Improving Water Quality
by Richard Weakland

As discussed at the annual meeting on September 14, 2016, the board of directors of Seneca Lake Pure Waters Association (SLPWA) has prioritized the focus of the Association on maintaining and improving the water quality of Seneca Lake. Towards this end, the board of directors has completed a Strengths, Weaknesses, Opportunities and Threats analysis as one means of understanding the current water quality issues affecting Seneca Lake and the association’s capability to address these issues. The results of this analysis are below:

Internal Strengths we can build upon or leverage: Collaborations with the Finger Lakes Institute, Community Science Institute, NYSDEC, the new Seneca Watershed Intermunicipal Organization and other lake associations; HABs and stream monitoring volunteers, and research completed.

Internal Weaknesses we need to address: current low membership levels; lack of knowledge about the audience for Lake communications; lack of baseline lake water quality metrics; and lack of a clear understanding of board member knowledge, skills and abilities needed and in place.

External Opportunities we should prioritize or optimize: substantially increasing annual giving; informing and educating the Lake communities.

External Threats we should work to counter: lack of professional staffing to carry on lake research and improvement projects; a lack of a clear identify for SLPWA; communicating the health of the lake in clear, measureable terms, including the impacts of our efforts.

The board of directors, as noted above, is very serious about restoring lake water quality and has realized that to be successful, we need to focus our efforts given the 18+ year time period required for the lake to restore itself. In a facilitated meeting with representatives from both Seneca Lake and Cayuga Lake, it was agreed that the priority problems affecting the water quality in each lake included the following:

1. Run-off, including storm water flows and the implications of agricultural practices, municipal road ditches and development within the lake watersheds.
2. A fragmented political framework involving municipalities, counties and various state, local and federal agencies and a lack of opportunities for education and involvement of residents and businesses in an informed manner in efforts to restore water quality within the lakes.
3. The emergence of Harmful Algae Bacteria and other new species in the lake that inhibit recreation and/or have the potential to negatively impact water supplies; a lack of available resources to fund scientific analyses necessary to inform regulators, agencies involved in protecting or restoring lake water quality and parties pursuing water quality improvement projects as to the causes of issues and their remedies.
4. Recognition that many municipal sanitary systems are inadequate due to their age and that individual septic systems are not rigorously monitored or maintained.
5. And finally, that invasive species have and will continue to affect the biology of the lakes and their health.

Each Lake association responsible for Cayuga or Seneca Lake will be working over the next couple of months to determine action plans to address the top priorities identified above.
A Healthy Lake is Healthy for Property Values!

As we sip our morning coffee gazing at Seneca Lake from the kitchen of our home, or our seasonal cottage dock, or the deck of our business, or from the seat of a tractor, one thing remains constant for all of us, we reap the enjoyment and beauty of Seneca Lake every day.

People are always interested in the value of their property. If you maintain your property and make improvements over the years the value of your property rises. If you reside in a neighborhood and everyone takes care of their home and property it helps increase values in the neighborhood. Seneca Lake “in our backyard” makes us all neighbors, so let’s apply the same general rules caring for our lake as we do for our home.

Here are a few suggestions to help maintain and improve our lake:

- Pump, inspect, and maintain your septic systems.
- Be smart about lawn care and use phosphorus-free fertilizer.
- Boaters be careful when filling up with a 5-gallon can or at the marina. The effects of spillage are immediate and be sure your boat engine isn’t leaking fluids.

It is no secret that Seneca lakeside and lake view properties are in demand. The value of the property depends on the water quality of the lake. All of us prefer clean water and the fact is people will pay more to live on a lake with better water quality. If we all want to protect the value of our property investment, we need to work together staring right now. The benefits include:

- Home and property values will continue to rise.
- Tourists will continue to visit.
- Businesses will continue to grow.

How can you partner with SLPWA and help protect Seneca Lake? Become a member! Visit our website www.senecalake.org and feel free to post a comment. Informing you is our job, partnering with you is our goal!

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Stories from the Shores of Seneca Lake

40 Years Ago…. 

In February of 1977, Hector residents Guy Schamel, Jim Hazlett and Dave Kendall successfully walked across a frozen Seneca Lake.

