

# Using Community Science to Monitor Water Quality in the Cayuga Lake Watershed

Town of Dryden  
7/18/24, 6 PM

Grascen Shidemantle, Ph.D.  
Executive Director




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

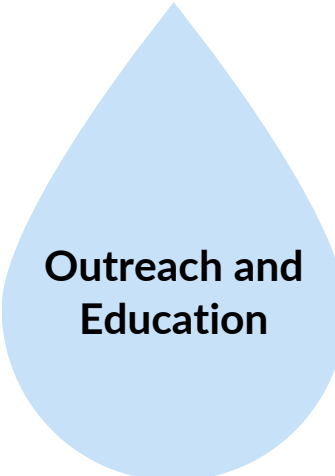
CSI offers three types of programming:



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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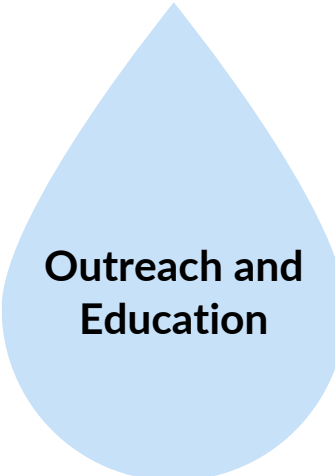
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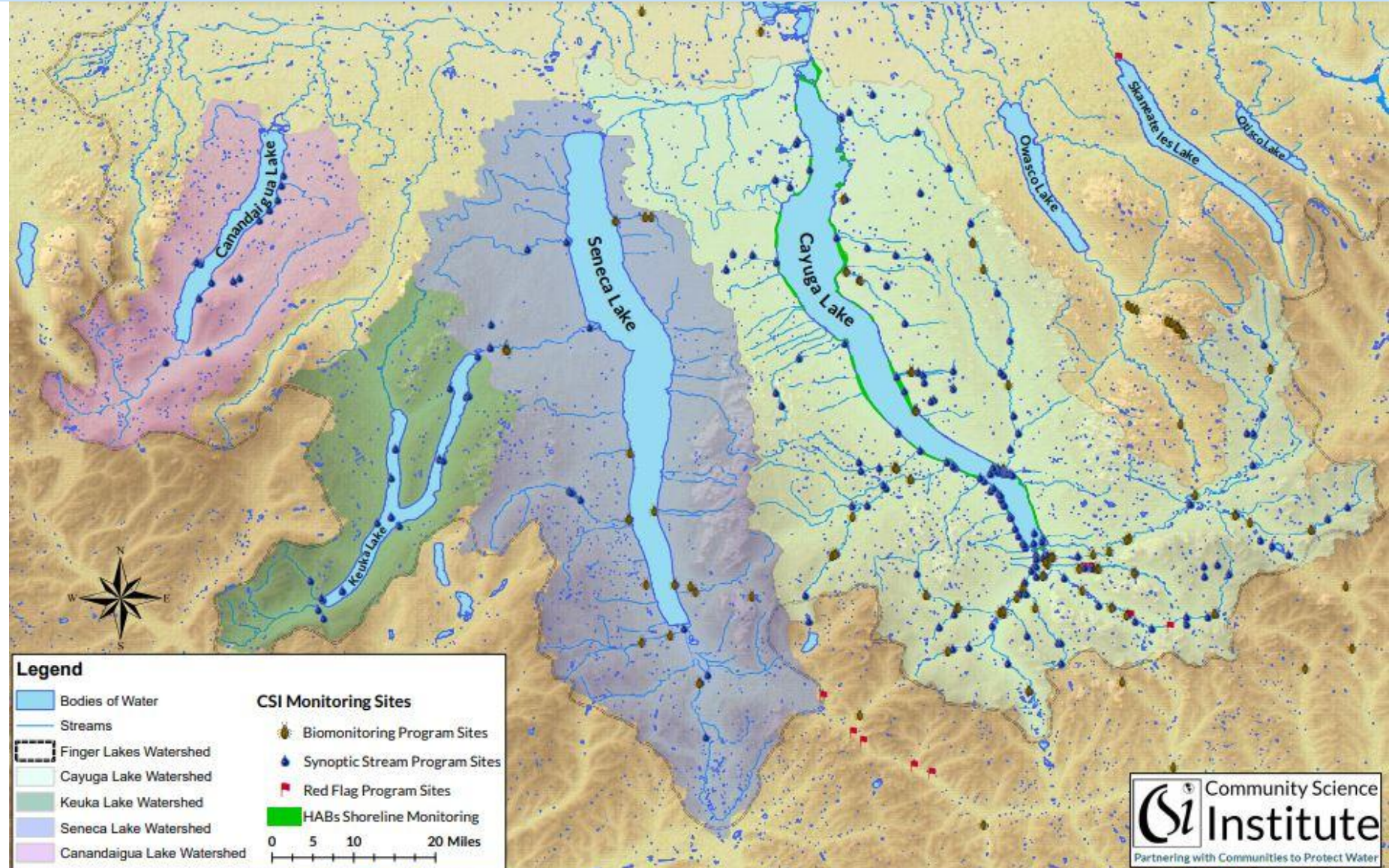
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# CSI Volunteer Monitoring Partnerships

