

An aerial photograph of a pond or lake. The water is heavily covered with a thick layer of bright green algae, likely a cyanobacteria bloom. Several pieces of white plastic trash, including a bottle and a piece of paper, are floating on the surface. The water between the algae patches is a dark, deep blue. The overall scene suggests environmental pollution and water quality issues.

DETECTION & MONITORING

HARMFUL ALGAL BLOOM MONITORING WITHIN SJRWMD

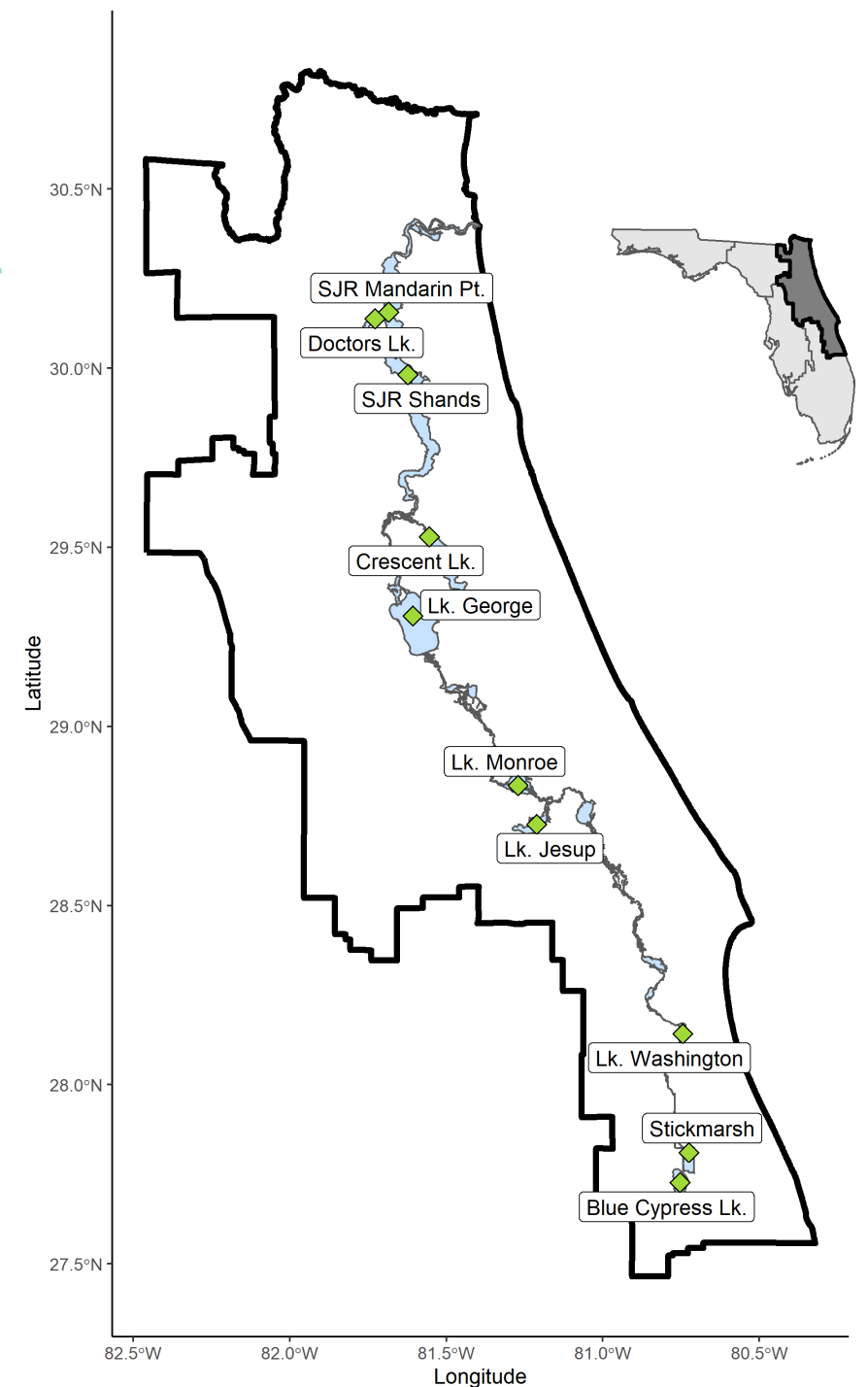
Joshua Papacek, Ph.D.

