Are Cyanotoxins Emerging Risks in Oregon’s Drinking Water?

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National Water Quality Monitoring Conference
Denver, Colorado
2019
Presentation Outline

- Cyanotoxin surveillance in Oregon
- The Salem Incident, spring 2018
- Temporary emergency drinking water rule
- Overview of the DEQ lab and cyanotoxin monitoring logistics.
- Permanent drinking water rule, 2019 cyanotoxin monitoring
Cyanotoxin surveillance in Oregon

- Recreational
- Drinking water
Advisory Levels
Oregon Health Authority

Recreational Use Guidance Values:

Table 2. Health advisory RUVs for cyanotoxins in Oregon recreational waters (μg/L)

<table>
<thead>
<tr>
<th>RUVs*</th>
<th>Microcystin</th>
<th>Anatoxin-a</th>
<th>Saxitoxin</th>
<th>Cylindrospermopsin</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>8</td>
<td>4</td>
<td>8</td>
<td></td>
</tr>
</tbody>
</table>

Drinking water:
EPA and Oregon have established Health Advisory Levels for:

<table>
<thead>
<tr>
<th>Cyanotoxin</th>
<th>For Vulnerable People (ppb)</th>
<th>For Age 6 and Above (ppb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Microcystins</td>
<td>0.3</td>
<td>1.6</td>
</tr>
<tr>
<td>Cylindrospermopsin</td>
<td>0.7</td>
<td>3</td>
</tr>
</tbody>
</table>
• Most water bodies not are monitored
• Animals and children at higher risk
• Oregon Health Authority issues advisories but does not usually “close” lakes
• “When in doubt, stay out”
Harmful Algae Bloom Recreational Advisories

Lakes, reservoirs, rivers and creeks that had an Oregon Health Authority harmful algal bloom advisory through 2011

Contact Recreation Advisories

2008 OHA receives 5-year grant from CDC for HABs occurrences resulting in more rec advisories posted
The Salem Incident, Spring 2018

Detroit Reservoir, North Santiam River
Until July 2018, Public Water Systems voluntarily monitoring for toxins in Oregon

- Salem conducting aggressive toxin monitoring in Detroit reservoir, downstream of reservoir and at their treatment plant.
- Beginning in May 2018, Salem starts detecting a bloom on Detroit reservoir, recreational advisory posted on May 23rd.
- Toxins being detected downstream of Detroit reservoir including Salem’s raw water intake.
- Salem detects toxins in finished water May 29!
Dear Customers,

While the City of Salem drinking water advisory is in place, no beverages that use water or ice will be prepared or sold.

During the advisory the following can be sold: RTD beverages, and RTE food.

We are closed today due to the water contamination.
Thank you.
Sorry.
Salem Cyanotoxin Incident

- 33 days of Do Not Drink Advisory for vulnerable population.
- Local emergency response with State support.
- City, County and National Guard operated bulk water distribution sites, some operated 24/7.
- City engineering consultants installed powdered activated carbon pre-treatment within weeks.
- New OHA cyanotoxin emergency rules adopted within 3 weeks.
Salem Cyanotoxin Incident

• Hospitals, health care, dialysis facilities advised not to use water for patient care, delay elective surgery.
  – Hospitals chose to treat all patients as “vulnerable” population.

• Dental offices advised not to use tap water in patient care.

• Schools, day care advised to provide alternate water.

• Restaurants advised to post notices to inform customers.
  – Starbucks stopped selling coffee drinks.

• Food and beverage manufacturers advised not to use tap water if water is a principal ingredient.
  – Some food processors initially shut down.
  – Breweries suspended production.
Salem Cyanotoxin Incident: Positive Outcomes

• Interim treatment at Salem, long term options under review.
• New cyanotoxin rules help to restore public confidence and increase certainty for systems
• Tested emergency preparedness measures
• Improved public awareness: people learned the value of safe drinking water
Nearly 100 Oregon Water Systems Will Test For Toxins Plaguing Salem's Water

by Dirk VanderHart | OPB June 29, 2018 2:50 p.m. | Updated: June 29, 2018 5:19 p.m.

