

# 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*

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# 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



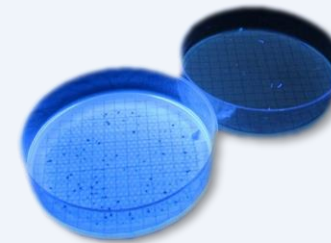
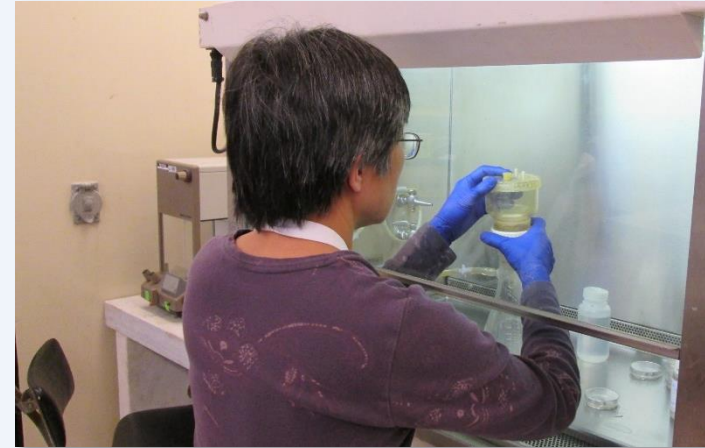


# Certified Lab

- ◆ 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/](http://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







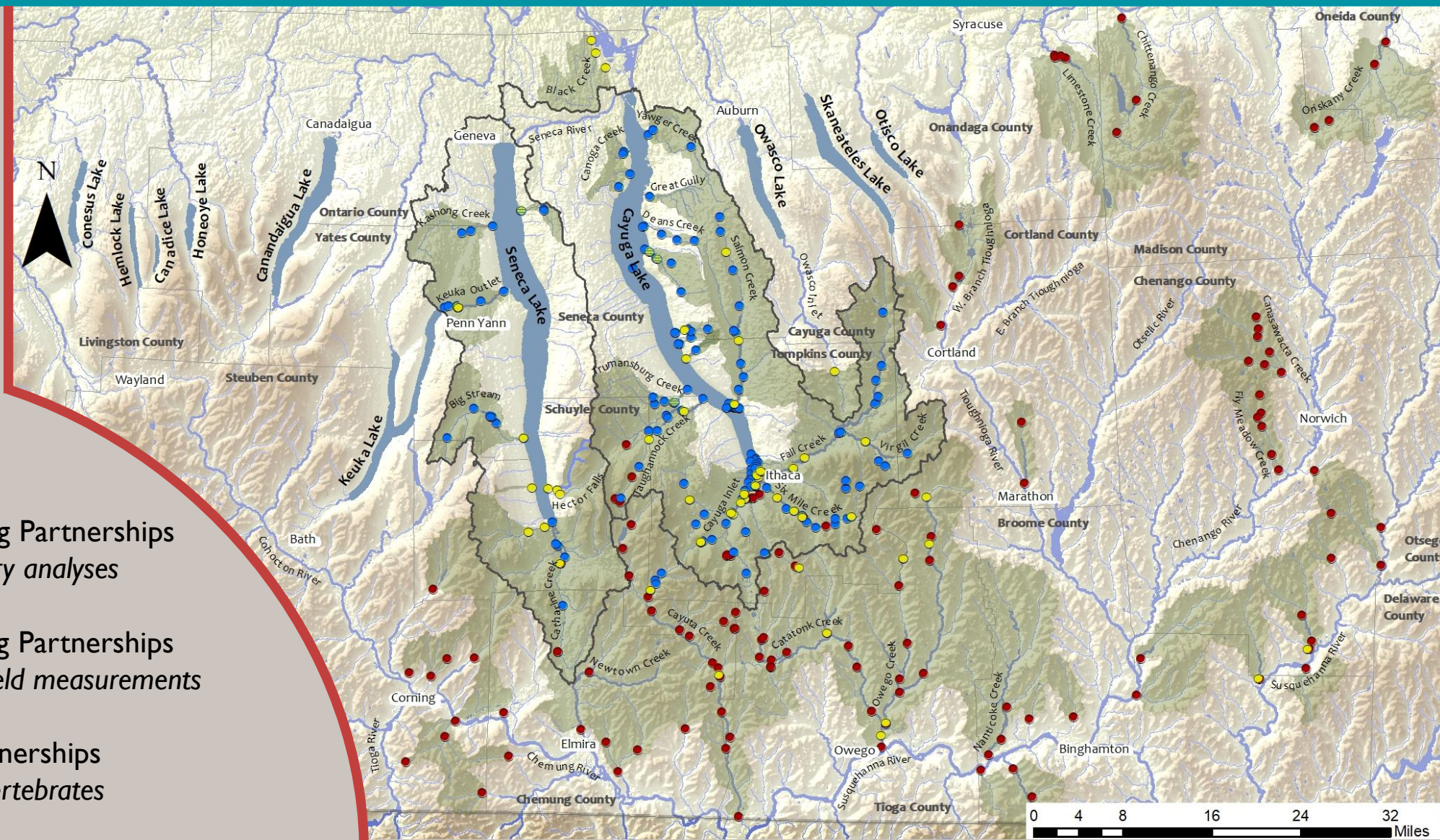
# Volunteer Water Monitoring Partnerships



