



# Partnering with communities to protect water at Community Science Institute

Caroline Town Board Meeting  
7/17/24, 7 PM

Grascen Shidemantle, Ph.D.  
Executive Director




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

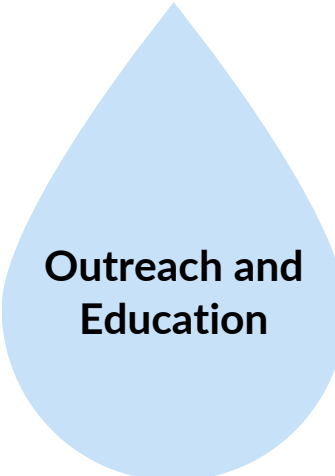
CSI offers three types of programming:



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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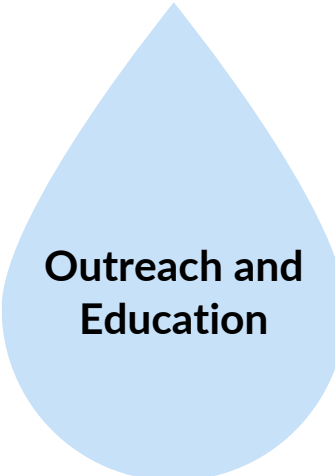
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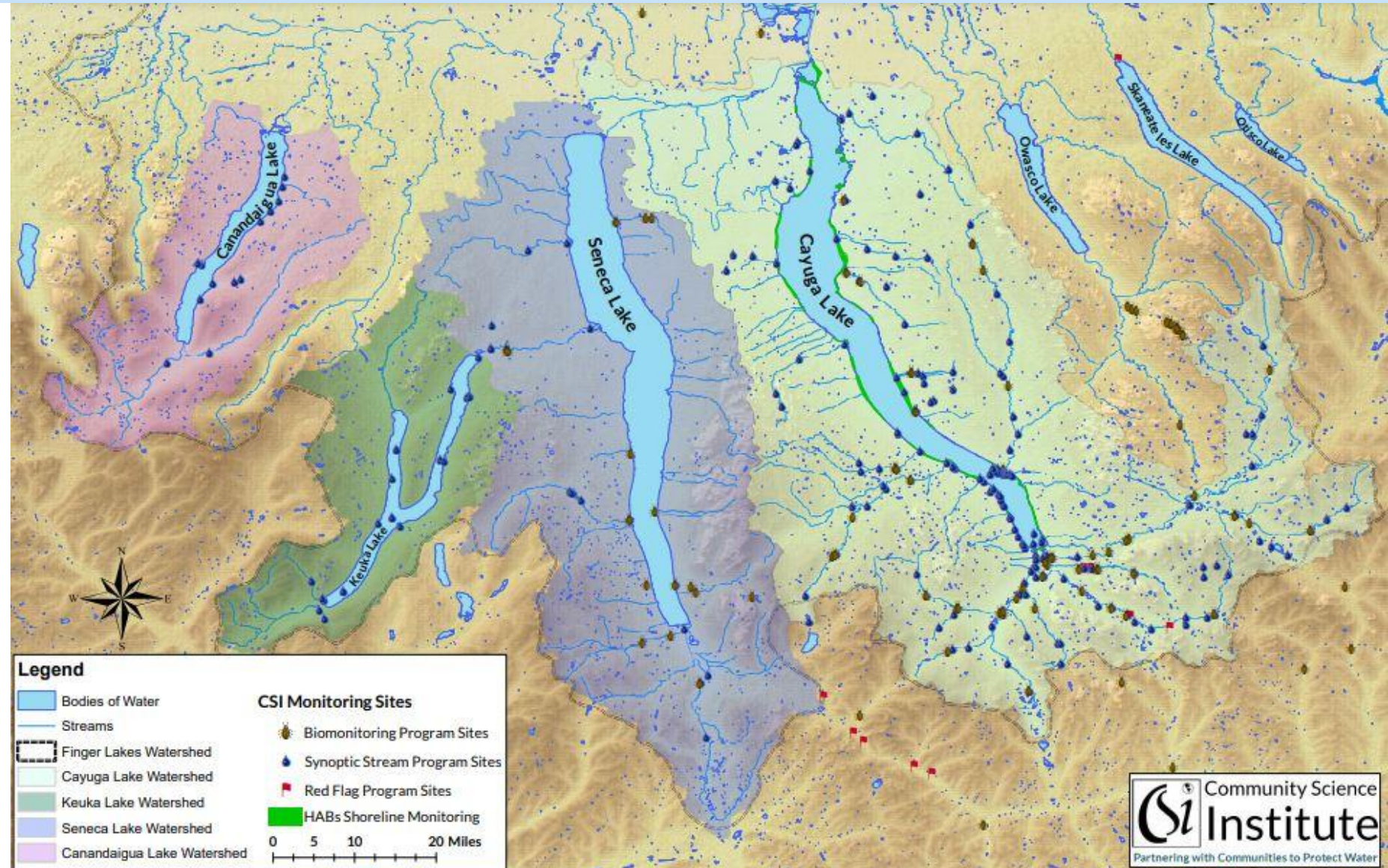
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# CSI Volunteer Monitoring Partnerships