Their journey started at Peach Orchard Point with a ladder, canoe and a gallon of wine. They made their way across and landed just North of Glenora.
Celebrity Guest Chef Pasta Night on April 13th to Benefit Seneca Lake Pure Waters Association

By Barbara Schiesser

SLPWA Board Members Rick Weakland, Hank Kimball, Tom Burrall, and Larry Martin will prepare fresh pasta dishes at the elegant Veraisons restaurant on Thursday, April 13, 2017 as SLPWA participates for the 2nd year in Glenora Wine Cellars’ Celebrity Guest Chef’s series.

For the price of $19.95 per person, each guest will receive a fresh garden salad and bread basket served at the table, as well as unlimited trips to the Pasta Bar – where guests can guide our SLPWA chefs in creating their own pasta plate. Guests choose from a selection of pastas, homemade sauces and other delicious ingredients, which include meats, seafood, fresh veggies, garlic, and herbs. Attendance promises both a fun time and a delicious meal.

Each organization participating in the Celebrity Chef series receives a portion of the per plate charge for all who order from the pasta bar. SLPWA narrowly missed garnering the most patrons during last year’s series– held from January through April. The SLPWA board hopes to be in first place this year as Glenora matches the per plate donation to the organization drawing the highest attendance to their event.

Be sure to mark your calendar for April 13th and make your reservations NOW!

Last year many would be attendants were turned away as the evening sold out. Call now to reserve your table for the SLPWA Glenora Celebrity Chef Pasta Night, Thursday, April 13th – between 5:00 and 8:30 PM. Better yet, call your friends, family or neighbors and reserve a table for your entire group!

For reservations, call Glenora at 800 243-5513. For parties of six or more, you can also reserve online at: http://www.glenora.com/Restaurant/Reservations

Membership News

By Tom Burrall

The Membership and Fundraising Committee is excited to report our annual appeal response is steady and continuing to bring bountiful returns. To date, we have collected 112 donations for a total of $12,570.

May this be a reminder, especially if you have set your appeal letter aside, we would be thrilled to receive your donation to support our active mission. Your thoughtful generosity will help us reach our $25,000 goal.

We are actively designing new print material for the dual purpose of promoting education to preserve and improve water quality and to grow our membership. Growing membership is a key component for our organization and we ask for your help and your ideas.

When you are finished reading this newsletter, please pass it on or leave it in the magazine rack at a doctor’s office.

We believe everyone who uses Seneca Lake’s water should be a member of Seneca Lake Pure Waters Association. It is that important.
Seneca Lake Water Level Basics

Seneca Lake is part of the network of lakes, canals and waterways that comprise the Oswego River Basin. The Oswego River Basin drains water from an area of 5,122 square miles, towards Lake Ontario. The water level of Seneca Lake is partially determined by the physiological features found within the Oswego River Basin.

Water enters Seneca Lake from higher elevations such as Keuka Lake via the Keuka Lake Outlet. Water exits the lake at the north end where the discharge is managed by Gravity Renewables, which owns the hydroelectric power plants at Waterloo and at Seneca Falls.

Seneca Lake Rule Curve

The Seneca Lake Rule Curve defines the lake’s highest tolerable level and lowest tolerable water level. Gordon Hansen of the Navy’s Underwater System Center located in Dresden developed the Seneca Lake rule curve in the mid-1970s to establish a target range for the water level. Target levels help to prevent severe flooding or severe drought conditions, ensuring a stable, reliable water supply throughout low water summer months and protecting damage to delicate natural resources during high water months.

- **Winter Target** 445.0 feet Barge Canal Datum (BCD) ±0.3 foot
- **Summer Target** 446.0 feet Barge Canal Datum (BCD) ±0.3 foot

Seneca Lake Water Level at Geneva

The NYS Canal Corporation maintains a water level gage at the north end of Seneca Lake. To learn more about water levels and to access the current lake level readings visit: [www.SenecaLake.org](http://www.SenecaLake.org)
How Do Scientists Measure Water Quality?

by David Youst & Kelly Coughlin

A 2015 report by Dr. John Halfman at the Finger Lakes Institute ranked Seneca Lake in the middle tier of the lakes he tested for water quality. Recent stream samples taken by the Seneca Lake Pure Waters Association and the Community Sciences Institute show many areas of concern that require careful attention and additional research.

**Trophic Index**

One commonly used measure of water quality in lakes is the Carlson Trophic State Index. It provides estimates of living matter (biomass) in the lake.

