



Partnering with communities to protect water at Community Science Institute

Lansing Town Board Meeting
5/15/24, 6:30 PM

Grascen Shidemantle, Ph.D.
Executive Director



CSI is a 501(c)3 non-profit and NYSDOH-ELAP certified water testing lab

CSI offers three types of programming:



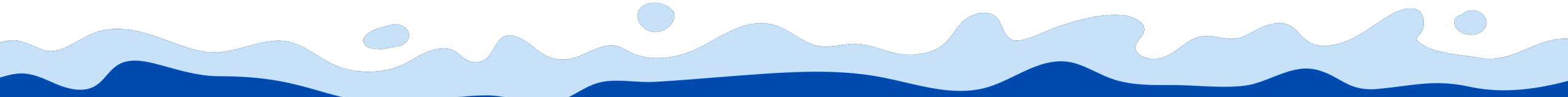
Volunteer
Water
Monitoring
Partnerships



Fee-for-
Service Water
Testing



Outreach and
Education



CSI's Mission

To foster and support environmental monitoring in partnership with community-based volunteer groups in order to better understand our shared natural resources and how to manage them for long-term sustainability and protection.

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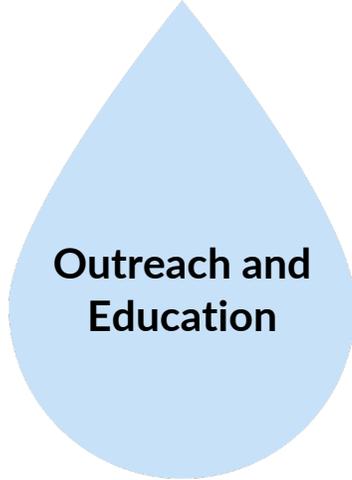
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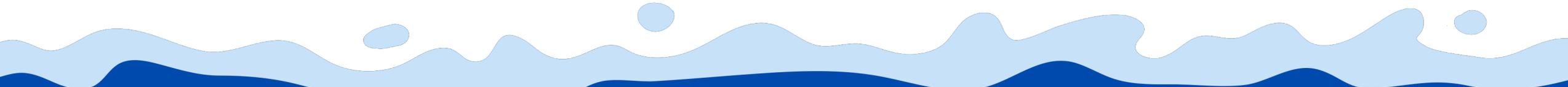
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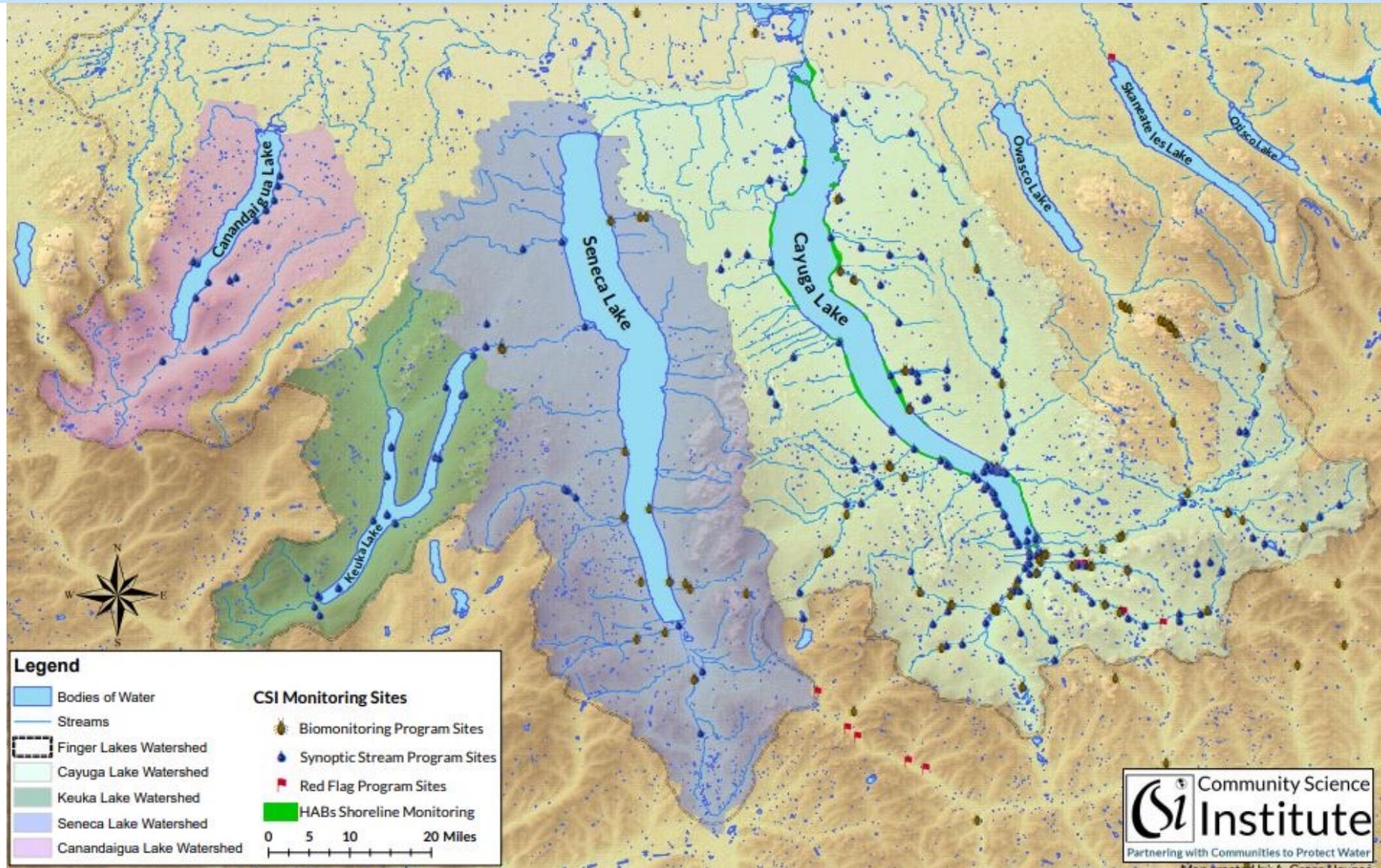
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CSI Volunteer Monitoring Partnerships

