



QUARTERLY

THREE LAKES ASSOCIATION

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

JANUARY 2019

A few words about Golden Brown Algae

By Becky Norris
Water Quality Chairman

The summer of 2018 found us very busy collecting water and algae samples in our study of Golden Brown Algae (GBA). We monitored the nutrient levels of phosphorus and nitrogen in the lake water, the lake floor water, and the groundwater every two weeks over the growing season to establish their seasonal pattern. We monitored the chemical composition of the water samples to determine how closely samples from different sources were related. We had many of the samples checked for Ace-K, an artificial sweetener used extensively in human foods, which could only be present in the samples if it had come through residential waste water. The data from many of our samples are still being generated so we are waiting for some of the results.

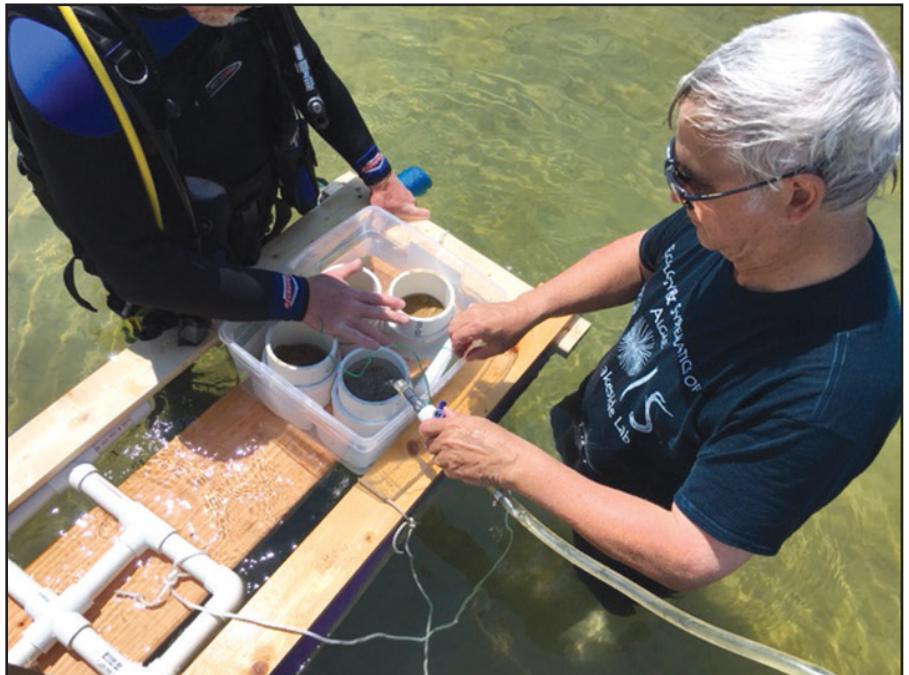
We have also continued a monthly aerial photographic survey of the shores of Torch Lake which allows a broad view of the seasonal progression of the GBA on the shallow shoals. Our pilot and photographer, Art Hoadley, has developed a computer program that facilitates selection of images by month and year so the appearance of sites can be followed over time.

Our consultant, Dr. Jan Stevenson from MSU, has some experiments ongoing that will further determine which nutrient mixes facilitate the growth of which GBA diatoms. We will be looking for the results of these

studies sometime in the summer or fall of 2019.

And in preparation is an educational effort that will allow our volunteers to do some of the time-consuming quantitation

and identification of the GBA diatoms we are finding in the lake. We anticipate this may speed up our data acquisition and conclusions about the causes of the GBA proliferation.



Dr. Jan Stevenson preparing experimental equipment.



Equipment installed on the lake floor. This experiment is intended to determine to what extent nutrients in groundwater seeping up into the lake floor influence the GBA growth.

Sneak peek

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THREE LAKES ASSOCIATION

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Please direct comments or questions to:
231-544-7221
P.O. Box 689
Bellaire, MI 49615
info@3lakes.com

President's Message

As we enter the New Year, and look back on another calendar year, many of us ask where the year has gone and reflect on the things accomplished and also on what we promised to do and just never got around to doing. No matter how well we organize ourselves there is always something that takes us in a different direction. And such was the case this year.

Quoting from the TLA newsletter of February 2018 president's message: "Some see a collaborative team leader, who acts as the 'primus inter pares' (first among equals), seeking to understand the goals of the team and to remove the barriers that stand in the way of the team members' progress toward that goal. These are not the only models of leadership, of course – but they illustrate the wide range of concepts attached to the term 'leadership.' The TLA mission is 'to provide leadership to preserve, protect, and improve...'"

