

A set of falls on Enfield Creek at Robert H. Treman State Park. Volunteers of CSI's Synoptic Stream Monitoring Program have been monitoring the water quality of this creek for over a decade. Photo taken by Nathaniel Launer.



Community Science
Institute

Partnering with Communities to Protect Water

Annual Report 2020



Synoptic Stream Monitoring Program

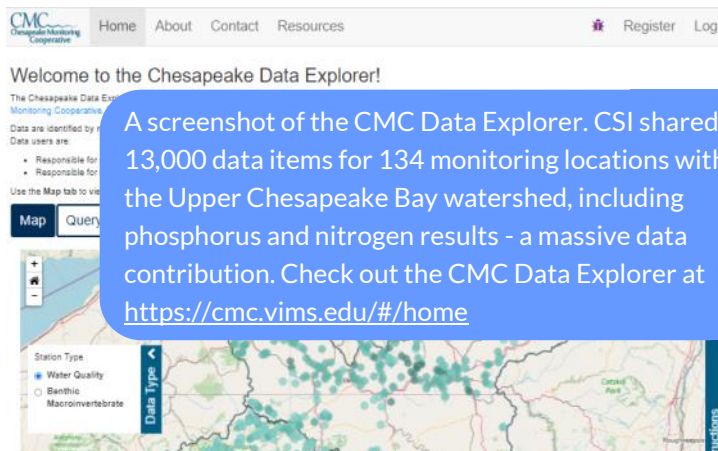
Beginning in January each year, our Synoptic Stream Monitoring teams hold winter meetings to review past data and discuss monitoring plans for the year ahead. When the lockdown began in early 2020, our volunteers were flexible and willing to shift the meetings online. We quickly implemented protocols to ensure each other's safety, such as collecting stream samples in smaller groups, wearing masks, social distancing, and disinfecting all shared sampling equipment. Through it all, we were able to complete a successful Synoptic Stream Monitoring season that included 54 monitoring events covering 19 tributary streams of Cayuga Lake, 6 tributary streams of Seneca Lake, and 4 tributary streams of Keuka Lake.

In 2020 we also added two new Synoptic Stream Monitoring volunteer teams to the list: one monitoring Johnsons Creek and one monitoring Sheldrake Creek. These teams carried out a total of six monitoring events in 2020, collecting some of the first ever water quality data for these streams. They will continue to build these datasets in years to come, making an important contribution to our shared understanding of surface water quality in Seneca County. To view these and other long-term datasets in the Cayuga Lake watershed, check out our public Water Quality Database at database.communityscience.org.



Volunteers Griffin and Jody Price and Cathy Hart collect samples at a bridge crossing on Sheldrake Creek.

Red Flag Monitoring Program



A screenshot of the CMC Data Explorer. CSI shared over 13,000 data items for 134 monitoring locations within the Upper Chesapeake Bay watershed, including phosphorus and nitrogen results - a massive data contribution. Check out the CMC Data Explorer at <https://cmc.vims.edu/#/home>

The volunteer teams of our Red Flag Monitoring Program continue to monitor water quality in their streams once per month by collecting field data using portable test kits. While many of our Red Flag teams retired after the threat of hydrofracking in New York subsided in 2014, ten of the original 25 teams continue to build invaluable, long-term datasets. Rejoining the program in 2020 after a few years absence is team Trout Unlimited Onondaga monitoring Nine Mile Creek and Limestone Creek, tributaries of Onondaga Lake and Oneida Lake, respectively (near Syracuse). We are excited to welcome them back to the program.

As teams of Red Flag volunteers continue monitoring their streams, CSI will be searching for ways to expand and revitalize this program. We will be seeking new volunteers as well as opportunities to put these long-term datasets to use in understanding and protecting our shared water resources across the region. One opportunity that we took advantage of in 2020 was to share all of our Red Flag data from the Upper Susquehanna River Basin with the Chesapeake Monitoring Cooperative (CMC) going back to 2009. We hope that the infusion of our 13,000+ quality-assured field measurements in the [CMC Data Explorer](https://cmc.vims.edu/#/home) will help support the management of the New York headwaters of the Chesapeake Bay watershed for years to come.

