# 10 Years of Monitoring Water Quality in Seneca Lake Tributaries with Community Science Institute

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Executive Director

Community Science Institute

Community Science Institute

Partnering with Communities to Protect Water

Glen Eldridge Creek
*Photo by Lou DeSarno*

# Agenda

- Community Science Institute
- CSI X SLPWA Partnership
- Water Quality Monitoring Results
- Why it Matters
- Q&A

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**Community Science Institute**

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# Community Science Institute

Community Science Institute
Partnering with Communities to Protect Water

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

**CSI offers three types of programming:**

**Fee-for-Service Water Testing**

**Volunteer Water Monitoring Partnerships**

**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.

# CSI's Water Monitoring Partnerships

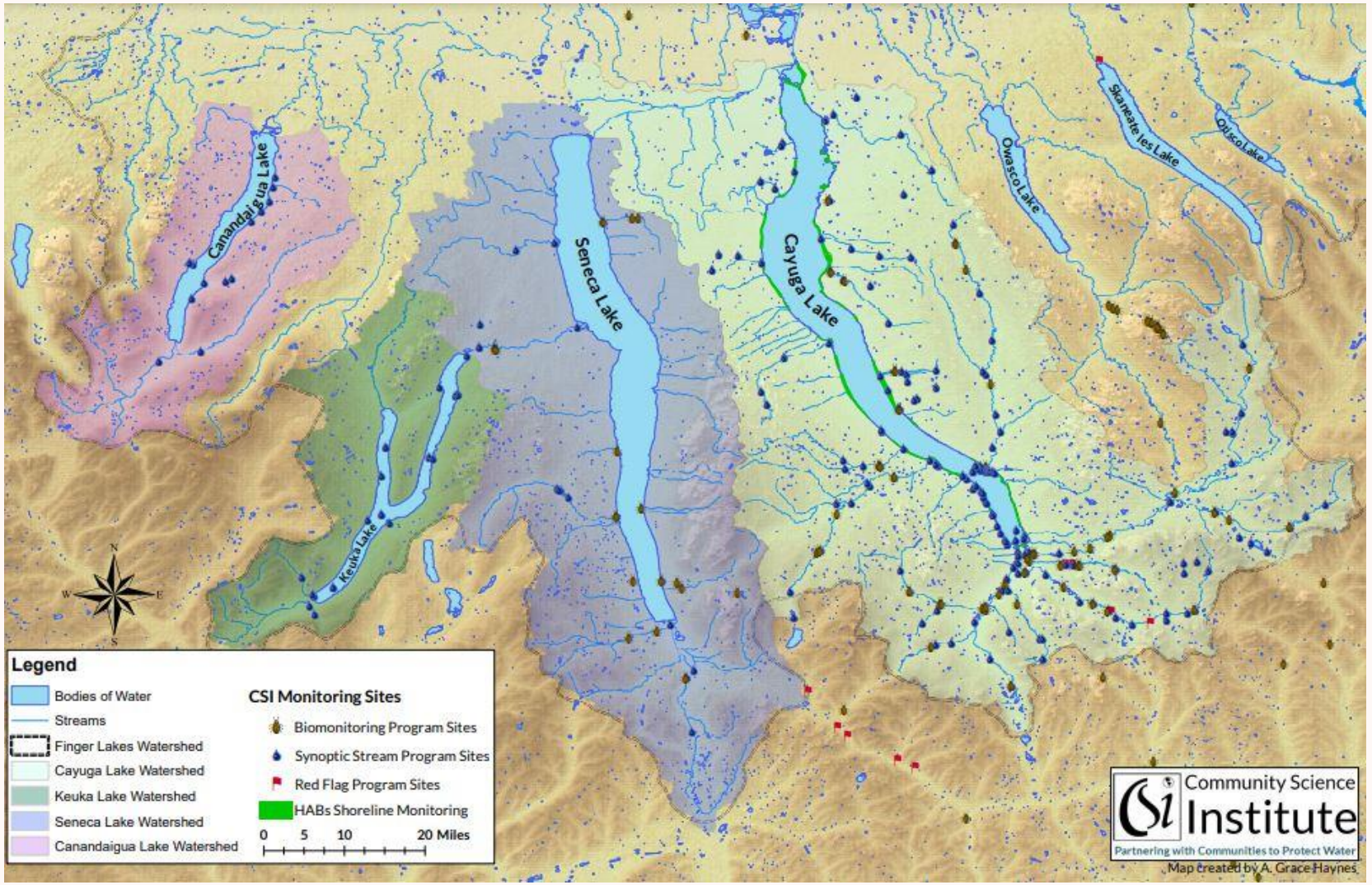
1. Synoptic Sampling

2. Red Flag Monitoring

3. Biomonitoring

4. Harmful Algal Bloom (HAB) Monitoring

**CSI recruits, trains, and coordinates over 250 volunteers!**



# CSI's Synoptic Sampling Program

Big Stream
*April 4, 2024*

**Volunteers work in groups to collect samples under baseflow and stormwater conditions.**

**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 for:**

- Nutrients
- Sediment
- Bacteria
- Salt
- Other general water quality indicators

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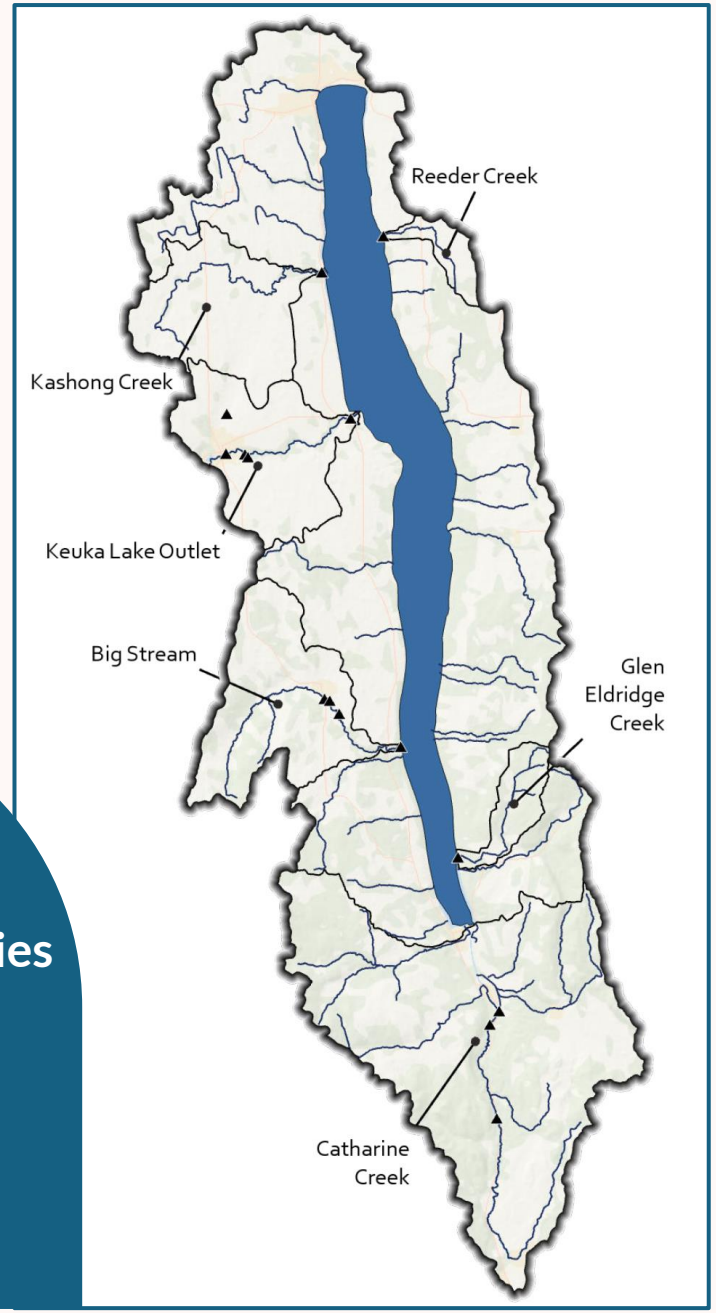
# CSI X SLPWA Partnership