The best water quality is designated oligotrophic; it has the least amount of living material, good water clarity and healthy oxygen levels for fish. The poorest water quality is eutrophic; it has the most living material -- such as high algae levels -- and has very poor water clarity. Mesotrophic falls in between these two classes.

High quality drinking water is usually found in oligotrophic lakes. These lakes support many species of fish and other aquatic life with well-oxygenated waters and do not have excessive nutrient run-off from their watersheds. The following chart shows the ranges used to classify oligotrophic, mesotrophic, and eutrophic lakes on the Carlson Trophic Index.

<table>
<thead>
<tr>
<th>Trophic Index</th>
<th>Chlorophyll microgram/liter</th>
<th>Phosphorus microgram/liter</th>
<th>Secchi Depth meters</th>
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<tbody>
<tr>
<td>Oligotrophic</td>
<td>&lt;30-40</td>
<td>0-2.6</td>
<td>4-8+</td>
</tr>
<tr>
<td>Mesotrophic</td>
<td>41-50</td>
<td>2.7-20</td>
<td>2-3.9</td>
</tr>
<tr>
<td>Eutrophic</td>
<td>50-70+</td>
<td>21-56+</td>
<td>0-1.9</td>
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</table>

Other Trophic Indexes include additional measures such as Soluble Reactive Phosphorus, Nitrate+Nitrite, Total Kjeldahl Nitrogen, Total Suspended Solids, Chlorophyll a, etc., but all basically attempt to quantify the amount of biomass in a lake.

Images courtesy of: UW-Extension Lakes Program

Continued…
Benthic Analysis

Scientists also measure water quality in streams by evaluating the species of very small animals living in them. A Benthic Analysis counts the number and types of macroinvertebrates found along the stream bottom. Through experience, scientists have learned that healthy streams contain certain patterns of Macroinvertebrate species and their relative abundance. These patterns can be used as a tool to rank stream health and track improvements or declines in stream health over time.

Additional Measures of Lake Water Quality

In addition to measuring biomass and bottom-water habitat, the effect of pollution sources on water quality can be evaluated in many other ways. Some scientists group pollutant sources into categories such as Industrial, Agricultural, and Organic; or Point-Source vs. Nonpoint-Source Pollution. These categories are helpful when looking for specific sources of the pollutants and help to identify actions to reduce them.

Scientists also check for a variety of other indicators including fecal indicator bacteria such as E. coli or other coliforms; invasive species; algae species that cause harmful algal blooms; excessive erosion and polluted run-off; heavy metals such as mercury; air quality over the watershed; silicates; salt concentrations; safety; water temperature at various depths; seasonal changes at various depths; viruses that infect aquatic animals such as game fish, and many others.

In general, excessive nutrients in the lake (nutrient over enrichment or eutrophication) are a serious long-term problem. Excessive amounts of phosphorus, while not harmful to humans, feeds excessive aquatic plant growth and can lead to further decline in water quality. Since Seneca Lake holds as much water as all the other Finger Lakes combined, the system responds more slowly and it will take much longer to recover from over enrichment than lakes that are shallower and hold less water.

To identify whether excessive nutrients are a problem, stream and lake sampling for nutrients and other parameters are an important tool to gather further information to assess overall lake health and to help identify specific sources of pollution. For example, samples taken upstream and downstream of a wastewater treatment plant can pinpoint a source, show improvements from corrective actions, and monitor long-term compliance by the plant.

Challenges to Protecting Lake Water Quality

Potential threats to the lake and watershed exist when there are conflicting scientific opinions, disagreement over the interpretation of scientific data, or experts disagree on appropriate regulatory actions. Regulatory agencies such as the Department of Environmental Conservation, Environmental Protection Agency, Federal Energy Regulatory Commission, and various court systems often have a role in issuing permits and informing the public about the relative risks due to development along the shoreline and watershed, but these agencies can be slow to act and hindered by lack of information and lack of funding.

Water quality protection in our lakes is particularly challenging because there are many 'unknown unknowns'; there is not always enough information to identify a particular water quality threat to public health or to the long-term health of the lake. For example, counties surrounding the lake have very little information regarding possible seepage from residential septic systems. Seasonal cottage users and year-round homeowners who draw drinking water directly from the lake do not usually test their systems regularly, so the quality and safety of residential drinking water is unknown.