Biomonitoring Program

In 2020, volunteers collected and analyzed benthic macroinvertebrate (BMI) samples from 21 sites on twelve different creeks. Biomonitoring results, which include family-level BMI diversity, tolerance to impaired conditions, and BMI composition as compared to an average NY healthy stream, give a good overall picture of water quality and ecosystem health. CSI's 2020 results, along with over a decade of prior results, are ultimately destined for inclusion in a new, searchable CSI Biomonitoring database. Some good progress was made on the development of this database over the year and it will hopefully soon be available to the public. Open Lab nights were challenging in the wake of the COVID 19 pandemic, but they continued through the winter in a new, more spacious and better-ventilated lab space and with limited numbers, temperature checks, masking and physical distancing. Though we were only able to accommodate a few volunteers at a time, these volunteers did an amazing job of working through the summer's samples. Paul Alderige, for example, came to almost every session and further developed his keen and meticulous sorting and BMI identification skills. We appreciate the patience, enthusiasm and ever-developing skills that every volunteer brought to the program this challenging winter. Our volunteers are truly amazing. In the summer of 2020, CSI collaborated with Finger Lakes State Parks for a third year to offer Biomonitoring Fun! events at Lower and Upper Buttermilk and Robert H. Treman State Parks. These fun-filled science activities remain popular educational events for the whole family.



Soon, long-term BMI datasets will be available on our public Water Quality Database at database.communityscience.org

Harmful Algal Bloom (HABs) Monitoring Program



The summer of 2020 was the third season of our harmful algal bloom monitoring program on Cayuga Lake. With COVID restrictions in place, CSI adapted by hosting our three HABs Harrier volunteer orientation meetings online in June. They were attended by nearly all of our 90+ volunteers, and monitoring proceeded relatively undisturbed by the pandemic. Thanks to generous support from Tompkins County and the Emerson Foundation, we were able to continue our rapid reporting and analysis of blooms.

Throughout the summer of 2020, HABs were frequent and intense. In early September, widespread blooms occurred at the northern end of the lake. One bloom extended over two miles of shoreline. More concerning still was the number of blooms that were found to have high levels of microcystin toxin. In 2020, 55 of 78 blooms (71%) had microcystin toxin levels that exceeded the safe guidance value for contact recreation (4 ug/L). This was a large increase from 2019 when just 28 of the 67 blooms (42%) had high microcystin toxin concentrations.

We would like to acknowledge the leadership of our HABs Harrier volunteers who closely monitor the shoreline, quickly report blooms, collect samples for analysis, and are among the first to alert their neighbors and local officials to a HAB. Their dedication to addressing the HABs issue illustrates the strength of community science.

While attendance at our in-person outreach and education events was limited due to the pandemic, we adapted and persevered thanks in large part to a generous grant from the Park Foundation and the guidance of Tompkins County 4-H. Our 4-H2O Youth Education Program hosted three “Getting to Know Harmful Algal Blooms” informational workshops at Stewart Park, three “Biomonitoring Fun!” events at local state parks, and two “Water Quality Cruise” events in partnership with Discover Cayuga Lake. At a time when most in-person learning opportunities were restricted, we were glad to engage children and their families with hands-on educational activities. Our goal is to inspire a lasting interest in science and an ethic of water stewardship. In addition to these eight in-person events Adrianna Hirtler, CSI’s Biomonitoring Coordinator, developed an innovative, at-home guide to biomonitoring for kids. Entitled the “Water Quality Report Card”, this fun booklet leads children and families through an exploration of their favorite creek that follows a NYSDEC designed outline for pre-screening creeks for possible water quality impacts. The booklet also introduces biomonitoring vocabulary, serves as a field guide to some common stream organisms and includes some “just for fun” activities. By completing the activities in the booklet, children gain a basic understanding of the aquatic life in streams and what this life may indicate about the



Biomonitoring Coordinator Adrianna Hirtler explains the fascinating ecology of cyanobacteria to attendees of one of our three “Getting to Know Harmful Algal Blooms” workshops at Stewart Park. During these three workshops, CSI staff were also able to distribute HABs related outreach materials to passerby to help educate the public about these harmful blooms.