- 2014 – present
- 6 streams monitored regularly
  - Reeder Creek
  - Kashong Creek
  - Keuka Outlet
  - Big Stream
  - Glen Eldridge Creek
  - Catharine Creek
  - Some monitoring on Castle Creek, but not consistent




**CSI's role:**

- **Provide volunteer training and supplies**
- **Certified water testing**
- **Publish data on public database**

# CSI X SLPWA Partnership

- 1-2 baseflow events/year + as many stormwater events as possible
  - Stormwater sampling is only done at the mouth locations
- Regularly monitoring for:
  - *E.coli*
  - Total Phosphorus
  - Soluble Reactive Phosphorus
  - Nitrate-+Nitrite-Nitrogen (NOx)
  - Total Kjeldahl Nitrogen
  - Total Suspended Solids
  - Conductivity
  - Temperature

Big Stream
*March 29, 2020*

# CSI X SLPWA Partnership

**Together, with the help of ~60 volunteers, we have created a dataset of over 6,500 water quality data points from Seneca Lake tributaries!**

Havana Glen Inlet
*Photo by Lou DeSarno*

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CSI X SLPWA Partnership

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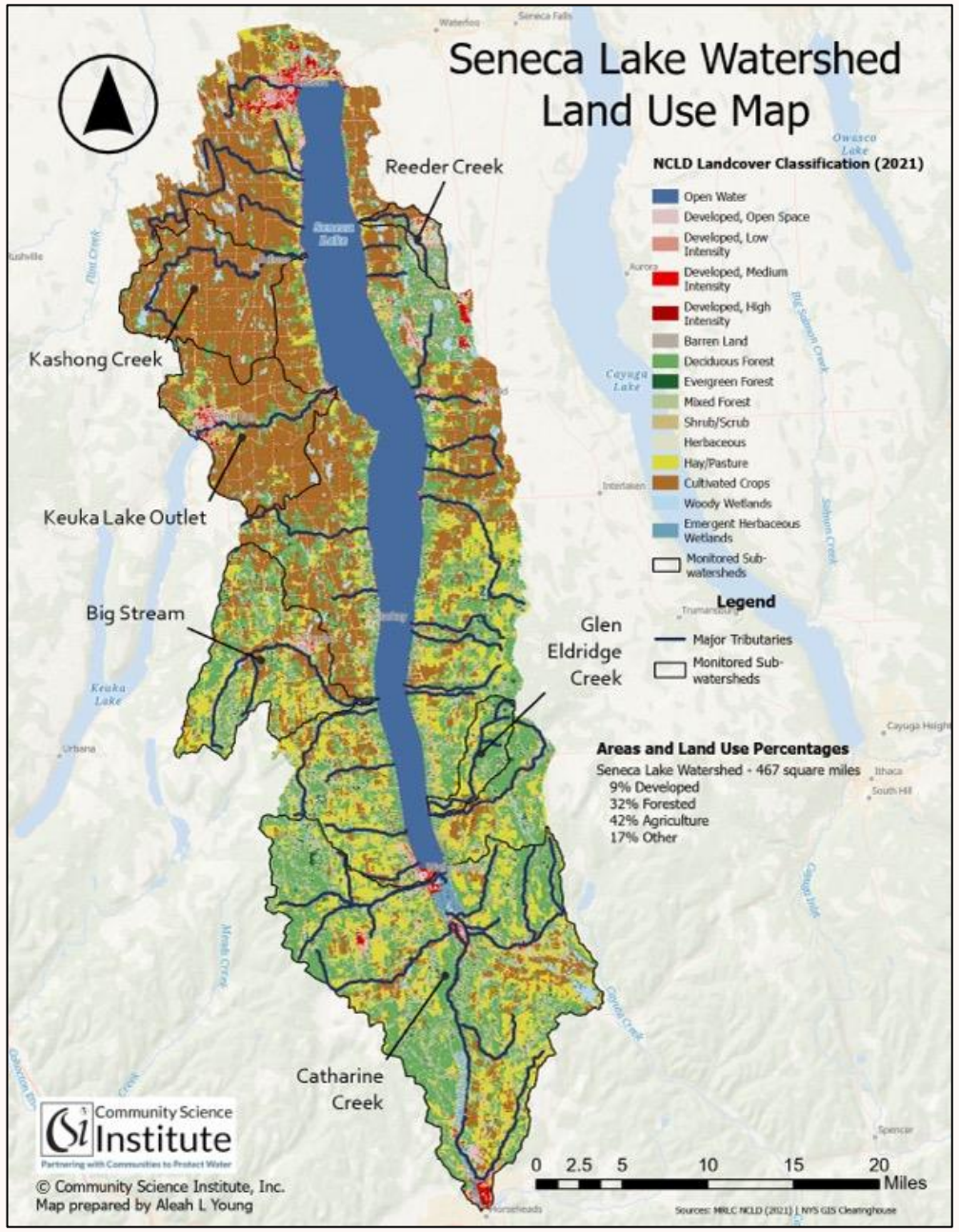
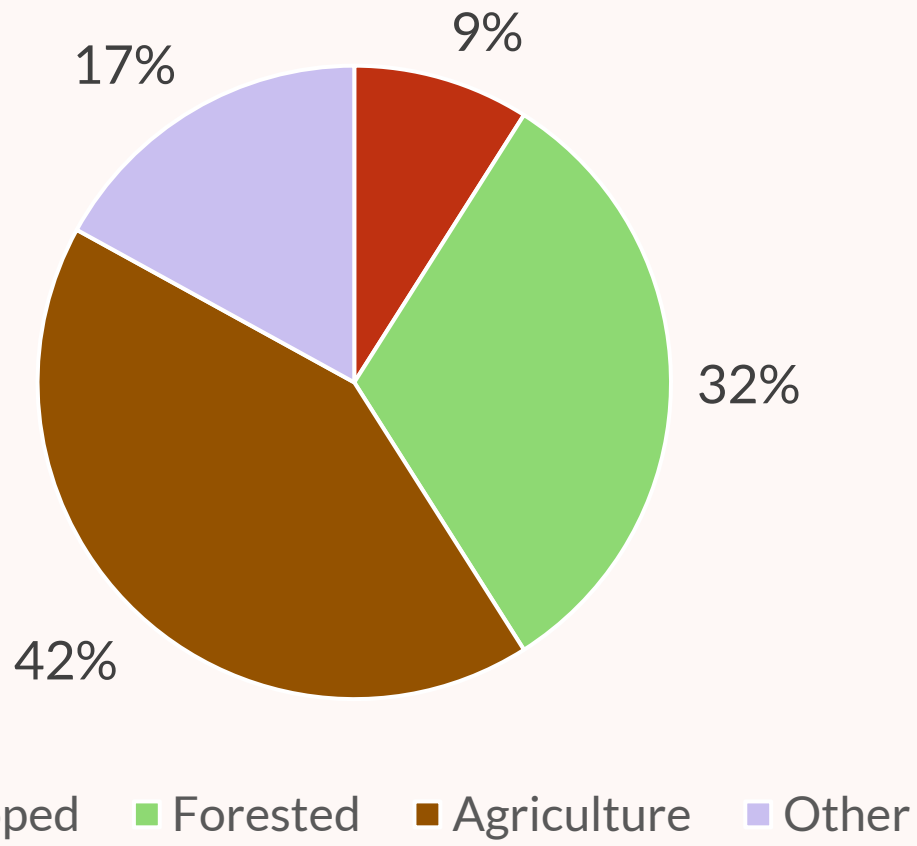
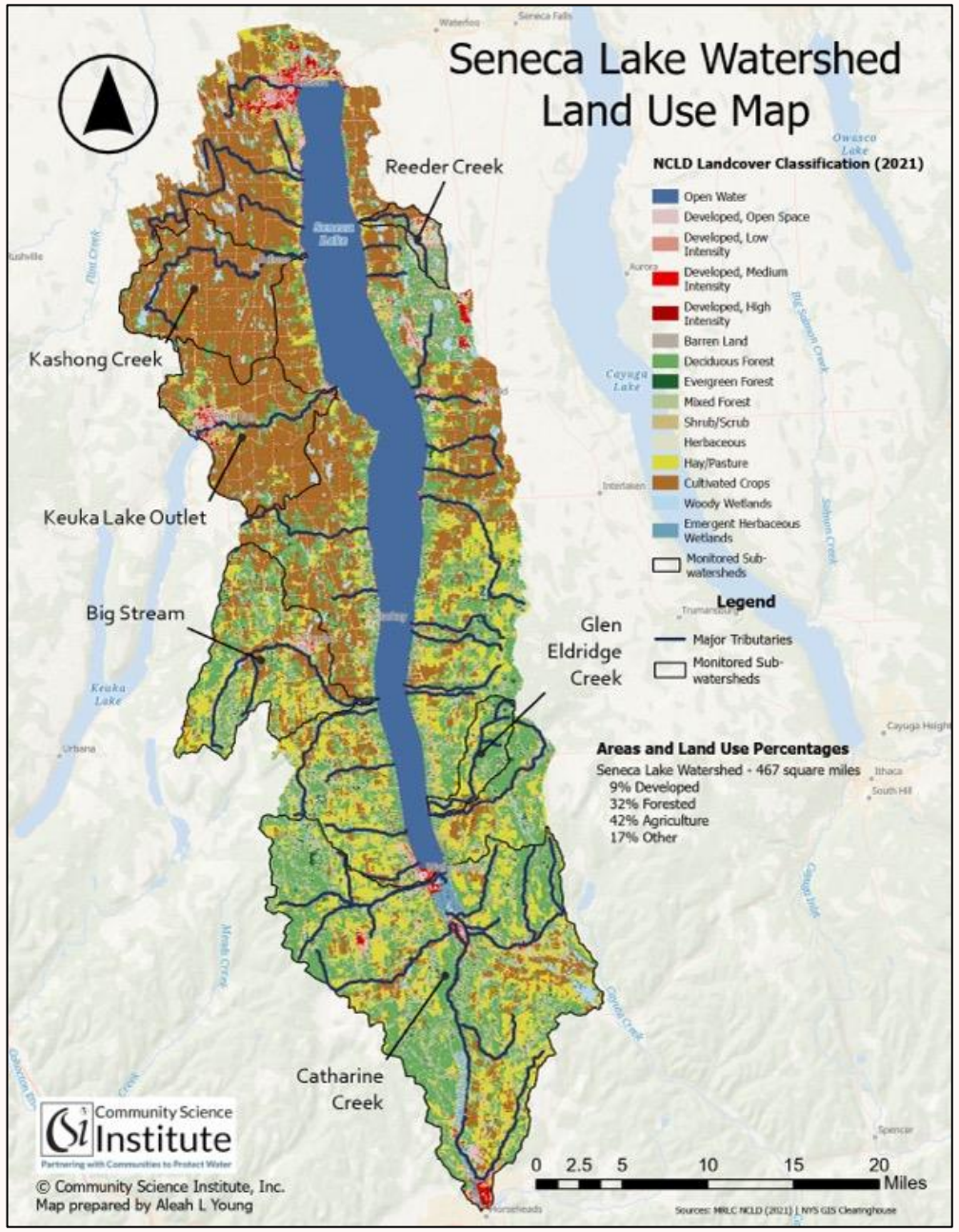


