



# QUARTERLY

THREE LAKES ASSOCIATION

SERVING LAKE BELLAIRE, CLAM LAKE AND TORCH LAKE IN ANTRIM COUNTY, MICHIGAN

OCTOBER 2019

## Golden Brown Algae Update

### What did we do in 2019?

The summer of 2019 represents the 5th year of our studies on Golden Brown Algae (GBA) that began to discolor our lake bottoms a few years ago. From mid-May to early September Rick Doornbos and Becky Norris collected algae samples from the lake bottom and water samples from the lake surface, the lake bottom, and the groundwater entering the lake. These samples were taken at two sites in Torch Lake and two sites in Lake Bellaire. Laboratory analysis of the samples is in progress. Art Hoadley again took monthly aerial photographs around the perimeter of Torch Lake to document GBA color intensity and distribution. In late August, Dr. Jan Stevenson, MSU professor and TLA consultant, harvested from the lake bottom an algae growth experiment designed to look at GBA growth rates and composition in samples with and without access to groundwater. The results of this experiment should help determine how much of GBA growth is due to nutrients arriving through the groundwater.



### What have we learned so far?

While we still have not confirmed exactly why GBA discoloration of our lake bottoms has increased, we have learned a significant amount over the last few years from our studies. Here is a sampling of those learnings.

- GBA is made up of more than 100 diatom species native to northern Michigan lakes and is non-toxic to human, plant and animal life
- The relative abundance of each species

### *Sneak peek*

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may shift depending on nutrient availability and this may make the GBA more readily visible at times

- GBA discoloration exists in relatively shallow water, generally less than 15 feet
- GBA growth peaks in the month of August and declines significantly by late September
- Discoloration of lake bottoms due to GBA is present in many northern Michigan lakes, not just our three lakes
  - Phosphorous is the key nutrient controlling GBA growth
  - Because the phosphorus in our lakes is in very low concentration, tiny increases can have a large stimulatory impact on GBA growth
  - Phosphorous in groundwater entering our lakes is substantially higher than in lake water
  - Some of our testing has shown a decline in nutrients over the growing season possibly due

to consumption of GBA

- Zebra mussels (an invasive species that entered our lakes in late 1990's) which are highly efficient filter feeders, concentrate nutrients from the lake water to the lake floor sediments by consumption of phytoplankton, possibly increasing the nutrients available to the GBA
- Aerial photographs confirm increases in the distribution and color intensity of the GBA during the growing season, but show no significant overall change from year to year since 2015
- However, on-site examination of the GBA has shown a change in appearance over the last two years from loose, fluffy, non-adherent material to a crusty mat adherent to the lake bottom

*GBA continued on page 6*





# THREE LAKES ASSOCIATION

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# President's Message

Wow! Another summer has passed. What a terrific one for our Three Lakes Association. We started with our summer intern program. You can read about that in this newsletter. We held an educational event wine and cheese at the Alden Depot. This was a very successful event updating the membership on the status of the loon population, our fish shelter project, Eurasian water milfoil and the status of the relic trout. Updates are provided within the newsletter. Our annual meeting attracted a large crowd for a fabulous BBQ and presentation on swimmer's itch at the Summit Village Beach Club on Lake Bellaire. We continued with our other projects, including Golden Brown Algae and water quality samples for Harmful Algae Blooms (or HAB's). All in all, a very successful summer.

This was partly possible to our Interim Executive Director, Leslie Meyers. Leslie stepped forward to fill this important role in our Association for the past six months as we began the search for a new Executive. We were and are very grateful to have her as a member of our team.

TLA has completed the search process for our new Executive Director Jeanette Rea Williams or Jeannie Rae for short. She comes to us from the Inland Seas School Ship in Sutton's Bay. Jeanette was Inland Seas lead scientist. She was responsible for keeping abreast

of developments (i.e. new invasive species, water level changes, fishery modifications, microplastics legislation, Army Corp solutions to Asian Carp threats, reports on water quality from local, state, national, and international agencies) that could affect the health of the Great Lakes. She will be highlighted in our next newsletter.



