#### Harmful Algal Blooms (HABs) in Oregon



Agency roles, Response capacity, and Public health



April 2<sup>nd</sup>, 2019 Presentation to the Joint Ways & Means Subcommittee on Natural Resources



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## Harmful Algal Blooms Impacts

- Toxic to humans, pets, livestock and fish
- Negative effects on drinking water, recreational opportunities, agricultural products, and aquatic habitat
- Health, economic and environmental implications



PO

A blue-green aloae bloom in a Lake County. Ore , pond killed 32 gattle. Though not all blooms are tox



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## What are Harmful Algal Blooms (HABs)?



- Cyanobacteria simple?
- First life forms: 3.5 billion years old
- First photosynthesizers
- Adjustable buoyancy
- Explosive bloom potential
- May produce toxins







## DEQ's Roles in Harmful Algae Bloom Management

- Data collection and monitoring of blooms
- Laboratory analysis to support OHA advisories
- Assessment of the possible factors contributing to HABs and developing management solutions
- OHA is responsible for issuing advisories related to HABs





## DEQ role: Identify potential causes

Causes are *waterbody specific* and may involve one or more factors:

- High rates of nutrient input
- Warm water temperatures
- Slow moving or stagnant water
- Invasive species





# Potential mitigation strategies



- Strategies are waterbody specific and may include:
  - Reducing nutrient inputs from:
    - Point sources of wastewater
    - Leaky septic systems
    - Agricultural runoff
    - Urban stormwater
    - Fertilizers
  - Restoring vegetation next to waterbodies to provide shading
  - Promoting water movement and/or mixing
  - Preventing and/or controlling invasive species

https://www.oregon.gov/deq/wq/Pages/Harmful-Algal-Blooms.aspx



#### Harmful Algae Bloom Recreational Advisories Quality **Contact Recreation Advisories** 25 Oregon Waters with CyanoHAB Advisories Coffenbury Lake Total Advisories per Year (OHA ~2004-2018) ~60 waterbodies **Cullaby Lake** Fairview Lake Laurelhurst Pond Blue Lake Willamette River at Portland Ross Island Lagoon Lake Oswego Wapato Lake Bed **Clackamas** Cove Willow Creek Reservoir North Fork Reservoir **Timothy Lake Devils Lake Detroit Reservoir Brownlee** Reservoir Newport/Big Creek Reservoir Lake Billy Chinook Havstack Reservoir Suttle Golden Gardens Pond **Blue River Lake** Mercer Lake ern Ridge Cougar Reservoir Walterville Pond Fall Creek Lake Siltcoos Lake Lava Lake Octtonwood Reservoir Dexter Reservoir (Needs Verification) **Crane Prairie Reservoir** Cottage Grove Lake **Dorena Lake Paulina Lake** Elk Creek North Tenmile Hills Creek Lake Wickiup Reservoir **Umpgua River** Odell Lake **Tenmile Lake** Lemolo Number 2 Forebay 0 **Diamond Lake** Fish Lake 2016 2015 2014 2013 2013 2012 2011 2010 2009 2007 2018 2017 South Umpgua River at Lawson Bar O Sru Lake Lost Creek Lake Willow Lake Agency Lake Whetstone Pond Fish Lake 2008 OHA receives 5-year grant from CDC Jackson Creek Gerber Reservoir Drews Reservoir Hyatt Reservoir Lake Selmac for HABs occurrences resulting in Link and Klamath River to JC Boyle Dam more rec advisories posted

Health



# **Detroit Lake**

#### May 29, 2018

- Late May of 2018 a bloom formed in Detroit Lake
- A drinking water advisory for vulnerable populations in the Salem area was issued on May 29<sup>th</sup> (after cyanotoxins were detected in treated water)

#### City of Salem issues drinking water advisory



Late this afternoon, the city of Salem issued the following press release regarding a "Do Not Drink" notice for tap water in the cities of Salem, Turner, Suburban East Salem Water District, and Orchard Heights Water Association. The city is recommending that vulnerable people including infants, children under six, people with compromised

immune systems, people receiving dialysis treatment, people with pre-existing liver conditions, pets, pregnant women or nursing mothers, or other sensitive populations should follow this advisory.

Everyone may use tap water for showering, bathing, washing hands, washing dishes, flushing toilets, cleaning and doing laundry.

Please see the full press release below for more information or visit cityofsalem.net.