We will continue to pursue this leadership style in a collaborative spirit, without losing our identity, through 2019. We will continue to follow our mission.

With new leadership, the Board held a retreat in October. The goal was to review our mission, review our history, look at where we have been and consider where we may be going. In this newsletter you will read about our retreat

and the results.

I sincerely hope that you enjoy the articles in this newsletter - articles reviewing some of the

past year's accomplishments in more detail, and considering possible projects for 2109.

We look forward to this year with excitement as we pursue present projects and begin afresh with a couple of new initiatives that promise to enhance our mission. We hope that, as a member, you share our passion.

In the spring newsletter, we will have our initiatives outlined, which will give you the opportunity to follow us as we progress through the year. It will also provide you with the opportunity to participate in our projects. See what project really spikes your interest, and volunteer to be part of it.

Please feel free to contact us if you have questions, thoughts, or suggestions. Please remember to renew your membership, as this is the foundation that allows us to continue our mission. Have a terrific New Year!

Sincerely Mike



New Members and Donations

New Members

David & Laura Atkinson
Dale & Bridget Fox
Mark & Kristen Freund
Michael & Ann Green
Byrne & Hope Harmon
MJ Henry
Mark & Katherine Lefanowicz
Todd & Carla McDonald
John & Catherine Nicholson
John & Karen Parker
Hal & Sue Rummery
Marlene Sdao
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Large donations:

Todd Collins III	\$250.00
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Bruce & Nancy Brown	
Charitable Foundation	\$500.00
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Ken Wrobel	\$500.00
Rob & Linda Lanphier	\$1,000.00
Richard & Susan Bingham	\$1,500.00

TCE Groundwater Plume: Wrapping up TLA's Role

By Dean Branson
and Gary Knapp

TLA successfully advocated for solutions to the trichloroethylene (TCE) groundwater plume through community engagement activities and advocacy for the last 14 years. Now that a 300,000-gallon storage tank at the Cedar River Well Field is functional, TLA anticipates being less actively engaged in the future.

This storage tank is the second of two construction projects to improve MAWSA's public water system to assure access to TCE-free drinking water in the affected area for the next few years. The first construction project was the installation of a new 12-inch water main and pressure-reducing station, and the second project is the installation of this in-ground 300,000-gallon storage tank near the Cedar River Well Field that enables the operators to reduce the pumping rate of the deep Cedar River Wells from 600-to-900 gallons per minute to about 100 gallons per minute. Slow pumping these Wells reduces the chances of pulling the TCE plume from a higher aquifer that contains the TCE downward to the deeper aquifer (450 ft deep). The goal is to minimize the chance of pulling contaminated water into this public water system. The idea is for the slow-moving TCE plume in the higher aquifer to migrate over the deep-well screens (450 ft deep).

The water in this public water system is routinely monitored for TCE by the operators of this system, Mancelona Area Water and Sewer Authority (MAWSA). Although the State of Michigan considers water containing less than 5 ppb to be safe to drink, it was anticipated that consumers of water might be concerned about consuming any detectable



Finished storage tanks where the cement walls have been back-filled, the vents installed after the top was covered, and the area was fenced, and landscaped.

amount of TCE because of EPA's classification of TCE as a human carcinogen.

Initially, TLA became involved in this issue due to environmental concerns for TCE seeping into the Cedar River. TLA's subsequent leadership involvement was to advocate for greater non-adversarial, consensus-building, community engagement, rather than adversarial resolutions of conflict, as part of a group of stakeholder organizations including:

- Several Property owners' associations
- Potentially impacted businesses, including realtors, and Shanty Creek Resort
- Michigan Department of Environmental Quality
- Mancelona Water and Sewer Authority (MAWSA)
- Local units of government; townships and Antrim County

- Public Health Department
- Local environmental organizations
- Gourdie-Fraser Engineering firm

At first this group, ACUTE (Antrim County United Through Ecology), operated under the auspices of the Community Resources Development in Mancelona. As TLA became more involved in ACUTE's community engagement and its search for solutions to this problem, we applied for and received two grants from Freshwater Future to pay for administrative activities associated with resolving this TCE plume problem.

