



LAKE REPORTER

WHAT IS CAUSING HARMFUL ALGAE BLOOMS (HABS) IN CANANDAIGUA LAKE AND WHAT CAN WE DO ABOUT IT?

By Kevin Olvany, Watershed Program Manager, Canandaigua Lake Watershed Council

I have been asked this critical two-part question many times over the last few years and especially so this year after experiencing the most substantial lake wide HABS event since we starting seeing HABS in 2015. I hate to disappoint so early in the article- but I am not going to be able to give you an absolute definitive answer to either part of this question! We, in the scientific/watershed management profession have a great deal of answers regarding the major causes of HABS in lakes with substantial amounts of nutrients. However, we are still working on determining the exact cause(s) of HABS in low nutrient lakes across New York State and the Great Lakes region such as Canandaigua, Keuka, Skaneateles and even Lake Superior; that have not had recorded HABS events until the last few years.

When you look at our long term in-lake phosphorus data- there is no discernible upward trend in phosphorus that would point to an easily identified source of phosphorus that is driving HABS in Canandaigua Lake. However, we are in year four of HABS in Canandaigua Lake and the Village of Rushville issued a do not drink advisory because of HABS toxin in the water supply. Each of the four years were somewhat different in HABS intensity, geography and duration. 2015 was our first year and was a substantial HABS event that was similar to 2018 in duration- but only impacted the northern 2/3 of the lake and the bloom intensity did not come close to the levels that we saw in 2018. 2016 was a very light HABS year with only isolated spots in the north half of the lake. We also had a major drought in 2016 that really minimized any watershed-based sources of nutrients entering the lake. 2017 was more intense than 2016, but nowhere near the geographic extent and intensity as 2018.

There was a cool/rainy spell in late August of 2017 that may have helped stave off an intense bloom. 2018 was a true lake-wide HABS event that was the most substantial visually, geographically and had the highest concentrations of BGA and the associated toxin.

One of the main questions that we are struggling with is- what changed in the watershed and/or Canandaigua Lake in the early part of this decade to trigger HABS to really take off in late August/early September timeframe of the last four years. Over the last 25 years of research on Canandaigua Lake, long time FLCC professor Dr. Bruce Gilman has identified that by late summer we typically see blue green algae (Microcystis) dominate the algal community- but at very low concentrations. We have some good clues as to what has changed to possibly trigger the concentrations of BGA to really explode in lakes like Canandaigua that I will review in this article.



Aerial image of an algae bloom on September 14th, 2018
Photo by Doug Turnbull



CLWA
Box 323
Canandaigua, NY 14424
(585) 394-5030

Email:
info@canandaigualakeassoc.org

Website:
www.canandaigualakeassoc.org

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PRESIDENT'S MESSAGE

by Neil Atkins



Our member volunteers have been busy this season.

Our expanded volunteer-driven shoreline Harmful Algal Bloom (HAB) monitoring program began the first of August and continued into October. We had 17 volunteers surveying 18 zones around the lake. Each volunteer made weekly observations, which were reported to DEC (see article, page 3). If blooms were observed or there were suspicions of blooms occurring in their zone, we determined if samples were to be collected and

submitted for testing. Finger Lakes Institute at Hobart and William Smith Colleges performed the initial screening process for Blue-Green Chlorophyll a levels. The samples were then sent to the DEC approved lab when determined necessary to provide toxin levels. During the period in which blooms occurred, CLWA along with our partner the Canandaigua Lake Watershed Council (CLWC) provided regular Water Quality Updates. CLWA and CLWC have worked together for many years in water quality monitoring.

Our Secchi Disk water clarity program also expanded. We added 4 new areas and 4 volunteers, who check and record the water clarity, and temperature at the one meter depth on a weekly basis (See article, page 10). The Secchi Disk is a device that is lowered to a depth where it is no longer visible. That depth along with the temperature is recorded and maintained in a database. One result of a decrease in water clarity other than storm turbulence could be the onset of the algae blooms.

Our Citizen Statewide Lake Assessment Program (CSLAP) completed its second year of water sampling for water quality. We have two locations on the lake in which samples are taken, preserved and submitted based on a DEC protocol. The results are entered on a data base maintained by DEC.

Our watercraft stewards have had a busy summer with boat inspections for aquatic invasive species at the public launches in Canandaigua and at Woodville. Stewards performed 16,312 inspections, and this year's expanded program continued on weekends throughout October. This program is administered by the Finger Lakes Institute and overseen by our association.

CLWA is also a member and an active participant in the Finger Lakes Regional Watershed Alliance. The alliance membership includes the representatives of each of the 12 Finger Lakes and meets every other month. It provides an opportunity to share projects, events, environmental issues and approaches to their solution. It has provided opportunities for discussion with our political, environmental and scientific leaders.

We encourage those of our members who would like to be active in our programs to join our committees and participate in our mission.

Editor's Note:

CLWA warmly welcomes Neil Atkins as our new President. Neil has been an active participant in CLWA initiatives over the years, serving as Chairman of the Projects Committee and the Canandaigua Lake representative for the Finger Lakes Regional Watershed Alliance.

