

Comments on the 2020 Updated Harmful Algal Bloom Guidance

Comment Number	Commentor	Guidance Section	Comment	UDOH/UDWQ Response
1	Wasatch Front Water Quality Council	Cyanobacterial Cell Counts	<p>While the Council appreciates that the Divisions updated the State Guidance to ensure that the public health advisory trigger levels for microcystin and cylindrospermopsin reflect current EPA guidance, the Council disagrees with the Divisions' continued reliance on cyanobacterial cell density to trigger public health advisory decisions.</p> <p>The State Guidance provides for tiered levels for public health advisory, using cyanobacteria cell density, microcystin concentration, cylindrospermopsin concentration, and anatoxin concentration levels to establish three tiers of advisory. With respect to cell counts, cyanobacterial cell density from 5,000 cells/mL to 100,000 cells/mL could result in a "Warning Advisory," and cell density greater than 10,000,000 cells/mL results in a "Danger Advisory" warning. The Council reiterates its comments from its November 1, 2019 letter (attached as Ex. 1) and subsequent January 6, 2020 Memorandum (attached as Ex. 2) that use of cell density is contrary to EPA Guidance and not a reliable advisory trigger. The Council further requests that the cell density factor be eliminated from the State Guidance.</p> <p>The EPA Guidance focuses exclusively on concentrations of toxins microcystin and cylindrospermopsin for both use attainment in setting water quality criteria and to guide recreational health advisories. In its 2019 guidance, EPA declined to make recommendations for issuing public health advisories based on cell counts. Specifically, EPA concluded that, with respect to using cyanobacterial cell density to guide health advisories, "available data are insufficient to develop quantitative recreational values" 2 and that given the inconsistency in the epidemiological studies, additional research is needed. The State Guidance nonetheless prescribes quantitative recreational values, contrary to EPA's conclusion.</p>	<p>Thank you for your comment on the suitability for using cell counts to protect human health in recreational waters. Utah, like many other states, relies on measures of cyanobacteria concentrations (cell counts) in the water body as an independent line of protection for public health. There are several reasons that the Utah Department of Health (UDOH) and the Utah Division of Water Quality (UDWQ) have used this line of protection in addition to individual toxin thresholds.</p> <p>1. Exposure to cyanobacteria cells alone, even in the absence of analyzed toxins, has adverse inflammatory health effects. From EPA 2019, p.96 : 'The number of cells in freshwater reported to be statistically-associated with a significant increase in inflammatory endpoints ranged from 5,000 to 100,000 cells/ml'. On p. 94, proceeding the quote referenced in this public comment, the authors cite five different peer reviewed studies that point to the observed inflammatory health effects associated with cyanobacterial cell densities (Pilotto et al. 1997, Stewart et al. 2006, Lévesque et al. 2014, Lin et al. 2015, and Lévesque et al. 2016) including levels just below 1,500 cells/mL (Lin et al. 2015). Because EPA 2019, p.96 notes that 'epidemiological variability observed and uncertainties in determining what level of cyanobacterial cells result in a specific level of inflammatory responses' (EPA 2019) exist, UDOH/UDWQ has taken stakeholder comments into account through the UDOH/UDWQ Health Advisory Panel, the Utah Conference of Local Environmental Health Administrators (CLEHA), and the Water Quality Board and chosen the upper end of this range at 100,000 cells/mL. This change now benchmarks Utah's cell count threshold with state HAB programs such as Idaho, Kansas, Kentucky, and Oklahoma (EPA 2019).</p> <p>2. Cyanobacteria cell counts provide a proxy measure of cyanotoxins, both those that are measurable and those that are not currently suitable for analysis. EPA 2019, p. 96 states that 'Under certain conditions, cyanobacteria possessing the toxin synthesis genes, also referred to as toxigenic cyanobacteria, begin producing cyanotoxins. Toxigenic cyanobacteria are a functional subgroup of the total cyanobacterial population that may be present in a waterbody and the proportion of toxigenic cells present can vary geographically and over time'. DWQ staff can visit affected waterbodies weekly at best. Cyanobacteria and associated toxins are variable and episodic over the course of a day, becoming elevated quickly. Based on environmental conditions that could increase cyanobacteria cell counts, EPA 2019, p.97 notes that 'proliferating cyanobacterial biomass can result in an increased potential for toxins being produced (Pearl et al. 2001; Otten et al. 2012)'. Because of this, elevated cell counts are currently the most important early and integrative indicator for Local Health Departments (LHDs) to act appropriately to warn the public about a public health threat. Additionally, there are several cyanotoxins such as anatoxin-a/s, lyngbyatoxins, lipopolysaccharides, and anabaenopeptins, and others that have been identified, but for various reasons are not suitable for routine laboratory analysis. In the absence of a reliable laboratory measure for these emerging toxins, cyanobacteria cell counts provide a proxy to the potential for their presence and associated health effects.