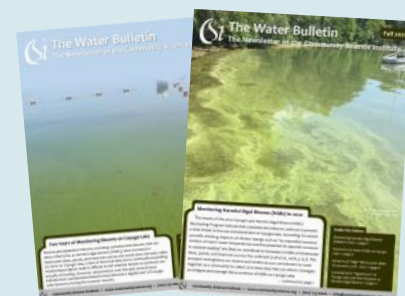
health of the stream ecosystem. The Water Quality Report Card is now available for pick-up free of charge at Tompkins County Cooperative Extension, the Paleontological Research Institute, the Cayuga Nature Center, Discover Cayuga Lake, and the Ithaca Sciencenter. Copies for download and print can be found on the [‘Learning Materials’](#) page under the ‘Outreach and Education’ tab on CSI’s website at www.communityscience.org. This at-home learning opportunity marks another important development in CSI’s education initiatives and our continuing commitment to inspiring the next generation of scientists and environmental stewards.



To sign up for a summer program, or for more information, please email us at info@communityscience.org or give us a call at (607) 257-6606

The Water Bulletin

The Fall 2020 Edition of CSI’s Water Bulletin Newsletter featured a synopsis of the past three years of monitoring harmful algal blooms (HABs) on Cayuga Lake. It details bloom data that we have collected in partnership with over 90 HABs Harriers around the lake, and it identifies multi-year patterns of bloom occurrence. Our exceptionally detailed HABs datasets, which include microcystin toxin concentrations, may help inform strategies to manage the risk that blooms present. You can read our Water Bulletin Newsletter online at www.communityscience.org.





In a year of great uncertainty for many, CSI was extremely fortunate. During the lockdown in the early months of the pandemic, our lab was able to stay open as an essential business that supports the Health Department with certified drinking water testing. The Langmuir Laboratory where CSI is located was, however, closed to the public like other buildings owned by Cornell University. For more than a year, our staff accepted water samples from clients outdoors, in front of the building, trekking up and down the stairs from and to our second-floor lab. We adhered strictly to NYSDOH and CDC guidance, implementing masking and social distancing for ourselves and our clients. Despite a couple of scares, nobody at CSI contracted the virus.

Thanks in large part to our dedicated volunteers and their willingness to social distance, mask, and continue collecting stream samples in small groups, it was also possible to continue our long-term stream and lake monitoring programs. We learned that volunteer training could be conducted successfully online and adopted this approach to host three training sessions in June for our Cayuga Lake HABs Harrier volunteers. Our 4-H2O Youth Education Programs took place with in-person events, thanks to guidance from Tompkins County 4-H and generous support from the Park Foundation.

All in all, CSI staff and our volunteer partners were able to adapt to the public health measures necessitated by the pandemic and continue pursuing our mission to foster water stewardship by empowering stakeholders through the scientific method and data collection. We are pleased to report the following highlights of 2020:

- County and municipal governments in Tompkins and Cayuga Counties continued their financial support of CSI's stream monitoring partnerships with eleven volunteer groups around Cayuga Lake, helping us build long-term data sets on nutrients, sediment, salt and pathogenic bacteria in 70% of the Cayuga Lake drainage, with the goal of informing its sustainable management.
- In our stream monitoring work, we continued performing certified measurements of dissolved, bioavailable phosphorus, which is widely considered to be the main driver of cultural eutrophication in freshwater lakes. CSI's long-term data sets are unique in the Finger Lakes and indispensable for identifying sources of dissolved phosphorus and managing the amounts that are allowed to flow into Cayuga Lake.
- The Park Foundation provided a generous grant of \$8,000 to support CSI's 4-H2O Youth Education Program. We held in-person events (with reduced attendance in line with Covid guidance) including two "Water Quality Cruises" aboard Discover Cayuga Lake/Floating Classroom, three "Biomonitoring Fun" events on streams in state parks, and three "Getting to Know Cyanobacteria" events in Stewart Park.
- A grant of \$14,000 from the Emerson Foundation combined with \$6,000 from the Tompkins County Health Department and \$2,600 from online fundraising made possible the 2020 Cayuga Lake HABs Monitoring Program, a joint undertaking of CSI, the Cayuga Lake Watershed Network, Discover Cayuga Lake and over 90 dedicated HABs Harrier volunteers.
- CSI's Fall 2020 Water Bulletin newsletter reviewed results of three years of HABs monitoring, tentatively identifying patterns that, if confirmed in coming years, should help inform management of public health risks from the blooms.

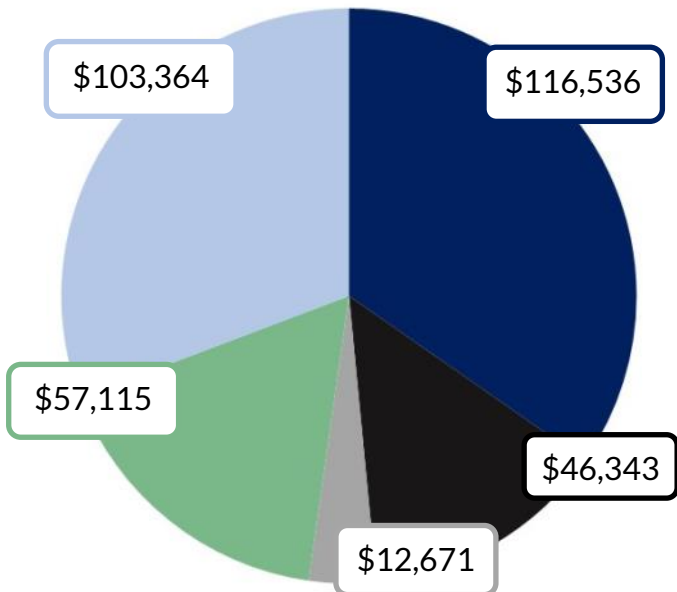
I would like to express my gratitude to our funders and donors, our sister nonprofits and above all to our volunteers for "hanging in" and keeping CSI going through the pandemic. Thanks to you, CSI can continue to promote stewardship of water through data-driven stories about the streams and lakes we share.

Stephen Penningroth, Ph.D., Executive Director



CSI 2020 Income Total: 336,072

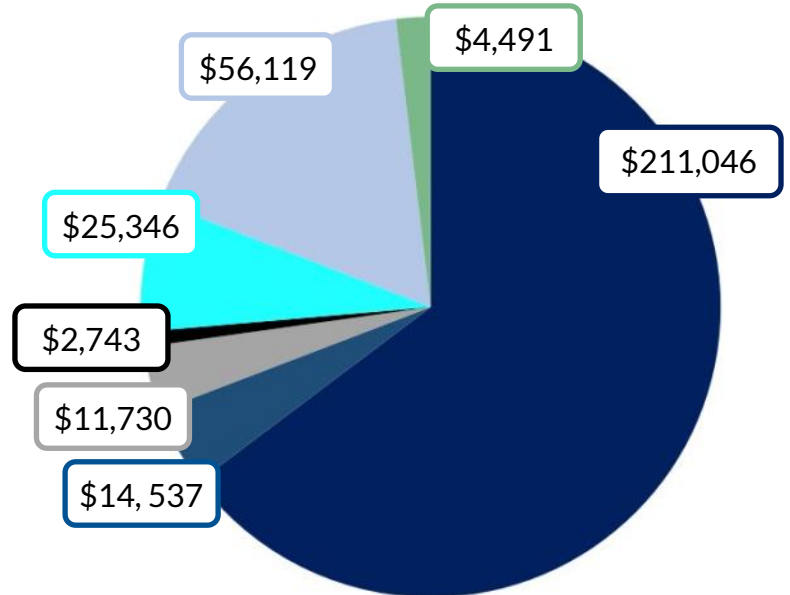
*Including \$43.05 interest and dividends