Neil also serves on the Canandaigua Yacht Club Board and is active in the Canandaigua Community Sailing program. He is now retired from engineering for a small family-owned machinery manufacturing business and has served on numerous committees and boards over the years, including: the Town of Gorham Planning Board (25 years!), the Ontario County Planning Board, the Penn Yan Flying Club.

Neil and his wife Maggie live in the City of Canandaigua.

2018 VOLUNTEER SHORELINE HABS MONITORING PROGRAM - RESULTS FROM OUR PILOT YEAR

As the monitoring season comes to a close, we have a lot to share on our citizen science programs!

On top of the existing secchi disk program and involvement in CLSAP, (see article on page 10) in 2018 CLWA launched a Volunteer Harmful Algae Bloom Shoreline Monitoring Program. Primary goals of the program included:

- To work with our partners to provide timely HABS information to CLWA members and users of Canandaigua Lake waters.
- The collection of data under DEC protocol that will contribute towards the ongoing research of HABS across the Finger Lakes region, and potential solutions.

Partners in this cooperative effort included: the Canandaigua Lake Watershed Association (CLWA), the Canandaigua Lake Watershed Council (CLWC), the Finger Lakes Institute (FLI), State University of New York College of Environmental Science and Forestry (SUNY ESF), Upstate Freshwater Institute (UFI) and the New York Department of Environmental Conservation (DEC).

Seventeen volunteers signed on to the program and committed to weekly surveillance of eighteen zones around the lake for a ten-week time period (end of July through the end of September). Zones were established with a goal of covering HAB “hotspots” (areas where blooms had been observed in previous years) as well as distributing the monitoring zones around the lake to ensure a good representation of the shoreline. Volunteers were trained to identify blooms and collect water samples under DEC protocol and reported their findings to CLWA, the Watershed Council and the DEC. CLWA operated a water sample drop-off site at our office on South Main Street in Canandaigua.

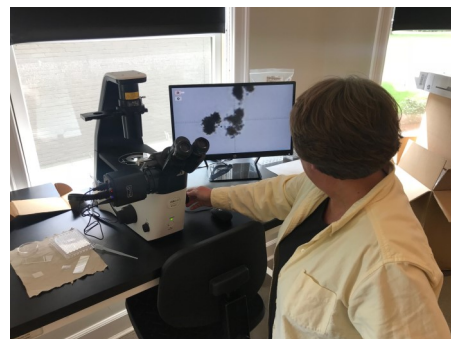
A main component to this program was a partnership between CLWA, the Seneca Lake Pure Waters Association, and the Finger Lakes Institute to purchase a BBE Fluoroprobe to analyze the samples collected as part of the shoreline monitoring program. The new equipment is housed at the water quality lab at the Finger Lakes Institute in Geneva, where FLI lab technicians are available to run samples and provide detailed reports on a variety of indicators, including Blue Green Chlorophyll a. If samples screened above 25 ug/L (micrograms per liter) of Blue Green Chlorophyll a, then the sample was filtered and shipped to the state lab for toxin analysis. The purchase of this important piece of equipment was funded by our CLWA members as part of the Annual Appeal campaign contributions. This investment ensures that CLWA and our partners are able to gather timely information on the nature of the blooms, which aids in our public notifications. A

grant from the F.F. Thompson Foundation also supported the purchase of materials and equipment for our volunteers.

THE RESULTS

2018 proved to be our most significant year for HABS events on Canandaigua

Lake (see article, page 1). Blooms were seen lake wide, and in some cases they persisted for extended periods of time, as compared to previous years where they were more isolated in nature. The long and the short of it is – this was a good year to have more eyes on the lake! Our volunteers helped us gather critical data that adds to the developing picture of lake health. Results from the samples collected document the water quality challenges that our lake experienced in 2018, and can be used to give context in grant applications and funding proposals to show the need for more state resources.



FLI Director Lisa Cleckner takes a closer look at cyanobacteria under a microscope

Weekly Shoreline Surveys performed	216
Water samples collected by volunteers and watershed staff and submitted for lab analysis	54
DEC Confirmed Blooms (results exceeded 25 ug/L Blue Green Chlorophyll a)	25
Confirmed with High Toxins (results exceeded 20 ug/L of Microcystin)	23

Over 90% of the DEC confirmed bloom samples came back with a high toxin result from the state lab. While there was some frustration this year over the length of time it took to receive toxin results, we are working with our other Finger Lake Association counterparts to address this with the DEC moving forward.

Results from the weekly sampling are posted on the CLWA website, and include an interactive map detailing the locations that blooms were observed that week. CLWA and the Watershed Council also co-author Water Quality Updates that are sent to our members, local media contacts, and our municipal partners on a weekly (if not daily) basis when HAB conditions are being observed. Updates are cross-posted on our CLWA Facebook page, which is proving to be an effective tool to help spread the word about lake conditions. You can help by forwarding the email blasts and Facebook posts to neighbors and friends!

