



OREGON  
**HEALTH**  
AUTHORITY

March 23, 2026

# **State experiences in developing/applying cyanotoxin thresholds to protect animal health**

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Public Health Division

# Agenda

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- Oregon Recreational CyanoHAB Program overview
- Dog safety cyanotoxin guideline development
- Implementation of dog safety guidelines

# House Bill 3409 (2023)

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**The Department of Environmental Quality (DEQ), in coordination with the Oregon Health Authority (OHA), shall:**

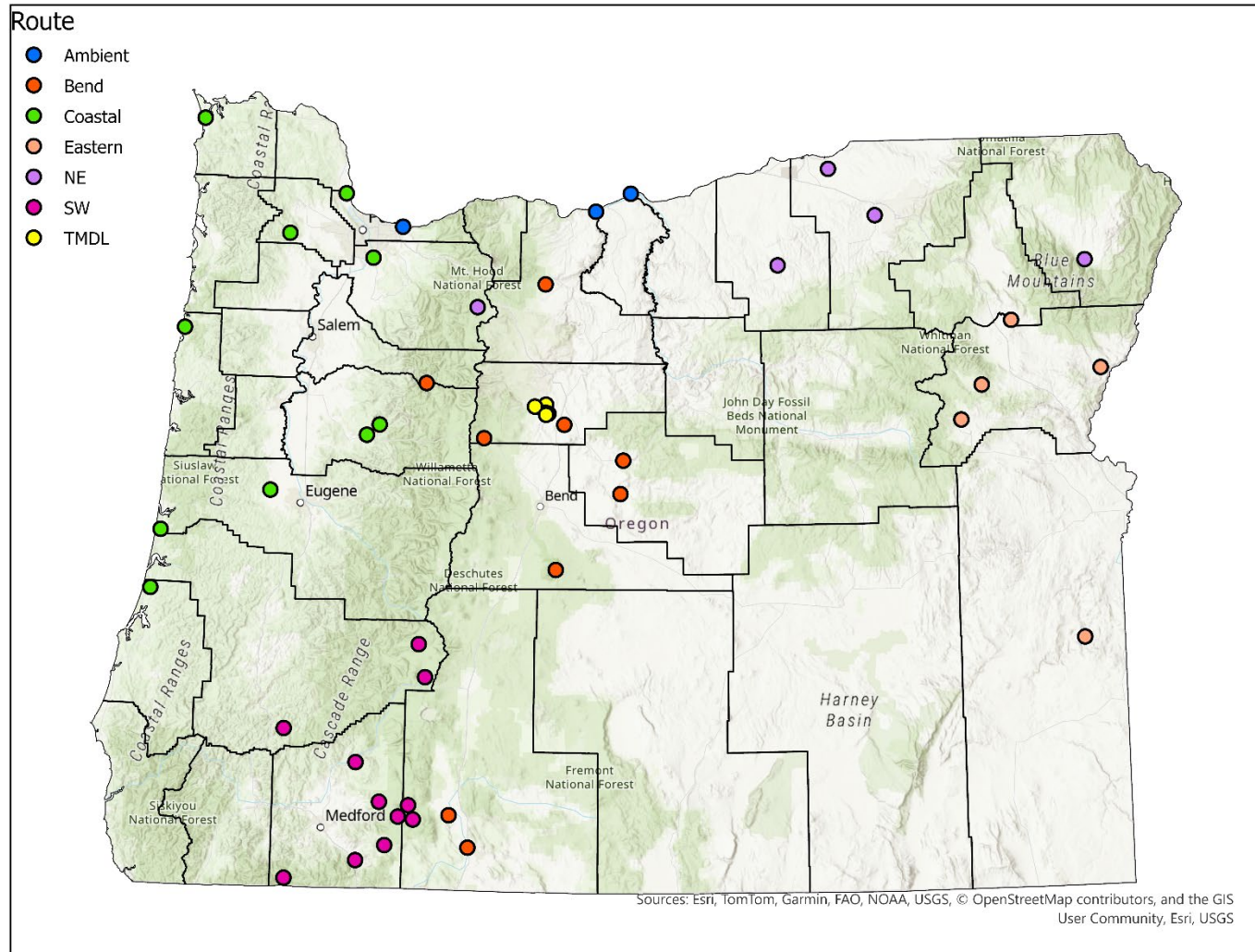
- Develop and maintain a coordinated state agency for harmful algal bloom monitoring and response strategy.
- Produce timely and high-quality data that allow the authority to determine the level of risk of harm or injury to public health by the occurrence of harmful algal blooms.
- Prioritize monitoring of water bodies that are susceptible to harmful algal blooms and that are bodies of water accessed by the public for recreational use.

# House Bill 3409 continued

- Develop a protocol for issuing hazard advisory alerts to the public in the occurrence of a harmful algal bloom.
- Develop and implement strategies for reducing pollutants that contribute to the occurrences of harmful algal blooms and the frequency and severity of harmful algal blooms.