We look forward to an autumn of goal setting and planning for the year 2020 and will continue to participate with our neighboring lake associations. We are in the process of completing a partnership agreement with Torch Conservation Center and Torch Lake Protection

Alliance. I have at the end of this letter included our mission statement to remind all of why we are members.

Please enjoy this newsletter for your pleasure. Sit down and enjoy the fall colors. Thank you for your continued support.

*Thanks, Mike Bertram  
President Three Lakes Association  
Seagull753@yahoo.com  
231-620-5111*

*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.*

**Please save our new email information  
3lakes.info@gmail.com**

## New Members and Donations

New Members:  
Gregory & Karen Fredericksen  
Melinda Jetts  
James & Susan Wheeler

Life Member Donations:  
Len and Karen Franseen  
Norton & Mary Bretz

# TLA's 2019 Summer Internship Program, Recent Developments

By Dean Branson  
and Becky Norris

Each Tuesday this past summer, our four summer interns, Riley, Angel, Matt, and Emily, as coordinated by Matt Carter (AP Biology teacher from Elk Rapids High School) collected a total of 60 near-shore or tributary water samples to be analyzed by a new method for quantifying the DNA from specific organisms, such as enteric bacteria or swimmer's itch cercariae. The DNA extractions and qPCR analysis of these samples was conducted in Freshwater Solution's lab in Cedar Michigan. This was the first time that TLA has attempted to use this new, state-of-the-art methodology as a water quality management tool

and it was applied to provide useful information about Torch and Bellaire Lakes and their tributaries. If this new methodology, called quantitative Polymerase Chain Reaction (qPCR) is found to be capable of detecting trace amounts of the DNA from a variety of organisms in water samples, then we anticipate using this methodology in the future, which will include samples from Clam Lake. In response to a question about whether the DNA in water samples is from living or dead organisms, the DNA in surface water is known to degrade quickly, which means it is most likely, predominantly from living organisms.

Although we are still compiling and interpreting the findings from these 60 samples,

we are sufficiently impressed with the potential for the applications of this new tool for us to co-host a networking-strategizing session with other regional lake associations and experts in this new technology, Professor Patrick Hanington from the University of Alberta, Canada, and Ron Reimink of Freshwater Solutions, LLC. This session is scheduled for Sunday afternoon, September 22<sup>nd</sup>. Based on the outcomes of this session, we anticipate the development of plans for a regional qPCR lab in 2020, and a series of satellite DNA-extraction facilities to foster the collaborative use of this new tool in the future, i.e. A "Community-based DNA Testing" concept. Once the DNA is extracted...a step that must take place within six-hours of the collection of the sample...then the extracted DNA can be stored indefinitely at -80°F for later analysis for various marker genes specific for the organisms in question in a regional qPCR lab. We anticipate that a synopsis of this brainstorming session will be available on TLA's website a few weeks later.

To our surprise, the levels of enteric bacteria in some of the near-shore samples from around Torch and Bellaire Lakes were relatively high that neared or exceeded EPA's level of concern for full-body immersion in the water. Until these findings are shown to be from human sources, no follow-up action is anticipated. The results from follow up testing of the same samples to determine if the detected enteric bacteria are or are not from human sources are anticipated to be received after the publication of this article. The results will be summarized in a future article in a TLA Newsletter.

The DNA from swimmer's itch cercariae was detected in water samples from several locations around Lake Bellaire where cases of swimmer's itch have been reported, which provides further justification for TLA to pursue the use of this qPCR tool in the future.