Four Monitoring Partnerships

1. Synoptic Stream and Lake Monitoring
2. Harmful Algal Bloom (HAB) Monitoring
3. Biomonitoring
4. Red Flag Monitoring

CSI recruits, trains, and coordinates over 250 volunteers



Si Volunteer Monitoring Partnerships

Synoptic Stream & Lake Monitoring



Test samples for:

- Nutrients (Phosphorus and Nitrogen)
- Pathogenic Bacteria (*E. coli*)
- Total Suspended Solids
- Temperature
- Turbidity
- pH
- Conductivity
- Chloride
- Total Hardness

Thank you to the Town of Lansing for supporting this program on Salmon Creek, Milliken Creek, and the east shore of Cayuga Lake!

Biomonitoring (Benthic Macroinvertebrate Monitoring)



Identify samples of benthic macroinvertebrates (BMI) to calculate:

- Total Family Richness
- EPT Richness
 - Ephemeroptera = mayflies, Plecoptera = stoneflies, Trichoptera = caddisflies
- Family Biotic Index
- Percent Model Affinity
- Biological Assessment Profile

Harmful Algal Bloom (HAB) Monitoring



Test HABs samples to:

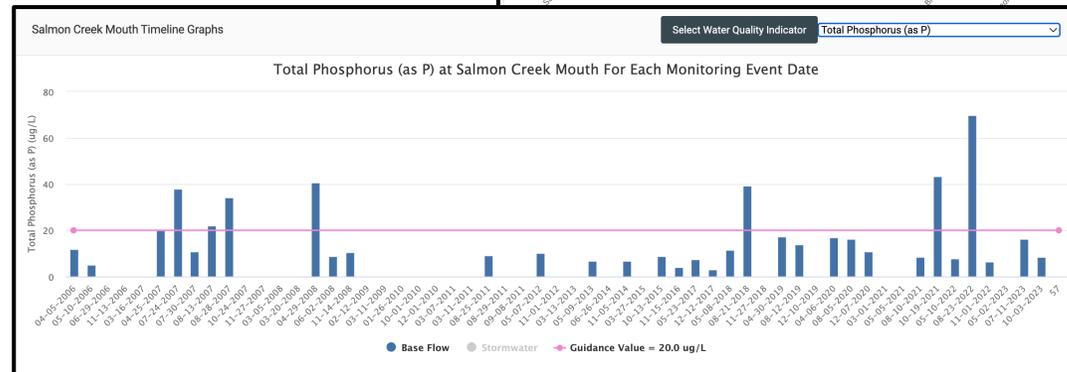
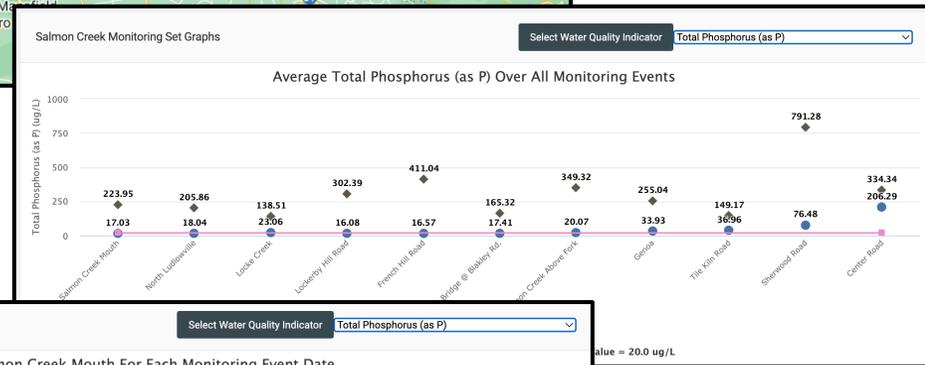
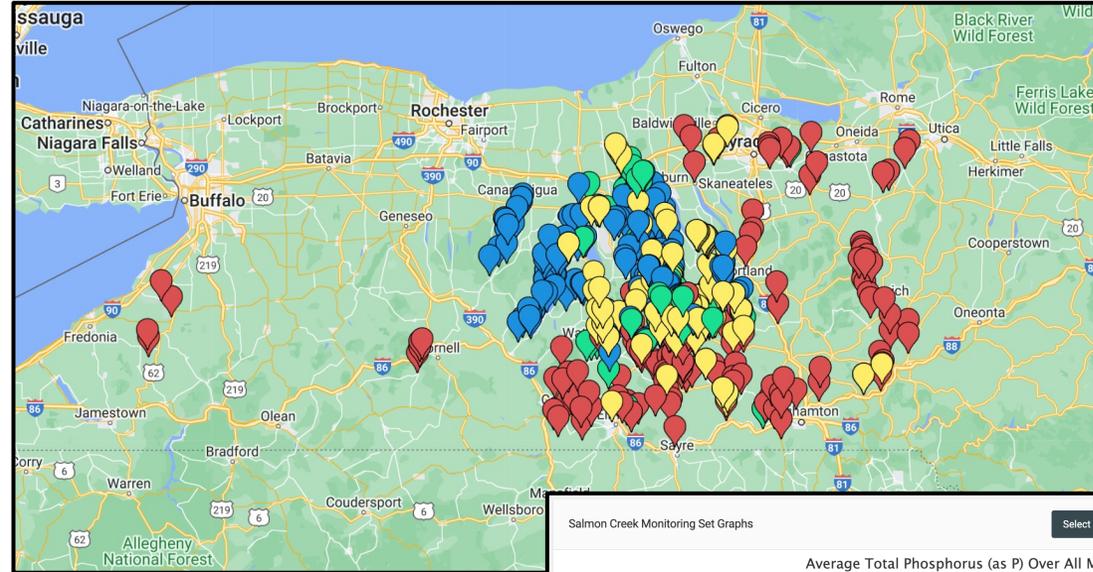
- Identify cyanobacteria genera
- Measure chlorophyll a
- Measure cyanotoxins (e.g., microcystin)

In collaboration with:



CSI's Public Database – Streams and Lakes Chemistry

Our database houses over 85,000 regulatory-quality measurements of water quality!