# Seneca Lake Watershed



# Median *E.coli* Counts

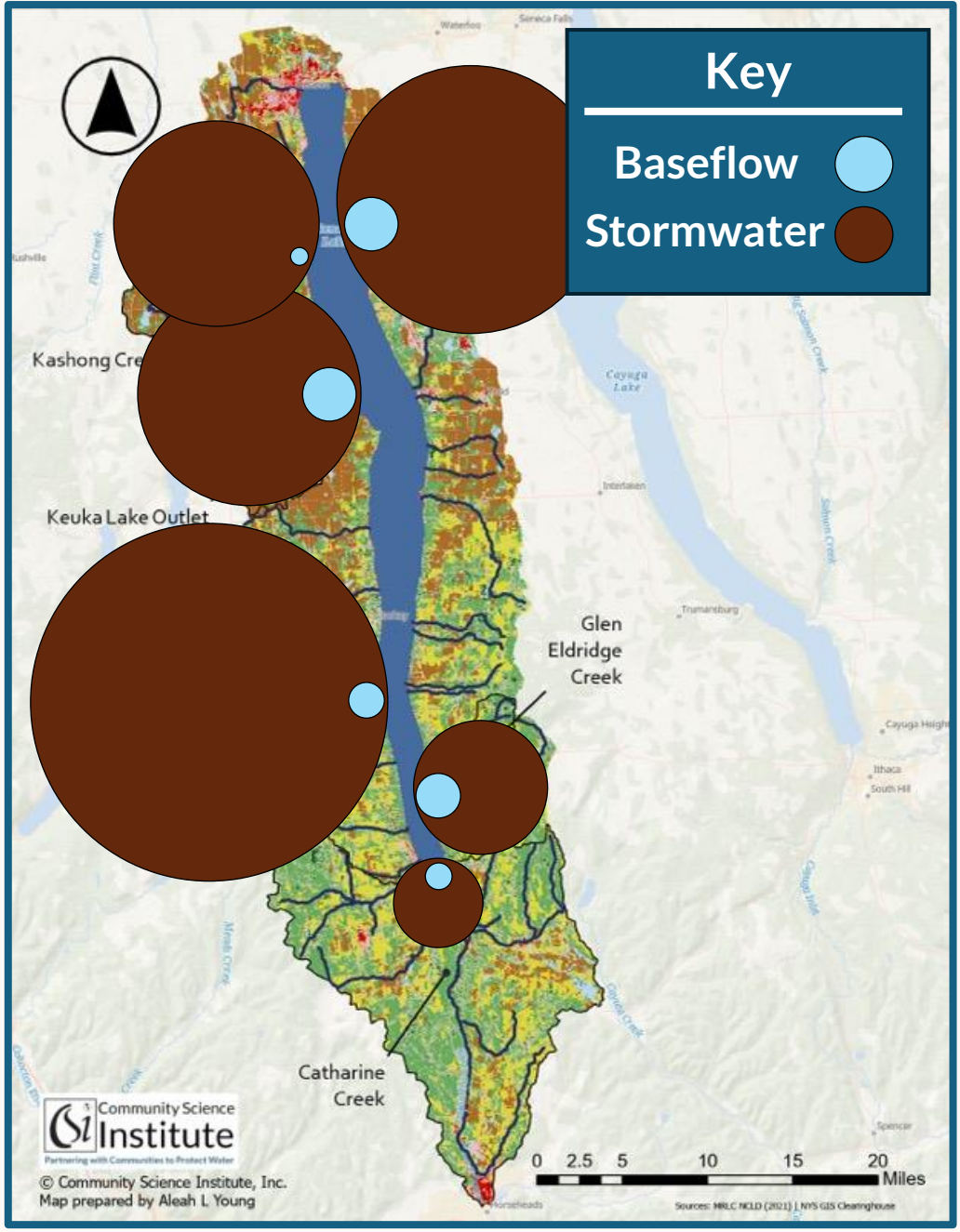
## Contact Recreation Limit = 235 colonies/100 mL