## Three Volunteer Water Monitoring Programs

- Synoptic Sampling
- Red Flag Monitoring
- Biomonitoring

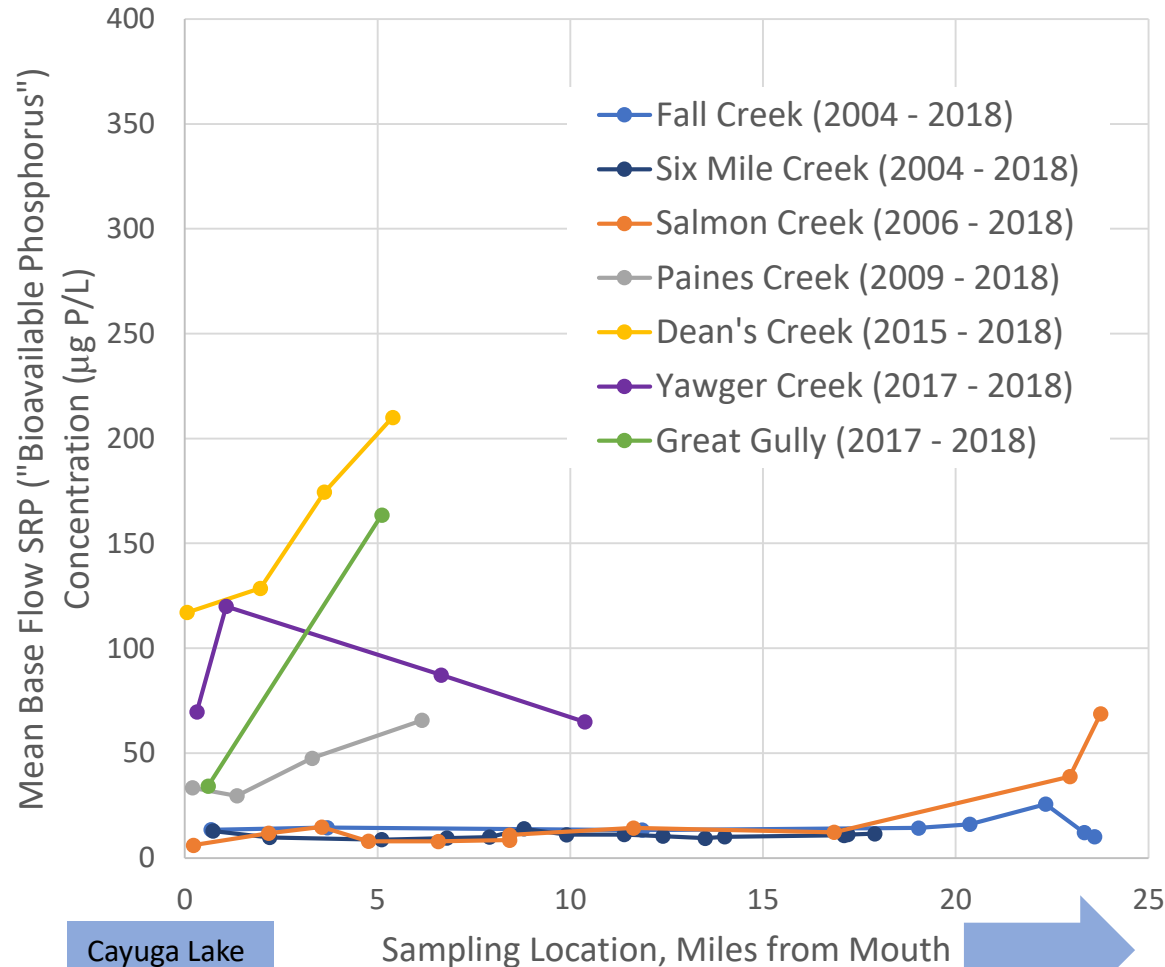
-  Synoptic Monitoring Partnerships  
*Certified laboratory analyses*
-  Red Flag Monitoring Partnerships  
*Quality-assured field measurements*
-  Biomonitoring Partnerships  
*Benthic macroinvertebrates*



