
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- Invasive Species
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- Other

Three Lakes Association is a 501(c)(3) corporation. Your dues and other contributions are tax deductible.

To join Three Lakes Association,

Please visit our website 3lakes.com or return this form with your check to: THREE LAKES ASSOCIATION, P.O. Box 689, Bellaire, MI 49615

Membership matters!

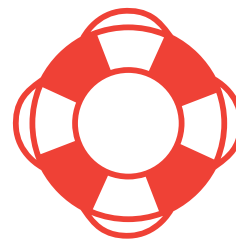
We are into our 2025 membership and fund raising campaign!
THANK YOU to everyone who help support our work with memberships, membership upgrades and donations!

The acknowledgement of your donation has been generated and sent via email. If needed, it can be re-emailed or if you require a printed and mailed version of the acknowledgment please reach out and we will get it sent as soon as possible.

Boater Safety and Stewardship webinar

Thursday, April 24 at 1 p.m.

Join us: <https://us02web.zoom.us/j/83526676084?pwd=CurHBdwKpRAthJXM4W5GYEbjHyVbDL.1>
Meeting ID: 835 2667 6084 Passcode: 299796



Get the latest news from our partners in stewardship:

- Antrim County Sheriff, Kevin Hoch
- Antrim County Marine Patrol, Edward Sell & Roy Wicht
- Grass River Natural Area Conservation Director, Emma Fitzgerald
- DNR officer, Andrea Alberts

Q & A will follow the presentation.

Mark your 2025 calendar and watch for details to be announced:

April 24, Boater Safety and Stewardship webinar

July 8, Education event, in person, public welcome

August 7, Annual meeting, in person, members and guests

In person events will be held at the Summit Village Beach Club on beautiful Lake Bellaire

We are excited about the important work underway to keep our waters healthy! Environmental surveying and water quality testing of our waters have increased as have the costs of the laboratory analysis. Please consider a membership upgrade or an additional donation.



The mission of the 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.

Three Lakes Association
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Thank You!

Three Lakes Association is very much focused on the quality of our waters and on the education of our youth.

We are grateful to have partners who are dedicated to supporting our youth education programs.

Thank you to those that help to fund the Wierda Intern Program Fund.

Thank you to Gordy Shafer for the continued support of the SEOP.

Thank you to the Dole Family Foundation for helping to fund the 2024 Intern Program.

Thank you to those that contribute to the SEOP fund raising efforts with items for auctions and to those who participate in the auctions.

