



The Water Bulletin

Community Science Institute Newsletter

WINTER 2014

DID YOU KNOW?

- Private drinking water wells should be tested annually for Total Coliform & E.coli bacteria, according to the NYS Health Dept. CSI Members get special discounts on drinking water tests!
- Cayuga Lake contains 2.5 trillion gallons of water. That's enough water to fill the Empire State building 9,031 times!

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BMI - A Report Card for Our Streams

CSI's volunteer bio-monitoring efforts in a few numbers

by Adrianna Hirtler

A healthy stream fosters a good diversity of aquatic organisms. By looking at some of the smaller critters that live on the stream bottom, aquatic organisms known as benthic macroinvertebrates (or BMI), you can get a good overall sense of water quality in an area. Unlike chemical tests that monitor for target parameters at specific moments in time, looking at benthic macroinvertebrates gives a sense of water quality over longer time periods in which these critters have been laid as eggs, have hatched and have been able to develop into the organisms that our volunteers pull out in nets to bring back to the lab to sort and identify to family.

The counts that volunteers come up with for each family of organisms help us give our sampled streams a "report card". In 2013 over 80 volunteer hours have been spent in the field collecting samples and over 200 hours in the lab sorting, identifying and counting small organisms such as mayfly and caddisfly nymphs which range in size from a comma in this text to longer than the word "caddisfly." As a result of these labors



Our streams are home to hundreds of different kinds of benthic macroinvertebrates (BMI)

we have 13 report cards for 13 sites on 10 different streams sampled in 2012 in the Cayuga Lake and Susquehanna River watersheds. By early 2014, CSI should have an additional 15 report cards from the Susquehanna River, Cayuga Lake and Seneca Lake watersheds, including 7 new sites and a total of 11 different streams.

So, what do the "grades" mean? In general, wide
(Continued on page 2)

Mapping CSI's Red Flag Sites

Using GIS to find ideal monitoring locations

by Matt Yarrow

Maps can be a great way to harness the innate ability of the human eye and brain to detect and analyze visual patterns. Maps and Geographical Information Systems (GIS) have become an invaluable tool for CSI over the last few years as we developed our Red-Flag Monitoring Program. Using the Google Maps and Google Earth interfaces, CSI staff trained volunteers to find the streams and watersheds near their homes, iden-

tify land uses that may affect stream water quality, and display information from the NYSDEC about local gas wells and permits.

Because volunteers are generally most engaged and knowledgeable about their local streams, CSI encourages them to select monitoring sites close to their homes. As a result, red-flag sites are not

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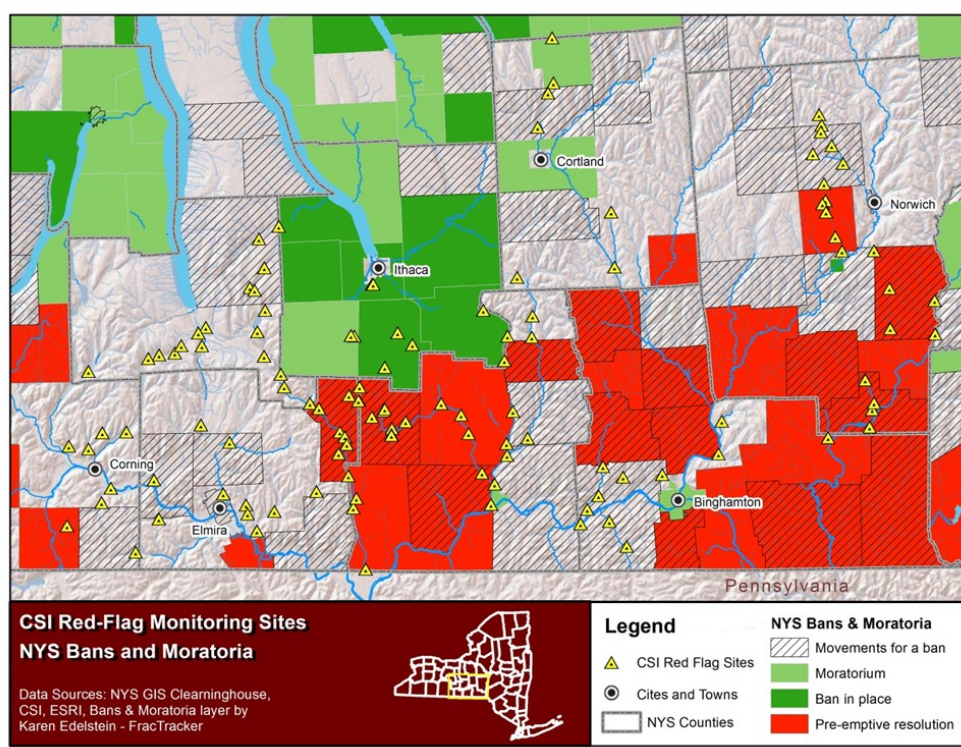
Volunteer Nancy Ostman identifies BMI samples from Owego Creek

