

Microcystin and HAB Monitoring in

# Kansas City Urban Lakes

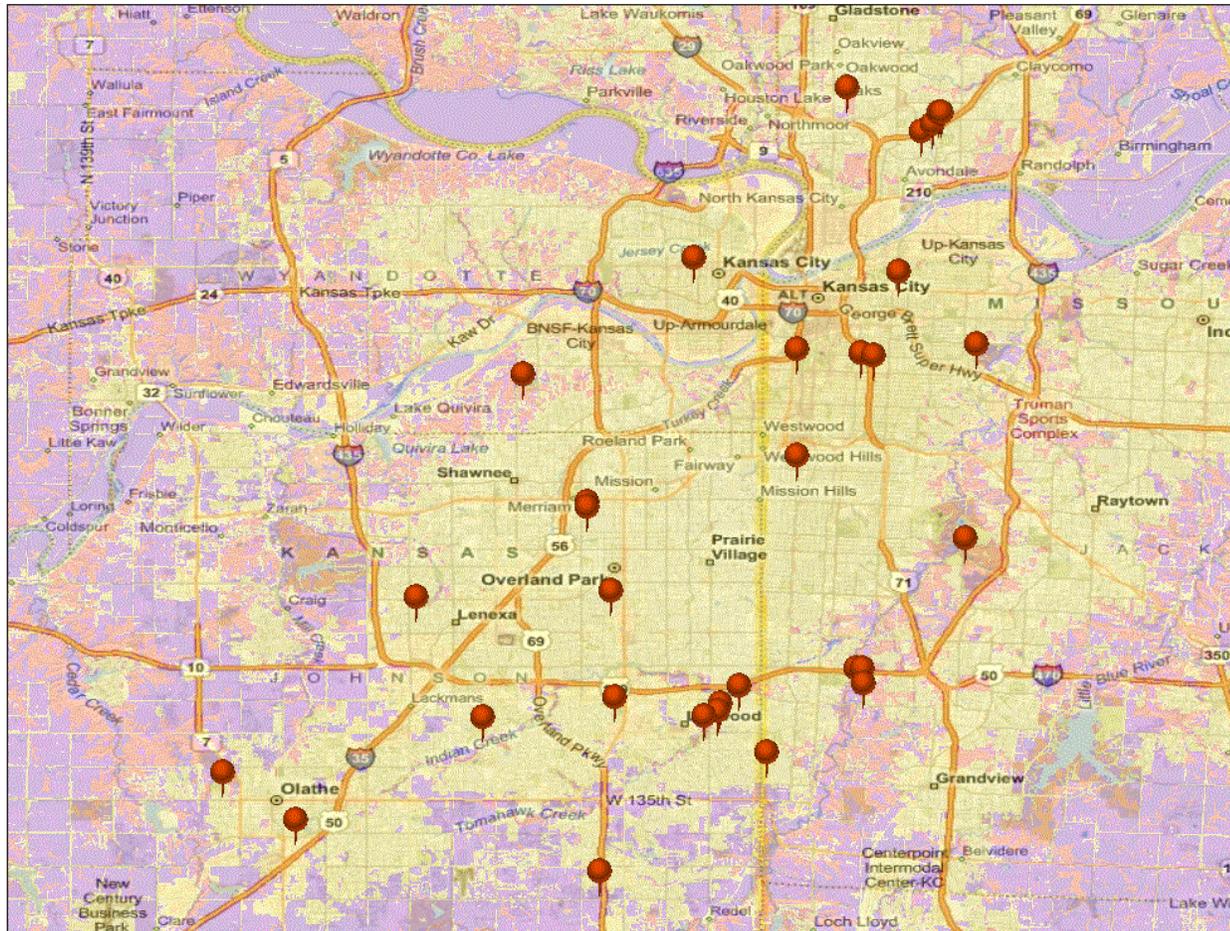
Laura Webb, EPA Region 7

# Why Urban Lakes?

- The mission of EPA is to **protect human health** and the environment.
- Urban Lakes are:
  - Heavily Used
  - Frequented by Children
  - Under Studied
  - Stressed