# 2025 Recreational Monitoring Network



- 45 Sites
- 5 Routes + 2 programs
- 4 Cycles

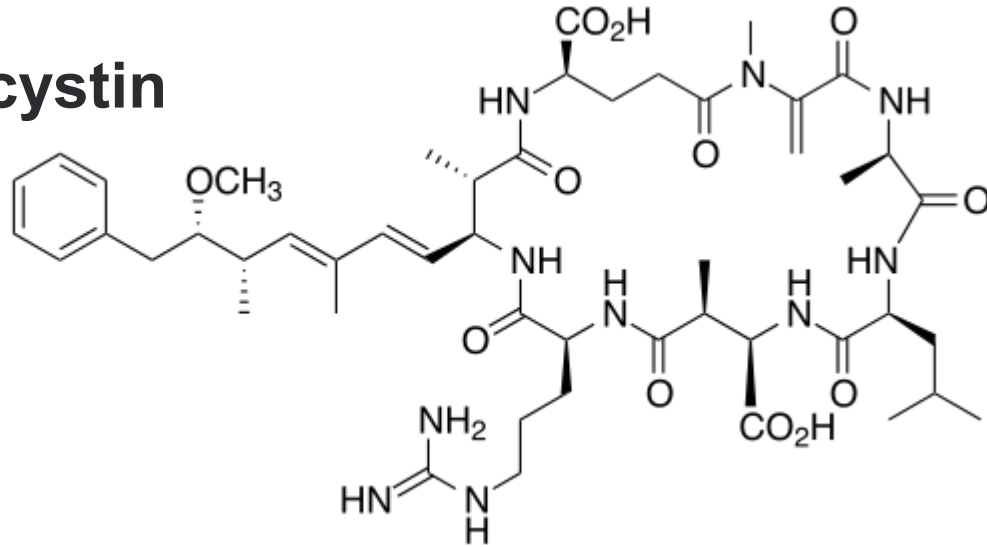
# Sampling and Testing

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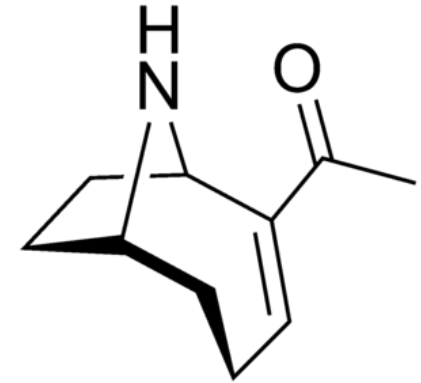
- Always aiming for “worst case scenario” sample
- Sampling in area of highest recreation (docks, swimming beaches, etc.)
- Test for all four toxins at once
- ELISA (enzyme-linked immunosorbent assay) test – color producing reaction where color corresponds to amount of cyanotoxin present

# Toxins we test for in Oregon

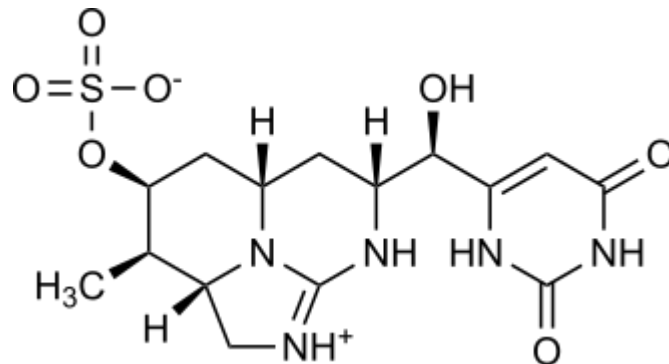
**Microcystin**



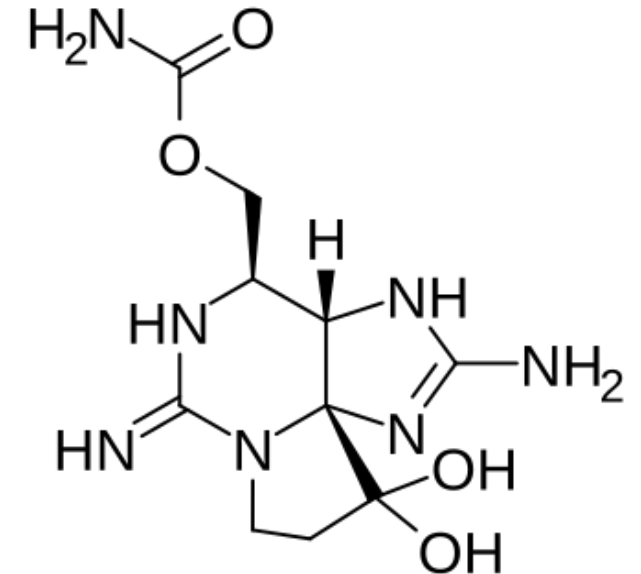
**Anatoxin-a**



**Cylindrospermopsin**



**Saxitoxin**



# Recreational use values (RUVs) and dog safety values (µg/L)

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	<b>Microcystin</b>	<b>Cylindro-spermopsin</b>	<b>Anatoxin-a</b>	<b>Saxitoxin</b>
<b>RUVs</b>	<b>8</b>	<b>15</b>	<b>15</b>	<b>8</b>
<b>Dog Safety</b>	<b>0.2</b>	<b>0.4</b>	<b>0.4</b>	<b>0.02</b>

# Elements of a Toxicity Threshold Value

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- Health guideline value (HGV) (e.g., Reference dose, Tolerable daily intake, Minimal risk level, etc.) ( $\mu\text{g}/\text{kg}/\text{day}$ )
- Exposure factors

$$\text{Dog – specific guidance value } (\mu\text{g}/\text{L}) = \frac{\text{Health Guideline Value } (\mu\text{g}/\text{kg}/\text{day})}{\text{Exposure factor for dogs } (0.255 \text{ L}/\text{kg}/\text{day}^*)}$$

\*From CalEPA 2012 guidance

# Dog-specific Guideline Values

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- Used same health guideline values as for people\*
- Used California EPA's 2012 water intake rate for dogs (0.255 L/kg/day) as the exposure factor

	<b>Microcystin</b>	<b>Cylindro-spermopsin</b>	<b>Anatoxin-a</b>	<b>Saxitoxin</b>
<b>Dog Safety</b>	<b>0.2</b>	<b>0.4</b>	<b>0.4</b>	<b>0.02</b>

\*Except for saxitoxins; added additional UF of 10 for extrapolating from people to dogs.