CONTINUED ON PAGE 8

SPOTTED LANTERFLY: A NEW THREAT TO OUR REGION

By Cynthia Mellen Smith

With recent discoveries of a new invasive insect in New York State, the possibility of the spotted lanternfly (SLF) permanently calling the Finger Lakes home has become more real. One of these insects was found in Penn Yan, an area with a robust wine industry. Although tree of heaven (*Ailanthus altissima*) appears to be the preferred host, the list of more than 70 plants SLF is known to feed on includes grapevines, fruit trees, hops, and maples. Its establishment in NY could impact agriculture and tourism, two important economic sectors of our region.

First detected in Pennsylvania in 2014, SLF is thought to have arrived on a shipment of stone slabs imported from China. The population has greatly increased and spread to New Jersey, Delaware, and Virginia. A large plant hopper with poor flying abilities, SLF spreads primarily through human activity. Egg masses are laid on smooth surfaces including vehicles, wood, stone, and outdoor equipment, and can easily be transported to other areas. The nymphs and adults can also hitch rides inside vehicles.

The inch long egg masses, laid between September and December, are at first brownish-gray and smooth, but later become brown and scaly looking. Wingless nymphs that are black with white spots, begin to emerge in April and develop red markings by July. The approximately 1 inch long and ½ inch wide adults appear in late July. At rest, the forewings of the adults are grayish in color with black spots at the front and a darker band at the wing tips. With the wings open, the hind wings show patches of red with black spots, and black and white areas.

The sap-sucking nymphs and adults reduce plant growth and yield, and can lead to the plant's death. The release of sticky "honeydew" during feeding allows mold growth, and tiny feeding wounds seep sap that can ferment and attract other insects. The ants, bees, and wasps that come in, along with the sticky substances dripping from trees from congregating SLF, can become a nuisance to outdoor activities.

Although two SLF adults were found in NY State, in both cases, they were quickly recognized and reported to authorities. The NY State Department of Environmental Conservation (DEC) and Department of Agriculture and Markets (DAM) followed up to make sure there weren't additional insects. The best way to help combat this new insect is to be proactive and watch for them, as eradication can be difficult once they become established. It is through public awareness and action that there is hope in keeping SLF from moving into and impacting our region.



Spotted Lantern Fly adult, wings closed.

Photo credit: Lawrence Barringer, Pennsylvania Department of Agriculture, Bugwood.org



SLF adult, wings open.

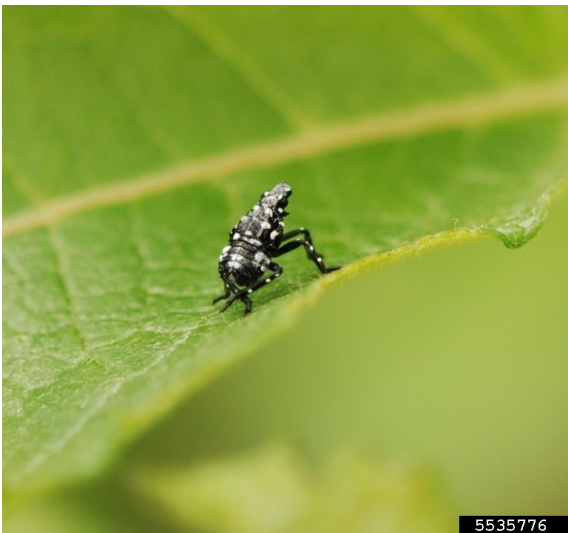
Photo credit: Lawrence Barringer, Pennsylvania Department of Agriculture

Here's what you can do:

- Learn to identify SLF.
- Check outdoor items for egg masses (furniture, vehicles, firewood, etc.).
- If you visit an area where SLF is present, check and remove SLF hitchhikers on your gear and on or in your vehicle before leaving. If egg masses are found, scrape them into a plastic bag and use rubbing alcohol or hand sanitizer to kill them.

If you think you find SLF in NY:

- Take a picture (if possible, include something for scale like a coin).
- Place the insect in a closed container and put in the freezer for later identification.
- Note the location.
- Promptly report it to the DEC at spottedlanternfly@dec.ny.gov



SLF early instar nymph.

Photo credit: Lawrence Barringer, Pennsylvania Department of Agriculture, Bugwood.org



SLF 4th instar nymph.

Photo credit: Lawrence Barringer, Pennsylvania Department of Agriculture, Bugwood.org



LEFT: SLF young egg mass.

Photo Credit: Pennsylvania Department of Agriculture, Bugwood.org



RIGHT: SLF old egg mass.

Photo Credit: Emelie Swackhamer, Penn State University, Bugwood.org

HARMFUL ALGAE BLOOMS IN CANANDAIGUA LAKE, CONTINUED FROM PAGE 1.

The Governor's HABs Summits that occurred earlier this year, brought together national, state and local experts to review the explosion of HABs in all types of lakes across NYS. The experts reviewed some of the research to date regarding the general ingredients that are essential to the formation of HABs- sunlight, warm water, calm wind conditions and nutrients- specifically phosphorus and nitrogen. The summits primarily focused on the only factor that we can somewhat control; the nutrient load into lakes from the watershed and/or in-lake sources and what can be done to reduce the amount of nutrients entering the lake.

