

Lake Levels and Our Dynamic Chain of Lakes

By Mark Stone,
Antrim County Operator of Dams

As we all know, the spring rains and runoff of 2013 brought unusually high water levels in the Antrim Chain of Lakes. The situation made for a busy spring for me as the Operator of Dams for Antrim County fielding the many inquiries of concerned lakefront dwellers. Hopefully, I can clarify a very complex situation.

There are two—and only two—court-ordered lake levels in the Antrim Chain: Elk Lake and Intermediate Lake. The Elk Rapids Hydro Dam controls Elk Lake. The Bellaire Dam controls Intermediate Lake. However, “control” is a term that becomes more problematic as one moves upstream in the Chain of Lakes.

Elk and Skegemog Lakes

The Elk Lake level is pretty straightforward (here I am discussing Lake Skegemog as well). The capacity of the Elk Rapids Hydro Dam and its close proximity to the lake proper combined with the overflow that routes water through the Kids’ Fishing Pond is more than enough to allow true control over the level of Elk Lake. In a short period of time, we are able to lower the lake the 0.6 inches necessary to meet the winter level that begins on November 1st of each year, 590.2 feet above mean sea level. It also allows us to maintain Elk Lake within a couple of centimeters of the prescribed level even after heavy rains. So, after April 15th (or



Elk Rapids Hydro Dam - view from upstream

the break up of ice, whichever date is later), you can be sure the level of Elk Lake is at 590.8 feet above sea level and remains constant all summer.

Yet, residents on Elk and Skegemog Lakes regularly call me with concerns of the level being too high. Since 1997, we have had only two instances of a problem at the dam causing the level to be a couple of inches high. In both cases, the electronic gauge had malfunctioned leading the operator to think he had the level at the correct height. Only one of those cases was brought to my attention by a resident living on the lake. Both were remedied within 24 hours. Also, both cases occurred when Traverse City Light and Power (TCLP) was operating the hydro prior to 2007. If residents believe the level to be too high, I direct them to view the sight gauge on the south wall of the raceway above the dam, easily viewed from the north side of the raceway.

So why the continuing concerns about the Elk and Skegemog Lake levels? One

of two factors is most likely (and they can apply to many callers on the other lakes).

The first is an observable change in the level of the bottomland, possibly from the dock riding higher or lower than last year when installed in the same location; or perhaps a landmark, such as a rock, sitting lower in the lake. The resident makes the observation, assumes the water level is different, and calls to ask why. However, the cause is probably a change in the lake bottom from currents moving sediment, ice scouring, or, in the case of the rock, subsidence and the slow sinking of heavier density object settling into less dense sediment—not a change in the lake level. The lake bottom—especially at the littoral zone—is a very dynamic place and change is continual. The rock, by the way, could also have been shoved up higher in the water, making the level to appear lower! Every shoreline is a bit different and there is no simple answer.

See LAKE LEVELS page 4

Sneak peek

PRESIDENT'S MESSAGE	P2
TLA DIRECTOR EMERITUS	P3
TLA'S INVESTMENT PAYING OFF	P5
2013 GREEN BELT PROJECT	P6
2013 HIGH SCHOOL INTERNSHIP	P7

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, especially Torch Lake, Clam Lake, and Lake Bellaire, for all generations.





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President's Message

Greetings to all,

Has anyone ever thanked you for your part in some project with the phrase “We couldn’t have done it without you”? Even though you were probably pleased with the thanks, didn’t you dismiss it - just a little? Didn’t you secretly feel that what you did wasn’t that big a deal, and that anybody could have done it? Yeah, me too! But, it IS true that if NOBODY steps forward to help when help is needed, things will just not get done!

The Three Lakes Association began because a small group of environmentally-conscious citizens saw a need and stepped forward to take care of that need. If you haven’t yet read the history of how TLA came to be, I encourage you to do so. The history is posted on the website (www.3lakes.com), as a pdf file. Point to “About,” slide your mouse pointer down to “History,” and click “TLA First 30 Years.” If you would prefer, contact our Executive Director, Leslie Meyers, about obtaining a printed copy of the history - we still have a few copies left. I believe you will be inspired by the accomplishments of the volunteers who gave life and meaning to TLA.

