Monitoring Phosphorus and Nitrogen in the Cayuga Lake Watershed, 2004-Present

*Presentation to the Water and Community Forum*

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*The Inns at Aurora, Aurora, NY*

Stephen Penningroth, Ph.D., Director, Community Science Institute
Long-term, Comprehensive Water Quality Data Sets Make It Possible To:

• Make generally accurate statements about water quality in monitored water bodies (as opposed to making sweeping assumptions about unmonitored water bodies)
• Identify sub-watersheds, and also catchment areas within sub-watersheds, that may be contributing disproportionately to pollutant loading
• Obtain nutrient loading estimates sufficient to focus watershed management efforts
• Assess public health risks due to pathogenic bacteria in streams and lakes
• Document long-term water quality trends and take corrective action, as appropriate
• Detect significant changes in monitored water quality parameters over time
Volunteer Monitoring Partnerships

**Synoptic Chemical Sampling** – Cayuga and Seneca Lake Watersheds
- Impacts from agriculture, urban development, point sources

**Red Flag Chemical Monitoring** – Upper Susquehanna Watershed
- Baseline and nutrient data collection on small streams

**Biological Monitoring (BMI)** – Any stream of local interest
- Aquatic insect communities show long-term water quality
Certified Lab

- Regulated by NYS Department of Health
  - Regulatory & Legal purposes
- Potable and Non-potable water
- Chemistry & Microbiology
- Full list of tests and fees online

Learn more about testing your drinking water at www.communityscience.org/certified-lab/

Michi tests for total coliform and E. coli bacteria

After the assay is complete bacteria colonies grow and are counted on plates
Volunteer Water Monitoring Partnerships

Three Volunteer Water Monitoring Programs

• Synoptic Sampling
• Red Flag Monitoring
• Biomonitoring

Synoptic Monitoring Partnerships
Certified laboratory analyses

Red Flag Monitoring Partnerships
Quality-assured field measurements

Biomonitoring Partnerships
Benthic macroinvertebrates
 Mean Concentrations of SRP ("Bioavailable Phosphorus") Throughout Selected Sub-watersheds of Cayuga Lake

"Base Flow" Conditions

Mean Base Flow SRP ("Bioavailable Phosphorus") Concentration (µg P/L)

- Fall Creek (2004 - 2018)
- Six Mile Creek (2004 - 2018)
- Salmon Creek (2006 - 2018)
- Paines Creek (2009 - 2018)
- Dean’s Creek (2015 - 2018)
- Yawger Creek (2017 - 2018)
- Great Gully (2017 - 2018)

"Stormwater" Flow Conditions

Mean Stormwater SRP ("Bioavailable Phosphorus") Concentration (µg P/L)

- Fall Creek (2004 - 2018)
- Six Mile Creek (2004 - 2018)
- Salmon Creek (2006 - 2018)
- Paines Creek (2009 - 2018)
- Dean’s Creek (2015 - 2018)
- Yawger Creek (2017 - 2018)
- Great Gully (2017 - 2018)
Cayuga Lake Watershed Land Use and Monitored Sub-Watersheds

Legend
- Monitored Sub-watersheds
- Major Tributaries
- Synoptic Stream Monitoring Locations

NLCD Landcover Classification Legend (2011)
- 11 Open Water
- 12 Developed, Open Space
- 13 Developed, Low Intensity
- 14 Developed, Medium Intensity
- 15 Developed, High Intensity
- 16 Barren Land
- 17, 18, 19, 20, 21, 22, 23 Other

Dean's Creek Mouth Sampling Location

Fall Creek Mouth Sampling Location

Source: NLCD 2011 • Map by Claire Weston and Nathaniel Launer

Dean's Creek Mouth Sampling Location

Fall Creek Mouth Sampling Location
"Bioavailable Phosphorus" in Fall Creek and Dean's Creek, 2004-2018

- Fall Creek Mouth, “Base Flow” Conditions
- Fall Creek Mouth, “Stormwater” Conditions
- Dean's Creek Mouth, “Base Flow” Conditions
- Dean’s Creek Mouth, “Stormwater” Conditions
Inorganic Nitrogen in Fall Creek and Dean's Creek, 2003-2018

- Fall Creek Mouth, “Base Flow” Conditions
- Fall Creek Mouth, “Stormwater” Conditions
- Dean’s Creek Mouth, “Base Flow” Conditions
- Dean’s Creek Mouth, “Stormwater” Conditions
Phosphorus and Nitrogen Levels Remain Constant in Southern Cayuga Lake, 2006-2018; Chloride Shows Upward Trend

Middle of Lake Opposite Salmon Creek
HABs Mapping

Northwestern Quadrant

Southwestern Quadrant

Northeastern Quadrant

Southeastern Quadrant

Sheldrake Point

30% Of Cayuga Lake Shoreline Monitored Weekly

Over 75 volunteers in the first year!

Legend

- Blooms with microcystin levels less than drinking water limit of 0.3 µg/L
- Blooms with microcystin levels greater than 0.3 µg/L and less than recreation limit of 4 µg/L
- Blooms with microcystin levels ranging from 4 µg/L to 2,533 µg/L

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