Based on these summits and the evolving research that is occurring in many places- we are identifying the potential changes in our watershed that could be triggering HABs in Canandaigua Lake. Here is an initial list and review of potential changes in the watershed that we are continuing to refine. I will only be able to briefly review each of these very complex bullet points:

MORE EXTREME STORMS GENERATING HIGHER NUTRIENT LOADS TO THE LAKE

Our field investigations, communications with Highway Superintendents and many residents along with national level research has identified that we have been experiencing extreme storms on a more frequent basis and across a larger portion of the watershed in recent years. These intense storms carry heavy nutrient loads from both natural and human dominated landscapes into the lake. 2015 and 2017 were heavy runoff years and also substantial HABs years whereas 2016 was a major drought year and our lightest HABs year out of the four years. This was leading us to look at the extreme storm issue as a substantial trigger to the HABs that are impacting Canandaigua Lake. However, 2018 was a pretty dry summer and field investigations showed most streams dried up by early summer and stayed dry. I would investigate streams during the rain that we did get and there was very little flow. We did get a little more rain in late August, but we did not get the extreme storms that impacted us in both 2015 and 2017. 2018 was our most intense HABs event, but it was devoid of extreme storms- adding complexity to what is triggering the HABs.

WARMER SUMMER LAKE TEMPERATURES

Dr. Bruce Gilman has documented an increase in the summer lake surface temperatures over the last 25 years, which could be a key ingredient to providing more favorable growing conditions for HABs.

AGRICULTURAL PRACTICES INCREASING NUTRIENT LOADS



Approximately 1/3 of the 109,000-acre Canandaigua Lake watershed is in some form of active agriculture. There does not appear to be any substantial change in the number of acres farmed over the last 10-15 years. Some fields have gone fallow and some fields have been opened up to active agriculture. In addition, there have been millions of state and federal grant dollars along with local farmer money spent on implementing a wide array of water quality practices on watershed farms over the last 20 years through Soil and Water Districts and the US Department of Agriculture that have had tangible water quality improvements. We have gotten numerous questions about manure

application and the use of Round Up ready crops as possible causes of HABs. Here is a quick summary regarding these two potential issues:

- Manure application - There have been a couple high profile news articles that have looked at manure applications from large scale farm operations as a driving factor in increasing nutrient loads to the Finger Lakes and thus driving HABs in these lakes. I have been asked about these articles on multiple occasions. We do not have any large-scale Concentrated Animal Feeding Operations (CAFO) operations in the watershed. Many of the other Finger Lakes have several CAFO operations in their watersheds. We have four family run CAFO regulated farm operations that are outside of the watershed area, but do spread manure on some fields in the watershed. These operations must follow plans for manure storage and proper application and are regulated by DEC. We also have some smaller dairy's mostly on the east side of the watershed in the Gorham area. These smaller operations do not have to follow the same regulations as the larger operations. However, when you look at how the overall farming community fertilizes its fields, a substantial portion of the fertilization is not manure based- but from chemical fertilizers. Therefore, we need to look at both forms of fertilizer and from both ag and non-ag land uses. The combination of increased extreme storms with any type of fertilization is an issue that we need to come up with innovative partnership solutions to build water quality resiliency into our landscape.

- Increased use of “Round Up” ready crops - such as genetically modified soybeans and corn that are engineered to tolerate the spraying of “Round-up” during the growing season. This technique is used to knock out weed growth in the field to reduce competition for the crop that is growing on the field. These types of crops have increased over the last decade and thus the use of glyphosate (the active herbicide in Round-up) has potentially increased as well. There is ongoing research in the Lake Erie basin and elsewhere on the impact of glyphosate. The science and chemistry are complex and evolving- but some of the research is suggesting that some BGA are adapted to utilizing the phosphonate portion of glyphosate and as glyphosate breaks down it can also provide a bio-available form of phosphorus. Glyphosate has been around for 50+ years and has been widely used on fields in the watershed when crops are rotated. This is an area that will require much further research by chemists to better understand the complex interactions. This is another area where the combination of increased storm intensity with this potential source of phosphorus is an issue that requires innovative partnership solutions to build water quality resiliency into our landscape.

Agriculture is a critical asset to our community and also needs to be protected and promoted. We will continue to work with our agricultural producers, along with county soil and water and federal agricultural agencies to help build water quality resiliency into our landscapes to reduce the nutrient impact from farming operations even during extreme storm events.

