2022 training webinar

Drinking Water Cyanotoxin Monitoring (OAR 333-061-0510 to 333-061-0580)

April 20, 2022
Housekeeping

- Please let us know if you cannot hear, etc.
- Mute your phone/computer
- Ask questions in chat box
- This presentation is being recorded
Training Outline

• Cyanotoxins monitoring in Oregon drinking water - Gregg
  – OAR 333-061-0510 to 333-061-0580
• 2021 monitoring season recap – Nathan
• qPCR monitoring - Nathan
• Updates to 2022 monitoring – Nathan
• Step-by-step guide to sampling - Nathan
  – Field collection
  – Shipping samples to DEQ
  – Lab analysis and reporting

Questions and Discussion - all
Who to contact

Oregon Health Authority roles:
- Drinking water safety
- OAR 333-061-0510
- Contact recreation safety
- Issue advisories

DEQ Laboratory roles:
- Provide lab support for OHA drinking water rule
- Coordinate with DW facility operators
- Provide training, supplies, shipping, lab analyses and report results to OHA

OHA is your go-to for questions about:
- Drinking water rules
- Regulations
- Resources

DEQ is your go-to for questions about:
- Logistical issues (shipping, training, etc.)
- Sampling (schedule, protocol, etc.)
- Interpreting results
Who to contact

OHA
Gregg Baird
503-936-1657 (cell)
Gregg.c.baird@dhsoha.state.or.us

DEQ Lab
Nathan Reetz
503-706-9572 (cell) | 503-693-5756 (office)
Nathan.REETZ@deq.oregon.gov

Mike Mulvey (backup)
971-806-4281 (cell) | 503-693-5732 (office)
Mike.mulvey@deq.state.or.us
Health Advisory Levels

• Cyanotoxins monitored in Oregon: microcystins, cylindrospermopsin

Health effects include: upset stomach, diarrhea, vomiting, long-term liver/kidney damage
Who is required to monitor?

- Sources deemed susceptible by OHA, DEQ
- “Susceptible” means:
  - Source has had harmful algal blooms (HAB) or cyanotoxin detections in the past
  - Intake is downstream from a water body with past HAB or cyanotoxin detections
  - Source water on 303(d) list for limiting factors of algae and aquatic weeds
  - 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

## 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 Integrated 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. GW = 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.

<table>
<thead>
<tr>
<th>PWS ID#</th>
<th>PWS Name (1)</th>
<th>Drinking Water Source</th>
<th>County</th>
<th>System Type (2)</th>
<th>Populaton Served</th>
<th>Previous Documented Risk of Cyanotoxin Detection (6) OAR 333-061-0510 (22 and 24)</th>
<th>DEQ Water Quality Limited (WQL) listing for algae and aquatic weeds in OR 333-061-0580 (25 and 26)</th>
<th>Other Criteria OAR 333-061-0500 (26)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OR4100012</td>
<td>Albany, City of (*)</td>
<td>Santiam River</td>
<td>Linn</td>
<td>C</td>
<td>54,945</td>
<td>X</td>
<td>X</td>
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<tr>
<td>OR4101453</td>
<td>Angler’s Cove/SCHWC</td>
<td>Rogue River</td>
<td>Jackson</td>
<td>C</td>
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<td>OR4100097</td>
<td>Ashland Water</td>
<td>Ashland Creek</td>
<td>Jackson</td>
<td>C</td>
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<td>Bulli-Red Prairie</td>
<td>Gooseneck Creek</td>
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<td>C</td>
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<tr>
<td>OR419176</td>
<td>Camp Baker BSA</td>
<td>Infiltration Gallery (Silcoos Lake)</td>
<td>Lane</td>
<td>NC</td>
<td>75</td>
<td>X</td>
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<tr>
<td>OR4100157</td>
<td>Canby Utility</td>
<td>Common header for Molalla River, IGF and Springs Gallery</td>
<td>Clackamas</td>
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<td>OR4100137</td>
<td>Clackamas River Water - Clackamas (*)</td>
<td>Clackamas River</td>
<td>Clackamas</td>
<td>C</td>
<td>41,338</td>
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</table>
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 either toxin ≥ 0.3 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
May 2019

Raw water (intake) monitoring:
Every 2 weeks
May 1 through October 31

No
Cyanotoxins Equal to or greater than 0.3 μg/L?

Yes
Raw water monitoring: Weekly
Return to every 2 weeks if cyanotoxins are less than 0.3 μg/L in two consecutive weeks and no recreational HAB Advisory upstream

Entry Point monitoring: Within 1 business day, then weekly

Discontinue EP monitoring if cyanotoxins are ND at EP in two consecutive samples and less than 0.3 μg/L in raw water in two consecutive samples

No
Cyanotoxins detected at EP?