As you read through this newsletter and marvel at what TLA has managed to accomplish over the summer, and, indeed, over the past year, remind yourself that all of it was done through the efforts of volunteers. The TLA Board of Directors consists of four elected officers, the past president, two directors for each of the eight zones, about eight directors at large, and one director emeritus for life - a total of about thirty people, when at full capacity. All officers and directors are volunteers. We believe that having a working board of dedicated volunteers is essential to the success and survival of our Three Lakes Association. Our board is aided by an executive director and an administrative assistant; both of these positions are part-time contract positions.

But, and this is the crux of the message, the couple dozen people on the board cannot continue trying to do everything. We need willing volunteers from our general membership to step forward and say “Use me where you need me.” Over time, people get weary, people move on, and people just get worn out. I entreat you, as you read the articles in this newsletter, when a project or program attracts your interest, please consider contacting someone on the board, or sending an email to info@3lakes.com, or posting a message on our Facebook page (www.facebook.com/3lakes), and volunteering some of your valuable time. We have a place for you, no matter what skillset you bring to the party.

Ultimately, it really is true that we can’t do it without you!

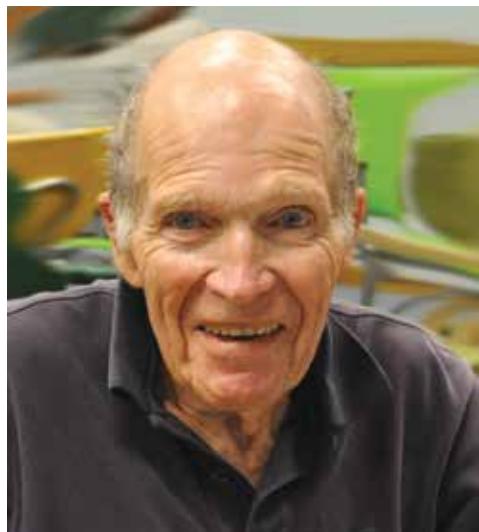
Best,

Tina

New Members

O’Leary, Patrick and Linda
Owen, William and Judith
Hannan, Richard and Anna
Leslee Preece
Daniel Thompson

Bob Oswald - TLA Director Emeritus



At the Annual Meeting on August 22, Tina Norris Fields introduced our new Director Emeritus, Bob Oswald. We would like to take this opportunity to welcome Bob to this role and to introduce him to those who may not already know him.

Bob was raised in Dearborn, Michigan, attended Dearborn High School and upon graduation, in 1950, entered the US Air Force during the Korean War. At the end of the war he returned home to study at the University of Michigan. There he earned his Bachelor of Science in Engineering (Mathematics), Bachelor of Science in Engineering (Mechanical), Masters of Science in Engineering (Mechanical) and, in 1964, his Ph.D. in Nuclear Engineering. While completing his Ph.D. he married Judy, his wife of over 50 years. They have 2 children and three grandchildren.

Upon the completion of his Ph.D., Bob accepted a research position with the Harry Diamond Laboratories and the family moved to the Washington, DC area. With the exception of one year as a Visiting Professor at the University of Michigan Bob spent his professional years in the DC area. In his last position as Director of Research and Development for the Army Corps of Engineers he developed programs promoting the detection and

clean-up of hazardous waste and the protection of threatened/endangered species on our military bases. Furthering his interest in the environment he served as Executive Director of a tri-agency effort (EPA, DOE, and the DOD) to focus their capabilities on solving the major environmental problems facing the Department of Defense. One of the numerous awards he received throughout his 30 year career was the Distinguished Presidential Rank Award.

Bob and his family have had a home on Torch Lake since the early 1970's and so it was natural that he and his wife would retire here part-time. In 1996, after settling in, they joined the Three Lakes Association and, once in TLA, Bob met Jack Norris. The rest, as they say, is history. Bob became a member of the Board of TLA and became Director of Water Quality. He, Jack, and Jack's daughter Becky (along with others) spent many summers testing the waters of all three lakes for e-coli and seeking out and recording the sources of the contaminant. At the request of Milton Township Neighbors they worked to stop the disposal of septic materials from seeping into the soil and thus into Mitchell Creek. The hope is that the successful completion of this mission will eventually lead to more stringent regulation of the disposal of human waste. Eurasian Milfoil was also a focus of their attention and a variety of methods were tried to eradicate this invasive species. It is still an ongoing issue.

