



The Water Bulletin

Community Science Institute Newsletter

FALL 2014

DID YOU KNOW?

- ◆ **Hydrilla**, an invasive aquatic plant that has been found in the Cayuga Inlet can grow up to a foot a day!
- ◆ In 2011 Tropical Storms Lee and Irene tore through upstate New York. That year, 51,923 tons of sediment washed into Cayuga Lake from Six Mile Creek. That's as much as the previous four years combined, underscoring the power of storm water runoff!

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Testing New Waters with Seneca Lake Monitoring Partnership

After more than a decade of volunteer monitoring partnerships in the Cayuga Lake watershed, CSI has teamed up with the Seneca Lake Pure Waters Association (SLWPA) and launched a pilot program to monitor streams that flow into Seneca Lake. Concerned about water quality degradation in Seneca Lake itself and the lack of current data for tributary streams, SLPWA proposed a program to monitor three Seneca Lake tributaries: Big Stream, Catherine Creek, and Reeder Creek. These streams flow into the west, south, and east sides of Seneca Lake, respectively (map shown on Page 2).

Each of the watersheds is home to potential sources of pollution, whether it be industrial dairy farming, aging wastewater treatment plants, or the former Seneca Army Depot, an EPA Superfund site.

Results from initial monitoring events have begun to shed light on the water quality in the streams. Pathogenic bacteria levels have been elevated at some stream locations, but more sampling will need to take place to determine the extent of the problem. Chloride and phosphorus concentrations are elevated compared to similar sized Cayuga Lake streams. Reeder Creek in particular has shown phosphorus



Volunteers Mary Rose and Dan Corbett measure the water temperature before collecting their sample from Big Stream, a Seneca Lake tributary near Dundee. Photo by Steve Clendenin

concentrations more than 10 times higher than other local watersheds, raising concerns about excessive amounts of nutrients being added to Seneca Lake.

So where is all the phosphorus coming from? There are two main sources in most of the streams that CSI monitors: runoff from fertilizers used on farms, lawns, and golf courses; and phosphorus bound tightly to eroded soil particles. Given the lack of residential and agricultural land in the Reeder Creek watershed, which is almost entirely occupied by the former Seneca Army Depot, the extreme phosphorus concentrations are puzzling.

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Monitoring around Seneca Lake, continued

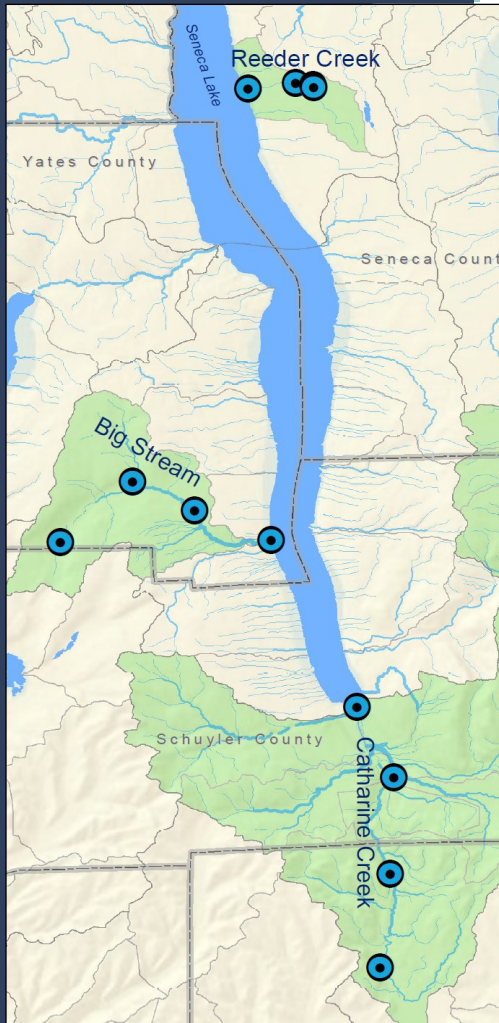
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The EPA has documented lead and copper contamination in the soil, and volatile organic compounds like trichloroethylene (TCE) in groundwater. Fortunately, initial testing for these parameters showed no detectable amounts in samples from Reeder Creek.

The Depot was used regularly for munitions disposal, which involved controlled explosions of unused weapons. Carol Hardy, a Reeder Creek volunteer, has lived in the watershed her entire life. "I remember well being at our cottage and hearing 'BOOM BOOM' from the Depot. Sometimes it would even shake the cottage. But my mother always told me it was just the Depot exploding their old bombs again." Some of those bombs could be the source of the extremely high concentrations of phosphorus in Reeder Creek.

White phosphorus bombs, or phosphorus incendiary bombs, were used extensively by the US Army during WWII and more recently in Afghanistan. Despite the extensive cleanup of the former Seneca Army Depot that has taken place by the EPA, phosphorus in Reeder Creek may be a case of legacy pollution, and one that could persist for years to come.