SUBSTANTIAL DEVELOPMENT ON THE WEST SIDE OF THE WATERSHED INCREASING NUTRIENT LOADS

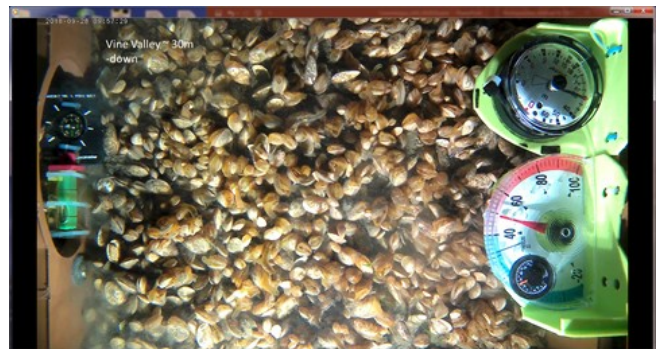
The vast majority of the development and thus population increase in the watershed over the last 10+ years has occurred along the Middle Cheshire Corridor of the Town of Canandaigua. We have had some issues over the years with these developments, but over the last four years they have largely stayed in compliance with stormwater regulations. In addition, for the last decade, the Town and City of Canandaigua have required that any new residential or commercial development must meet enhanced phosphorus regulations, that go beyond the State DEC requirements, in order to reduce the discharge of phosphorus from these areas. In addition to addressing large scale development, there is also a long list of regulations that have been adopted over the last decade by several of the lakeshore towns to reduce the impact of single lot development around the lake. We also have an active septic system inspection program. The new onsite wastewater law will provide further protection from this potential source of pollution. The municipalities understand that more still needs to be done and we are reviewing various options.

VEGETATIVE INVASIVE SPECIES IN THE LAKE

There is ongoing research on certain plant species actually moving phosphorus from the sediments into the water column- thus feeding the algae community. Dr. Bruce Gilman has completed aquatic plant (macrophyte) studies on Canandaigua Lake. Starry stonewort is the new invasive species that has made its way into Canandaigua Lake earlier this decade. Research has indicated that starry stonewort actually utilizes phosphorus from the water column thus potentially reducing phosphorus levels in the lake. Again, there are a lot of complex interactions within the lake ecosystem and further research is warranted.

INVASIVE QUAGGA MUSSELS LARGELY REPLACING INVASIVE ZEBRA MUSSELS

In the mid-1990s, zebra mussels invaded Canandaigua Lake and most other lakes in NYS and the Great Lakes basin. They were the dominant mussel in the lake and had substantial impacts on the ecosystem by filtering/eating the primary producers that formed the base of the food chain. Zebra mussels do not like the taste of BGA and tend to spit them back out. Thus, they tend to shift the ecosystem by the late August timeframe to a more BGA dominated algal community.



Underwater image of mussel density taken off Vine Valley at 30m (~100ft), image taken by Tony Prestigiacomo

Based on Dr. Gilman’s and others research on Canandaigua Lake, quagga mussels invaded Canandaigua Lake somewhere in the 2010-2011 timeframe. In very simplistic terms- quagga mussels are like zebra mussels- but on steroids! They tend to do everything better- they can live in deeper water, grow on more substrates, reproduce at a higher rate and filter more good algae. They also spit out BGA because they find the taste unpalatable. Dr. Gilman has done dredge surveys to document densities and that the quagga mussels have largely outcompeted zebra mussels. In September, Tony Prestigiacomo from the DEC Finger Lakes HUB, did some initial underwater camera surveys of the lake bottom and found high densities of mussels at various depths. Quagga mussels also “poop” out feces that contains dissolved phosphorus- which is immediately available to algae.

CONTINUED ON PAGE 8

HABS ON CANANDAIGUA LAKE, CONTINUED FROM PAGE 7

There is evolving research on other lakes that are documenting the quagga/HABs correlation. To summarize what we think is going on: quagga mussels filter out most of the competition (the good algae) through the growing season, they find BGA unpalatable and thus regurgitate it back into the water column and finally pump out dissolved phosphorus to feed the end of season BGA monopoly. This perfect storm of events seems to be at this point, a substantial contributor to the emergence of HABs as a major issue in Canandaigua Lake and other low phosphorus lakes. The 2018 HABs event on Canandaigua Lake seems to support this possibility.

While we think quagga mussels along with increased water temperatures are key factors for the emergence of HABs on Canandaigua Lake, it does not negate the need for enhanced land-based watershed management. These in-lake factors (that are out of our control) actually increase the need for enhancing our watershed level work because they have made the lake more sensitive to subtle increases in phosphorus.

WHAT CAN WE DO ABOUT REDUCING/ELIMINATING HABs ON CANANDAIGUA LAKE?

Some of the issues identified are largely beyond our control such as: quagga mussels, water temperature and rainfall intensity. Increasing watershed resiliency by managing land-based sources of phosphorus and nitrogen from entering the lake is key- especially with extreme storms becoming more of the new normal. This could be a whole other long article! We have written a watershed plan and comprehensive update of the plan on the various watershed sources of nutrients and how we are working to reduce their impacts. I might be a little biased in saying this - but when you look at each of these sources we can point to many tangible projects, laws and practices that have been implemented across the watershed over the last 20 years that have a net positive impact on the water quality of the lake. However, we obviously need to do a lot more.