Environmental Scientist, Bureau of Water Resources
St. Johns River Water Management District



PROJECT SUMMARY

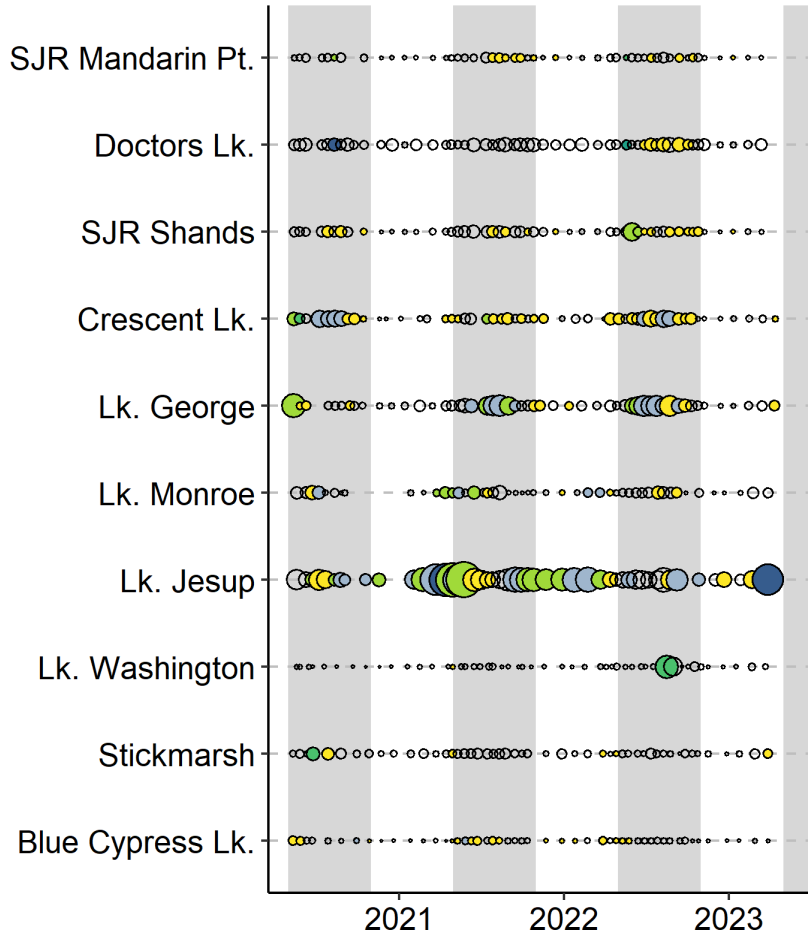
- **Routine monitoring**
 - 2020-present
 - 10 sites along SJR
 - Semimonthly (May-Oct) or monthly (Nov-April)
- **Response monitoring**
 - Ad-hoc sampling following public report or field crew observations
- **Samples analyzed by DEP**
 - Dominant species
 - Cyanotoxins (MC, CYL, ATX, STX)
 - WQ from SJRWMD Lab