#### DRINKING WATER ADVISORY

City of Salem: MAY 29, 2018,

CYANOTOXINS PRESENT IN DRINKING WATER DO NOT DRINK THE TAP WATER --INFANTS, YOUNG CHILDREN AND OTHER VULNERABLE INDIVIDUALS

Applies to City of Salem, City of Turner, Suburban East Salem Water District, and Orchard Heights Water Association

WHY IS THERE AN ADVISORY? Low levels of cylindrospermopsin and microcystin (cyanotoxins) have been found in treated drinking water. These toxins are created by algal blooms in the source of City of Salem drinking water, Detroit Reservoir.

To ensure the greatest quality of drinking water, City of Salem voluntarily samples for such toxins during algal events. Samples were collected on May 23, 2018, and May 25, 2018.



## 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 pretreatment within weeks.
- OHA cyanotoxin emergency rules adopted within 3 weeks.



## HABs and Protecting Public Health

#### OHA's role:

- <u>Recreational Use Advisories</u>. Evaluate available HABs information and data for a water body and determine whether a recreational advisory is warranted based on current advisory guidance and protocol.
- <u>Regulate Public Water Supplies</u>. Require public drinking water systems with sources susceptible to HABs to monitor for cyanotoxins at their intakes and take appropriate action in the event of detections.



## **Drinking Water Regulations**

- OHA adopted emergency regulations in July 2018 requiring about 100 water systems to: sample biweekly for cyanotoxins, report data and issue public notices if health advisory levels are exceeded.
- 8 water systems had raw water detections. None in treated drinking water. No new advisories issued.
- Permanent regulations adopted in December 2018. Require about 58 water systems to sample biweekly May-Oct using an ORELAP certified lab or DEQ lab.

PUBLIC HEALTH DIVISION Drinking Water Services



## **Recreational Use Advisories**

- Sampling of water bodies is voluntary and based on cooperation of several local, state and federal agencies
- Not all water bodies are monitored.
- OHA Environmental Health staff review available data against health-based Recreational Use Values to determine if an Advisory is warranted.
- Use Advisories are non-regulatory, public information.





### Advisory Levels Recreational Use Guidance Values:

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

RUVs*	Microcystin	Anatoxin-a	Saxitoxin	Cylindrospermopsin	
	4	8	4	8	

#### Drinking water:

#### EPA and Oregon have established Health Advisory Levels for:

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





#### Oregon Drinking Water Facilities Under the OHA Emergency Cyanotoxin Monitoring Rule



## Monitoring public water systems

Quality





#### 2018 DEQ Laboratory Activity for Water Quality Monitoring Programs

Number of Samples (n=1,269)





## Analytical Testing for Cyanotoxins



ELISA: Enzyme Linked Immunosorbent Assay





LC MS/MS: Liquid Chromatography with double mass spec



## Emergency funding September 26<sup>th</sup> 2018

- E-board appropriated \$380,000 from the emergency fund for:
  - Reimbursement for costs incurred during
     2018 HAB season
  - Limited duration funding for cyanotoxin testing from public drinking water facilities through June 2019



# Challenges for the DEQ Lab

- Short lead time to set up program.
- New instrument, method development 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











# Additional Monitoring Opportunities

Sentinel 3a satellite - Ocean and Land Color Instrument (OLCI)





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Quality

#### Lake Billy Chinook: Recreational advisory

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]	Max. length	28 mi (45 km)	
	Surface area	4,000 acres (1,600 ha)	
	Average depth	102 ft (31 m)	
	Max. depth	415 ft (126 m)	
	Shore length <sup>1</sup>	72 mi (116 km)	
	Surface elevation	1,945 ft (593 m)	





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Transparency

# Google

#### News

#### Lake Billy Chinook algae health advisory expanded

Alert now covers all three arms of the lake

By: KTVZ.COM news sources Posted: July 11, 2018 05:11 PM PDT Updated: July 11, 2018 05:11 PM PDT





Green scum of blue-green algae evident in early summer in areas of Lake Billy Chinook (File photos: Oregon Health Authority)

SALEM, Ore. - The Oregon Health Authority said Wednesday it has updated a recreational use health advisory issued June 22 for part of Lake Billy Chinook to cover all three arms of the lake, based on the latest test results.

Google Earth

Google Earth



# What more could be done to better protect Oregonians from CyanoHABs?

- Increase capacity to proactively detect blooms across the state
- Coordinate monitoring activities and provide analytical support for volunteer organizations and other partners
- Refine sampling methodology and requirements for optimal efficiency and accuracy
- Increase assessment of waterbodies with repeated CyanoHABs to determine causes and possible solutions

## Questions?



CyanoHAB in Lake Billy Chinook, August 2016 Source: www.ktvz.com



CyanoHAB in Ross Island Lagoon, July 2015 Source: www.kptv.com

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 <u>deginfo@deq.state.or.us</u>.