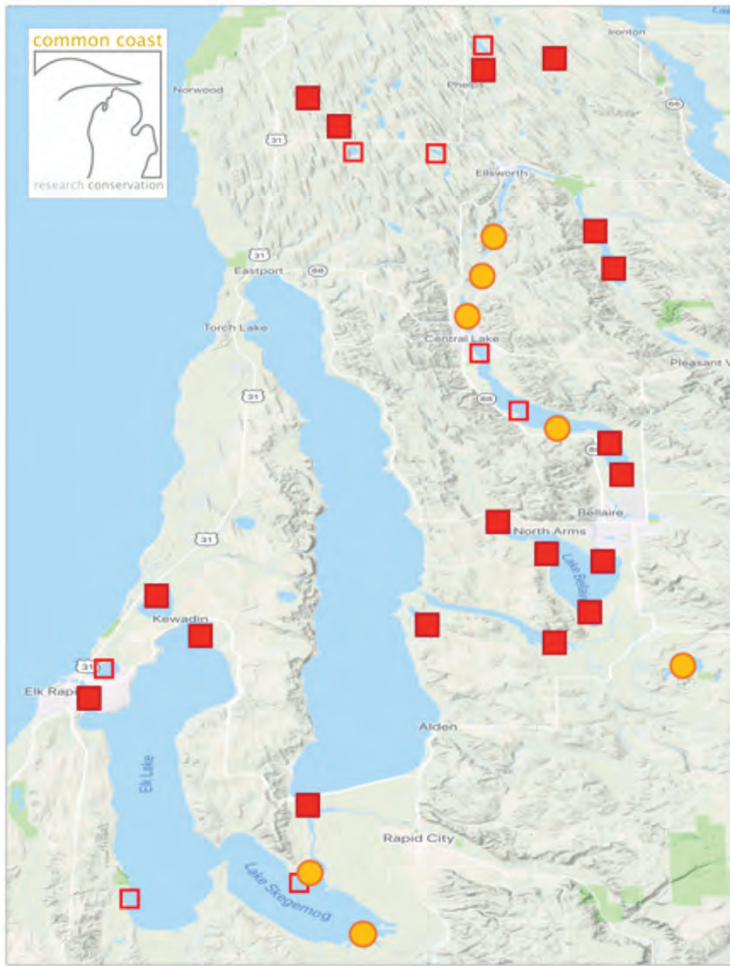
Levels of enteric bacteria in water samples from four tributaries following a major rain event were compared to the levels during a time of normal flow. This comparison was pursued because several years of previous monitoring of these tributaries had shown elevated counts of *E. coli* following major rain events. Our question was how much of the elevated *E. coli* counts were associated with human enteric bacteria. When the results become available – expected in October this year -- we will have qPCR data on the levels of HF183, a gene associated exclusively with human enteric *Bacteriodes* bacteria.

We wanted to determine if the qPCR methodology could detect any difference in surface water enteric bacteria levels in samples collected from the Torch Lake sandbar before crowds of people arrived and at 3 PM on the 4<sup>th</sup> of July at a time of heavy occupancy. The United States EPA has established 300 cfu per 100 ml as the level above which there is substantial health risk associated with contact with the water. The qPCR results for the two samples were 183 cfu/100ml (July 2) and 680 cfu/100ml (July 4). These very preliminary, range-finding results suggest qPCR may be a practical methodology to test the quality of water for



Emily Comai and Riley Fillmore collecting a 25-liter water sample in a phytoplankton filter from Lake Bellaire as part of their monitoring for swimmer's itch cecariae in near-shore water samples.





## Nesting Common Loons in the Elk River Chain of Lakes (ERCOL) region, 2019

- Breeding loon pair utilizing an artificial nesting platform
- Breeding loon pair utilizing natural nesting habitat
- Artificial nesting platform not utilized this season

- 25 breeding pairs; 72% used a nesting platform
- Highest chick productivity in Michigan from 2014-2018
- Over 90% of chicks hatched by pairs using platforms
- Future potential for 35-40 breeding pairs



## Internship Program *Continued from page 3*

evidence of contamination by enteric bacteria.

TLA teamed up with other lake associations in the Elk River Chain of Lakes, the Health Department, and Freshwater Solutions to develop information in the form of a rack card with helpful hints on how people could minimize their chances of getting swimmer's itch. A copy of this rack card is available on TLA's website ([www.3lakes.com](http://www.3lakes.com)) and may be available at selected tourist sites in the area. This rack card includes a Quick Response code that enables people with cell-phone readers of QR codes to report their cases of swimmer's itch. Your feedback to us ([3lakes.info@gmail.com](mailto:3lakes.info@gmail.com)) regarding this rack card would be appreciated very much because one of our goals is to improve this rack card for use next year. One of the improvements may be to include the location in the lake where swimmers contracted on the form that users of the QR code fill out.



