

May 31, 2019



Florida Department of Environmental Protection
Attn: Kaitlyn Sutton
2600 Blair Stone Road
Mail Station 6511
Tallahassee, FL 32399-2400

Re: Recommendation for inclusion of water quality standards for cyanobacteria and associated toxins microcystin and cylindrospermopsin as part of the potential revisions of Chapters 62-4; 62-302; 62-303 and 62-304 Florida Administrative Code through the FDEP 2019 Triennial Review Process.

The cyanobacteria problem in Florida

Cyanobacteria was recognized as a statewide problem considered by the first Harmful Algal Bloom (HAB) Task Force in the late 1990s. In 2000 the Florida HAB Task Force determined several goals for addressing the cyanobacteria problem in Florida.

“FY 2000-2001 cyanobacterial project recommendations, either specific projects were recommended to be continued, e.g., surveys, epidemiology studies, and educational materials or new time sensitive projects, e.g., culture of Cylindrospermopsis for toxin standards and a workshop to discuss probes or sensors to detect cyanobacteria and quantify their toxins. The latter would be appropriate for natural waters as well as water treatment plants. The workshop entitled “Cyanotoxin Detection and Quantification and Instrumentation” laid out a plan for initial collaboration and approaches. It looked at instrumentation and packaging of the instrumentation for deployment into natural water bodies or installation in treatment plants.”

Unfortunately, the Florida HAB Task Force was defunded in 2001 (Steidinger ca. 2004). Since 2001, some 18 years ago, Florida has yet to adopt water quality criteria specific to cyanobacteria.

Cyanobacteria blooms are worsening in Florida and elsewhere

Harmful Algal Blooms, especially blooms of cyanobacteria are increasing in frequency, duration, and severity in Florida and the U.S. (Lopez, et al. 2008; HAB RDDTT 2008; FDEP 2004). Cyanobacteria blooms are now debated among researchers as possibly the greatest inland threat to water quality and ecosystems (Brooks et al. 2016). In Florida, major lakes, rivers, and estuarine ecosystems have been significantly impacted including the St. Johns River, Lake Okeechobee, Harris Chain of Lakes, Caloosahatchee River and estuary, and St. Lucie River and estuary (FDEP 2004). Burns 2008, reports that cyanobacteria blooms in Florida waters “represent a major threat to water quality and ecosystem stability.”

The underlying causes and impacts of cyanobacteria blooms on aquatic ecosystems have been researched for decades

The primary impacts from high biomass cyanobacteria blooms include hypoxia that cause mortality to fish and benthic sessile organisms and the blockage of sunlight affecting beneficial phytoplankton and macrophytes can lead to disruption of food webs and biological community structure and function (Lopez et al. 2008, Havens 2008). Cyanotoxins can be consumed by primary consumers and transferred to higher trophic levels (Prepas et al. 1997). Toxin production by cyanobacteria has caused fish kills and can potentially magnify the effects of cyanobacteria to aquatic ecosystems (Havens 2008). Cyanotoxins can cause sub-lethal and lethal

toxic effects to fish, zooplankton, aquatic macroinvertebrates, wading birds, and other aquatic vertebrates (Havens 2008).

Occurrence of cyanobacteria blooms correlate positively to total nitrogen and total phosphorus in lakes, rivers, and coastal ecosystems in many regions (Pearl 1988). However, factors promoting cyanobacteria blooms and toxin production can also include variables other than macronutrients including water temperature, water transparency, reduced CO₂, elevated pH, abundant iron and dissolved organic matter, and zooplankton grazing dynamics (Havens 2008). In Florida waters eutrophication and impairment from nutrient pollution has increased dramatically. Since 2010 the watershed acreage in Florida under active Basin Management Action Plans, primarily for nutrient pollution, has gone from about three million acres to over 13 million acres by 2016 (FDEP 2017).

Prediction, detection, identification, and monitoring of cyanobacteria have improved dramatically

Cyanobacteria taxa identification, monitoring for relative abundance and methods for toxin sampling, and identification have improved dramatically over the past decade in Florida. USGS conducts continuous and periodic determination of phycocyanin, a pigment produced by cyanobacteria, in several locations in Florida. Phycocyanin as measured by relative fluorescence units (RFUs) can be used to estimate cyanobacteria biovolume and assist in the development of threshold water quality criteria for cyanobacteria by FDEP (Almuhtaram 2018).

U.S. EPA final guidelines for microcystin and cylindrospermopsin issued in May 2019 vs. 2016 Draft Guidelines

EPA determined that the recent 2019 guidelines issued for recreational exposure to microcystin and cylindrospermopsin could be used for both swimming advisories and as new water quality standards by the States. If adopted under section 303(c) of the Clean Water Act, the standards could be used for Clean Water Act Purposes. In the latter context, we suggest adopting the EPA draft 2016 recreational guidelines for microcystin (4 µg/l) and cylindrospermopsin (8 µg/l) thresholds as new Florida water quality standards through the Florida Triennial Review process. We feel the lower 2016 toxin thresholds are appropriate due the increased frequency, duration, and severity of cyanobacteria blooms in Florida. We suggest that it is important to consider cyanotoxins independent of nutrients to further refine the relationship of nutrients and other hydrological variables to cyanobacteria blooms.

Waterkeepers Florida respectfully request that FDEP initiate rulemaking and promulgate water quality standards for cyanobacteria and the associated toxins microcystin and cylindrospermopsin as appropriate in Chapters 62-4, 62-302; 62-303; 62-304 as part of the FDEP Triennial Review process.

Thank you for your consideration.

Please contact us at 904-256-7591 or at lisa@stjohnsriverkeeper.org.



Respectfully,

A handwritten signature in cursive script that reads "Lisa Rinaman".

Lisa Rinaman
St. Johns Riverkeeper
Board Chair of Waterkeepers Florida



Jen Lomberg
Matanzas Riverkeeper
Jen@MatanzasRiverkeeper.org
(904) 471-9878



Georgia Ackerman
Apalachicola Riverkeeper
Georgia@ApalachicolaRiverkeeper.org
(850) 653-8936



John Cassani
Calusa Waterkeeper
Cassani@CalusaWaterkeeper.org
(239) 444-8584



Harrison Langley
Collier County Waterkeeper
Harrison@CollierCountyWaterkeeper.org
(239) 261-2888



Laurie Murphy
Emerald Coastkeeper
Laurie@EmeraldCoastkeeper.org
(850) 712-9566



Marty Baum
Indian Riverkeeper
Keeper@IndianRiverkeeper.org
(772) 631-5827



Reinaldo Diaz
Lake Worth Waterkeeper
Reinaldo@LakeWorthWaterkeeper.org
(561) 707-2897



**MIAMI
WATERKEEPER**

Rachel Silverstein
Miami Waterkeeper
Rachel@MiamiWaterkeeper.org
(305) 905-0856



Anna Laws
St. Marys Riverkeeper
StMarysRiverkeeper@Gmail.com
(404) 909-0667



Andy Mele
Suncoast Waterkeeper
AndyMele@Mac.com
(914) 204-0030



John Quarterman
Suwannee Riverkeeper
wwwswatershed@gmail.com
(850) 290-2350



Andy Hayslip
Tampa Bay Waterkeeper
Andy@TampaBayWaterkeeper.org
(727) 537-0484

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