QUARTERLY

THREE LAKES ASSOCIATION SERVING LAKE BELLAIRE, CLAM LAKE AND TORCH LAKE IN ANTRIM COUNTY, MICHIGAN OCTOBER 2015

Golden Brown Benthic Algae in Torch Lake: Study Update

By Becky Norris, Trish Narwold, and Dean Branson

"So, what is this orange-y stuff proliferating on the floor of Torch Lake and what is causing it?" These are the questions the Three Lakes Association has been addressing over the summer in collaboration with scientists from MSU (Drs. Jan Stevenson and Sherry Martin), U of M (Dr. Rex Lowe) and U of Colorado (Dr. Pat Kociolek). Understanding what is stimulating this proliferation of lake floor algae is essential for developing strategies to remedy the situation. The hypothesis being explored in our study is that excess nutrients (phosphorus and nitrogen) are being delivered to the lake floor through groundwater inflows and are thereby stimulating the growth of the algae. This benthic algae growth is different from the greenish algae blooms in surface water in other lakes (such as Lake Erie) which are known to be due to excess phosphorus in surface water run-off, and also different from shoreline Cladophora blooms (that stringy green stuff) typically seen in early spring with snow-melt run-off or where polluted water drains into the lake.

Art Hoadley has flown around the full shoreline of Torch Lake taking aerial photographs monthly that allow us to visually follow the progression of the algae patches over the summer. One of the intriguing features of this golden brown algae is its distribution in some areas, as seen in the aerial photographs, in a crescent shape in ripples between areas relatively free of algae (Fig 1). In an effort to understand this growth pattern, we have collected groundwater samples both in areas of high and of low algae abundance.

Crescent Shaped Patches of Golden Brown Algae

Groundwater collection has been ongoing through various methods including small shallow wells (piezometers, Fig 2), a re-usable temporary piezometer (Fig 3), gentle suction a few inches below the lake bottom by syringe or turkey baster, passive diffusion into dialysis tubing inside protective perforated PVC tubing ("peepers," Fig 4), and filling of plastic baggies held tightly over sites with visible flow into the lake (groundwater springs, Fig 5). Over 100 water samples have been collected and sent to MSU for chemical analysis; results are anticipated sometime in November.

Samples of benthic algae on rocks and sand have been collected by scraping material from measured surfaces of rocks and by capturing of algae-coated sand in petri dishes. Quantitative determination

See ALGAE page 4

Sneak peek

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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Please direct comments or questions to
Leslie Meyers, Executive Director
231-544-7221 - Please leave a message
734-777-2335 (cell)
P.O. Box 689
Bellaire, MI 49615
info@3lakes.com

www.3lakes.com

President's Message

Greetings to all,

Have you ever noticed how some people can bring order to a situation with a careful, clear, explanation? At every annual meeting of the Three Lakes Association, one of the motions made is to ratify the actions of the board that have been taken since the last annual meeting. Chuck Drouillard was the man who usually made that motion. A few years ago, he responded to the question of why we make that motion, explaining that the Three Lakes Association is a membership-based organization, and that the board acts by the authority vested in it by the membership. Therefore, it is important for the membership to periodically put its stamp of approval on the actions of the board.

Chuck was also the one who usually, after the slate of candidates had been presented – and additional nominations had been sought – would make the motion that a unanimous ballot be cast for the resulting slate of candidates.

Chuck did not make these motions at the annual meeting, this year. He did not attend because he was very ill. He died at his home in Bellaire on August 23, 2015. I know I am not alone in saying I will miss Chuck very much.

As I look at the letters I have written to you this year, I realize that all but one have brought you the sad news of the passing of another one of our long-time, dedicated, TLA leaders. I know how downhearted that made me feel, and I suspect it affects all of us the same way. Would you join me in striving to emulate the fine qualities of the friends we have lost? Chuck was direct and honest. He cared passionately about our lakes and our watershed. He found ways to educate others about the proper stewardship of our shared lake shore. May we do the same.

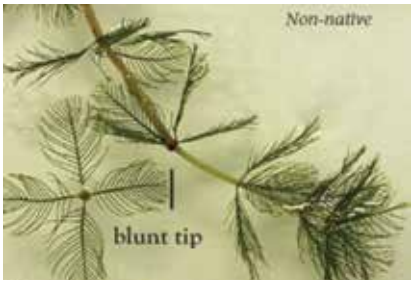
If you are inspired by the dedication and service of people like Chuck Drouillard, Bob Oswald, and Bob Bagley, consider filling one of the vacancies we have on the Three Lakes Association board of directors. Do feel free to call us at (231-544-7221), or email us at info@3lakes.com, or visit our website (www.3lakes.com) and fill out the volunteer form. In fact, if there is any area of TLA activity that you are interested in, please fill out the volunteer form and submit it – we can always use your help.