# Site Map



# Sampling Scheme



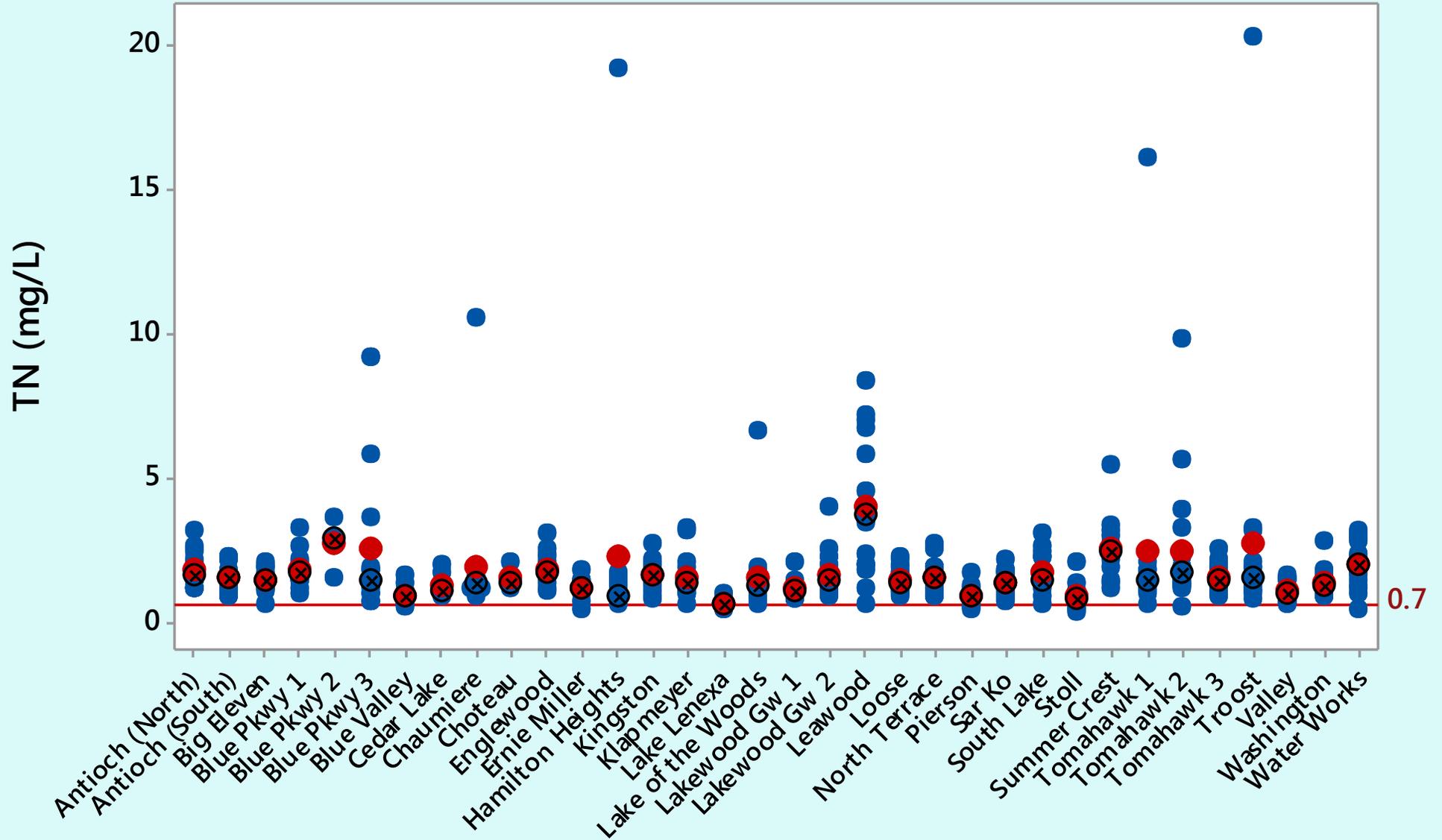
- Sites selected at high traffic areas
  - Playgrounds, fishing spots, foot paths, picnic areas
- Sampling done 1 meter offshore
- Integrated sample (0.5 m) for nutrients and MC
- Grab sample for bacteria
- *In situ* with multi-parameter sonde

# Parameters

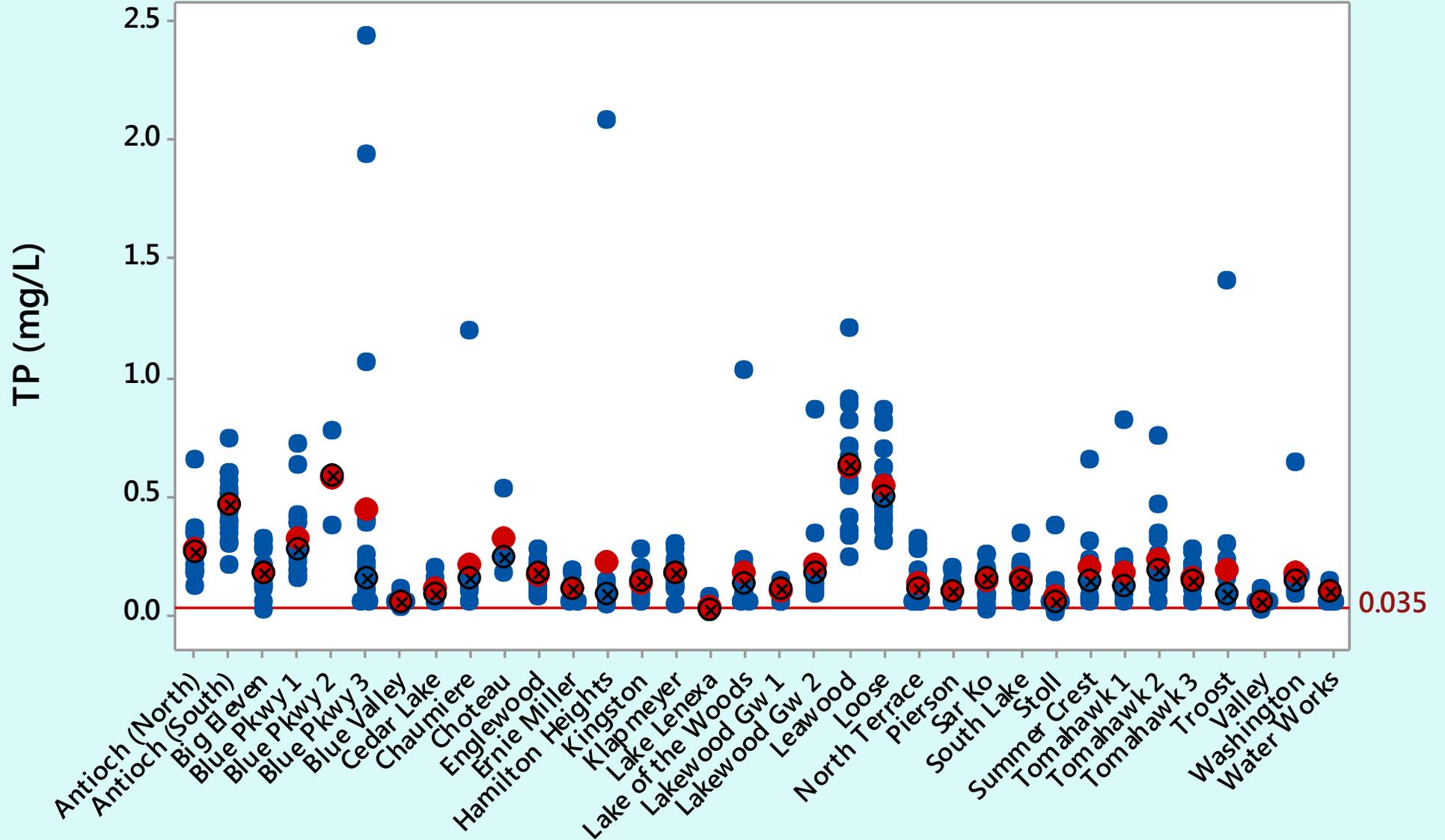
- DO, cond, pH, turbidity, temp
- TN, TP
- Chlorophyll a (extracted)
- E coli
- Microcystin
- Added BGA-PC, CHL probes
- Adding Algae taxonomy
- Adding Cylindrospermopsin