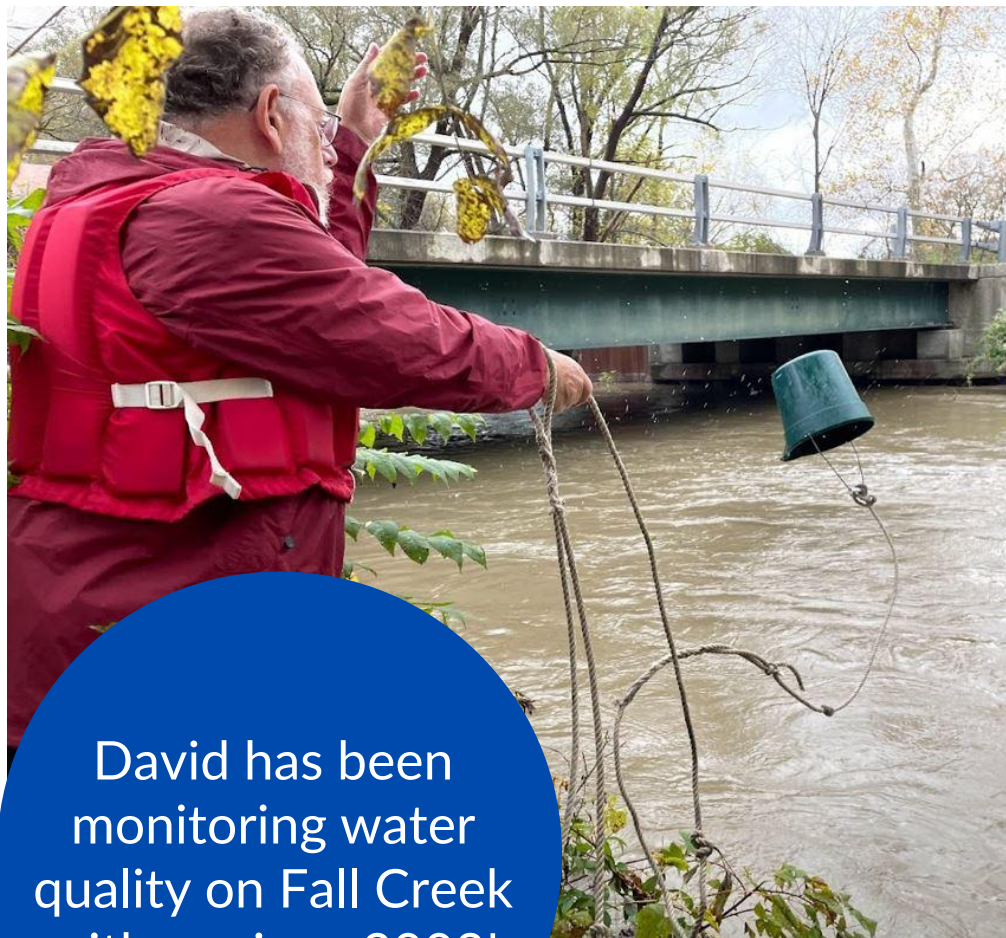
## Four Monitoring Partnerships

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



David has been monitoring water quality on Fall Creek with us since 2002!