</p> <p>3. Through implementation of this program, UDOH/UDWQ has also learned that it is much easier to communicate quantitative measures (cells/ml) of a bloom to LHDs and the public rather than describe a visible surface scum, which many states rely upon as an indicator to recommend swimming advisories. In other states, such as Michigan (Kohlhepp 2015) or North Carolina (NCDHHS 2014), public health authorities issue recreational waterbody advisories based solely on 'visible surface accumulations/scum' or 'cells are visible throughout the water column' (Kohlhepp 2015). By using a quantitative measure of cyanobacteria cell count accumulation, UDOH/UDWQ is able to provide specific data on the absolute and relative magnitude of any given bloom event and ensure LHDs receive information solely about toxigenic cyanobacteria species rather than recommending advisories which could have included non-toxigenic cyanobacteria and eukaryotic species. The guidance document has been updated to emphasize that only toxigenic cyanobacteria species are included in the cell count threshold.</p>
2	Wasatch Front Water Quality Council	Cyanobacterial Cell Counts	<p>As demonstrated in the Council's January 6, 2020 memorandum submitted by Leland Myers, significantly fewer warnings would have been issued in Utah last year were the EPA Guidance applied to the same data. Continued use of cell density as a trigger for public health warnings will continue to exaggerate the actual public health problem and create negative impressions about Utah Lake and other water bodies water quality even when toxin concentrations are not exceeded.</p>	<p>Thank you for your comment on the relationship between recreational health advisories and cell count densities. UDOH/UDWQ are also expressly concerned about misapplied public perception of water quality due to Utah's HAB advisory program. For this reason, since 2015, UDOH/UDWQ have led monthly strategic communication meetings with local and state agencies representing impacted stakeholders, including LHDs, Utah Division of State Parks and Recreation, and Utah Department of Agriculture and Food. Our agencies continue to work collaboratively to ensure advisory messaging is accurate, consistent, and balanced from our respective agencies and through the media.</p> <p>To be clear, from 2017 to 2019, there were 62 HAB advisories issued by LHDs across Utah. Of those, only 4 advisories (6%) occurred where cyanotoxins did not precede, accompany concurrently, or follow elevated cyanobacteria cell counts. Utah Lake specifically has never had a recreational season in this time period in which cyanotoxins did not precede, accompany concurrently, or follow elevated cyanobacteria cell counts. With this context, the use of the toxigenic cell count indicator is not being misapplied by LHDs to issue recreational advisories. Further, as stated in the response to Comment 1, instances when recreational advisories are issued due to elevated toxigenic cyanobacteria cells, although rare, have merit.</p>
3	Wasatch Front Water Quality Council	Cyanobacterial Cell Counts	<p>The Council requests that the State Guidance be amended to focus exclusively on toxin concentrations to guide public health advisories for HABs, rather than relying on imprecise and unsupported cyanobacterial cell density range as a factor. This revision is necessary pursuant to Utah Code Ann. §19-5-105, which provides that state standards developed in administering a program under the federal Clean Water Act can be no more stringent than federal standards addressing the same circumstances unless the agencies make a written finding, after public comment and hearing, that the corresponding federal standard is not adequate to protect public health and the</p>	<p>The guidance will not be revised to focus exclusively on toxin concentrations because doing so is not necessary pursuant to Utah Code Section 19-5-105. The federal EPA guidance on HABs includes discussion of a range of cell density values associated with health effects (5,000 - 100,000 cells/mL), from which UDWQ/UDOH has selected the upper most value as a threshold (100,000 cells/mL). Therefore, there is not a corresponding federal standard and the State Guidance is not more stringent, but is only more specific than the federal guidance.</p>
4	Wasatch Front Water Quality Council	Guidance Formatting	<p>If the Divisions insist on continuing to use cell density as a trigger for public health advisories, the Council requests that the Divisions eliminate the 5,000 to 100,000 cells/mL range for the "Warning Advisory" and replace it with a permissive advisory when the cell density exceeds 100,000 cells/mL. In that instance, local health departments would be encouraged to take into account other contextual information - in addition to cell density – and consider issuing an advisory. To achieve this, the Council suggests including the following language, which is similar to that contained in Table 1 of the proposed State Guidance: "Above 100,000 cells/mL, take into account other contextual information and consider issuing an advisory." This would allow for consideration of various factors, including toxin concentrations, before a local health department issues an advisory based on cell counts alone.</p>	<p>Thank you for your comment on the formatting of the updated cell density thresholds for recreational health advisory warnings. While UDOH/UDWQ will keep 100,000 cells/mL as the lower threshold in the 2020 HAB guidance (see UDOH/UDWQ Response to Comment 1), the guidance table has been updated by changing the 5,000 to 100,000 cells/mL range to a footnote of the table to reduce confusion (Table 1). In addition, the guidance has been clarified to only include toxigenic cyanobacteria species in the cell count.</p>