| Stream (North to South) | Baseflow | |
|---|---|---|
| | Counts (colonies/100 mL) | % CRL Exceedances |
| Reeder Creek | 150 | 31% |
| Kashong Creek | 40 | 21.1% |
| Keuka Outlet | 150 | 39.1% |
| Big Stream | 75 | 20.8% |
| Glen Eldridge Creek | 92 | 22.2% |
| Catharine Creek | 50 | 7.7% |

# Median *E.coli* Counts

## Contact Recreation Limit = 235 colonies/100 mL

| Stream (North to South) | Baseflow | | Stormwater | |
|---|---|---|---|---|
| | Counts (colonies/100 mL) | % CRL Exceedances | Counts (colonies/100 mL) | % CRL Exceedances |
| **Reeder Creek** | 150 | 31% | 8,875 | 100% |
| **Kashong Creek** | 40 | 21.1% | 6,400 | 100% |
| **Keuka Outlet** | 150 | 39.1% | 7,700 | 100% |
| **Big Stream** | 75 | 20.8% | 10,000 | 100% |
| **Glen Eldridge Creek** | 92 | 22.2% | 630 | 100% |
| **Catharine Creek** | 50 | 7.7% | 500 | 83.3% |



# Median Total Phosphorus

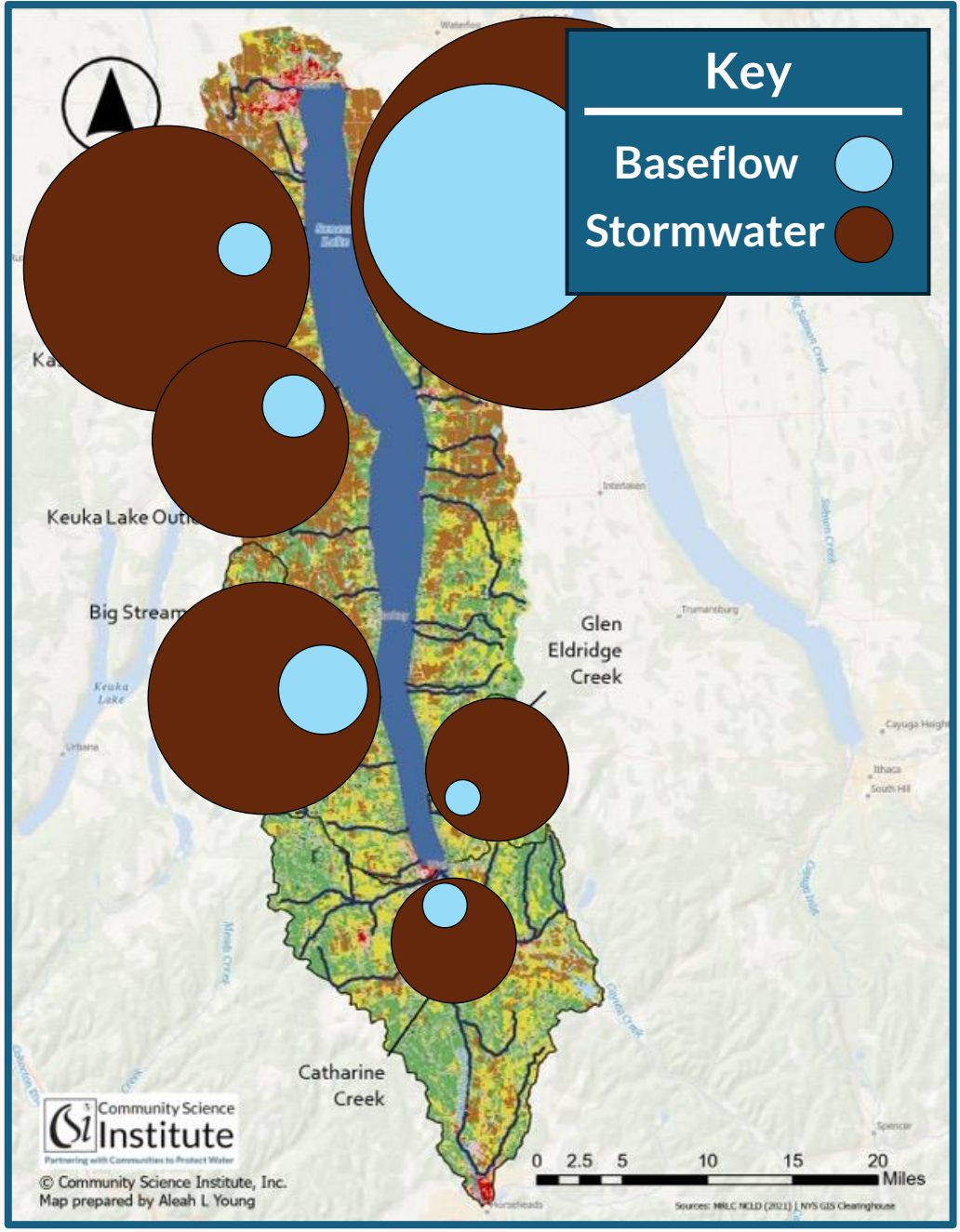
## Guidance Value = 20 ug/L

| Stream (North to South) | Baseflow | |
|---|---|---|
| | Concentration (ug/L) | % GV Exceedances |
| Reeder Creek | 276.0 | 100% |
| Kashong Creek | 24.2 | 70% |
| Keuka Outlet | 27.4 | 68% |
| Big Stream | 51.3 | 96% |
| Glen Eldridge Creek | 14.2 | 35.3% |
| Catharine Creek | 19.3 | 43.8% |

