

IV. Many Cyanotoxins not Analyzed as Part of the Calculation

These criteria are the results of analysis of the effects of microcystin and cylindrospermopsin; however, many more cyanotoxins, known and unknown, have not been analyzed. Cyanotoxins such as beta-N-methylamino-L-alanine (BMAA) have been indicated as a risk in the development of neurodegenerative diseases and have been found in south Florida waters (Brand et al. 2011), but are not analyzed as part of this study. It may be that no amount of exposure to cyanotoxins is safe.

Given that there is much that remains to be understood about cyanobacteria and cyanotoxins, we urge you to develop a standard that includes guidelines for both cyanobacteria and cyanotoxins. Measurements of chlorophyll *a* should not be triggered by the sighting of a visible bloom, but should be part of a regular water quality monitoring effort, as with the Florida Healthy Beaches program. Swimming advisories should be issued when a bloom is sighted during part of regular sampling, when chlorophyll *a* is greater than 10 µg/L, as stated in Table 2-1, WHO (2003a) Recreational Guidance/Action Levels for Cyanobacteria, Chlorophyll *a*, and Estimated Corresponding Microcystin Level in the EPA's May 2019 Recommended Human Health Recreational Ambient Water Quality Criteria or Swimming Advisories for Microcystins and Cylindrospermopsin document) or when cyanotoxins are detected. This includes consistent, clear, and obvious posting of signage at recreational areas to indicate that cyanobacteria are present, and consistent, clear, and obvious notification to the public, beyond posting it on the Department of Health website. If there is an absolute need to quantify the level of cyanotoxin in order to issue advisories as part of regular monitoring for blooms and measurement of chlorophyll *a*, we recommend the 2016 calculations, which included different routes of exposure and resulted in lower levels of cyanotoxins proposed as a threshold.

Numeric Nutrient Criteria

I. The Florida Algae Crisis and the Lake Okeechobee Experience

In 1969, a USGS report found that agriculture in the Lake Okeechobee watershed was dumping fertilizer into the Lake. The Legislature commissioned a Report on the Eutrophication of Lake Okeechobee in 1976, which determined that action to reduce fertilizer loading was urgently needed to prevent algae outbreaks in the Lake. An Interim Action Plan to reduce fertilizer loading into the Lake was adopted in 1979. Since that first plan, multiple permits, plans, and reduction goals for fertilizer, sewage, and manure (FSM) have been implemented during the 1980s, 1990s and into the 2000s. Despite this, FSM pollution has continued to accumulate in the bed of the Lake and continues to increase, while massive algal blooms have continued to occur. In 2005, an unprecedented massive toxic algae outbreak covered most of Lake Okeechobee, rendering contact with the water unsafe and triggering warning signs where Lake Okeechobee water was conveyed into the Caloosahatchee and St. Lucie Rivers. In 2007, the Legislature responded to the crisis by deleting the statutory finding that fertilizer pollution was causing algae outbreaks in the Lake. Ch. 2007-253, Laws of Florida. FSM pollution of the