Going forward, it is critical we continue to use and improve upon the tools discussed above to address the increasing threats to water quality--tools that include water quality monitoring and reporting, following the latest scientific research, and working with municipalities, state agencies and residents--in our ongoing efforts to protect Seneca Lake.
March 18, 2017
9:00am - 5:00pm • Geneva High School Auditorium
Free Admission • Register On-line: www.SenecaLakeAcademy.org

The Bones of Seneca Lake: Geology as Life
Presented by: Adrianna Hirtler, Finger Lakes Naturalist

Waterways, Women and Industry, and the Seneca Falls Convention
Presented by: Walter Gable, Seneca County Historian

Workshop Choice
• 20,000 Millimeters Under the Lake: Observation and Biological Drawing Workshop (for complete beginners).
• Two Herons Drum Circle: Drumming Workshop

Beyond Power: Hydroelectric on the Seneca-Cayuga Canal
Presented by: Julie Smith-Galvin, Gravity Renewables

The Honorable Harvest - made possible through the support of the New York Council for the Humanities’ Public Scholars program.
Presented by: Freida Jacques, Onondaga Clanmother

People, Land and Water -- Stories of Sustainable Stewardship in Seneca Lake's Watershed
Presented by: Patricia F. Thompson, Instructor of Environmental Conservation, Finger Lakes Community College

Vermicomposting: Making Nutrient Rich Fertilizer and Soil from Food Waste
Presented by: Jacob Fox, Organix Green Industries

Reflections of Seneca Lake
Presented by: Geneva High School Creative Writing Class
De-bugging Stream Water

by David Youst

Want to help Seneca Lake Pure Waters Association improve water quality in Seneca Lake? We have openings for volunteers to sort and identify macroinvertebrates found in streams surrounding the lake. The numbers and mix of these very small animals can tell us how healthy a stream is and how well the stream supports beneficial species such as fish when they are spawning.

Recently, Adrianna Hirtler, Bio-monitoring Coordinator at the Community Science Institute, arranged trays, lights and microscopes around our dining room table. She also brought water samples taken from a stream by moving rocks around and capturing the plants and animals that were stirred up and then fixed in alcohol. After washing the alcohol out of the samples in our kitchen sink, Adrianna spread the mush evenly around a large tray. Each pair of volunteers got a sample drawn from one part of the tray. We were asked to use tweezers to pull out what we thought might be animals and to place them into a small Petri dish. We then used the microscopes to examine our work and remove any plants mistakenly added. This was shock time for many of us. The variety of macroinvertebrates was incredible. Even though some of them were smaller than the head of a tweezer, we could see their entire body structure – heads, segmented legs, antennae, mouths, and elaborate tails.

We learned that we were looking at several different species – mayfly larvae, stonefly larvae, caddisfly larvae, scuds, and many others. Two hours had passed quickly but still more work was waiting for Adrianna and other volunteers back in her lab. Our collection of tiny animals would have to be sorted into similar groups, counted, and evaluated. Finally the professionals would communicate the results back to SLPWA and its stream sampling committee.

Benthic Macroinvertebrate Analysis is part of a larger process of stream bio-monitoring during which volunteers collect and evaluate samples from area streams in the spring, summer and early fall. The results complement the data gathered from stream sampling for nutrients and pollutants and will soon become part of a new database under development at CSI.

You can go to the CSI website to review results from prior years at: www.communityscience.org.
If you want to help as a volunteer or if you just want to know more please contact us at: www.senecalake.org.
You can also contact Adrianna directly through CSI at: Adrianna@communityscience.org.
## Macroinvertebrate Identification Key

**GROUP 1 – Very Intolerant of Pollution**

- **Stonfly Nymph**: 2 tails long antennae
- **Mayfly Nymph**: 3 tails fluttering gills
- **Rifle Beetle Adult & Larva**: very small & hard shell
- **Caddisfly Larva**: makes a case from twigs, rocks, leaves
- **Water Penny Larva**: top looks like a suction cup
- **Dobsonfly Larva**: large head & 2 pinchers
- **Right-Handed Snail**: must be alive to count

