

## Integrated Report Improvements

### Harmful Algal Blooms

Date: May 11, 2018

#### Introduction and background

Harmful Algal Blooms or HABs are caused by an over production of photosynthetic organisms (phytoplankton), typically cyanobacteria or blue-green algae in fresh waters, which have the potential to produce toxins that can harm people, pets and wildlife <sup>1,2</sup>. Shifts in water chemistry can cause blooms to occur. Specifically, high levels of nutrients, high temperatures, changes in pH and light can cause naturally occurring cyanobacteria to grow exponentially and result in a bloom<sup>2</sup>. From 2009 to 2013, the Oregon Health Authority (OHA) used a five-year federal grant from the U.S. Centers for Disease Control and Prevention (CDC) to initiate a statewide Harmful Algal Bloom Surveillance program. The focus of the program was to issue and lift public health advisories in a consistent way. Although HABs can occur in fresh and saltwater environments, the OHA HABs program has primarily focused on fresh water cyanoHABs.

From 2007 to 2016, OHA has issued 130 public health advisories for more than 50 water bodies in Oregon due to the presence of HABs. The blooms that triggered advisories have occurred on reservoirs, ponds and portions of rivers, often at popular recreation areas, and have caused dog deaths, affected recreational and drinking water uses and had negative effects on local economies.

#### HABs and the Integrated Report

The Clean Water Act section 303(d) requires states to identify waters not meeting water quality criteria. The 303(d) list of impaired waters is one component of the Integrated Report (IR) requirements. Beginning in 2010, the Department of Environmental Quality (DEQ) began to include waters with HABs related health advisories on the 303(d) list of impaired waters, utilizing the statewide narrative criteria OAR 340-41-0007 (see below). Once a water body is on the list, DEQ is required to develop a Total Maximum Daily Load (TMDL) during which it can determine the cause of the bloom as a component of the process.

*340-041-0007 Statewide Narrative Criteria (9) The development of fungi or other growths having a deleterious effect on stream bottoms, fish or other aquatic life, or that are injurious to health, recreation, or industry may not be allowed;*

Given lack of numeric criteria for HAB-related toxins, DEQ has used OHA's public health advisories as evidence that algae blooms are affecting the designated uses for health, recreation, or industry. Since the last methodology update in 2010, there has been an increase in the science and technology of identifying HABs and quantifying the toxins they can produce. Despite this increased national focus, the federal grant that funded OHA's HABs program ended in 2013 and was not renewed. At this point, no other funding has been allocated by the State, and the program now depends solely on partner agencies to provide the data for advisories. In response to this, OHA has developed updated guidelines for classifying advisories and responding to HABs<sup>1</sup>. The

<sup>1</sup> Public Health Advisory Guidelines Harmful Algae Blooms in Freshwater Bodies - <http://www.oregon.gov/oha/PH/HEALTHYENVIRONMENTS/RECREATION/HARMFULALGAEBLOOMS/Documents/HABPublicHealthAdvisoryGuidelines.pdf> - Revised guidelines 4/2018

<sup>2</sup> Oregon DEQ Harmful Algal Bloom (HAB) Strategy - <http://www.oregon.gov/deq/FilterDocs/HABstrategy.pdf>



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intent of this paper is to incorporate these new guidelines into an updated methodology for listing impaired water bodies under Section 303(d) for HABs.

### OHA Criteria for Issuing a HABs Related Public Health Advisory

In 2016, OHA outlined new decision-making criteria used to make a public health advisory for HABs (Figure 1). Because the program, at this time, is based on data collected by partners, OHA has four pathways that could result in issuing an advisory: 1) documented visible scum with toxicity test results pending, 2) cell counts of toxigenic species, 3) cyanotoxin results and/or 4) combinations of option 2 or option 3. Most advisories occur in the warmer season from late spring to early fall when water contact recreation is most frequent. In one area of the Umpqua River, OHA has issued a permanent health advisory for bedrock pools that can have HABs year around.

