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# Cyanotoxin Monitoring Requirements for Public Water Systems in Oregon

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PUBLIC HEALTH DIVISION  
Drinking Water Services

Oregon  
Health  
Authority

# Overview

- Cyanotoxins rulemaking history
- 2023 Cyanotoxins rule revisions
- Cyanotoxins monitoring rules for public water systems in OR
- Bipartisan Infrastructure Law (BIL) – Emerging Contaminants Funding
- Resources

# No federal rule for cyanotoxins in drinking water!

- EPA DW Health Advisory Levels (non-regulatory) for two cyanotoxins:
  - Total Microcystins
  - Cylindrospermopsin
- Cyanotoxins monitoring in finished water part of UCMR4 (2018-2020)
- Regulations in Ohio, Rhode Island, and now Oregon.



# Cyanotoxins HALs

- EPA drinking water health advisory levels (HALs) that Oregon decided to regulate (regulatory/enforceable standards in Oregon but not nationally)

<b>Cyanotoxin</b>	<b>For Vulnerable People (ug/L or ppb)</b>	<b>For Anyone (ug/L or ppb)</b>
Total Microcystins	0.3	1.6
Cylindrospermopsin	0.7	3

- Only SW PWSs susceptible to cyanotoxins required to monitor
- 10-day health advisory but our rules require public notice if cyanotoxins confirmed in finished water regardless of duration

# Cyanotoxins Rulemaking History

- Temporary rules – effective July 1, 2018
- Permanent rules – effective December 27, 2018
- **Revised rules – effective February 1, 2023**

# Rule revisions: Trigger levels

- Raw water trigger levels for weekly raw/finished monitoring:
  - Lowers **microcystins** trigger level to **0.20 ug/L** (was 0.3 ug/L)
  - Sets **cylindrospermopsin** trigger level at 2 significant figures to **0.30 ug/L** (was 0.3 ug/L)

## 333-061-0540(1)(a) Cyanotoxin Monitoring

- (B) If at any time ~~either~~ total microcystins concentration is detected at greater than or equal to 0.20  $\mu\text{g/L}$  or cylindrospermopsin concentration ~~in raw water are~~ is detected at greater than or equal to 0.30  $\mu\text{g/L}$  in raw water, or there is a recreational use health advisory in a water body upstream, water suppliers must immediately increase raw water monitoring of cyanotoxins to weekly.
- (C) Water suppliers may resume raw water monitoring every two weeks if there is not a recreational use health advisory upstream and cyanotoxin levels are not detected or are less than 0.20  $\mu\text{g/L}$  for total microcystins and 0.30  $\mu\text{g/L}$  for cylindrospermopsin in at least two consecutive weekly samples.

# Rule revisions: SAES kit equivalency

- Clarifies that using the SAES kit is considered equivalent within the method 546
- Allows a lower minimum reporting limit for microcystins

## 333-061-0550 Analytical Methods

- (1) A water supplier must use a laboratory accredited according to OAR chapter 333, division 64 and the Oregon Environmental Laboratory Accreditation Program (ORELAP), or the Oregon Department of Environmental Quality Laboratory to analyze samples required by OAR 333-061-0510 to 333-061-0580.
- (2) For total microcystins, a water supplier must ensure that samples are analyzed using EPA method 546, or another EPA-approved method that applies at the time samples are analyzed. **The Eurofins Abraxis SAES ELISA kits (520011SAES) are equivalent to the ELISA kits (520011OH) discussed in Section 6.1 of EPA Method 546.**

# Rule revisions: Finished water results taken in response to raw water result over trigger level

- 0560(3): requires faster reporting of entry point results taken in response to raw water result over the trigger level
- Clarifies reporting of detections
  - (d) Laboratories must report any entry point analytical result taken in response to a raw water analytical result with a detection greater or equal to 0.20 µg/L for total microcystins or 0.30 µg/L for cylindrospermopsin to the Authority and the water supplier within one business day of validation;
  - (de) Laboratories must report any analytical result with a detection greater or equal to 0.20 µg/L for total microcystins or 0.30 µg/L for cylindrospermopsin cyanotoxins to the Authority and the water supplier within one business day of validation;
  - (ef) Laboratories must report all other analytical results not detected or less than 0.20 µg/L for total microcystins or 0.30 µg/L for cylindrospermopsin to the Authority within 10 days of the end of the month the sample was collected; and
  - (fg) Analyses required by OAR 333-061-0540 must be uploaded by the laboratory to the Authority in an approved XML format or submitted in a format approved by the Authority.



