Sent via email

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Florida Department of Environmental Protection
Attn: Avril Wood-McGrath
Division of Environmental Assessment and Restoration
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Tallahassee, FL 32399
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Re: Comments on Triennial Review of Water Quality Standards (Cyanotoxin Criteria)

Dear Ms. Wood-McGrath:

Thank you for soliciting comments regarding the Florida Department of Environmental Protection's (Department) triennial review of water quality standards.

As you are aware, in May 2019 the Center for Biological Diversity (Center), Sanibel-Captiva Conservation Foundation (SCCF), and Calusa Waterkeeper petitioned the Department to establish water quality criteria for cyanotoxins based on EPA's 2016 draft recommended criteria.[1] In June 2019, the Department granted the petition "to the extent that it seeks the initiation of triennial review rule development process…and consideration during this process of adopting criteria for microcystins and cylindrospermopsin."[2] The Department stated, "Public health and safety are of paramount importance to the Department," and that "Reducing and ultimately solving the blue-green algae problem is a top priority of the Department."[3] We were therefore disappointed to learn during the Department's May 5 virtual public workshop that the Department will not be establishing criteria for cyanotoxins.

For the reasons explained below we do not believe the Department has adequately explained its reasons for not establishing criteria, particularly at a time when the public is looking to the state for leadership while a 500-square-mile bloom ravages Lake Okeechobee and health alerts are

[1] *See In Re: Petition to Initiate Rulemaking to Establish Water Quality Criteria for Cyanotoxins*, Petition to Initiate Rulemaking to Establish Water Quality Standards for Cyanotoxins in Florida Surface Waters, Center for Biological Diversity, Sanibel-Captiva Conservation Foundation, and Calusa Waterkeeper, OGC Case No. 19-0419 (May 23, 2019)("Petition").
[2] *In Re: Petition to Initiate Rulemaking to Establish Water Quality Criteria for Cyanotoxins*, Order, State of Florida Department of Environmental Protection, OGC Case No. 19-0419 (June 25, 2019).
[3] *Id.*

being issued for the Caloosahatchee River due to high levels of cyanotoxins in the water.[4] We hope the Department will reconsider its course of action and seize the opportunity to be the national leader on this issue that Florida so desperately needs it to be.

I. The State's Numeric Nutrient Criteria Have Failed to Adequately Protect Aquatic Life and Human Health from the Spread of Toxic Algae.

During the virtual public workshop, Department staff cited Florida's numeric nutrient criteria as a basis for not establishing cyanotoxin criteria. The State has promulgated both narrative and numeric standards for nutrients (total phosphorus and total nitrogen) for surface waters.[5] Many waterbodies and segments throughout the state, including Lake Okeechobee, the St. Lucie and Caloosahatchee estuaries, and the Indian River lagoon are "impaired" by pollutants, including nutrients.[6] To control these nutrients, the State relies in large part on total maximum daily loads (TMDLs) and Basin Management Action Plans (BMAPs). In 2001, the Department established a total phosphorus TMDL for Lake Okeechobee,[7] which was followed by a BMAP in 2014.[8] In 2009 the Department established a TMDL for total phosphorus (TP), total nitrogen (TN), and dissolved oxygen (DO) for the St. Lucie Basin,[9] and a TMDL for TN for the Caloosahatchee Estuary.[10] The Department finalized BMAPs for the St. Lucie and Caloosahatchee Basins in