BMI Report Cards, cont'd.

(Continued from page 1)

family diversity of organisms is a good sign and especially if there is diversity within a few specific orders of aquatic insects – the Mayflies, Stoneflies and Caddisflies. These two numbers are counted as “**Family Richness**” and “**EPT Richness**”. We also score how tolerant each particular family has been determined to be in New York State to various types of environmental stress (this metric is called the “**Family Biotic Index**”). Looking at the distribution of the sample between major groups of organisms such as Mayflies, Beetles and Aquatic Earthworms lets us compare samples to what the New York State Department of Environmental Conservation (NYSDEC) considers the average composition of a healthy New York stream (we call this “**Percent Model Affinity**”). We then combine these four metrics into one number called the Biological Assessment Profile (or “**BAP**”) which translates into a degree of assessed impact ranging from “non-impacted” to “severely impacted.”

Most of our sampling sites come up with BAP scores that indicate they are relatively healthy or “non-impacted,” with a few exceptions (visit www.communityscience.org for access to many of our results). This work nicely complements chemical monitoring done at some of the same locations. BMI sampling is used by some groups to monitor the impact of already existing land uses and by others to get a good report card of non-impacted conditions should land uses change in the future. We hope that our streams will continue to keep up the good grades!



CSI's Red Flag sites are well-represented in municipalities with pro-fracking resolutions.

Mapping, cont'd

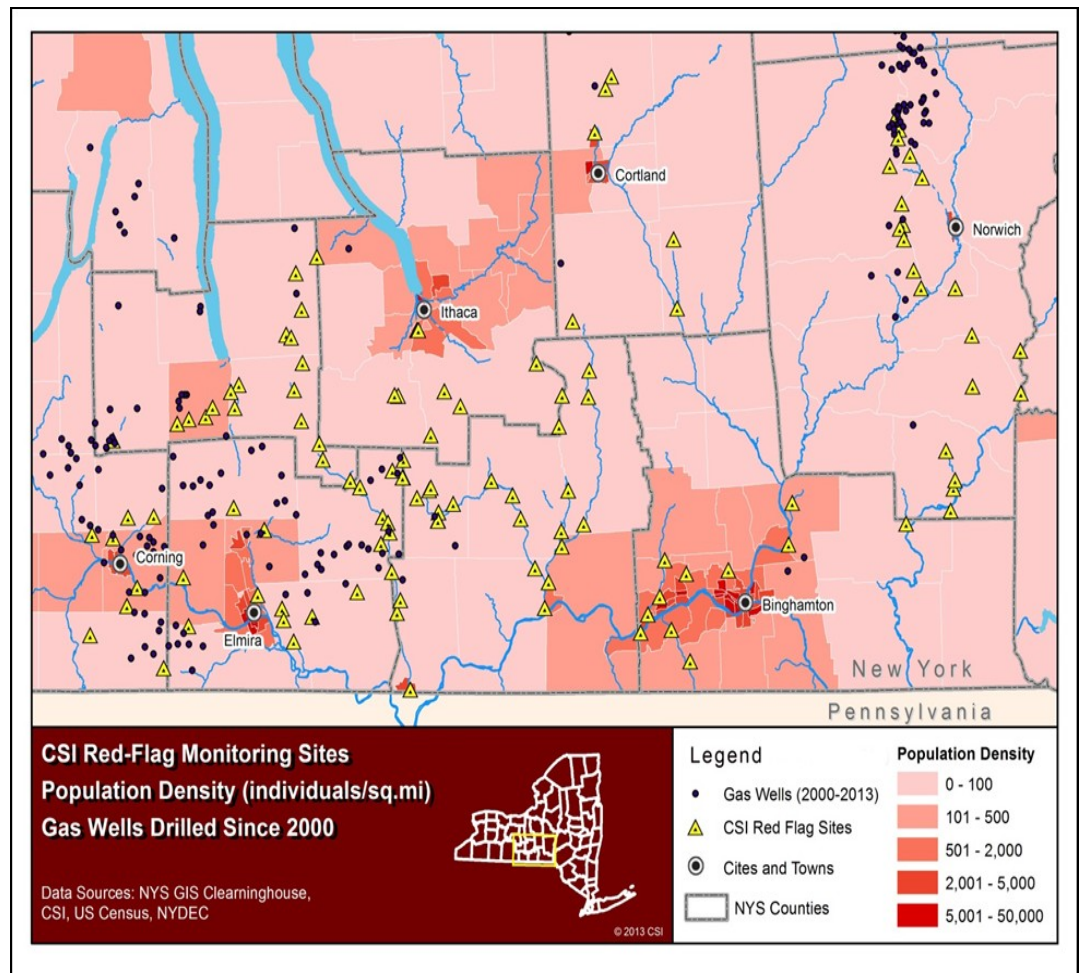
evenly distributed across the Southern Tier and Central New York. The maps to the left and on page 3 show that red-flag sites are relevant to the potential risk of contamination from high volume horizontal hydraulic fracturing (fracking) in New York.

