MARTIN COUNTY

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May 30, 2019

Via electronic mail only: *Kaitlyn.Sutton@dep.state.fl.us*

Kaitlyn Sutton
Florida Department of Environmental Protection
2600 Blair Stone Road, M.S. 6511
Tallahassee, FL 32399

Dear Ms. Sutton:

Re: Proposed Rulemaking under the Clean Water Act's Triennial Review of State Surface Water Quality Standards

The Martin County Board of County Commissioners (Martin County) submits this letter as supplemental public comment on the Florida Department of Environmental Protection's (DEP) Triennial Review of the Surface Water Quality Standards in Chapter 62-302, Florida Administrative Code.

At the May 15, 2019 public meeting at Jonathon Dickenson State Park, DEP staff acknowledged that the agency was not intending to include new surface water quality standards for cyanotoxins because the U.S. EPA's guidance on these toxins was merely in "draft" format. The following week, May 22, 2019, the U.S EPA issued its final recommendations on for cyanobacteria standards in surface water. The EPA report, *Recommended Human Health Recreational Ambient Water Quality Criteria or Swimming Advisories for Microcystins and Cylindrospermopsin* (Report), noted that as of 2018, twenty states have issued quantitative standards for these toxins. The Report can be accessed at: https://www.epa.gov/wqc/recommended-human-health-recreational-ambient-water-quality-criteria-or-swimming-advisories

In the Report, the EPA states:

> The EPA is publishing these recommended values for microcystins and cylindrospermopsin under the CWA section 304(a) for states to consider as the basis for swimming advisories for notification purposes to protect public health in recreational waters. The EPA envisions that if states decide to use the values as swimming advisory values, they would do so in a manner similar to their current recreational water advisory programs. **Alternatively, states may consider using these same values when**

> **adopting new or revised WQS. If adopted as WQS and approved by the EPA under the CWA section 303(c), the WQS could be used for all CWA purposes. States may also wish to consider using these values as both swimming advisory values and WQS.**
>
> Section 2.0., pg. 18. (emphasis added).

Appendix B of the Report, attached hereto, identifies the states that adopted quantitative, and in some cases qualitative standards, prior to EPA's publishing of its final recommendations. It should be noted that many of these states with existing cyanobacteria/microcystin standards have significantly less fresh water bodies than the state of Florida.

EPA's new recommended standards for microcystins and cylindrospermopsin are 8 and 15 ug/ respectively. Martin County requests that DEP include in its proposed rulemaking for Rule 62-302.530, Florida Administrative Code, the *Human Health Recreational Ambient Water Quality Criteria or Swimming Advisories Criteria (AWQC/SA) for Microcystins and Cylindrospermopsin* that EPA is recommending for these toxins.

As a local government with Class III and designated Outstanding Florida Waters (Jensen Beach to Jupiter Inlet and North Fork St. Lucie River Aquatic Preserves), the County needs to be able to communicate with the public about the quality of the water that is of vital importance to the health and well-being of its residents, visitors, and the sustainability of the overall economy. Our residents and visitors expect a high and consistent level of protection in our surface waters. Martin County believes that surface water quality standards help to achieve those protections.

We look forward to working with DEP on surface water criteria rulemaking. Should you or anyone on your staff have any questions or concerns, please do not hesitate to contact me.

Sincerely,

Don Donaldson, P.E.
Deputy County Administrator

APPENDIX B. STATE RECREATIONAL WATER GUIDELINES FOR CYANOTOXINS AND CYANOBACTERIA

EPA compiled the information presented in this appendix based on searches of state websites for publicly available information regarding guidelines or action levels for cyanotoxins and cyanobacteria. Online searches for state guidance were conducted in 2015, 2016, and 2018. Direct personal communication of state guidelines and state public comments on the draft AWQC revealed some updated information.

Table B-1. Summary Counts of State Recreational Water Guidelines for Cyanotoxins and Cyanobacteria by Type and Scope of Guidelines

Recreational Water Guideline Type and Scope	Number of States and List of States	Additional Information
Quantitative guidelines for cyanobacteria only	5 states: Arizona, Idaho, Maine, New Hampshire, Wisconsin	Measurements for these criteria include cyanobacterial cell densities, proportion of toxigenic cyanobacteria, chlorophyll concentration, and Secchi disk depth measurements.
Quantitative guidelines for cyanotoxins only	4 states: Illinois, Iowa, Nebraska, Ohio	State guidelines address four cyanotoxins in order from most to least common: microcystins (24 states) anatoxin-a (11 states) cylindrospermopsin (9 states) saxitoxin (5 states)
Quantitative guidelines for cyanotoxins and either quantitative or qualitative guidelines for cyanobacteria	20 states: California, Colorado, Connecticut, Indiana, Kansas, Kentucky, Maryland, Massachusetts, Michigan, New Jersey, New York, North Dakota, Oklahoma, Oregon, Pennsylvania, Rhode Island, Utah, Vermont, Virginia, Washington	
Qualitative guidelines only	6 states: Delaware, Florida, Missouri, Montana, North Carolina, West Virginia	Examples include: presence of surface scum visible discoloration presence of potentially toxic algae presence/absence test for microcystins
Guidelines under development	4 states: Arkansas, Georgia, Minnesota, Wyoming	

Note: The EPA found that Texas and North Carolina published guidelines in the past, but the guidelines are no longer found on their websites. Missouri is in the process of developing quantitative thresholds.