[4] Stephanie Byrne, "2 algae health alerts issued in Lee County as community on watch," WINK News (Apr. 28, 2021), at https://www.winknews.com/2021/04/27/two-algae-health-alerts-issued-in-lee-county-as-community-is-on-algae-watch/; Joel Malkin, "Health Department Issues Health Alert Over Algae in Lake Okeechobee," News Radio WFLA (Apr. 28, 2021), at https://wflanews.iheart.com/featured/florida-news/content/2021-04-28-toxic-algae-in-lake-okeechobee-gets-the-attention-of-florida-congressman/; Vanessa Bein, "Rinse & Repeat: Blue-green algae covers Lake Okeechobee," NBC-2 (May 14, 2021), at https://nbc-2.com/news/environment/2021/05/12/rinse-repeat-blue-green-algae-covers-lake-okeechobee/; Katelyn Massarelli, "Blue-green algae toxins detected at Franklin Lock on Caloosahatchee," NBC-2 (May 14, 2021), at https://nbc-2.com/news/2021/05/13/blue-green-algae-toxins-detected-at-franklin-lock-on-caloosahatchee/; Florida Department of Health, "Health Alert for Caloosahatchee-Franklin Locks," (Apr. 20, 2021), at HEALTH ALERT FOR CALOOSAHATCHEE-FRANKLIN LOCKS | Florida Department of Health in Lee (floridahealth.gov).

[5] *See* Rules 62-302.530, 62-302.531, and 62-302.532, F.A.C.

[6] *See* DEP, Comprehensive Verified List (Aug. 1, 2018), at https://floridadep.gov/dear/watershed-assessment-section/documents/comprehensive-verified-list.

[7] *See* Florida Department of Environmental Protection, Total Maximum Daily Load for Total Phosphorus Lake Okeechobee, Florida, 9-10 (Aug. 2001), available at https://floridadep.gov/sites/default/files/Lake_O_TMDL_Final.pdf.

[8] *See* Florida Department of Environmental Protection. 2014. Basin Management Action Plan for the Implementation of Total Maximum Daily Loads for Total Phosphorous by the Florida Department of Environmental Protection in Lake Okeechobee (Dec. 2014).

[9] *See* Florida Department of Environmental Protection. 2008. TMDL Report, Nutrient and Dissolved Oxygen TMDL for the St. Lucie Basin.

[10] *See* Florida Department of Environmental Protection. 2009. Final TMDL Report, Nutrient TMDL for the Caloosahatchee Estuary.

2013 and 2012, respectively.[11] These BMAPs have subsequently been updated by the Department.[12]

The Department should surely recognize that since it established a phosphorus standard for Lake Okeechobee twenty years ago that harmful algae blooms have only become more frequent, more intense, and even more harmful to wildlife, local communities, and the economy. Throughout these two decades, the State has never come close to achieving the Lake Okeechobee phosphorus TMDL. According to a report issued by the University of Florida Water Institute, since 1974, annual total phosphorus loads to Lake Okeechobee have exceeded 500 metric tons nearly 50% of the time.[13] Averaged over the 41-year period of record, the annual phosphorus load is approximately 3.6 times the annualized TMDL.[14] Even after the Florida State Legislature in 2015 extended the date to achieve the TMDL by another twenty years,[15] the Department in its most recent update to the Lake Okeechobee BMAP expressed doubt that it is practicable to achieve reductions sufficient to meet the phosphorus TMDL within 20 years.[16] Clearly the current approach is not working.

A more aggressive and comprehensive approach is necessary to combat harmful algae blooms. By establishing criteria for cyanotoxins and incorporating cyanotoxins as biological endpoints for setting nutrient discharge limits in TMDLs,[17] the Department would be able to fully address the primary contributors to harmful algal blooms (HAB), which in addition to nutrient pollution, include water management decisions (e.g. water flow and water levels),[18] and the effects of

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[11] *See* Florida Department of Environmental Protection. 2013. Basin Management Action Plan for the Implementation of Total Maximum Daily Loads for Nutrients and Dissolved Oxygen by the Florida Department of Environmental Protection in the St. Lucie River and Estuary Basin; Florida Department of Environmental Protection. 2012. Basin Management Action Plan for the Implementation of Total Maximum Daily Loads for Nutrients Adopted by the Florida Department of Environmental Protection in the Caloosahatchee Estuary Basin (Dec. 2012).