On several occasions, ACUTE stakeholders actively investigated the viability of various options for remediating this very large TCE plume (more than 10 square miles). Possible technical options included the *in situ* de-chlorination of TCE using nano-scale iron, microbial degradation of TCE, and air-stripping of TCE from pumped groundwater. But the very large size of this TCE plume, more than 13 trillion gallons of groundwater, precluded a comprehensive evaluation of these intriguing technologies.

The following three activities were turning points for resolving this problem:

Successfully requested \$300,000 from Michigan legislators to pay for preliminary engineering study of options for short-term and long-term plans to address this TCE plume problem. The cost estimate for a consensus, long-term option was roughly \$5.5 MM, which was about \$5 MM more than DEQ



Poring the cement walls for two side-by-side 150,000-gallon storage tanks; each tank is 68 ft long, 23.5 ft wide, 14 ft high. Total volume of these two in-ground tanks is 44,744 cubic feet, which corresponds to 334,685 gallons.

PLUME continued on page 4



Steve Grill and a Grand Traverse Construction's employees inspecting the site adjacent to the Cedar River Well Field being prepared for the new in-ground storage tank.

Plume *Continued*

had available for this site over the next 7 to 8 years. Although ACUTE investigated several options for cleaning up the groundwater contamination, or removing the TCE from the water, the consensus plan only involved the installation of water mains to the very large area affected by the groundwater contamination.

Negotiated and advocated for funds to pay for two short-term construction projects. Deliberations and sources of funds regarding the companion long-term construction projects have not been considered by community stakeholders. The initial engineering cost estimates for the two short-term construction projects was \$1.253 MM, and the negotiated sources of funds was \$0.75 MM from DEQ, \$0.25 MM from Antrim County (a skin-in-the-game prerequisite), and \$0.253 MM from engineering cost-cutting measures (repurposing existing equipment). Although there have been several cost overruns and delays, the decision to move forward was based on the initial cost estimate, and the DEQ has absorbed the cost overruns.

The most difficult authorization to move

forward with these short-term construction projects was obtained from Antrim County Commissioners on February 12, 2015 with a 7 to 2 vote to provide \$0.25 MM to the Mancelona Area Water and Sewer Authority for the two short-term construction projects.

On December 7, 2017, the DEQ hosted a public informational update meeting at Shanty Creek Resort. One of the key points from that update was that the TCE plume may be migrating in a more westerly direction, which appears to be pointing toward the headwaters of the spring-fed Shanty Creek. More monitoring wells in this area were planned for 2018 and 2019, as well as monitoring for TCE in the creek water and the residential well water in this area.

An overriding lesson learned: addressing groundwater contamination problems in an adversarial manner, using lawyers and the courts can be very expensive and time consuming, compared to the non-adversarial model employed by ACUTE to engage communities and regulatory agencies. In addition to consensus-driven decisions, the ACUTE process enabled all stakeholders to have a voice and a seat at the table, and

communications were more transparent and more constructive. The ACUTE model could be replicated in other settings where community engagement and consensus could avoid costly litigation.

Acknowledging Individuals:

Several people played very important roles that helped accomplish these two short-term construction projects so that people living in the affected area can continue to drink, TCE-free, high-quality water. Gary Knapp and Dean Branson would like to take this opportunity to acknowledge the contributions of a dozen individuals, in no particular order:

Bob Wagner, now retired DEQ Division Manager; in 2004 Bob worked with Gary Knapp to encourage community engagement through the ACUTE process.

Janet Adams, DEQ's project engineer in charge of this TCE plume (Wickes Manufacturing Site), which includes oversight for interpreting the data from hundreds of monitoring wells and the flow of DEQ funds to investigate and manage this site.

PLUME continued on page 5

Randy Roth, DEQ-Regional Manager, Remediation & Redevelopment

Steve Murray & Leonard Mankowski, AMEC Foster Wheeler-Environment & Infrastructure, DEQ's contract consultants that built the 3-D groundwater models and maps based on data from the monitoring wells. The maps help forecast the future location of the TCE plume in various aquifers.

Mike Crawford, Chairman of Antrim County's Board of Commissioners in 2015

Pete Garwood, Antrim County Administrator, helped resolve disputes regarding the legal basis for providing financial assistance, in conjunction with Jim Young, who also helped resolve the legality of this issue.