- Local Government Support for Stream and Lake Monitoring°
- Monitoring Grants from Foundations & Not-for-Profits (NFPs)*
- Membership Donations
- Agency and Lake Association Testing Contracts
- Fee-for-Service Drinking Water Tests

CSI 2020 Expenses Total: 327,499

*Including \$1,487.37 travel and transportation



- Personnel
- Web Services
- Sub-Contract Lab Tests
- Contract Labor
- Lab and Office Supplies
- Indirect Costs
- Fees and Miscellaneous Expenses

Thank You to Our Donors!

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Lake

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Roxanne Marino
Ezra Oyer
Curtis and Amanda Ufford
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Louise Mudrak
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Dan Karig and Joane Molenock
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Dennis Swaney
Robert Rieger
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John Abel
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Claire Weston
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Stream

\$50 +

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Robert Weiss
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Jonathan Miller
Esther Racoosin
Glenn and Sandy Galbreath
Donald Sargent and Shannon Barrett
G. Walton Cottrell
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Margret Thompson
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Creek

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Theodora Weatherby
Linda Byard
Pete Meyers
Philip Koons
Roberta Healey
Dan Broadway
Rebecca Kiss
Kathren Kneer
Binwei Zhang
Patricia Meyers

Local Government Support for Stream and Lake Monitoring °

Tompkins County - \$32,000
Cayuga County - \$22,067
Town of Ithaca - \$21,526
Town of Dryden - \$10,761
City of Ithaca - \$9,356
Town of Ulysses - \$6,312
Town of Newfield - \$6,155
Town of Danby - \$4,124
Town of Caroline - \$3,234
Town of Hector - \$1,000

Monitoring Grants from Foundations and NFPs*

Fred L. Emerson Foundation - \$14,000
Seneca Lake Pure Waters Association - \$13,843
Park Foundation - \$8,000.00
Cornell University - \$7,000
Cayuga Foundation - \$3,000
The Community Foundation of Tompkins County
- Taylor Peck Fund - \$500

Staff

Stephen Penningroth, *Executive Director, Senior Scientist*
Noah Mark, *Technical Director*
Alex Sopilniak, *Senior Lab Analyst*
Diana Beckenhaupt, *Lab Analyst*
Nathaniel Launer, *Director of Outreach, Cayuga Lake
HABs Monitoring Program Coordinator*
Adrianna Hirtler, *Biomonitoring Coordinator*

Supporting Services

Abner Figueroa, *Web and Database Development*
William George, *Data Entry*

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Angel Hinickle, *Vice-President*
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Discover Cayuga Lake
Tompkins County 4-H
Tompkins County Soil and Water
Conservation District
West Shore Neighbor Association
Cayuga Lake Environmental Action Now
Seneca Lake Pure Waters Association



Partnering with Communities to Protect Water

Annual Report - 2020

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Certified Water Quality Testing Lab

NYSDOH-ELAP #11790

EPA Lab Code NY01518

Send To:

A large, multi-tiered waterfall cascades over dark, layered rock formations. The water is captured with a long exposure, creating a soft, white, misty appearance. The surrounding area is lush with green trees and vegetation. In the foreground, there are some rocks and a small wooden structure.

Our Mission

The mission of the Community Science Institute is to foster and support environmental monitoring in partnership with local groups of volunteers in order to gain a better understanding of natural resources, particularly water, and how to manage them for long-term sustainability.

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