

Lakewatch

QUARTERLY PUBLICATION OF THE SENECA LAKE PURE WATERS ASSOCIATION SERVING THE SENECA LAKE WATERSHED REGION

The Spring issue of Lakewatch is devoted to SLPWA's work on stream monitoring and harmful algae blooms. The plans for 2016 are also explained.

Seneca Lake contains 4.2 trillion gallons of water. This is approximately ½ of all the water in the Finger Lakes. The calculated water retention time (WRT) is the average time it takes for a substance introduced into the lake today, to disappear from the lake. The WRT for Seneca Lake is 18 years. Because of its size and WRT, it is important to control substances entering the lake waters that can adversely affect the water quality for many years..

Long-term studies of Seneca Lake by the Finger Lakes Institute and others show that the lake has moved from pristine, weed-free, algae-free water body (oligotrophic) to one that produces weeds and algae as result of increasing nutrient levels in the lake water (mesotrophic).

Over the past 3 years, SLPWA has studied the water quality of the streams that feed Seneca Lake. The streams that feed Seneca Lake waters carry nutrients higher in concentration than in Seneca Lake waters. Left unchecked, the nutrient levels in Seneca Lake will rise and the "production" of weeds and algae will continue to increase.

The efforts of additional volunteers for this work are essential to make it successful. Please consider volunteering for these vitally important projects to protect Seneca Lake. Sign up forms are included in this newsletter and are available at www.senecalake.org.

PROTECTING SENECA LAKE

Ed Przybyłowicz



STREAM MONITORING: SEEING RESULTS

Ed Przybyłowicz



Big Stream, Catharine Creek, Keuka Outlet and Reeder Creek all have high levels of nutrients , particularly phosphorus, from agricultural, residential and public wastewater treatment sources. All four streams also have elevated levels of E. coli bacteria, particularly during high flow conditions. E. coli is an indicator of fecal contamination. Its presence may represent recent sewage or animal waste contamination. Sewage may contain many types of disease-causing organisms.

High levels of nutrients and fecal bacteria, during heavy flow conditions, add up to a lot of pollution that continues to flow into Seneca Lake.

The high nutrient levels are responsible for the weed and algae growth in the lake. Both weeds and algae have visually increased in recent years. These create problems along shorelines for recreational activities. More importantly, there are significant health risks for humans and animals associated with harmful algae blooms (HABs), also known as cyanobacteria.

SLPWA held public meetings to share results from Catharine Creek, Big Stream and Reeder Creek with residents and community leaders (The results from the Keuka Outlet will be presented in 2016.) Results were also shared with the New York State Department of Environmental Conservation (DEC), and the Environmental Protection Agency (EPA).

The results were presented to the newly formed Seneca Watershed Intermunicipal Organization (SWIO). SWIO is made up of elected representatives of the municipalities that make up the Seneca Watershed, including the 5 counties of Chemung, Ontario, Schuyler, Seneca, and Yates, the City of Geneva, the villages of Dresden, Dundee, Montour Falls, Penn Yan, and over 20 towns. SWIO can impact lake quality by recommending policies to reduce pollution sources. Examples include, septic system checks, farming practices, and drainage ditch maintenance.

SLPWA used the stream data to request that Reeder Creek be added to the Clean Water Act, "impaired water body" list. This proposal was approved by the DEC in January, 2016 and is pending EPA approval. Another article in this newsletter discusses the Reeder Creek issues in more detail.



The plan for a new combined waste water treatment plant (WWTP) for Montour Falls and Watkins Glen should help the water quality of Catharine Creek, which contributes 31% percent of the stream flow to the lake.

Results on Big Stream raise concerns with the Dundee WWTP. The Village of Dundee is applying for a grant to plan corrective actions. SLPWA has added more sampling locations to identify the specific pollution sources on this stream.

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STREAM MONITORING: SEEING RESULTS

(Continued)



Keuka Outlet contributes the greatest input to Seneca Lake. It has very high phosphorus and E. coli levels during storm flow. Additional sampling sites will be added in 2016 to help identify the contaminant sources. The Lockwood Ash Landfill borders Keuka Outlet and was used for coal ash disposal from the Greenidge power plant. The issues at the landfill and plans for additional monitoring in 2016 are detailed in another Lakewatch article.