Table B-2. State Recreational Water Quality Guideline for Cyanotoxins and Cyanobacteria Sorted by Type

State	Recreational Water Guideline Level	Recommended Action	Reference
States with Guidelines Based on Cyanobacteria Only			
Arizona	Blue-green algae (mean value based on a minimum of two sample events within one peak season): 20,000 cells/ml and Chlorophyll *a* result (mean value based on a minimum of two sample events within one peak season) in target range	Violation of the Narrative Nutrient Standard.	Arizona Department of Environmental Quality (2008). Narrative Nutrient Standard Implementation Procedures for Lakes and Reservoirs. http://www.azdeq.gov/environ/water/standards/download/draft_nutrient.pdf. Last Accessed: 11/27/2018.
Idaho	*Microcystis* or *Planktothrix*: >40,000 cells/ml	Public health advisory posting by Public Health District in conjunction with water body operator.	IDEQ (Idaho Department of Environmental Quality) (2015). Blue-Green Algae Bloom Response Plan: Final. http://www.healthandwelfare.idaho.gov/Portals/0/Health/EnvironmentalHealth/Idaho%20Blue-Green%20Algae%20Response%20PlanFinal.pdf. Last Accessed: 11/27/2018.
	Sum of all potentially toxigenic taxa: ≥ 100,000 cells/ml	Public health advisory posting by Public Health District in conjunction with water body operator.	
	Visible surface scum that is associated with toxigenic species	Public health advisory posting by Public Health District in conjunction with water body management agency.	

State	Recreational Water Guideline Level	Recommended Action	Reference
Maine	Secchi disk reading < 2 meters caused by algae	Body of water considered impaired, but still safe to swim.	Maine Department of Environmental Protection (2013). Reports of Algal Blooms. http://www.maine.gov/dep/water/lakes/repbloom.html. Last Accessed: 11/27/2018.
New Hampshire	Cyanobacteria: > 50 percent of total cell counts from toxigenic cyanobacteria OR the cyanobacteria cell count is greater than 70,000 cells per ml of water	Post beach advisory.	New Hampshire Department of Environmental Services (2014). Beach Advisories. http://des.nh.gov/organization/divisions/water/wmb/beaches/advisories.htm. Last Accessed: 11/27/2018.
Wisconsin	Cyanobacteria: > 100,000 cells/ml	Post health advisory and possible beach closure.	Wisconsin Department of Natural Resources (2012). Draft Blue-Green Algae Section of 303 (d) Report – 7/3/2012: Harmful Algal Blooms. http://dnr.wi.gov/lakes/bluegreenalgae/documents/HarmfulAlgalBloomsvs2.pdf. Last Accessed: 11/27/2018. Wisconsin Department of Health Services (2016). Harmful Algal Blooms Toolkit: A Planning Guide for Public Health and Emergency Response Professionals. https://www.dhs.wisconsin.gov/publications/p0/p00853.pdf. Last Accessed: 11/27/2018.
	Visible scum layer	Post health advisory and possible beach closure.	Werner M, and Masnado R (2014). Guidance for Local Health Departments: Cyanobacteria and Human Health. http://city.milwaukee.gov/ImageLibrary/Groups/healthAuthors/DCP/PDFs/CyanobacteriaLHD.pdf. Last Accessed: 11/27/2018. Wisconsin Department of Health Services (2016). Harmful Algal Blooms Toolkit: A Planning Guide for Public Health and

State	Recreational Water Guideline Level	Recommended Action	Reference
			Emergency Response Professionals. https://www.dhs.wisconsin.gov/publications/p0/p00853.pdf. Last Accessed: 11/27/2018.
States with Guidelines Based on Cyanotoxin(s) Only			
Illinois	Microcystin-LR: > 10 µg/L	Appropriate lake management personnel and Illinois EPA staff will be notified; follow-up monitoring by the Illinois EPA may occur as professional judgment dictates and staff, laboratory, and financial resources allow.	Illinois Environmental Protection Agency (2013). 2013 Statewide Harmful Algal Bloom Program. https://www2.illinois.gov/epa/topics/water-quality/monitoring/algal-bloom/Pages/2013-program.aspx. Last Accessed: 11/27/2018. Illinois Environmental Protection Agency (2018). Blue-Green Algae and Harmful Algal Blooms. https://www2.illinois.gov/epa/topics/water-quality/monitoring/algal-bloom/Pages/default.aspx. Last Accessed: 12/5/2018.
Iowa	Microcystin: ≥ 20 µg/L	Warnings are posted at state park beaches.	Iowa Environmental Council (2018). Toxic Blue-Green Algae: A Threat to Iowa Beachgoers. http://www.iaenvironment.org/our-work/clean-water-and-land-stewardship/swimming-advisories. Last Accessed: 11/27/2018.
Nebraska	Microcystin: ≥ 20 µg/L	Health alert; signs posted advising public to use caution; affected swimming beaches will be closed; boating and other recreational activities will be allowed, but public advised to use caution and avoid prolonged exposure to the water.	Nebraska Department of Environmental Quality and Nebraska Department of Health and Human Services: Division of Public Health (2018). Fact Sheet: Precautions and facts regarding toxic algae at Nebraska Lakes.