The first map shows municipalities that have enacted bans or 12-month moratoria against fracking. This map also shows areas where there are movements to ban fracking as well as pre-emptive (pro-fracking) resolutions preventing such bans. These data were compiled by Karen Edelstein for FracTracker and is current as of Nov. 22nd, 2013. The municipalities that have passed pre-emptive resolutions tend to cluster in the Southern Tier, and CSI's red-flag sites are well represented in these areas.

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The second map shows existing gas wells. The NYSDEC oil and gas well database was queried on Dec. 12th, 2013 and only gas wells that were drilled after 2000 and have been modified in some way since 2010 are shown. The map also shows red-flag sites and population density by U.S. Census tract. The collaboration between CSI staff and volunteers has created a good distribution of monitoring sites, with many near existing gas extraction activities. The map shows that most existing gas wells are located in areas of very low population density. This underlines the importance of red-flag baseline monitoring in rural streams that could be impacted if the shale gas industry gets a green light from New York State.



CSI Lab Crucial for Safe Hydrilla Eradication

From July to October 2013, the Hydrilla Task Force of the Cayuga Lake Watershed continued efforts in the Cayuga Inlet, Fall Creek and adjacent areas to eradicate the highly invasive aquatic plant hydrilla (*Hydrilla verticillata*). Similar to 2012, treatment utilized the contact herbicide endothall (trade name Aquathol-K) followed by the systemic herbicide fluridone (trade name Sonar One/Sonar Genesis). Per New York State Department of Environmental Conservation permits for herbicide use, the Task Force was required to monitor herbicide levels in and beyond the Cayuga Inlet and Fall Creek herbicide treatment zones. Once again, the Community Science Institute supported hydrilla eradication efforts by providing professional water testing services.

The New York State Department of Health's Maximum Contaminant Level (MCL) for both endothall and fluridone is 50 parts per billion (ppb). Bolton Point supplies drinking water from Cayuga Lake to thousands of households. Although there is very little risk of herbicide migration from the treatment zone to the Bolton Point water intake, the Task Force and CSI conducted vigilant

testing throughout the 2013 season to ensure public safety.

At no time during the 2013 season did herbicide concentrations reach or exceed the 50 ppb MCL at the Bolton Point water intake.

It was a busy and successful 2013 treatment season. A summary of results for the 2013 season can be found online at: <http://www.tompkinscountyny.gov/health/eh/water/hydrilla>. CSI is committed to continuing to provide local laboratory support in the ongoing effort to protect the native ecosystem and eradicate hydrilla from Cayuga Lake.

Article contributed by James Balyszak, the Hydrilla Program Manager for the Hydrilla Task Force. Email him at stophydrilla@gmail.com



Chemical Analyst Patty Chuang tests water samples for herbicide concentrations



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