Searchable results on these streams can be accessed on-line at the CSI website at:

<http://database.communityscience.org/monitoringregions/4>

Additional analysis of the results is available on the Seneca Lake Pure Waters website: <http://senecalake.org/projects/watershed-monitoring/stream-sampling-documents/>

2016 STREAM MONITORING

Ed Przybylowicz

Stream monitoring was supported by over 80 volunteers during 2014 and 2015. The Tripp Foundation, Freshwater Futures and SLPWA members provided generous financial support.. The total annual budget for the 2016 stream monitoring program is \$25,000. We can only do it because of our volunteers.

SLPWA will continue testing on Big Stream, Catharine Creek, Keuka Outlet and Reeder Creek to pinpoint sources of pollution and monitor changes. Sampling locations may be adjusted to better target sources of pollution and stay within available funds.

These streams account for 75% of the stream flow and 77% of the total phosphorus that enters the lake. According to data from Finger Lakes Institute, three additional streams: Castle, Kashong and Wilson contribute the remainder of the phosphorus to Seneca Lake.

The SLPWA Board has approved the addition of the Kashong Creek sub watershed to the tested streams in 2016. The Kashong watershed consists of 85% agricultural, 14% forest lands and very small residential development. During the summer of 2015 the lake region near the mouth of Kashong Creek had two algae blooms. These were sampled by SLPWA and confirmed by NYS DEC as cyanobacteria.. By monitoring this stream SLPWA hopes to identify sources of nutrients in the streams that are responsible for algae blooms in the lake. There are no permitted point source discharge locations, such as waste water treatment plants (WWTPs) on this creek. The other four creeks SLPWA have WWTPs and some have other point sources.

Financial sponsors for monitoring these streams of concern are being solicited. A form to volunteer for stream monitoring on Kashong Creek or another stream can be found in this newsletter.

BIO-MONITORING AND WATER QUALITY IN SENECA LAKE STREAMS

Adrianna Hirtler, CSI Staff Member



The Community Science Institute (CSI) has supported biological monitoring by volunteers for over a decade. Our volunteers have generated bio-monitoring results for over 40 stream locations, mainly in the Cayuga Lake watershed, but also on tributaries of Seneca Lake, Owasco Lake, and the Susquehanna River.

CSI has partnered with the Seneca Lake Pure Waters Association (SLPWA) to monitor chemical water quality in Seneca Lake tributary streams since 2014. In 2015, CSI staff began partnering with one particularly intrepid SLPWA volunteer, Carol Hardy, to conduct bio-monitoring activities on Reeder Creek. Reeder Creek now joins Logan Creek and Inwood Creek as the third Seneca Lake stream with bio-monitoring results generated by CSI volunteers.

What is biological monitoring? Biological monitoring is based on identifying and counting various types of organisms that live in a body of water. Perhaps the most common type of biological monitoring is based on benthic macroinvertebrates, abbreviated BMI. BMI are tiny organisms that live on stream bottoms and include a wide variety of insects and other small aquatic organisms that are at the base of the aquatic food chain in streams. BMI feed on algae and decomposing organic matter such as leaf litter; sometimes they eat each other. They are visible to the naked eye and can be identified under a low power microscope.

BMI tell us about the health of a stream's ecosystem BMI are completely dependent on the quality of the water flowing through their habitat, and a healthy stream hosts a diversity of these critters. BMI families have different degrees of tolerance for various kinds of pollution. Observing the composition of BMI communities provides a long-term picture of water quality as these organisms typically live in the stream for months to over a year. Examples of water quality impacts that affect the BMI community are increased temperature, pollutants such as salt or heavy metals and sediment from stormwater runoff that coats the stream bottom and suffocates these bottom-dwelling organisms. The New York State Department of Environmental Conservation (DEC) relies on BMI to track general water quality across the state.

What is involved in biological monitoring with CSI? As a first step, volunteers are trained by CSI staff in BMI sample collection. They learn how to identify a suitable stream habitat for BMI sampling, how to use a kick net to collect two replicate samples per location, and techniques for preserving samples on site for later analysis in the CSI lab. Our volunteers learn techniques for picking out, identifying, and counting the organisms from a sample. Based on counts of different families of BMI, four standard metrics are calculated to assess stream health. These four metrics are then combined into one water quality metric called the Biological Assessment Profile, or BAP, which translates into one of four water quality ratings as defined by the DEC: "No impact," "slight impact," "moderate impact," or "severe impact."

