May 31, 2019

Florida Department of Environmental Protection
Attn: Kaitlyn Sutton
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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 booms 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