



State of Oregon
**Department of
Environmental
Quality**



Temporary Rules for Cyanotoxin Monitoring Frequently Asked Questions June 29, 2018



TEMPORARY RULES

What do the temporary rules for cyanotoxins require?

Any public drinking water system that meets the following criteria must monitor for cyanotoxins:

- Uses a surface water source that has had harmful algal blooms or cyanotoxin detections in the past
- Uses a surface water source downstream of a water body with past harmful algal blooms or cyanotoxin detections
- Uses a surface water source found to be susceptible to cyanotoxins based on water quality characteristics that can promote algal growth, such as the presence of algae and aquatic weeds, and water chemistry that includes high levels of chlorophyll-a, phosphorus and pH, and low dissolved oxygen levels, as determined by the Oregon Department of Environmental Quality.
- A water supplier that purchases and supplies water from any of the above water systems

When is monitoring required to begin?

The new rules are effective July 1, 2018. Applicable water suppliers must monitor raw water from their intake every two weeks. The first sample must be collected between July 15 and July 28 and continues every other week until Oct. 31.

When would a health advisory need to be issued under the new rules?

If a sample taken from the treated water detects cyanotoxins over any health advisory level, a confirmation sample must be taken within 24 hours. If a health advisory level exceedance is confirmed, a “do-not-drink” notice must be issued.

Cyanotoxin	For Vulnerable People (ppb)	For Age 6 and Above (ppb)
Total Microcystins	0.3	1.6
Cylindrospermopsin	0.7	3

Why do the rules only require monitoring for microcystins and cylindrospermopsin, and not other cyanotoxins?

The U.S. Environmental Protection Agency has determined there is insufficient data upon which to develop health advisory levels for anatoxin-a and saxitoxin. States that have done so independently have widely varying conclusions. Oregon will consider whether to regulate cyanotoxins other than microcystins and cylindrospermopsin during a permanent rulemaking process.

How can a water system remove cyanotoxins or reduce risk to its customers?

Typical surface water filtration plants are capable of removing some cyanotoxins from drinking water. Treatment plant operators can optimize their processes to ensure as much is removed as possible. If additional treatment is needed, several treatment technologies are available to remove cyanotoxins, such as ozonation, UV/advance oxidation, activated carbon and reverse osmosis. Even with additional treatment in place, monitoring according to the rules is still required. If a water supplier has a supplemental source that is not impacted by cyanotoxins, use of the impacted source can be discontinued until the cyanotoxins are no longer detected.

When will permanent rules be adopted?

OHA intends to develop permanent cyanotoxin monitoring rules by the time the temporary rules expire Dec. 27, 2018. When developing permanent rules, there will be an official public comment period. The temporary rules will be in effect through the 2018 algal bloom season.

Where can I get more information?

OHA-DWS Rules web page:

<https://www.oregon.gov/oha/PH/HEALTHYENVIRONMENTS/DRINKINGWATER/RULES/Pages/index.aspx>.

Cyanotoxin Resources web page:

<https://www.oregon.gov/oha/PH/HealthyEnvironments/DrinkingWater/Operations/Treatment/Pages/algae.aspx>.

A list of water systems that OHA believes meets the criteria can be found on the OHA Drinking Water Services home page, www.healthoregon.org/dwp. Modifications may be made to the list as appropriate.

MONITORING

Which labs are available to perform analyses for cyanotoxins?

ORELAP—the Oregon Environmental Laboratory Accreditation Program, based at OHA—is working on a certification process for labs that analyze for cyanotoxins using EPA Method 546. For purposes of this temporary rule, any lab may be used that is able to conduct analysis for microcystins and cylindrospermopsin using an enzyme-linked immunosorbent assay (ELISA) method, including the DEQ lab.

Who will pay for monitoring costs?

DEQ will perform analysis required under this rule at no cost for any water supplier subject to the rule. Information regarding this service will be distributed by DEQ directly to affected water suppliers.