Joe Elliott, now retired engineer with Gourdie-Fraser, MAWSA's contract consultant, architect of a master plan for construction projects to assure long-term access to safe drinking water in the area affected by the TCE plume. In 2017, Wade Trim firm became MAWSA's contract consultant.

Pete Bigford, Chief Operating Officer for Shanty Creek Resort, a major stakeholder associated with the area affected by this

TCE plume. Thank you for providing complimentary meeting rooms for ACUTE meetings, and public updates. We are also acknowledging the description of the economic impact of the TCE plume on property values with and without access to safe drinking water, that was provided by an area realtor, Bob Edwards;

Scott Kenzierski, Director of Environmental Health Services-NW Michigan, including Antrim County, implemented a "Well-First Policy" for the 570 vacant parcels that could be affected by the TCE plume, and conducts residential well monitoring for TCE for the homes in front of the leading edge of the plume.

Jim MacQuarrie, Mancelona Area Water and Sewer Authority's, manager of public water system operations within the service area.

Tim Hannert, TLA's Executive Director, through 2006, during the time when TCE was seeping into Cedar River, built a physical 3-D model to help show the location of various TCE plumes in different aquifers at different depths.

Steve Grill, past president of the association of Property Owner's associations.



The process started at a meeting on January 31, 2012, where Michigan's House & Senate officials from the Appropriations Committee for the Department of Environmental Quality met with ACUTE-associated advocates to discuss the need for an additional \$300,000 in the State's budget to pay for a preliminary engineering study of options for resolving the TCE plume problem. (l to r) Gary Knapp, Rep Greg MacMaster, Eric Dean, Senator Howard Walker, Pete Garwood, Sen Mike Green, Pete Bigford, and Dean Branson. The success of this meeting was announced in a press release on June 14, 2012. ACUTE = Antrim County United Through Ecology.

Calendar of Events

Mark the date on your calendar and watch for updates on location, time, and program

Annual Meeting

Thursday,
August 1

Regular Board Meetings

Held on the fourth Tuesday of the month, January through November, at the Forest Home Township Hall, at 9 a.m.

