TLWA

THREE LAKES WATERFRONT ASSOCIATION

LAKE STEWARDS SINCE 1967

Making Waves: Fall 2022

Photo by Kerry Griebenow

President's Forum

by Fred Knoch

So, what shall I write about in this issue that I haven't discussed in previous issues? The facts remain essentially the same, that is, the TLWA sponsors campaigns towards controlling Invasive Species in the waters of Three Lakes, Wisconsin. This topic seems repetitive, in that the focus of the Association and the Newsletter has been on these issues for as long as I have been the President, and all the Presidents before me. This points out the fact that invasive species are a reality which does not go away! Each year we, the TLWA, do battle against Nature, and much like Ahab, we realize that Nature will win out. The difficult thing for me to swallow is that we are the instruments of our own destruction. Our carelessness and lack of concern for the ecology of the previously unspoiled waters of the Chain have allowed the invasives to take hold and flourish. We brought them here, and now we are subject to the consequences. And what are the consequences? Unsightly and non-navigable mats of Eurasian Water Milfoil (EWM) which diminish our ability to enjoy the lakes which drew us to this area in the first place, not to mention the resulting decline in property values.

So, what can we do about this? We can take as an example what the riparian owners on Virgin and Long Lakes have done. When confronted with the threat of EWM on those lakes, the Lake Captains have rallied the volunteers and mounted a targeted plan to attempt to control the menace. Each lake has a cadre of volunteers who wage war against EWM including pontoon boat drivers, SCUBA divers who hand harvest the EWM from the bottom, and kayakers who spot plants, scoop

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up EWM fragments, and serve as protection for the divers. Their commitment is weekly from mid-June through mid-September. This type of effort is needed on every lake challenged with Aquatic Invasive Species (AIS), which is all lakes.

There are no lakes which don't have AIS! Included in the acronym AIS is EWM, Pale Yellow Iris, and Purple Loosestrife. To date, the only lakes identified as having EWM are Virgin and Long. All the rest have Pale Yellow Iris, which is the most common of the AIS, and Purple Loosestrife, common, but less so. The TLWA has collected a vast amount of data identifying the locations of AIS on all the lakes of the Three Lakes Chain. This has been accomplished through the efforts of the Adopt Your Shoreline volunteers, observations by Onterra, LLC in their lake surveys, and data collected by the Oneida Land and Water Conservation Department.

We know where the AIS are on every lake. What we need to have happen is the Lake Captains and their volunteers take charge and mount campaigns on each of the lakes, taking as an example the Virgin and Long Lake groups. We can no longer have the Adopt Your Shoreline volunteers merely identify AIS on their lakes, we need them to take remedial action! The TLWA can supply maps indicating exactly where AIS is located on every lake, the data is available to any who may want it. Become part of the solution. Just to make it perfectly clear, I am not only the President of the TLWA writing the President's Forum two times a year, I am also one of the volunteer divers on Long Lake diving every week against the EWM. It is hard work for me and every one of our team volunteers who share a commitment to be part of the solution. I invite you to be part of the solution! As always, I will see you on the lake, hard or soft water.

CLOCKWISE: Bruce Renquist, was recognized as the "2022 Three Lakes Volunteer of the Year" by the Three Lakes Community Foundation for his work with TLWA; AYS volunteers enjoyed coming together at the annual thank you dinner at Pine Isle; Along with a summary of this past year's TLWA activities by Fred Knoch, Ted Rulseh spoke at the 2022 Annual Meeting held in July; The TLWA tent at the 4th of July town celebration

Fish Sticks

2022 – 2023

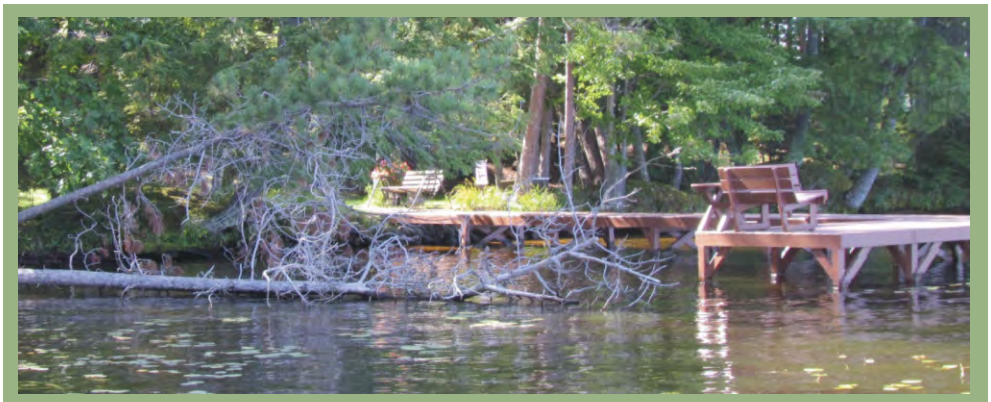
by Jerry Oehmen

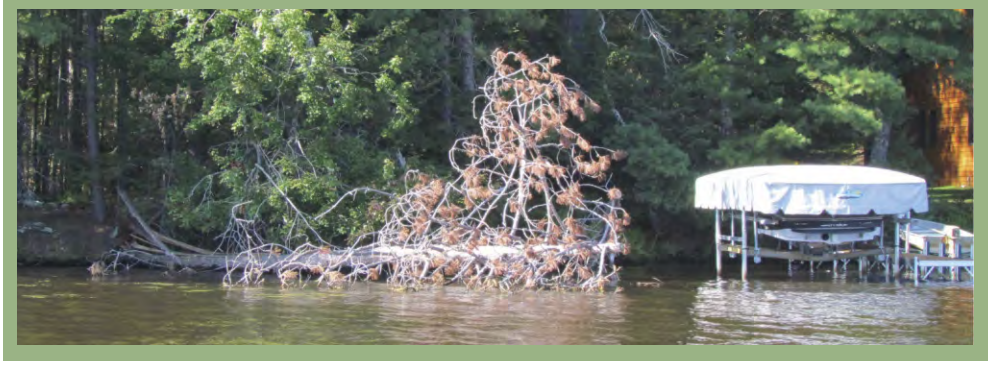
Last year we were very successful placing several fish sticks on Medicine Lake & Laurel Lake. We were very happy to have enthusiastic volunteers. We were also very happy to have the Three Lakes Fish and Wildlife Assoc. contribute the labor and materials necessary to complete these installations. It would not be possible to complete these installations without their help.

For 2022-23 we only have a few sites that were not completed in 2021.

However, as we boat through the chain, we are very encouraged to see that Mother Nature has dropped a lot of woody habitat. We are also very pleased to see that if these trees do not interfere with the owner's shoreline they are leaving them in the water rather than removing them.

It may seem unsightly to some but to the lake and fishery it is a wonderful gift. We must remember that we are only stewards for this natural resource for a short time. By leaving the trees in the water we are being the best stewards possible. Of course, there will be exceptions that may create a safety issue or interfere with a recreational activity or navigation. In those cases, removal is necessary but as we tour the chain, we see that the message has been heard to leave those trees in the water if possible.





If you would like to volunteer your shoreline for placement of a Fish Stick, please feel free to contact me. The first step is to review the shoreline with the Oneida County Fish Biologist Nathaniel Lederman to gain his approval of the shoreline condition and the lake bottom structure. If it is a gravel lake bottom it presents good spawning for walleyes so it would not be suitable. If it is a muck bottom it is preferred for fish stick placement. These approvals are done via boat or land and need to happen prior to the lake freezing over so the bottom conditions can be observed.

Typically, these installations are done in the winter when ice conditions are favorable.

I want to thank everyone who has chosen to help by leaving the fallen trees in the water. If you are interested in volunteering your shoreline, please contact me at gfoehmen@gmail.com.