State	Recreational Water Guideline Level	Recommended Action	Reference
			http://deq.ne.gov/NDEQProg.nsf/OnWeb/ENV042607. Last Accessed: 5/10/2019.
Ohio	Anatoxin-a: 300 µg/L	Issue no contact advisory.	Ohio EPA (2016). State of Ohio Harmful Algal Bloom Response Strategy For Recreational Waters. http://epa.ohio.gov/portals/35/hab/HABResponseStrategy.pdf. Last Accessed: 11/27/2018.
	Anatoxin-a: 80 µg/L	Issue recreational public health advisory.	
	Cylindrospermopsin: 20 µg/L	Issue no contact advisory.	
	Cylindrospermopsin: 5 µg/L	Issue recreational public health advisory.	
	Microcystins: 20 µg/L	Issue no contact advisory.	
	Microcystins: 6 µg/L	Issue recreational public health advisory.	
	Saxitoxin: 0.8 µg/L	Issue recreational public health advisory.	
	Saxitoxin: 3 µg/L	Issue no contact advisory.	
States with Guidelines Based on Cyanobacteria and Cyanotoxin(s)			
California	Anatoxin-a: detection using an analytical method that detects <1 µg/L	Caution trigger level: increase monitoring and post caution sign warning people to stay away from scum and warning people to keep pets and livestock away from water and scum.	Butler N, Carlisle J, Kaley KB, and Linville R (2012). Toxicological Summary and Suggested Action Levels to Reduce Potential Adverse Health Effects of Six Cyanotoxins. http://www.waterboards.ca.gov/water_issues/programs/peer_review/docs/calif_cyanotoxins/cyanotoxins053112.pdf. Last Accessed: 11/27/2018. Cyanobacteria Harmful Algal Bloom Network (2016a). Appendix to the CCHAB Preliminary Changes to the Statewide Voluntary Guidance of CyanoHABs in Recreational Waters.
	Anatoxin-a: 20 µg/L	Warning tier 1: post warning sign stating that swimming is not recommended and that pets and livestock should be kept away from the water.	
	Anatoxin-a: 90 µg/L	Danger tier 2: post sign stating that there is a present danger and that people, pets and livestock should stay out of the water and away from water spray.	
	Cylindrospermopsin: 1 µg/L	Caution trigger level: increase monitoring and post caution sign warning people to stay away from scum and warning people to keep pets and livestock away from water and scum.	

State	Recreational Water Guideline Level	Recommended Action	Reference
	Cylindrospermopsin: 4 µg/L	Warning tier 1: post warning sign stating that swimming is not recommended and that pets and livestock should be kept away from the water.	http://www.mywaterquality.ca.gov/monitoring_council/cyanohab_network/docs/appendix_a.pdf. Last Accessed: 11/27/2018. Cyanobacteria Harmful Algal Bloom Network (2016b). Table 1: CyanoHAB trigger levels for human health. http://www.mywaterquality.ca.gov/monitoring_council/cyanohab_network/docs/triggers.pdf. Last Accessed: 11/27/2018.
	Cylindrospermopsin: 17 µg/L	Danger tier 2: post sign stating that there is a present danger and that people, pets and livestock should stay out of the water and away from water spray.	
	Microcystins: 0.8 µg/L	Caution trigger level: increase monitoring and post caution sign warning people to stay away from scum and warning people to keep pets and livestock away from water and scum.	
	Microcystins: 6 µg/L	Warning tier 1: post warning sign stating that swimming is not recommended and that pets and livestock should be kept away from the water.	
	Microcystins: 20 µg/L	Danger tier 2: post sign stating that there is a present danger and that people, pets and livestock should stay out of the water and away from water spray.	
	Site-specific indicators of cyanobacteria (e.g., blooms, scums, mats)	Caution trigger level: increase monitoring and post caution sign warning people to stay away from scum and warning people to keep pets and livestock away from water and scum.	
	Toxin-producing cyanobacteria: 4,000 cells/ml	Caution trigger level: increase monitoring and post caution sign warning people to stay away from scum and warning people to keep pets and livestock away from water and scum.	
Colorado	Anatoxin-a: ≥ 7 µg/L	Issue toxic algae caution: a. post sign with "caution" language. b. perform routine testing for toxin levels. bi. if test results are below caution thresholds, test at	Colorado Department of Public Health and Environment. Algae bloom risk-management toolkit for recreational waters.

State	Recreational Water Guideline Level	Recommended Action	Reference
		least once per week until algae visually subsides. bii. if test results are above caution thresholds, test at least twice per week until toxin levels are below caution thresholds for two consecutive tests. c. notify drinking water providers and county health department if toxin levels exceed the caution thresholds. d. toxic algae caution ends when there is no visual evidence of algae and toxin levels are non-detectable for two consecutive weeks. di. notify drinking water providers and county health department that bloom has ended. dii. remove "caution" sign.	https://www.colorado.gov/pacific/cdphe/harmful-algae-blooms . Last Accessed: 11/27/2018
	Cylindrospermopsin: ≥ 7 µg/L	Issue toxic algae caution: a. post sign with "caution" language. b. perform routine testing for toxin levels. bi. if test results are below caution thresholds, test at least once per week until algae visually subsides. bii. if test results are above caution thresholds, test at least twice per week until toxin levels are below caution thresholds for two consecutive tests. c. notify drinking water providers and county health department if toxin levels exceed the caution thresholds. d. toxic algae caution ends when there is no visual evidence of algae and toxin levels are non-detectable for two consecutive weeks. di. notify drinking water providers and county health department that bloom has ended. dii. remove "caution" sign.	
	Microcystin-LR: ≥ 10 µg/L and < 20 µg/L	Issue toxic algae caution: a. post sign with "caution" language. b. perform routine testing for toxin levels. bi. if test results are below caution thresholds, test at least once per week until algae visually subsides.	