*TLA's summer interns explaining their 2019 project to TLA's board on Aug 27, 2019. Left to right; Matt Baker (Elk Rapids High School), Emily Comai (Kalkaska High School), Riley Fillmore (Mancelona High School), and Angel Shaw (Central Lake H.S.)*

# Swimmers Itch for the Non-Scientist

Swimmer's itch is a **temporary skin rash** that is caused by an allergic reaction to microscopic parasites that are carried by waterfowl, semi-aquatic mammals, and snails. As a part of their life cycle, these parasites are released by infected snails into the water, where they may come in contact with people and burrow into their skin.

The good news is the organism that causes swimmer's itch cannot complete its life history in the human body. Your body's immune system detects it as a foreign protein, then attacks and kills it shortly

after it penetrates your skin. The itching and **welts are not caused by the organism living under your skin, but by an allergic reaction.**

Not everyone is sensitive to swimmer's itch. Some people show no symptoms of swimmer's itch even though others swimming at the same time and place break out severely. Much like poison ivy, however, your sensitivity to swimmer's itch will increase with each exposure.

## Where does it come from?

The organism that causes swimmer's itch has a complicated life history.

1. It starts out as a worm (parasite) in the intestinal lining of aquatic birds and mammals (host).
2. The worms lay eggs inside the host animal.
3. The eggs are eliminated by the host and drop to the bottom of the lake.
4. Then the eggs hatch into **miracidia** that swim around in the water until they find a snail.
5. Once they find a snail, they live inside them and develop into **cercariae**.
6. The snails then release the cercariae back into the water where they look for another host - aquatic birds, mammals or humans.
7. When the cercariae find a potential host, they burrow into the host's skin.
8. If the host is suitable, the life cycle starts all over again.
9. **Humans are not a suitable host and the cercariae die after penetrating the skin.**

*Swimmer's itch is not spread from person to person.*



## Reducing the odds of getting swimmer's itch

The cercariae only live for a day or so and typically swim around in the upper few inches of lake water. This increases their chances of coming into contact with a duck. Once the cercariae is in the duck, it easily moves around the lake as a parasite, and ultimately along the shoreline.

There are actions you can take to help reduce your odds of getting swimmer's itch.

- **Keep waterfowl away from your dock and shoreline.** If you are feeding waterfowl (ducks and geese) from your dock, stop. If ducks like to rest on your dock, do what you can to discourage them. You can try putting an owl wind sock or statue on your dock and move it around occasionally so the ducks don't become accustomed to it.

- **Stay out of the water by the shore.** The swimmer's itch organism may originate somewhere else in the

lake and is being brought to your shoreline by wave action or currents. You may want to try swimming from a raft or boat farther out from shore where you are less likely to come into contact with the cercaria. Of course, this strategy may not be practical if you don't swim or have young children who want to play in the water near shore.

- **Apply a water repellent substance** such as petroleum jelly, waterproof sunscreen or other skin oils to reduce the ability of the Cercariae from penetrating the skin.

- **Dry off with a towel as soon as you get out of the water.** When you get out of the lake, **don't let the water evaporate off your skin.** The organism in the droplets of water on your skin will look for somewhere to go as the droplet of water evaporates.

(Courtesy of the Minnesota DNR)



# And the shoreline survey says ...

During the summers of 2016 and 2017, the Tip of the Mitt Watershed Council led a coordinated effort to conduct a shoreline survey for 15 Lakes in the Elk River Chain of Lakes Watershed. The surveys were meant to document conditions that could impact water quality, including the three biggest threats to inland lakes: nutrient pollution, habitat loss, and shoreline erosion. Within the Watershed, shoreline properties have a large connection to the surrounding landscape and can serve as the last line of defense for protecting water quality. Conducted on a parcel by parcel basis, survey results indicate that human activity along sections of shoreline of many Lakes is likely impacting the lake water quality to some extent. Importantly,

Lake water quality remains quite high in all Lakes surveyed. The purpose of each survey was meant to identify areas of the shoreline that can be enhanced and improved to prevent nutrient pollution, erosion, increase fish habitat, and help protect and conserve the Elk River Chain of Lakes for future generations. Improving areas with poor greenbelts will help the character and quality of your Lake by helping to reduce nutrient pollution and sediment input from erosion along the shoreline.