[12] *See* Florida Department of Environmental Protection, Lake Okeechobee Basin Management Action Plan (Jan. 2020), at http://publicfiles.dep.state.fl.us/DEAR/DEARweb/BMAP/NEEP_2020_Updates/Lake%20Okeechobee%20BMAP_01-31-20.pdf; St. Lucie River and Estuary Basin Management Action Plan (Jan. 2020), at http://publicfiles.dep.state.fl.us/DEAR/DEARweb/BMAP/NEEP_2020_Updates/St_Lucie_BMAP_01-31-20.pdf Caloosahatchee River and Estuary Basin Management Action Plan (Jan. 2020), at http://publicfiles.dep.state.fl.us/DEAR/DEARweb/BMAP/NEEP_2020_Updates/Caloosahatchee%20BMAP_01-31-2020.pdf.

[13] Graham, W.D., et al. 2015. Options to Reduce High Volume Freshwater Flows to the St. Lucie and Caloosahatchee Estuaries and Move More Water from Lake Okeechobee to the Southern Everglades. An Independent Technical Review by the University of Florida Water Institute, p. 63.

[14] *Id.* at 63-64.

[15] *See* § 373.4595(3)(b), Fla. Stat. (2016).

[16] Florida Department of Environmental Protection, Lake Okeechobee Basin Management Action Plan, 15 (Jan. 2020).

[17] *See* Williams, C.D., J. Burns, A. Chapman, M. Pawlowicz, and W. Carmichael. 2006. Assessment of Cyanotoxins in Florida's Surface Waters and Associated Drinking Water Resources, Final Report, 34, April 11, 2006 (recommending that "surface water management plans, Pollution Load Reduction Goals (PLRGs), and Total Maximum Daily Load (TMDLs) goals for nutrient-impaired water incorporate cyanobacteria and specifically cyanotoxins as biological endpoints for setting nutrient discharge limits. This strategy would help protect aquatic ecosystems and water catchments that are used for drinking water supply.").

[18] *See* Indiana University-Purdue University, Indianapolis, Center for Earth and Environmental Science, "What causes algal blooms?," at https://cees.iupui.edu/research/algal-toxicology/bloomfactors.

climate change. Water quality criteria for cyanotoxins would necessitate greater regulatory focus, transparency, and accountability because these criteria would serve as a clearly defined level of human health and environmental protection that pollution control measures must meet. Further, by identifying cyanotoxins independently of nutrients, the Department would be able to better address the connection between nutrients and HABs and tackle other contributors to HABs, including the timing, volume, and distribution of water flows and levels by water managers, and rising temperatures and changes in precipitation fueled by climate change. In sum, exacting water quality criteria specifically for cyanotoxins sets a clear path forward for monitoring, assessing, and reducing HABs.

II. Chlorophyll-a Is Not an Appropriate Proxy for Microcystin or Other Cyanotoxins.

In the Department's June 2019 order granting our petition for rulemaking, the Department stated, "The [Blue Green Algae] Task Force is charged with focusing on expediting progress toward reducing the adverse impacts of blue-green algae blooms and making recommendation for regulatory changes." It appears the DEP looked to the Task Force for guidance regarding the establishment of water quality criteria for cyanotoxins. In its Final Consensus Document #1, the Task Force stated, "Defensible health advisories should be established by the Florida Department of Health and defensible water quality criteria should be established by the Florida Department of Environmental Protection. These actions should be supported by the best available science and monitoring, and updated as new information becomes available."[19] To rely on chlorophyll-a as a proxy for cyanotoxin criteria the Department is not only inappropriate, but it is also not consistent with the recommendations of the Blue Green Algae Task Force. Had the task force believed chlorophyll-a was an adequate proxy it is unlikely they would have specifically recommended that the Department establish defensible criteria for cyanotoxins as they did in their First Consensus Document.[20]

Chlorophyll is not an appropriate proxy for cyanotoxins for characterizing impairment because the conditions that promote or suppress chlorophyll in water are different than the conditions that allow for cyanotoxins such as microcystin from cyanobacteria.