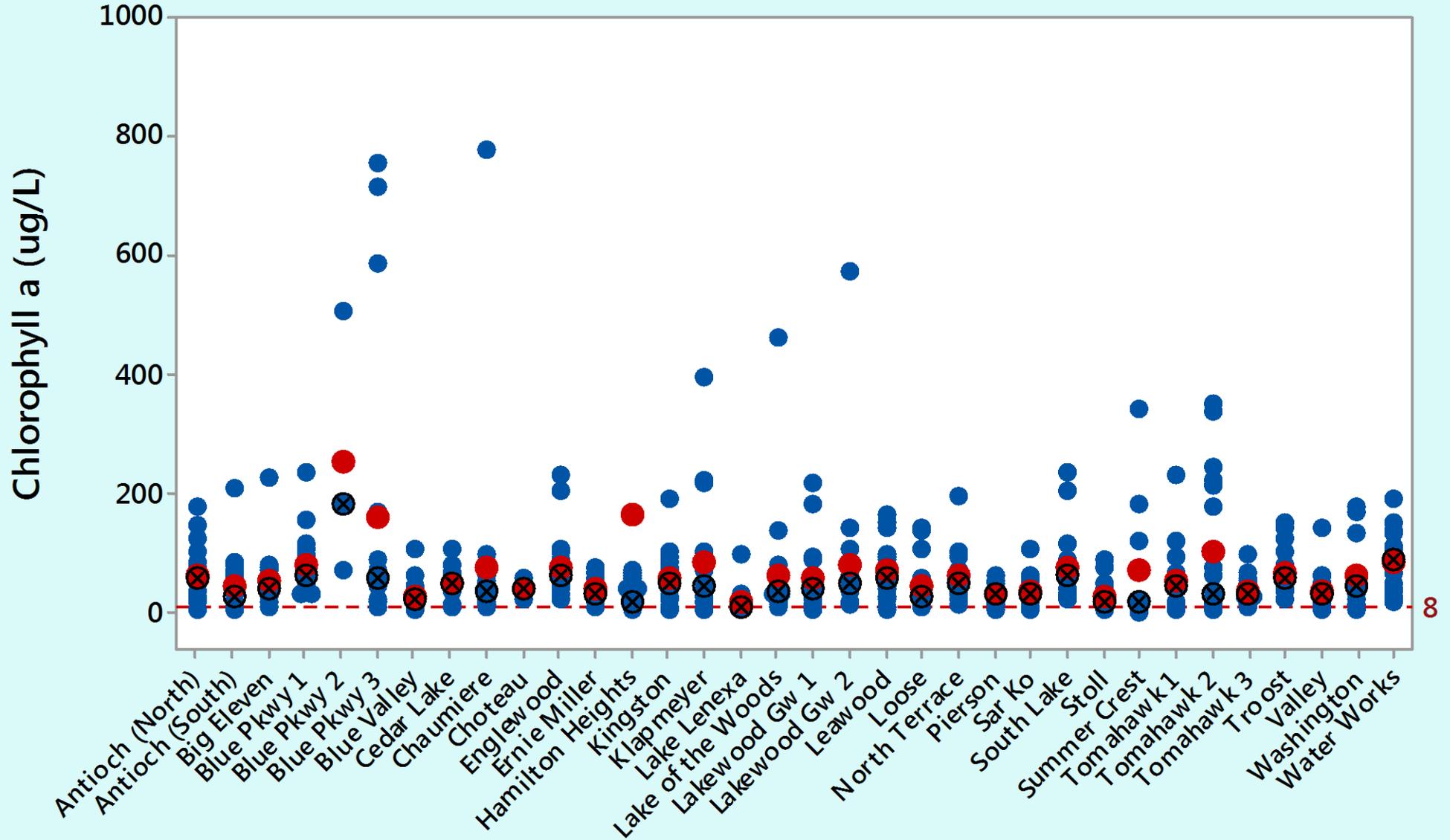
### 2010 - 2015 Urban Lakes



### 2010 - 2015 Urban Lakes

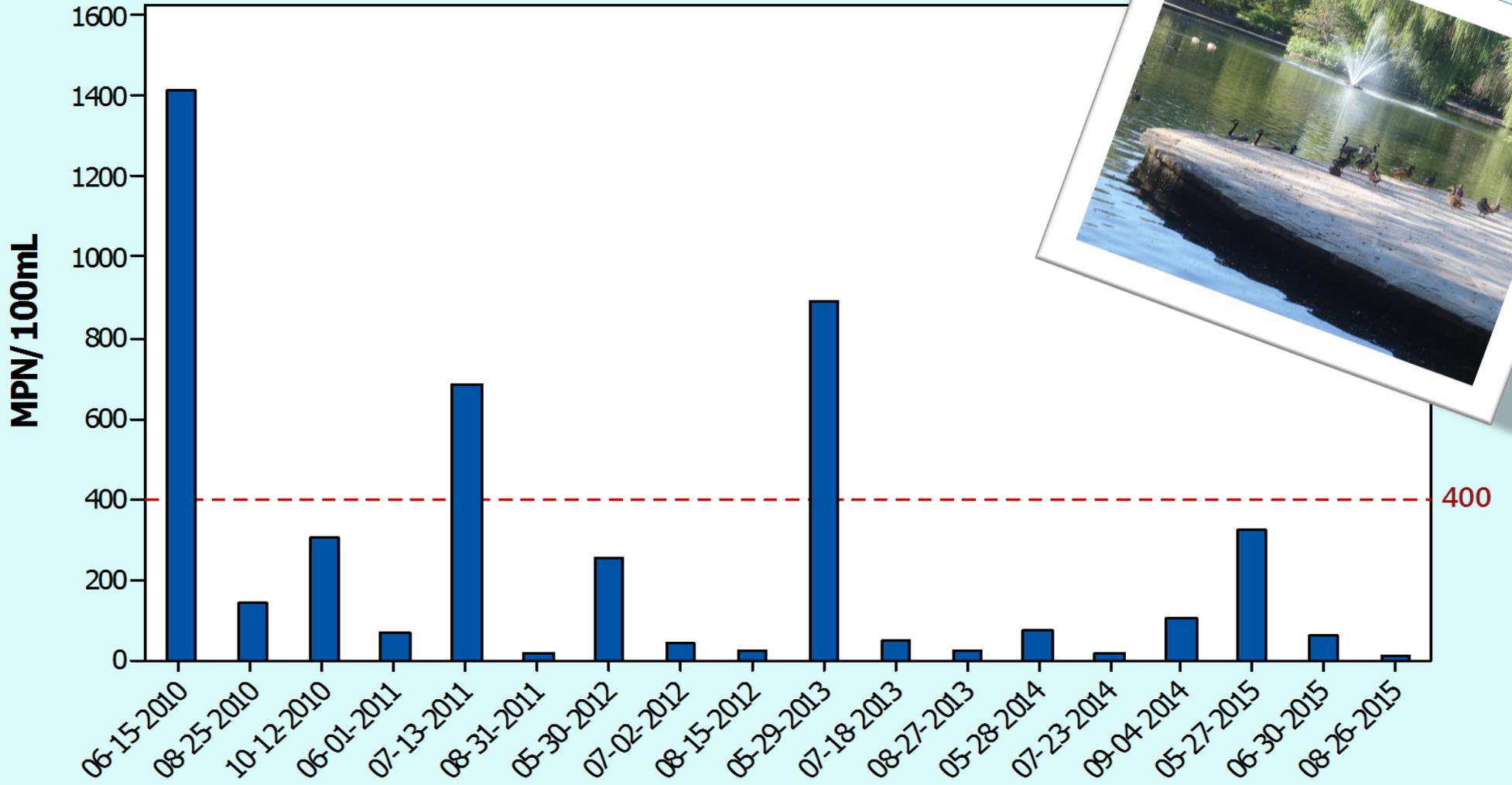