For individual parcel results, please contact Tip of the Mitt Watershed Council at (231) 347-1181, or at [info@watershedcouncil.org](mailto:info@watershedcouncil.org). You will be given a unique ID number enter at <https://www.freshwatercenter.org/ercolss>



## GBA *Continued from page 1*

### What is the most likely cause of GBA?

Based on the above learnings, it is unlikely that there is a single cause for the increase in GBA growth. The most likely causes are higher levels of nutrients in near shore lake bottoms due to increased human activity, the nutrient redistribution effects of invasive species such as Zebra mussels, and changes in land use around our watershed. Analysis of this year's water samples and Dr. Stevenson's lake bottom study should help us evaluate this conclusion.

### What can you do to help?

There are many things you can do to help minimize the increase in GBA and its discoloration of our lake floor. First, follow environmentally friendly practices around your property such as minimizing the use of lawn fertilizers, maintaining a natural vegetation buffer zone near the lake, and performing regular maintenance and pump outs of your septic system. Second, continue to support TLA efforts to spend time, energy and \$\$ to better understand GBA causes and ways to control. Lastly, report anything unusual in lake waters such as increased plant/algae growth, colored plumes or runoffs from streams or drain pipes, or suspected malfunctioning septic systems. TLA volunteers are always willing to help evaluate your concerns and offer advice.



*This past summer, The Antrim County Dive Team exercised out on Torch Lake diving the Fish Shelters that were installed in 2012-2013. They found that the fish shelters were all still viable and working! While one of the slab trees had "slipped" down the drop off and a few of the trees had tipped on their sides, the remainder of the shelters were in their original location.*

# Chain of Lakes Water Level Update

The Intermediate Lake Association's Lake Level Committee was formed just over a year ago to help address the problems we have been experiencing with lake level flooding in the Upper Chain of Lakes. In that year's time we have made significant progress in beginning to tackle this complicated problem.

The Lake Level committee continues to make progress on its mission to understand what the root causes for the increased variability of Intermediate Lake water levels are and try to do something about it when we do. While it is important to realize that this will be a multi-year effort - there are no quick fixes - we are moving forward on several fronts.

First, as part of our cooperative engagement with Antrim County, we have recommended modifications to the operating protocols for the Bellaire Dam which should improve adherence to the court established

summer & winter lake levels.

Second, we continue to move forward on conducting a Hydrology Study of the entire Elk River Chain of Lakes (ERCOL). Once we know the root causes, we can apply solutions to fix what is causing the trouble. Of course, if any near-term quick fixes are identified as the study progresses, we will apply them as we are able.

Third, a sub-team headed by Fred Sittel of Friends of Clam Lake and Three Lakes Association is continuing to measure daily lake levels for the following lakes in the ERCOL: Six Mile, St. Clair, Ellsworth, Wilson, Intermediate, Bellaire, Clam Lake and Torch, as well as the Bellaire Dam impoundment basin. Fred's team of volunteers has been gathering this data since April.

Finally, we continue to work with, speak to and inform various organizations and interest groups what we are doing and why, endeavoring to bring them alongside us in