# Median Total Phosphorus

## Guidance Value = 20 ug/L

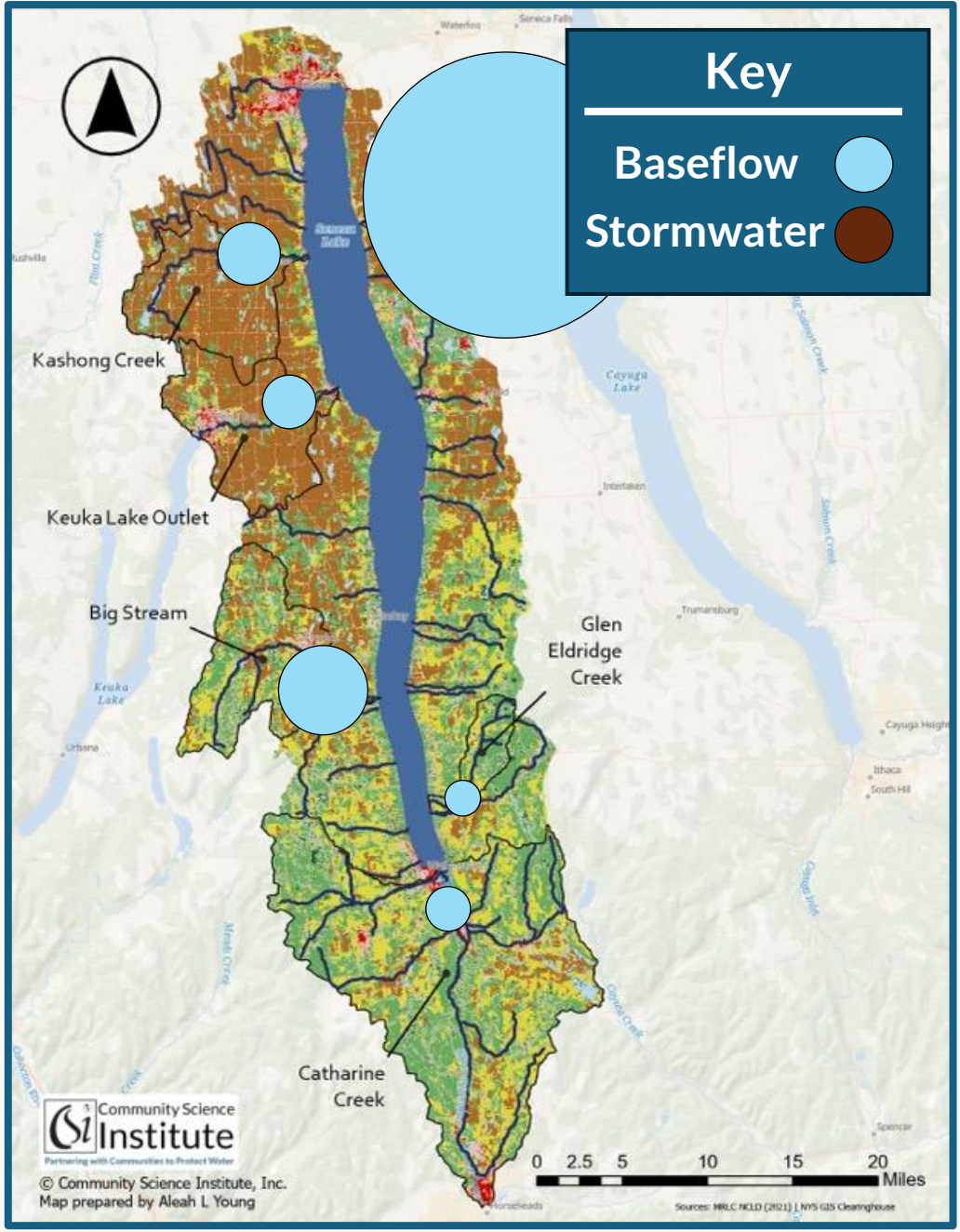
| Stream (North to South) | Baseflow | | Stormwater | |
|---|---|---|---|---|
| | Concentration (ug/L) | % GV Exceedances | Concentration (ug/L) | % GV Exceedances |
| **Reeder Creek** | 276.0 | 100% | 508.5 | 100% |
| **Kashong Creek** | 24.2 | 70% | 295.5 | 100% |
| **Keuka Outlet** | 27.4 | 68% | 199.5 | 100% |
| **Big Stream** | 51.3 | 96% | 245.0 | 100% |
| **Glen Eldridge Creek** | 14.2 | 35.3% | 63.7 | 50% |
| **Catharine Creek** | 19.3 | 43.8% | 53.4 | 75% |



# Median Soluble Reactive Phosphorus

## Guidance Value = 20 ug/L*

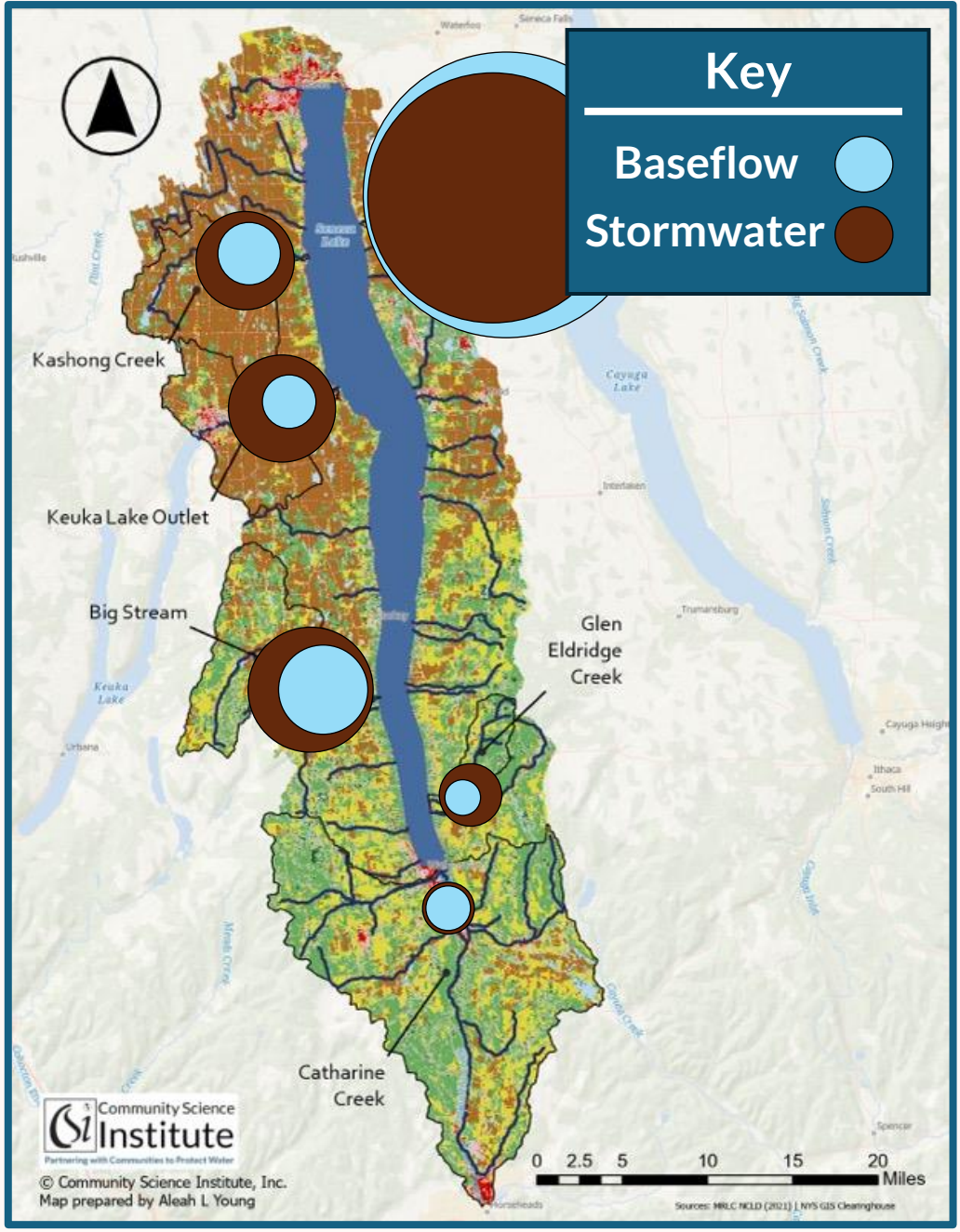
| Stream (North to South) | Baseflow | |
|---|---|---|
| | Concentration (ug/L) | % GV Exceedances |
| Reeder Creek | 303.5 | 100% |
| Kashong Creek | 21.2 | 61.9% |
| Keuka Outlet | 14.2 | 26.9% |
| Big Stream | 43.5 | 79.3% |
| Glen Eldridge Creek | 9.1 | 4.8% |
| Catharine Creek | 11.1 | 14.3% |