# Anatoxin-A Oregon Health Guideline Value

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- Critical toxicological study: Fawell 1994 and 1999
- 10 male and 10 female mice per exposure group (0, 100, 500, 2,500  $\mu\text{g}/\text{kg}/\text{day}$ )
- Dosed orally by gavage daily for 28 days

$$\text{Health Guideline Value} = \frac{\text{NOAEL}}{\text{Uncertainty Factors}} = \frac{100 \mu\text{g}/\text{kg}/\text{day}}{1,000} = 0.1 \mu\text{g}/\text{kg}/\text{day}$$


Uncertainty factor breakdown: 10 for animal to human extrapolation, 10 for human variability, 10 for database limitations

# Saxitoxins Oregon Health Guideline Value

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- Critical Study: European Food Safety Authority 2009 reference dose (0.5 µg/kg/day)
- Based on case reports of toxicity in people from eating contaminated shellfish

$$\text{Health Guideline Value} = \frac{\text{NOAEL}}{\text{Uncertainty Factors}} = \frac{0.5 \mu\text{g/kg/day}}{10} = 0.05 \mu\text{g/kg/day}$$

Uncertainty factor breakdown: 10 for database limitations\*

\*Original value did not include this UF, but followed Ohio's lead in adding in 2014

# Dog-specific Guideline Values

---

- Used same health guideline values as for people\*
- Used California EPA's 2012 water intake rate for dogs (0.255 L/kg/day) as the exposure factor

	<b>Microcystin</b>	<b>Cylindro-spermopsin</b>	<b>Anatoxin-a</b>	<b>Saxitoxin</b>
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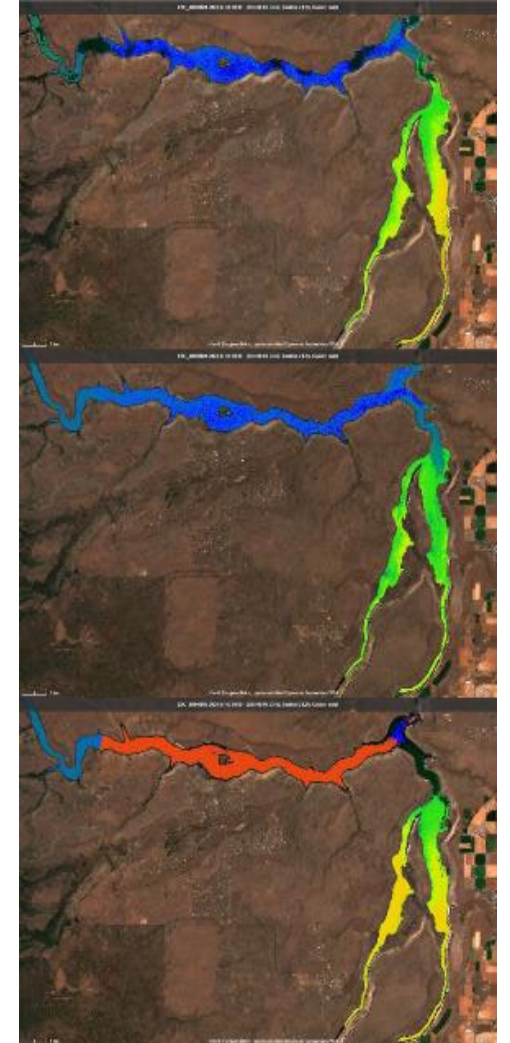
# Implementation of RUVs and dog safety values

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- Issue advisories for water bodies that exceed OHA-established **Recreational Use Values (RUVs)**
- Track cyanotoxin results
- Educate and inform the public regarding health risks
- Conduct health investigations
- Build capacity of our partners to monitor water bodies
- Work with DEQ to determine if a water body is susceptible to cyanoHABs

# Response to cyanoHABs: notification and verification

- Toxin results
- Reports from water body managers or DEQ samplers
- Bloom and illness reports from the public
- Photos
- Satellite imagery