**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.

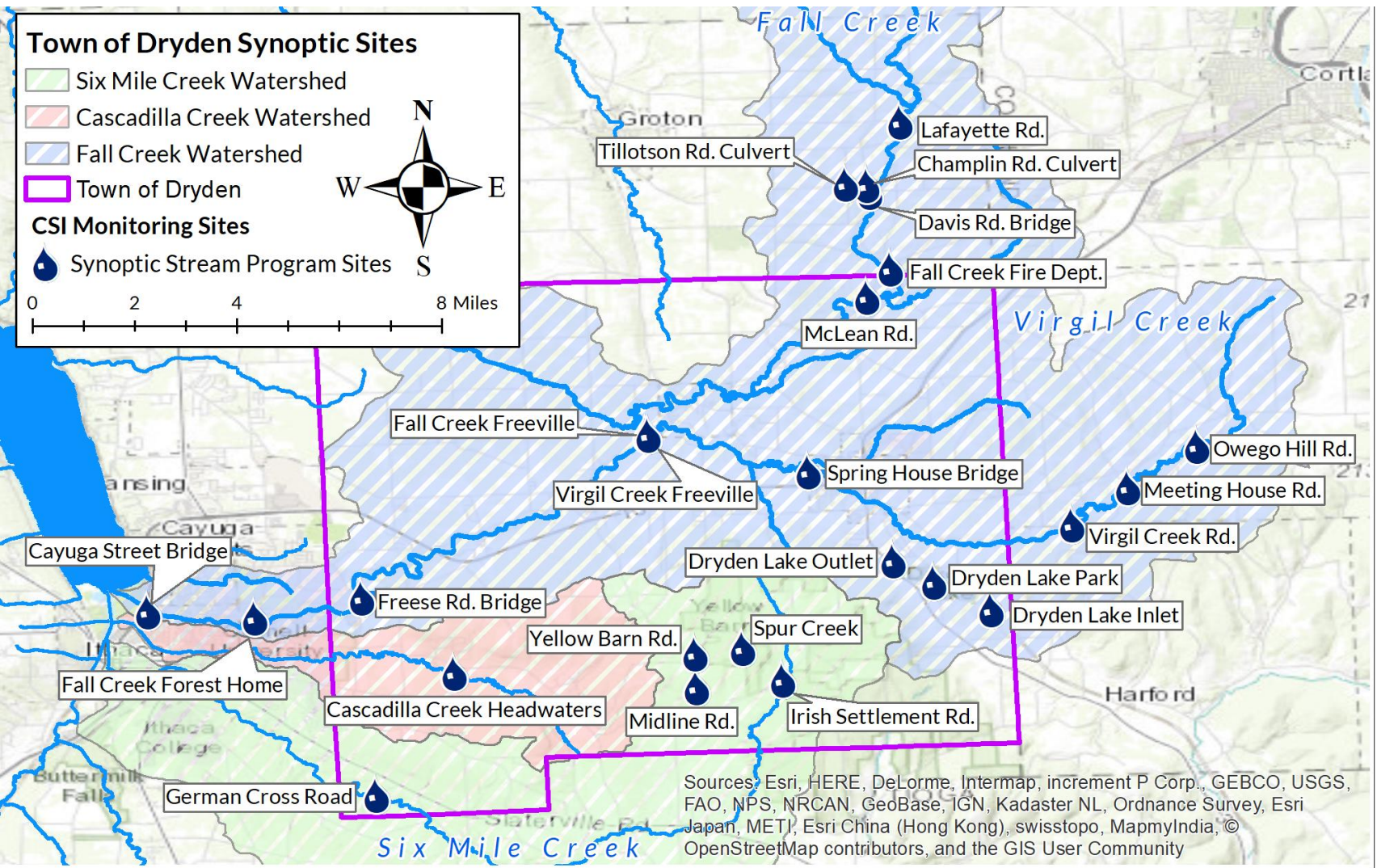
## Monitor streams and lakes for:

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

Volunteers collect samples from their designated stream 3-4 times each year

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

# CSI Town of Dryden Water Quality Data – Synoptic Stream Chemistry



CSI's synoptic stream volunteers monitor the following streams in the Town of Dryden:

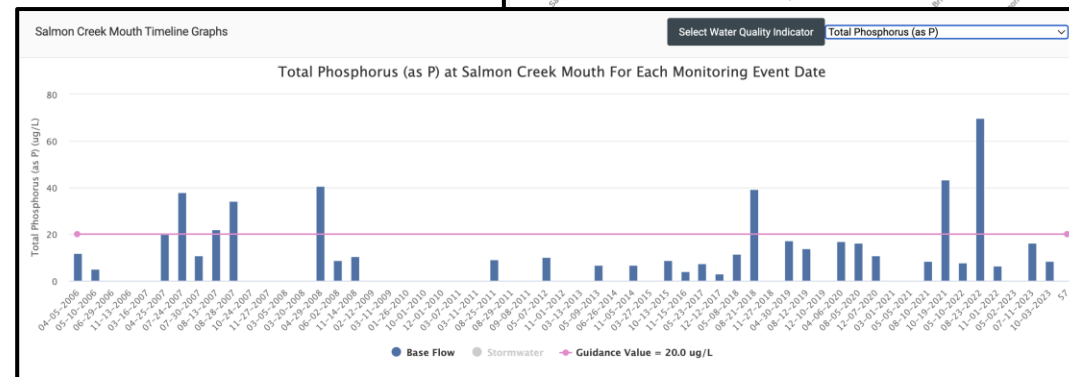
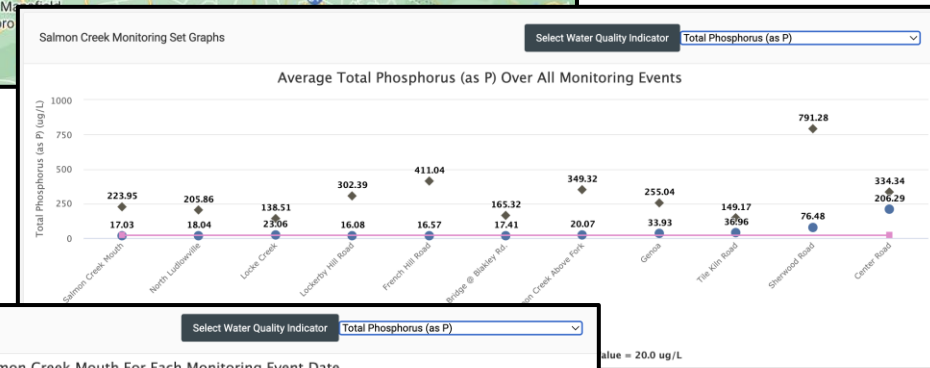
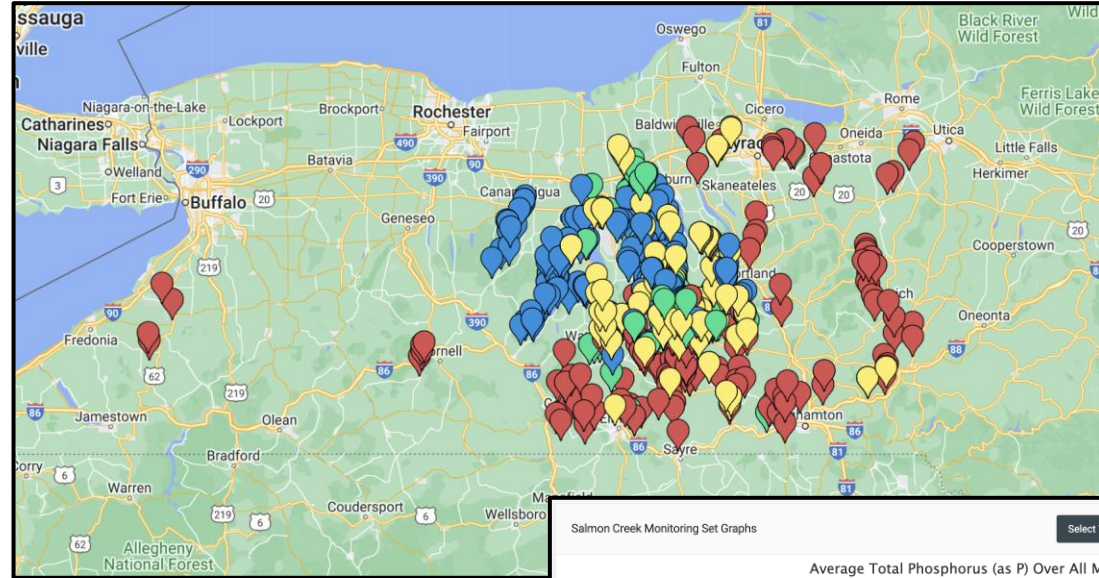
1. [Fall Creek](#)
2. [Virgil Creek](#)
3. [Cascadilla Creek](#) (tributary of Cayuga Inlet)
4. [Six Mile Creek](#)

These volunteers sample 14 locations in the Town of Dryden

The Fall Creek watershed has the largest drainage area of any of the Cayuga Lake tributaries (129 mi<sup>2</sup>)