Among Bob's other interests are golf (he's on the Board of the Elk Rapids Golf Club) and water color painting, a hobby he's taken up in the last five years. Although he resides in Florida during the winter months (sailing was also an important past time), he considers the Torch Lake area a special place in his life. (He kept a photo of the lake on his desk at work and escaped into it during dull meetings.) He wants to continue to help preserve the beauty of this place in whatever capacity he can for future generations.



Spotlight on Leah Varga

My name is Leah Varga, and I was a research associate with Three Lakes Association during the summer of 2012. My main role with TLA was to aid in the deployment and monitoring of the artificial fish shelters placed throughout the Chain of Lakes. Since then, I lived in Durham, NC and worked while taking a couple of classes at Duke University. During this year off after undergrad, I also took the GRE and applied to graduate programs, particularly marine biology or oceanography programs. In May of 2013, I decided to attend Scripps Institution of Oceanography at UCSD in San Diego, CA for a Master's of Science in Biological Oceanography. During the summer of 2013, I interned with Whale and Dolphin Conservation, a non-profit organization based in Plymouth, MA. I was a field intern with WDC, and collected opportunistic data while on the commercial whale watch boats in the Cape Cod area. I just recently moved to La Jolla, CA, just north of San Diego where UCSD is based. I have decided to defer my enrollment and aim to begin my M.Sc. next fall at Scripps. Instead, for this next calendar year, I have accepted a position at the lab where I would be conducting my research as a student – the Scripps Whale Acoustics Lab. I will be a staff research associate in this lab for the next year before beginning my Master's next September. It has been a busy few years, but my love for anything aquatic has only grown!

Lake Levels

continued from page 1

The second likely factor is wind shear. Sustained high winds from one direction can easily gather the water up on one side of the lake for a period of time and locally raise the water level in that area. With high winds comes heavier wave action and the combined effect can certainly cause erosion. On more than one occasion, I've talked to a resident while he or she is alarmed watching their shoreline battered. When the wind dies, they see a normal lake level.

Torch Lake, Clam Lake and Lake Bellaire

High water in Torch Lake, Clam Lake and Lake Bellaire seemed to reach a new scale last spring and brought with it the opportunity to speak to many new voices. It was also an opportunity to explain that we are not able to control these lake levels at either the Bellaire Dam or the Elk Rapids Hydro Dam. Several years ago we experienced high spring levels on these lakes that caused me to consult with Jim Coughlin, an engineer who specializes in dams and dam safety. (Jim acts as our consulting engineer for the County dams.) Jim evaluated the flow at Torch River and the grade between Torch Lake and Skegemog Lake. He concluded that the principal factor controlling the level of Torch Lake was the flow capacity under the bridge over the Torch River and that the Elk Rapids Hydro Dam had little impact. In effect, the Torch River Bridge is a dam.

A look at Google maps can help understand the Torch River Bridge situation. Prior to the construction of Crystal Beach Road and the bridge, the outlet from Torch Lake was much larger and probably varied over a span of several hundred feet. Whether the road engineers deliberately sized the man-made outlet to establish the modern level of Torch Lake or it was a happenstance of gradual construction is a question for historians.

It is important to clear up one rumor



The Bellaire Dam - view from downstream

that I heard several times this spring: that the County was backing up water in Elk Lake to run the Hydro Dam for more profits—and therefore, causing Torch Lake to rise. In fact, the County is required by, and monitored by, several different government agencies to run the dam in “run of the river” mode, which means that we are only allowed to generate electricity from the natural flow of the river based on the legal lake level.

Intermediate Lake

Of the two lakes with legally established lake levels, Intermediate Lake poses a much bigger challenge. Like Elk Lake, Intermediate Lake has two levels: on November 1st the level is prescribed to be 606.54 feet above sea level, on May 15th or ice break-up (whichever is earlier) the level is to rise to 607.15 feet above sea level. While we do our best to meet this requirement, due to the limitations of the Bellaire Dam, these levels are better described as “goals.” Here’s why:

The Bellaire Dam is situated well over a mile downstream from Intermediate Lake on the Intermediate River. The Bellaire Dam itself has plenty of capacity once the water makes the long trip from the lake to the dam through a shallow river channel, but the river greatly limits the effectiveness of the dam. As a result, we can open the dam wide, but it may take days or weeks before the level of Intermediate Lake drops to the legal level. Then there’s the additional complication that the Cedar River joins the Intermediate River a couple of hundred yards above the dam, complicating the flow dynamics of water moving from Intermediate Lake.