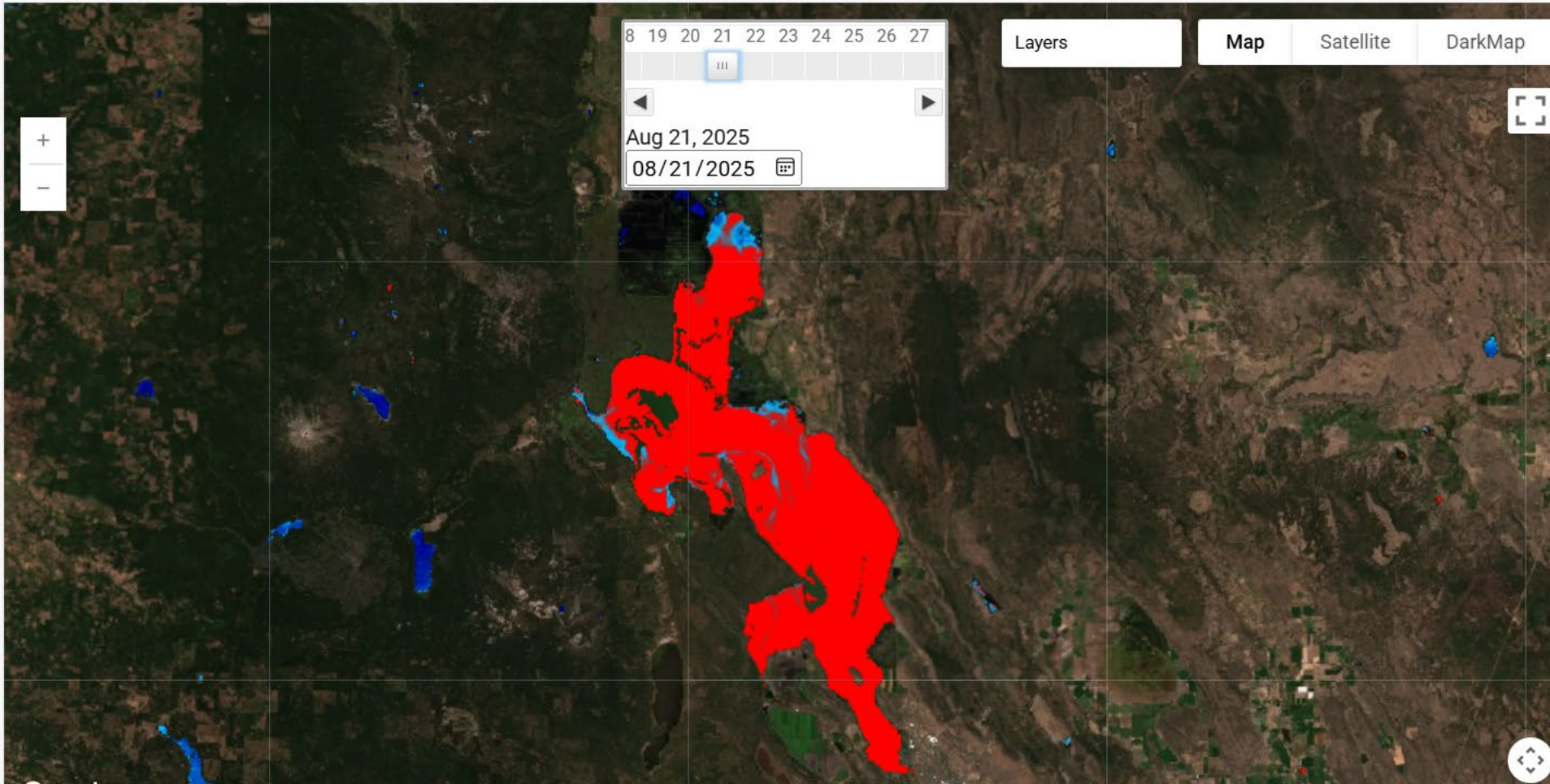


# Satellite imagery



Upper Klamath Lake, Oregon, USA

Google Earth Engine Apps



## REmote Aquatic Chlorophyll-a Tracker (REACT)

**Due to a lapse in government funding, this website will not be updated except to provide important public safety information. For more information please visit:**

[www.doi.gov/shutdown](http://www.doi.gov/shutdown)

This tool is designed to display the probability that aquatic chlorophyll-a > (exceeds) 10 micrograms per liter ( $\mu\text{g/L}$ ). Probabilities are computed from aquatic reflectance from 10-meter Sentinel-2 satellite imagery.

Use the date slider to select a date to examine on the map. Note that Sentinel-2 imagery is acquired approximately once every 5 days.

Use the drawing tools below to generate a chart of Chlorophyll-a > 10  $\mu\text{g/L}$  exceedance probability, Normalized Difference Chlorophyll Index (NDCI), or Normalized Difference Turbidity Index (NDTI), for an area of interest.

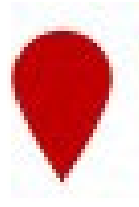
Map layers:

# Recreational use values (RUVs) and dog safety values ( $\mu\text{g/L}$ )

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	<b>Microcystin</b>	<b>Cylindro-spermopsin</b>	<b>Anatoxin-a</b>	<b>Saxitoxin</b>
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# Advisory process



**“Advisory”** (posted to OHA website and publicized with news release)

Site is known to have public recreational or occupational contact with water, partners are available and willing to post advisory signage on site, plus one of the following criteria are met:

- 1. Visible scum:** Visible scum is indicated with supporting photographs or satellite imagery **and** sampling can be done within 1 business day; this advisory will be confirmed or lifted based on cyanotoxin analysis.
- 2. Toxin-based Monitoring:** Analysis showing cyanotoxin levels above OHA RUVs.

# What does an advisory mean?

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- NOT a closure
- Minimize contact with the water
- Recommend not swimming or engaging in activities that cause water to spray in face
- Kayaking/canoeing, picnicking, birdwatching, hiking okay
- Fishing and eating fish typically okay if you remove fat, skin, and organs and wash the fish with fresh source of water
- Keep pets away from the water

# Advisory process continued

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**“Precaution”** (posted to OHA website, no news release)

All the following criteria are met:






1. Photos submitted by public are deemed by OHA/DEQ to represent a possible cyanoHAB **or** satellite data indicate a possible cyanoHAB.
2. Site is known to have public recreational or occupational contact with water.
3. Immediate (< 1 business day) water quality testing is unavailable due to resources limitations, remoteness, etc.

