



Revising Harmful Algal Bloom Advisory Protocols and Assessment Methods

In 2015, the UDOH and DWQ published the *Utah Harmful Algal Blooms and Human Health Guidance for Local Health Departments*. The guidance relies on thresholds for cyanotoxins and cyanobacteria cell counts established by the World Health Organization. These guidelines were put into use during the 2016 Harmful Algal Bloom season. During these events, several questions related to the guidelines were raised that we would like the Water Quality and Health Advisory Panel to consider (see discussion questions below).

In December 2016, EPA released *Draft Human Health Recreational Ambient Water Quality Criteria and/or Swimming Advisories for Microcystins and Cylinderspermopsin*. DWQ is currently reviewing these guidelines and preparing to submit comments during EPA's public comment period of 60 days. We are interested in hearing perspectives on these new criteria or health advisory guidelines from the WQHAP. See Tables 1 and 2 from the current *Utah HAB and Human Health Guidance for LHDs* and EPA's draft *Human Health Recreational Ambient Water Quality Criteria and/or Swimming Advisories for Microcystins and Cylinderspermopsin* respectively.

Finally, in March 2015, DWQ released for public comment Utah's 303(d) Assessment Methodology which included methodology for evaluating whether harmful algal blooms are impairing the drinking water and recreational uses of affected waterbodies. The assessment methods are part of Utah's Integrated Report, a required biannual submission to EPA of the state of Utah's waters. Waters identified as impaired require development of additional studies to determine the cause of the impairment. If the cause is found to be a pollutant, the State of Utah must develop a total maximum daily load or alternative plan to recover the waterbody. Under these guidelines, DWQ listed Utah Lake as impaired for recreational uses due to the harmful algal bloom that occurred in 2014. DWQ received extensive public comments on the decision to list Utah Lake. Most comments related to the HAB assessment method. DWQ's responses to these comments can be found in Appendix A of the comment responsiveness summary.

DWQ will assess the data from the 2016 algal bloom for the subsequent 2018 Integrated Report. DWQ is interested input from the WQHAP regarding whether Utah's 303(d) assessment methods should be modified for the 2018 Integrated Report.

Materials for Review (hyperlinked and attached to email)

Utah Harmful Algal Blooms and Human Health Guidance for Local Health Departments (UDOH and UDEQ 2015)

Draft Human Health Recreational Ambient Water Quality Criteria and/or Swimming Advisories for Microcystins and Cylinderspermopsin

Utah's 303(d) Assessment Methods for the 2016 Integrated Report (pp 60 – 62)

Narrative Standard Assessment of Recreational Use Support in Lakes and Reservoirs and Application to Utah Lake

2016 Integrated Report Response to Public Comments (see Appendix A, page 91)

For discussion:

1. Should UDOH and UDEQ revise the Guidance for Local Health Departments to incorporate EPA's recommended toxin thresholds for microcystin and cylindermopsin?
2. Should UDOH and UDEQ revise the Guidance for Local Health Departments threshold advisories (e.g., swimming closure between 20,000-100,000 cells/mL and/or 4-20 µg/L microcystin) ?
3. Should public health advisories be altered in cases where high cyanobacteria cell densities are observed but relatively low toxin concentrations are observed?
4. Do WQHAP members have comments on EPA's draft guidelines for recreational thresholds for microcystins and cylindermopsin that DWQ should consider in preparing comments to EPA?
5. Should DWQ revise the 303(d) Assessment Methodology for the 2018 Integrated Report to incorporate the toxin thresholds identified in EPA's draft guidance?

Table 1. Current Utah HAB Guidance Comparison to Cell Counts to Other Measurements of Harmful Algal Blooms from WHO (1999)

Relative Probability of Acute Health Risk	Toxin Producing Blue-green algae Cell Density (cells/mL)	Microcystin Concentrations (µg/L)	Anatoxin-A ¹ (µg/L)	Chlorophyll <i>a</i> (µg/L)	Health Risks	Action Recommended
Low	<20,000	<4	<20	<10	Negligible	None
Low to Moderate	20,000-100,000	4-20	NA	10-50	Short-term effects e.g. skin irritation, gastrointestinal illness	Issue caution advisory; Post CAUTION sign; Weekly sampling recommended
Moderate to High	100,000 – 10,000,00 or Reports of animal illnesses or death	20-2,000	NA	50-5,000	As above for low risk, and potential for long-term illness	Issue warning advisory; Post WARNING sign; Weekly sampling recommended
High	>10,000,000 or Visible scum layer or Reports of human illness	>2,000	>20	>5,000	As above for moderate risk, and potential for acute poisoning	Issue Danger Advisory; Post DANGER sign; Weekly sampling recommended Consider Closure
Notes: ¹ From Oregon Public Health Advisory Guidelines NA = None available						

Table 2. DRAFT EPA Recreational Criteria or Swimming Advisory Recommendations for Microcystins and Cylindrospermopsin

Application of Recommended Values	Microcystins			Cylindrospermopsin		
	Magnitude (µg/L)	Frequency	Duration	Magnitude (µg/L)	Frequency	Duration
Swimming Advisory	4	Not to be exceeded	One day	8	Not to be exceeded	One day
Recreational Water Quality Criteria		No more than 10 percent of days	Recreational season (up to one calendar year)		No more than 10 percent of days	Recreational season (up to one calendar year)