Yes, > HAL
Confirmation EP sample within 24 hours and begin EP monitoring daily

Yes, < or = HAL

Yes
Recreational HAB Advisory upstream?

No

*HAL = Health Advisory Level

EP monitoring: within 24 hours, then daily
Purchasing water 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 is over HAL (joint advisory issued)
Public Notification & Advisories

• 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 ≤ HAL and
  – Distribution samples ≤ HAL for 2 days

• Must publish EP & DIST detections in annual CCR
Reporting results

• PWS must ensure labs analyze and report results > HAL within 2 business days
• 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 10th of following month
Potential Rule Revisions

- OHA is in the early stages of drafting proposed rule revisions:
  - Lowering total microcystins “trigger” level
  - Requiring weekly raw and entry point samples to be paired and collected at least 7 days apart
  - Adding language indicating that SAES kit is equivalent to standard kit mentioned in EPA Method 546
  - Requiring faster reporting of entry point results taken in response to raw water result over the trigger level
  - Requiring samples collected outside the May to October monitoring season that otherwise meet the rules to be reported
Cyanotoxins sample results
Viewable on OHA Data Online webpage: [https://yourwater.oregon.gov/](https://yourwater.oregon.gov/)

### Cyanotoxin Sample Results

<table>
<thead>
<tr>
<th>Regulating Agency</th>
<th>County Served</th>
<th>PWS</th>
<th>PWS Name</th>
<th>Sample Date Received</th>
<th>Sample Date Processed</th>
<th>Source ID</th>
<th>Source Name</th>
<th>Total Microcystins (ng/L)</th>
<th>Cylindrospermopsis (ng/L)</th>
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<tr>
<td>REGION 3 Jackson</td>
<td></td>
<td>00847</td>
<td>ASHLAND WATER DEPARTMENT</td>
<td>06/30/20</td>
<td>06/30/20</td>
<td>Ch-A</td>
<td>NORTH SANTIAM RIVER</td>
<td>1.65</td>
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<td>00217</td>
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<td>07/13/20</td>
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<td>NORTH SANTIAM RIVER</td>
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<td>GATES, CITY OF</td>
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<td>NORTH SANTIAM RIVER</td>
<td>0.15</td>
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<td>REGION 2 Marion</td>
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<td>JACKSON CO PKS EMIGRANT LAKE</td>
<td>10/02/20</td>
<td>10/08/20</td>
<td>SRC-AA</td>
<td>NORTH SANTIAM RIVER</td>
<td>0.16</td>
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<td>09/08/20</td>
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<td>06/23/20</td>
<td>SRC-AA</td>
<td>NORTH SANTIAM RIVER</td>
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<td>REGION 1 Marion</td>
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<td>00751</td>
<td>SALEM PUBLIC WORKS</td>
<td>07/27/20</td>
<td>07/31/20</td>
<td>SRC-AA</td>
<td>NORTH SANTIAM RIVER</td>
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<td>REGION 1 Marion</td>
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<td>00843</td>
<td>STAYTON WATER SUPPLY</td>
<td>07/09/20</td>
<td>07/13/20</td>
<td>SRC-AA</td>
<td>NORTH SANTIAM RIVER</td>
<td>0.16</td>
<td>ND</td>
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</tbody>
</table>
Cyanotoxin Resources for Drinking Water

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 those 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:

<table>
<thead>
<tr>
<th>Cyanotoxin</th>
<th>For Vulnerable People (µg/L or ppb)</th>
<th>For Anyone (µg/L or 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>
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</tbody>
</table>

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 saxitoxin 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
- List of Susceptible Sources required to monitor for cyanotoxins - March 8, 2022, subject to change
- Cyanotoxin Monitoring Flowchart
- Cyanotoxin Rules Fact Sheet
- Cyanotoxin Sampling DEQ & OHA Presentation from 4/21/21 (webinar recording from 4/21/21)
- 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

Recommended Reading

- EPA Recommendations for Public Water Systems to Manage Cyanotoxins in Drinking Water
- EPA Fact Sheet on Cyanobacteria and Cyanotoxins - Information for Drinking Water Systems
- EPA Drinking Water Cyanotoxin Risk Communications Tool Box
- EPA Cyanotoxin Management Plan Template and Example Plans

Treatment Information

- Optimizing Toxic Removal - All surface water systems can take steps at their treatment plants to increase the removal efficiency of cyanotoxins
What you can do now

• Understand monitoring requirements, including if detections are found
• Determine potential distribution sampling sites
• Evaluate best treatment optimization steps if needed
• Update contact lists (internal, purchasers, state)
• Know where to get public notice templates and resources
Take away messages