Shoreline Restoration

by Ceci Kiefer

Now To Watch Restoration Take Shape

The Three Lakes Waterfront Association was pleased to present a $1000 check to the winners of the Your Shore - Your Lake Shoreline restoration contest. Barb Meriggioli and her brother, Alan Phillips, received the check from TLWA President Fred Knoch and Shoreline Restoration Program Director Ceci Kiefer after completing the planting of a buffer strip of native wildflowers and grasses along the shoreline of the historic Jollywood Property on Big Fork Lake.

Using a design by Nature's Design Landscape Services and native plants from Hansen's Greenhouse in Rhinelander, members of the family worked together to complete the planting. As the plants mature, they will stabilize the shoreline and enhance the look of this historic property.

A portion of the total cost of the project is covered by TLWA and two grants from Healthy Lakes and Rivers, sponsored by the WI DNR. Find out more about Three Lakes Waterfront Association and resources for your shoreline at TLWA.org. Healthy Lakes and Rivers grants information can be found at https://healthylakeswi.com/

DNR Q&A Corner

DNR Liaison James Yach – Secretary's Director Northern WI

Question answered by James Yach – Secretary's Director Northern WI

This fall's questions from TLWA are the following:

Can I walk anywhere in a lake?
Yes as long as your feet remain wet. In the instance that a dock is obstructing ones path the dock may be traversed.

The Public Trust Doctrine applies to all navigable waters, which are defined as any waterway on which it is possible to float a canoe or small watercraft at some time during the year. The Public Trust Doctrine protects the people of Wisconsin's rights to:

- *Transportation and navigation on waterways.*
- *Protection of water quality and aquatic habitat.*
- *Recreational activities, including boating, fishing, hunting, trapping and swimming in waterways.*
- *Enjoyment of scenic beauty while on the water.*

The state and the DNR protect these rights through permitting requirements for water projects and enforcement actions to stop unauthorized impacts. Also, local zoning ordinances that limit development along navigable waterways help to ensure near-shore development does not result in unintended impacts that interfere with public rights.

If I see an invasive, such as yellow iris, growing along a neighbor's shoreline can I remove it without their permission?
The presence of invasive species does not authorize trespass onto another's property. Even if one was to keep their feet wet removing plants from a neighbor's shoreline is not authorized without the landowner's permission. Securing permission to prior to removal and educating awareness of the invasive plants is the appropriate means to address the removal of Yellow Iris and other terrestrial invasives.

Are all animals allowed in lakes, even cows and horses?
This one is a bit less clear. I take this to mean that a livestock fenced area cannot include waters of the state.

No, unlimited livestock access to waters of the state in locations where high concentrations of animals prevent the maintenance of adequate or self-sustaining vegetative cover.

Purple Loostrife

by Paul Matthiae

Purple Loosestrife Control Project

Spring of 2022 saw very good over winter survival of our transplanted purple loosestrife plants. These plants were dug in fall of 2021, bare rooted and replanted into large pots by Oneida County Aquatic Invasive Species Control staff, and over wintered in an enclosure that protected the plants while allowing full exposure to winter temperatures. On May 17th the plants were moved to our beetle rearing enclosures located at the Petroleum Museum. In mid-June, with the plants already 2-3' tall, Cela Beetles were introduced to the enclosures. Cela Beetles feed exclusively on purple loosestrife and reproduce rapidly, producing several generations of beetles within six to eight weeks. Within several weeks we had hundreds of beetles feeding on the loosestrife and flying all over the inside of the net cages.

Planting Ground Lake is our primary area of concern for purple loosestrife control at this time on the Three Lakes Chain. There are other purple loosestrife infestations on the Chain, however, they have been or will be controlled by hand removal or use of herbicides. Planting Ground Lake, on the other hand, has a serious infestation of purple loosestrife in a shallow, boggy bay located off the west side of the lake. The plants are inaccessible to hand control and herbicide use is impracticable. On July 26th the caged plants were "bagged" in nylon netting and free flying beetles were captured and put into containers for transport via pontoon boat to the infected bay and then transferred to canoes for dispersal among the invading purple loosestrife.

Paul lets the beetles take off to land on the purple loosestrife

Photographic and visual assessments of previous years' beetle treatments (2018, 2019, and 2021) indicate that the beetles are having a significant impact on the Planting Ground Lake purple loosestrife population. Large patches have been greatly reduced in size. However, single plants and small clusters are evident and continue to spread along the open water shoreline as a result of seed dispersal. The battle to contain and suppress purple loosestrife will take a number of additional years; how many is unpredictable at this time.

A number of people are involved in this effort. I want to thank Stephanie Boismenue and her interns and staff from the County AIS office; the members of the TLWA Board of Directors who have all helped over the years to make this project work and be successful; and to the member volunteers who have also helped with digging plants, erecting beetle cages, and paddling a canoe. We greatly appreciate volunteers and can always use the help they can offer. Controlling invasive species is in everyone's best interest.

Small Ballast Ships (WAKE BOATS) Have Arrived!

by Norris Ross

Those of you who have followed the introduction of aquatic invasive species into our fresh water lakes know the story. Large intercontinental cargo ships arrived at ports in the Great Lakes and emptied their foreign ballast water into the Great Lakes at US port cities. The ballast water contained non-native species of all kinds

Many don't realize the damage that can be done having fun.

from faraway places. Some proved to be extremely well suited to their new home, and they prospered, often where they were not wanted. As time passed, Eurasian Water Milfoil (EWM), spiny water fleas and numerous others were slowly transported by humans to our inland lake environments.

Many groups have worked diligently to control these "invasive" species with mixed success. Now a new spreading tool has arrived to add to the magnitude of the battle against the spread of invasive species and are also causing environmental degradation – **Wake Boats**.

By design, wake boats operate in a manner that creates large wakes and increases bottom scour that is a threat to natural resources in inland lakes. Wake boats can produce waves with up to 17 times the energy of other comparable-sized power boats. Their propellers, which are often pointed straight down, can resuspend bottom sediments in water up to 33 feet deep. In addition, the use of huge ballast tanks results in the dramatic increase of transporting microscopic aquatic invasive species and pathogens from one lake to another. The cumulative negative effects of wake boats on natural ecosystems can lead to loss of habitat, resulting in the decline of lake ecosystems and greatly affect angling opportunities and other recreational uses of a lake. Current boating laws are inadequate and out of date to prevent damage from the recent introduction of wake boats. The current regulations for distances from shores are not appropriate for the deep scours and waves created by the new ballast boats.

Wake boats are specifically designed to greatly increase wave height and depth. The ballast tanks sink the boat deep into the water, and the powerful engine "plows" the vertical-oriented boat deep into the water with props pointed down to the bottom of the lake. The wake surfer then lets go of the start rope and surf boards on the giant created waves. This "giant wave action" creates massive environmental effects that are detrimental to the health of our fresh water lakes.

The detrimental effects are well documented in numerous studies and research. These detrimental effects are only briefly outlined below:

Shoreline Erosion

- Can lead to degradation of fish habitat.
- Water quality is reduced due to physical disruption of rooted plants and resuspension of sediments and nutrients.

Sediment Resuspension

- Decreases water clarity.
- Reduces the ability of fish to find food and aquatic plants to grow.
- Increases turbidity and phosphorus concentrations.

Aquatic Plant and Effects on Fish Populations

- Aquatic invasive species (AIS) will be spread by chopping wave action and increased fragmentation.
- Filling and emptying ballast tanks from lake to lake will quickly spread microscopic organisms (like spiny water fleas, blue green algae, etc.).
- Transportation of invasives such as fish pathogens is also possible.

In general, all aquatic plant populations will be affected which will greatly affect fish populations.
Only a few effects are enumerated here. Many studies

are currently underway to document other more subtle effects.

The number and variety of reported cases of "bad" experiences with wake boat encounters have greatly increased and vary widely in magnitude. Examples are swamped kayaks and canoes, interrupted fishing due to giant waves, docks being pulled out from shore, people being swamped on their docks, destruction of shoreland property, etc.