5	Richard Mickelsen, Timpanogos Special Service District	Cyanobacterial Cell Counts	<p>We assert that the listing of cell counts should not be an "Advisory" threshold. It is a secondary stressor and gives inaccurate an unwarranted fear. The above referenced document clearly states; "At this time, available data are insufficient to develop quantitative recreational values for total cyanobacterial cell density related to inflammatory health endpoints" (p 94). The document also clearly states that some programs are using cell counts as an indicator and provides supporting information related to their use. Should Utah persist in using cell counts?</p>	<p>Thank you for your comment. Please see UDOH/UDWQ response to Comment 1.</p>
6	Richard Mickelsen, Timpanogos Special Service District	Cyanobacterial Cell Counts	<p>To date, sixty-five Utah lakes have been reported to have cyanobacteria pcell counts are high, the actual toxicity is low. There are multiple different kinds of cyanobacteria and not all have the same toxicity levels, or produce toxins at all. Cell counts provide no reliable correlation with toxicity and are not directly related to toxicity. Other lakes, as opposed to Utah Lake, may exhibits low cell counts with higher toxicity during bloom season. The current management policies are creating the wrong perception of the water quality.</p>	<p>Thank you for your comment. Please see UDOH/UDWQ response to Comment 2. The guidance has been clarified to only include toxigenic cyanobacteria species.</p>

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7	Richard Mickelsen, Timpanogos Special Service District	Cyanobacterial Cell Counts	Other states including California and Oregon list toxic cell counts, not just total cell counts. Total cell counts are an indicator, which alone provide inconclusive and misleading data. Using total cell counts to issue advisories leads to an increase in the difficulty to understand listed advisories and adds to the confusion for the public. The over reliance on cell counts have led to multiple instances of over reactions and irrational concerns when little action was warranted. It is agreed that additional information should be collected for cylindrospermopsin It should also be noted that the specific cyanobacterial species of concern, microcystin and cylindrospermopsin, were not even tested for each sample taken. This leads to question whether DWQ have enough resources to provide appropriate data?	<p>Thank you for your comment. The revised guidance document has been clarified to only consider toxigenic cyanobacteria species in the cell count thresholds. This eliminates the concern raised by using total cell counts.</p> <p>In regards to the comment 'It should also be noted that the specific cyanobacterial species of concern, microcystin and cylindrospermopsin, were not even tested for each sample taken', UDWQ currently uses a laboratory in St. Joseph, Michigan called PhycoTech, Inc. and has previously used Rushforth Phycology in Orem, UT to test for the presence and concentration of all known toxigenic cyanobacteria species. This specific comment references two toxins, 'microcystin and cylindrospermopsin', but might be trying to address the cyanobacteria species microcystis and cylindrospermopsis. If it is referring to the latter two, both PhycoTech and Rushforth have routinely reported quantities of both these species and found the species microcystis in over 500 different samples and cylindrospermopsis in roughly 25 different samples from 2016 - 2019.</p> <p>If this comment is attempting to reference our sampling protocol for the cyanotoxins cylindrospermopsin and microcystin, UDOH/UDWQ prioritizes toxin analysis based on toxigenic cyanobacteria species occurrence in the water and their associated primary toxins. Given that microcystis has an occurrence rate 20 times higher than cylindrospermopsis in Utah, UDOH/UDWQ has focused on testing for the toxins microcystin and anatoxin-a, which several cyanobacteria species found in Utah waters are capable of producing.</p> <p>This year, UDOH/UDWQ will increase the frequency of cylindrospermopsin toxin analysis into routine sampling and also explore testing an emerging toxin, saxitoxin.</p>
8	Richard Mickelsen, Timpanogos Special Service District	HAB Advisory Signs and Communication	We propose a better solution would be to put general warning signs on all water bodies known to have cyanobacteria stating: "Don't go into water that looks foamy, scummy, thick like paint, pea-green, blue-green or brownish red. A good rule of thumb for you and your pet is: When in Doubt, Stay Out!"	Thank you for this suggestion on how to communicate the risk of HABs to the public. UDOH/UDWQ will continue to work with LHDs, natural resource agencies, and other affected stakeholders to post more permanent signs and efficiently communicate risk. Every season UDOH/UDWQ aims to improve this aspect of the program as much as possible.