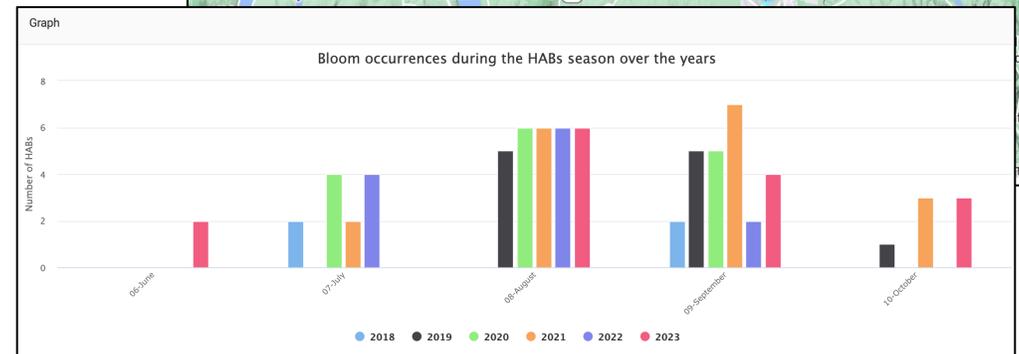
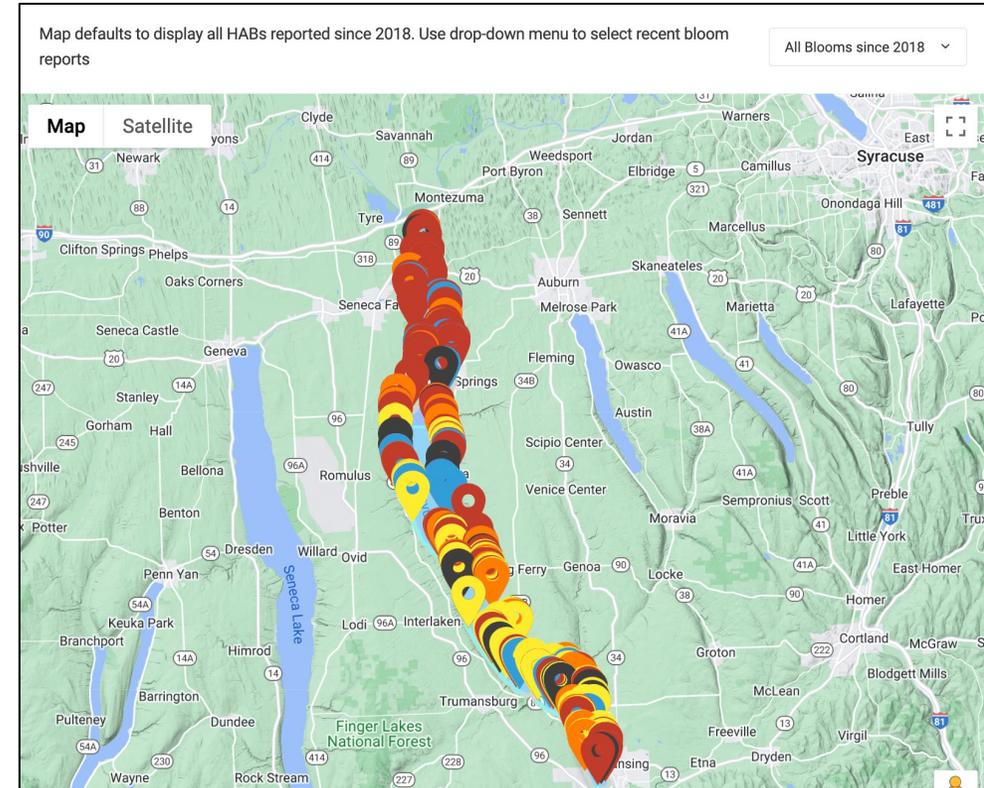


www.database.communityscience.org

CSI's Public Cayuga Lake HAB Database

Our Cayuga Lake HAB database contains data from HABs reported to CSI from 2018-present