State	Recreational Water Guideline Level	Recommended Action	Reference
		bii. if test results are above caution thresholds, test at least twice per week until toxin levels are below caution thresholds for two consecutive tests. c. notify drinking water providers and county health department if toxin levels exceed the caution thresholds. d. toxic algae caution ends when there is no visual evidence of algae and toxin levels are non-detectable for two consecutive weeks. di. notify drinking water providers and county health department that bloom has ended. **dii. remove "caution" sign.**	
	Microcystin-LR: ≥ 20 µg/L	Issue toxic algae warning: **a. immediately post sign with "warning" language.** b. take necessary steps to prevent contact with water in affected area for humans and pets. c. notify drinking water providers and county health department if toxin levels exceed warning thresholds. d. test at least twice per week until toxin levels are below warning thresholds for two consecutive tests. **e. posting can be reduced to "caution" language** when microcystin test results drop below the warning threshold and no new human illness or pet deaths have been reported for two consecutive weeks.	
	Saxitoxin: ≥ 4 µg/L	Issue toxic algae caution: **a. post sign with "caution" language.** b. perform routine testing for toxin levels. bi. if test results are below caution thresholds, test at least once per week until algae visually subsides. bii. if test results are above caution thresholds, test at least twice per week until toxin levels are below caution thresholds for two consecutive tests. c. notify drinking water providers and county health department if toxin levels exceed the caution thresholds.	

State	Recreational Water Guideline Level	Recommended Action	Reference
		d. toxic algae caution ends when there is no visual evidence of algae and toxin levels are non-detectable for two consecutive weeks. di. notify drinking water providers and county health department that bloom has ended. **dii. remove "caution" sign.**	
	Potentially toxic algae are visible	Issue toxic algae caution: **a. post sign with "caution" language.** b. perform routine testing for toxin levels. bi. if test results are below caution thresholds, test at least once per week until algae visually subsides. bii. if test results are above caution thresholds, test at least twice per week until toxin levels are below caution thresholds for two consecutive tests. c. notify drinking water providers and county health department if toxin levels exceed the caution thresholds. d. toxic algae caution ends when there is no visual evidence of algae and toxin levels are non-detectable for two consecutive weeks. di. notify drinking water providers and county health department that bloom has ended. **dii. remove "caution" sign.**	
Connecticut	Visual rank category 2: cyanobacteria present in low numbers; there are visible small accumulations but water is generally clear; OR blue-green algae cells > 20,000 cells/ml and < 100,000 cells/ml	Notify Connecticut Department of Public Health (CT DPH), Connecticut Department of Energy and Environmental Protection (CT DEEP); increase regular visual surveillance until conditions change; consider cautionary postings at public access points.	Connecticut Department of Public Health and Connecticut Department of Energy and Environmental Protection (CDPH and CDEEP) (2017). Guidance to Local Health Departments for Blue-Green Algae Blooms in Recreational Freshwaters. http://www.ct.gov/deep/lib/deep/water/water_quality_management/monitoringpubs/bluegreenalgaeblooms_guidanceforlhds_2017version.pdf. Last Accessed: 11/27/2018.
	Visual rank category 3: cyanobacteria present in high numbers; scums may or may not be present; water is discolored throughout; large areas affected; color assists to rule out sediment and other algae; OR blue-green algae cells > 100,000 cells/ml	Update/inform CTDPH and CTDEEP and expand risk communication efforts; collect samples for analysis and/or increase frequency of visual assessment; POSTED BEACH CLOSURE: if public has beach access, alert water users that a blue-green	

State	Recreational Water Guideline Level	Recommended Action	Reference
		algae bloom is present; POSTED ADVISORY: at other impacted access points.	Connecticut Department of Energy and Environmental Protection (CDEEP). (2017). Comment Letter Regarding Human Health Recreational Ambient Water Quality Criteria and/or Swimming Advisories for Microcystins and Cylindrospermopsin. March 20, 2017. Docket No. EPA-HQ-OW-2016-0715. https://www.regulations.gov/docket?D=EPA-HQ-OW-2016-0715. Last accessed: 11/27/2018.
	Anatoxin-a: 80 µg/L	Issue recreation advisory.	
Indiana	Blue-green algae: 100,000 cells/ml	Issue recreation advisory.	Indiana Department of Environmental Management (2018). Blue-Green Algae: Indiana Reservoir and Lake Update. http://www.in.gov/idem/algae/. Last Accessed: 11/27/2018.
	Cylindrospermopsin: 8 µg/L	Issue recreation advisory.	
	Microcystin-LR: 20 µg/L	Close beaches.	
	Microcystin-LR: 4 µg/L	Issue recreation advisory.	
	Cyanobacteria: ≥ 10,000,000 cells/ml	Recommended that all in-lake recreation cease and that picnic, camping and other public land activities adjacent to affected waters be closed.	
Kansas	Cyanobacteria: ≥ 250,000 cells/ml	Issue public health warning.	Kansas Department of Health and Environment (2015). Guidelines for Addressing Harmful Algal Blooms in Kansas Recreational Waters. http://www.kdheks.gov/algae-illness/download/HAB_policy.pdf. Last Accessed: 11/27/2018. Kansas Department of Health and Environment (2015). Harmful Algal Blooms (HABs): KDHE Agency Response Plan. http://www.kdheks.gov/algae-illness/download/HAB_response_plan.pdf. Last Accessed: 11/27/2018.
	Cyanobacteria: ≥ 80,000 and < 250,000 cells/ml	Issue public health watch.	
	Microcystin: ≥ 2,000 µg/L	Recommended that all in-lake recreation cease and that picnic, camping and other public land activities adjacent to affected waters be closed.	
	Microcystin: ≥ 20 µg/L	Issue public health warning.	
	Microcystin: ≥ 4 and < 20 µg/L	Issue public health watch.	
	Blue-green algae: > 100,000 cells/ml	Issue an HAB advisory.	