# Rule revisions: Sampling outside May to October window

- Requires any samples collected at any time from a compliance location during normal operations and analyzed by an accredited lab with an approved method to be reported.

(4) Samples collected at any time from the raw water sample point, entry point, or distribution system that are analyzed for cyanotoxins by an ORELAP-accredited lab or the Oregon Department of Environmental Quality Laboratory using the analysis methods in OAR 333-061-0550 must be reported per OAR 333-061-0560.

# Rule revisions: Criteria to stop EP monitoring: MISTAKE!

When a system is conducting EP monitoring, criteria to stop EP monitoring was inadvertently not revised. 😞 **Resources will reflect intent** and rules will be revised this year.

## Final rules (old rule):

- (D) Water suppliers may cease entry point monitoring if the results from two consecutive samples of the raw water are less than **0.3 µg/L** and is not detected in two consecutive entry point or distribution samples.

## Intention:

- (D) Water suppliers may cease entry point monitoring if the results from two consecutive samples of the raw water not detected or are less than **0.20 µg/L for total microcystins** and **0.30 µg/L for cylindrospermopsin** and cyanotoxins are not detected in two consecutive entry point or distribution samples.

# Summary of rule revisions

- **333-061-540 Cyanotoxin Monitoring:**
  - Lowered total microcystins trigger level to **0.20 ug/L** (from 0.3 ug/L)
  - Changed cylindrospermopsin trigger level to **0.30 ug/L** (from 0.3 ug/L)
- **333-061-0550 Analytical Methods:**
  - Added language indicating that Eurofins Abraxis SAES kit is equivalent to standard kit mentioned in EPA Method 546
- **333-061-0560 Reporting:**
  - Requires faster reporting of finished water results taken in response to raw water result over the trigger level
  - Requires samples collected outside the May to October monitoring season that otherwise meet the rules to be reported

# Overview of cyanotoxin monitoring rules (incl. recent revisions)

# PWSs with “susceptible sources” required to monitor

- 60 sources (59 PWSs) currently meet the rule criteria for conducting routine monitoring (“susceptible source”):
  1. A harmful algae bloom was documented in past, or a cyanotoxin was previously detected; or
  2. The intake is downstream of or influenced by another surface water source susceptible to harmful algae blooms or release of cyanotoxins; or
  3. The source is on a water quality limited listing in the Oregon DEQ Integrated Report and Clean Water Act Section 303(d) list for the limiting factors of algae and aquatic weeds.
  4. If OHA determines source is susceptible based on characteristics of the source

**Table 1. Public Water Systems (PWSs) susceptible to harmful algae blooms (HABs) and subject to OAR 333-061-0510 to 333-061-0580 for OHA-DWS Permanent Cyanotoxin Rules**

version: March 8, 2022 , subject to change

Notes:

(1) Includes surface water intake and groundwater under the direct influence of surface water (GWUDI) sources. Systems that purchase water from wholesale providers (\*) can be identified in OHA's Data Online for each individual PWS.