Fundraising is currently underway to continue the monitoring and expand the program to more Seneca Lake tributary streams in 2015 and beyond. To see results from the first events, visit www.communityscience.org/database



CSI Volunteer Monitoring Sites

- Synoptic Monitoring Sites
- Large Watershed Units
- Monitored Watersheds
- Streams
- Lakes



(August 2014)

Map showing locations of CSI Volunteer Monitoring Locations on three Seneca Lake tributary streams: Big Stream, Catherine Creek and Reeder Creek

Future Science Leaders Examine Life in Cascadilla Creek

CSI has completed a second year of partnership with the Sciencenter to bring rigorous, real world science to middle school students involved in Sciencenter's Counselor-in-Training (CIT) Future Science Leaders program. Sciencenter, the interactive science museum in Ithaca, has developed a leadership program as an adjunct to their summer camp with a strong emphasis on engaging the CITs with exposure to science professionals and assisting in data gathering projects. As a fun, interactive project accessible for all ages, the Benthic Macro Invertebrate (BMI) surveys have been the focus of this collaboration. BMI surveys involve collecting, identifying, and counting aquatic organisms as indicators of stream health.

Cascadilla Creek, which flows next to the Sciencenter, was chosen for the study, and a site within walking distance of the museum was identified as suitable riffle habitat for BMI, which live in the stream bed. Michi Schulenberg, one of CSI's two BMI specialists and recently certified taxonomist, led CITs and Sciencenter visitors in the BMI sampling protocols in June. Over the course of the summer, Michi returned to the Sciencenter weekly to work with CITs and museum visitors to pick, sort and identify BMI from the sample. The data were then analyzed generating various metrics to characterize the water quality of the

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creek based on the relative abundance and pollution tolerances of the BMI present in the sample.

As in CSI's past experience doing BMI surveys with young people through both the 4-H2O Monitoring Club and the BMI in the Classroom module, Sciencenter's CITs and young visitors proved quite adept at picking out the often minuscule BMI and by matching the organisms to drawings and photos. Many youth were able to gain skills in identification to taxonomic order. This collaboration has proved to be an opportunity to expand CSI's BMI Monitoring program while at the same time exposing young, aspiring scientists and general museum visitors to the importance and accessibility of community-based water monitoring programs. Some CITs were returning for their second year of the program and retained familiarity with the sampling process and identification. Metrics showed that in 2013, the creek was "moderately impacted" and in 2014 was "slightly impacted".

Data from 2013 and 2014 sampling events with the Sciencenter in Cascadilla Creek are on posted on the CSI website.



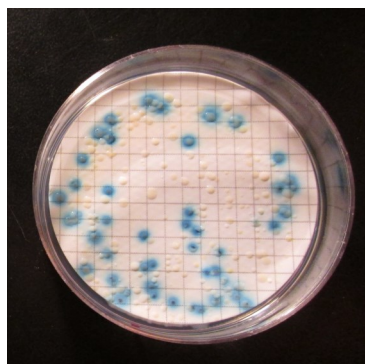
Michi Schulenberg works with campers to identify organisms from Cascadilla Creek. Photo provided by the Sciencenter.

Neighbors Investigate Lakeshore Septic Systems

If you live in a place with municipal water and sewer, you may have never thought about where your waste ends up after going down the drain. If you're not connected to a municipal sewer system, it's probably something that you've thought a fair amount about, since you're responsible for your own on-site wastewater treatment system, commonly referred to as a septic system.

Septic systems can effectively treat household wastewater if installed and used properly. If a septic system is not working properly, it can lead to potentially serious problems, namely untreated waste coming to the surface, or entering nearby streams and lakes.

There is some concern that the density of houses along the southern end of Cayuga Lake, many with older septic systems, could be polluting the lake with pathogenic bacteria. CSI investigated the issue near Myers Park in Lansing and has found that levels of *E.coli*, a marker for pathogenic bacteria, along the lake shore are below the EPA maximum level for swimming areas (235 colonies/100 mL) except after heavy rains, when the levels are expected to be higher. These results, gathered over eleven sampling events from 2006-2014, are an indicator that leaking septic systems do not appear to be a problem, at least near Lansing's Myers Park. These results may have contributed to the withdrawal of the proposed sewer system for the Town of Lansing, where concerns about lakeshore homes



A petri dish showing coliform and *E.coli* bacteria. The blue dots are colonies of *E.coli*. High levels of *E.coli* can indicate health risks when water is used for contact recreation.

possibly polluting the lake was proposed as one reason for a municipal sewer system.

On the other side of Cayuga Lake the West Shore Neighborhood Association (WSNA) contacted CSI with a similar concern. "We are lucky to live along the lake, and with our proximity are natural lake stewards. We want to make sure the lake is healthy for swimming and does not pose any hidden

environmental risks to humans or wildlife," said Andy Yale, WSNA member.

The first monitoring event, held in June, showed promising results. Only one location had *E.coli* levels above the swimming limit, and not by much. The other 14 locations had levels at 60 colonies/100 mL or less. The second monitoring event, held in August, did not show any locations with *E.coli* levels above the EPA limit. These results are a good indication that septic leakage is probably not a problem on Cayuga Lake's west shore, either. The full results can be viewed in the CSI database.



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