# Advisory table

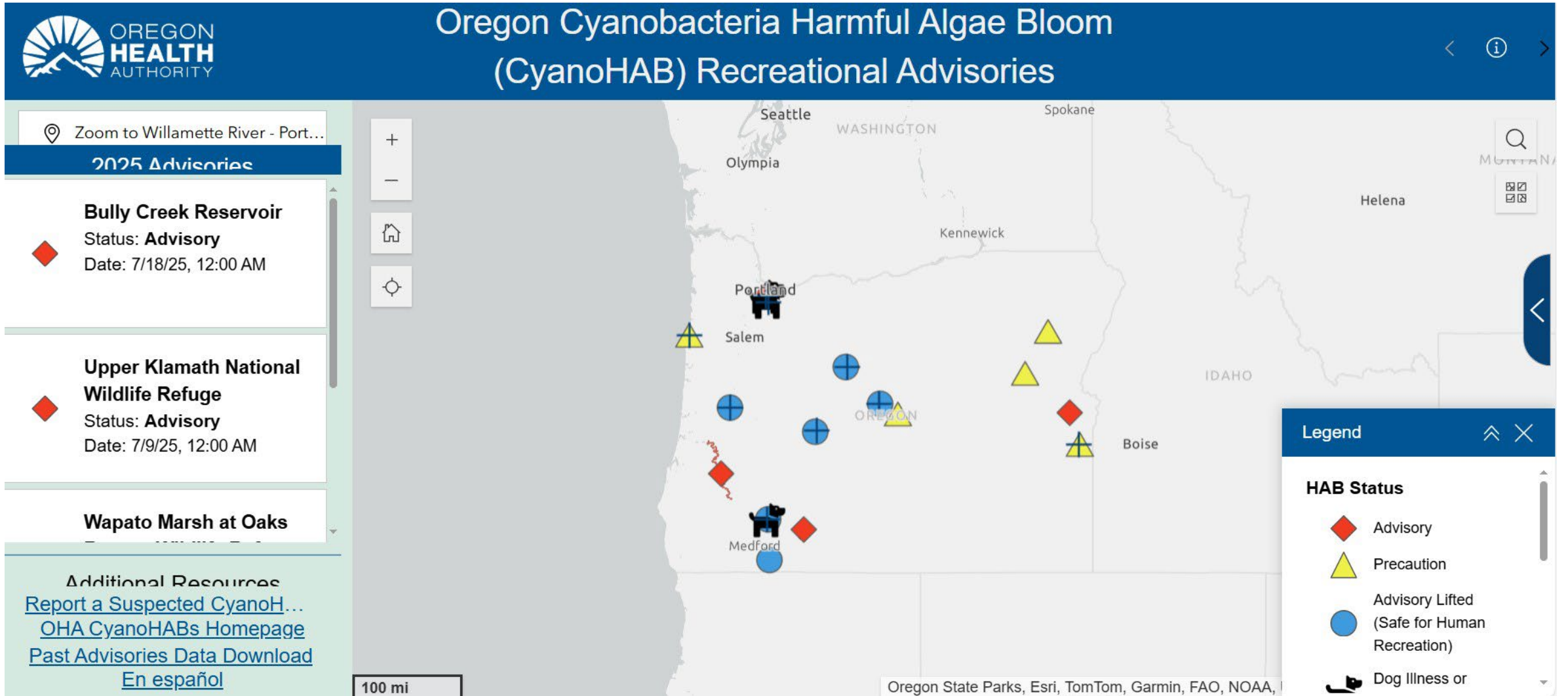
## Advisory Levels

 = Advisory in effect    = Precaution in effect    = Advisory/precaution has been lifted

- **Advisory:** Cyanotoxins have been confirmed through testing and are at unsafe levels, or a bloom has been sighted and water will be sampled within 1 business day.
- **Precaution:** A bloom has been sighted and water sampling is unavailable within 1 business day due to limited resources.
- **Advisory/Precaution Lifted:** An 'Advisory' is lifted when water testing shows safe levels. If a site has previously tested at unsafe levels, regular testing continues until the bloom is visibly gone and cyanotoxins are at safe levels. A 'Precaution' is lifted when testing shows cyanotoxin levels are safe, or when the bloom is visibly gone.

Waterbody	Status	Date/Link	County	Toxin	Data
Bully Creek Reservoir	 Advisory	<a href="#">7/18/2025</a>	Malheur	Microcystin	> 10 ug/L
Thief Valley Reservoir	 Precaution	7/18/2025	Baker & Union		
Upper Klamath National Wildlife Refuge	 Advisory	<a href="#">7/9/2025</a>	Klamath	Microcystin	2,304.5 ug/L
Antelope Flat Reservoir	 Precaution	7/9/2025	Crook		
Unity Reservoir	 Precaution	7/1/2025	Baker		