Why do biological monitoring? Bio-monitoring is a fun, affordable and educational way to track water quality. For those who enjoy activities like wading in streams, peering through microscopes and becoming familiar with insect taxonomy, it's a great way to observe the incredible diversity of stream life and contribute to your community's knowledge of the health of their streams. BMI complements but does not replace detailed information from chemical and microbiological monitoring that is needed to manage water resources. Bio-monitoring results created through CSI are disseminated publicly on the CSI website at: <http://communityscience.org/bmi-results/>.

Plans are in the works to add BMI data to the chemical and microbiological data already in CSI's online database at: <http://database.communityscience.org>.

CITIZEN SCIENTIST VOLUNTEERS



Mary Rose and Carol Hardy have been volunteers since the program began. They will discuss their experience to help others who might want to volunteer.

Volunteer for Stream Bio-Monitoring!

Carol Jean Hardy, Ithaca and Geneva, NY

In the 1950's, I spent my childhood summers at a cottage south of Reeder Creek, and every summer my friends and I would walk up the road to the mouth of Reeder and hike up the stream to the old cobblestone mill where we would have our lunch and swim in the old millpond. This was also the time when old munitions were being disposed of at Seneca Ordnance Depot, and the explosions were loud and would often shake the cottage. I now have a cottage north of Reeder, so when the call came for volunteers to do chemical monitoring of Reeder Creek, I thought, "I can do that." I always wondered what years of bomb disposal had done to the creek.

The Community Science Institute of Ithaca (CSI) folks trained us to do sampling, and I joined the Lower Reeder group. We sample the creek where it passes under 96A, and again near the mouth. It doesn't take long; most of the time is consumed in hiking to the sites through the brambles (and poison ivy). The sampling technique is rigid; in order for samples to be comparable, they must all be collected using exactly the same procedures. CSI provides all the bottles and instructions – they just need to be properly filled, recorded and delivered to CSI.

What did we find? The phosphate level is out of sight. Terrible! I became interested in what this level was doing to the critters in the stream, so I joined the Benthic Macroinvertebrate Identification group (**BMI**) with Adrianna Hirtler at CSI on Thursday nights. BMI assessment complements chemical monitoring. Because BMI organisms live in streams for long periods of time and vary in their tolerance for pollution, the populations of organisms present gives information about the health of the stream. Last May Adrianna graciously came out to my cottage and taught me how to do BMI sampling. Adrianna describes this method of analysis and the results on Reeder Creek in her [article](#).

There is a simpler BMI procedure that is part of the NYS Department of Conservation **WAVE** program (Water Assessments by Volunteer Evaluators) in which the specimens are collected, brought back, immediately sorted, and identified. I have also been trained in this, and I am hoping that some of you would be interested in helping me collect and identify – at my cottage this summer. Wouldn't it be interesting to sample our four different Reeder sites and see how the sites differ in terms of aquatic life? Is there any relation of these results to the distance from the Depot?



So why volunteer for stream sampling? Well, you can make a difference. Because of what we found in Reeder, SLPWA has successfully petitioned the DEC to place Reeder Creek on the "impaired stream list" which will result in DEC monitoring of the stream and designing corrective actions for the stream. Plus, I have met interesting people through these activities and I feel I am contributing to the betterment of our lake. I live in Ithaca most of the year and didn't know anyone at the lake other than my neighbors, but I now have new friends. BMI identification is tough – lots to learn—but fascinating, and even at my advanced age it can be done. Most of all, stream volunteering is just plain fun and you get to walk in the woods.

CITIZEN SCIENTIST VOLUNTEERS



My Experience as a Stream Sampling Volunteer

Mary Rose, Dundee, NY

My involvement with stream sampling started at the beginning of the program in early 2014. I remember how I responded to the post card from Seneca Lake Pure Waters Association. I seized the opportunity to take an active role serving the lake on which I grew up.

I had been a SLPWA supporter in various forms since its formation. Howard Kimball, one of the founders, was a neighbor, so SLPWA was a topic of local conversations. But I was itching for hands-on service above the membership money and verbal support I had been giving.

The post card from SLPWA asked for stream-sampling volunteers to step up for training with Community Science Institute (CSI), whose 10-year experience in the Cayuga watershed was leading the field locally in citizen science. This was the beginning of a fruitful collaboration of SLPWA and CSI. It made sense for me to join up for sampling Big Stream because it flows just feet from our cottage into Seneca Lake at Glenora Point.