What can be done to minimize the effects of wake boats? The amount of damage reported from wake boat use varies from place to place because of variables such as: size of lake, depth of lake, lake topography and structure, local ordinances restricting their use, wave height restrictions, and distance from shore regulations.

Water regulations are controlled by your local government. Many local town boards are creating ordinances in an attempt to mitigate the effects of wake boats without restricting their use completely. An example: "Wakes exceeding 2 feet prohibited less than 700 feet from shore." This common standard is emerging and has become law in nearby states and towns.

Report any incidents in your area. Talk to your representative! Local ordinances are already in place as models for their consideration. Get involved!

Information about how wake boats function and their destructive nature can be found with a simple web search.

Visit our Facebook page:
www.facebook.com/threelakeswaterfront
for information about our lakes and association!

TLWA
THREE LAKES WATERFRONT ASSOCIATION

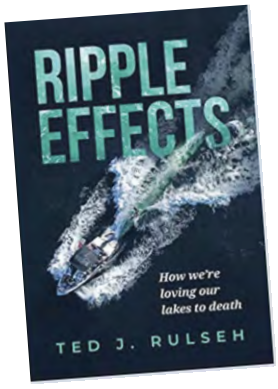
"Ripple Effects" Spotlights Threats to Wisconsin Lakes – and Remedies

by Norris Ross

"Ripple Effects: How We're Loving Our Lakes to Death," the new book by the speaker at our 2022 Annual Meeting, is now available. Author Ted Rulseh explores the threats facing lakes in Wisconsin and the Great Lakes Region and describes what we can do to protect the lakes for the future.

Published by The University of Wisconsin Press, the book includes chapters that explore invasive species, phosphorus pollution, defective septic systems, inadequate shoreland zoning protections, hazardous boat wakes, stresses on loons, climate change and other challenges.

In an engaging, conversational style, the author draws on personal experience, interviews, academic research, and government reports to describe the state of the lakes and avenues to sustainable lakeside living. You can find out more at https://thelakeguy.net.

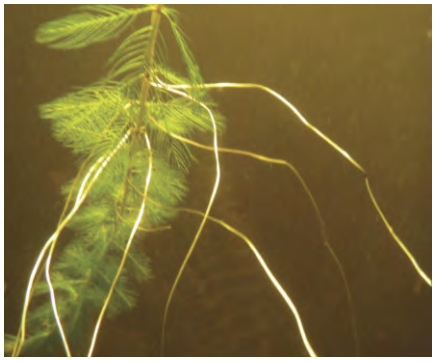


Summer 2022 Dive Team Report by Jon Willman

EWM Continues to Spread
Thanks to All Our Volunteers

The summer of 2022 was both gratifying and frustrating. Frustrating because it was another banner year for EWM growth on both Virgin and Long Lakes. Gratifying because we have a great group of volunteers who chose to spend more than 300 hours on Virgin Lake and 200 hours on Long Lake working to control the spread of EWM.
I would like to thank our team of Bob Agen, Danielle Andrews, Mike Apple, Bob Borek, Bev Beyer, Chris and Jerry Cayo, Kerry and Marian Griebenow, Al Huntington, Bev and Fred Knoch, Mike Malloy, Sue Nelson, Ally Obenberger, Jackie and Michael Palmer, Lorna and Jim Payne, Betty and Larry Roth, Scott Schuster, Vicki and Rick Vigo, Jack Werner, Karen and Gary White, Linda Woiak and Lynn Zibell and Larry Zibell. Without their help and the generous support of the TLWA, Johnson Outdoors and Watercraft Sales we could not continue the effort.

Virgin Lake
EWM continues to spread in Virgin Lake. We're finding more individual plants in more spots around the perimeter of the lake. This occurs primarily as a result of natural autofragmentation. A process by which EWM plants actually create "baby" plants complete with roots which then separate and float off to where ever wind and wave action take them. After their journey, the rooted "babies," or "fragments"



EWM "baby" with adventitious roots settling to the bottom.

as their known, settle to the bottom and take root. We dive and hand harvest these individual plants and then monitor the areas for additional growth throughout the season. The late season EWM survey conducted by Onterra showed about 95% of Virgin Lake still remains free of EWM. The remaining 5% ranges from dominant EWM populations and surface matting to isolated clumps of plants. Treatment options for the problem areas are being studied and will be implemented this Spring. They range from increased hand harvesting, to Diver Assisted Suction Harvesting (DASH) to possible herbicide treatments.

Long Lake
The area of EWM on the Northeast end of the lake discovered in 2020 was hand harvested several times this summer and seems to have diminished from the Spring survey. A few new plants were spotted this Fall on the West side of the lake and will be removed and the area monitored.

Eagle River Channel between Burnt Rollwys Dam and Long Lake
The Fall survey found a number of single EWM plants in and along the channel. The dive team will focus hand harvesting efforts in this area next Spring.

Diver Assisted Suction Harvesting - DASH
TLWA hired Aquatic Plant Management in early August for DASH services in one of our major EWM problem areas on Virgin Lake. While we won't know for sure until next season, the initial results of their efforts look very promising. So much so, TLWA has budgeted for the purchase of our very own DASH

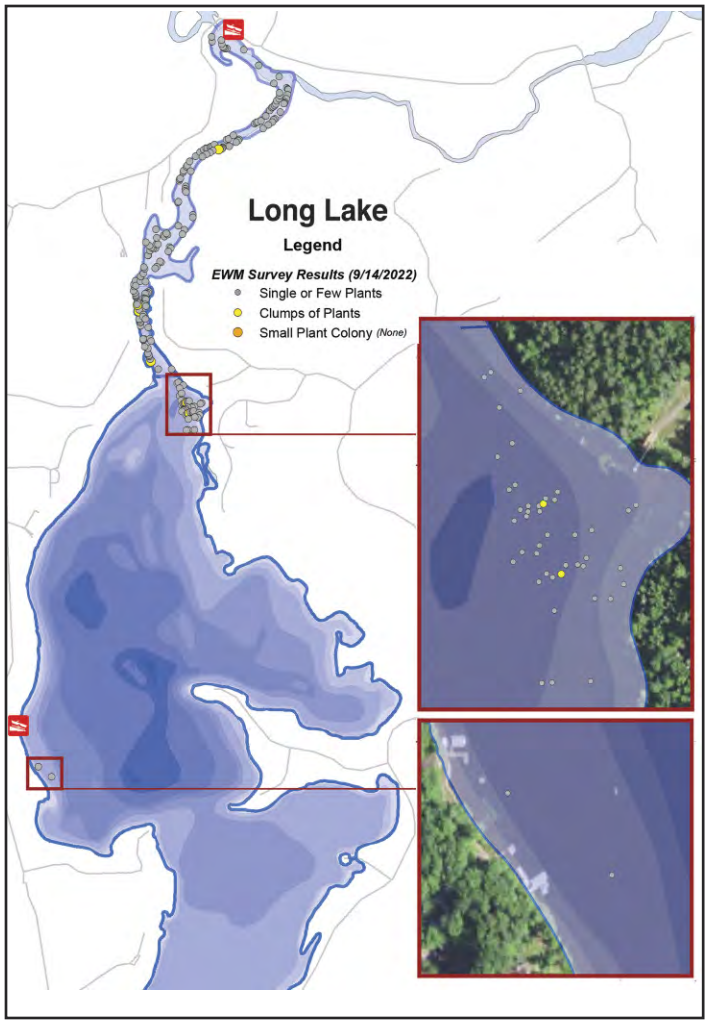
Basic DASH boat.