# Median Soluble Reactive Phosphorus

## Guidance Value = 20 ug/L*

| Stream (North to South) | Baseflow | | Stormwater | |
|---|---|---|---|---|
| | Concentration (ug/L) | % GV Exceedances | Concentration (ug/L) | % GV Exceedances |
| **Reeder Creek** | 303.5 | 100% | 280.5 | 100% |
| **Kashong Creek** | 21.2 | 61.9% | 58.2 | 100% |
| **Keuka Outlet** | 14.2 | 26.9% | 62.0 | 91.7% |
| **Big Stream** | 43.5 | 79.3% | 77.4 | 94.1% |
| **Glen Eldridge Creek** | 9.1 | 4.8% | 21.6 | 50% |
| **Catharine Creek** | 11.1 | 14.3% | 13.9 | 37.5% |



# Median Total Nitrogen

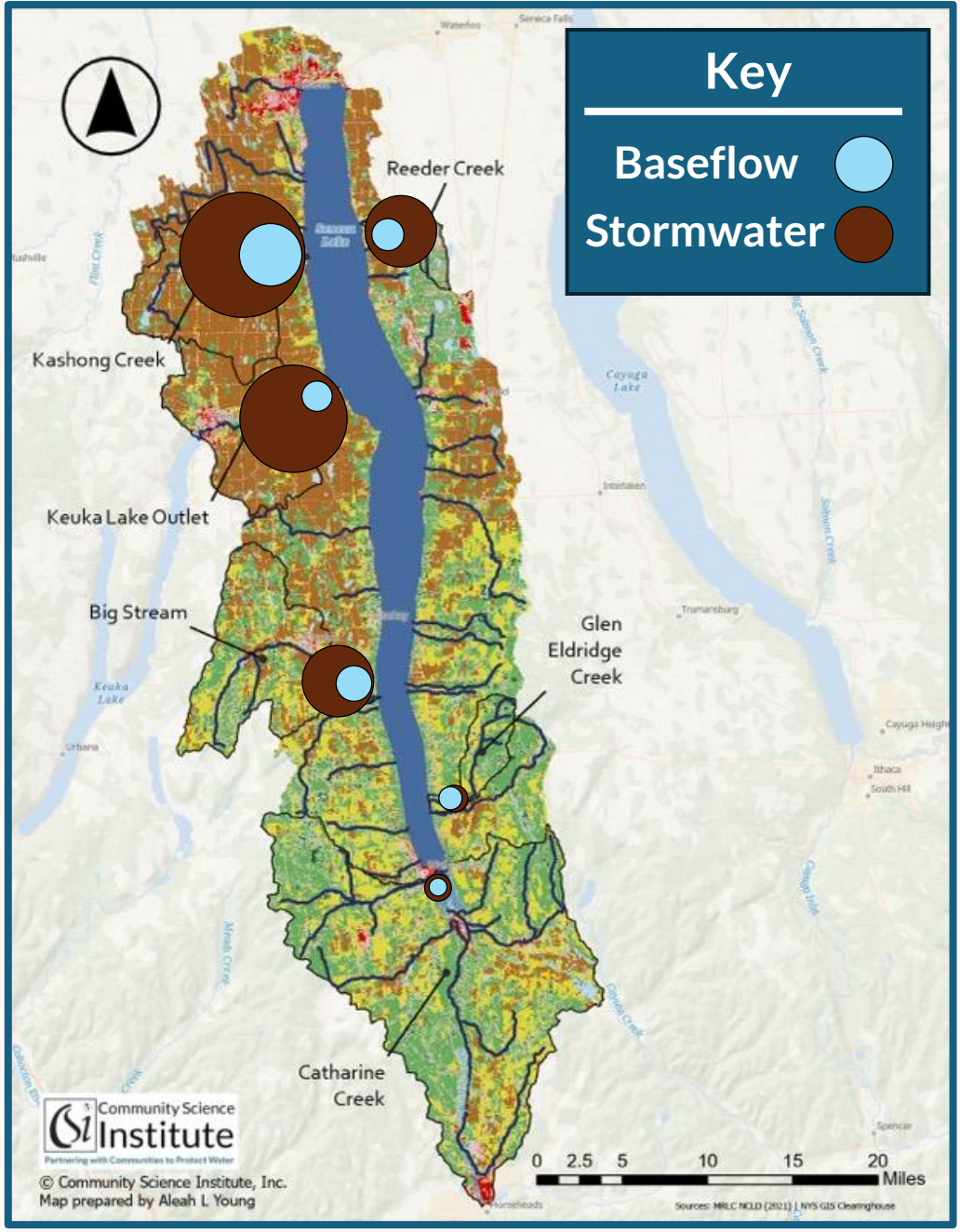
## NOx + Total Kjeldahl Nitrogen = Total Nitrogen

| Stream (North to South) | Baseflow (mg/L) |
|---|---|
| Reeder Creek | 1.16 |
| Kashong Creek | 2.62 |
| Keuka Outlet | 1.08 |
| Big Stream | 1.43 |
| Glen Eldridge Creek | 0.60 |
| Catharine Creek | 0.39 |

# Median Total Nitrogen

## NOx + Total Kjeldahl Nitrogen = Total Nitrogen

| Stream (North to South) | Baseflow (mg/L) | Stormwater (mg/L) |
|---|---|---|
| Reeder Creek | 1.16 | 2.70 |
| Kashong Creek | 2.62 | 4.55 |
| Keuka Outlet | 1.08 | 3.34 |
| Big Stream | 1.43 | 2.71 |
| Glen Eldridge Creek | 0.60 | 0.75 |
| Catharine Creek | 0.39 | 0.72 |