# 2010 - 2015 Urban Lakes

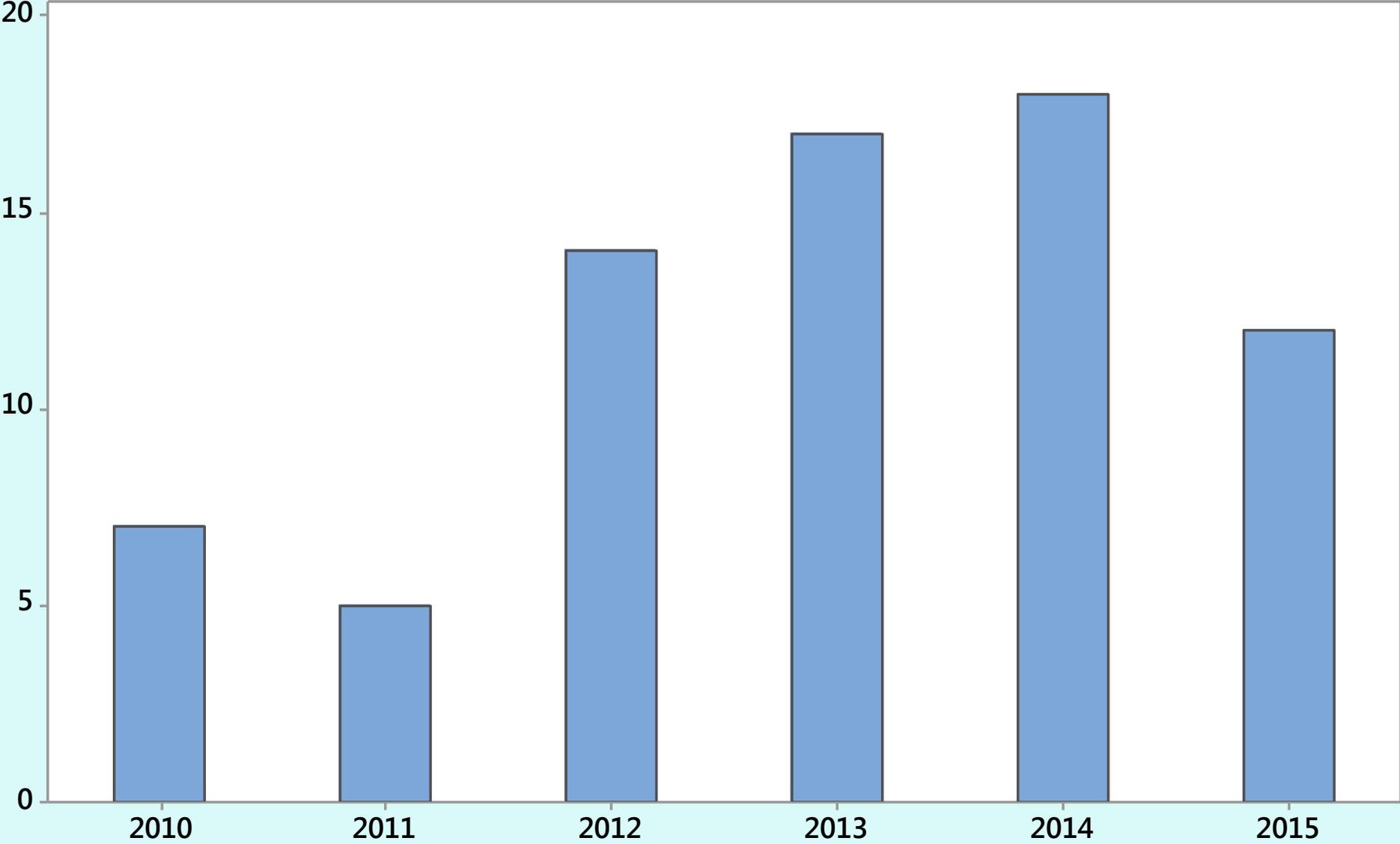


B  
A  
C  
T  
E  
R  
I  
A