I liken operating the Bellaire Dam to piloting a freighter. You can put the brakes on and it will start slowing down, but it will

take a while to stop—the same is true for starting up. In effect, Intermediate Lake is usually either rising or falling. It takes an extended period of low precipitation to be able to maintain a steady lake level. Nevertheless, over time we’ve gotten pretty good at keeping the summer level at or near the prescribed level and minimizing the level swings.

Thankfully, the hundreds of calls I’ve fielded from residents on Intermediate Lake and the river over the years seem to have increased the average level of tolerance and broadened their understanding. The situation is toughest for the residents on the river. Since the dam’s capacity is greater than the river, folks with river frontage see an appreciable drop in the river’s level while we are trying to lower the level of Intermediate Lake. The court ordered level pertains only to Intermediate Lake, so the river levels are secondary. Nevertheless, we try to operate the dam with consideration of the river levels as we attempt to meet our legal obligation. It’s the Antrim County Operator of Dam’s conundrum (and constant headache): if Intermediate Lake is high, Intermediate River becomes low; if Intermediate Lake is low, Intermediate River becomes high.

I hope this clarifies some of the complexity and reality of managing the water levels in our chain of lakes, from Intermediate Lake on through Elk Lake.

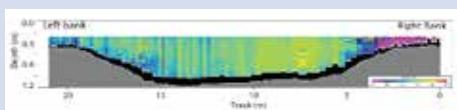
Mark Stone can be reached at 231-533-6265 or visit antrimdraincommissioner.com for more information.

TLA's investment in Grass River research paying off

By Dean Branson



MSU Professor, Anthony Kendall pulling an Acoustical Current Doppler Profiler (ADCP) to accurately measure depth and flow of the river.



An example of a read out from the ADCP instrument showing the cross-sectional profile of the river channel. Colors in purple and blue indicate slower flow rates (potentially even flowing backwards), while yellow and red colors indicate more swiftly flowing current.



6 ½ miles of Grass River showing the average depth every few hundred yards based on data from MSU's ADCD instrument. The cluster of three red dots indicating a shallow stretch downstream from where Cold Creek enters Grass River is the location of the 2013 pilot project to determine if installing tree revetments (large woody debris systems) can naturally deepen the channel.



TLA's most recent investment in Grass River research was to hire a team of stream experts, under the direction of MSU Professor Anthony Kendall to further improve our collective understanding of the hydrology and channel morphology of Grass River and its three tributaries. The following co-investigators were part of this team:

Brett Fessell, Biologist, Grand Traverse Band of the Ottawa & Chippewa Indians
Kevin Cronk, Biologist, Tip of the Mitt Watershed Council
Paul Richards, Hydro-geologist, State University of New York, Brockport College
Volunteers from TLA and Elk-Skegemog Lakes Association

In 2011 and 2012 TLA's volunteers investigated sources of sediment entering Grass River from its three tributaries (Shanty, Cold, and Finch Creeks) that have been causing the river to become shallower and wider due to the accumulation of sediment. One of the recommendations from a group of community stakeholders based on the findings, was to conduct a more comprehensive study. We would again like to thank the stakeholder organizations that participated in making this recommendation including owners of property along Grass River and its tributaries, Custer Twp, Grass River Natural Area, Antrim County Conservation District, Shanty Creek Resort, Tip of the Mitt Watershed Council, Watershed Center Grand Traverse Bay, Vacation Properties, and TLA's Board of Directors.

One of the most important pay offs from our \$6,000 investment was the rationale for the conclusion/recommendation that installing large woody debris (tree revetment systems) along the banks of Grass River may help deepen the channel. The recommendation was based, in part, on the results of the depth profiles of Grass River, and an analysis of a series of aerial images showing changes in the river since

Mark Stone (left; Antrim County Drain Commissioner) and Fred Sittel (Three Lakes Association & Friends of Clam Lake) accurately measuring the depth profile of Grass River slightly downstream from one of the tree revetment systems about three weeks before the tree revetment systems were installed. These measurements will be repeated next year to determine if the channel profile has been deepened.