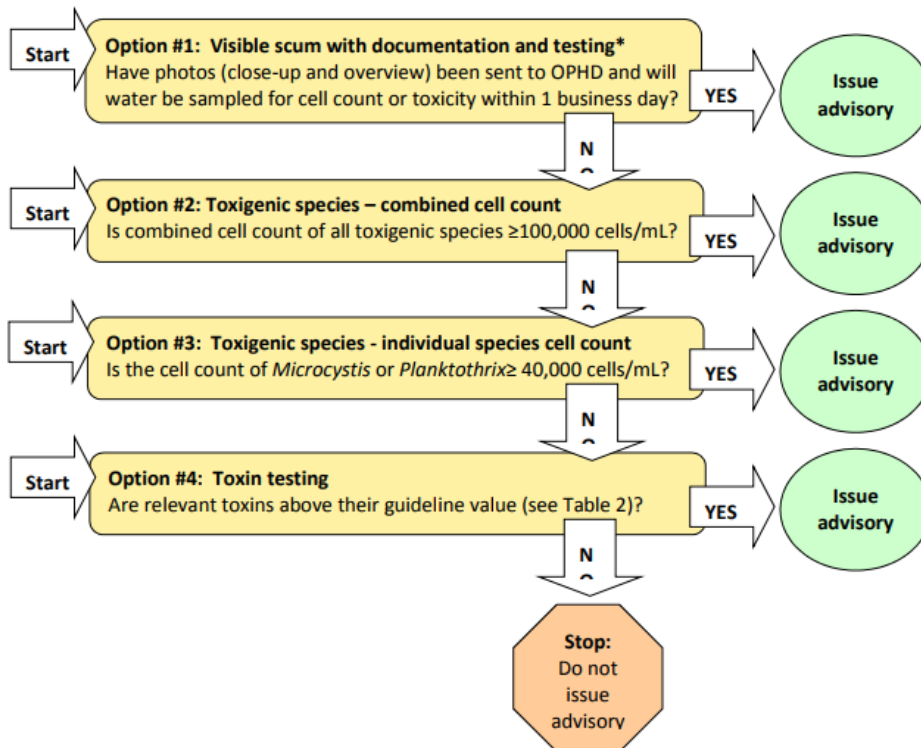


Figure 1. Current OHA process for issuing public health advisories for HABs<sup>1</sup>.

### Proposed New Listing Criteria for HABs in Oregon

The intent of a public health advisory is inherently different from that of an impaired water designation or 303(d) listing. OHA’s purpose for issuing public health advisories is to, “help to inform the public of the health risks associated with exposure to *potentially* toxic cyanobacteria in Oregon’s recreational fresh waters”<sup>1</sup>. As stated, the intent of these advisories is to communicate potential health risks to the public using the most conservative approach. The intent of placing a waterbody on the 303(d) list is to identify waterbodies that are not meeting water quality criteria or not supporting designated uses; and, if possible, to determine the sources of the pollutant causing the impairment and work with stakeholders to determine plans to abate the source through the TMDL process. In the case of a HABs listing, this process is even more complicated because the occurrence of a bloom is not a direct measure of a traditional pollutant. Additionally, as Figure 1 shows, not all public health advisories issued by OHA are of equal severity or

certainty. For these reasons, DEQ is proposing to update the 2018 IR methodology to align the method for HABs listings based on OHA public health advisories in fresh water as described below.

**Category 5 - Water is impaired and a TMDL is needed – 303(d) list**

To ensure the protection of beneficial uses while also understanding that not all public health advisories have adequate data to determine impairment, DEQ is proposing to add water bodies to the 303(d) list for HABs using the following method. Any public health advisory issued within the 2018 IR data window (2008-2017) which; (1) is a permanent advisory; (2) has reoccurred for two or more HABs seasons; *or* (3) only occurred once but has cyanotoxin values above OHA guidelines for water contact recreation (Table 1&2).

**Table 1. OHA cyanotoxin guidelines for health advisories in recreational waters (µg/L)<sup>1</sup>.**

	OHA health advisory guidelines for cyanotoxins in recreational waters (µg/L)			
	<i>Anatoxin-a</i>	<i>Cylindrospermopsin</i>	<i>Saxitoxin</i>	<i>Microcystin</i>
Recreational Value:	8	8	4	4

**Category 3B - Potential Concern - Insufficient data to determine use support but some data indicate non-attainment of a criterion**