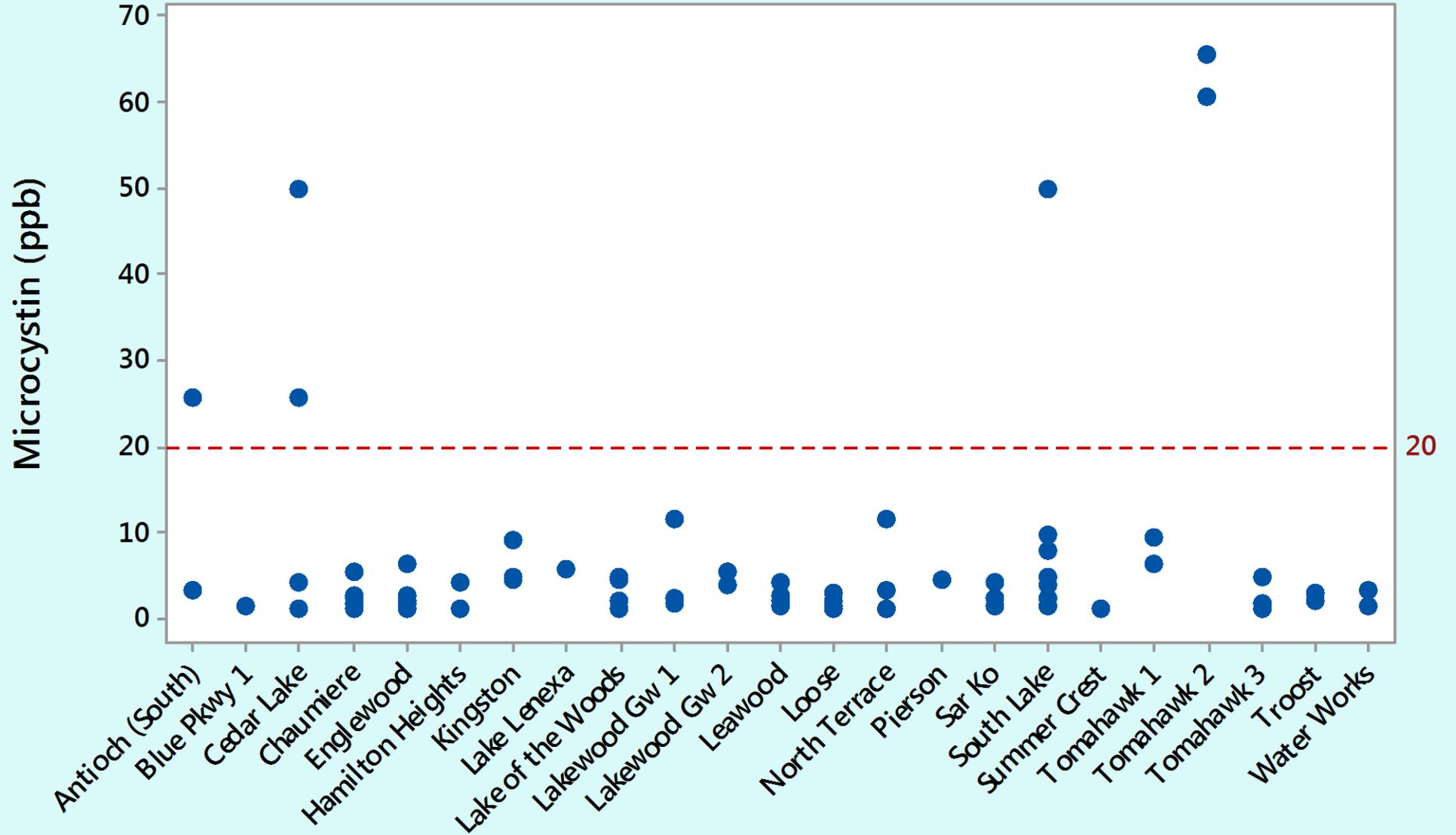
### Median E. Coli concentrations



### Microcystin Hits > 1.0 ppb

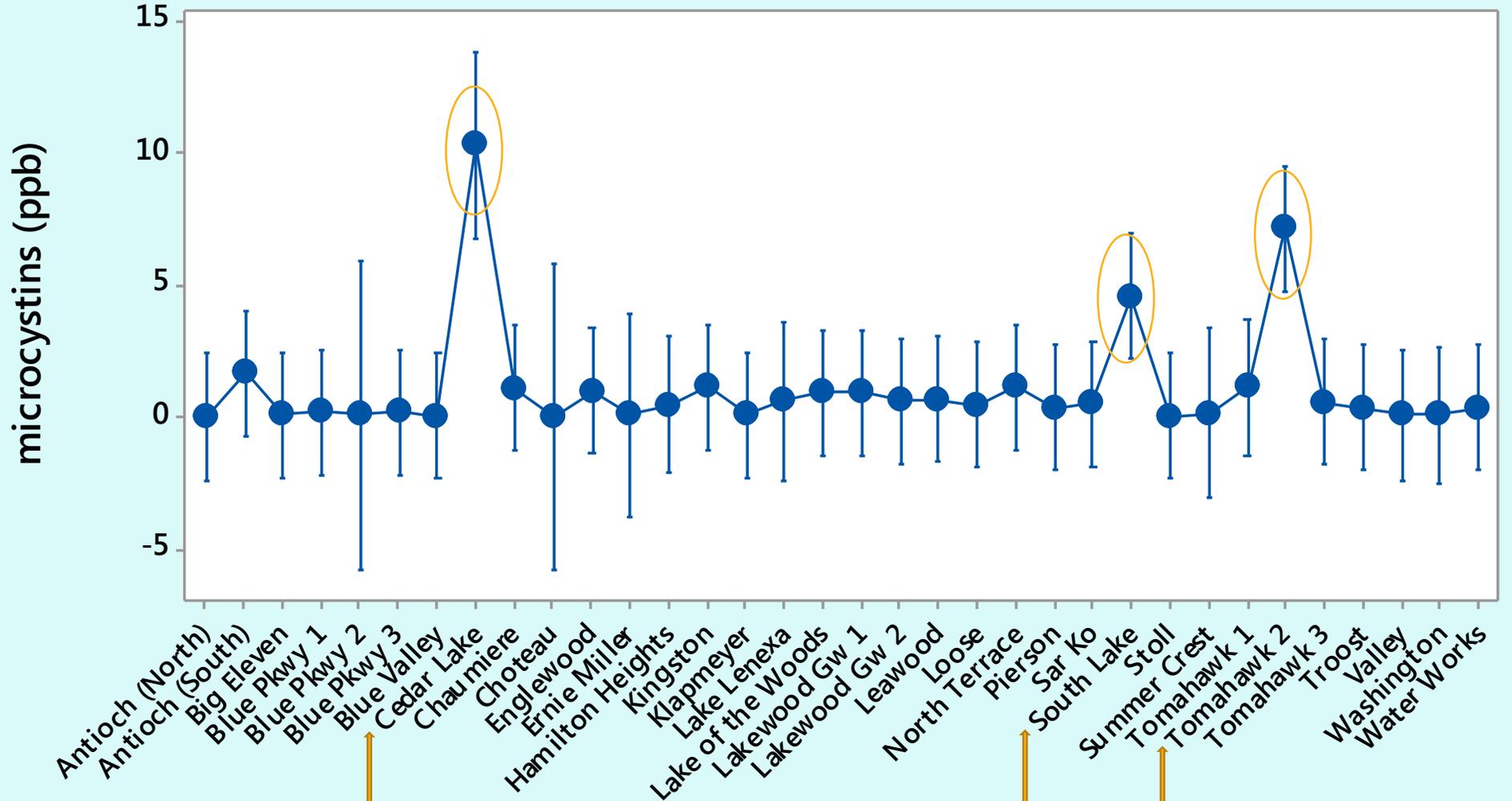