Major areas we need to focus on:

- continuing to educate the public on managing their landscapes
- building more wetland and natural stormwater systems throughout the watershed to reduce downstream nutrient loads- we are completing a 3rd system in the Sucker Brook subwatershed, and have funding for large scale projects in multiple locations over the next couple years
- partnering with our farming community and ag related governmental agencies to reduce field-based migration of manure and chemical fertilizer to the road side ditch- nearby stream and ultimately Canandaigua Lake. We have to think outside the box and figure out innovative ways to get many small projects done quickly
- enhance tangible regulations to provide water quality treatment on individual lots in high priority areas
- implementing the onsite wastewater system law throughout the shoreline communities

I have only touched on some of the big potential issues driving HABs in Canandaigua Lake and what we can do about it. There is a lot more research that needs to be completed to better understand the dynamics in our lake and across the Finger Lakes system. It is easy to point to one issue instead of looking at the combination of factors that could be involved. Hopefully this article helps to better understand the clues that we have regarding the dynamics that are driving HABs in Canandaigua Lake. We will have a lot more information coming out over the next few months on how we are going to further research the causes of HABs and the watershed-based strategies to protect Canandaigua Lake.

VOLUNTEER MONITORING, CONTINUED FROM PAGE 3

CLWA would like to thank our 2018 volunteers for their participation in this important program: Steve Zumbo, Marty Lasher, Lynn Klotz, Sally Napolitano, Susan Carpenter, Kathy Postma, Cindy Mellen Smith, Steve Lewandowski, Bob Olsen, Bill Yust, Carolyn Morehouse, Lynn Thurston, Dee Crofton, Nadia Harvieux, Scott Kreher, Chuck Wochele, and Neil Atkins .

We also hosted a town-hall style HABs Forum on Tues 11/13, sharing our results with the public and featuring presentations from the Watershed Council, DEC, and the Department of Health. We look forward to hosting more HABs related outreach events in the future.

For 2019, we are looking at ways to strategically expand our shoreline coverage by incorporating additional volunteers in areas that are not currently being monitored. Volunteer assistance will also be needed for non-monitoring positions too (sample drivers, technical support). If you are interested in getting involved in this program, please send a note to Lindsay McMillan at lindsaym@canandaigualakeassoc.org.

We thank our members for all of their support in this important initiative through their donations, volunteer time, and advocacy. Thank you for spreading the word about CLWA's work and educating others about HABs concerns.

LAND TRUST AND TOWN OF GORHAM FORM PARTNERSHIP TO PROTECT PRIME FARMLAND IN CANANDAIGUA LAKE WATERSHED

Submitted by the Finger Lakes Land Trust

The Finger Lakes Land Trust and the Town of Gorham recently announced the permanent protection of 50 acres of prime farmland in the Canandaigua Lake watershed through the use of a perpetual conservation easement. The property, previously owned by Joe Christofferson, overlooks Canandaigua Lake and provides the public with scenic views from Twitchell Road.

The Land Trust and the town formed a partnership to conserve the property which will remain in agricultural use. The town provided over \$85,000 in funding for the project, and the Land Trust agreed to hold the easement and monitor future compliance with the agreement.

The Town of Gorham is committed to conserving farmland and scenic vistas. They have codified this commitment through a Farmland, Open Space, and Resource Conservation Plan, as well as zoning ordinances that limit subdivision and development in high priority open space areas.

Photo by Nigel Kent



"The Town of Gorham has been trying to protect the water quality of Canandaigua Lake, open space, and active farmland throughout the town for many years now," said Town Supervisor Fred Lightfoote. "This project accomplishes all three of these goals which are very important to the new and former owners of the property. They are to be commended. My hat is off to all who worked on this project, as well as the many past and present members of various town boards whose vision, determination, and persistence placed the town in a position to help bring the project to fruition."

"The Land Trust is grateful for the town's commitment to conserving open space," said Land Trust Executive Director Andrew Zepp "Without their leadership, this project would not have been possible."

This is the second project which the Land Trust and the Town of Gorham have partnered on. They previously worked together with New York State to protect 95 acres of forest on the northern slope of Bare Hill.

Conservation easements are legal agreements that limit future development while allowing land to remain in private ownership and on the tax rolls. Landowners who donate conservation easements may be eligible for both state and federal tax benefits.

By working cooperatively with landowners and local communities, the Finger Lakes Land Trust has protected more than 21,000 acres of the region's undeveloped lakeshore, rugged gorges, rolling forest, and scenic farmland. The Land Trust owns and manages a network of over 30 nature preserves that are open to the public and holds perpetual conservation easements on 136 properties that remain in private ownership.

The Land Trust focuses on protecting critical habitat for fish and wildlife, conserving lands that are important for water quality, connecting existing conservation lands, and keeping prime farmland in agriculture. The organization also provides programs to educate local governments, landowners, and local residents about conservation and the region's unique natural resources.

Additional information about the Finger Lakes Land Trust may be found at www.fllt.org. Information on the region's premiere destinations for outdoor recreation may be found at www.gofingerlakes.org, a new web site developed by the Land Trust to encourage people to get outdoors.