• Public needs to know if they are at risk, even without federal regulation
  – Report as soon as possible
• Testing water only way to know for sure
• Tell people what you know when you know it

• Establish relationships with local stakeholders & agencies to mitigate risk
  – How to reach vulnerable populations
  – Where to obtain water hauling trucks
  – Messaging plans

Consider treatment options if your system is at risk
2021 monitoring season recap

- 56 facilities participated in the program in 2021
- No drinking water detections at any facility
- 49 facilities had no detectable cyanotoxins in their source water
- 7 facilities had 40 microcystins detections, 2 cylindrospermopsin detections
2021 – Drinking Water Monitoring
2020 vs. 2021

2020 Microcystins Source Water Detections

2021 Cyanotoxin Detections

- Burfl Red Prairie (North Fork)
- City of Cottage Grove (Went)
- City of Creswell (C22, Alkenone)
- City of Drain (N. Santiam)
- City of Monmouth (Crescent)
- Josephine County Parks Lake Selma (Regent)
- Mlik Academia (S. Umpqua)
# qPCR monitoring 2020 and 2021

## qPCR Monitoring Summary

<table>
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<tr>
<th></th>
<th>2020</th>
<th>2021</th>
<th>Total</th>
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<tbody>
<tr>
<td>Number of Samples</td>
<td>460</td>
<td>186</td>
<td>646</td>
</tr>
<tr>
<td>Number of Facilities</td>
<td>54</td>
<td>30</td>
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</tbody>
</table>
qPCR monitoring 2022

• No samples required this year.

• Thank you to all who participated.
<table>
<thead>
<tr>
<th>Week #</th>
<th>Group A</th>
<th>Group B</th>
<th>Notes</th>
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<td>5/2/2022</td>
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<td>2</td>
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<td>5/9/2022</td>
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<td>5/16/2022</td>
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<td>4</td>
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<td>5/23/2022</td>
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<td>5</td>
<td>5/30/2022</td>
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<td>Memorial Day – sample on Tuesday, 5/31/2022</td>
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<tr>
<td>6</td>
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<td>6/6/2022</td>
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<td>6/27/2022</td>
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<td>10</td>
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<td>7/4/2022</td>
<td>Independence Day – sample on Tuesday, 7/5/2022</td>
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<td>9/5/2022</td>
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<td>Labor Day – sample on Tuesday, 9/6/2022</td>
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<tr>
<td>26</td>
<td></td>
<td>10/24/2022</td>
<td></td>
</tr>
</tbody>
</table>
Sampling protocol - cyanotoxins

Unpack box and inspect kits. Each box will contain the following:

- 8 coolers in cardboard boxes
- 32 ice packs (4/cooler) – **freezing** these before collecting samples!
- 8 Amber Glass 125mL bottles
- 8 bubble bags (1/glass bottle)
- 8 lab paperwork packets (1/cooler)
- 8 prepaid UPS return labels
Labeling bottles

Check appropriate water type

- “Raw water” = SRC or CH
- “Finished water” = EP
  - You will only collect EP sample if requested by DEQ
Additional samples – by request only

- Weekly raw water (source or common header) samples
- Weekly finished water (entry point) samples
- Cylindrospermopsin confirmation vials – finished water (entry point)
# Oregon Department of Environmental Quality Chain of Custody Record

**Facility:** Salem Public Works - OR4100731  
**Address:** 1410 20TH ST SE BLDG 2  
Salem  
OR 97302  
**Facility Contact:** Dwayne Barnes  
**Facility Phone:** (503) 588-6483  
**Sampling Agency:**  
**Sample Collector(s):**  
**Sample Information:**

<table>
<thead>
<tr>
<th>Item</th>
<th>Sampling Point ID</th>
<th>Water Facility State Code</th>
<th>Source or Finished water (Circle one)</th>
<th>Sample Collection Date and time</th>
<th>Collection Address (If in Distribution)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>PWS00731:SRC-AA</td>
<td>Not Applicable</td>
<td>Source Water</td>
<td>S</td>
<td>F</td>
<td>North Santiam River I.G.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Relinquished By:**  
**Agency/Company:**  
**Date/Time:**  
**Received By:**  
**Agency/Company:**  
**Date/Time:**