Positive MC hits > 1.0 ppb



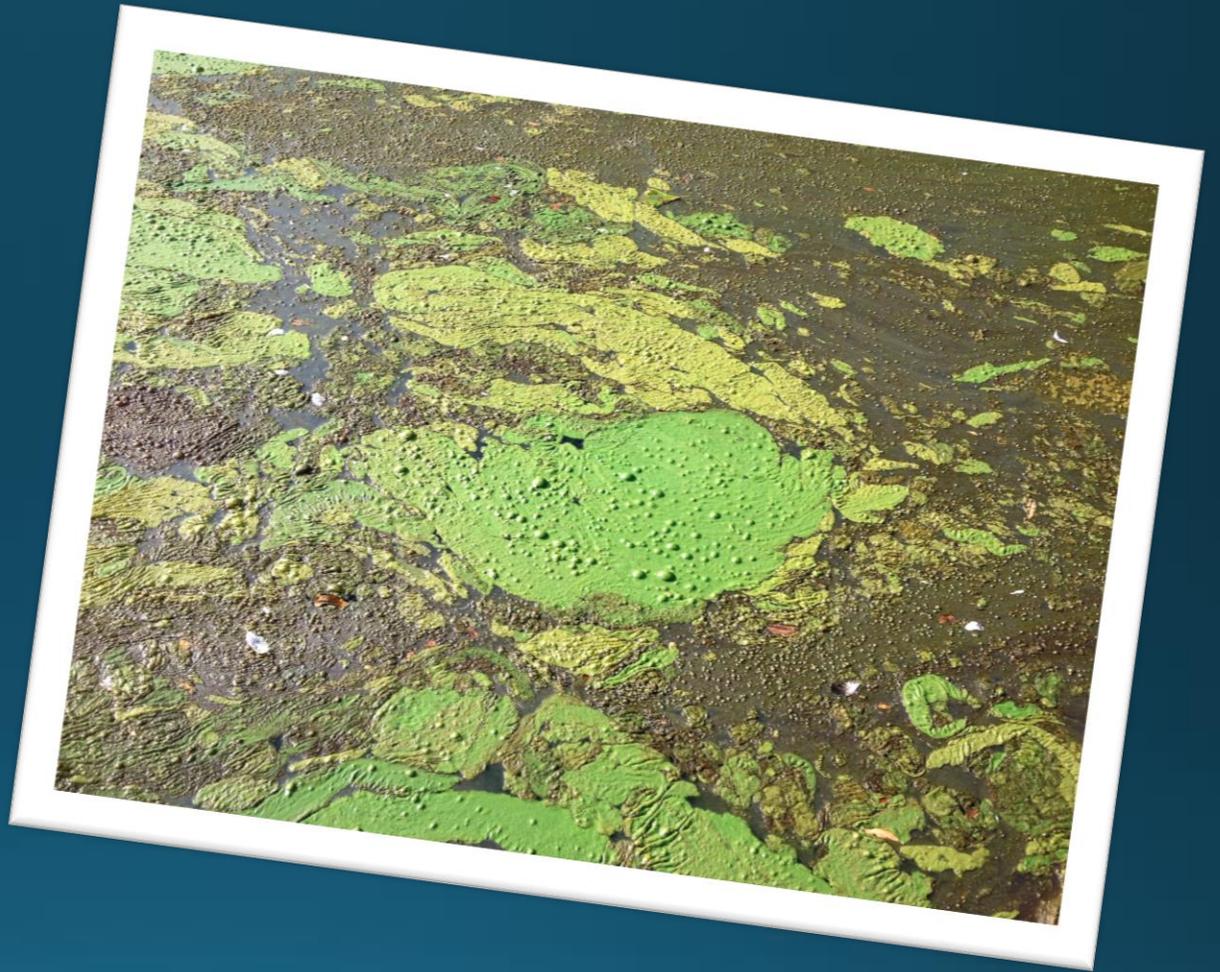
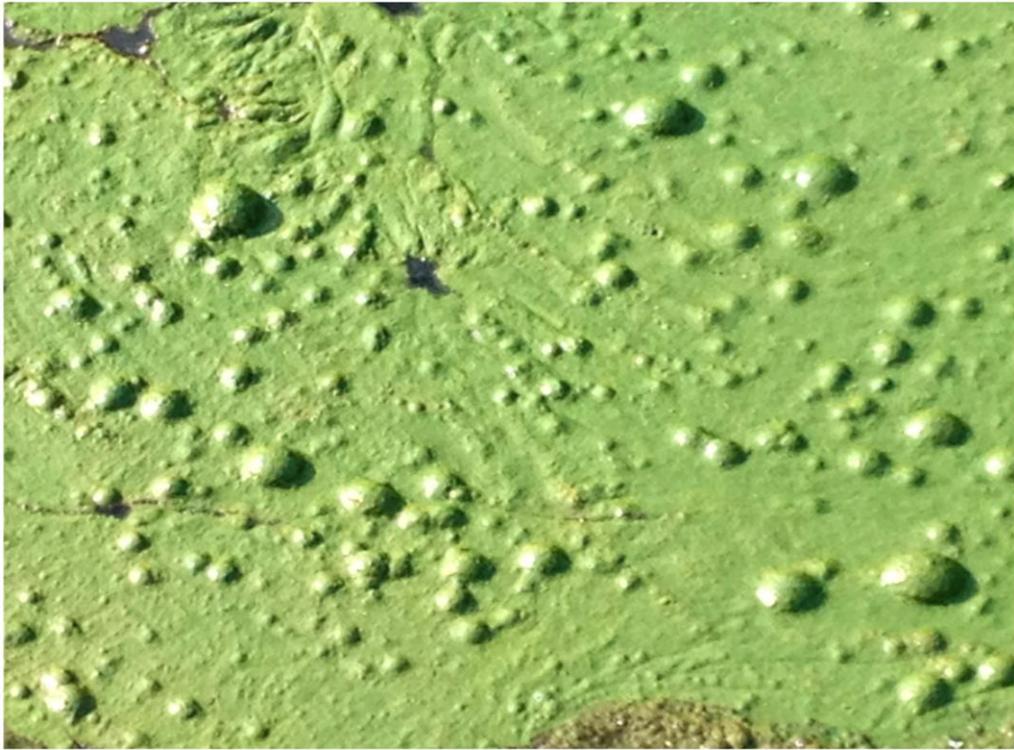
# Anova MC vs Lake