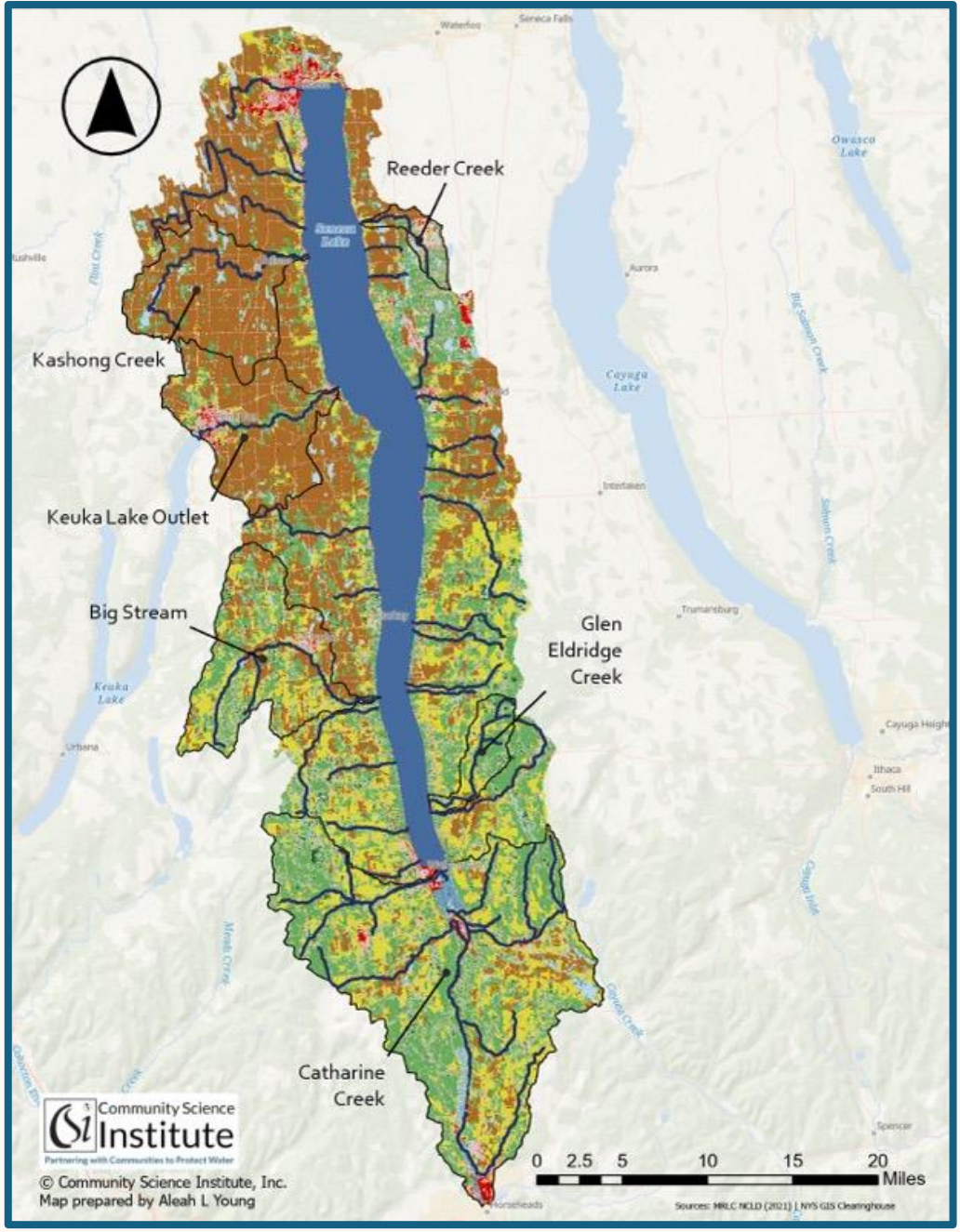
# Summary

- ***E.coli:*** Counts are typically low under baseflow conditions, but explode under stormwater conditions

- **Phosphorus:** It is not uncommon for the more northern streams to exceed guidance values for TP. Reeder Creek has much higher TP and SRP concentrations than the other five creeks. All Reeder Creek mouth samples have exceeded guidance values for TP and SRP

- **Nitrogen:** Total Nitrogen levels are average. Highest concentrations are seen in Kashong Creek.

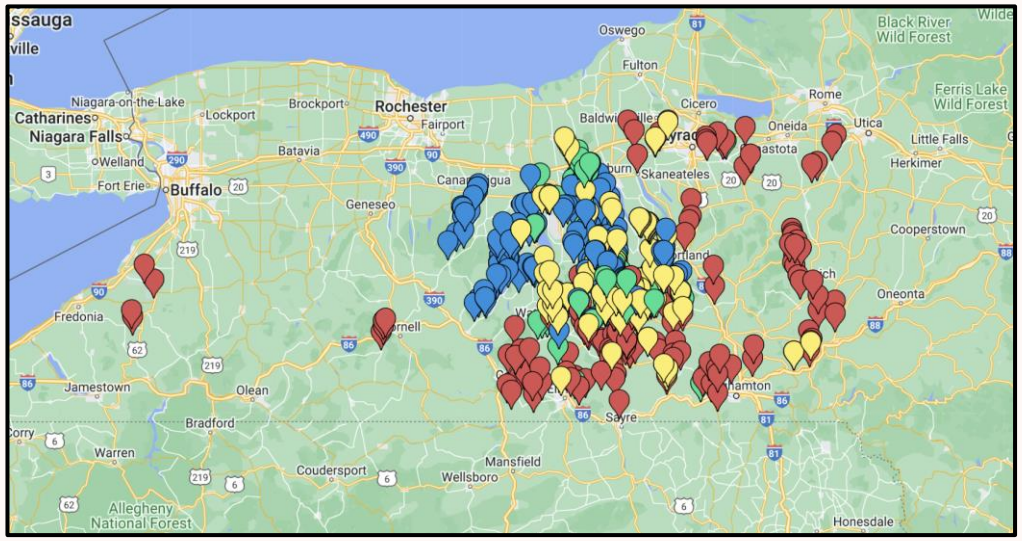
- Across all nutrients and *E.coli*, Glen Eldridge Creek and Catharine Creek tend to have the lowest values and the fewest percent of guidance value exceedances.



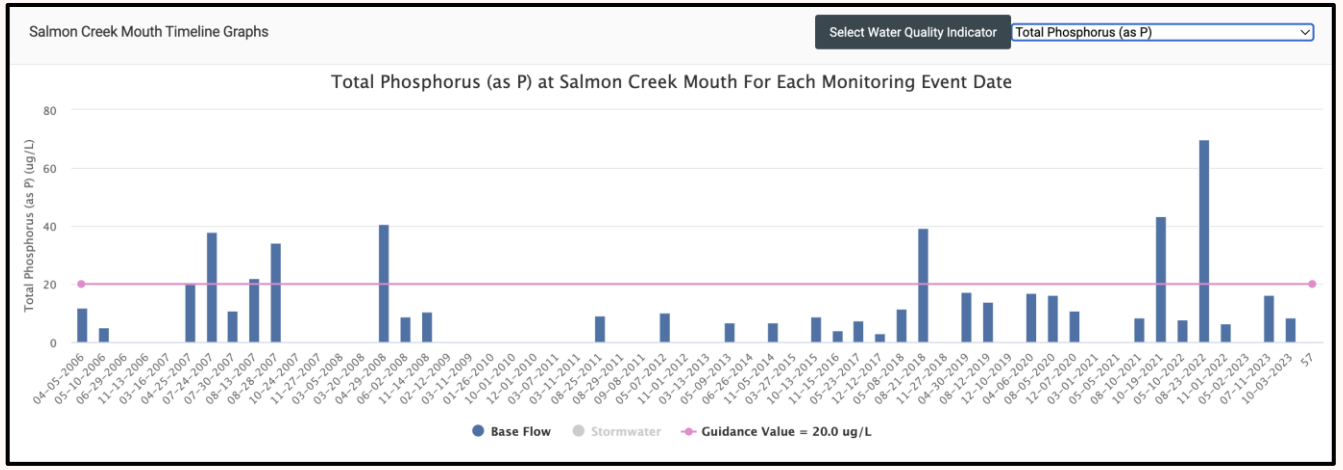
# Want to dive deeper into the data?