10	David Richards, Oreohelix Ecological	Cyanobacterial Cell Counts	<p>Utah Division of Water Quality (UDWQ) has requested public comment on its "Utah Updated 2020 HAB Guidance document (https://deq.utah.gov/water-quality/utah-updated-2020-hab-guidance). The document was based on several agencies' guidance and guidelines for recreational use during cyanobacterial blooms including CWQMC (2016), EPA (2019), OHA (2019), WHO (1999), and WHO (2003). These groups cited dozens of references to help determine cyanobacterial guidelines and several, including UDWQ, relied on papers by Pilotto et al 2017a and Pilotto et al. 2017b. Although UDWQ may have decided not to use these references in their current guidelines, UDWQ's 2016 draft IR cites these papers and I assume UDWQ still relies on these papers. In a previous public comment, I reviewed the Pilotto et al 1997a paper and had some major misgivings concerning their conclusions that needed to be addressed. In this public comment I will review that paper once again and also review and critique Pilotto et al 1997b.</p> <p>In short, neither the Pilotto et al. 1997a or 1997b papers provide support that cyanoHABs have detrimental effects on human health. These reports were either poorly analyzed or their observed effects were no more severe than simple allergies common to 30% or more of the population and that minor effects are very short lived. I recommend that UDWQ not base its cyanobacteria guidelines on the findings of these two papers and that UDWQ critically evaluate other papers that they use in their proposed guidelines.</p> <p>I suggest that UDWQ eliminate both Pilotto et al. references as part of their multiple lines of evidence for cyanobacteria guidelines. In addition, those additional papers that had the most influence on UDWQ's guidelines need to be more thoroughly, rigorously, and critically evaluated. One approach would be to conduct a formal meta-analysis based on data obtained from a more exhaustive literature review and by critically evaluating and weighting those studies prior for use in meta-analysis or in criteria development.</p>	<p>Thank you for taking time to provide comments to UDOH/UDWQ's 2020 HAB Recreational Guidance. UDOH/UDWQ do not rely on individual references in building recreational health advisory guidance. States, including Utah, rely upon the interpretation of these peer-reviewed references by national human health professionals within several Offices of US EPA such as, Office of Children's Health Protection, Office of Drinking Water, and Office of Science & Technology, among others. These organizations helped develop US EPA's 2019 "Recommended Human Health Recreational Ambient Water Quality Criteria or Swimming Advisories for Microcystins and Cylindrospermopsins" (EPA 2019) guidance that was used as a basis for UDOH/UDWQ 2020 guidance. The EPA's guidance development process provided several opportunities for public comments similar to what was provided here. UDOH/UDWQ are not in a position to use this comment to amend a finalized document that was developed by leading national human health professionals over several years. Furthermore, dismissing the findings of the two "Pilotto" references identified in the comment would not impact the conclusions of several other peer-reviewed studies identified in EPA's guidance indicating the potential human health risks associated with cyanobacteria cell exposure, including Stewart et al. 2006, Lévesque et al. 2014, Lin et al. 2015, and Lévesque et al. 2016.</p> <p>For further clarification, please see UDOH/UDWQ response to Comment 1.</p>
9	Eric Ellis, Utah Lake Comission	Guidance Formatting	<p>As many of the changes have been proposed were to simplify confusion, please note that the cell count portion of the new guidance document will instead exacerbate that confusion. It seems the new recommendation of a warning advisory for cell counts between 100,000 - 10,000,000 is lost entirely by what should be a footnote; describing the contextual situation that Health Departments should consider when cell counts are between 5,000 and 100,000 cells/mL.</p> <p>If anything, the new guidance appears to establish a threshold of 5,000-100,000 and at first glance seems to have a large gap between 100,000 and 10,000,000 = more confusion. Please consider using 100,000 - 10,000,000 as the bolded range for Warning advisory and then use the "Note 1" or the existing description as the footnote in that threshold box.</p> <p>If not, 5,000 - 100,000 cells/mL will be the new standard for warning advisories, as it's easier and safer politically than considering the contextual information. When the public sees in large print below the "Warning Advisory" 5,000 - 100,000 cells/mL and the health department is not issuing a warning, it will be slammed for the appearance of not protecting human health. If it's a footnote below the constant warning threshold of 100,000 - 10,000,000, Health Departments will be more comfortable not issuing a warning when those contextually aggravating variables are not present.</p>	Thank you for your comment. Please see UDOH/UDWQ response to Comment 4 .