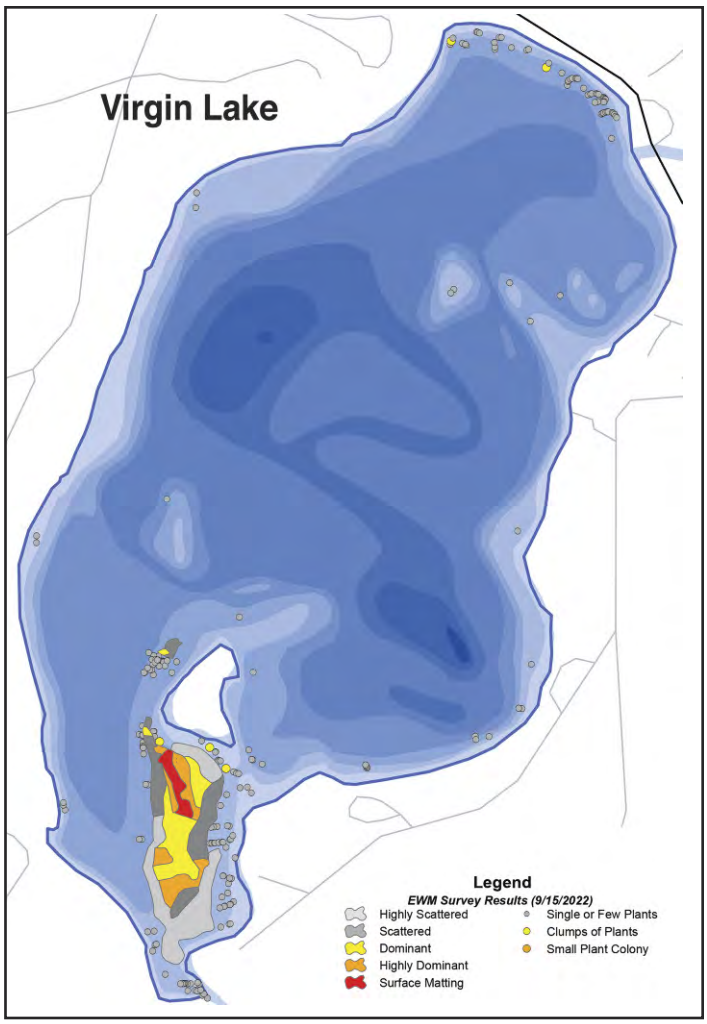
boat. The equipment is the next logical weapon in our EWM battle. DASH increases diver efficiency by eliminating the need to stuff the harvested plant into a bag and carry it to the surface. Instead of harvesting just hundreds of pounds of EWM in a season, we'll be removing thousands. The suction hose allows the diver to dig out the plant, roots and all, and feed it into the suction hose where it's

whisked to the surface and captured in a mesh bag on the surface. Hand harvesting EWM is effective and very desirable because the entire plant is removed without the use of herbicides. Herbicides kill virtually all aquatic plant life in a treatment area. Those dead plants sink to the bottom and rot. The decaying plants increase Dissolved Organic Matter (DOM) in the lake and have a negative effect on water color, clarity and quality. Hand harvesting EWM leaves nothing in the lake.

A drone flyover of the area south of the island on Virgin Lake shows the matting of EWM format.

The unfortunate reality in Virgin Lake is we have a 13-acre area where EWM has "elbowed" out the native plants and taken over. EWM is so thick in this area it cannot be controlled with any type of hand harvesting making it necessary to consider an herbicide treatment this Spring. The TLWA board, Onterra and the WDNR will meet this Winter and plan a strategy to be implemented next Spring.





My Thoughts on Diving for EWM

by Linda Woiak

For five years we've been diving for EWM on Virgin Lake. Frequently people ask-will you ever be done with it? The answer is a sad no.

I relate EWM to crab grass in my garden. It will never be completely 'weeded out'. This year was a healthy year for EWM. It seemed to be spreading quicker than we could keep up with it. There are areas in Virgin Lake that have grown so thick that by late August EWM was forming mats on the surface.

The dive team concentrates on areas of the lake with the most boat traffic. We are also limited by weather and wind, preferring to dive in areas where our kayaking and support team doesn't get blown off the lake.

We try to dive once a week, June to September. There are two spotters on the dive boat and at least two kayakers. We always have two divers and sometimes as many as four. It's a lot of volunteer time. But, in my opinion, well worth it.

I am a 60-year-old woman and climbing onto a boat with 21 lbs. of lead and a 38 lb. tank on my back can be a little strenuous. This summer we had five divers, I personally spent 43 hours underwater. We would love to have more divers…

If you're wondering what EWM can do if left uncontrolled, just look online… There are two areas of concern on the Three Lakes Chain, Virgin Lake and the area at

ABOVE: Fellow Diver Amy Obenberger was part of this summer's crew. BELOW: Bob Borek is at the helm of the dive boat.

the end of Long Lake near the dam. That puts the rest of our beautiful chain in the middle.

The situation is not hopeless. According to the DNR study this year, fish and aquatic conditions are excellent. Less than five percent of Virgin is affected by EWM. There's a healthy and diverse native underwater plant population.

The dive team does the best we can with pulling EWM, harvesting over 300 gallons this summer. There's a possibility of using a herbicide on the areas where EWM is matting. The Waterfront Association hires dive teams to come in with DASH (Diver Assisted Suction Harvesting) equipment to occasionally clear areas of spreading EWM.

I've enjoyed the waters of the Three Lakes Chain my whole life. I remember when snails first moved into the chain in the 70's, we took them out of our swimming area on Dog Lake, by the five-gallon pail. Then the geese discovered they could eat them. Now the snails are part of the system. I trust that Mother Nature will find some kind of balance. Things change. If I can do something to slow down an invasive and give nature a hand, I'm all in…

I plan to keep diving as long as possible- even though I complain about the muck. There are rewarding days, when the sun is shining and everything underwater is golden, huge bass keep us company and you find yourself in schools of assorted minnows! I even have come to appreciate the beauty of the underwater plants-except for the itchy ones that get wrapped around my mouthpiece! Then there are the bryozoans that can be the size of a basketball… It really is a different world.

There is so much we don't know or appreciate about the healthy water of our chain.

Three Lakes Chain of Lakes Environmental Monitoring 2022 Project update

Submitted by Tim Hoyman, Onterra, LLC

The Three Lakes Chain of Lakes Comprehensive Management Plan was completed in 2020 and approved by the Wisconsin Department of Natural Resources (WDNR) in 2021. The management plan contains six goals and ten corresponding actions. In 2020, the TLWA was awarded the first of several Surface Water Planning Grants to implement the single action under the plan's first goal:

Management Goal 1: Continue to Understand, Protect and Enhance the Ecology of the Three Lakes Chain of Lakes Through Stakeholder Stewardship and Science-based Studies

Management Action: Continue Three Lakes Chain of Lakes environmental monitoring.

The Three Lakes Chain Environmental Monitoring Project will be completed in seven phases, following the same pattern used during the management planning project and includes continued monitoring of water quality, aquatic vegetation, and aquatic invasive species on the chain. Fieldwork for Phase I, which included The Thoroughfare, and Virgin, Whitefish, and Big lakes was completed during 2020 and in 2021, surveys were completed on Dog, Crystal, Deer, Big Stone, and Laurel lakes. This project update focuses upon the water quality data collected during these two phases, with some discussion on impacts to vegetation as well.

Onterra spent time this September on the Chain collecting samples for their report

Water quality data are collected by volunteers on the chain through the WDNR's Citizen Lake Monitoring Network on 19 of the Chain's 21 lakes. As of 2021, five of the lakes were involved in the advance water quality collection program and the remaining 14 collect water clarity data only. Combined with the data collected by professionals as a part of the current project and the management planning project, there is a great deal of water quality information for the Three Lakes Chain.

The current project's water quality data collection centers on nutrient levels, open water algal levels, and water clarity. Nutrient analysis includes nitrogen and phosphorus. Algal abundance is determined through chlorophyll-a analysis. Chlorophyll-a is the green pigment in plants that is used in photosynthesis and is an excellent surrogate for understanding how much algae is in the water column. Water clarity is measured with a Secchi (sec-he) disk. In most Wisconsin lakes, phosphorus is considered the nutrient that limits agal growth, and the Three Lakes Chain is no exception. So, with increasing phosphorus, a corresponding increase in algal growth is found, which is seen in higher chlorophyll-a concentrations. In over 80% of Wisconsin lakes, algae are the most prevalent particulate in the water column, so if algal abundance increases, there is a decrease in water clarity.