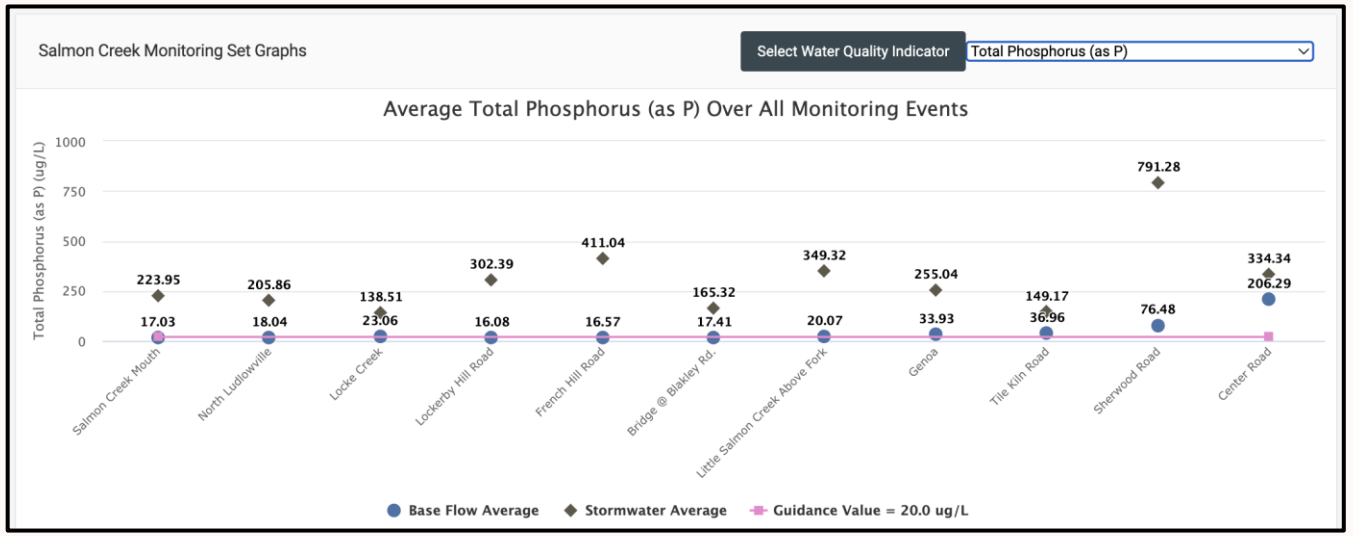
# Visit CSI's Water Quality Database!

## Observe trends in water quality across space and time




www.database.communityscience.org



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Water Quality Monitoring Results

**Why it Matters**

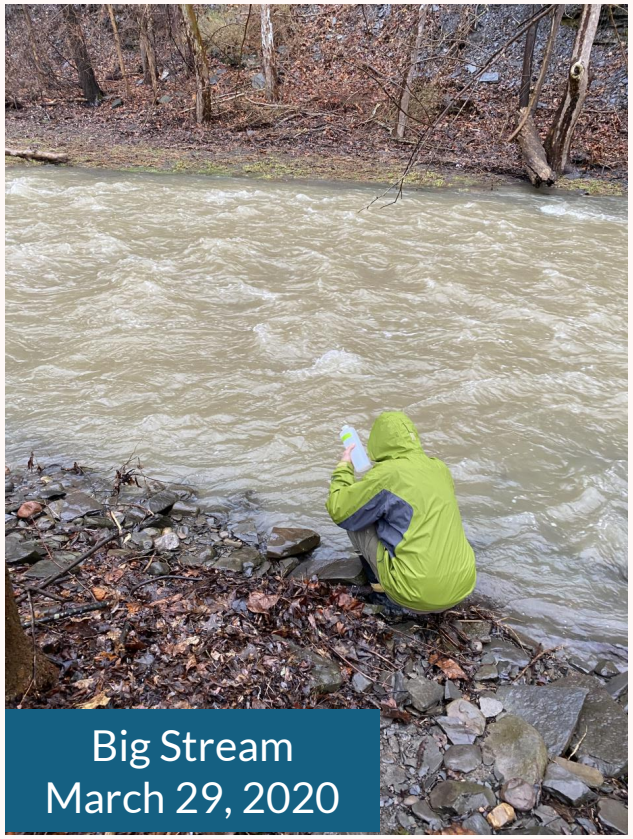
Q&A

# Long-Term Volunteer Monitoring: Why it matters

- Development of management plans and strategies
  - e.g., Seneca-Keuka 9E Plan
- Detect and respond to changes in water quality quickly
- Cover a greater geographic area
  - e.g., smaller streams
- Engage residents in water quality protection
  - Leverage local knowledge
  - Build trust in science
  - Inspire individual and collective action to protect water quality

Carol DeSarno
Catharine Creek
June 6, 2023

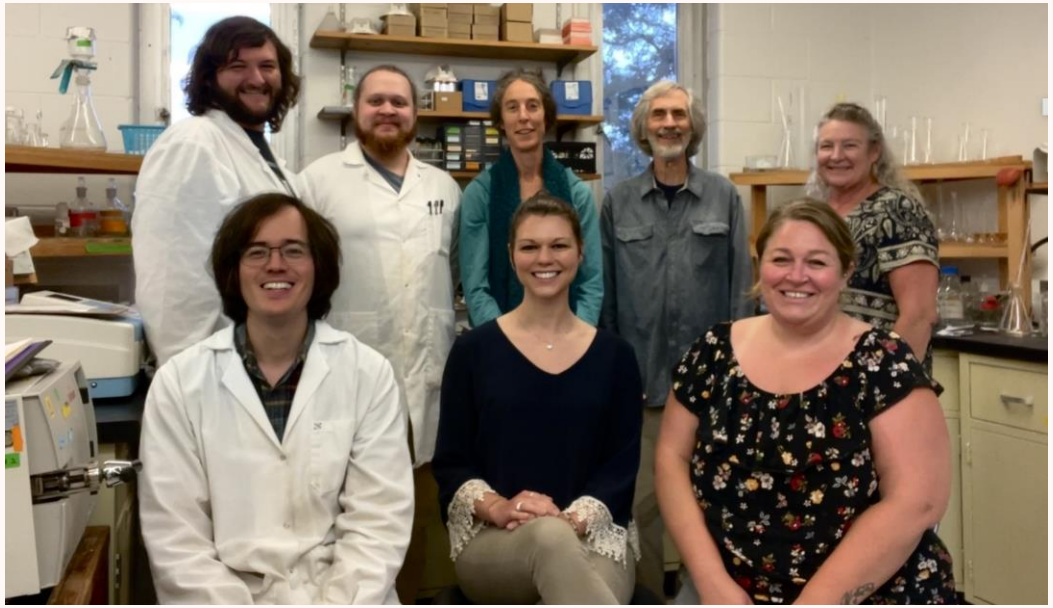
# Acknowledgements



Big Stream
March 29, 2020

**SLPWA Stream Monitoring Volunteers**

Seneca Lake PURE WATERS Association



**CSI Staff**

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# Stay in touch

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@communityscienceinstitute

## Contact us and learn more

info@communityscience.org

(607) 257-6606

www.communityscience.org

# Extra Slides

# Specific Conductance

## Guidance Value = 500 $\mu$S/cm

| Stream (North to South) | Baseflow | | Stormwater | |
|---|---|---|---|---|
| | Concentration ($\mu$S/cm) | % GV Exceedances | Concentration ($\mu$S/cm) | % GV Exceedances |
| **Reeder Creek** | 744 | 93.3% | 395 | 33.3% |
| **Kashong Creek** | 663 | 100% | 475 | 28.6% |
| **Keuka Outlet** | 415 | 13.0% | 401 | 9.1% |
| **Big Stream** | 525 | 58.3% | 307 | 0% |
| **Glen Eldridge Creek** | 402 | 11.8% | 318 | 0% |
| **Catharine Creek** | 560 | 66.7% | 405 | 42.9% |