Will monitoring data be publicly available?

Once a water supplier reports its cyanotoxin monitoring results to OHA, they will be posted on the OHA Drinking Water Services webpage along with other water quality data, at <https://yourwater.oregon.gov>. There will be a link specific to cyanotoxins. In addition, DEQ will input the data into its ambient water quality data system, <https://orwater.deq.state.or.us>.

Why do the rules only require the ELISA lab method?

OHA DWS received comments from public water systems urging that the ELISA method (EPA Method 546) be used for screening purposes only and that confirmation samples and decisions regarding advisories be based on the LC MS/MS method (EPA Method 544 and 545). Commenters note studies indicating the potential for false positives and variability using the ELISA method. OHA and DEQ reviewed the issue of lab methods with colleagues at the U.S. EPA and Ohio EPA and found the method to be the best choice for purposes of this rule. EPA Method 546 measures total microcystin congeners and can be used to compare with EPA Health Advisory values that are also based on total microcystins. EPA

Method 544 only measures six specific microcystin congeners. EPA reports that the variability observed with the ELISA method is within acceptable thresholds for drinking water analyses. The following is an excerpt from Ohio EPA's 2016 response to similar comments on their proposed rule which requires the ELISA method:

“Ohio EPA has carefully reviewed all of the analytical methodologies currently available, including performing a comparative analysis and an evaluation of potential interferences. Ohio EPA considers the ELISA-ADDA method as suitable for quantitative analysis. The ELISA MC-ADDA kit is U.S. EPA ETV certified. Validation is part of the ETV certification process. In addition, U.S. Geological Survey selected the ELISA MC-ADDA kit for use in the National Lakes Assessment sample analysis after a comprehensive review of available ELISA kits and comparison of ELISA MC-ADDA and LC-MS/MS results. U.S. EPA has also included ELISA MC-ADDA as a monitoring tool for UCMR 4.”

EPA has noted in email correspondence that the agency has sufficient confidence in the ELISA method to warrant its use in the UCMR4 sampling program. In the Dec. 20, 2016, Federal Register notice for the Final UCMR4 rule, U.S. EPA also responds to comments on the two methods:

“EPA also received comments reflecting confusion about the interpretation of results from the Adda ELISA microcystin method and Method 544 (microcystins by LC-MS/MS). EPA notes that the two methods provide different measures of microcystin occurrence and risk, and one result cannot practically be used to confirm the other. The Adda ELISA allows for an aggregate quantification of a wide spectrum of microcystin congeners based on the ability of the antibodies used in the assay to recognize microcystins, while Method 544 focuses on quantifying six specific microcystin congeners. The microcystins addressed in Method 544 may or may not be the dominant congeners in particular source waters.”

While all lab methods have their advantages and limitations, the ELISA method provides a reasonable representation of total microcystins and can be implemented quickly in a simple, cost-effective manner. Commercial ELISA kits are also available for analysis of cylindrospermopsin. Public water systems may seek additional analyses of cyanotoxin samples if they choose to, but the ELISA method must also be performed in conformance with the rule.

ALGAE

What is blue-green algae?

“Blue-green algae” are actually not algae at all but single-celled organisms called cyanobacteria. They were the first forms of life on earth, originating more than 3.5 billion years ago. Cyanobacteria were also the first life form to acquire their energy using photosynthesis providing the atmospheric oxygen required for the development of the oxygen breathing life forms that came later. Cyanobacteria are distinguished from other plants, animals and fungi by their lack of membranes around the nucleus and organelles within their cell.

What are harmful algal blooms?

Harmful algal blooms happen when cyanobacteria grow explosively. Sometimes, these blooms release dangerous toxins into the water that can pose a health risk to people who recreate in or drink the water. Pets and livestock are particularly vulnerable to the toxins. Oregon has documented cases of dogs and livestock dying and humans becoming ill. Harmful algal blooms can also create hypoxic (low oxygen) conditions in water bodies that can kill fish and other wildlife.