In general, phosphorus levels in the Phase I and II lakes have remained close to the same as found during the planning project, with most of the lakes tending to have phosphorus concentrations fluctuating between good and excellent levels. The exceptions are Big Stone Lake and Crystal Lake, which tend to fluctuate between good and fair concentrations of phosphorus. In all Phase I and II lakes, chlorophyll-a levels have also remained about the same and fluctuate between what are considered to be good and excellent levels, although Crystal Lake's and Big Stone Lake's levels have

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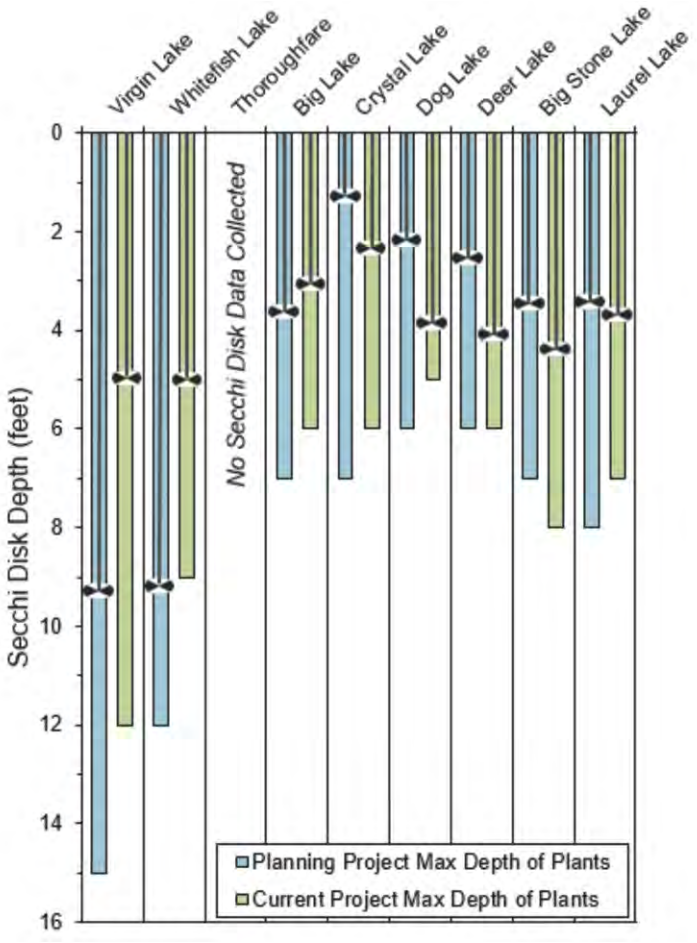
infrequently bumped into fair levels. In the Three Lakes Chain, the relationship between phosphorus concentrations and chlorophyll-a concentrations is strong. However, the same cannot necessarily be said regarding the relationship between chlorophyll-a and water clarity.

Water clarity levels in the Three Lakes Chain have shown a decreasing trend starting in 2011 and 2012; however, as described above, there has not been a corresponding increase in algal abundance over the same timeframe. While algal abundance definitely plays a role in chain lake water clarity, an overriding factor, at least in the past decade or so, has been water color. Water color also plays a role in water clarity with more color absorbing light as it penetrates the water. More color leads to less clarity. Dissolved organic matter (DOM) causes the water in lakes, particularly in northern Wisconsin, to be brown in color, or stained. This DOM originates from decaying plant matter in forests and wetlands in the lake's surface drainage basin. Studies reported on in LakeLine in 2020, have shown that DOM has been increasing in lakes across North America as the result of increases in precipitation and increases in extreme precipitation events. Higher rates of precipitation cause increases in DOM in a couple of ways: first, higher precipitation saturates soils which creates anoxic conditions which increases the production of DOM, and second, higher precipitation increases the amount of water and DOM flowing into the lake.

Precipitation measured at the Eagle River airport have shown annual levels well above average in 8 of the last 12 years. This is following four consecutive drought years from 2006-09. The increased rainfall definitely darkened the chain's water and reduced Secchi disk readings. So, while water clarity has decreased in the chain over the past few years, there is a reason why, but the trend is not caused by worsening nutrient and algal levels.

The decrease in water clarity has had a significant impact on the chain's submergent aquatic plant community by decreasing the available area that these types of plants can grow in the lakes. The figure below shows the maximum depth of plants found during the planning project (2010 and 2011) and the maximum depth of plants found during the current project (2020 and 2021). The chart also includes the average Secchi disk readings found during each of those years. The



Three Lakes Chain maximum depth of plants and average growing season Secchi disk depth for Phase I & II lakes.

pattern is very clear in the Phase II lakes with reduced clarity during the current project, the maximum depth of plants was less than in the same lakes, ten years earlier, during the planning project. Although many of the lakes in Phase II saw greater Secchi disk transparencies in 2021 compared to 2011, the overall trend of a lower maximum depth of plants during the current project is apparent in all lakes except Big Stone. Overall difference is not as great in the Phase II lakes compared to the Phase I lakes, which may be an indication the plant community is beginning to recover with average rainfall occurring during 2021.

Data collection is nearly complete on the Phase III lakes, which includes Four Mile and Big Fork Lakes. This fall, the TLWA will apply for state funding to continue monitoring during 2023 on the Phase IV lakes, including Moccasin, Spirit, and Maple.

Clean Boats Clean Waters

by Bob Agen

The 2022 Spring Report

Like most looking to hire help, we had trouble filling our three paid positions. We like to hire kids from the local high school but started the year with only one. Our constant contact ad sent to all TLWA members did result in a senior citizen starting full time the Fourth of July weekend. Our senior citizen boat inspector turned out to be a great asset. He seemed to really enjoy engaging boaters and inspecting their boats looking for invasives. At this time, he says he will be back next year. I encourage all seniors to think about taking the job next summer. We will have at least two openings. I am sure you would enjoy the peace and quite of working a boat landing and in the process earning some extra cash.

Our paid boat inspectors logged 810 hours for the summer and our 10 volunteers put in 300 hours. One visiting high schooler was able to add 10 hours to his community service requirement by working a landing checking boats. I encourage others to seek me out if they need community service hours for school. Most of the inspections took place at the landing next to the Sunset Grill restaurant, Burnt Rollways lift and dam and Townline boat landing.

Looking towards next summer we will again hope to have three paid CB/CW boat inspectors and will welcome back our volunteers. Keep an eye out for our constant contact ad in the spring and apply for one of the positions, seniors this means you.

TLWA T-SHIRTS AND HATS ARE AT NORTHLAND CLOTHING CO.

TLWA T-shirts and hats are quite popular items at Northland Clothing Co. according to owner, Jennifer Baumann. During the summer, whole families will often come into the store and purchase a T- shirt for everyone. With sizes going from small to 3x, the small fitting an average 10 year old, this is easy to do. Christmas is also a popular time. Jennifer will get calls from grandparents to place an order for all family members. What a fun group picture that makes when everyone is visiting grandma and grandpa at the cabin!

Northland Clothing Co., a familiar storefront at 6991 W. School Street in Three Lakes, has been carrying our TLWA T-shirts and hats for the past several years, along with their fall and winter sportswear. TLWA is thankful that we have a venue like Northland Clothing Co. to display and sell them. Visitors to the Northwoods are then made aware of our lake association which works to keep the lakes pictured on the front of our T-shirts healthy.

TLWA THREE LAKES WATERFRONT ASSOCIATION

amazonsmile You shop. Amazon gives.

The TLWA is partnering with Amazon Smile to earn a few dollars.

You can now shop Amazon and a percentage of your purchase will be given back to TLWA!
Same products, same prices!

1. Use Smile.Amazon.com to access Amazon
2. Click on “Get Started”
3. Choose Three Lakes Waterfront Association
4. Shop away!