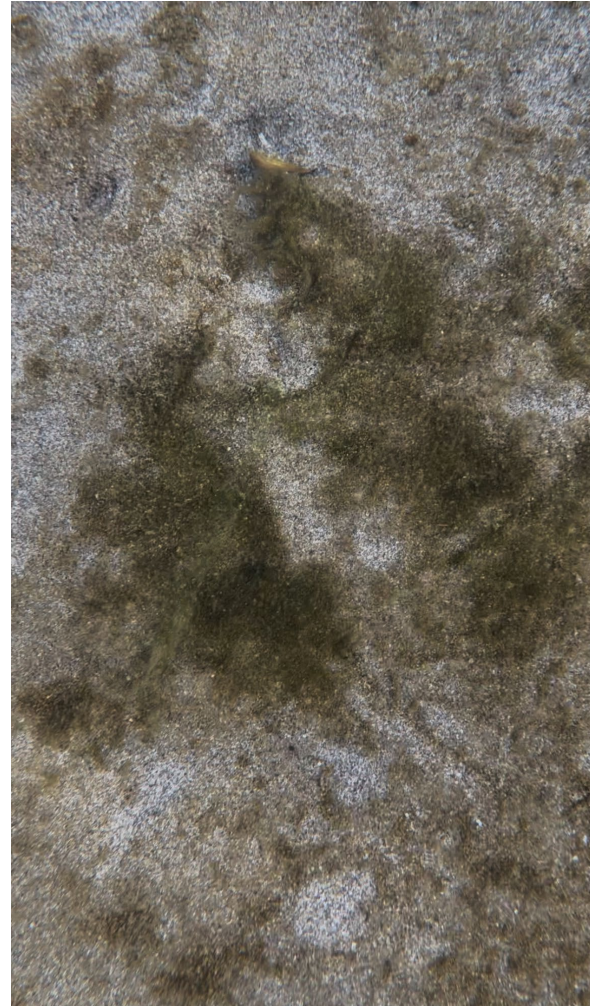
# Advisory map



# Emergent issue – Benthic cyanoHABs

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- Investigate reports of dog illness or death
- Coordinate with WA colleagues
- Created benthic-specific signs



# Communications – dog illness or death

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## “CyanoHAB-related dog illness or death”

- Dog icon posted to OHA website at location of exposure and remains on the website for the remainder of the monitoring season
- “Dog illness/death” physical sign posted with date of dog death at public access points or sign boards at water body of exposure

Site is known to have public recreational or occupational contact with water, plus one of the following criteria are met:

1. OHA receives a report that a dog has died or has become sick from a potential benthic or planktonic cyanoHAB **AND** OHA has followed-up with treating veterinarian for diagnosis or toxin present to confirm likely exposure **OR** illness or death with toxin present above RUVs.

# Communication

**ADVISORY**






## Cyanobacteria and Toxins Present

**AVOID WATER AND AREAS WHERE:**  
 You see a visible scum that is foamy, scummy, thick like paint, pea-green, blue-green or brownish red


**HOW AM I EXPOSED?**  
 By swallowing affected water in and around a bloom.  
 Toxins are not absorbed through the skin.

**CHILDREN and ANIMALS are at greatest risk**

**DO NOT USE water for drinking or cooking**  
 Toxins are not removed by boiling or using camping filters or treatment.  
 Local water systems should not be affected.

For advisory information go to: <https://www.healthoregon.org/hab>  
 For questions about blooms, exposures or illnesses (people/pets), call the Oregon Health Authority at 971-673-0440



## Cyanobacteria Harmful Algae Blooms Can Make People and Animals Sick



Cyanobacteria are natural bacteria that live in water. They are not really algae! Blooms can be bright green or blue-green and often look like scum or paint on the water.





Some cyanobacteria produce toxins that can make people and pets sick.

**People are exposed to toxins by swallowing affected water. If there is a bloom:**



Don't swim, wade or play in the water



Never drink or cook with affected water



Don't let pets play in the water, eat the scum or lick the scum from their fur

**Most at risk:**



Infants, if the water is used for their formula



Children age 6 and younger



Dogs



People age 60 and older and those with health conditions

**Be aware and take action**

Look out for diarrhea, vomiting or flu-like illness. Seek medical care if symptoms continue. Seek veterinary care right away if your dog gets sick.

**When in doubt, stay out!**



Learn more about cyanoHABs at [www.healthoregon.org/hab](http://www.healthoregon.org/hab).



Questions? Call 1-877-290-6767 or email [hab.health@odhsoha.oregon.gov](mailto:hab.health@odhsoha.oregon.gov).



You can get this document in other languages, large print, braille or a format you prefer. Contact the Cyanobacteria Harmful Algae Bloom program at 1-877-290-6767 or email [hab.health@odhsoha.oregon.gov](mailto:hab.health@odhsoha.oregon.gov). We accept all relay calls or you can dial 711.

OHA 4192 (03/2022) TMP(03/2025)



## Dog Safety Alert



Cyanobacteria are natural bacteria found in fresh water everywhere. Sometimes they multiply into blooms and produce toxins harmful to pets. You can't tell by looking if a bloom has toxins. Dogs have died after drinking water with low toxin levels.



Do not let your pet swim in or drink water that is foamy, scummy or looks like spilled paint. Don't let them lick scum off rocks or their fur.

**If your dog is exposed to a bloom:**

Wash your dog with clean water as soon as possible. Get veterinary help right away if your dog shows symptoms like drooling, weakness, vomiting or staggering.



Urine samples from affected pets can help scientists better understand blooms and their impact on animal health. Contact our program to learn more about collecting a sample.