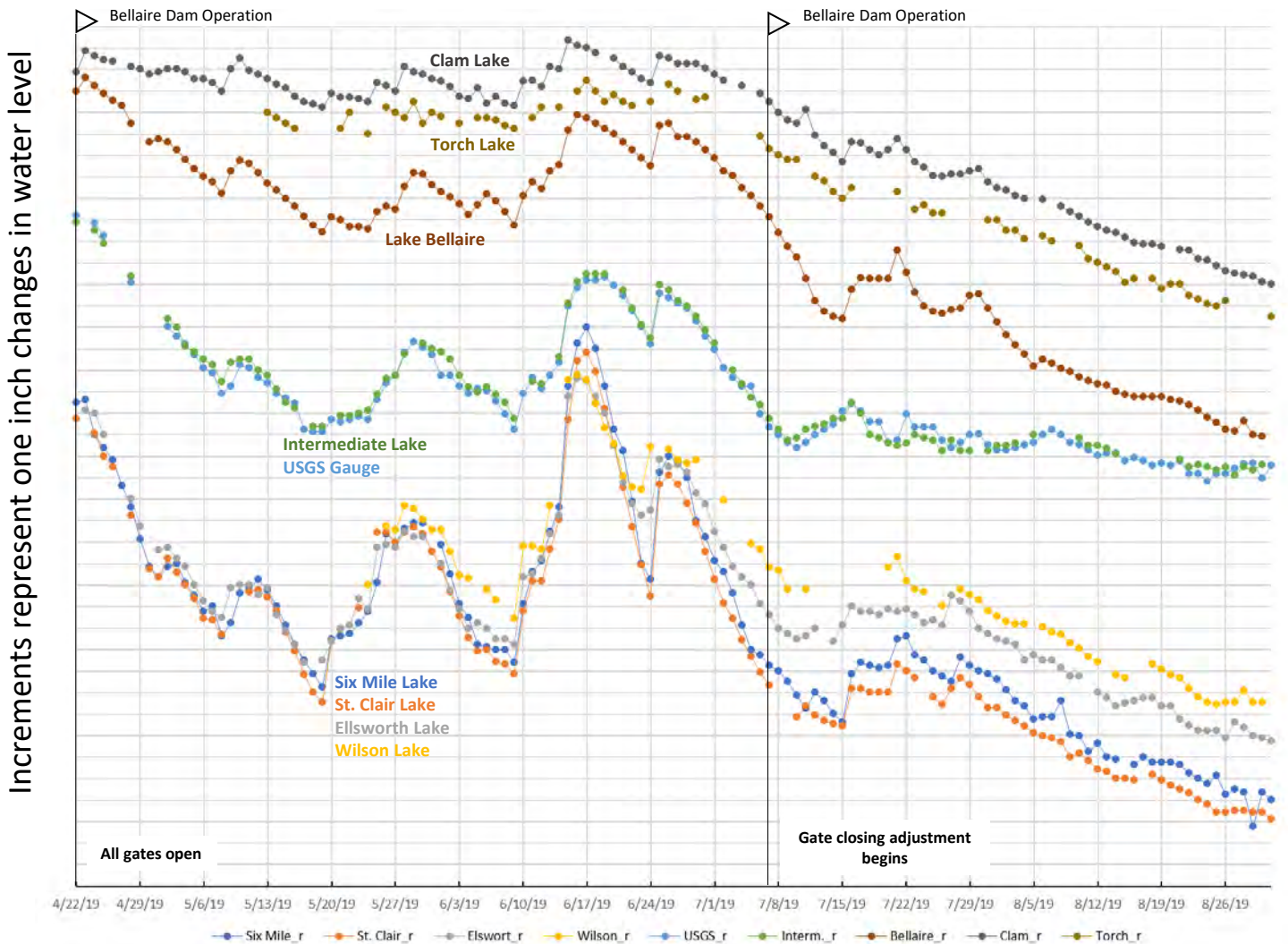
our work. It is important all property owners on the ERCOL know what we are doing and support us in our efforts - this work will benefit all of ERCOL and all of Antrim County as well.

As part of the funding process for the Hydrology Study we are doing - covering the entire Elk River Chain of Lakes, we asked Antrim County to cover a share of the cost of the Hydrology Study. At their September 19<sup>th</sup> meeting, the County Board of Commissioners unanimously approved roughly \$77,000, about 21% of the total cost. The remainder of the study will be funded by the U.S. Army Corps of Engineers (USACE), who will be carrying out the study for us. We are unbelievably fortunate to have an organization like the USACE conducting this study for us, and funding 79% of it to boot!

*Dave Christian & Janet Hickman  
Co-chairs of the Intermediate Lake Association Lake Level Committee*

## Volunteer lake level monitoring program

Change of lake level from first measurement taken this season





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