(2) System Type: C = Community; NTNC = Non-Transient Non-Community; NC=Transient Non-Community; OVS= Oregon Very Small system

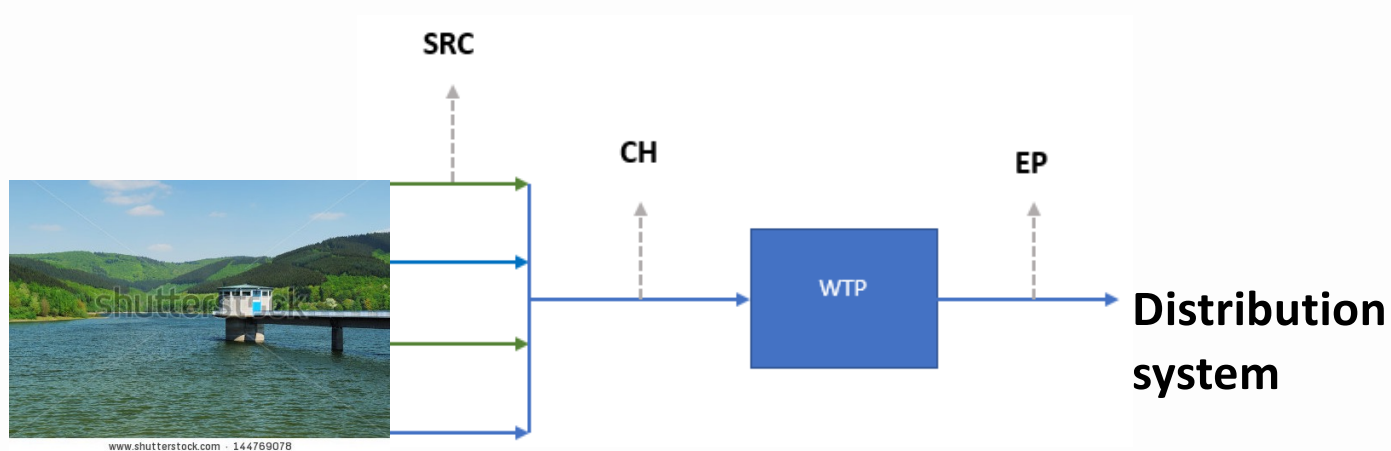
(3) Previous HAB Detection or Advisory based on Recreational HABs from OHA, 2011, updated with data from OHA Recreational HAB Website for 2012-2021; Previous cyanotoxin detections based on 2018 or earlier PWS or watershed data.

(4) DEQ Water Quality Limited (WQL) listing indicates the waterbody is impaired and needs a Total Maximum Daily Load to calculate amount of pollutant a water body can receive and still meet Oregon water quality standards. Based on Category 4 and 5 listings in most recent OR DEQ Integrated Report and 303(d) list (2018/2020 approved by EPA Nov 12, 2020). Note that DEQ's Intergrated Report methodology for Aquatic Weeds and Algae includes 303(d) water quality limited listings for Harmful Algal Blooms, Aquatic Weeds, Chlorophyll-a or Excess Algal Growth.

(5) GU - Groundwater under the direct influence of surface water - refers to a groundwater source that is located close enough to nearby surface water (e.g., a river or lake) to receive direct surface water recharge. Since a portion of the groundwater source's recharge is from surface water, the groundwater source is considered at risk of contamination from pathogens and viruses that are not normally found in true groundwaters and the water source is subject to the surface water treatment rule.

PWS ID#	PWS Name <sup>(1)</sup>	Drinking Water Source	County	System Type <sup>(2)</sup>	Population Served	"Susceptible" Water Source (OAR 333-061-0510 (2)) risk criteria/factors identified in the Drinking Water Source Area		
						Previous Documented HAB or Cyanotoxin Detection <sup>(3)</sup> OAR 333-061-0510 (2a and 2c)	DEQ Water Quality Limited (WQL) listing for algae and aquatic weeds <sup>(4)</sup> OAR 333-061-0510 (2b and 2c)	Other Criteria OAR 333-061-0510 (2d)
<b>Susceptible Water Source per OAR 333-061-0510 (2)</b>								
OR4100012	Albany, City of (*)	Santiam River	Linn	C	54,945	X	X	
OR4101483	Angler's Cove/SCHWC	Rogue River	Jackson	C	80	X	X	
OR4100047	Ashland Water Department	Ashland Creek	Jackson	C	20,700	X		
OR4101174	Buell-Red Prairie Water District	Gooseneck Creek	Polk	C	788	X		
OR4191786	Camp Baker BSA	Infiltration Gallery (Silcoos Lake)	Lane	NC	75	X	X	
OR4100157	Canby Utility	Common header for Molalla River, IG and Springs Gallery	Clackamas	C	16,866	X		
OR4100187	Clackamas River Water - Clackamas (*)	Clackamas River	Clackamas	C	41,338	X	X	