Learn more at [www.healthoregon.org/hab](http://www.healthoregon.org/hab). Questions? Call 1-877-290-6767 or email [hab.health@odhsoha.oregon.gov](mailto:hab.health@odhsoha.oregon.gov).





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# Communication Continued

## CHECK FOR ALGAE

### Toxic algal mats may be present in this water

Mats can be attached to the bottom, detached and floating, or washed up on shore



Image of algal mat in 5 inches of water.



### If you see algal mats:



Do NOT let children or adults touch, eat or swallow any algal mats.



Do NOT let dogs eat algal mats or drink from the water.



Call your doctor or veterinarian if you or your pet get sick after contacting or ingesting algae. For more information on toxic algae visit:

[healthoregon.org/hab](http://healthoregon.org/hab)

For more information, contact [hab.health@odhsoha.oregon.gov](mailto:hab.health@odhsoha.oregon.gov) 1-877-290-6767

Public Health Division

Cyanobacteria Harmful Algae Bloom Program



### Dog death reported due to possible cyanobacteria exposure at Sellwood Riverfront Park



Date of Exposure – June 9, 2025

Location of Exposure – Sellwood Riverfront Park – water, near dock

For more information or to report a boom or illness, visit or contact:

<http://healthoregon.org/hab>; [hab.health@odhsoha.oregon.gov](mailto:hab.health@odhsoha.oregon.gov); 1-877-290-6767

# Communication continued

An official website of the State of Oregon [How you know »](#) Language

**OREGON HEALTH AUTHORITY**

About OHA ▾ Programs and Services ▾ Oregon Health Plan ▾ Health System Reform ▾ Licenses and Certificates ▾

Public Health ▾ Jobs ▾

**Cyanobacteria Blooms**

Cyanobacteria Season

Current Advisories

Advisory Archive

Frequently Asked Questions

Advisory, Sampling, and LPHA Guidance

**Education and Outreach**

Partners

Private Drinking Water Intakes and In-Home Treatment Systems


The Water Sampling Process

Contact Us

Get information about cyanobacteria harmful algae blooms (CyanoHABs), exposure pathways, health effects, and the science behind the blooms.

**Risk Communications Toolkit**

- Cyanobacteria blooms communication plan [English \(pdf\)](#) | [Spanish \(pdf\)](#)
- Cyanobacteria Harmful Algae Blooms [English \(pdf\)](#) | [Spanish \(pdf\)](#)
- Be Aware of Cyanobacteria Harmful Algae Blooms (CHABs) in Oregon Waters [English \(pdf\)](#) | [Spanish \(pdf\)](#)
- Five Things to Know about Cyanobacteria Harmful Algae Blooms [English \(pdf\)](#) | [Spanish \(pdf\)](#)
- Cyanobacteria Harmful Algae Blooms Can Make People and Animals Sick [English \(pdf\)](#) | [Spanish \(pdf\)](#)
- Safe Fishing and Recreation in Oregon Waters - What to Know About CHABs [English \(pdf\)](#) | [Spanish \(pdf\)](#)
- Lake Safety Comic - Looks like you're headed down to play at the lake. Do you know about CHABs? [English \(pdf\)](#) | [Spanish \(pdf\)](#)
- When Renting Lake Property - Know Your Risks From CHABs [English \(pdf\)](#) | [Spanish \(pdf\)](#)
- Precaution signage template [English \(Word\)](#)
- Dog Safety alert [English \(pdf\)](#) | [Spanish \(pdf\)](#)
- Benthic cyanoHABs [Combination English and Spanish \(pdf\)](#)
- Protect your livestock [English \(pdf\)](#) | [Spanish \(pdf\)](#)



## Check For Algae Revise Si Hay Algas

Toxic algal mats may be present in this water  
Es posible que haya capas de algas tóxicas en esta agua

Mats can be attached to the bottom, detached and floating, or washed up on shore • Las capas de algas pueden estar pegadas al fondo, sueltas y flotando, o haberse acumulado en la orilla

**If you see algal mats • Si ve capas de algas:**



**Do NOT let children or adults touch, eat, or swallow any algal mats.**  
**NO permita que niños ni adultos toquen, coman o ingieran ninguna capa de algas.**



**Do NOT let dogs eat algal mats or drink from the water.**  
**NO permita que los perros coman capas de algas ni beban del agua.**





Provided by Benton-Franklin Health District and Ian Waite, showing samples of Benthic CyanoHAB algae. • Fotografías proporcionadas por el Distrito de Salud Benton-Franklin y Ian Waite, en las fotos se pueden ver muestras de algas bentónicas CyanoHAB

Call your doctor or veterinarian immediately if you or your pet get sick after contacting or ingesting algae. For more information on toxic algae, email: [hab.health@odhsoha.oregon.gov](mailto:hab.health@odhsoha.oregon.gov) or call 877-290-6767.

Llame a su médico o veterinario inmediatamente si usted o su mascota se enferman después de estar en contacto con las algas o ingerirlas. Para obtener más información sobre las algas tóxicas, correo electrónico: [hab.health@odhsoha.oregon.gov](mailto:hab.health@odhsoha.oregon.gov) o llame al 877-290-6767.

For local information, contact • Para obtener información local, comuníquese con:

Date posted • Fecha de publicación:

Scan code for more information.  
Escanee el código para obtener más información.