State	Recreational Water Guideline Level	Recommended Action	Reference
Kentucky	Microcystins: > 20 µg/L	Issue recreational use advisory.	Kentucky Department for Environmental Protection (2014). Harmful Algal Blooms: Background. http://water.ky.gov/waterquality/Documents/HAB_FACTs/HAB%20Background%20Fact%20Sheet.pdf. Last Accessed: 11/27/2018.
	Microcystis aeruginosa or other potential microcystin-producing blue-green algae > 40,000 cells/ml, and samples contain microcystins: > 10 ppb	Put up signs advising public of health risk, notify local press (through joint DHMH, DNR, MDE press release) and coordinate with local health department, place advisory information on DNR web site (Eyes on the Bay), Maryland Healthy Beaches web site if a swimming beach is affected, or other local web site. MDE will initiate emergency closure to shellfish harvesting if warranted, and coordinate with DNR Natural Resource Police.	Commonwealth of Kentucky: Department for Environmental Protection Division of Water (2015). Harmful Algal Blooms. http://water.ky.gov/waterquality/pages/HABS.aspx. Last Accessed: 11/27/2018.
Maryland	Presence of potentially toxic algae	Issue algae bloom beach alert.	Wazniak C personal communication. (2016). Regarding Maryland Department of Natural Resources Harmful Algal Bloom (HAB) Monitoring and Management SOP. Sent via email correspondence from Catherine Wazniak, Program Manager at the MD DNR, on February 22, 2016, to John Ravenscroft, U.S. EPA. Maryland Department of Natural Resources (2014). Harmful Algal Bloom Management in the Chesapeake and Coastal Bays. http://dnr.maryland.gov/waters/bay/Documents/HAB_Management.pdf. Last Accessed: 11/27/2018.
	Blue-green algae: > 50,000 cells/ml	Toxin testing of lysed cells should be done to ensure that guideline of 14 ppb is not exceeded.	

State	Recreational Water Guideline Level	Recommended Action	Reference
Massachusetts	Blue-green algae: > 70,000 cells/ml	Post an advisory against contact with the water.	Massachusetts Bureau of Environmental Health (2015). MDPH Guidelines for Cyanobacteria in Freshwater Recreational Water Bodies in Massachusetts. Boston, Massachusetts. http://www.mass.gov/eohhs/docs/dph/environmental/exposure/protocol-cyanobacteria.pdf. Last Accessed: 11/27/2018.
	Microcystins: ≥ 14 µg/L	Post an advisory against contact with the water.	
	Visible cyanobacteria scum or mat is evident	MDPH recommends an immediate posting by the local health department, state agency, or relevant authority to advise against contact with the water body.	Massachusetts Department of Public Health (2008). MDPH guidelines for cyanobacteria in freshwater recreational water bodies in Massachusetts. http://www.mass.gov/eohhs/docs/dph/environmental/exposure/protocol-cyanobacteria.pdf. Last Accessed: 11/27/2018.
	Microcystin: ≥20 micrograms per liter (µg/L)	Not reported.	
Michigan	Other algal toxins are at or above appropriate guidelines that have been reviewed by MDEQ-WRD	Not reported. Post advisory.	Michigan Department of Environmental Quality (2018). Algae (Harmful Algal Blooms) website http://www.michigan.gov/deq/0,4561,7-135-3313_3681_3686_3728-383630--,00.html. Last Accessed: 11/27/2018. Kohlhepp (2015) Harmful Algal Bloom Monitoring and Assessment in Michigan Waters. Michigan Department of Environmental Quality Water Resources Division. MI/DEQ/WRD-15/013. http://www.michigan.gov/documents/deq/wrd-swas-algae-HABsummary_551207_7.pdf. Last Accessed: 03/6/2018.
	Chlorophyll *a*: >30 µg/L and visible surface accumulations/scum are present, or cells are visible throughout the water column		
	Microcystins (as total including –LR and other detectable congeners): 3 µg/L		
New Jersey	Cylindrospermopsin: 8 µg/L	Post advisory.	