In Memory of
Charles H. Brigham and
Bruce W. Brigham

From Joyce A. Keeney

A donation was made in honor and
celebration of the marriage of
Lisa Napolitano and Jeff Roy

From John and Sonya Lightbody

In Memory of
Richard Hargrave

From Richard & Eleanor Hyland

CITIZEN SCIENCE REPORT—SUMMER 2018

By Nadia Harvieux

CLWA’s citizen science volunteers were out in full force this summer for the 9th year of the Take-A-Dip water clarity program and second year of the Citizens Statewide Lake Assessment Program (CSLAP). The goal of the Take-A-Dip program is to contribute to the overall water quality monitoring efforts on Canandaigua Lake by tracking changes in water clarity. This data is important because a significant decreases in water clarity over a short period of time can indicate an active algae bloom. The CSLAP program is a partnership between the NYSDEC and New York State Federation of Lakes Association (NYSFOLA). Last summer was the first year this program included the Finger Lakes and we are happy to share that the CSLAP program continued to support bi-weekly monitoring by our volunteers at two locations in year two of this program.

TAKE-A-DIP

The Take-A-Dip water clarity program currently has 24 volunteers monitoring lake clarity weekly at 20+ locations (Figure 1). This season, our volunteers collected 230+ water clarity readings from early May through the beginning of October, a tremendous effort to be commended! Average weekly water clarity remained high May through the early part of July, between 6.64 and 7.79 meters (Figure 2). A significant decrease in water clarity between the weeks of July 1st and July 8th was documented, with the weekly average water clarity decreasing from 7.20 meters to 4.97 meters, respectively. Through the second half of July and the entire month of August, the average weekly water clarity ranged from 5.2-5.9 meters. A significant decrease was again recorded at the beginning of September, with average weekly water clarity dropping to

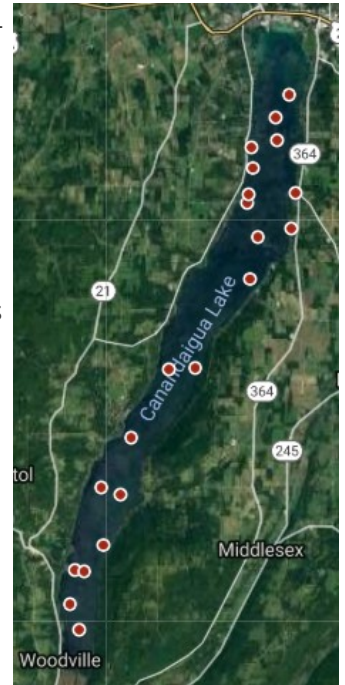
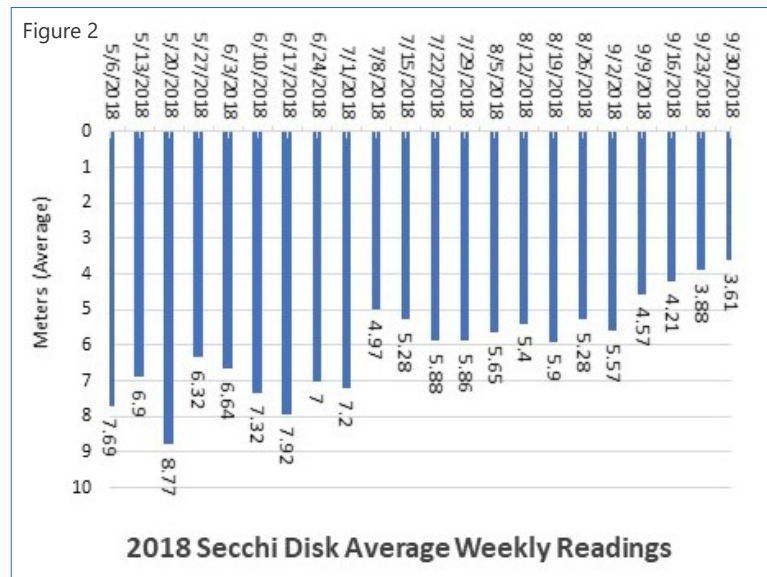


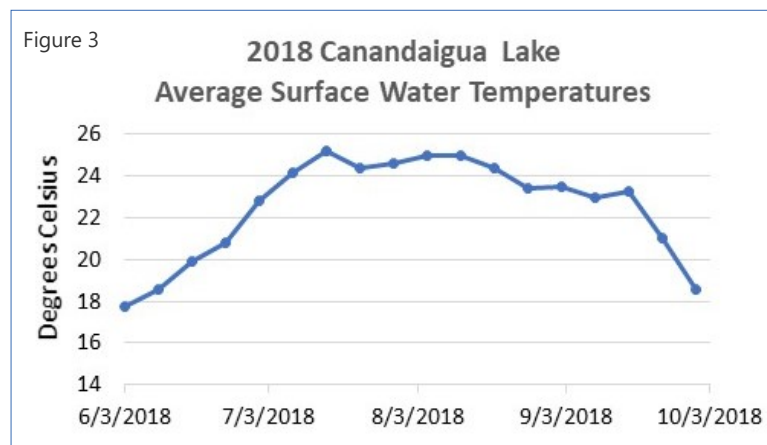
Figure 1: Map of Take-A-Dip volunteer water clarity monitoring locations



4.57 meters. That decrease continued through the month of September with an average water clarity of only 3.61 meters at the end of September. The overall decreasing trend in weekly water clarity in the month of September coincided with a significant cyanobacteria bloom and HABs event. Additionally, our Take-A-Dip volunteers recorded surface water temperature data (Figure 3) through the monitoring season and we look forward to tracking the surface water temperature in future monitoring seasons.