**GROUP 2 – Moderately Intolerant of Pollution**

- **Damselfly Nymph**: 3 paddle-like (feathery) tails
- **Dragonfly Nymph**: flattened side-ways & swims on side
- **Scud**: no tails large eyes
- **Crayfish**: looks like a mini-lobster
- **Sowbug**: flattened top to bottom (looks like a pill bug)
- **Cranefly**: caterpillar-shaped, ringed
- **Clam/Mussel**: must be alive to count

**GROUP 3 – Fairly Tolerant of Pollution**

- **Midge Larva**: small, but visible head intense wiggler
- **Planaria**: one end is swollen
- **Black Fly Larva**: 2 eye spots & very small
- **Leech**: flattened & segmented

**GROUP 4 – Very Tolerant of Pollution**

- **Aquatic Worms**: segmented "earthwormy"
- **Left-Handed Snail**: must be alive to count
- **Rat-tailed Maggot**: bright red
- **Blood Midge Larva**:
You Can Help Restore Water Quality!

Shoreline Buffers

More and more people are building year-round or second homes near the shores of Seneca Lake. When planning lakeside landscaping remember to maintain a lake front vegetation buffer.

A vegetation buffer zone is an un-mowed strip of native vegetation that extends borders the water’s edge. Buffer zones extending 25-50 feet from shore is preferable, but even 10-15 feet provides benefits.

By restoring the shoreline with native plants, you restore the ecological functions of the lakeshore. A well-landscaped vegetative buffer adds value to your property and can also benefit Seneca Lake’s water quality and overall health.

The benefits of buffers include:

- Food and shelter for local wildlife.
- Stabilization of soil to reduce erosion.
- Filtration of pollutants and sediments.
- Absorption of nutrients.
- Deterrence of nuisance species.
- Privacy from lake users;

Protecting the buffer:

- Never mow to the edge of a stream or lake; let the buffer develop naturally;
- Plant appropriate native vegetation and cuttings in the buffer zone;
- Create a compost pile for grass clippings and yard waste.
- Leave natural woody debris in a stream. It provides habitat and food for aquatic communities.
- Use pesticides and fertilizers sparingly in your yard and not at all in the buffer.
- Keep septic systems in good working order to prevent contaminated runoff.

Winter De-icing

If you shovel early and often, you will remove more snow and ice so less salt and de-icing material will be needed, and the de-icing material will work better. You may even decide that salt isn’t needed!

- By using an ice chipper, a tool specifically designed for chopping at ice build up, you can avoid build-up that will require de-icing material or salt.
- Apply only as much de-icing material or salt as needed, by sprinkling it on icy areas only. Follow the manufacturer’s instructions for working temperatures and applications rates.
- Apply the de-icing smartly, by keeping it away from storm drains, or where melted runoff can mix with the de-icing material and then flow into a storm drain or ditch. Many of the ditches lead right into the lake, causing non point source pollution.
- Make sure downspouts aren’t directed at paved areas where the water can freeze and need de-icing. This way, you avoid needing to use de-icing material that when melted, will wash off the paved area.
- Direct the melting snow away from paved areas where chemicals accumulate.

Research de-icing materials before you purchase them to determined which is best for your specific property and need. Not all products have the same ingredients. Consider purchasing a de-icer that is chloride free.
**Annual Membership Renewals**

Seneca Lake Pure Waters Association is a membership organization. Through the support of members, like you, we are able to continue our efforts to enhance and preserve the water quality of Seneca Lake.

Over the last year we have transitioned to an annual membership renewal cycle, beginning June 1\textsuperscript{st} and ending May 31\textsuperscript{st}. Renewal letters will be mailed to members in mid-May for the upcoming membership year. Membership for new members and members who joined or renewed after December 1\textsuperscript{st} will be extended through the next membership year.

**Membership Form**

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<th>Name:</th>
<th>Membership Level</th>
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Total Enclosed: ____________

Lakewatch Newsletter Delivery:  
☐ US Postal Service  
☐ Email

Please return completed form and check made payable to:

Seneca Lake Pure Waters Association, Inc.  
PO Box 247  
Geneva, NY 14456
SLPWA Youth Ambassadors invite you to attend:

Seneca Lake Academy at Geneva
March 18th at Geneva High School
9:00 am - 5:00 pm

- Explore the natural and cultural history of the Seneca Lake watershed.
- Interesting topics, speakers, hands-on activities and exhibits.
- Admission is free – must register on-line by March 15th.
- For more information visit: www.SenecaLakeAcademy.org