State	Recreational Water Guideline Level	Recommended Action	Reference
	Anatoxin-a: 27 µg/L	Post advisory.	New Jersey Department of Environmental Protection (2017). Cyanobacterial Harmful Algal Bloom (HAB) Freshwater Recreational Response Strategy. http://www.state.nj.us/dep/wms/bfbm/NJHABResponseStrategy.pdf. Last Accessed: 11/27/2018
	Cyanobacterial cell count: ≥ 20,000 cells/ml	Post advisory.	
	Visual indication of a bloom – receipt of a bloom report or digital photograph	Suspicious Bloom: DEC HABs Program staff determine if a bloom is Suspicious and whether collection of a sample is feasible or warranted.	
New York	Blue-green chlorophyll levels: ≥ 25 µg/L; OR Microscopic confirmation that majority of sample is cyanobacteria and present in bloom-like densities; OR only in absence of the previous criteria being met: microcystin ≥ 4 µg/L but less than 20 µg/L and accompanied by ancillary evidence of the presence or recent history of a bloom	Confirmed Bloom: Signs have been developed by NY State Department of Health for use at regulated swimming beaches when Local Health Department personnel or beach operators close beaches. Online summer notification provides weekly update on the number of HABs locations in New York is included in MakingWaves, the DEC email subscription.	New York State Department of Environmental Conservation (2017). Harmful Algal Blooms (HABs) Program Guide. http://www.dec.ny.gov/docs/water_pdf/habsprogramguide.pdf. Last Accessed: 11/27/2018.
	Microcystin ≥ 20 µg/L (shoreline samples only); OR microcystin ≥ 10 µg/L (open water samples only); OR known risk of exposure to anatoxin or another cyanotoxin, based on consult between DEC HABS Program and NYSDOH staff	Confirmed with High Toxins Bloom: Signs have been developed by NY State Department of Health for use at regulated swimming beaches when Local Health Department personnel or beach operators close beaches. Online summer notification provides weekly update on the number of HABs locations in New York is included in MakingWaves, the DEC email subscription.	
	Blue-green algae bloom is present AND microcystin-LR: < 10 µg/L	Issue advisory.	
North Dakota	Blue-green algae bloom is present over a significant portion of the lake AND microcystin-LR: ≥ 10 µg/L	Issue warning.	North Dakota Department of Health: Division of Water Quality (2016). Blue-green algae advisories and warnings.
	Cyanobacteria: 100,000 cell/ml	Issue advisory.	

State	Recreational Water Guideline Level	Recommended Action	Reference
			http://www.ndhealth.gov/wq/sw/habs/defaulthabs.htm. Last Accessed: 11/27/2018.
Oklahoma	Microcystin: > 20 µg/L	Issue advisory.	Oklahoma Legislature (2012). SB 259 Bill Summary. http://webserver1.lsb.state.ok.us/CF/2011-12%20SUPPORT%20DOCUMENTS/BILLSUM/House/SB259%20ccr%20a%20billsum.doc. Last Accessed: 11/27/2018.
	Anatoxin-a: ≥ 20 µg/L	Issue public health advisory.	
Oregon	Cylindrospermopsin: ≥ 20 µg/L	Issue public health advisory.	Oregon Health Authority (2018). Oregon Harmful Algae Bloom Surveillance (HABS) Program Public Health Advisory Guidelines: Harmful Algae Blooms in Freshwater Bodies. https://www.oregon.gov/oha/ph/HealthyEnvironments/Recreation/HarmfulAlgaeBlooms/Documents/HABPublicHealthAdvisoryGuidelines.pdf. Last Accessed: 11/27/2018.
	Microcystin: ≥ 10 µg/L	Issue public health advisory.	
	Microcystis: > 40,000 cells/ml	Issue public health advisory.	
	Planktothrix: > 40,000 cells/ml	Issue public health advisory.	
	Saxitoxin: ≥ 10 µg/L	Issue public health advisory.	
	Toxigenic species: > 100,000 cells/ml	Issue public health advisory.	
	Visible scum with documentation and testing	Issue public health advisory.	
	Microcystin: > 6 µg/L	Recreational Public Health Advisory.	
Pennsylvania	Microcystin: > 20 µg/L	Recreational No Contact Advisory.	Pennsylvania Department of Environmental Protection (2014). Lake Erie Harmful Algal Bloom Monitoring and Response Strategy for Recreational Waters. https://seagrant.psu.edu/sites/default/files/PA%20Lake%20Erie%20Harmful%20Algal%20Bloom%20Response%20Strategy%20For%20Recreational%20Waters%20-%202nd%20Draft.pdf. Last Accessed: 11/27/2018.
	Cylindrospermopsin: > 5 µg/L	Recreational Public Health Advisory.	
	Cylindrospermopsin: > 20 µg/L	Recreational No Contact Advisory.	
	Anatoxin-a: > 80 µg/L	Recreational Public Health Advisory.	
	Anatoxin-a: > 300 µg/L	Recreational No Contact Advisory.	
	Saxitoxin: > 0.8 µg/L	Recreational Public Health Advisory.	
	Saxitoxin: > 3 µg/L	Recreational No Contact Advisory.	