CSLAP (Citizen Statewide Lake Assessment Program)

The CSLAP program started in 1985 and currently includes over 250 New York State lakes. The goals of this program are to collect water quality data that will help identify changes in lake ecosystems over time and to educate the public about lake management strategies and water quality issues. CLWA had two lake monitoring locations that water quality testing occurred bi-weekly from June through September for a wide range of water quality indicators selected by the NYSDEC. The results of the CSLAP monitoring program will be reported by the NYSDEC in the spring. To view the results from the 2017 monitoring season, visit the CSLAP table on the CLWA website: <http://www.canandaigualakeassoc.org/science-education/cslap/>. Here you can view the Canandaigua Lake North 2017 Report and Canandaigua Lake South 2017 Report.



CONTINUED ON PAGE 11

WHITMAN FIFTH GRADE EXPLORES THE WEST RIVER WETLAND

By Watershed Educator Beth Altemus

Last winter the Education Program visited the fifth grade at Marcus Whitman with a classroom based watershed lesson on various land uses and their effects on water quality. This was quite exciting because it was the first time in the history of the Education Program that the Whitman fifth grade had participated in the program. The current fifth grade team at Whitman is a great crew of creative, energetic teachers that are working to engage their students in more field based environmental science opportunities. They asked us if we could expand upon what we brought to them last winter in an outdoor setting and we enthusiastically obliged!

This October, we had all four fifth grade classes participate in what is becoming an established wetland exploration lesson. We originally designed and implemented this field trip with Seth Almekinder's NOLA (Naples Outdoor Learning Adventures) class two years ago. We then tailored it to fit the needs and time constraints of the Whitman crew and came up with a session that explores macroinvertebrates, land uses and wetland functions within the West River Wetland environs along the Middlesex Rail Trail.



Middlesex Rail Trail, looking south towards Naples

We began the day with a presentation of our Enviroscope Wetland Model, which provides an excellent visual demonstration of how wetlands absorb flood water and filter contaminants from the landscape. The students gain an understanding of how wetlands are the "kidneys" of our watershed and are critical environmental features that should not be destroyed or removed. The model also explores the introduction of restored or reconstructed wetlands to mitigate the effects of contaminants running through watersheds.

With this foundational knowledge the students then walked along the trail to see if any of the land uses discussed in the model (agricultural, commercial, residential, recreational, conservation, etc.) could be spotted and whether they might be contributing potential pollution or negative impacts to the nearby waterways. We imagined the wetland as being a giant sponge that can absorb and filter all the water flowing in from Naples Creek and the West River as they meet in the wetland and ultimately flow into Canandaigua Lake. The goal was to impress upon them how critical that wetland is for the lake's water quality.

Also along the trail students had the opportunity to observe and identify macroinvertebrates collected from the wetland. Macroinvertebrate assemblages from pond and wetland environments differ greatly from those found in streams and some students got to see some pretty large and extra "creepy" crawlies! This work with macroinvertebrates and understanding their place in ecosystems laid a foundation for the work they will do with us in sixth grade when we visit them for their two day macroinvertebrate lab at school.

Before then, we will be visiting the fifth grade again this winter with our classroom land use lesson to follow up on what they learned this fall. We anticipate that both of these visits will become a regular part of the Education Program schedule and are thrilled to be working with this great group of teachers and students.

CITIZEN SCIENCE REPORT, CONTINUED FROM PAGE 10.

CLWA would like to recognize the following volunteers for their participation in the 2018 Secchi Disk Program: Dee Crofton, Gary Helming, Kevin Hefner, Scott Hill, Bruce Kennedy, Marty Lasher, Wade Sarkis, Lynn Thurston, Vickie Tucker, Bill Yust, Steve Zumbo, Kathy Bromley & Greg Talomie, Amy Bowen, Rob Gray, Nadia Harvieux, Bill Mehls, David Schwaner, Brian & Dolores Perkins, Sue Ford, Maggie Benham, Brad Kellog, and Scott Kreher. A very special thank you to Dee Crofton for coordinating the volunteers. The CLWA would also like to extend our appreciation to Dee and Bert Crofton and Saralinda Hooker for their volunteer work with the 2018 CSLAP program.



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Our 2019 CLWA Membership Drive is in full swing ... Join us and do your part to help protect the watershed!

The Canandaigua Lake Watershed Association has a strong base of supporters and a long history of protecting Canandaigua Lake and its watershed. Because of many complex and escalating challenges to the health of the watershed, we need YOUR support.

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| <input type="checkbox"/> \$ 50 Guardian | <input type="checkbox"/> \$ 250 Watershed Steward |
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Membership year will begin with receipt of your application and extend to the end of the calendar year.

Name / Business Name: _____

Principal Address: _____

E-mail _____ Phone _____

Lake area township: _____

Checks can be made payable to: CLWA PO Box 323 Canandaigua, NY 14424