# Sampling locations



- **SRC** = Source, from intake prior to any treatment (“raw” water)
- **CH** = Common header; after all sources combine, as it enters the treatment plant (also “raw” water)
- **EP** = Entry point to the distribution, representing treated or finished water
- **Distribution system** = sample at representative distribution locations

# Monitoring requirements

- Raw water monitoring **every 2 weeks** (May to October)
- If recreational HAB advisory upstream, raw water **weekly**
- If raw water microcystins  $\geq 0.20$  ug/L or cylindrospermopsin  $\geq 0.30$  ug/L , raw and finished water **weekly**
- If toxins detected in the finished water, finished water **daily**
- If  $>$  Health Advisory Levels (HAL) in finished water:
  - Confirmation sample asap
  - If confirmation  $>$  HAL = issue a Do-Not-Drink advisory

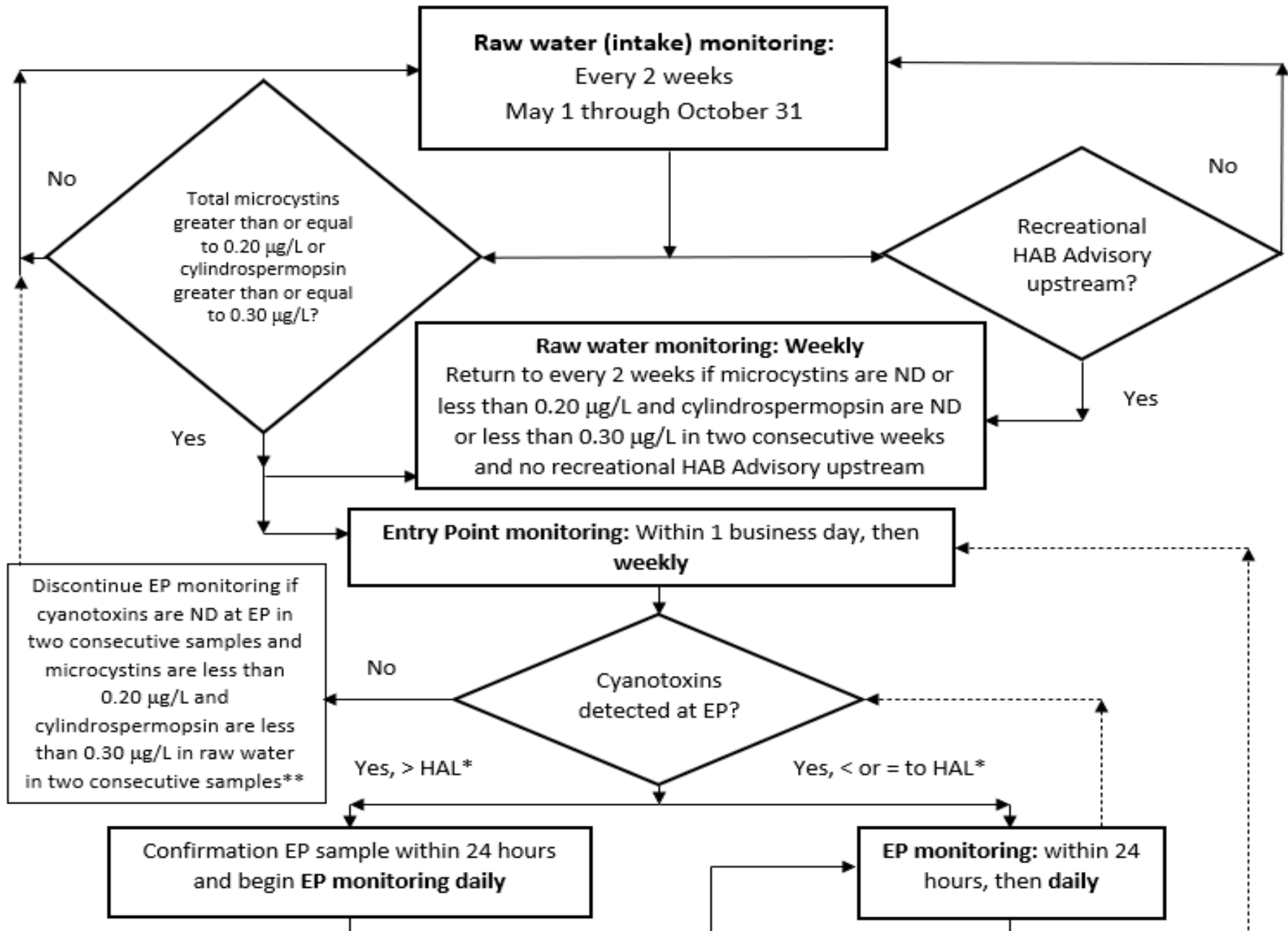


# Cyanotoxin Monitoring Requirements

For Sources Determined to be Susceptible

Oregon Health Authority

February 2023



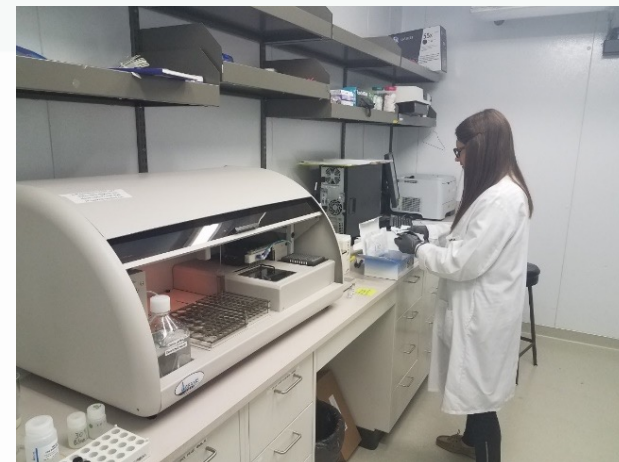
# Public Notification

- Health Advisory if confirmed  $>$  HAL
  - PWS and any purchasers
  - Press release
  - If advisory is delayed with OHA approval (rare), PWS must issue press release stating results but no advisory
- To lift advisory:
  - 2 daily samples at EP  $<$  or  $=$  HAL and
  - Distribution samples  $<$  or  $=$  HAL for 2 days
- Must publish EP & DIST detections in annual CCR

# Reporting

- PWS must ensure labs analyze and report results > HAL within 2 business days
- Finished water samples taken in response to raw water detection over the trigger must be reported within 1 business day
- Finished water samples > HAL must be reported to OHA & purchasers within 24 hrs
- Confirmation samples > HAL must be reported to OHA & purchasers within 8 hrs
- Report results to lift an advisory to OHA within one business day
- Report all other results to OHA by 10<sup>th</sup> of following month

# Analytical methods



- Must use ORELAP-accredited lab or the DEQ lab
- Total microcystins: EPA method 546 (ELISA).
  - The ONLY approved method that measures total microcystins
  - SAES kit is equivalent to standard kit mentioned in the method
- Cylindrospermopsin: DEQ ELISA method
  - No EPA approved ELISA method
  - If detected at the entry point over the HAL, EPA method 545 (LC-MS/MS) must be used. Best to confirm with an EPA method.