Studies have described the competitive advantage cyanobacteria have over phytoplankton under a variety of conditions, especially those being influenced by climate change and warming waters.[21] Cyanobacteria have adapted to maximize available light near the surface utilizing vacuoles for buoyancy whereas most phytoplankton contributing to chlorophyll concentration do

[19] Blue-Green Algae Task Force Consensus Document #1, p. 9 (Oct. 11, 2019).
[20] *See* July 29, 2020 Department of Environmental Protection Blue Green Algae Task Force Meeting Part I (3:13), at https://thefloridachannel.org/videos/7-29-20-department-of-environmental-protection-blue-green-algae-task-force-part-1/. After the issuance of the Final Consensus Document #1 and following a presentation by FDEP, it appears Task Force members did not believe chlorophyll-a was a good indicator of microcystins.
[21] Paerl, H.W., Fulton R.S. 2006. Ecology of Harmful Cyanobacteria. In: Graneli E., Turner J.T. (eds) Ecology of Harmful Algae. Ecological Studies (Analysis and Synthesis), vol 189. Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-540-32210-8_8; Pearl, H.W. and J. Huisman. 2009. Climate change: a catalyst for global expansion of harmful cyanobacterial blooms. Environmental microbiology reports, 2009- Wiley Online Library; Zhenyan et al. 2020 Alteration of dominant cyanobacteria in different bloom periods caused by abiotic factors and species interactions, Journal of Environmental Sciences, 10.1016/j.jes.2020.06.001, 99, (1-9).

not have this advantage.[22] Additionally, the presence of mat-forming cyanobacteria or very high cell densities in the water column would likely contribute to light limitation of co-occurring phytoplankton that may ultimately suppress sample chlorophyll concentrations.

High levels of tannins and other macrophyte derived allelochemicals are found to inhibit phytoplankton that contribute to water column chlorophyll.[23] Conversely, cyanobacteria proliferate in Florida waters such as the Caloosahatchee River and Lake Okeechobee with high tannins, allelochemicals and other dissolved organic compounds (CDOM) derived from plant decomposition. Additionally, microcystin producing *Microcystis* have been shown to have some resistance to macrophyte derived allelochemicals that more negatively affect other phytoplankton species.[24]

Thus, *Microcystis* avoids light limitation by forming surface mats and appears to have some resistance to the same allelochemicals found in water bodies with relatively high tannins and dissolved organic plant derivatives that would more negatively impact groups of eukaryotic planktonic algae without similar adaptive strategies for dominance as cyanobacteria. In the example described, cyanobacteria would likely dominate the aquatic community and indirectly suppress or outcompete phytoplankton, indirectly reducing water-column chlorophyll. In such a scenario chlorophyll would under-represent the potential impairment of recreation as a designated use.

III. The Department's Cyanotoxin Sampling Protocol May Underestimate the Potential for Public Health Risk and Bias the Assessment of Cyanotoxins as Indicators of Impairment.

The current sampling is a protocol specific for phytoplankton blooms. Most phytoplankton blooms do not form surface mats or scums as do cyanobacteria. As such, the Department's cyanotoxin sampling protocol for phytoplankton avoids sampling cyanobacteria concentrated at the surface likely resulting in a reduced toxin estimate from latent intracellular toxin release when present. The Department's Dr. Whiting has stated that to incorporate cyanobacteria biomass that may be part of a cyanobacteria surface mat would require following a "biological sample" protocol.[25] Cyanobacteria samples having some cyanobacteria biomass collected by Calusa Waterkeeper and analyzed by GreenWater Laboratories in 2018 resulted in microcystin concentrations ranging from 5,300 ug/l to 38,450 ug/l. It is probable that collecting those same samples some distance from the surface mat at depth of 0.5 m as FDEP likely does and without