State	Recreational Water Guideline Level	Recommended Action	Reference
	HAB verified by visual observation	Recreational no contact advisory.	
	Cyanobacteria: > 70,000 cells/ml	Issue health advisory.	
Rhode Island	Microcystin-LR: ≥ 14 µg/L	Issue health advisory.	Rhode Island Department of Environmental Management, and Rhode Island Department of Health (2013). Cyanobacteria Related Public Health Advisories in Rhode Island. http://www.health.ri.gov/publications/datareports/2013CyanobacteriaBloomsInRhodeIsland.pdf. Last Accessed: 11/27/2018.
	Visible cyanobacteria scum or mat	Issue health advisory.	
	Anatoxin-a: detection 90 µg/L	Tier 2: Warning: Issue WARNING advisory, Post WARNING signs, sampling recommended weekly.	
Utah	Anatoxin-a: > 90 µg/L	Tier 3: Danger: Issue DANGER advisory, Post DANGER signs, consider CLOSURE, sampling recommended at least weekly.	Utah Department of Environmental Quality and Department of Health (2017). Utah HAB Guidance Summary. http://health.utah.gov/enviroepi/appletree/HAB/HAB_Guidance_Summary_2017.pdf . Last Accessed: 11/27/2018.
	Cyanobacteria: 20,000 – 10,000,000 cells/ml	Tier 2: Warning: Issue WARNING advisory, Post WARNING signs, sampling recommended weekly.	
	Cyanobacteria: >10,000,000 cells/ml	Tier 3: Danger: Issue DANGER advisory, Post DANGER signs, consider CLOSURE, sampling recommended at least weekly.	
	Microcystin: 4 – 2,000 µg/L	Tier 2: Warning: Issue WARNING advisory, Post WARNING signs, sampling recommended weekly.	
	Microcystin: > 2,000 µg/L	Tier 3: Danger: Issue DANGER advisory, Post DANGER signs, consider CLOSURE, sampling recommended at least weekly.	
	Cylindrospermopsin: > 8 µg/L	Tier 2 or 3: Consult with Utah Department of Environmental Quality and Utah Department of Health as needed on this issue.	
	Reports of animal illnesses or death	Tier 2: Warning: Issue WARNING advisory, Post WARNING signs, sampling recommended weekly.	

State	Recreational Water Guideline Level	Recommended Action	Reference
	Reports of human illness	Tier 3: Danger: Issue DANGER advisory, Post DANGER signs, consider CLOSURE, sampling recommended at least weekly.	
	Anatoxin-a: ≥ 10 µg/L	Close recreational beaches.	
Vermont	Cylindrospermopsin: ≥ 10 µg/L	Close recreational beaches.	Vermont Department of Health (2015). Cyanobacteria (Blue-green Algae) Guidance for Vermont Communities. http://www.healthvermont.gov/sites/default/files/documents/2016/12/ENV_RW_CyanobacteriaGuidance.pdf. Last Accessed: 11/27/2018.
	Microcystin-LR (equivalents): ≥ 6 µg/L	Close recreational beaches.	
	Visible known blue-green algae bloom/scum or an unknown, potentially blue-green algae (i.e., not pollen), bloom/scum	Close recreational beaches.	
	Blue-green algal "scum" or "mats" on water surface	Immediate public notification to avoid all recreational water contact where bloom is present; continue weekly sampling.	
Virginia	Microcystin: > 6 µg/L	Immediate public notification to avoid all recreational water contact where bloom is present; continue weekly sampling.	Virginia Department of Health (Division of Environmental Epidemiology) (2012). Virginia Recreational Water Guidance for Microcystin and *Microcystis* Blooms: Provisional Guidance. http://www.vdh.virginia.gov/content/uploads/sites/12/2016/02/VDHMicrocystisGuidance.pdf. Last Accessed: 11/27/2018.
	Microcystis: > 100,000 cells /ml	Immediate public notification to avoid all recreational water contact where bloom is present; continue weekly sampling.	
	Microcystis: 20,000 to 100,000 cells/ml	Notify public through press release and/or signage; advise people and pet owners that harmful algae are present; initiate weekly water sampling.	
	Microcystis: 5,000 to < 20,000 cells/ml	Local agency notification; initiate bi-weekly water sampling.	
	Anatoxin-a: 1 µg/L	Tier 2: local health posts WARNING sign; local health takes additional site-specific steps; minimum weekly sampling. In addition, if history of high toxicity, or reports of illness, pet death than tier 3: local health posts DANGER sign; lake closed.	

State	Recreational Water Guideline Level	Recommended Action	Reference
Washington	Bloom is forming or a bloom scum is visible (toxic algae may be present); toxin levels do not exceed thresholds	Tier 1: local health posts CAUTION sign; samples taken and sent for toxicity tests; weekly sampling until bloom dissipates.	Hardy J, and Washington State Department of Health (2008). Washington State Recreational Guidance for Microcystins (Provisional) and Anatoxin-a (Interim/Provisional). http://www.doh.wa.gov/Portals/1/Documents/4400/334-177-recguide.pdf. Last Accessed: 11/27/2018.
	Cylindrospermopsin: 4.5 µg/L	Tier 2: local health posts WARNING sign; local health takes additional site-specific steps; minimum weekly sampling. In addition, if history of high toxicity, or reports of illness, pet death than tier 3: local health posts DANGER sign; lake closed.	Hardy J, and Washington State Department of Health (2011). Washington State Provisional Recreational Guidance for Cylindrospermopsin and Saxitoxin. http://www.doh.wa.gov/portals/1/documents/4400/332-118-cylindrosax%20report.pdf. Last Accessed: 11/27/2018.
	Microcystins: 6 µg/L	Tier 2: local health posts WARNING sign; local health takes additional site-specific steps; minimum weekly sampling. In addition, if history of high toxicity, or reports of illness, pet death than tier 3: local health posts DANGER sign; lake closed.	
	Saxitoxin: 75 µg/L	Tier 2: local health posts WARNING sign; local health takes additional site-specific steps; minimum weekly sampling. In addition, if history of high toxicity, or reports of illness, pet death than tier 3: local health posts DANGER sign; lake closed.	Hardy J, and Washington State Department of Health (2008). Washington State Recreational Guidance for Microcystins (Provisional) and Anatoxin-a (Interim/Provisional). http://www.doh.wa.gov/Portals/1/Documents/4400/334-177-recguide.pdf. Last Accessed: 11/27/2018.
	Saxitoxin: 75 µg/L	Tier 2: local health posts WARNING sign; local health takes additional site-specific steps; minimum weekly sampling. In addition, if history of high	Hardy J, and Washington State Department of Health (2011). Washington State Provisional Recreational Guidance for Cylindrospermopsin and Saxitoxin.