## Four Monitoring Partnerships

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

CSI recruits, trains,  
and coordinates  
over 250  
volunteers



# CSI Synoptic Stream and Lake Monitoring Partnership

**Purpose:** Produce regulatory-quality stream and lake water chemistry data that can inform water resource management decisions as well as keep the public informed on the state of their local water resources.



Kristen and Hope monitoring Six Mile Creek on 7/17/24

## Monitor streams and lakes for:

- Nutrients
- Sediment
- Bacteria
- Salt
- pH, conductivity, temperature, etc.

Volunteers collect samples from their designated stream 3 times each year

Samples are analyzed in CSI's state-certified water testing laboratory

# CSI Synoptic Stream Monitoring in the Town of Caroline

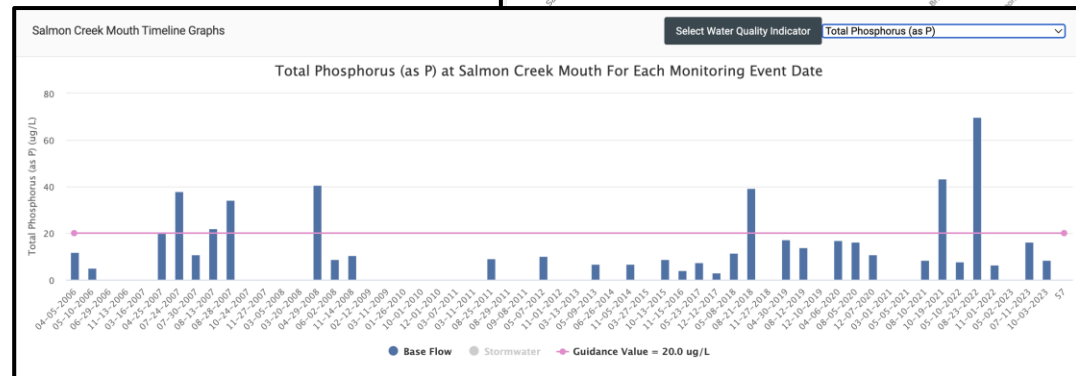