[22] Paerl and Fulton (2006).
[23] Mulderij, G. 2006. Chemical warfare in freshwater-allelopathic effects on macrophytes on phytoplankton. ISBN: 90-9019798-2.
[24] Dziallas, C. and Grossart, H.P. 2011. Increasing oxygen radicals and water temperature select for toxic Microcystis sp PLoS One 2011 6 e25569; Zilleges, Y. et al. The cyanobacterial hepatoxin microcystin binds to proteins and increases the fitness of Microcystis under oxidative stress conditions PLoS One 2011 6 e17615; Leunert, F. et al. 2014. Phytoplankton response to UV-generated hydrogen peroxide from natural organic matter. J Plankton Res. 2014 36 185 97.
[25] *See* July 29, 2020 Department of Environmental Protection Blue Green Algae Task Force Meeting Part I, 2:29, at https://thefloridachannel.org/videos/7-29-20-department-of-environmental-protection-blue-green-algae-task-force-part-1/.

incorporating more concentrated cyanobacteria at the surface would result in much lower microcystin concentrations. This same issue of sampling bias was reported by Lantigua (2017).[26]

For more accurate estimates of toxin potential, it may be necessary to develop and adopt a specific protocol that blends elements of the FDEP protocols for phytoplankton blooms and biological sampling. A protocol specific to cyanobacteria with more meaningful potential for toxin estimates is critically important for understanding public health risk addressed by swim advisories and Class III waters designated for recreation and for a more thorough evaluation as a parameter defining impairment. Just because an adopted protocol does not currently exist specific to cyanobacteria does not necessarily mean that such a protocol should not be pursued.

IV. The Presence of Surface Scum is Not an Appropriate Threshold for Taking Action and it is Not Consistent with the Precautionary Principle.

During the Department's presentation at the virtual public workshop, staff stated that the visual presence of a bloom is used as a threshold instead of numeric toxin values. These qualitative guidelines are inadequate because it takes a visible surface scum to have formed or other clear visual indicators to be present before a health advisory is issued and people are notified to avoid waters impacted by an HAB. Microcystins can persist even after a bloom is no longer visible and cyanotoxin concentrations can be higher after the initial bloom fades.[27] Zastepa (2014) found that dissolved microcystin-LA was present in waters at a concentration of 20 u/L or more for 9 ½ weeks even though the bloom was not visible after 5 weeks.[28] Moreover, cylindrospermopsin-producing cyanobacteria do not tend to form visible surface scums and the highest concentrations occur below the water surface.[29]

These studies do not support the Department's contention that there is "very low incidence of toxins in waters without a visible bloom present." Moreover, while the Department asserts that using these qualitative standards "allows the public to make decisions about recreating in a water at the time of use" people could be unknowingly exposed to harmful levels of cyanotoxins while recreating in waters that are not the subject of a health advisory. This is hardly precautionary. Quantitative guidelines, on the other hand, set levels that can be routinely monitored for and serve as clear trigger points for public health officials to take action.

V. The Department Has No Basis for Assuming that the Department of Health Will Adequately Monitor DEP Data and Post Signage.

Even when an HAB is observed, state agencies routinely fail to promptly notify the public and close affected waters to recreation. It is not clear what specific protocols the Florida Department of Health follows to protect public health. According to the Department of Health (DOH), the agency issues press releases, posts signs at areas affected by HABs, meets with local

[26] Lantigua, J. 2017. Tainted waters, threats to public health and the people's right to know. American Civil Liberties Union.
[27] U.S. Environmental Protection Agency. 2016. Human Health Recreational Ambient Water Quality Criteria or Swimming Advisories for Microcystins and Cylindrospermopsin, Draft, pp. 1, 5, 31 (EPA 2016).
[28] Zastepa A. (2014). Fate and persistence of microcystin congeners in lakes and lake sediments. University of Ottawa, Ottawa, Canada.
[29] EPA (2016) at 1, 5.

governments, and distributes information to educate the public[30] but it is not clear whether all these measures are taken in every instance, how fast the DOH must respond, and whether these actions are effective in protecting public health. In fact, DOH's response to HABs in 2018 sparked significant criticism from the media and the public[31] and news reports from that summer noted that the Health Department did not mention either algae or red tide on its Twitter and Facebook accounts over the course of a month.[32] HABs were not even listed as "Trending Topics" on the Health Department's website.[33] DOH has struggled to address the concerns of numerous residents affected by HABs.[34]