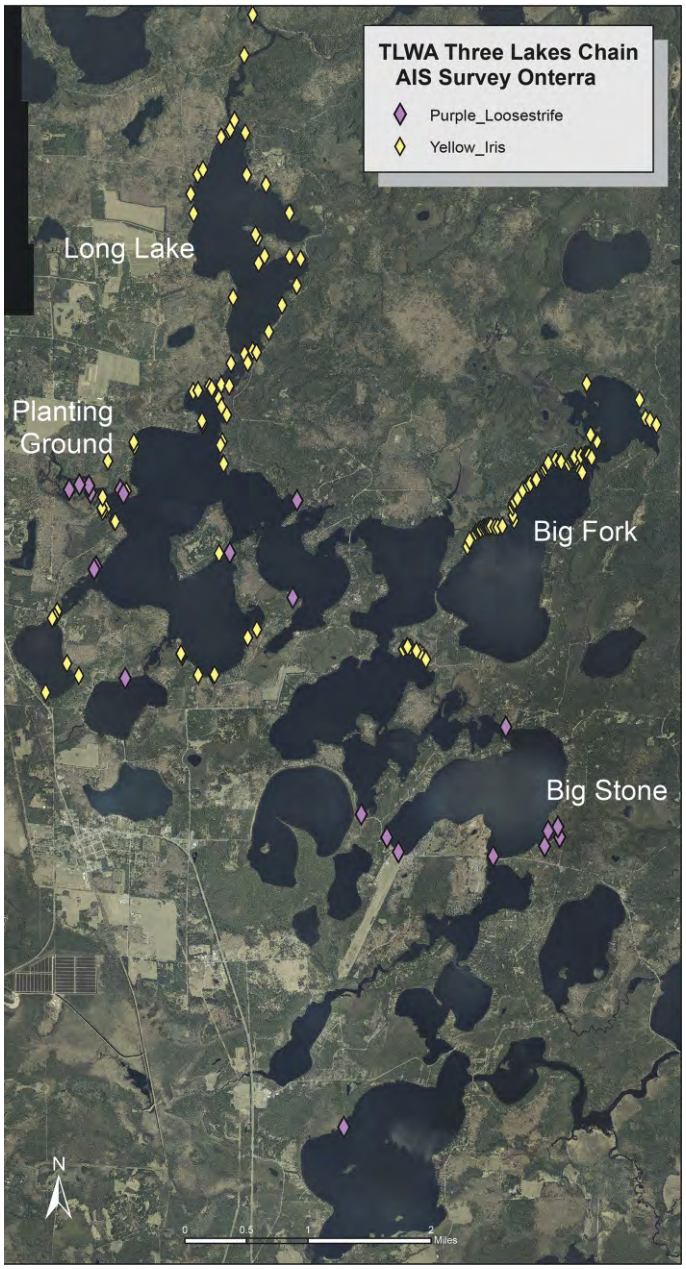
Your donations will be given directly to TLWA and are very much appreciated.
All proceeds go to protecting our lakes and shorelines.

Adopt Your Shoreline

by Dave Wheeler

It's Not a Pretty Plant!

Since this is my first year leading the Three Lakes Waterfront Association's Adopt-Your-Shoreline (AYS) program, I wanted to get out and see firsthand the impact of the aquatic invasive species (AIS) on our lakes. This summer, I focused on yellow flag iris. I was informed by three of our Lake Captains of the spread of yellow flag iris on their lakes. After witnessing the problem, it is very evident to me that the problem is growing worse. Yellow flag iris is prevalent on Little Fork, Big Fork and Medicine Lakes. It is also found on Dog, Deer and Island Lakes. There are also reports of yellow flag iris on other lakes.



Yellow flag iris, Iris pseudacorus, is also known as pale yellow iris, yellow iris and water flag. It is native to Europe, Western Asia and Northwestern Africa. It is a flowering perennial and grows 40-60" tall with erect leaves up to 35" long. The flowers are a bright yellow. The fruit is a dry capsule up to almost 3" long containing many pale brown seeds. The petals, stems, leaves and rhizomes are toxic and care should be exercised to avoid contact. It grows best in wet conditions and tolerates water submersion. It spreads by rhizomes and water dispersion.

Yellow flag iris establishes very dense stands and thick mats of underwater rhizomes that prevent the germination and growth of our native species. This leads to a further negative impact including the reduction of nesting habitat for fish and waterfowl. Contact with the plant can cause skin irritation in wildlife. Animals that ingest the plant can experience non-fatal poisoning.

Control measures for yellow flag iris include digging and pulling the entire plant including its rhizomes, if the plant is at an early growth stage. In larger established stands where mechanical removal may cause severe soil disturbance, cutting the plant followed by a dripless wick herbicide treatment (Rodeo) to the cut is the best method for controlling plants. It may take three years of herbicide treatment to completely eradicate the plant. Dripless wicks are available in season at Anchor Marine, located on Big Stone Lake. There is a sign out sheet and instructions on the use of the applicators located there. Annual removal of the seed pods can also control the spread to other areas on our lakes. Also, repeated annual cutting of the plant stem may also deplete its energy reserves and kill it. If you notice yellow flag iris on a neighbor's

shoreline, inform them that it is an undesirable invasive and offer to assist in its eradication. Be sure to notify your Lake Captain of its existence.

CLOCKWISE: Yellow Flag Iris Rizomes; Seed Pods and dense stand on Three Lakes Chain.

Lastly, I want to thank all of our volunteers who monitored, removed and/or reported AIS on the Three Lakes Chain this year. Your interest and efforts are greatly appreciated and invaluable. If you are interested in becoming an Adopt-Your-Shoreline volunteer, please contact your Lake Captain.

Our Adopt-Your-Shoreline Program is also looking for an individual on Big Stone Lake and an individual on Townline Lake who would be willing to serve as Lake Captains for their respective lake. If you are interested, please contact me at darkhorse53@gmail with a topic line of "Lake Captain."

LAKE CAPTAINS

BIG	**Steve Laszewski**	920-562-0321	steve.laszewski@foth.com
BIG FORK	**Kathy Olkowski**	715-891-0367	kathleenrunner@yahoo.com
BIG STONE	**OPEN**		
CRYSTAL	**Jeffrey Goelz**	414-562-6703	jgoelz454@hotmail.com
DEER	**Jay Teagle**	630-460-5362	jay.teagle@yahoo.com
DOG	**Gene Baltz**	715-546-8109	gfbaltz@att.net
FOUR MILE	**Mike Gray**	920-540-6027	mike.gray@valmet.com
	Lori Gray	920-540-6027	lagray1520@gmail.com
ISLAND	**Doug Scheffen**	715-546-2732	dougscheffen@aol.com
JULIA	**David Mitzner**	715-546-2583	david.mitzner165@gmail.com
LAUREL	**Mark Wallesverd**	920-344-0698	walsvrd@gmail.com
	Charles Brady	651-408-2505	bradycharles@msn. com
LITTLE FORK	**Mary O'Hara**	715-546-8107	mcohara@att.com
LONG	**Gary White**	920-251-7388	garykarenwhite@charter.net
MAPLE	**Ron Bennett**	815-351-7573	rjbennett247@gmail.com
MEDICINE	**Bruce Renquist**	262-498-5351	bruce.renquist@gmail.com
MOCCASIN	**Ryan Lamon**	715-546-3351	ryan@watercraftsales.com
PLANTING GROUND	**Norris Ross**	715-546-2250	norrisross@frontier.com
RANGE LINE	**John Folaron**	414-687-5900	john.folaron@outlook.com
ROUND	**Gwen Hutchins**	608-556-1234	hutchinsfoundation@gmail.com
SPIRIT	**John Lake**	619-980-7654	jrlncal@sbcglobal.net
THOROUGHFARE	**Paul Matthiae**	715-891-6154	pjmatthiae@gmail.com
TOWNLINE	**OPEN**		
VIRGIN	**Bob Borek**	715-546-3457	bobborek18@gmail.com
WHITEFISH	**Dave Wheeler**	309-696-9855	darkhorse53@gmail.com

Aquatic Education Update

by Paul Matthiae

Al Votis, Three Lakes High School Chemistry and Global Science (GS) teacher, said early on that GS being an elective course, student numbers would vary from year to year. Indeed they have, first year 8 students, second year 24, and this year 16 students. Before taking to the water students are introduced to the equipment used in gathering oxygen and temperature data, water and bottom samples, plankton netting, and aquatic vegetation sampling. Lake types and structures are introduced, along with the importance of the lakes watershed.