# Purchasing systems

- **No routine sampling required**
- Purchasers only monitor if under an advisory (in order to **lift** the advisory)
- Seller must notify purchasers within **24 hours** of initial finished water sample over HAL (“heads up”)
- Seller must notify purchasers within **8 hours** if confirmation sample is over HAL (joint advisory issued)

# Other related monitoring

- qPCR study
  - Purpose: Test for genes of cyanotoxin-producing cyanobacteria to see if genes show up before toxins do in the hope gene testing could be a cheap reliable predictor test.
    - 2020: All PWS with susceptible sources
    - 2021: PWS within wildfire zone, within sub-watershed impacted by fire, or cyanotoxins detected in 2020
  - Final report Sept 2022: Unable to show that gene testing was a reliable predictor of toxins
- Voluntary cyanotoxins monitoring program
  - PWS without susceptible source can test if bloom observed

# Cyanotoxins sample results

Viewable on our Data Online webpage: <https://yourwater.oregon.gov/>

## Cyanotoxin Sample Results

**Regulating Agency**

**County**

**Sample Location:**  
 Distribution system  
 Entry point (finished water)  
 Source (raw water)  
 Common header (raw water)

**Data Results:**  
 All results  
 All detections  
 Exceedances only (entry points and distribution)

**Sample Date Range**  
 From  to

### Health Advisory Levels (for entry points and distribution)

- Total Microcystins: 0.3 ug/L for vulnerable people; 1.6 ug/L for everyone.
- Cylindrospermopsin: 0.7 ug/L for vulnerable people; 3 ug/L for everyone.

Health advisory level exceedances in entry point and distribution samples are indicated with **red text**.

ND = Not detected at the minimum reporting level; -- = Not sampled

39 results found for selected criteria.

### Cyanotoxin Sample Results- All sample locations - Detections only

Regulating Agency	County Served	PWS	PWS Name	Sample Date	Received Date	Source ID	Source Name	Total Microcystins (ug/L)	Cylindrospermopsin (ug/L)
REGION 2	Josephine	90186	JOSEPHINE CO PKS LAKE SELMAC 1	11/21/22	11/29/22	SRC-AA	LAKE SELMAC	0.14	ND
REGION 2	Josephine	94645	JOSEPHINE CO PKS LAKE SELMAC 2	11/14/22	11/17/22	SRC-AA	LAKE SELMAC	0.24	ND
REGION 2	Josephine	90186	JOSEPHINE CO PKS LAKE SELMAC 1	11/08/22	11/10/22	SRC-AA	LAKE SELMAC	0.26	ND
REGION 2	Josephine	94645	JOSEPHINE CO PKS LAKE SELMAC 2	11/08/22	11/10/22	SRC-AA	LAKE SELMAC	0.22	ND
REGION 1	Polk	01174	BUELL-RED PRAIRIE WD	11/01/22	11/04/22	SRC-AA	GOOSENECK CREEK	0.18	--
REGION 2	Josephine	90186	JOSEPHINE CO PKS LAKE SELMAC 1	10/31/22	11/04/22	SRC-AA	LAKE SELMAC	0.39	--
REGION 2	Josephine	94645	JOSEPHINE CO PKS LAKE SELMAC 2	10/31/22	11/04/22	SRC-AA	LAKE SELMAC	0.28	--
REGION 2	Josephine	90186	JOSEPHINE CO PKS LAKE SELMAC 1	10/25/22	10/28/22	SRC-AA	LAKE SELMAC	0.95	ND
REGION 2	Josephine	94645	JOSEPHINE CO PKS LAKE SELMAC 2	10/25/22	10/28/22	SRC-AA	LAKE SELMAC	0.44	ND
REGION 2	Lane	00246	CRESWELL, CITY OF	10/24/22	10/28/22	SRC-BK	WILLAMETTE RIVER (COAST FORK)	0.13	ND
REGION 1	Polk	01174	BUELL-RED PRAIRIE WD	10/17/22	10/20/22	SRC-AA	GOOSENECK CREEK	0.21	ND
REGION 2	Lane	00236	COTTAGE GROVE, CITY OF	10/17/22	10/20/22	SRC-BA	ROW RIVER	0.18	ND
REGION 2	Josephine	90186	JOSEPHINE CO PKS LAKE SELMAC 1	10/17/22	10/20/22	SRC-AA	LAKE SELMAC	0.45	ND
REGION 2	Josephine	94645	JOSEPHINE CO PKS LAKE SELMAC 2	10/17/22	10/20/22	SRC-AA	LAKE SELMAC	0.34	ND
REGION 2	Lane	00246	CRESWELL, CITY OF	10/10/22	10/13/22	SRC-BK	WILLAMETTE RIVER (COAST FORK)	0.22	ND
REGION 2	Josephine	90186	JOSEPHINE CO PKS LAKE SELMAC 1	10/10/22	10/13/22	SRC-AA	LAKE SELMAC	0.7	ND
REGION 2	Josephine	94645	JOSEPHINE CO PKS LAKE SELMAC 2	10/10/22	10/13/22	SRC-AA	LAKE SELMAC	0.59	ND