<http://database.communityscience.org/hab>



CSI data make a difference locally

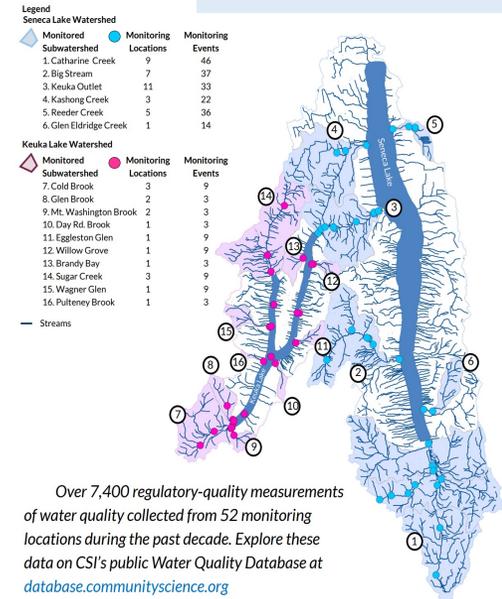


Removal of the southern end of Cayuga Lake from the 303(d) list for pathogenic bacteria

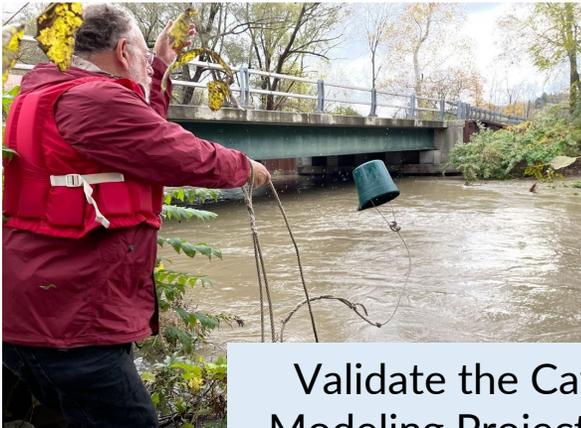


Trumansburg Wastewater Plant upgrades

Seneca-Keuka 9E Plan



Over 7,400 regulatory-quality measurements of water quality collected from 52 monitoring locations during the past decade. Explore these data on CSI's public Water Quality Database at database.communityscience.org



Validate the Cayuga Lake Modeling Project's model of Fall Creek phosphorus loading

Peer-reviewed research

Harmful algal blooms in Cayuga lake, NY: From microbiome analysis to eDNA monitoring

Wang, N., Mark, N., Launer, N., Hirtler, A., Weston, C., Cleckner, L., Faehndrich, C., LaGorga, L., Xia, L., Pyrek, D., Penningroth, S., Richardson, R. (2024). Harmful algal blooms in Cayuga lake, NY: From microbiome analysis to eDNA monitoring. *Journal of Environmental Management* 2024, 354, 120128. <https://doi.org/10.1016/j.jenvman.2024.120128>

Using Citizen Based Science to Provide Insights on Toxic Cyanobacteria Blooms in a New York Lake

Howarth, R., Swaney, D., Smith, C., Marino, R., Figueroa, A., & Penningroth, S. (2023). Using Citizen Based Science to Provide Insights on Toxic Cyanobacteria Blooms in a New York Lake. Abstract of presentation at the meeting of the Association of the Sciences of Limnology and Oceanography (ASLO) "Resilience and Recovery in Aquatic Ecosystems" - Mallorca, Spain; June 4-9, 2023

Community-Based Risk Assessment of Water Contamination from High-Volume Horizontal Hydraulic Fracturing