Please mark your calendar now for the 50th Annual Meeting of the Three Lakes Association, which will be held at Shanty Creek Resort, on August 11, 2016. This will be a tremendous celebration that you just don't want to miss. If you are one who enjoys helping with such a splendid event, please call or email us (contact info above), and we will put you in touch with the event Chair, Sandy Gourley.

Thanks for considering any of our volunteer opportunities,

Tina

Watershed 101



Eurasian watermilfoil (EWM), *Myriophyllum spicatum* **BAD**

Northern watermilfoil (NWM) *Myriophyllum exalbescens* **GOOD**

Allofragmentation: Occurs from disturbance such as boat motors, paddles, wind, etc., break fragments free from rooted stems. Fragments then create new plant growth.

Did you know that inter-lake movement is the largest cause of aquatic plant transfer?

Interns Tackle EWM with Benthic Barriers

For 2015, the TLA Interns experimented with Benthic Barriers to combat the invasive Eurasian water milfoil. Eurasian water milfoil (EWM) is a nuisance invasive aquatic plant that can reduce the quality of the aquatic environment through excessive growth. This causes native plants to be replaced, reduces plant diversity, adversely impacts fish habitat, and can interfere with boating and swimming activities due to the effects of large weed beds.

TLA has been monitoring EWM since the late 1990's. Over the years we have utilized limited chemical treatment, diver assisted suction and rudimentary benthic barriers to combat its spread. EWM continues to make its home in 4 locations: Butch's Marine, the Clam River (adjacent to Butch's), the Embayment between Stony and Lone Tree Points and Alden Harbor.

This year, we experimented with a formalized non-toxic benthic barrier approach. Benthic barriers prevent plant growth by blocking out the light required for growth. These barriers are non-exclusive, meaning they prevent ALL plant growth. By starting small, our goal is to see if we could eliminate the bad and allow the good plant life to return.

Assembling Benthic Barriers

In early July, four barriers were place in boat slips at Butch's. Two barriers were also placed in a private boat well behind the marina.

Upon Placement, sandbags are added for securing and submerging.

The barriers were removed in mid-August and relocated to Alden Harbor. Plans are to remove those barriers in late September.

Olivia sinking a barrier

We can officially say that the barriers were indeed non-selective! All plant life underneath them had ceased. The Water Quality Committee will continue to monitor this fall and establish a treatment plan for 2016.

Editor's Note: Special thanks go out to the Lake Louise Association for donating 6 of their barriers and their generous offer of material to create additional mats for next season.

Membership counts!

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ALGAE *continued from page 1*

of algae types, their relative abundances, distributions around the shoals of Torch Lake, and changes over the summer season are to be determined from these samples. These results are also anticipated for late this fall.

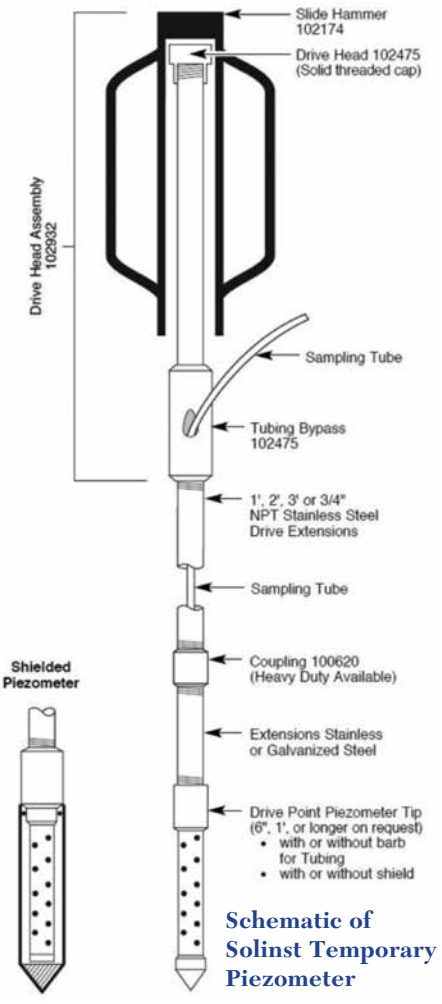
An experiment with known nutrient levels ("science in a basket" using nutrient-diffusing substrates, Fig 6) was carried out by Dr. Lowe's team to determine which types of algae grow preferentially with various concentrations of nitrogen and phosphorus and, thereby, to assess which of these nutrients is rate-limiting for the algae detected. Kristel Sanchez, the graduate student working with Dr. Lowe, has presented her interpretations from the data thus far generated at the U of M Biological Station as part of her masters' degree program.