# 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

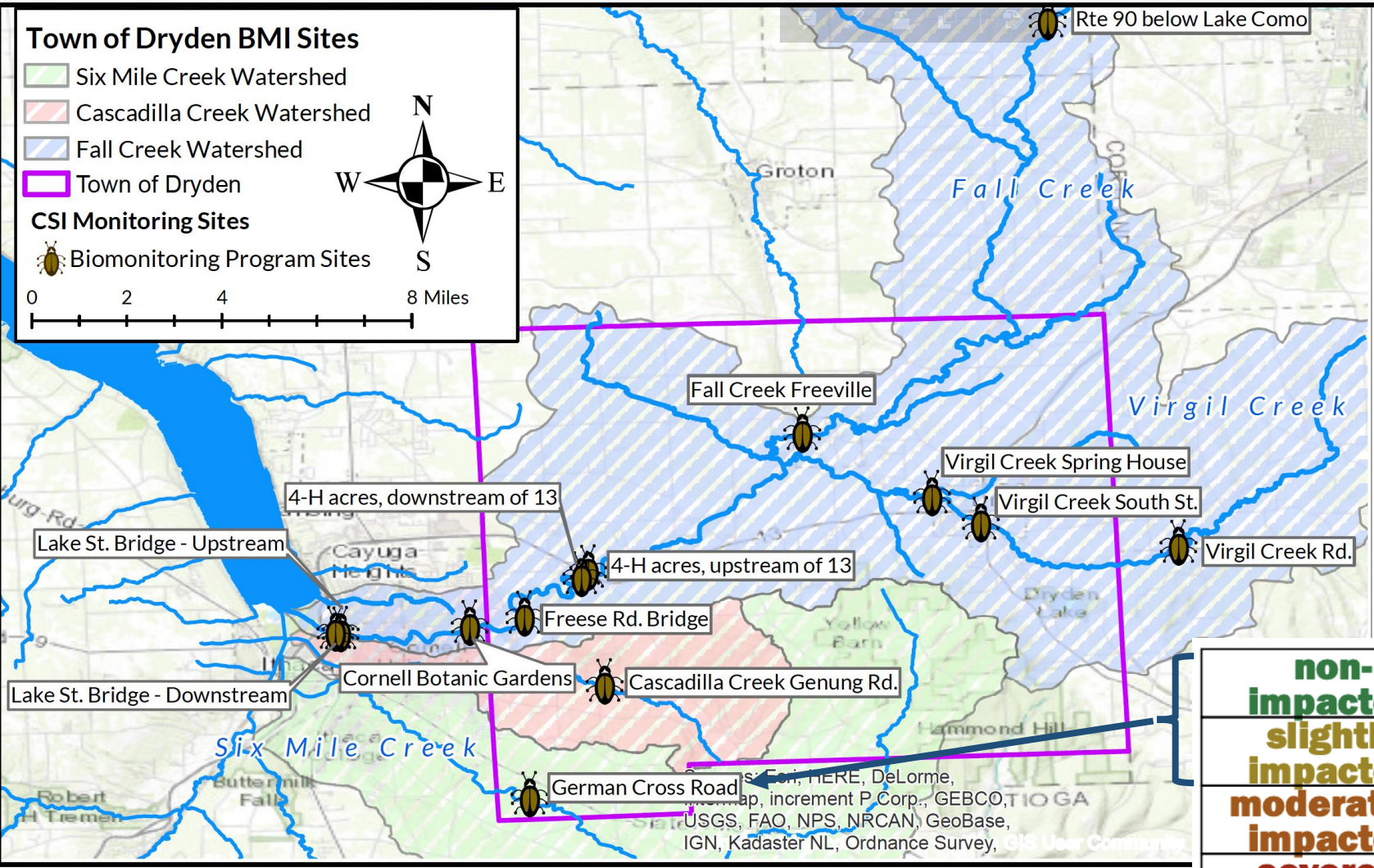
<b>non-impacted</b>
<b>slightly impacted</b>
<b>moderately impacted</b>
<b>severely impacted</b>



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



# CSI Town of Dryden Water Quality Data - Biomonitoring



CSI's biomonitoring volunteers monitor the following streams in the Town of Dryden:

1. Fall Creek
2. Virgil Creek
3. Cascadilla Creek (tributary of Cayuga Inlet)
4. Six Mile Creek

Our German Cross Road site on Six Mile Creek has been monitored every year since the start of our biomonitoring program in 2011!