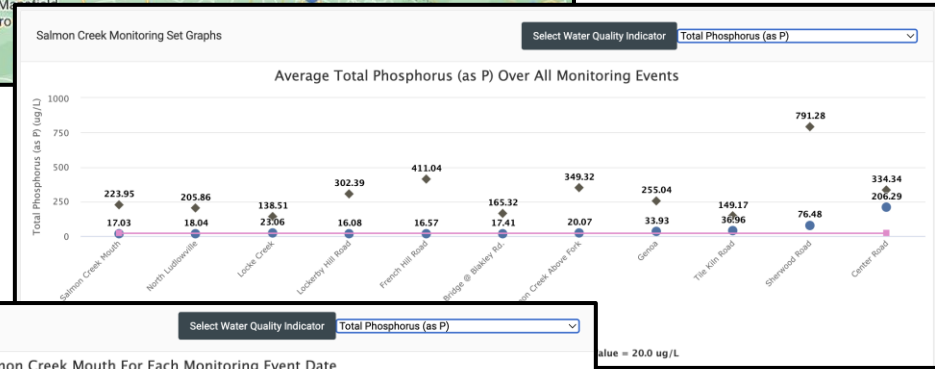
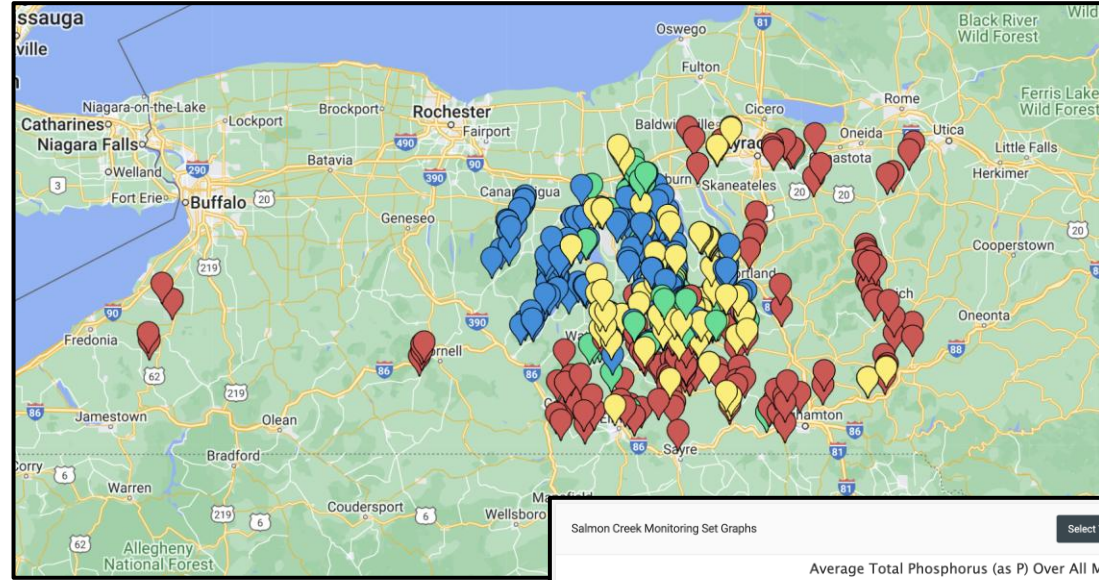
CSI volunteers have been monitoring Six Mile Creek since 2004.

7 of the 14 monitoring sites on Six Mile Creek fall within the Town of Caroline.



# CSI's Public Database – Streams and Lakes Chemistry

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



[www.database.communityscience.org](http://www.database.communityscience.org)

**Purpose:** Determine the ecological and long term health of streams while educating community members about local aquatic biodiversity

Collect and 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

<b>non-impacted</b>
<b>slightly impacted</b>
<b>moderately impacted</b>
<b>severely impacted</b>



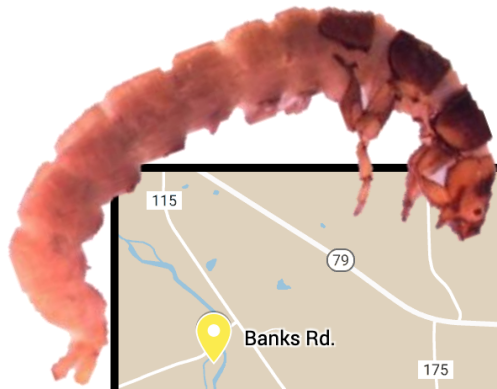
Volunteers collect samples in the field then sort and identify organisms in the lab