<http://healthoregon.org/hab>

# Educational resources



- About OHA ▾
- Programs and Services ▾
- Oregon Health Plan ▾
- Health System Reform ▾
- Licenses and Certificates ▾
- Public Health ▾
- Jobs ▾

## When in Doubt, Stay Out!

- Cyanobacteria Blooms
- Cyanobacteria Season
- Current Advisories
- Advisory Archive
- Frequently Asked Questions
- Advisory, Sampling, and LPHA Guidance
- Education and Outreach
- Partners
- Private Drinking Water Intakes and In-Home Treatment Systems

## Cyanobacteria Harmful Algae Blooms (CyanoHABs)

The Oregon Health Authority (OHA) reviews available information on cyanobacteria harmful algae blooms (called CyanoHABs) in the water. When the data show risk, OHA issues recreational health advisories to inform the public through the issuing and lifting of recreational use health advisories to warn people about areas that might not be safe for activities like swimming.



These advisories help people make safer choices about where to enjoy the water and avoid getting sick. OHA works with [partners](#) who provide water samples for testing. Learn more about how [water testing works](#).

- [View Current Advisories](#)
- [FAQs](#)
- [Report a HAB](#)
- [Report a HAB-Related Animal Illness](#)
- [Report a HAB-Related Human Illness](#)

[hab.health@odhsoha.oregon.gov](mailto:hab.health@odhsoha.oregon.gov)

<http://healthoregon.org/hab>

# Bloom and illness reporting

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## One Health Harmful Algal Bloom System (OHHABS)

- Investigate human and animal illness
- Report HAB-related illnesses to the Centers for Disease Control and Prevention (CDC) for national surveillance program
- Communicate with other states



# CDC Biospecimen Pilot – objectives

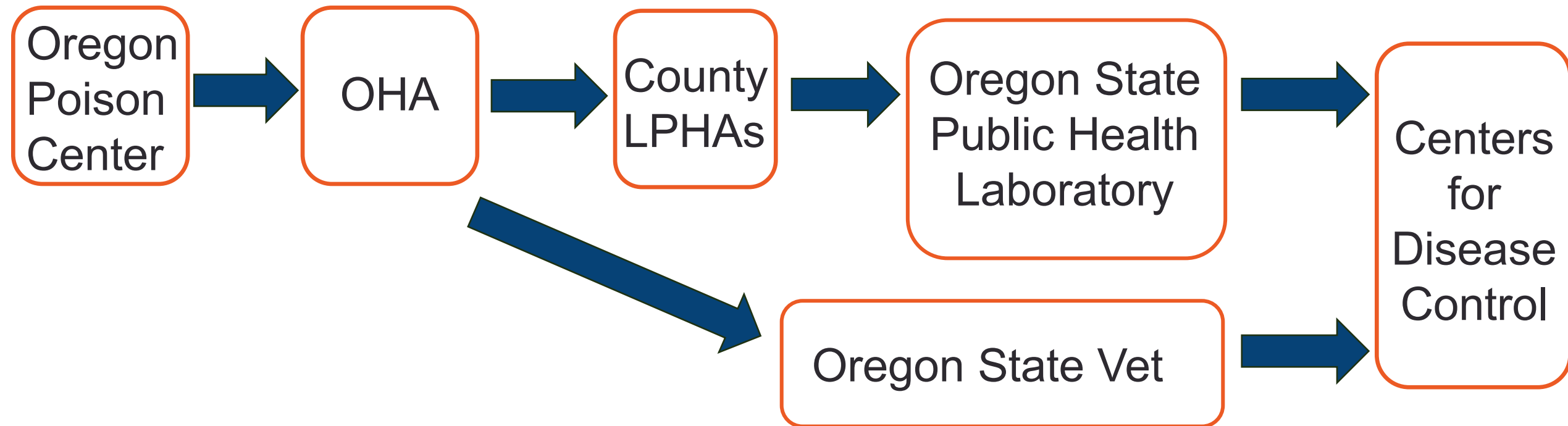
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## Pilot Program Objectives

- Test biospecimens for HAB toxins (microcystins, anatoxin-a, dihydroanatoxin-a) and related metabolites
- Accept urine and serum for humans and urine for dogs
- Enhance surveillance of HAB-associated illnesses in the United States by strengthening evidence of HAB toxin exposure as a cause of clinical illness.

# CDC Biospecimen Pilot – Oregon's process

Test for microcystin, anatoxin-a and their metabolites in **human plasma and urine** and **dog urine** after harmful algae bloom exposure



# Program Successes

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- Carrying out regular monitoring and response monitoring to select waterbodies
- Building partnerships with local public health authorities and waterbody managers
- Expanding capacity through coordination with local, state, and federal partners, including partners of shared waters in neighboring states

# Program Successes - Continued

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- Updated advisory map and information – our advisory page had nearly 89,000 views in 2025 alone, with thousands more visits on our other webpages throughout the year.
- Collecting samples for Centers for Disease Control Biospecimen Pilot Program

# Thank you

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You can get this document in other languages, large print, braille or a format you prefer free of charge. Contact the Cyanobacteria Harmful Algae Bloom program at [hab.health@odhsoha.oregon.gov](mailto:hab.health@odhsoha.oregon.gov) or 1-877-290-6767 (voice/text). We accept all relay calls.

Environmental Public Health  
Cyanobacteria Harmful Algae Bloom (CyanoHAB) Program  
800 NE Oregon St.  
Portland, OR 97232  
1-877-290-6767  
<http://healthoregon.org/hab>