September 13th was scheduled for our survey of Virgin Lakes physical, chemical, and biotic environments. Four pontoon boats were again provided and manned by Virgin Lake volunteers. Conditions were perfect; air was warm, wind calm, sky cloudless. Divided into four teams and with specific tasks assigned to each boat, the students set out to collect samples for later analysis. So all students could participate in every task we rotated the teams through all four boats.

This year we decided to bring the laboratory work to the lake rather than going back to the school to run analysis. Portable tables were set up and microscopes and chemistry equipment set in place. Students spent the afternoon undermining the lakes oxygen, phosphorous, ph, and nitrogen contents; identifying aquatic plants known collectively as plankton that inhabit the lake.

Chemical analysis combined with secchi disc reading (depth of light penetration) conductivity reading (salts in the water), temperature, and physical structure (inflow/outflow, watershed size and condition, depth) will determine the lakes trophic state, an indicator of the lakes water quality.

A week later Aquatic Explorations students moved to 9 Mile Creek, a stream that flows into Eagle River north of Long Lake and before Burnt Rollways Dam. Nine Mile Creek originates as drainage from a wetland northeast of Upper Nine Mile lake which it flows through, then on to Lower Nine Mile lake where it flows through an outlet dam beneath Town Road X.

Access to the creek was provided through the generosity of two land owners, Bruce Aumendson and Les Anderson, both retired school teachers. We set up in Aumendson's yard. Portable tables, microscopes and chemistry kits were set up. Sampling equipment was sorted and organized for quick access. Most of the equipment was the same gear used in the Virgin Lake study. Streams, however, require additional sampling equipment such as a Surber Sampling Net. Constructed with a rigid metal frame with built in wing nets and a long fine mesh nylon bag, the Surber Sampler is an incredibly good sampler of stream invertebrates, and other forms of aquatic life. Placed with open end facing up – stream all that is required are two or three students shuffling their feet along the stream bottom as they move toward the net. The nets an also work well when put in place and left for an extended period of time – we used both techniques. Short handled dip nets and insect nets were also used to capture invertebrates.

Teams were organized and task assigned. Water samples were collected and analyzed from both Nine Mile Lake and in the stream from the dam to compare water chemistry and physical factors. Bottom samples were taken with dredges in rock/cobble, sand and mud bottoms.

Essential to analysis of streams is determining rate and volume of flow. Three teams measured the stream's width at four locations along a measured 100' stretch of stream. At each location they also measured stream depth from near shore to middle to far shore, determining average depth. Each team then floated a tennis ball down the center of the stream's measured 100' reach, repeating the float three times and calculating the average time of float. Taking these numbers and applying a constant number based on the type of stream bottom, they were able to calculate the stream's rate of flow in cubic feet per second.

Bottom samples and dip netting produced a treasure trove of larval insects and crayfish. Adult crayfish were abundant in all age classes. Insects ranged from predacious diving beetles to dragon flies and numerous fly species. The microscopes were in constant use all afternoon and tubs full of bottom mud, rocks and sand got a thorough searching. Finding a large freshwater sponge and a large mud puppy were frosting on the cake.

We were fortunate to have Stephanie Boismenue join us for the day. In addition to being an aquatic plant expert, she is also in charge of a new program to monitor the occurrence of clams in our lakes and streams. Clams play an important role in keeping our lakes and streams clean. To illustrate this unique ability Boismenue had the students fill two large clear plastic tanks half full with stone, rock, mud and gravel from the steam bed; filled them with stream water, and to one tank added clams representing all 10 species the students found. But, I'm getting ahead of myself. After lunch all students were given nylon mesh bags an instructed to find as many clams as they could in 20 minutes. After 20 minutes the students gathered in small groups to sort their clams by species with the help of guide books. A total of 10 species, including three species listed as endangered in Wisconsin were identified, numbers of each species totaled and recorded for official state survey purposes.

Boismenue also explained the anatomy of clams, how their organs functioned and how they moved about. We then went to look at the two tanks prepared after the 20 minute collection. The tank with clams was nearly clear of suspended solids while the clam-less tank was still so cloudy you could not see through from side to side. Clams are important!

It's important to note that all water, bottom material, and aquatic plants and animals were returned whenever possible to both the lake and stream. All data collected would be recorded for classroom use and future reference., The biological and chemical structures, and biochemical cycles will be analyzed and explained in future classes. The students at Three Lakes High School are having unique first hand experiences in the application of scientific methods through the Global Science curriculum.

ABOVE: Students walk from the highway bridge to the lower natural areas of Nine Mile Creek. BELOW: AIS coordinator Stephanie Boismenue explains the characteristics of the mussels gathered.

A River Runs Through It

by John Ray

Wake up and take a look at your lake in the morning, and chances are that it looks pretty much like it did yesterday, last week, last month or even ten years ago. What is not readily apparent is the dynamic nature of the system... Indeed, "A River Runs Through It." The Three Lakes Chain is part of the headwaters of the Eagle River System and contributes an average of 71,000-acre feet of water to this resource every year. This water helps sustain life along its journey via the Wisconsin River all the way to the Gulf of Mexico and out to sea.

How much water is in your lake? The table (at right) lists the individual lakes in the Chain arranged by

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Lake	Surface Acres	Mean Depth	Capacity Acre-Feet	Volume %	Refresh Rate (times/year)	Flow/year (Acre-feet)	Residence Time (days)
Planting Ground	1045	15	15675	15	4.3	67403	88
Big Stone	609	20	12180	12	4	48720	91
Big Fork	670	17	11390	11	0.8	9112	453
Big	872	13	11336	11	3.6	40810	102
Medicine	397	22	8734	9	5.8	50657	62
Long	613	12	7356	7	9.7	71353	37
Little Fork	343	16	5488	5	10.9	59819	33
Spirit	355	14	4970	5	0.2	994	1544
Virgin	264	13	3432	3	2.3	7894	161
Island	304	11	3344	3	18.6	62198	18
Whitefish	199	16	3184	3	3.2	10189	113
Fourmile	210	11	2310	2	3.5	8085	106
Laurel	254	7	1778	2	27.1	48184	15
Deer	188	9	1692	2	28.1	47545	15
Range Line	128	13	1664	2	0.6	998	606
Dog	204	8	1632	2	24.7	40310	15
Townline	145	11	1595	2	1.5	2393	245
Round	151	8	1208	1	49.3	59554	7
Maple	139	8	1112	1	0.5	556	748
Moccasin	91	8	728	1	0.4	291	843
Crystal	117	6	702	1	8.5	5967	44
			101510				
Acre feet/gallon	325851						

Continued from page 17

capacity. Planting Ground is clearly the reigning champion followed closely by the triumvirate of the aptly named Big Stone, Big Fork and Big lakes. These four basins contain half of the entire water budget of the chain (Fig. 1). All the lakes on the chain are classified as drainage lakes in that they have surface water inflow and/or outflow in the form of rivers or streams[1], some demonstrably more than others. Since our water is constantly on the move, it is interesting to note the refresh rate or conversely, the residence time of water in our lakes. The Refresh rate shows the number of times per year that the holding capacity of each lake is displaced by the inflow of water from upstream. For example, Laurel Lake (27 times) is refreshed every two weeks, Medicine (5.8) every two months and Spirit (0.2) once every five years. If you happen to live along the main channel, somewhere between 30 and 60 million gallons of water are cruising past your pier every day. It's no wonder fish on the chain like to find a nice back bay to chill out.