Scientists, researchers, and physicians have also questioned DOH's position on the health effects of cyanotoxins and its response to HABs.[35] In 2018, several researchers identified the potential long-term implications of the State's failure to immediately notify the public of the harm caused by HABs.[36] Metcalf et al. (2018) detailed how public information on the toxicological risks of the 2016 HABs that severely impacted Martin and St. Lucie counties was not immediately forthcoming from public health authorities.[37] The researchers explained:

> As a result of the MC [microcystins] concentration contained within the bloom material, closure or restriction of access to the waters should have occurred rapidly, if not immediately, with continuous monitoring to determine potential adverse health effects. Given the likelihood of long-term hepatotoxic or carcinogenic consequences from the microcystin content, it may have been prudent for public health officials to offer assistance to households living on the banks or near the St. Lucie River until the cyanobacterial bloom subsided. Although there was the potential for adverse short-term human health impacts, there is also the possibility that exposure to such bloom material may have long-term health impacts.[38]

According to the researchers, the long-term implications of cyanotoxin exposure can be serious:

> Based on microcystin content alone reported here, it is a reasonable prediction that the cohort of Florida State citizens exposed to the 2016 Florida cyanobacteria bloom incident, including children of underprivileged families that we witnessed

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[30] *See* Florida Department of Health: The Facts on Blue Green Algae, August 23, 2018, at http://www.floridahealth.gov/_documents/newsroom/press-releases/2018/08/082318-blue-green-algae.pdf.
[31] *See, e.g.*, Hayden, T. 2018. Editorial: Health department ignorant to water crisis, News-Press, Aug. 21, 2018, at https://www.news-press.com/story/opinion/2018/08/21/toxic-algae-florida-health-department-ignorant-water-crisis/1051336002/.
[32] Williams, A.B. 2018. Florida toxic algae a long-term health concern, according to scientists, researchers, News-Press, (Aug. 23, 2018) at https://www.news-press.com/story/news/2018/08/22/toxic-algae-florida-scientists-question-health-departments-stand/973593002/.
[33] *Id.*
[34] Williams, A.B. 2019. Florida Department of Health emails show agency struggled to manage algae crisis. Ft. Myers News Press (April 7, 2019), at https://www.news-press.com/story/news/2019/04/07/florida-health-department-emails-show-struggle-manage-toxic-algae-crisis/3275715002/.
[35] Williams (2018).
[36] Metcalf, J., S.A. Banack, J.T. Powell, F.J.M. Tymm, S.J. Murch, L.E. Brand, L.E., and P.A. Cox. 2018. Public health responses to toxic cyanobacterial blooms: perspectives from the 2016 Florida event, Water Policy 20 (5): 919-932.
[37] *Id.*
[38] *Id.*

> picnicking, fishing, and swimming in cyanobacterially contaminated waters, may experience an increased lifetime risk of liver cancer and/or hepatic dysfunction requiring hospitalization or transplantation.[39]

Metcalf et al. (2018) concluded that essential planning and communication are necessary to inform the public to allow rapid risk assessment and closure of affected waters to protect human and animal health.[40]

Given DOH's track record and apparent reliance on county health departments to post signs and adequately warn residents, we are not confident that a Joint Cyanobacteria Bloom Response based on qualitative data will be adequate to sufficiently warn the public and protect human health. We therefore urge the Department to take stronger measures and promulgate numeric water quality criteria for cyanotoxins.