After CSI led our Big Stream group in identifying sampling sites, we were trained in the scientific techniques of synoptic sampling and the protocol for getting our samples to the CSI lab in Ithaca. Our team is segmented between the headwaters of Big Stream and the main branch, and on sampling days the team has numbered anywhere from 2 to 6 at each of the seven sites where we collect.

The result of my volunteering has brought some surprising knowledge. In addition to the data accumulated from our endeavors, which is available on both the SLPWA and CSI websites, I've learned a little bit about myself. I've found that both my capacity to function as a team member and my capability to marshal the team toward a goal are personal qualities of equal merit. Each exhibits plenty of room for improvement.

The ultimate beneficiary of our volunteerism is Seneca Lake. Our efforts in stream sampling deliver an ever-expanding knowledge base of what's in our watershed. This coming season I will be looking for more help in gathering stream data. There will be retraining for current volunteers and a call for new volunteers to be trained as citizen scientists.

Working in the streams has been personally enriching, sometimes physically uncomfortable, and always rewarding because I am acting to understand and preserve this wonder, Seneca Lake.



REEDER CREEK—A SPECIAL REPORT

Ed Przybyłowicz



Reeder is not a major contributor of water volume to Seneca Lake under normal flow conditions - less than 3%. Under storm conditions, it has a heavy flow and carries with it unusually high levels of pollutants into Seneca Lake. Then, concentrations of phosphorous and E. coli (an indicator of human or animal fecal contamination), are 10 to 70 times the maximum concentrations recommended by DEC. Even under normal flow conditions, the concentrations of these pollutants exceeds the DEC guidelines.

Bacteria levels in Reeder were as high as 44,000 colonies/100ml. The maximum allowed for public bathing beaches is **235 colonies/100 ml**. Phosphorus levels range from high, above DEC guidance levels (20 µg/L), to “crazy high.” Reeder Creek results were measured once at 1390 µg/L, or 70 times the guidance level. The levels of E. coli and Coliform bacteria represent direct health concerns, while the phosphorus nutrient levels directly link to the problems of algae and weed growth in Seneca lake.

CSI and SLPWA volunteers have conducted biomonitoring on Reeder Creek. Reeder has 5X the number of organisms living in it compared with other streams on Seneca and Cayuga Lakes. The high number of organisms indicates high levels of nutrients in the Creek. BMI is explained in more detail in this newsletter and on the CSI website: <http://communityscience.org/bmi-results/>.

These data were submitted to the DEC and led to their decision to place Reeder Creek on the “impaired waters” list with the cause of impairment being listed as “phosphorus.” See <http://www.dec.ny.gov/chemical/31290.html> for more information. This step will lead to additional stream sampling work by the DEC to understand the source of this contamination before remediation efforts can be implemented.

One possibility is that the high phosphorus content of Reeder Creek results from activities in the Seneca Army Depot (SAD). Outdated munitions were disposed of by being burned or exploded on unprotected soil, contaminating the soil and the groundwater. SLPWA will continue to monitor this stream as DEC work progresses.

WATER QUALITY CLASSIFICATIONS

Some times reports from the DEC mention a water way or water segments classification. This is what it means:

All waters of the state are assigned a class and designation by the DEC based on existing or expected best usage .

The classification AA or A is assigned to waters used as a source of drinking water. Classification B indicates a best usage for swimming and other contact recreation, but not for drinking water. Classification C is for waters supporting fisheries and suitable for non - contact activities. The lowest classification and standard is D.

Waters with classifications A, B, and C may also have a standard of T, (supporting a trout population), or TS, (supporting trout spawning).

The following are the assigned classifications of the streams SLPWA is monitoring:

Big Stream: Class D from the mouth to Route 14A in Dundee, Class B for the remainder of the reach.

Catharine: Class C, C(TS),

Keuka Outlet: Class C, C(T),

Reeder: Class C, C(T).

The water quality classification for **Seneca Lake** are:

| | |
|---|---------------|
| From north end south 2.4 miles | Class B |
| Portion within 1-mile radius of mouth of Keuka Lake Outlet | Class B |
| Pastime Park south for 32 miles (excluding previous segments) | Class AA (TS) |
| Quarter Mile Creek to south end | Class B |

LOCKWOOD ASH LANDFILL

Mary Anne Kowalski



In 2015, it was announced that the owners of the Greenidge coal-burning Power Plant (Greenidge) on the Keuka Outlet, were planning to reopen, converting to natural gas and bio-mass. Even though the plant ceased operations in 2011, DEC was handling the application as an existing permit. However EPA intervened and directed that a new application and environmental studies of the impact be conducted.