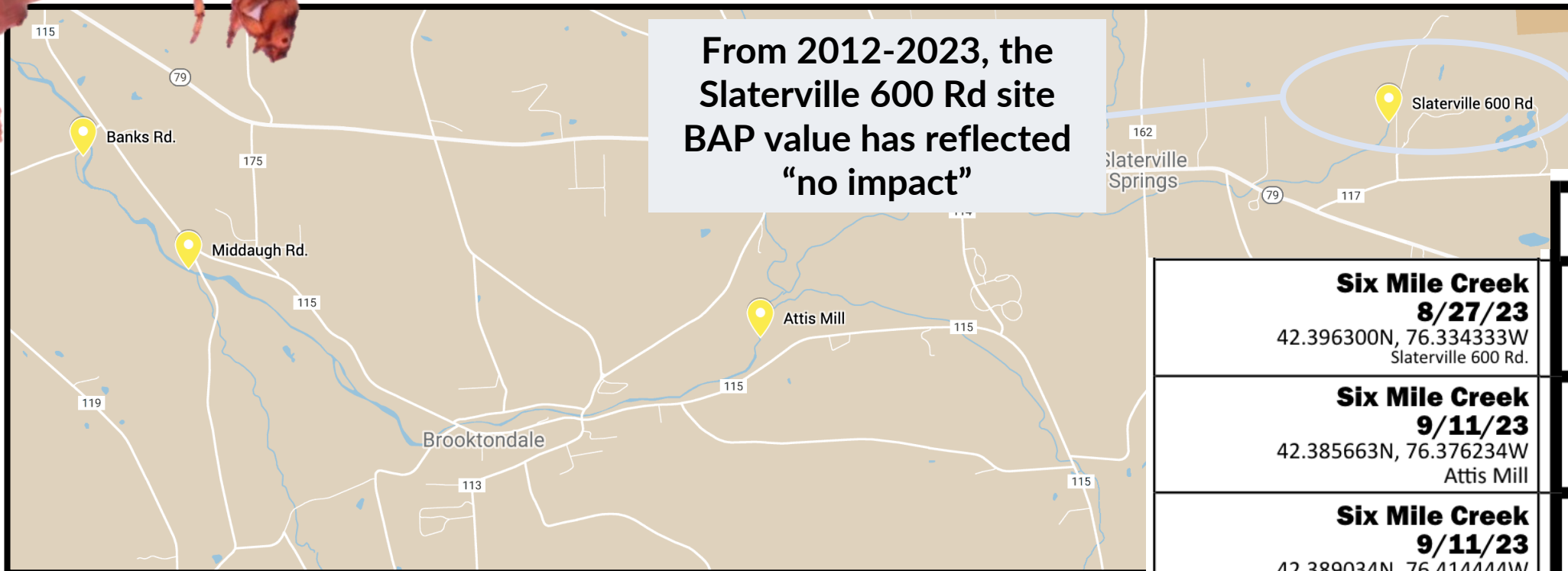
# Si Biomonitoring in the Town of Caroline

Biomonitoring volunteers have been monitoring Six Mile Creek since 2011.

There are four monitoring sites in the Town of Caroline.



From 2012-2023, the Slaterville 600 Rd site BAP value has reflected "no impact"



BAP Value	
Biological Assessment Profile	
<b>Six Mile Creek</b> <b>8/27/23</b> 42.396300N, 76.334333W Slaterville 600 Rd.	<b>9.0</b> no impact
<b>Six Mile Creek</b> <b>9/11/23</b> 42.385663N, 76.376234W Attis Mill	<b>7.6</b> no impact
<b>Six Mile Creek</b> <b>9/11/23</b> 42.389034N, 76.414444W Middaugh Rd.	<b>6.5</b> slight impact