Penningroth, S. M., Yarrow, M. M., Figueroa, A. X., Bowen, R. J., & Delgado, S. (2013). Community-Based Risk Assessment of Water Contamination from High-Volume Horizontal Hydraulic Fracturing. *NEW SOLUTIONS: A Journal of Environmental and Occupational Health Policy*. 23(1). 137-166. <https://doi.org/10.2190/NS.23.1.i>

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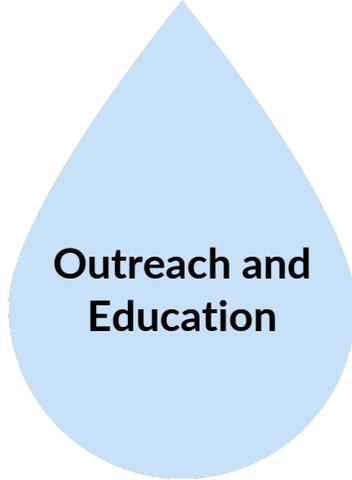
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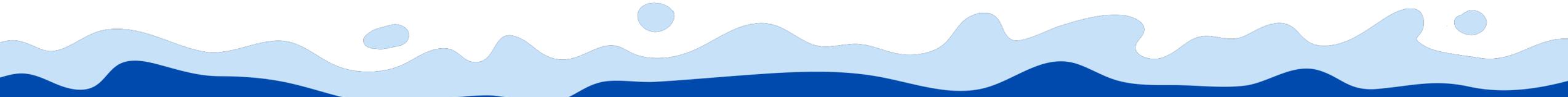
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Fee-for-Service Water Testing

We test water from private wells, municipal water systems, swimming beaches, effluents, and more!

We serve:

Residents

- Home sales
- Routine testing
- Health/taste/quality concerns

Government Agencies

- Tompkins County Health Dept.
- NY State Parks
- NYSDEC

Local Businesses

- Farms
- Restaurants
- Breweries
- Wineries
- Mobile Home Parks
- Apartment Buildings

In 2023, CSI's lab tested more than 2,500 drinking water samples!

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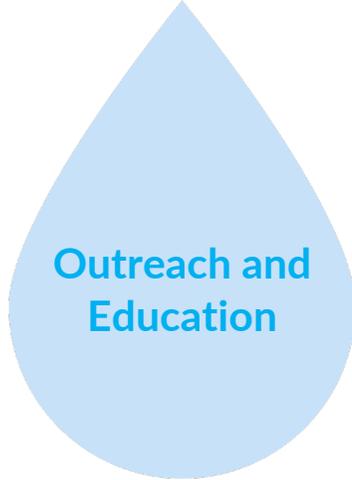
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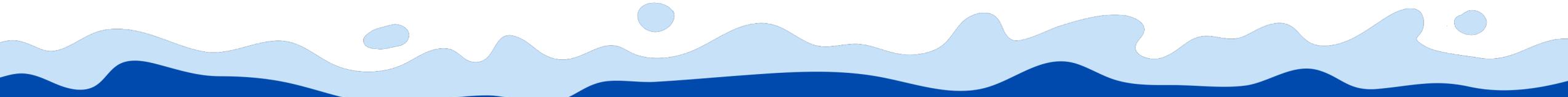
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CSI Outreach and Education



Journey of Water Summer Youth Education Program

2023 Edition
The Water Bulletin
 The Newsletter of the Community Science Institute

Enfield Creek at Robert H. Treman State Park. Photo by Nate Launer.

What Does it Mean to be a "Certified" Lab?

Community Science Institute (CSI) operates a "certified lab," but what does that really mean? And why bother with lab certification? In this article, we'll answer these two questions and give a brief history about the organization that certifies our lab. First, let's consider the importance of data — by the end of this article, I hope to convey more specifically the importance of "data of known and documented quality."¹

Most environmental compliance and clean-up decisions are made based on data. The quality of the data determines the effectiveness of these decisions, so regulatory agencies need to have a way to be certain that the data they use are of high quality. Laboratories may opt into an accreditation program to assure the overall reliability of their data, such that data can be used for regulatory purposes. In New York State (NYS), the enforcement of certain laws and regulations require that environmental testing be done by an accredited lab.² Such state water quality regulations implement federal requirements, namely those from the Clean Water Act (CWA) and the Safe Drinking Water Act (SDWA). Back in the 1970s, the CWA and SDWA granted the Environmental Protection Agency (EPA) the authority to implement controls on the release of pollutants into public drinking water supplies and navigable waters.^{3,4} This set the stage for compliance monitoring and the need for testing.