The results confirm an expected higher concentration of phosphorus in groundwater than in lake water. One of the exciting and unanticipated findings from benthic algae samples collected by Drs. Lowe and Kociolek is that ten of the roughly 200 species so far noted to be present have not been previously described in the scientific literature. Our collaborators are preparing a publication to describe these species. Figures 7 – 10 show activities of various team volunteers at work in the field.

As we learn more, further information will be posted to the Three Lakes Association web site, www.3lakes.com. The proliferation of this golden brown algae is threatening, at the very least, the pristine clear "Caribbean" blue of Torch Lake that we all so value. Analysis of one benthic algae sample costs $200. Analysis of the nutrients in one water sample costs $50. Essential equipment to conduct the study costs several hundred dollars. Thousands of additional dollars will be needed to investigate remediation possibilities. Financial support from those concerned about the health of the lake and able to give would be tremendously appreciated. If you would like to help out, please contact Leslie Meyers, TLA Executive Director, 734-777-2335.

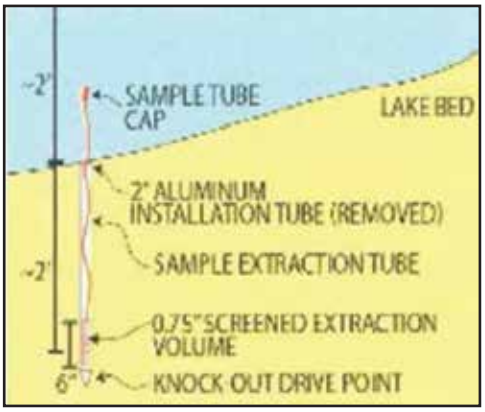
Editors Note: TLA would like to thank TLPA for their generous donation to assist us with our efforts.

See more photos on page 5



Schematic of Solinst Temporary Piezometer

Above, Jan Stevenson and Becky Norris discussing diffusion bags inside a perforated PVC pipe, a "Peeper"



Right, Schematic of Shallow Well Piezometer

Dr. Lowe's "Science in a Basket" Nutrient Experiment

Becky collecting water from flowing benthic spring

Sandy and Ed Gourley supervising collection of groundwater sample by Becky, Trish, and Dr. R. Jan Stevenson

Paul, Trish, Art, and Fred fabricating the well point of a semi-permanent piezometers

Dean Branson and Jan Stevenson Installing a Peeper

Right, first piezometer installation with Dean and Paul (in the water), Art and Steve (on the boat), and Trish and Fred (not pictured)

Torch Lake Sandbar Study

By Becky Norris,
Water Quality Chair

The Three Lakes Association and the Torch Lake Protection Alliance jointly undertook a study of E. coli and ammonia levels in the water at the southern sandbar in Torch Lake over the fourth of July week-end. E. coli is used worldwide as an indicator bacterium for the presence of fecal contamination. Ammonia is the test we chose as most likely to demonstrate urine contamination. Twelve sites were chosen and documented with GPS coordinates (latitude and longitude) to encompass the most densely utilized portions of the sandbar and the eddy current that flows easterly along the south shore. Teams of volunteers collected water samples at about 9 am and 4 pm on July 3, 4, and 5. Samples were promptly placed on ice and refrigerated until they could be delivered to the laboratory on July 6. Standard holding time for E. coli samples is up to six hours, a standard that could not be met due to the laboratory being closed over the week-end. The consequence of exceeding the standard holding time for E. coli is that the reported results could be lower than the actual values at the time of sample collection.

The human occupancy of the sandbar was lowest on the morning of July 3 with few people in the water and an estimated 200 or so boats at anchor; by the afternoon there were at least 500 boats and a few thousand people present. By the morning of July 4 there were an uncountable number of boats and several thousand people present; by the afternoon there were, by the sheriff's estimate, about 10,000 people present. On the morning of July 5 half or more of the boats and people had left and by that afternoon most of the visitors had gone and local people were there in modest numbers attempting to clean up the trash in the lake. During the week-end there were food, cigarette butts, beverage cans and cups, other assorted trash, and the occasional turd observed in the water. The lake floor was disturbed by the foot traffic to the point where the usually crystal clear water was turbid.