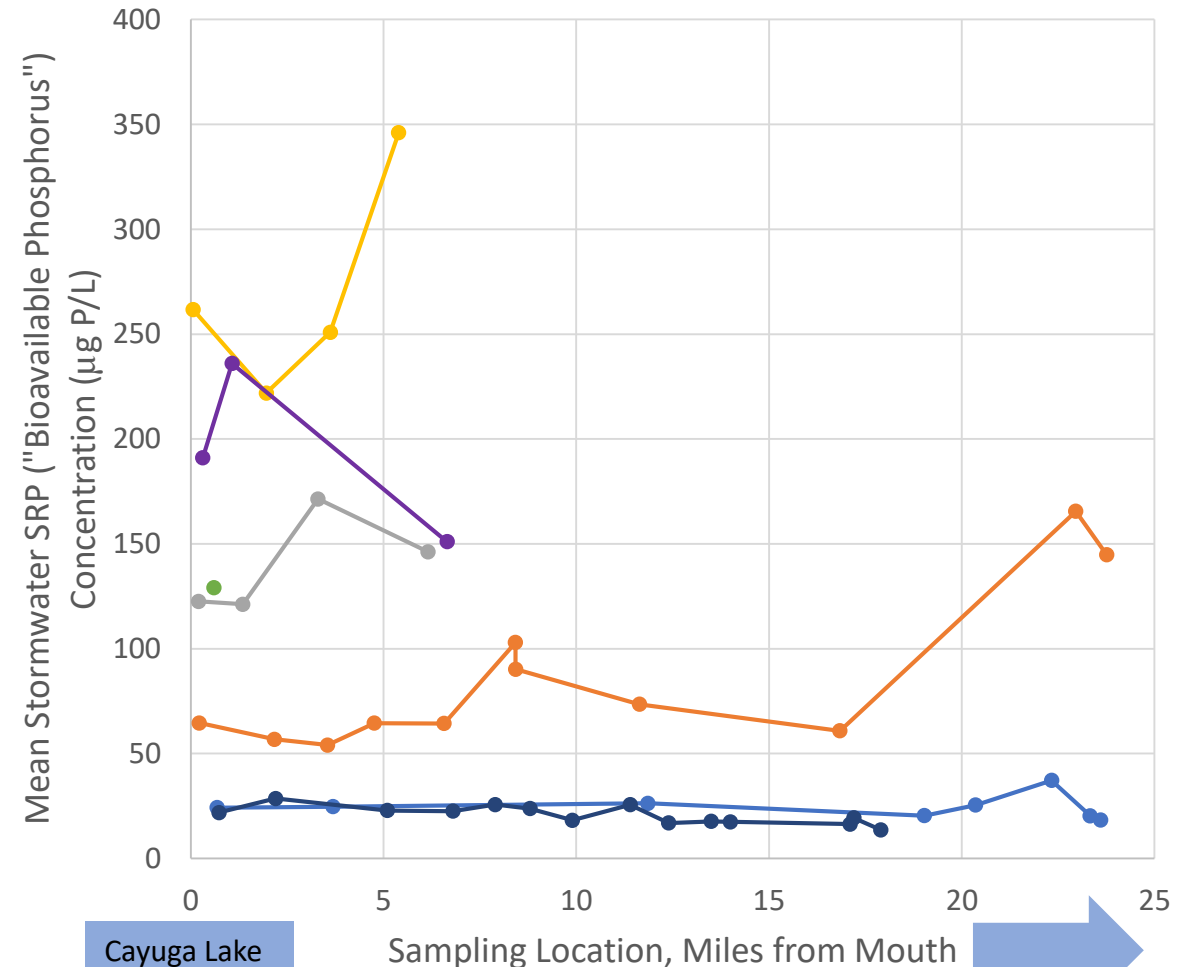


# Mean Concentrations of SRP ("Bioavailable Phosphorus") Throughout Selected Sub-watersheds of Cayuga Lake

"Base Flow" Conditions



"Stormwater" Flow Conditions



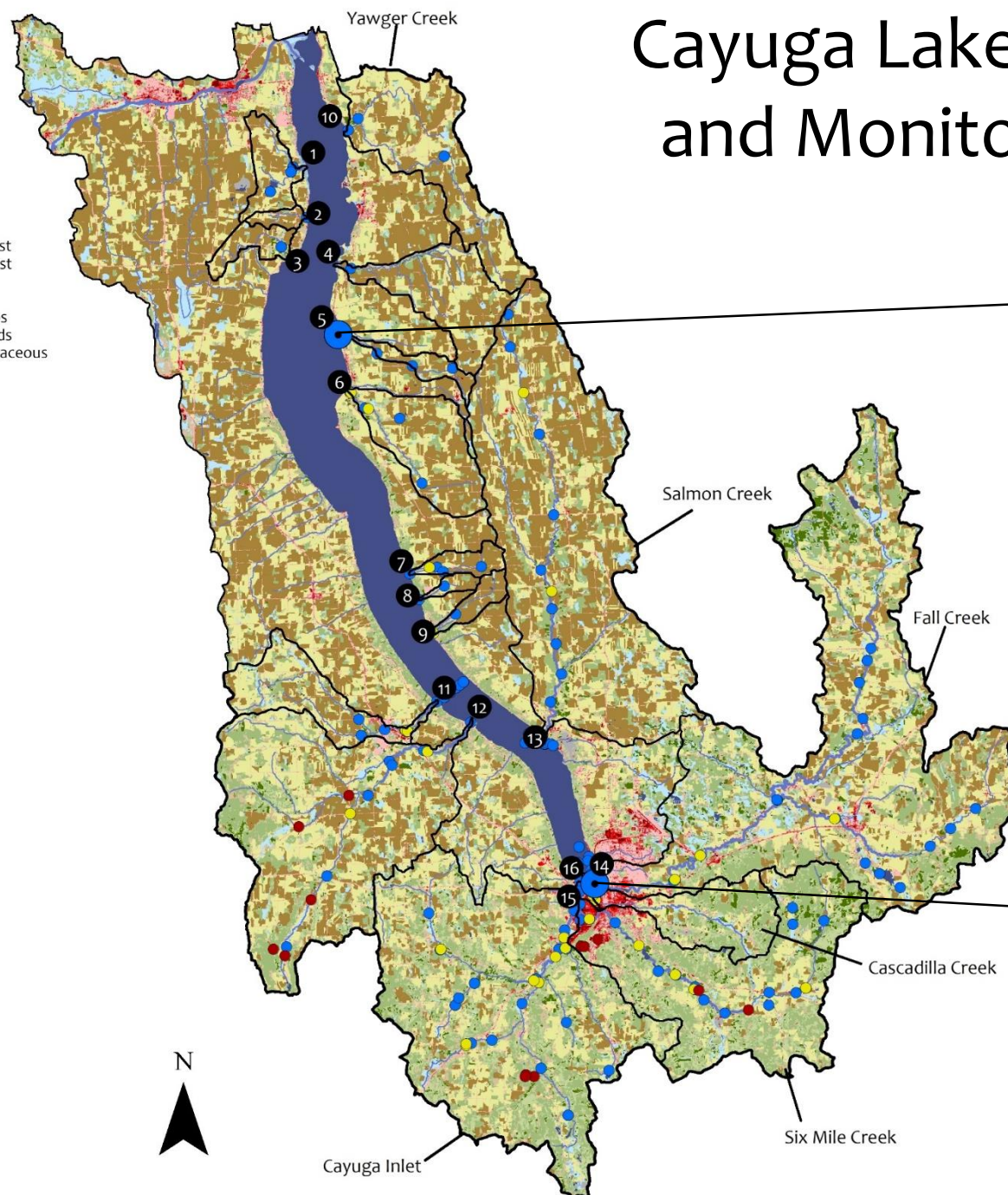
## Legend

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

## NLCD Landcover Classification Legend (2011)

- |                                |                                 |
|--------------------------------|---------------------------------|
| 11 Open Water                  | 41 Deciduous Forest             |
| 21 Developed, Open Space       | 42 Evergreen Forest             |
| 22 Developed, Low Intensity    | 43 Mixed Forest                 |
| 23 Developed, Medium Intensity | 81 Pasture Hay                  |
| 24 Developed, High Intensity   | 82 Cultivated Crops             |
| 31 Barren Land                 | 90 Woody Wetlands               |
| 12, 51, 52, 71, 72, 74 Other   | 95 Emergent Herbaceous Wetlands |

- 1 Canoga Creek
- 2 Williamson Creek
- 3 Burroughs Creek
- 4 Great Gully
- 5 Deans Creek
- 6 Paines Creek
- 7 Mills Creek
- 8 Town Line Creek
- 9 Lake Ridge Creek  
Milliken Creek
- 10 Yawger Creek
- 11 Trumansburg Creek
- 12 Taughannock Creek
- 13 Salmon Creek
- 14 Fall and Virgil Creek
- 15 Six Mile Creek
- 16 Cayuga Inlet