January 22,

February 26

March 26

April 23

May 28

June 25

July 23

August 27

September 24

October 22

November 26

Delving Deeper into Swimmer's Itch

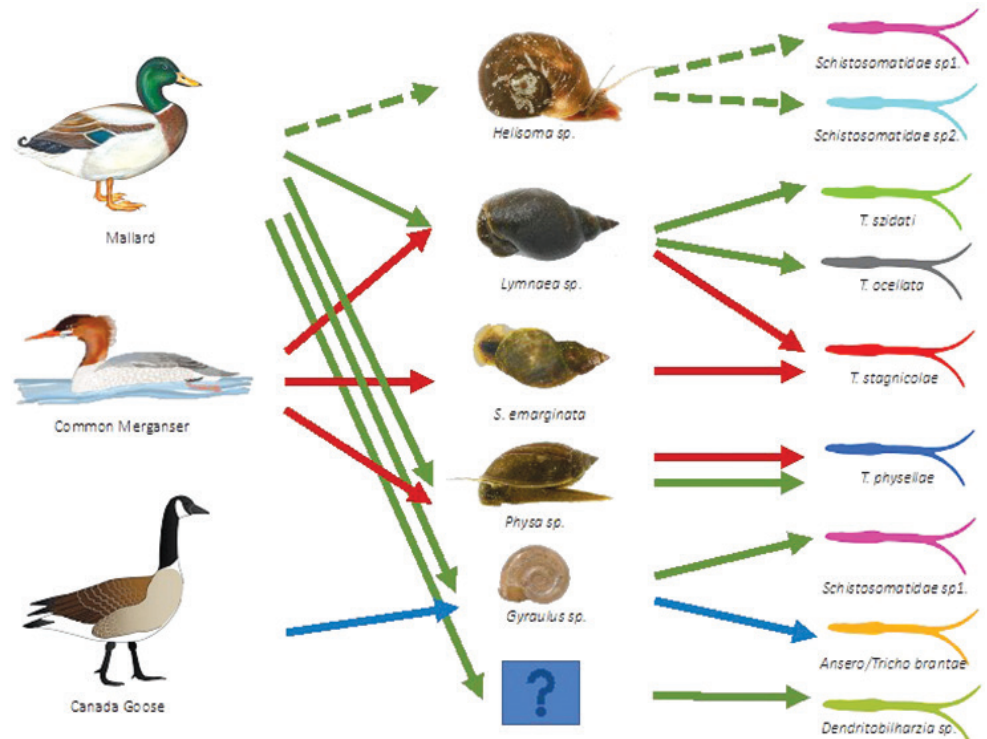
By Becky Norris
Water Quality Chairman

What is swimmer's itch? It's a rash produced when a schistosomal parasite, whose life cycle alternates between vertebrate and snail hosts, enters human skin and, unable to survive there, generates an allergic response. Figure 1 shows the representative appearance of this itchy rash. Until recently, reports to local environmental organizations of cases of swimmer's itch in Torch Lake, Clam Lake, and Lake Bellaire have been isolated or affecting fairly few individuals. However, in the past few years reports have been increasing in these lakes as well as in other lakes in the Elk River Chain of Lakes. The Three Lakes Association (TLA) conducted surveys in 2017 and 2018 asking members about their experience with swimmer's itch (SI). These surveys and member engagement on SI by other area lake associations, have led to an overall increase in awareness and in the number of cases being reported. The full survey reports are available on the TLA web site; go to <http://3lakes.com> and type swimmer's itch in the search bar.

Based on our survey results, TLA believes there is a sufficient problem with SI in our lakes to merit our attention and is looking at the possibility of conducting studies to determine the host animals responsible for the life cycle of the SI parasite and also the possibility of making available a rapid detection method to determine the likelihood of getting SI at a particular time and place.

The reports of SI were highest in July and August. In Torch Lake they clustered along the south sandbar and the east shore from the sandbar up to Clam River. In Lake Bellaire they clustered along the east and west shores. Figure 2 is a Google map showing the distribution of reported cases. A comprehensive lakes-wide study might have identified additional locations with abundant SI parasites that did not show up in these surveys.

In 2018 our sister lake association, ESLA, worked with Freshwater Solutions, Inc. to do a survey of Elk and Skegemog Lakes to determine which vertebrate and snail hosts



Partial representation of vertebrate and snail hosts for schistosomal parasites and the swimmer's itch cercariae they harbor.

were responsible for SI in these lakes. ESLA has courteously allowed TLA to provide links to their reports. An excellent summary of the ESLA study is included in their November 2018 Newsletter. The newsletter and the full study report are available on their web site at <http://elk-skegemog.org>.

Historically, in order to determine the specific combination of host animals responsible for SI in any location, it was necessary to collect snails and the droppings of the water fowl in the area and identify the specific parasites under microscopic study. A highly effective way of determining, both qualitatively and quantitatively, what specific SI parasite is present in the lake has now become available. Quantitative polymerase chain reaction (qPCR) allows the DNA associated with the parasite to be identified and its amount determined from lake water samples. This methodology has

developed a detailed protocol for collecting and processing water samples that allows a realistically accurate assessment of the true risk of contracting SI at the sampling site. And equipment for conducting the qPCR analysis in under one hour's time is now available.

TLA hopes to make qPCR analytical capability available in our area in 2019 by obtaining grants and partnering with other area organizations on a proposal from Fresh Water Solutions Inc. to establish local laboratory capability vetted by their partner research organization in Alberta Canada. Preliminary discussions with the science education staff at Elk Rapids High School has offered the potential to leverage existing facilities and expertise while teaching summer interns and area students about parasite life cycles and DNA analysis. The cost of the proposal is \$38,000, which means that a combination of grant funding and partnering will be required to reach this goal.

The contemplated qPCR laboratory facility would also allow us to test water for contamination by human enteric bacteria, and do it quickly (about an hour instead of a few days with *E. coli* testing, the universal



Swimmer's itch rash on a child's legs.

been published online in EcoHealth (<https://doi.org/10.1007/s10393-018-1362-1>) by Ron Reimink and colleagues. Freshwater Solutions, Inc. and colleagues have