The public focus and media coverage has been on the reopening of the plant. However, the Lockwood Ash Landfill (Lockwood) is a more immediate threat to Seneca Lake.

While investigating the impact of the power plant reopening proposal on Seneca Lake, SLPWA learned about Lockwood, which has separate permits and ownership from the power plant. According to the DEC, Lockwood Hills, LLC is the owner and operator of the Lockwood solid waste



Photo courtesy of *The Chronicle Express*, Penn Yan, NY

management facility, a wastewater treatment system, and “related improvements” in Dresden, Yates County. It received the ash and other waste when the Greenidge was open.

Among the “improvements” at the Landfill is an unlined leachate and storm water collection pond (the “Leachate Pond”). The Landfill has a State Pollution Discharge Elimination System (SPDES) permit and a solid waste management facility permit to allow and regulate the collection, management and discharge of treated, mixed leachate and storm water at the site.

In February 2015, DEC determined that “groundwater at the site contains substances in excess of the duly promulgated water quality standards for: total dissolved solids, boron, manganese, magnesium, iron, sodium and sulfate.” Further, DEC stated that the “Leachate Pond is a source of the substances and has contributed and continues to contribute to a contravention of duly promulgated water quality standards.”

DEC executed a consent order requiring the owner to eliminate the discharge of leachate to groundwater and to monitor the groundwater impacted by the discharge.

The engineering plan that was submitted to DEC to implement the consent order was rejected and, to date, no plan has been approved, so no corrective action has begun.

To monitor the impact of the groundwater contamination to the Keuka Outlet, the Committee to Preserve the Finger Lakes, with the assistance of SLPWA, obtained a grant from Freshwater Future, to test the Keuka Outlet, above and below Lockwood as part of the SLPWA stream monitoring of the Keuka Outlet in 2016.

SLPWA will continue to monitor the cleanup of this landfill in accordance with the new EPA coal ash landfill requirements, as well as the DEC rules. The test results will be posted on the CSI and SLPWA websites.

HARMFUL ALGAE BLOOMS (HABs)

Ed Przybyłowicz



In 2015, for the first time, Seneca Lake had three laboratory-confirmed, blue-green algae (BGA) blooms . The confirmed blooms were from Kime Beach, Seneca County; Severne Point and Serenity Road, both in Yates County.

SLPWA received 17 reports of suspicious algae blooms from around the lake, including Schuyler and Ontario Counties. Based on review of photographs, report descriptions, , and discussions with DEC, SLPWA believes that, of the 17 reports, 15 were BGA. Not all could be submitted for testing as the bloom had disappeared before the sample could be collected.

The widespread occurrence of the HABs around the lake, along with its transient nature, means that residents and users of the lake must be aware of what to look for and how to respond to suspicious algae blooms, for their own safety as well as the safety of people and animals in their care. The DEC warns:

“Because it is hard to tell a harmful algae bloom from other algae blooms, we recommend avoiding contact with any floating rafts, scums, and discolored water.”

The New York State Department of Environmental Conservation (DEC) has an excellent website <http://www.dec.ny.gov/chemical/77118.html> which describes current, useful information.

The New York State Department of Health (DOH) addresses the human and animal health aspects of contact with HABS on its website: <http://www.health.ny.gov/environmental/water/drinking/bluegreenalgae/> .

Lake users should report suspicious blooms to:

SLPWA: senecahabs@senecalake.org or slpwa@senecalake.org;

DEC: HABsInfo@dec.ny.gov

State DOH: harmfulalgae@health.ny.gov .

County Environmental Health Departments :

For Ontario, Wayne, or Yates Counties

NYS Health Department Geneva Office 315-789-3030

For Schuyler and Steuben Counties

NYS Health Department Hornell Office 607-324-8371

For Seneca County

Seneca County Health Department 315-539-1947

Reporting the presence of suspicious blooms will help alert authorities and other lake users. Read about the expanded 2016 program for monitoring HABs and how you can help: <http://senecalake.org/projects/harmful-algae-blooms-habs/habs-documents/>

2016 PROGRAM TO MONITOR HARMFUL ALGAE BLOOMS (HABS) SENECA LAKE

Ed Przybyłowicz



SLPWA has learned more about HABS on Seneca Lake from its two-year HABS monitoring program. Unlike other lakes, cyanobacteria in Seneca Lake is transient. The blooms seem easily dispersed or submerged by wave and wind action.