# Cayuga Lake Watershed Land Use and Monitored Sub-Watersheds

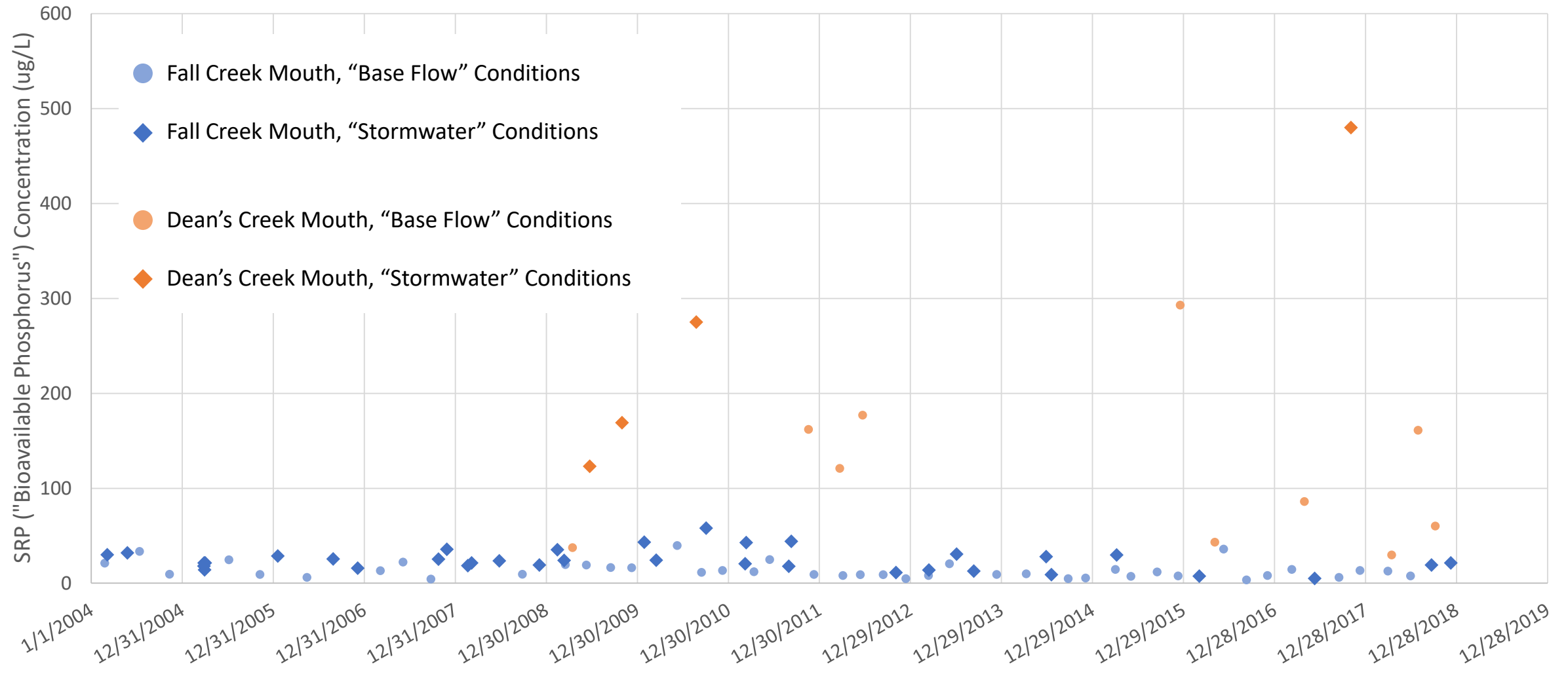
Dean's Creek Mouth Sampling Location

Fall Creek Mouth Sampling Location