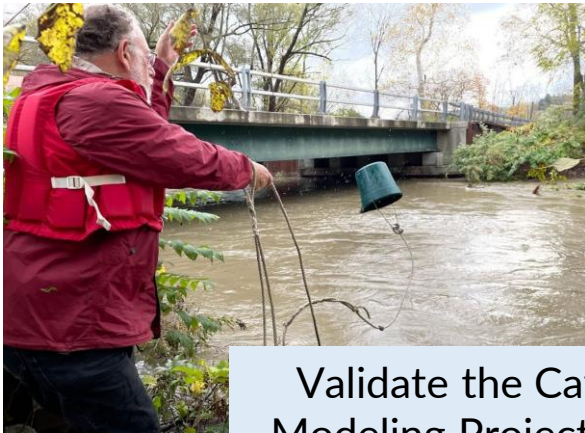
# CSI data make a difference locally



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

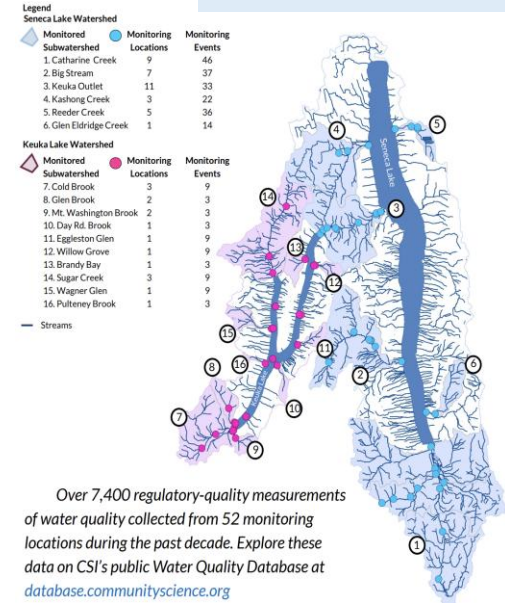


Trumansburg Wastewater Plant upgrades



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

Seneca-Keuka 9E Plan



## 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>

# Community Science Institute

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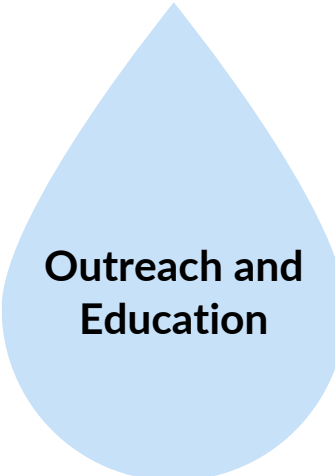
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# CSI Fee-for-Service Water Testing

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

## We serve:

### Residents

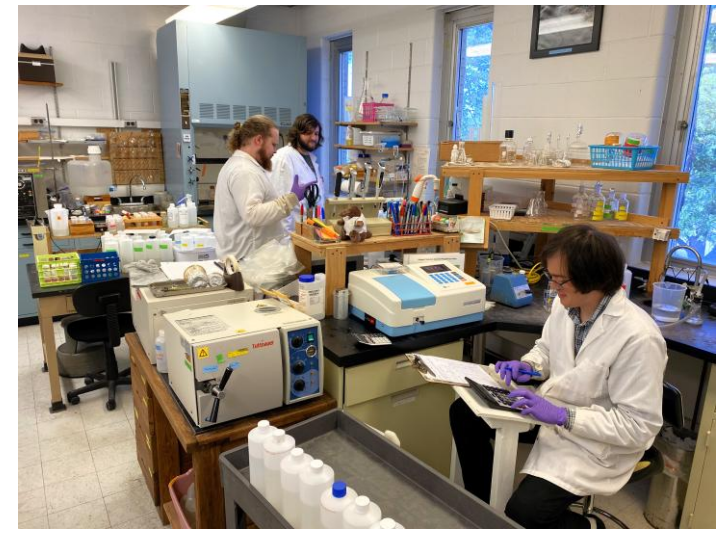
- Home sales
- Routine testing
- Health/taste/quality concerns

### Local Businesses

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

### Government Agencies

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



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

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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."<sup>1</sup>

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.<sup>2</sup> 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.<sup>3,4</sup> This set the stage for compliance monitoring and the need for testing.

**Inside this Edition**

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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:

 372 mg/L chloride	 922.7 mg/L chloride	 433.1 mg/L chloride
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Free Learning Materials

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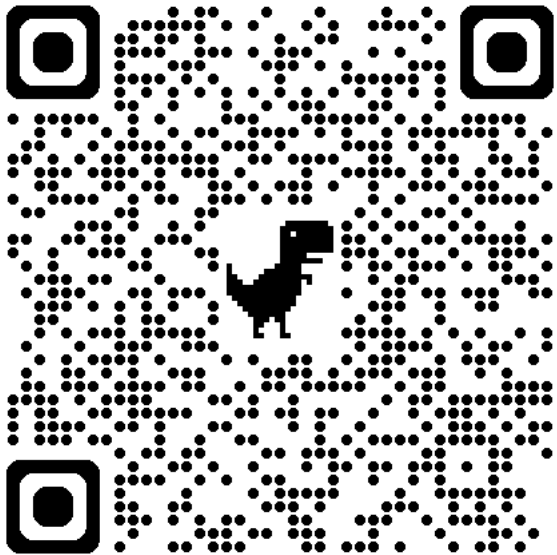
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Follow us on social media