Nearly 100 public water systems around Oregon—including the state’s largest—will be required to begin testing for harmful contaminants from algae blooms under new rules unveiled by the Oregon Health Authority.

As Salem officials continue to experiment with a new treatment system to address worrisome cyanotoxins in the city’s water, the OHA says it’s time to ensure all similar water systems have safeguards.

“Failure to immediately take rulemaking action would leave public water suppliers and the Authority without sufficient data to provide adequate...
Emergency Drinking Water Rule

• Approximately 100 facilities with cyanotoxins risk: past HABs, 303d List, other factors.
• Bi weekly raw water sampling and analysis at DEQ Lab
  • Total microcystins and cylindrospermopsin by ELISA
  • Cylindrospermopsin confirmation by LC/MS/MS
• Raw water detections:
  • 24 hour confirmation sample
  • Weekly sampling of raw and finished water at entry point
• Finished water detections: Daily sampling finished in distribution system
• All costs covered by the State for analysis by DEQ Lab
Sample locations

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

**Distribution system**

- Untreated source water
- Treated drinking water
Oregon Drinking Water Facilities Under the OHA Emergency Cyanotoxin Monitoring Rule

- 102 facilities identified as at risk
- 99 facilities participated
- 97 facilities worked with DEQ Lab
- 2 facilities used private labs
- 3 small facilities did not participate
- 2,318,500 people
- 56% of Oregon population
Challenges for the DEQ Lab

- Short lead time to set up program.
- New instrument and analysis
- Large program with many partners: 97 participating facilities monitored by DEQ.
- Short holding time: 48 hours.
- Quick turn-around time: two days
- Laboratory Information System glitches
- Sample shipping/receiving logistics
- UPS problems, late samples
2018 DEQ Laboratory Activity for Water Quality Monitoring Programs

1,269 Samples
2,173 Analyses

Number of Samples

- Total Maximum Daily Load 7%
- Groundwater Management Areas 6%
- Pesticide Stewardship Partnership 20%
- Drinking Water 27%
- Ambient Water Quality 28%
- Groundwater Assessment 6%

Number of Analyses

- Total Maximum Daily Load 9%
- Groundwater Management Areas 5%
- Pesticide Stewardship Partnership 6%
- Drinking Water 27%
- Ambient Water Quality 54%
- Groundwater Assessment 15%
Total Microcystins Detections

Drinking water samples
North Santiam and Santiam only

Source water samples, state-wide

Santiam and North Santiam

Siltcoos Lake, South Coast

Gooseneck Cr, Yamhill Basin

Lake Selmac, Rogue basin

"Data gap 6/23-7/1"

Total Microcystins (ug/L)

May June July August September October November Dec

OHA E. Rule begins

OHA E. Rule ends

Buell-Red Prairie Water Association City of Gates Josephine Co PWS Salem Public Works Stayton Water Supply City of Jefferson South Coast Water District Inc. Health Advisory Level Linear (Health Advisory Level)
Facilities with cyanotoxin detections

- Salem Public Works, N Santiam (192,000)
- Stayton Water Supply, N Santiam (7,830)
- City of Gates, N Santiam (490)
- City of Jefferson, Santiam (3,165)
- Buell Red-Prairie WD, Gooseneck Cr Pond, Yamhill basin (976)
- South Coast WD, Siltcoos Lake, Mid Coast basin (200)
- Two Josephine County Parks, Lake Selmac, Illinois basin (50)
2019 Drinking Water Cyanotoxin Monitoring

- New permanent Oregon Health Authority rule
- Very similar to 2018 emergency rule
- Approximately 60 facilities
- May 1 to October 31
- Biweekly sampling of raw water
- More frequent samples at more locations with cyanotoxin detections
- Funding and positions from Legislature are still uncertain.
  - Free analysis?
  - Charge for analysis?
  - Shift lab resources?
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Photographs by Barry Rosen, USGS, November 2018

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