SWIMMER'S ITCH continued on page 7

Swimmer's Itch *Continued*

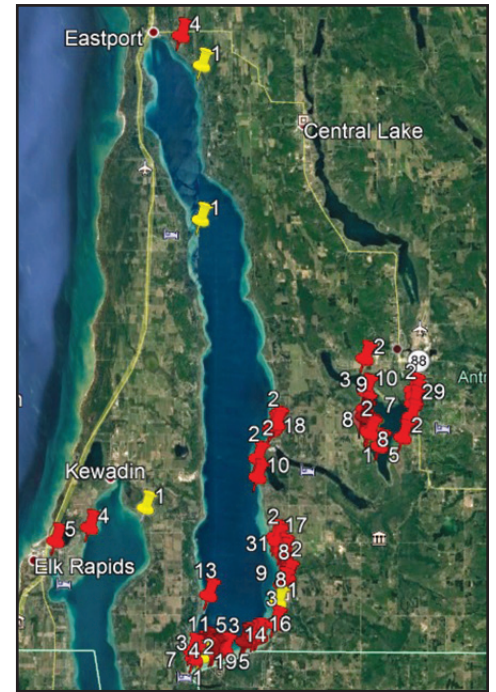
standard for detecting fecal contamination but which does not specifically detect human source contamination).

One way that has been found to reduce the burden of SI in a lake has been to capture and relocate elsewhere common Merganser duck broods. This is only effective, however, if the Merganser is the only vertebrate host for the SI present; this is often but not always true. There are numerous other water fowl (geese, gulls, other duck species) and other vertebrates (raccoons, beavers, etc.) that may be the actual vertebrate host and there are numerous types of snails that may be the alternate host in any given location. Figure 3 shows some of the vertebrate and snail hosts that harbor the SI parasites. It requires a DNR permit to relocate Mergansers, and the Mergansers are the only vertebrate host for which the DNR issues relocation permits. And data must be generated to demonstrate

that the Mergansers are the SI host before a permit will be issued. Given all of these considerations, it may be worthwhile to survey Torch Lake and Lake Bellaire to find out if the common Merganser is the SI vertebrate host carrier in these lakes. A bare-bones survey of at least some portion of each lake would cost at least \$5000. Funding of these studies may be supported in part by public and private grants but, as with the qPCR laboratory, would need financial support from the collaborating lake associations and good Samaritans.

There are many details yet to be worked out and TLA is diligently looking at what it can do and what collaborative partnerships can be formed to tackle the SI situation.

Google map of cases of swimmer's itch reported on the TLA Reporting Tool in the summer of 2018.



A day of reflection and teamwork

By Gary Knapp

TLA recently convened a facilitated Board Retreat. The purpose of the retreat was “to envision an enhanced leadership role whereby TLA builds upon its strengths through a debate of its priorities and, in the process, achieves a better understanding of its strengths, weaknesses, opportunities and threats.”

The primary outcomes of this day-long process focused on: enhanced leadership; collaborative partnerships; the need for project champions; organizational capacity building and sustainability.

It was determined that the common ingredients for past and future TLA successful projects include: a project champion; clearly defined mission and goals; dedicated volunteers; competence and relevant experience; the use of scientific data and methodologies; sufficiently allocated resources; a competent and enthusiastic Executive Director; collaboration with other organizations; adequate human and financial resources; public awareness and

support; responsiveness to community needs; and consistency with organizational mission.

Many of the past, present, and future initiatives discussed focused on TLA's long-standing history related to monitoring, advocacy and projects related to **water quality**. While water quality is just one of the five “pillars” which encompass TLA's mission the consensus view is that it has evolved to become a signature issue within the broader scope of TLA's mission.

Therefore, among the many outcomes of the retreat, a consensus emerged around the benefits associated with TLA's publication and ongoing use of its historical and current **water monitoring data collection system** – including its many broad and diverse applications.

Furthermore, it was agreed that TLA should assert its leadership role in the context of initiatives/projects with regard to historical baseline water quality related data collection and analysis.

Beyond water quality related issues the Board also affirmed its commitment to public education and inclusiveness; water safety; education; and publicity. Within this

broader context of TLA's overall mission a recommendation was put forward that the Board adopt a *Retreat Follow-Through Action Plan*. The first step in this Action Plan will be the identification and prioritization of short, long term and ongoing projects and their intended outcomes (both existing and proposed/future). Once developed, these projects would then each be challenged to comply with the list of “common ingredients of successful projects” in order to maximize their success. The overall list of projects would then be reviewed in the context of organizational structure, organizational capacity, and long term organizational and project sustainability.

Finally, it was determined that that the Board would follow through with the agreed upon outcomes of the retreat. In order to accomplish this it was further agreed that time would be allocated during each monthly Board meeting dedicated to following through with next steps – initially to focus on the aforementioned identification and prioritization of short and long term goals/projects and their intended outcomes.



Three Lakes Association

P.O. Box 689

Bellaire, MI 49615

3lakes.com



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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.

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