1938. Some of the shallowest stretches on Grass River were downstream from where Cold Creek enters Grass River. Dirt from an earthen dam on Cold Creek that washed out in 2006 may have contributed to the shallowness in this stretch of the river.

We were very pleased this spring when Mark Stone, Antrim County Drain Commissioner, proposed a pilot project to determine if installing tree revetment systems could deepen the Grass River channel, i.e. a river restoration project. A DEQ permit for this pilot project was obtained in August and the following sources of co-sponsoring funds have been pledged:

Antrim County:	\$ 1,500
Three Lakes Association:	\$ 500
Bob Probst, TLA member	\$ 250
Friends of Clam Lake:	\$ 250
Dockside Restaurant:	\$ 500
Butch's Marina	\$ 500
DeWitt Marine	\$ 500
Northaire Resort	\$ 500
Moon Electric	\$ 500
Total	\$ 5,000

In addition to these funds, there has been, and will continue to be, significant amounts of in-kind support for this pilot project including volunteers from TLA, Friends of Clam Lake, Grass River Natural Area, Antrim County Conservation District, Tip of the Mitt Watershed Council, and the Antrim County Drain Commissioner. Those wishing to make a tax deductible donation to this project may send a check to Three Lakes Association, P.O. Box 689; Bellaire, MI 49615.

The plan is to install eight clusters of tree revetments over about a 1/3rd mile stretch of Grass River during the first week in October 2013. The idea is to strategically place these tree revetment systems so they deflect some of the current from the shallow areas into the main channel. The primary purpose of this pilot project is to determine if this technique can be used to deepen the channel. Other expectations from this pilot project are (1) to capture and permanently store some of the sediment moving downstream as it passes through the tree branches and is deposited around the tree branches, (2) to improve the habitat for fish and aquatic insects around the trees in the water.

Currently the river is about 120 feet wide

See GRASS RIVER page 7



Lakeshore Restorations/Buffer Beltways/Landscapes – Plant Selection

By Diane Crandall,
Principle Bloomin' Buddies

Welcome to fall everyone! This is a great time to add to your plant collection or to move plants to other areas on your property. You can split them to make more of the ones you love and move them into bare spots or make a statement in a certain space that is lacking a “pop” of style and color!

The last article discussed planning and creating your desired design. The next step is the color fun. Choosing the plants that grab your heart and will thrive in their desired zone provides us with endless beauty and a bountiful showcase of blooms. On a shoreline, we define the “zone” that the plant belongs in, not only for it to prosper, but for the wonderful benefits that every plant can provide us. It all begins at the “root” as native plants offer natural erosion control due to the depths the roots that can reach. Given their soil, water, nutrient, and sun exposure needs, the roots can reach depths up to 10 feet. The roots provide a natural barrier to erosion which may be caused by changing water levels, boating waves, high winds, and ice push. They naturally protect our properties and waters by filtering sediments, chemicals and storm water runoff.

There are many types of plant root structures. A few include: Rhizomes, which

grow laterally with roots below and send up shoots; Stolons, which grow laterally with roots at points along its length; Fibrous, which grow laterally with fine, branched network in all directions; Taproots, which grow vertically, straight down; Adventitious, which form from shoot tissues and originate on the stem; and Clumps, which grow laterally and get larger over time. The root systems of plants are like a woven basket. Over time, by intertwining through their zones, they will create a strong natural barrier.

The shoreline planting zones are defined as: Aquatic (below water level), Beltway (between water level and ordinary high water mark), and Buffer (above ordinary high water mark). Plants have certain functions and purposes within them.

Many varieties of plants are available to choose from in the different zones, so when you begin placement, be sure to remember the ultimate visual desire of the final design. Keep taller plants away from areas where you want the view. You can bring in small to mid-height plants and use taller ones in the background or to the side to offer a back canvas. Consider blending different leaf styles based on colors, edges, formation, and depth, in addition to the blooms on top. This will keep it fresh and interesting when flowering ends each season. Put varying heights, clumps, formations around each other instead of planting in a line, as you

have many different viewing spots of the design and will see it from many different angles. In the right spot, a plant will thrive, so remember to pay attention to your sun/shade exposure and soil type (dry, moist, wet/sand/loam/clay). The wonderful thing about native plants is that once their roots have established themselves, they adapt to changing weather conditions naturally.