@communityscienceinstitute

Stay in touch and learn more

[info@communityscience.org](mailto:info@communityscience.org)

(607) 257-6606

[www.communityscience.org](http://www.communityscience.org)



Extra Slides

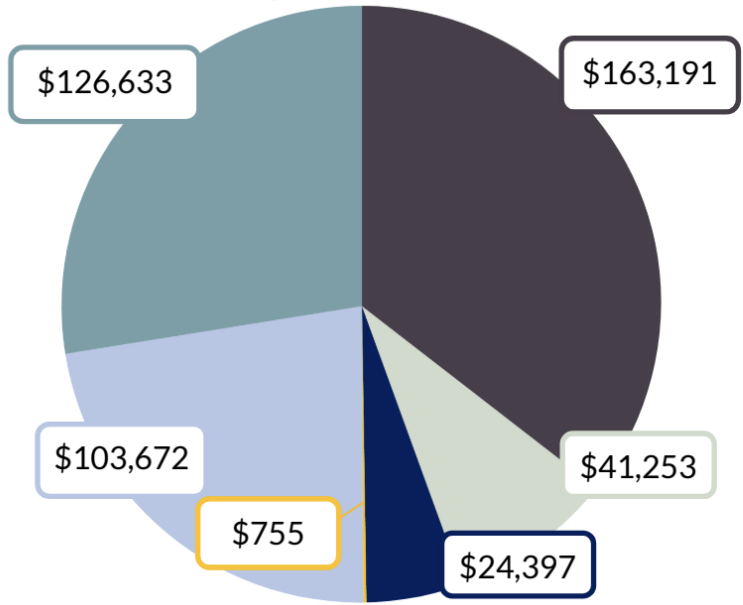
# CSI's 2023 Finances

## Financial Report



### CSI 2023 Income Total: \$459,948.36

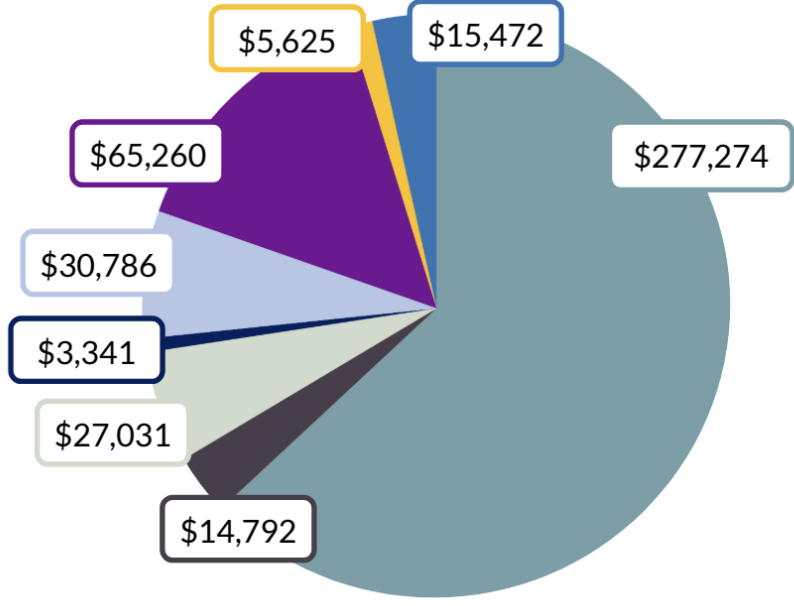
Includes \$49.49 interest and dividends



- Local Government Support for Stream and Lake Monitoring<sup>o</sup>
- Grants from Foundations & Not-for-Profits (NFPs)<sup>†</sup>
- 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
<b>Town of Caroline</b>	<b>\$3,432</b>
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