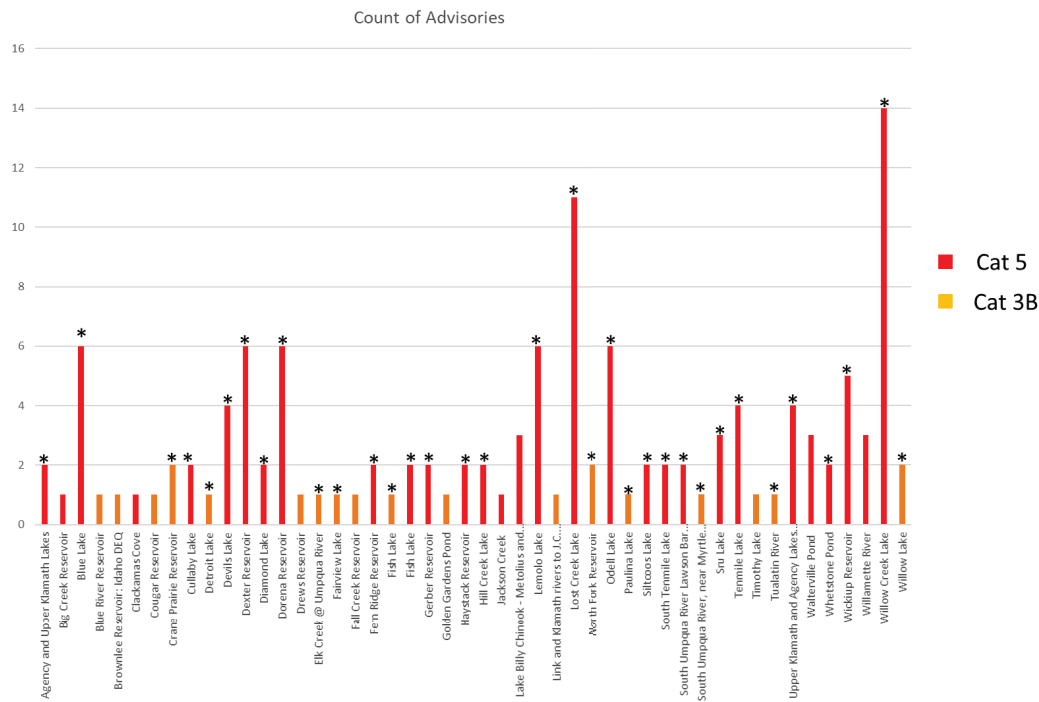
Due to the uncertainty surrounding a single season health advisory with no cyanotoxicity data, DEQ is proposing to place these water bodies in the assessment category 3B - Insufficient data to determine use support but some data indicate non-attainment of a criterion (Table 2). For any water body placed in category 3B, DEQ will follow up with lake managers and/or local watershed groups to recommend additional monitoring/surveillance. If resources are available, DEQ may be able to analyze samples collected by partners for cyanotoxins.

**Table 2. Proposed updated assessment categorical designations for HABs based on OHA public health advisories.**

Assessment Category			
Category 5: Water Quality Limited - 303(d) Listing		Category 3B: Insufficient Data; Potential Concern	
<i>Old Method</i>	<i>Proposed Update</i>	<i>Old Method</i>	<i>Proposed Update</i>
All OHA HABs advisories	Permanent advisories	Not used	Single season advisory with no toxin data
	≥ 2 seasons of reoccurring advisories		
	Single advisory with toxin data above OHA recreational waters guidelines		

## Implications of the Revised HABs listing Criteria

Using the HABs health advisory archive available on OHA’s website, the proposed methodology would result in 18 category 3B and 27 category 5 (303(d)) listings for water bodies in Oregon (Figure 2).



**Figure 2. Graph showing the proposed assessment categories for waterbodies with HABs advisories issued from 2008 through 2017. The two sites with a count of two in category 3B reoccurred in the same year (season). \* Water bodies that are currently on the 303(d) list for OHA HABs health advisories.**

## Recommended Updated Methodology for Delisting for HABs

DEQ is proposing that to in order to remove water bodies from the 303(d) list, they must be free of an OHA health advisory for more than three consecutive seasons and have supplemental data consistent with OHA’s advisory lifting procedures (photos, cell counts and toxin data below OHA guidelines) for at least two of those seasons<sup>1</sup>.

## Conclusion

DEQ is proposing a change from the 2010 and 2012 IR methodologies, which included placing all water bodies with an OHA health advisory for HABs on the 303(d) (Category 5) list regardless of the information used to issue the advisory, to an approach that reflects the different types of data and information that may be available. The main proposed change is to utilize category 3B for single season advisories with no cyanotoxin data. The reason for this proposed change is 1) OHA advisories are not all of equal severity or certainty, and 2) to account for the fact that public health advisories have a different purpose than 303(d) listings, and, may not always indicate an impairment. This method is being proposed for the 2018 IR cycle. DEQ will review this methodology again for the 2020 IR as the data window will be smaller and there will likely be updated procedures from OHA and partners. Furthermore, DEQ will seek out other approaches to list marine waters for HABs related closures for shellfish harvesting and recreation.

**Alternative formats**

Documents can be provided upon request in an alternate format for individuals with disabilities or in a language other than English for people with limited English skills. To request a document in another format or language, call DEQ in Portland at 503-229-5696, or toll-free in Oregon at 1-800-452-4011, ext. 5696; or email [deqinfo@deq.state.or.us](mailto:deqinfo@deq.state.or.us).