VI. The Department Should Adopt the EPA's 2016 Draft Recommended Criteria.

EPA regulations require states to "adopt those water quality criteria that protect the designated use" and that such criteria "must be based on sound scientific rationale and must contain sufficient parameters or constituents to protect the designated use."[41]

The petition for rulemaking submitted by the Center, SCCF and Calusa Waterkeeper requested DEP to adopt the EPA's draft recommendation, as opposed to its final recommended Human Health Recreational Ambient Water Quality Criteria or Swimming Advisories for Microcystins and Cylindrospermopsin.[42] These draft criteria limit microcytins to 4 ug/L and cylindrospermopsin to 8 ug/L[43] and are more consistent with other state recreational water cyanotoxin action levels.[44] EPA's final recommended values, on the other hand, are 8 ug/L for microcystins and 15 ug/L for cylindrospermopsin, nearly doubling the draft recommended values.[45]

We understand and share the Department's concerns about the final 2019 recommended criteria. As the Department correctly pointed out, the final recommended values were based only on potential ingestion exposure (based on estimated average pool water ingestion), and not on inhalation, dermal absorption, or from eating contaminating fish or shellfish. Therefore, it assumes that all cyanotoxin exposure is from ingestion.[46]

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[39] *Id.*
[40] *Id.*
[41] 33 C.F.R. § 131.11(a)(1).
[42] *See* Petition at 113-16.
[43] No more than 10 percent of days in a recreational season (up to one calendar year). EPA (2016) at 52.
[44] *See* EPA (2016), Appendix B State Recreational Water Guidelines for Cyanotoxins and Cyanobacteria at B-4 (California), B-5 (Colorado), B-9 (Ohio), B-10 (Vermont), B-17 (Virginia).
[45] Not to be exceeded in more than three 10-day assessment periods over the course of a recreational season. U.S. Environmental Protection Agency. 2019. Recommended Human Health Recreational Ambient Water Quality Criteria or Swimming Advisories for Microcystins and Cylindrospermopsin. (EPA 2019) p. 76.
[46] EPA (2019) at 58.

Obviously, exposure can occur through various recreational and non-recreational pathways. Exposure from recreational water sources can occur through incidental ingestion while recreating, contact with the skin during activities like swimming, wading, fishing, boating, kayaking, and surfing, and inhalation as waterborne cyanotoxins are aerosolized.[47] Researchers at Florida Gulf Coast University documented airborne particles of cyanobacteria at a size that can be potentially inhaled and reach deep into the lungs more than a mile inland from any retention ponds and three miles from the Caloosahatchee River.[48] These aerosolized cyanotoxins can continue to exist after a bloom has dissipated, causing chronic human health impacts.[49]

Notwithstanding the deficiencies in the 2019 recommended criteria, however, there is nothing stopping the Department from establishing different and more protective criteria-namely the EPA's 2016 draft criteria, which included a relative source contribution (RSC) to account for these multiple exposure pathways. Inexplicably, the Department offers no explanation for why it cannot adopt these draft criteria.

The Department should act immediately upon the Task Force's recommendations, follow the precautionary principle, and expeditiously establish the most protective water quality criteria for microcystins and cylindrospermopsin. These criteria would establish clear numeric baselines and form the basis of water quality monitoring that would provide state environmental and health officials with critical information to notify the public of the health and safety risks of recreating in waters with high cyanotoxin levels.

Respectfully,

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[47] EPA (2016) at 29-30, 35; Hoagland, Di Jin, Andrew Beet, Barbara Kirkpatrick, Andrew Reich, Steve Ullmann, Lora E. Fleming, and Gary Kirkpatrick. "The Human Health Effects of Florida Red Tide (FRT) Blooms: An Expanded Analysis." *Environment International* 68 (July 2014): 144–53.
[48] Williams, A.B. 2019. Algae crisis: Airborne particles of toxic cyanobacteria can travel more than a mile inland, new FGCU study shows, Fort Myers News Press, Mar. 15, 2019 at https://www.news-press.com/story/tech/science/environment/2019/03/15/new-health-questions-raised-fgcu-research-toxic-algae-dust/3176195002/.
[49] Svircev, Z., Lalic, D., Savic, G.B., Tokodi, N., Backovic, D.D., Chen, L., Meriluoto, J., and Codd, G.A. 2019. Global geographical and historical overview of cyanotoxin distribution and cyanobacterial poisonings. Archives of Toxicology. 93(9):2429-2481.