MAJOR TAKEAWAYS

CYANO DOMINANCE: 33% of samples

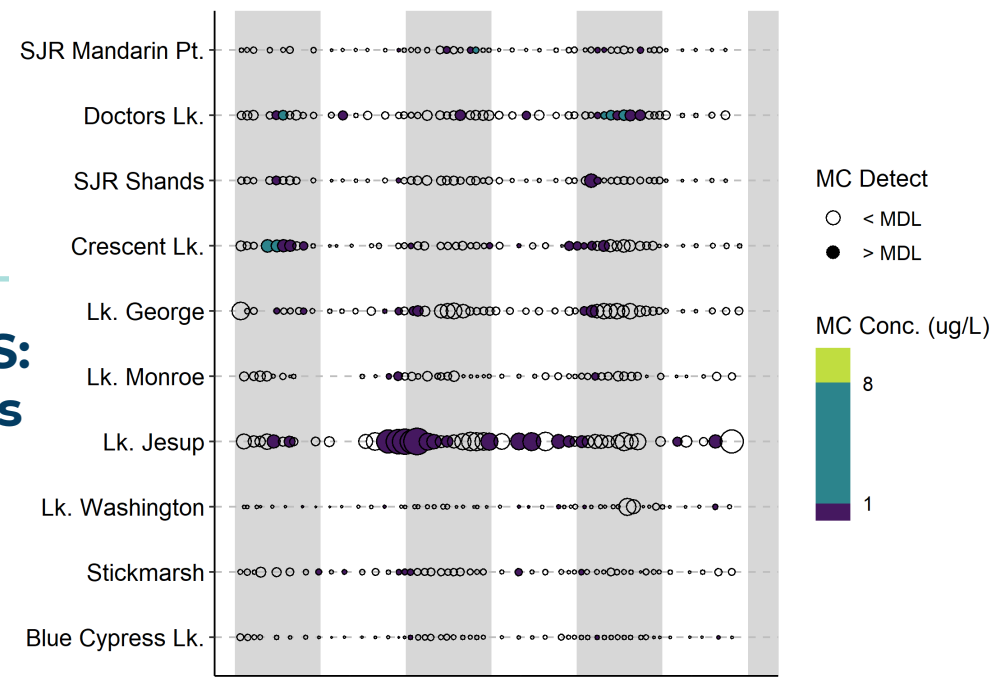
MICROCYSTINS: 16% of samples



- Dom. Taxa**
- Microcystis
 - Raphidiopsis/Cylindrospermopsis
 - Dolichospermum
 - Aphanizomenon
 - Planktolynghya
 - Co-dominant cyanos
 - Mixed

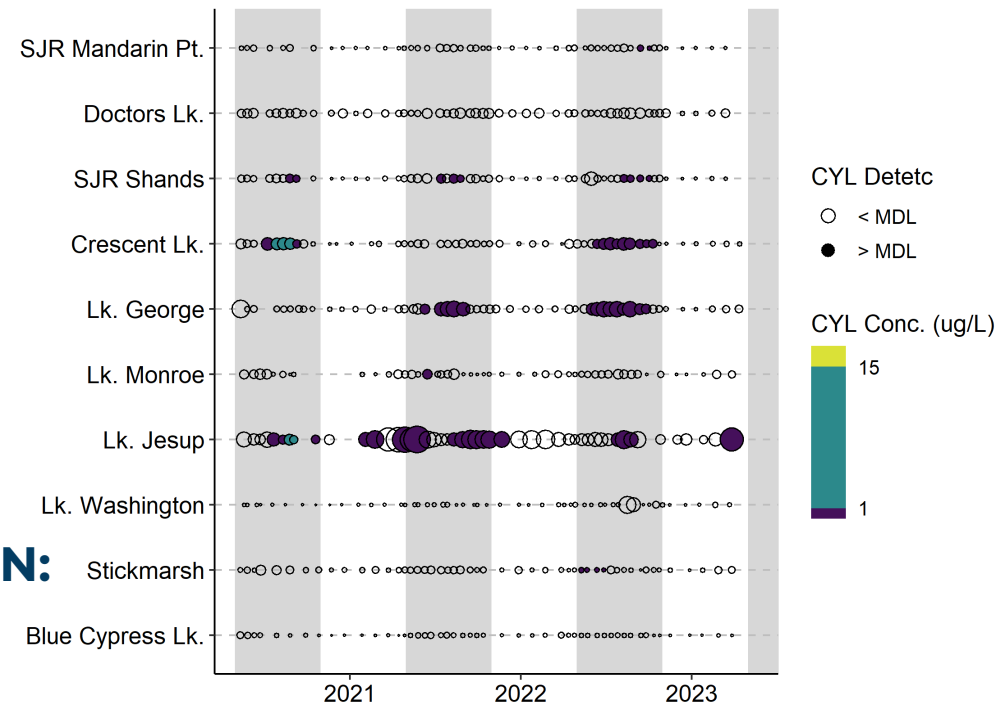
- Chl-a Conc. (ug/L)**
- 5
 - 20
 - 40
 - 100
 - 250