This site's Biological Assessment Profile (BAP) tends to fluctuate between "non-impacted" and "slightly impacted".

non-impacted
slightly impacted
moderately impacted
severely impacted

2021 Biomonitoring Results

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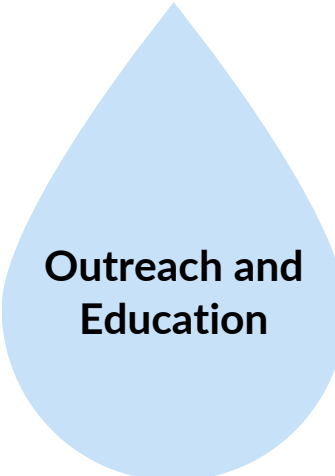
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# CSI Fee-for-Service Water Testing

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

CSI 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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HAB or HAB Not? Oscillatoria Clumps in the Cayuga Lake Watershed • page 6

Chloride in Cayuga Lake • page 8

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

Annual Water Bulletin Newsletter

**CHLORIDE** CSI 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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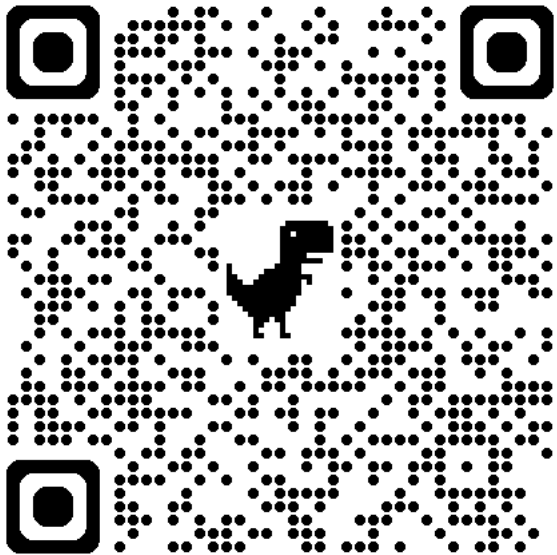
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Join our email list for monthly updates