# Summary of 2022 monitoring results

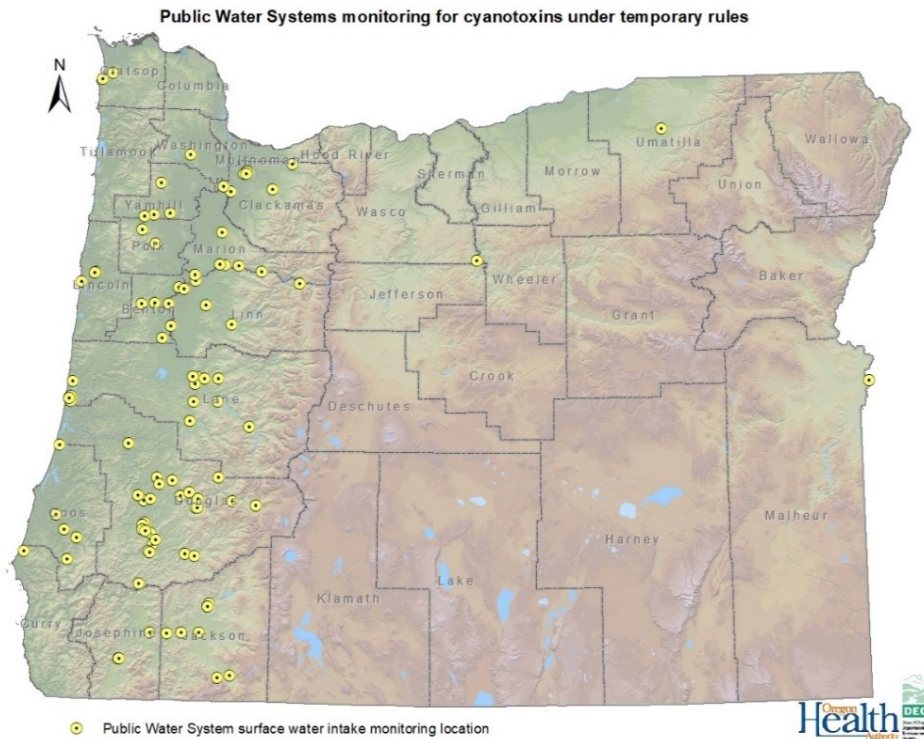
- 2022: 5th year of monitoring since rules adopted
- 39 raw water microcystins detections at 10 PWSs (about average)
- 0 raw water cylindrospermopsin detections
- 24 of 39 total microcystins detections were at 2 PWSs:
  - Josephine County Pks Lake Selmac 1 & 2.
  - Buell-Red Prairie in Polk County had the next highest number of raw water detections at 6.
- 3 PWSs had raw water detections high enough to be triggered into finished water monitoring this year;
  - *No finished water detections since the rules were implemented in 2018*



# Summary of 2022 monitoring results (cont.)

- Mid to late July blip: microcystins detected at 5 PWSs on the South Umpqua River in Douglas County (first time).
  - 1 detection at each PWS during that time period.
- October blip: microcystins detected at 2 PWSs in the mid-Willamette Valley (Cottage Grove and Creswell) with 4 detections total.
- No detections on the North Santiam River (unusual)
- Overall, 2022 was a quieter season than expected.
- Anticipated seeing increased bloom frequency and intensity and increased cyanotoxins detections in 2021 and 2022 due to increased nutrients being flushed into surface water sources after the 2020 wildfires, but we just haven't seen that.