Inside this Edition

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Chloride in Cayuga Lake • page 8

HABs on Cayuga Lake: Takeaways from the 2023 Monitoring Season • page 12

Annual Water Bulletin Newsletter

CHLORIDE

Community Science Institute
 Partnering with Communities to Protect Water

Chlorine + electron = chloride

WHAT IS CHLORIDE?

Chloride is a naturally-occurring ion formed when chlorine *gains* an electron. It most frequently occurs in salt compounds like **sodium chloride**.

In small amounts, chloride is essential for our cells to function.

WHY DO WE MEASURE CHLORIDE?

Brackish or marine ecosystems naturally have a much higher concentration of chloride than freshwater. We test chloride concentrations in streams and lakes to see if they fall within the normal range for these ecosystems.

Typical chloride concentrations

Freshwater:	< 50 mg/L
Brackish water:	~300 mg/L
Seawater:	~20,000 mg/L



Chloride is often the active ingredient in road salts. It can also be introduced to waterways via irrigation runoff or salt mines.

In the environment, chloride can trigger the mobilization of heavy metals like lead and mercury from soil particles into water. Within an organism, some chloride is normal or even beneficial. However, in large amounts, chloride can interfere with healthy cell function. The following organisms start to see sublethal effects at:

		
Daphnia sp. (water fleas) 372 mg/L chloride	Rainbow trout 922.7 mg/L chloride	Fathead minnows 433.1 mg/L chloride

Free Learning Materials

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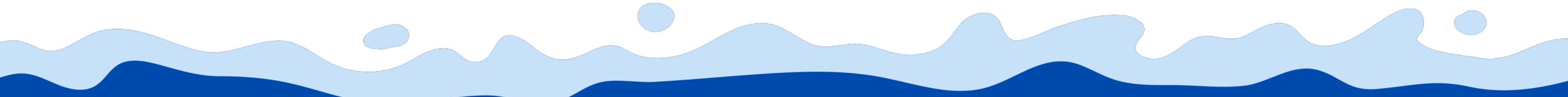
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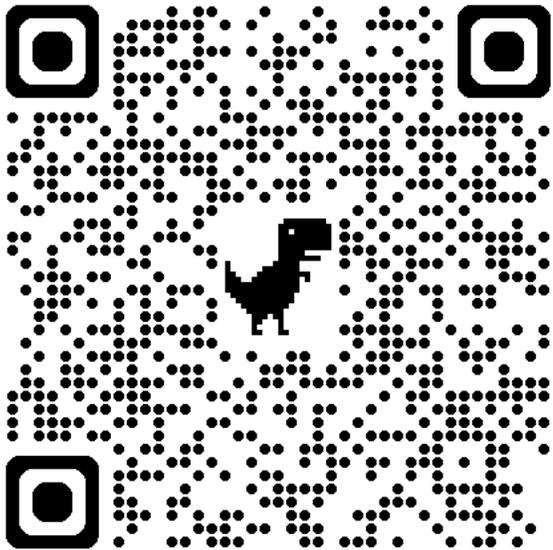
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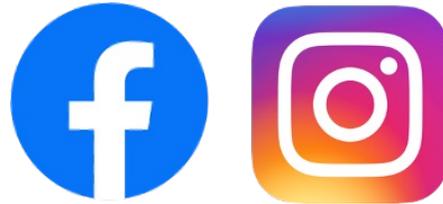
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Join our email list for monthly updates