Source: NLCD 2011 0 2 4 8 12 16 Miles

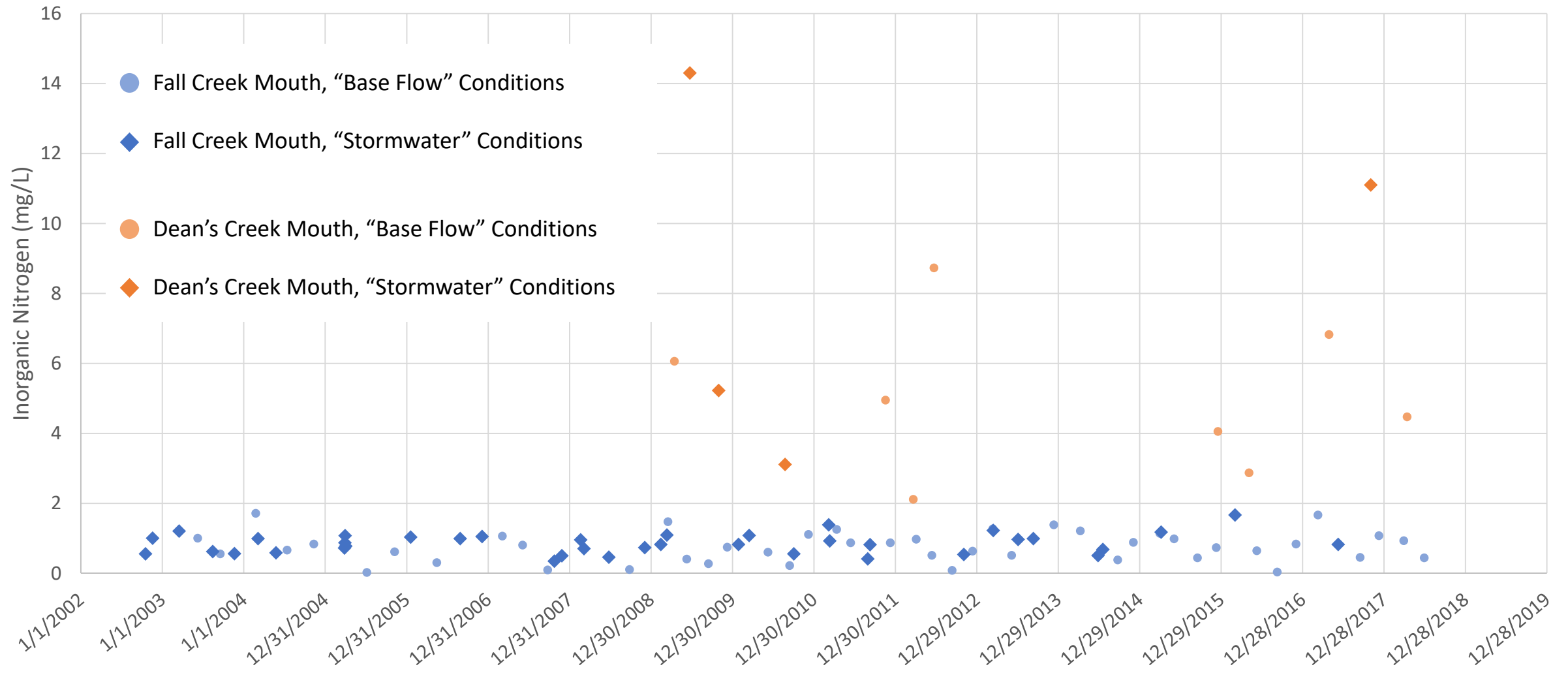
© 2019 Community Science Institute • Map by Claire Weston and Nathaniel Launer