CYLINDROSPERMOPSIS: 13% of samples



- MC Detect**
- < MDL
 - > MDL

- MC Conc. (ug/L)**
- 8
 - 1

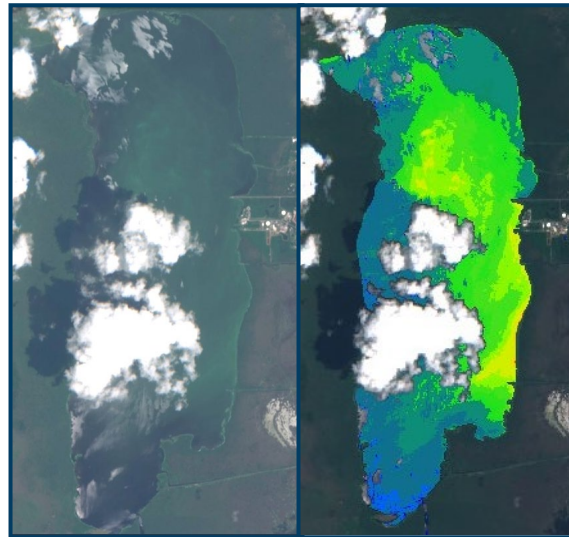
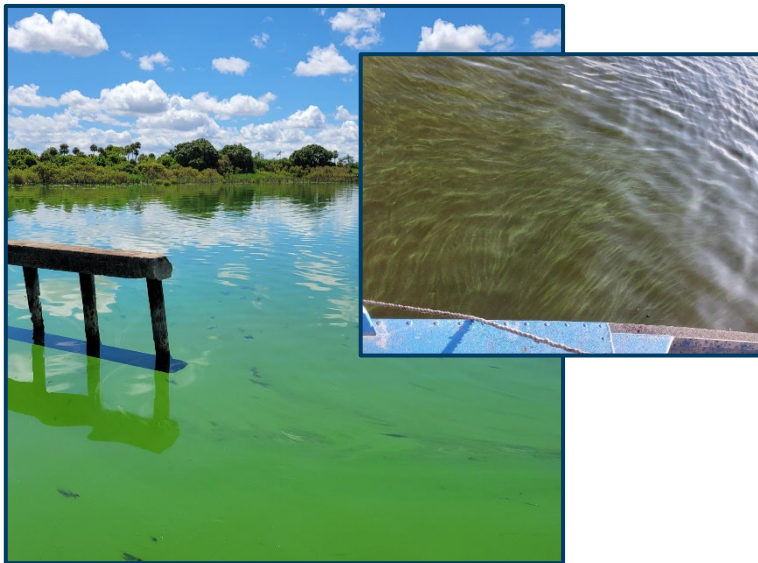


- CYL Detect**
- < MDL
 - > MDL

- CYL Conc. (ug/L)**
- 15
 - 1

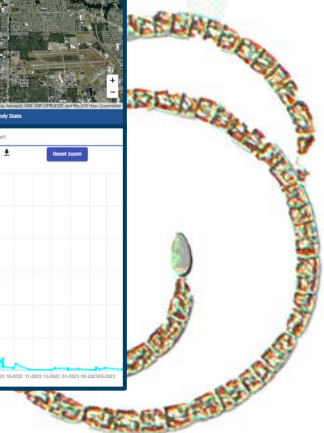
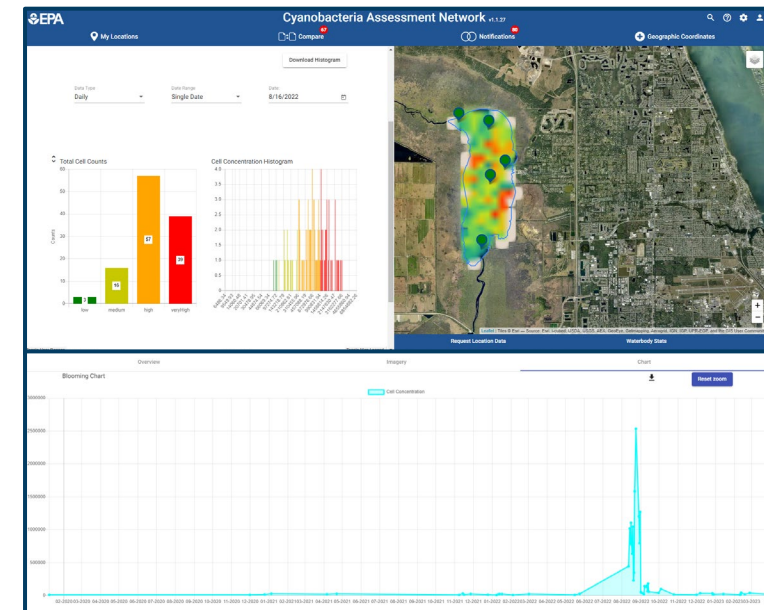
ADDITIONAL RELEVANT INFO

- **Lake Washington Bloom (Aug-Sep 2022)**
 - Field observations + Supplemental tools
 - Communication with stakeholders
 - Leveraging data



Sentinel-2 LIC RGB/NDCI

CyAN CI (Sentinel-3 OLCI)



RESEARCH PRIORITIES

- Enhance blue-green algae monitoring, including time series (longitudinal) as another data point
- Determine if and what role environmental conditions have on cyanotoxin levels
- Develop sampling plans to meet existing recommendations and use (e.g., WHO, EPA)



NEW DATA GAPS

- Blooms outside of routine sites and “peak” season
- Snapshot monitoring
- Sample turn-around time vs. management decision-making
- Linking data from multiple agencies



Georges Lake, Putnam Co.
Feb. 2023, *M. aeruginosa*
Photo from DEP NEROC

ACKNOWLEDGEMENTS

- Florida Department of Environmental Protection
- SJRWMD Bureau of Water Resources Information
- SJRWMD Bureau of Water Resources