Ah the color, the varying flower head formations! We all have different tastes, so try to determine what bloom seasons and flower heads are your favorite. For instance, are you an all season color lover, (spring through fall), early to mid summer (early bloomer) or the mid-summer into fall (late season bloomer)? You can put together your own custom bloomin’ blend time color show. Don’t forget to keep your vision open to include native grasses, sedges, and bushes in your choices, as they also offer diversification and variety along with the same natural benefits. As an additional bonus, native plants also come in crawling, climbing, weeping and various ground covers that even offer colorful blooms!

So enjoy the fun, and the best part, of the planting process: the color, the beauty, and the scents which all these wonderful natural plants provide to us, increasing our moods and happiness! They say saving the best for last is the icing on the cake. Well in this

See PLANT SELECTION page 7

Butch's Tackle and Marine Greenbelt Project

Butch's Tackle and Marine served as a demonstration project this summer for TLA's High School Internship Program. Under the direction of Diane Crandall of Bloomin' Buddies, the Interns retrofitted 1200 square foot of turf grass to a beautiful and very durable shoreline greenbelt. Erosion issues were corrected while providing a filter for contaminants. All native plants were used with a specific focus on durability due to the high volume of foot and vehicle traffic Butch's sees each day. Interested in more information? Check out the "Projects" section of our website and visit Butch's every season. Each season will bring an array of color and texture. A sincere thanks to

Bloomin' Buddies, Wilhelm & Associates, Matt Short, Alden Lumber, Larry Fields, Brad Fields, Trish Narwold, Becky Norris and the staff at Butch's for their assistance in making the project a reality.



2013 High School Internship Program

It was a busy summer for the 2013 Internship Program. Under the direction of our Executive Director, the program began June 17 and concluded on September 11. Ashley Robbins (Mancelona High), Tineka Witt (Central Lake High), Annika Stoltz and Sabeth Dalbo (both of Elk Rapids High) were this year's participants.

- Our Intern's interns studied the aquatic environment by:
- Expanding upon the current data regarding the Clam River Plume.
- Inventorying over 20 road ends to monitor water way and runoff erosion.
- Constructing a Greenbelt at Butch's Tackle and Marine.
- Studying macro invertebrates to determine the health of Maury Creek.
- Creating a "macro invertebrate kit" for each school district.
- Furthering public education by staffing a booth at the Antrim County Fair.

The internship included over 60 hours of research, training and sampling. For the past 9 years, the interns have prepared a final report based on their experience. As technology is changing the way we seek information, it was determined that this year, all intern work would become a part of our website as specific content, not a report. Additional information is linked to other portions of our website as well as external sites.

Interested in more information? Check out the "Projects" section of our website at 3lakes.com.



Grass River

continued from page 5

in the location of this pilot project. Based on contractor Ken Reed's experience in other rivers, the findings from Dr. Kendall's research, and a restriction in the DEQ permit, the river width at this location may be reduced to about 85 to 100 feet within a few years, which will still be more than enough width for two-way boat traffic on the river.

Measurements of the channel depth profile and aquatic insect populations have been documented before the trees are strategically placed along the riverbank, and these measurements will be repeated next year.

This article is dedicated to the memory of Mark Knight who lived on Grass River, was a member of TLA Board of Directors, and was an active volunteer including a participant in the Antrim County Waterways Work Group.
Mark died on August 12, 2013.

Plant Selection

continued from page 5

case it's very true. These plants will also attract a variety of wildlife: bumble bees, humming birds, finches, birds, butterflies, fish, frogs, turtles and more! This last note is for the ladies: remember these plants make wonderful fresh or dried arrangements.

Cut flowers, place in a vase with water, then let them dry out. It is as easy as that! What a great way to brighten winter days and right from your own yard!

Harvest time brings comfort foods, football games, beautiful holidays and

colder weather so why not use some of this time for your spring garden preparation and planning. This will be a great help as a reminder that winter does come to an end.

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