# "Bioavailable Phosphorus" in Fall Creek and Dean's Creek, 2004-2018

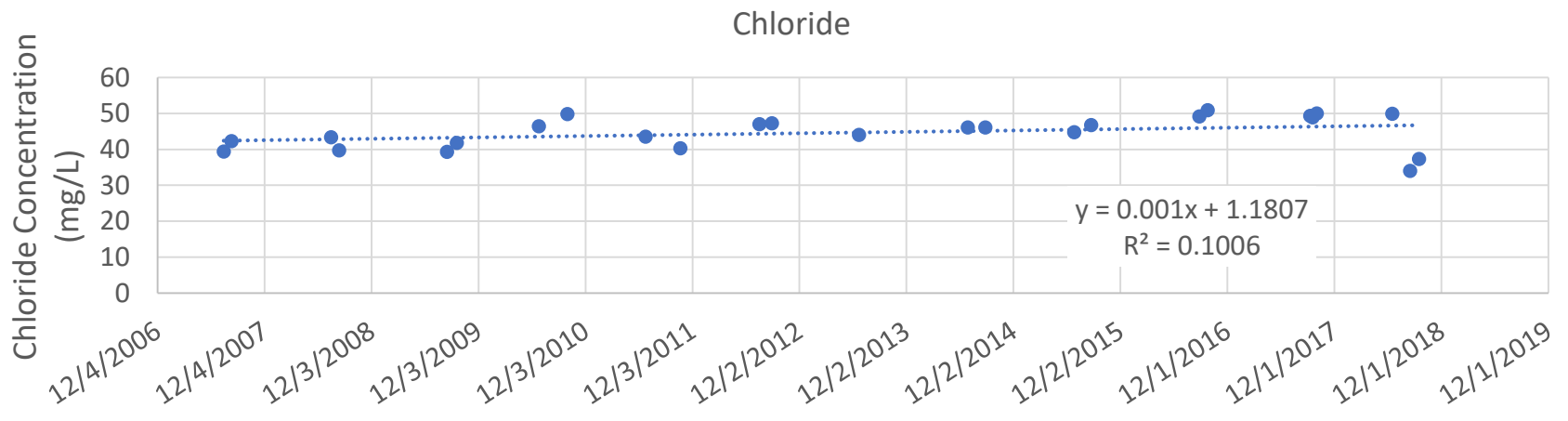
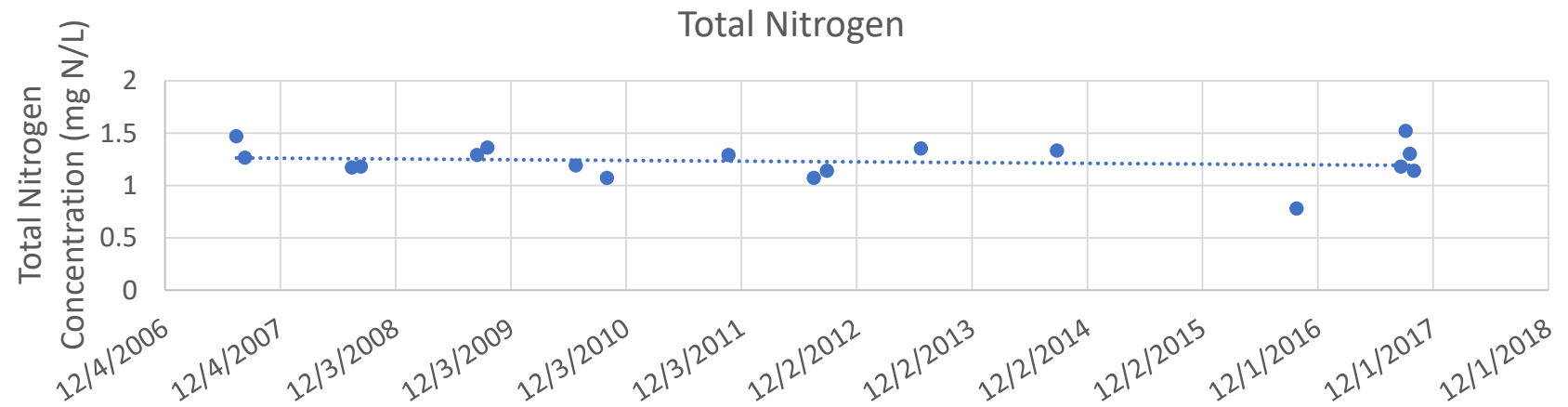
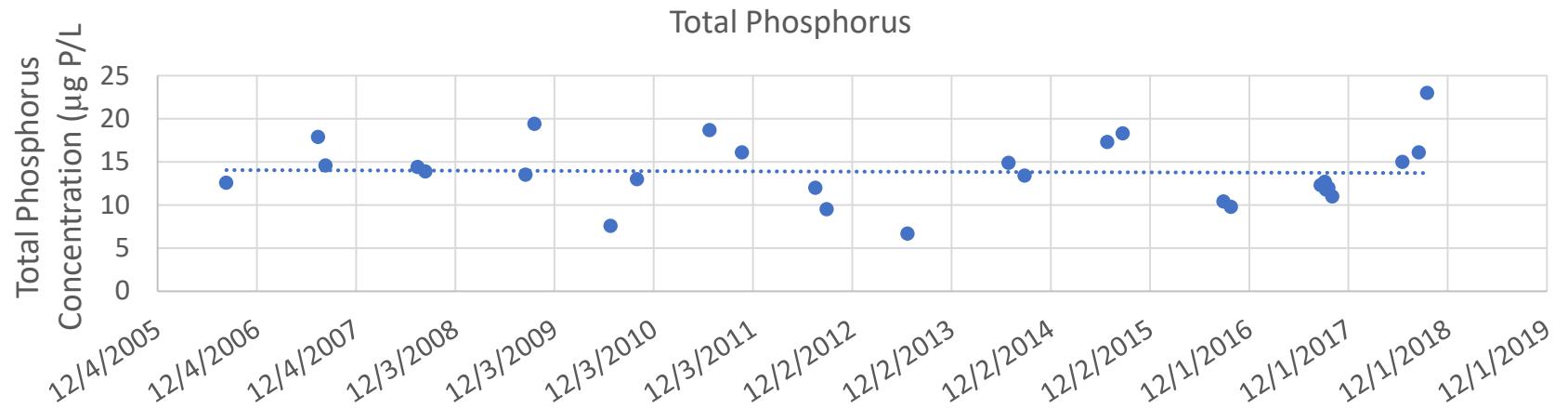




# Inorganic Nitrogen in Fall Creek and Dean's Creek, 2003-2018



# Phosphorus and Nitrogen Levels Remain Constant in Southern Cayuga Lake, 2006-2018; Chloride Shows Upward Trend





# HABs Mapping

Northwestern Quadrant

Northeastern Quadrant

Southwestern 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 ug/ L

Blooms with microcystin levels greater than 0.3 ug/ L and less than recreation limit of 4 ug/ L

Blooms with microcystin levels ranging from 4 ug/ L to 2,533 ug/ L

Shore zones monitored weekly from July through September by HABs Harrier Volunteers

0 1.25 2.5 5 7.5 10 Miles