What do harmful algal blooms look like?

Harmful algal blooms take on a variety of different appearances. They are typically blue-green to green in color. They may look like a green paint spill or grass clippings in the water. Sometime they look like little green blobs suspended throughout the water column or may form a scum on the water’s surface. They may also form streaks across the water.

What causes harmful algal blooms?

A number of environmental factors can contribute to harmful algal blooms. The cause of an individual bloom depends on specific conditions at a particular water body. Pinning down the specific cause of blooms requires a detailed environmental study. In general, the following conditions may contribute to the development of harmful algal blooms:

- Nutrient pollution
- Warm water
- Stagnant water
- Lots of sunlight
- Introduction of invasive fish species

Where does nutrient pollution come from?

Nutrient pollution comes from a variety of sources. These include:

- Wastewater treatment plants
- Septic systems
- Fertilizers
- Agriculture runoff
- Urban and forestry runoff
- Soil erosion

Can harmful algal blooms be prevented?

Not all harmful algal blooms can be eliminated because they are naturally occurring events. However, managing environmental factors that contribute to the development of harmful algal blooms can help to eliminate or minimize harmful algal blooms and their negative impacts in some cases. For example, actions that reduce nutrient inputs into a water body and reduce water temperature will create less favorable conditions for the development of a harmful algal bloom.

What are the roles of DEQ and other agencies?

DEQ's primary responsibility is to investigate the causes of harmful algal blooms and to identify the pollution sources that may contribute to the development of blooms. Once a study has been conducted, DEQ develops a pollution reduction plan outlining actions required to reduce or eliminate harmful algal blooms in a specific water body. DEQ does not allow discharge of wastewater to lakes or reservoirs. DEQ also works with the OHA to coordinate a statewide monitoring response for reported harmful algal blooms.

OHA's Harmful Algae Bloom Surveillance Program is responsible for posting warnings when harmful algal blooms pose a threat to public health for recreational use, and educating the public about harmful algal blooms. Its Drinking Water Services program also works with drinking water systems in the state to reduce the incidence and risk of waterborne disease and exposure of the public to hazardous substances potentially present in drinking water supplies, such as cyanotoxins.

Who does the sampling now?

Some lakes and reservoirs have a designated agency responsible for managing recreation or drinking water. When a potential harmful algal bloom is observed,

these agencies may collect samples to document conditions and potentially post preliminary warning signs.

When no such agency is identified, or when an agency is not willing to respond, OHA may coordinate with DEQ to monitor the bloom and collect and ship water samples to an appropriate laboratory for analysis.

Are we seeing an increase in harmful algal blooms?

That is difficult to say with certainty. While harmful algal bloom appear to be increasing, environmental data to answer that specific question are not available. What we do know is that the factors that contribute to more severe, longer blooms are increasing. As water temperatures warm and more nutrients enter our waterways, conditions that favor harmful algal blooms are becoming more available. New satellite imagery that looks at cyanobacteria from space holds great promise for answering the question, “Are we seeing an increase in harmful algal blooms?”

Is there a link between harmful algal blooms and climate change?

While data is still being collected on the direct impact of climate change on algal blooms, the effects of climate change, such as droughts and more intense storms, exacerbate the conditions that increase the likelihood of blooms.

What do I do if I see a harmful algal bloom?

If you see a harmful algal bloom, you can report it to the OHA’s Harmful Algae Bloom program. For contact information, visit OHA’s website at:

<https://www.oregon.gov/oha/PH/HealthyEnvironments/Recreation/HarmfulAlgaeBlooms/Pages/index.aspx>

Are certain water bodies more susceptible to harmful algal blooms?

Yes. The conditions in some water bodies favor the development of harmful algal blooms. Water bodies that are still, have warmer water and higher nutrients are more susceptible to harmful algal blooms.