State	Recreational Water Guideline Level	Recommended Action	Reference
		toxicity, or reports of illness, pet death than tier 3: local health posts DANGER sign; lake closed.	http://www.doh.wa.gov/portals/1/documents/4400/332-118-cylindrosax%20report.pdf. Last Accessed: 11/27/2018.
States with Qualitative Guidelines Only			
Delaware	Thick green, white, or red scum on surface of pond	Post water advisory signs.	Delaware Department of Natural Resources and Environmental Control: Division of Water. Blue-Green Algae in Delaware. (2016). http://www.dnrec.delaware.gov/wr/INFORMATION/OTHERINFO/Pages/Blue-GreenAlgae.aspx. Last Accessed: 11/27/2018.
Florida	Cyanobacteria bloom	Issue health advisory; post warning signs.	Florida Department of Environmental Protection (2019). Freshwater Algal Blooms: Frequently Asked Questions. https://floridadep.gov/sites/default/files/freshwater-algal-bloom-faqs_2019.pdf Last Accessed: 5/10/2019.
Missouri	Microcystins: presence (test strip range 0 to 10 ng/ml)	Missouri has a multi-agency proactive approach to address events which can result in the decision to temporary close swim beaches and post notices regarding the bloom around the lake to protect the citizens of Missouri from the health risk posed by exposure to a HAB. Information is also released to through the news media and social media to quickly share the possible health risk with the largest audience possible.	Missouri Department of Natural Resources (2017) Qualitative screening of algal toxins in drinking water and recreational waters using strip test by Abraxas, Inc. https://dnr.mo.gov/env/docs/mdnresp360.pdf. Last Accessed: 11/27/2018. Missouri Department of Natural Resources (2018) Harmful Algal Blooms and Blue-Green Algae. Website https://dnr.mo.gov/env/cyanobacteria.htm. and http://ephtn.dhss.mo.gov/EPHTN_Data_Portal/pdf/success-stories/MO-Blue-Green-
	Cylindrospermopsin: presence (test strip range 0 to 10 ng/ml)		
	Anatoxin-a: presence (test strip range 0 to 2.5 ng/ml)		

State	Recreational Water Guideline Level	Recommended Action	Reference
			Algae-Task-Force-Establishment.pdf Last Accessed: 11/27/2018.
Montana	Reservoirs that seem stagnated and harbor large quantities of algae	The Montana Department of Environmental Quality advises people to avoid swimming in ponds, lakes, or reservoirs.	State of Montana Newsroom (2015). DEQ Issues Advisory on Blue-Green Algae Blooms: Ponds, Lakes, and Reservoirs Most Often Affected. http://news.mt.gov/Home/ArtMID/24469/ArticleID/1564/DEQ-Issues-Advisory-on-Blue-Green-Algae-Blooms. Last Accessed: 11/27/2018.
North Carolina	Visible discoloration or surface scum	Microcystin testing.	North Carolina Health and Human Services: Division of Public Health (2014). Occupational and Environmental Epidemiology: Cyanobacteria (Blue-green Algae). http://epi.publichealth.nc.gov/oee/a_z/algae.html. Last Accessed: 11/27/2018.
West Virginia	Blue-green algal blooms observed and monitored	Issue public health advisory.	West Virginia Department of Health and Human Resources (2015). DHHR Continuing to Monitor Blue-Green Algal Blooms on the Ohio River: Residents Advised to Adhere to Public Health Advisory. http://www.dhhr.wv.gov/News/2015/Pages/DHHR-Continuing-to-Monitor-Blue-Green-Algal-Blooms-on-the-Ohio-River%3B-Residents-Advised-to-Adhere-to-Public-Health-Advisory.aspx. Last Accessed: 11/27/2018.
States with Guidelines Under Development			
Arkansas	TBD	TBD	Arkansas Beautiful Buffalo River Action Committee (2018). https://bbrac.arkansas.gov/pdfs/201701205

State	Recreational Water Guideline Level	Recommended Action	Reference
			-arkansas-harmful-algal-bloom-(habs)-workgroup.pdf. Last Accessed: 11/27/2018.
Georgia	TBD	TBD	Georgia Department of Public Health (2018). https://www.gachd.org/programs-services/environmental-health-2/beach_water_testing/. Last Accessed: 03/6/2018.
Minnesota	TBD	TBD	Minnesota Department of Health (2015). Toxicological Summary for: Microcystin-LR. http://www.health.state.mn.us/divs/eh/risk/guidance/gw/microcystin.pdf. Last Accessed: 11/27/2018.
Wyoming	TBD	TBD	Wyoming Department of Environmental Quality (2018). Harmful Algal Bloom Website. http://deq.wyoming.gov/wqd/nutrient-pollution/resources/harmful-algal-blooms/. Last Accessed: 11/27/2018.

Note: Alabama, Alaska, Hawaii, Louisiana, Mississippi, Nevada, New Mexico, South Carolina, South Dakota, Tennessee, and Texas did not have guidelines available online. Missouri is in the process of developing quantitative thresholds.