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



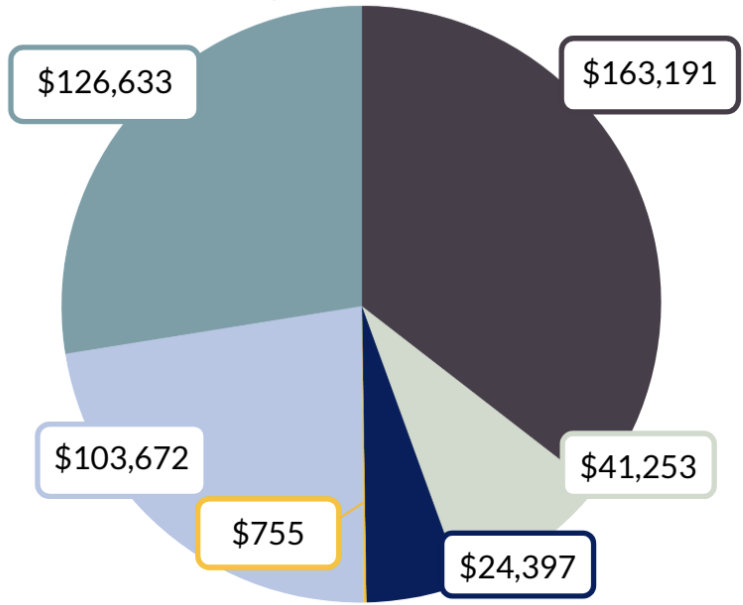
# CSI's 2023 Finances

## Financial Report



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

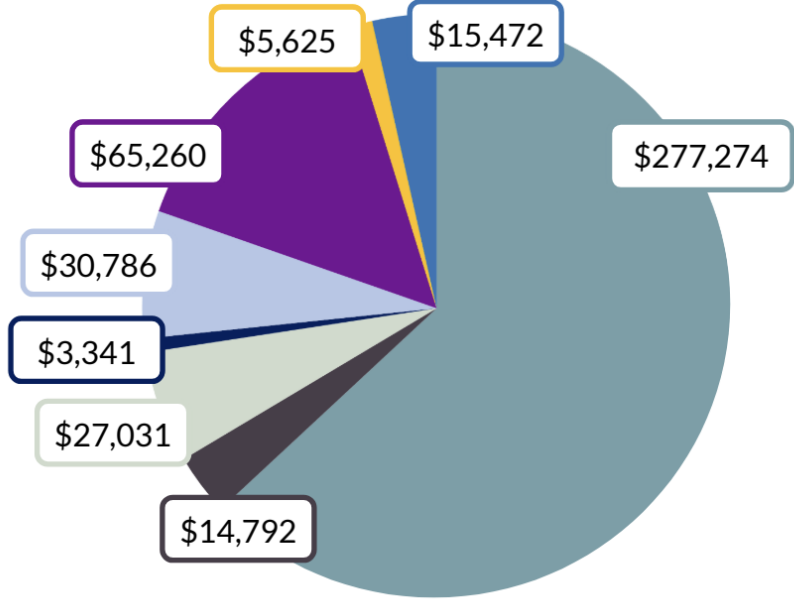
Includes \$49.49 interest and dividends



- 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

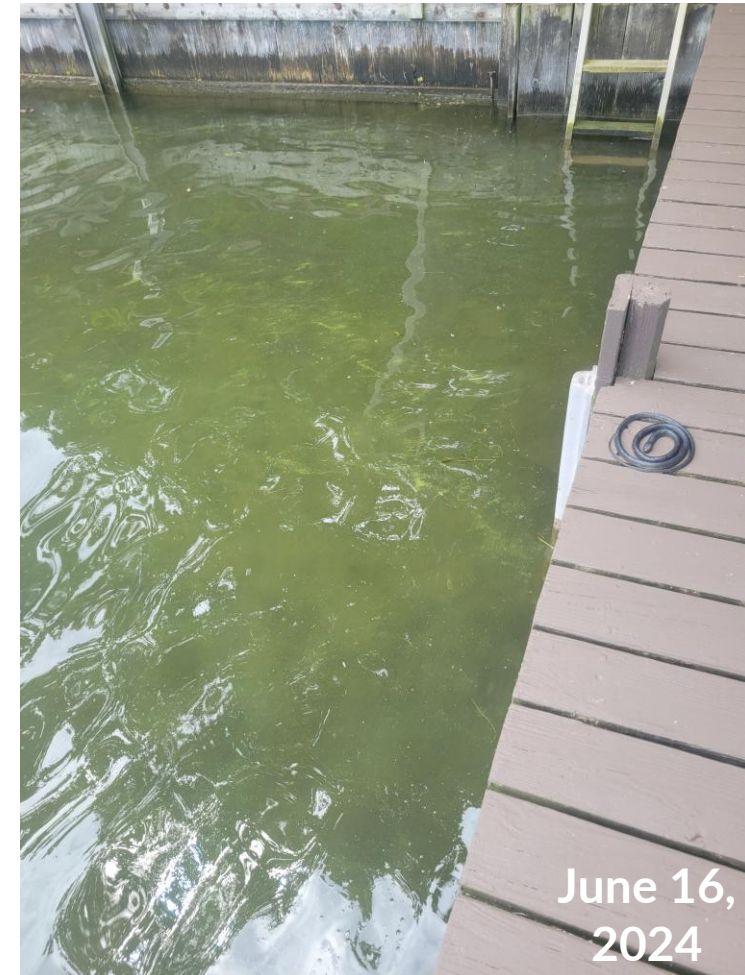
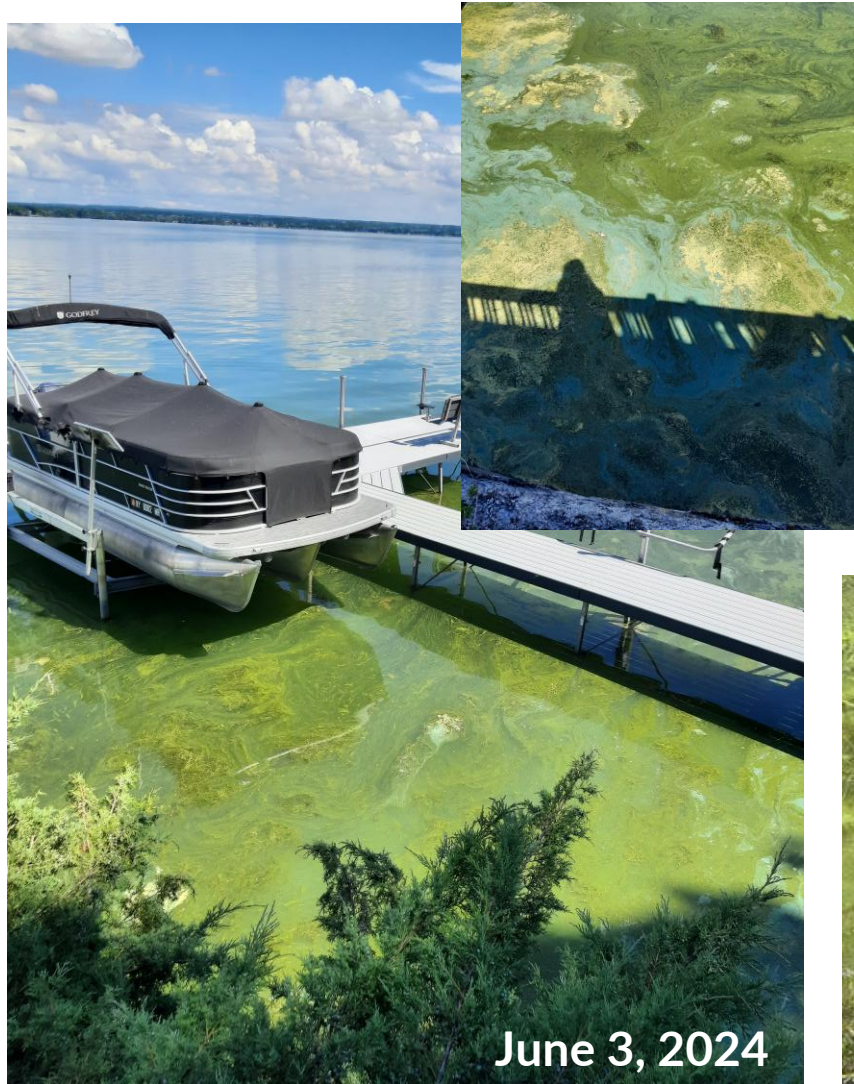