# Statewide results so far (since 2018)



- Annually 21-59 detections of Total Microcystins at intakes (raw water)
  - 0-5 annual detections of cylindrospermopsin
- 6 water bodies of most concern
- *No finished water detections*

# Bipartisan Infrastructure Law (BIL) – Emerging Contaminants Funding

- BIL provides **grants** through the State Revolving Fund for reducing exposure to PFAS or other emerging contaminants in drinking water
- Can be used by water systems with EC detections to provide treatment, develop a new source, or connect to another public water system
- 25% of funds must go to disadvantaged communities
  - Defined as having an MHI below the state median household income
- Covers planning, design, and construction costs
- Set-asides can be used for administration of the funds or additional testing.
- No state match is required
- Oregon’s annual allotment for next 5 years: \$9,940,000
- ***Cyanotoxins-related projects are eligible for funding!!!***

## Cyanotoxin Resources for Drinking Water

[Drinking Water Services](#)

[Water System Operations](#)

[Surface Water Treatment](#)

[Capacity Development](#)

[Public Notice Templates and Resources](#)

[Fact Sheets & Best Management Practices](#)

[Water System Surveys & Outstanding Performance](#)

[Circuit Rider Program](#)

[ePipeline Newsletter](#)

[Emerging Contaminants in Drinking Water](#)

[Per - and Polyfluoroalkyl Substances \(PFAS\)](#)

[Contact Us](#)

### Rules for Cyanotoxin Monitoring in Drinking Water

Oregon Health Authority (OHA) has developed regulations that require drinking water systems using surface water sources susceptible to harmful algae blooms to routinely test for two cyanotoxins that these blooms produce and notify the public about the test results.

The rules apply to the two cyanotoxins with a health advisory level established by EPA. These are for total microcystins and cylindrospermopsin, at the levels shown in the table below.

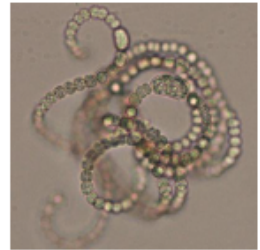
Cyanotoxin	For Vulnerable People (ug/L or ppb)	For Anyone (ug/l or ppb)
Total Microcystins	0.3	1.6
Cylindrospermopsin	0.7	3

These rules are effective starting December 27, 2018 and replace temporary administrative rules adopted for cyanotoxin monitoring and testing that were effective July 1, 2018 through December 27, 2018.

OHA is encouraging water systems not subject to the cyanotoxin monitoring rules that serve surface water and have had algae issues in the past to voluntarily test for cyanotoxins and notify the public about the results. If analysis is performed for anatoxin-a or saxitoxins and found in the raw or finished water, please contact OHA-Drinking Water Services for guidance and recommendations.

### Rules Resources

- [Rules for Cyanotoxin Monitoring for Public Water Systems - Revised rules effective February 1, 2023](#)
- [List of Susceptible Sources required to monitor for cyanotoxins - March 8, 2022, subject to change](#)
- [Cyanotoxin Monitoring Flowchart - Updated February 2023](#)
- [Cyanotoxin Rules Fact Sheet - Updated February 2023](#)
- [Cyanotoxin Sampling DEQ & OHA Presentation from 4/20/22 \( !\[\]\(0f0f508d296bff693b2b34288b8d91ee\_img.jpg\) webinar recording from 4/20/22\)](#)
- [Cyanotoxin Health Advisory for Vulnerable People Frequently Asked Questions](#)
- [Cyanotoxin Health Advisory for All Consumers Frequently Asked Questions](#)
- [Guidance for Health Care Providers and Facilities Frequently Asked Questions](#)



# Questions?



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