The overall flow of Eagle River begins in the lower right corner of Fig. 2 and then swings northerly through the center along the trail of progressively lighter shades of green. Flow volumes increase along this trend. The darkest colored lakes on the left side (from northwest to southeast: Rangeline, Town Line, Maple and Spirit) as well as Big Fork Lake on the right side contribute to the overall budget but are not "main channel lakes."

This impressive flow begins in Virgin Lake and in joining up with the waters of Whitefish Lake wind their way along the thoroughfare to collectively decant 15K acre-feet or more into the northeast end of Big Lake (lower right-hand corner of the map Fig. 2). Big Lake and its watershed adds a beefy 25K acre-feet to this flow and together 40K acre-feet are quietly rumbling down drainage into Deer Lake. Reserves from Dog Lake and Crystal Lake bring the outflow to nearly 50K acre-feet which then takes a breather and maintains equilibrium from Big Stone through Laurel and Medicine. At Little Fork, the river receives a 9K acre-feet influx from Big Fork which boosts it to 60K acre-feet as it continues through Island and Round into Planting Ground. The final contributions from Planting Ground and Long lakes result in 71K acre feet flowing out towards Burnt Rollways Dam and eventually into the Wisconsin River system.

[1] Onterra (2020)

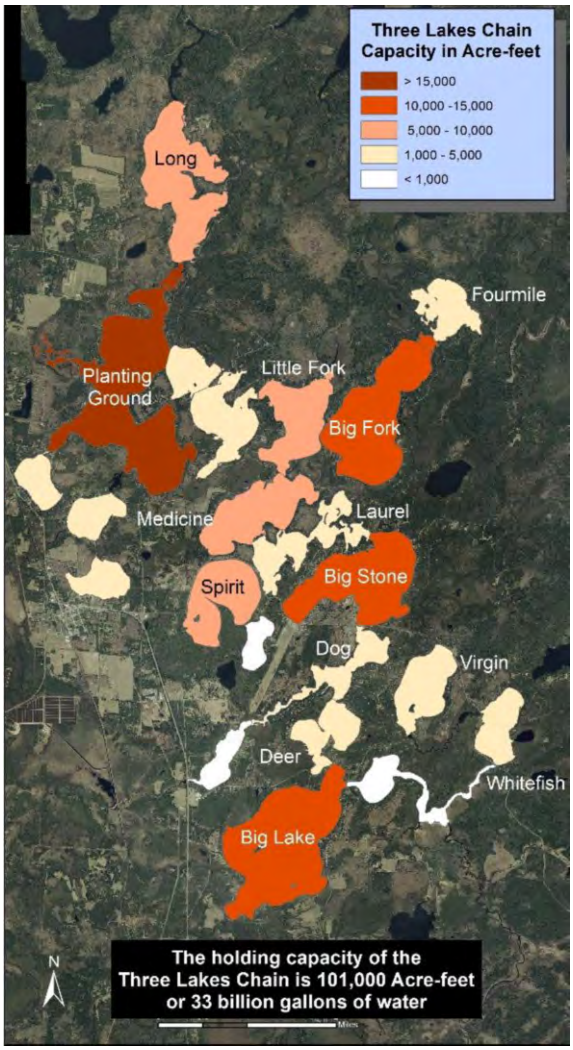

Figure 1.

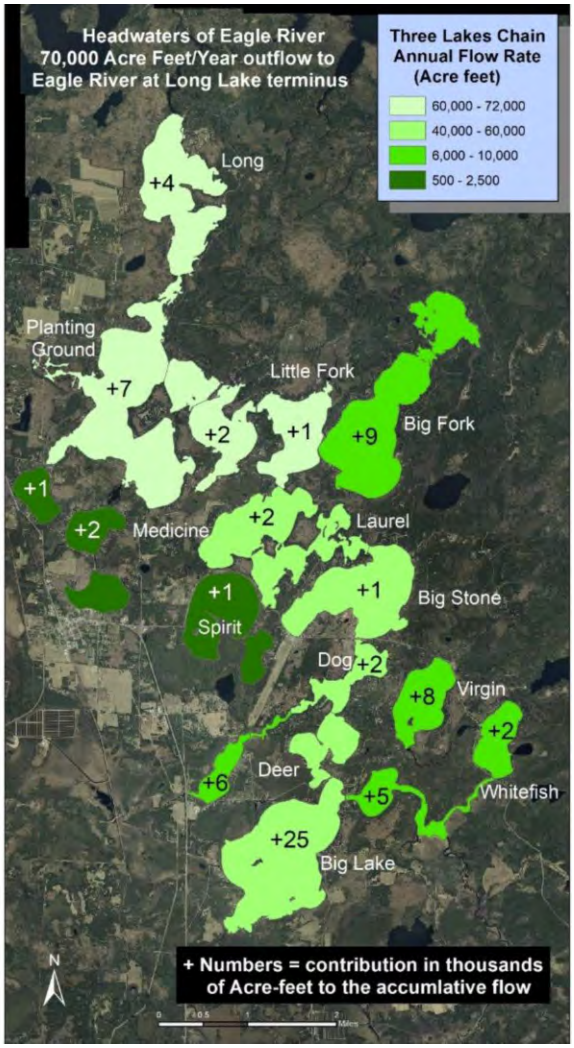

Figure 2.

The Killer Pine Tree

by Ed Cottingham

During our June Board meeting, Bob Agen reported that our kiosk at the Crystal Creek landing had received a direct hit from a pine tree during one of our many windstorms and should be replaced. I felt that the landing saw little traffic and questioned the need to replace it. The board members ultimately decided it should be replaced.

Never volunteer any ideas on how it should be constructed because some how you will own it. I said we will have to remove the old one and I would try to salvage any signage that was attached. Jerry Oehmen said he would bring his trailer and meet me at the landing a couple of days after our board meeting. When I went to collect our signs, the kiosk looked like it was run over by a truck, a really big truck. The 4x4 posts were snapped off, the roof was flat and every 2x4 was broken.

The pine tree that took out the kiosk was huge, probably as old as Ed Jacobsen, 100 years or more. Bob sent me an email saying he would help in any way he could. I think he felt a little guilty about pushing the need for replacement. I took some measurements of existing kiosks and went to my shop to work up a plan and material list. Then it was off to Menards. I called Bob to meet me at the landing to install the main 4x4 upright supports using a posthole digger borrowed from Norris Ross. Bob insisted we rent a power unit instead. Bob must be getting too old for manual labor.

COUNTERCLOCKWISE: The killer pine demolishes the sign; The sign is framed in; The finished product, not bad!

We had intended to put the kiosk in the same location, but the tree had developed so many roots, it was impossible to dig more than a few inches. We gave up and went to the opposite side of the road and installed the uprights. Turned out, the rental was a good idea. I went home and constructed the roof, called Jerry for some extra help lifting the roof assembly into place and between Bob, Jerry, and myself, we had the roof on in no time. We now have a new kiosk.

NEW BOARD MEMBER

Kelly Wranosky is our newest member, joining us this past summer. Born and raised in Eagle River, Kelly has made Three Lakes her home for the past 32 years. She recently retired from 30 years as a school counselor. Kelly loves swimming and boating on the chain. Protecting this natural resource is close to her heart. In her free time, she like to travel, bike, swim and read. "It has been an honor to be invited to join this important group and protect our lakes for all to enjoy," Kelly stated.

TLWA SCHOLARSHIP RECIPIENTS

LEFT: The Three Lakes Waterfront Association awarded a $750 scholarship to Three Lakes High School senior, Sawyer Siedschlag, as he pursues an education related to Natural Resources.

RIGHT: College student, Amy Olbenberger, a part of the Virgin Lake Dive Team accepts a $500 scholarship from TLWA as she continues her studies in Environmental Sciences.

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For information regarding important issues impacting our lakes and Your own lake property, visit the TLWA website at: **www.TLWA.org** or contact TLWA by emailing jaketheoilguy@yahoo.com