- Personnel
- Web Services
- Sub-Contract Lab Tests
- Contract Labor
- Lab and Office Supplies
- Fees and Miscellaneous Expenses
- Indirect Costs
- Strategic Planning

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

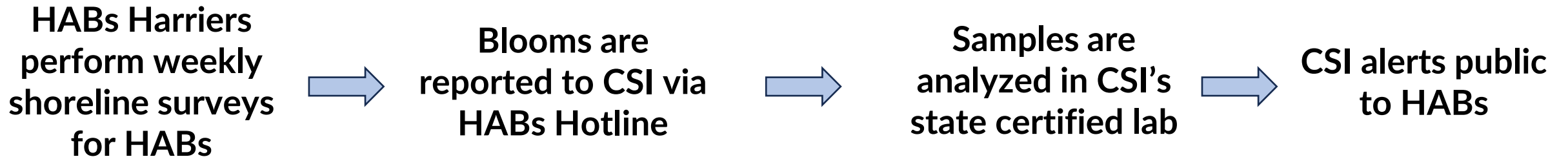
Town of Enfield	\$2,601
Town of Lansing	\$7,140
Town of Caroline	<b>\$3,432</b>
Town of Danby	\$4,376
Town of Ulysses	\$6,567
City of Ithaca	\$10,790
<b>Town of Dryden</b>	<b>\$11,420</b>
Town of Ithaca	\$22,844
Town of Newfield	\$6,532
Town of Scipio	\$500
Cayuga County	\$39,594
Seneca County	\$5,300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

# Cayuga Lake Harmful Algal Bloom (HAB) Monitoring Partnership



# Cayuga Lake Harmful Algal Bloom (HAB) Monitoring Partnership

**Purpose:** Collect actionable data on cyanobacteria blooms, protect public health, and relay bloom information and testing results quickly and efficiently.



*The Cayuga Lake HABs Monitoring Program is led by CSI in collaboration with CLWN and DCL*

# Cayuga Lake Harmful Algal Bloom (HAB) Monitoring Partnership

HAB samples are analyzed to:

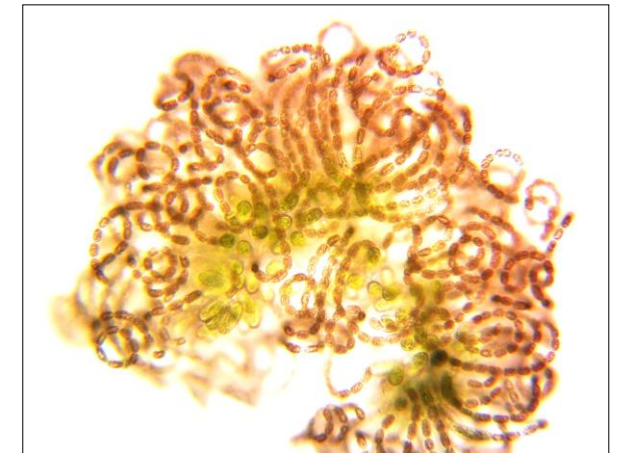
- Identify cyanobacteria genera
- Measure chlorophyll a
- Measure microcystin



*Microcystis sp.*

Bloom information is uploaded to CSI's **NEW**  
[HABs Database](#)

CSI reports all blooms to county health department  
officials and NYSDEC



*Dolichospermum sp.*