## 95% CI for the Mean



*The pooled standard deviation was used to calculate the intervals.*

Aug 26, 2015



Anabaena



Planktothrix



Aphanizomenon



Microcystis



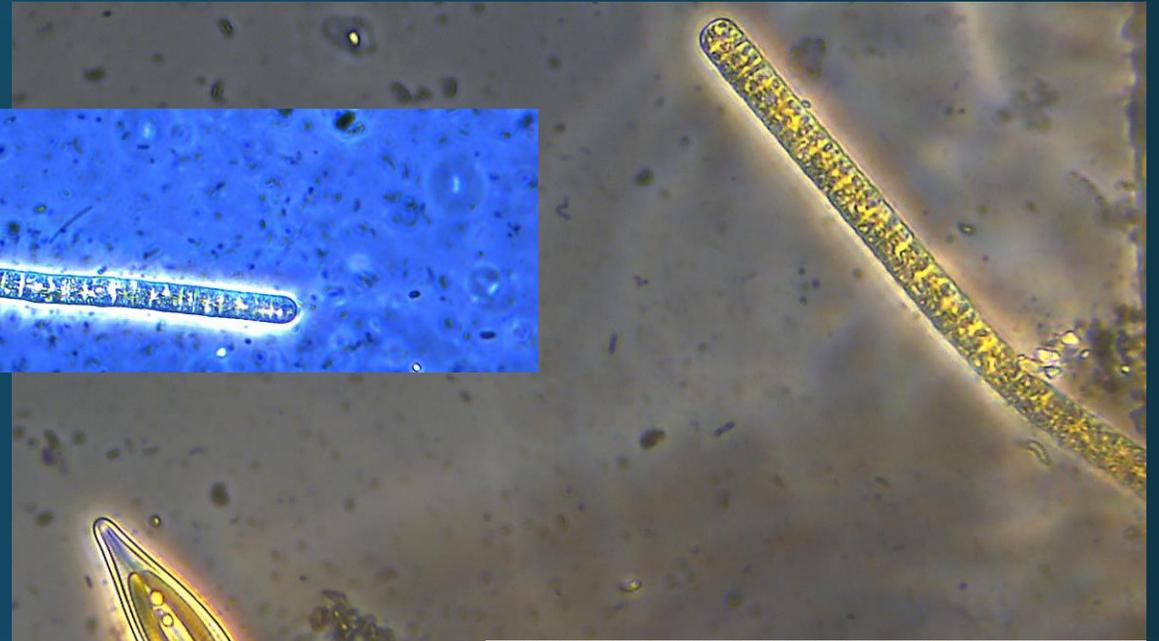
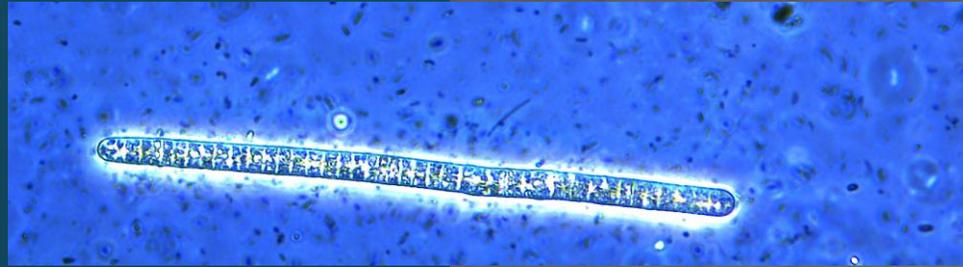
# Cyanobacteria (and a diatom)