The hotline program does not provide a very complete picture of the existence of HABS on the lake. These chance reports are local and lead to hazard warnings for specific locations. Other blooms may not be noticed or reported.

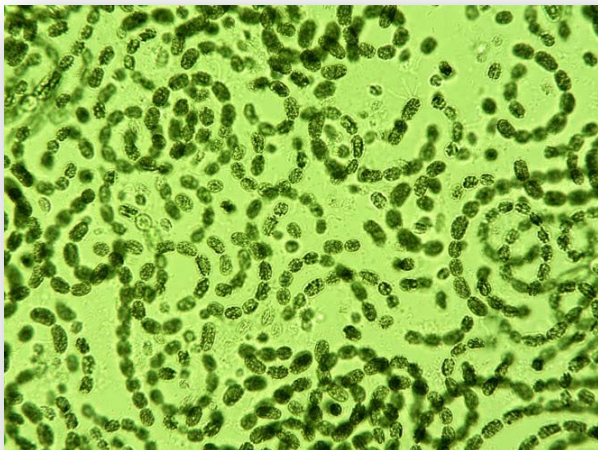
SLPWA met with the State Department of Environmental Conservation (DEC) and the Finger Lakes Institute (FLI) to plan more comprehensive monitoring of Seneca Lake in 2016.

Volunteers will survey assigned portion of shoreline on a weekly basis. Reports will be made on shoreline conditions. If suspicious algae are seen in this survey, photographs and samples would be taken for analysis. FLI and DEC will evaluate photographs and perform laboratory work. SLPWA will recruit volunteers to monitor the shoreline. If each volunteer monitor about two miles of shoreline, 40 volunteers will be needed to cover the entire lake.

The systematic survey will look at the entire shoreline and detect blooms more reliably and earlier. The survey begins a systematic scientific base of information that can be related to the analytical work on the lake and major streams. DEC is interested in improving the general understanding of these blooms particularly on the larger waterbodies.

The detailed proposal for HABS monitoring in 2016 is available on the SLPWA website.

A volunteer form can be found in this issue of Lakewatch. Interested volunteers can also volunteer at slpwa@senecalake.org or through the website at www.senecalake.org.



Shore Survey Volunteer training for Seneca Lake conducted by DEC staff will take place:

May 22, 2016, from 3-5 PM at the Hector Presbyterian Church, 5511 NY-414, Hector, NY 14841

May 23, 2016 from 11:30 AM to 1:30 PM at the Finger Lakes Institute, Geneva, NY 14456

If you are interested in serving as a volunteer for stream and or HABs shoreline monitoring, please complete this form and mail to:



Seneca Lake Pure Waters Association

Box 247

Geneva, NY 14456

Or go to www.senecalake.org and click on VOLUNTEER at the top of the Home page to indicate interest.

Name: _____

Address: _____

Telephone: _____ Email: _____

Volunteer for SLPWA Stream Monitoring

I am interested in: _____ Big Stream _____ Catharine Creek _____ Kashong Creek _____ Keuka Outlet _____ Reeder Creek

What other streams should SLPWA monitor and why? _____

Volunteer training will be conducted by the Community Science Institute. Location, date and time to be determined. Volunteers will be notified. Volunteer work will be 4 – 5 events from May through October for a couple of hours each time, working as a team member. Volunteers are also needed to transport the samples to the lab in Ithaca the morning of the event.

Volunteer for SLPWA Shoreline Monitoring

County and Town (for location assignment): _____

Training sessions for shoreline monitoring volunteers will be conducted by the NYS DEC:

- May 22, 2016, from 3-5 PM at the Hector Presbyterian Church, 5511 NY-414, Hector, NY 14841
- May 23, 2016 from 11:30 AM to 1:30 PM at the Finger Lakes Institute, Geneva, NY 14456

Shoreline monitoring will involve checking the shoreline, as assigned, for a few minutes each week, taking a few photos and completing a brief report on the conditions observed.

SLPWA is looking for volunteers to help monitor several issues that may impact Seneca Lake.

Committees are forming for the following projects:

- **Seneca Depot Reuse**
- **Lockwood Ash Landfill**
- **Salt Cavern Gas Storage**
- **Seneca Lake Salinity and Protecting our Drinking Water**

Or join an existing committee:

- **Lake Level**
- **Stream monitoring**
- **Harmful Algae Blooms**



PO Box 247

Geneva, NY 14456