---

**Sample Receipt Checklist “Office Use Only”**

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Sampled Same Day?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
<td>Cooler Contained Ice?</td>
</tr>
<tr>
<td>Yes</td>
<td>No</td>
<td>Samples collected in the appropriate containers?</td>
</tr>
<tr>
<td>Yes</td>
<td>No</td>
<td>Sample containers clearly and properly labeled?</td>
</tr>
<tr>
<td>Yes</td>
<td>No</td>
<td>Samples received intact and without damage?</td>
</tr>
<tr>
<td>Yes</td>
<td>No</td>
<td>Sample volumes sufficient for requested analyses?</td>
</tr>
<tr>
<td>Yes</td>
<td>No</td>
<td>All samples received within their holding times?</td>
</tr>
</tbody>
</table>

**Temperature Check (IR/Sample):___________C**

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Sample preservation checked at time of sample receipt?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
<td>If yes were all samples properly preserved?</td>
</tr>
<tr>
<td>Yes</td>
<td>No</td>
<td>COC form properly signed?</td>
</tr>
</tbody>
</table>

**Sample Receipt Comments**

---

**Health Authority**
## Sample Information

<table>
<thead>
<tr>
<th>Item</th>
<th>Sampling Point ID</th>
<th>qPCR</th>
<th>Sample Collection Date and time</th>
<th>Collection Address (if in Distribution)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>PWS00731:SRC.AA</td>
<td></td>
<td>Source Water Only</td>
<td></td>
<td>North Santiam River I.G.</td>
<td></td>
</tr>
</tbody>
</table>

## Relinquished By

Agency/Company | Date/Time | Received By: | Agency/Company | Date/Time |
---             | ---       |             | ---            | ---       |

## Sample Receipt Checklist

- **Sampled Same Day?**
  - Yes
  - No

- **Cooler Contained Ice?**
  - Yes
  - No

- **Samples collected in the appropriate containers?**
  - Yes
  - No

- **Sample containers clearly and properly labeled?**
  - Yes
  - No

- **Samples received intact and without damage?**
  - Yes
  - No

- **Sample volumes sufficient for requested analyses?**
  - Yes
  - No

- **All samples received within their holding times?**
  - Yes
  - No

**Temperature Check (IR/Sample):**

- **Temperature:** ________ C

**Sample preservation checked at time of sample receipt?**

- **Yes**
  - **No**

**If yes were all samples properly preserved?**

- **Yes**
  - **No**

**COC form properly signed?**

- **Yes**
  - **No**

**Sample Receipt Comments**

---
Packing and shipping to DEQ Lab

• Pack 4 frozen ice packs/cooler
• Double-check bottle labels. Are they both complete, labeled correctly?
• Double-check COC form(s). Are they circled, signed, dated?
• Wrap glass bottles in bubble packs
• Place lab COC(s) in Ziploc bag
• Fill empty space with packing material
Notes about shipping

• Labels are prepaid; each may only be used once (do not photocopy)
• No sample receiving on Saturdays, Sundays, holidays
• Double-check shipping drop-off times
  – Next-day delivery to Hillsboro
Invalid samples

• Too warm (>10° C)
  – Freeze ice packs early

• Too old (>48 hours after collection)
  – Ship ASAP after sampling

• Broken/leaking bottle
  – Check for broken bottles upon receipt
  – Pack in bubble packs carefully
  – Make sure lid is tightened

*Invalid samples cannot be analyzed. You will need to resample*
Reporting results

• Data management software automatically emails results
• Nathan will call facility contacts if extra sampling required (>trigger)
  – Thursday or Friday
• Nathan will email OHA with results >trigger
  – Thursday or Friday
• All results will be uploaded to OHA data repository weekly
  – Friday afternoon
Lab methods

- Samples must be analyzed by an accredited lab
  - DEQ lab is accredited
  - Please contact Nathan if not using DEQ lab
- Analyze using following methods:

<table>
<thead>
<tr>
<th>Toxin</th>
<th>Screening method</th>
<th>Confirmation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Microcystins</td>
<td>EPA method 546 (ELISA)</td>
<td>n/a</td>
</tr>
<tr>
<td>Cylindrospermopsin</td>
<td>OR DEQ 18-LAB-0050 (ELISA)</td>
<td>EPA method 545 (LC MS/MS)</td>
</tr>
</tbody>
</table>
Additional lab analyses

- DEQ Lab can analyze additional samples for a fee
  - Expired IGAs renewed until 2024 (contact Nathan if you are unsure)
  - Cost depends on sample load. OHA samples are priority

Contact Nathan if you are interested in additional sampling
Questions?

OHA
Gregg Baird
503-936-1657 (cell)
Gregg.c.baird@dhsoha.state.or.us

DEQ Lab
DEQ Lab
Nathan Reetz
503-706-9572 (cell) | 503-693-5756 (office)
Nathan.REETZ@deq.oregon.gov

Mike Mulvey (backup)
971-806-4281 (cell) | 503-693-5732 (office)
Mike.mulvey@deq.state.or.us