In 2016

- More bloom targeting
- Taxonomy, starting with BGA
- Cell counts

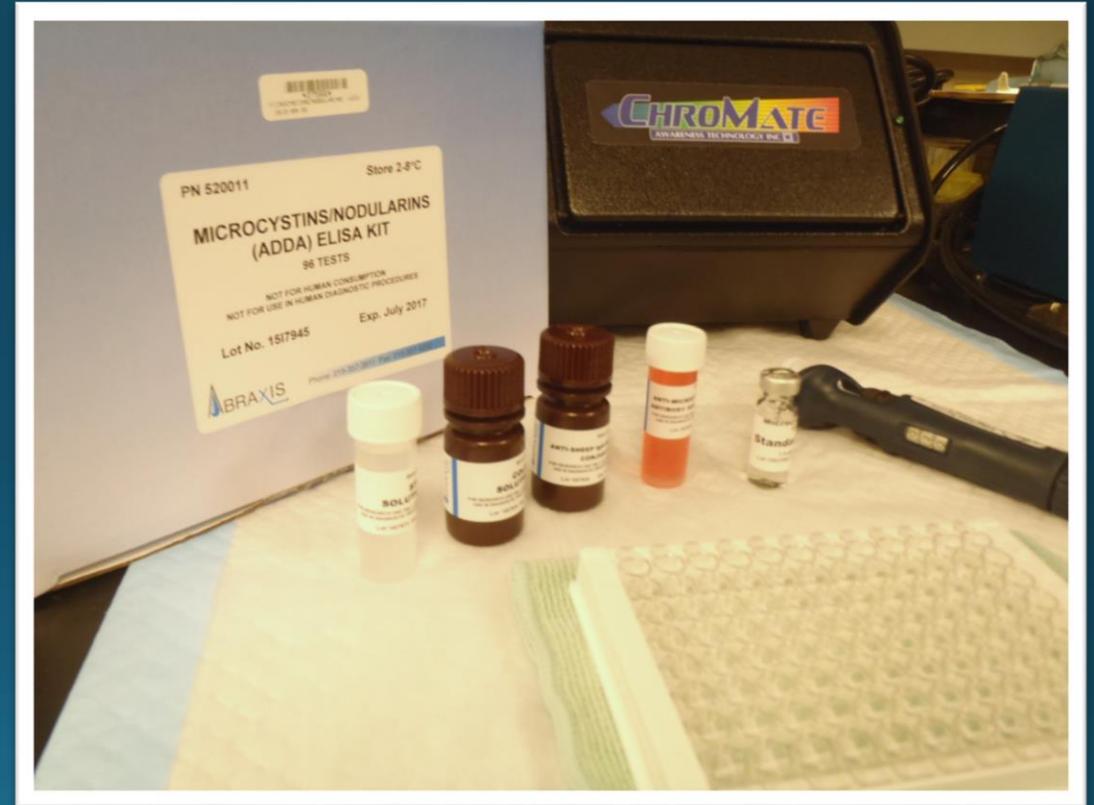
Field Microscopy with  
smart phone/tablet apps

High definition Microscopy  
with fluorescent light  
source in the lab



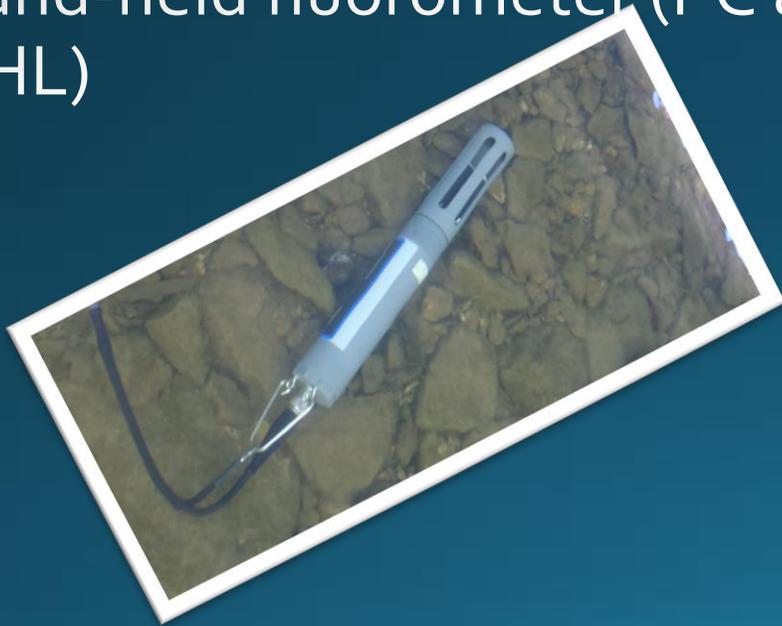
# AlgalToxins

- MC by ELISA
  - Adding Cylindrospermopsin in 2016
- Target Blooms in 2016 to compare not only toxins but pigments



# Pigments

- YSI sonde with PC and CHL probes
- 2016 - Aquafluor dual channel hand-held fluorometer (PC and CHL)



# Genetics



- 2016
  - q-PCR to identify toxic species and/or potential toxin production
- 2017 RARE project
  - Cyanobacteria assays developed by EPA ORD
  - Phylochip
  - Contributing factors (nutrients, anions, PPCP, pesticides)
  - Algal toxins and ID

# Mobile Applications

- Mobile lab fully equipped to run bacteria samples (NELAC certified for e coli)
- Portable microscopes attached to smart phone and tablets
- ELISA
- Pigments
- Field deployable sondes



# Questions?

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<https://www.epa.gov/nutrient-policy-data/cyanohabs>

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