The E. coli counts tended to increase from morning to afternoon and from day to day. Despite the huge crowds and the visible contamination in the water, and despite occasional elevated levels in the collected samples, the E. coli counts found did not reach the persistent levels that would have triggered beach closure advisories.

The ammonia levels in our samples were all below the laboratory's minimum detection level with the exception of one site on the afternoon of July 4 in the location where the most concentrated collection of beer drinkers was located.

The specific tests we used to detect fecal (E. coli) and urine (ammonia) contamination, given the circumstances under which we could perform the study, did not demonstrate excessive levels representing human health hazard. For the reasons noted above, these results should not be taken to indicate that the lake water was safe and free of harmful contaminants. If methodology becomes available for more prompt sample analysis, it would be worthwhile to do further testing when there is dense human occupancy on the sandbar.

Three Lakes Association Water Quality Chair, Becky Norris and Torch Lake Protection Alliance Board Member Gary Petty collecting water samples on July 3rd, 2015 the Sand Bar.

Letter to the Editor

My family built a summer cottage on Torch Lake back in 1970. Being raised in the Metro Detroit area, I had never seen lake water so clear and beautiful. I considered myself to be extremely fortunate to have access to one of nature's finest creations. Our family, along with countless friends and relatives, have had the opportunity to spend quality time on this wonderful lake for forty-five years now.

However, like many others on the lake, we've become totally disgusted by the evolving situation taking place at the south end of the lake, specifically the sand bar. This gorgeous strip of hard white sand has become a huge Holiday Partying Site. Even though our property is almost two miles away, we still have all sorts of nasty things floating ashore after the weekends and the holiday partying sessions. It never used to be this way. There have always been small groups of people, mostly families with kids, who park their boats along this sand bar and spend the day just peacefully enjoying the water and the outdoors. We noticed a big change in the quantities and attitudes of those using the sand bar however, after a local radio station began to promote the area. In fact, I saw a banner attached to a local business indicating that even further promotional efforts are being made by "Bud Light". There were between 7-10 thousand people using this site over the recent July 4th holiday. Most of these people are considered as "Walk-on's", as they don't live on the lake or have a boat to launch. They just drive to the lake and walk onto the sand bar, usually walking through private property to access the water.

The issue isn't that these people are using the lake. The lake should be shared by as many people as possible, as it is such a rare find. The problem relates to the overcrowding numbers of people and their careless behavior.

There is common open nudity, open fornication, fights, intoxication, injuries and arrests. This has become a place where families and lake residents firmly avoid. I can't imagine how disrupting these events must be for the people who live along that stretch of shoreline.

I recently spoke with an attorney about a law that I've always thought to be applicable in situations like this. This law; as it has been described to me, apparently assigns ownership of the lake bottom to the Riparian Property Owners, in a pie shape, from their lake frontage to the center of the lake. This same attorney says that the law is rarely enforced however, as local law enforcement departments prefer to let the civil courts handle the problem.

If our family property was located directly along that sand bar, I would be knocking on every one of my neighbors doors asking them to join me in a class action suit. I would bring suit against the local radio station, and Bud Light, for being instrumental in diminishing my property values. I would also bring suit against the Local Townships for not properly funding their law enforcement needs on the lake and for not responsibly choosing to bring the situation under control. I would also petition the local road commission to deter non-resident holiday parking within five miles of the area.

In closing, I feel that the lake should be accessible to everyone, not just the local residents. But those fortunate enough to venture onto the lake still have a responsibility to behave themselves and not cause issues for others. They shouldn't leave bad feelings and a littered mess in their wake every time they come. I feel that if the holiday sand bar access were to be heavily restricted for two or three consecutive years, it just might break this cycle and allow the area to go back to its more normal usage pattern.

Robert Sullivan
Torch Lake, Michigan

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Correction: President's Letter, July Quarterly

Tina's letter in our last addition referred to a picture of Bob Oswald and Jack Norris. Unfortunetly that picture just showed Bob. In Tina's words, "One of my favorite photos is of Bob and Jack, taking a rest and making notes on the shoreline survey work they had just completed, by canoe, along the south shore of Clam Lake. The canoe they had been paddling is visible, as is the walker Jack needed for getting around. The two men were soldiering on, overcoming the challenges visited on them by Bob's Parkinson's and Jack's COPD and crippling leg injuries. Intense dedication to preserving the health of our waters, demonstrated again and again by men of such courage and determination...."

We regret the mistake but are privileged to reflect on both men again in this issue.