Follow us on social media



@communityscienceinstitute

Stay in touch and learn more

info@communityscience.org

(607) 257-6606

www.communityscience.org

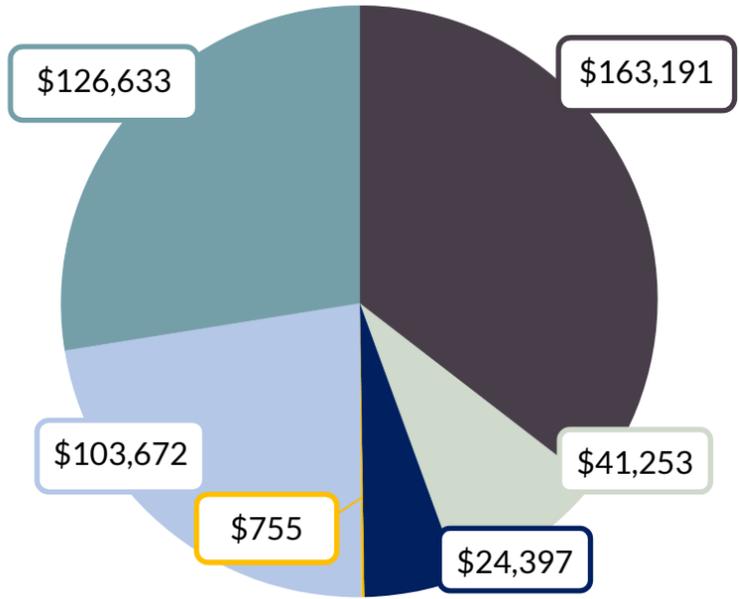
Extra Slides

CSI's 2023 Finances

Financial Report

CSI 2023 Income Total: \$459,948.36

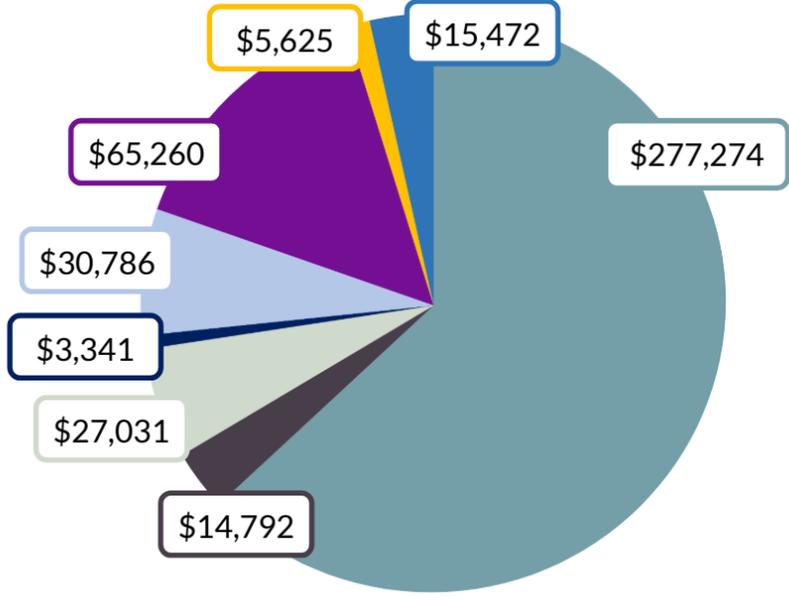
Includes \$49.49 interest and dividends



- Local Government Support for Stream and Lake Monitoring^o
- Grants from Foundations & Not-for-Profits (NFPs)[†]
- Donations
- Agency and Lake Association Testing Contracts
- Fee-for-Service Drinking Water Tests
- Silent Auction

CSI 2023 Expenses Total: \$440,780.13

Includes \$1,200.10 travel and transportation



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

Thank you to the local governments who support CSI's monitoring partnerships!

Town of Enfield	\$2,601
Town of Lansing	\$7,140
Town of Caroline	\$3,432
Town of Danby	\$4,376
Town of Ulysses	\$6,567
City of Ithaca	\$10,790
Town of Dryden	\$11,420
Town of Ithaca	\$22,844
Town of Newfield	\$6,532
Town of Scipio	\$500
Cayuga County	\$39,594
Seneca County	\$5,300
Tompkins County	\$42,095