

Freshwater harmful
algal blooms:

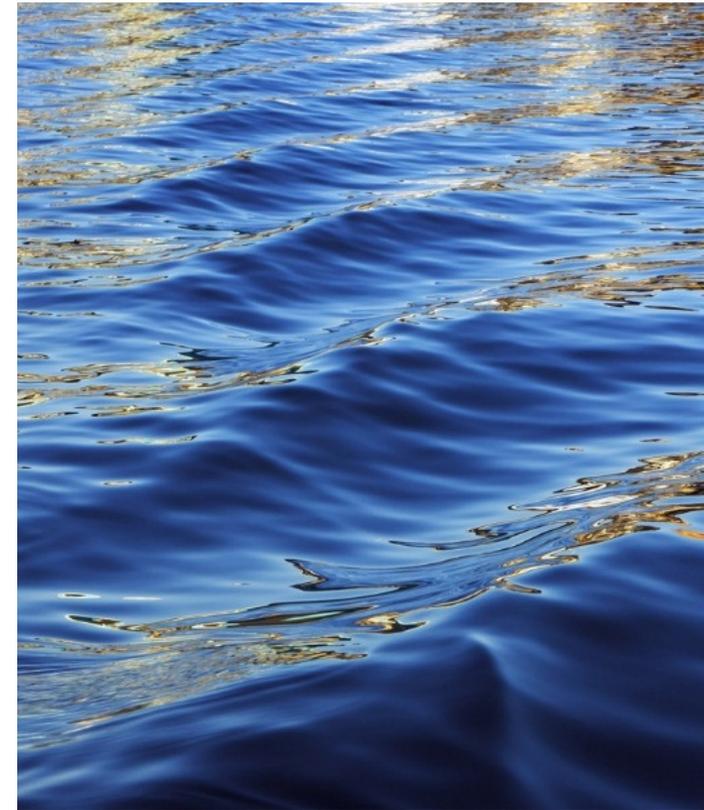
What are they?

Are they getting worse?

What can we do?

Science Seminar
November 1, 2018

Water and Land Resources Division



King County

What are Harmful Algal Blooms (HAB's)?

- Cyanobacteria
- Photosynthetic
- Ancient and diverse
- Can create (cyano)toxins

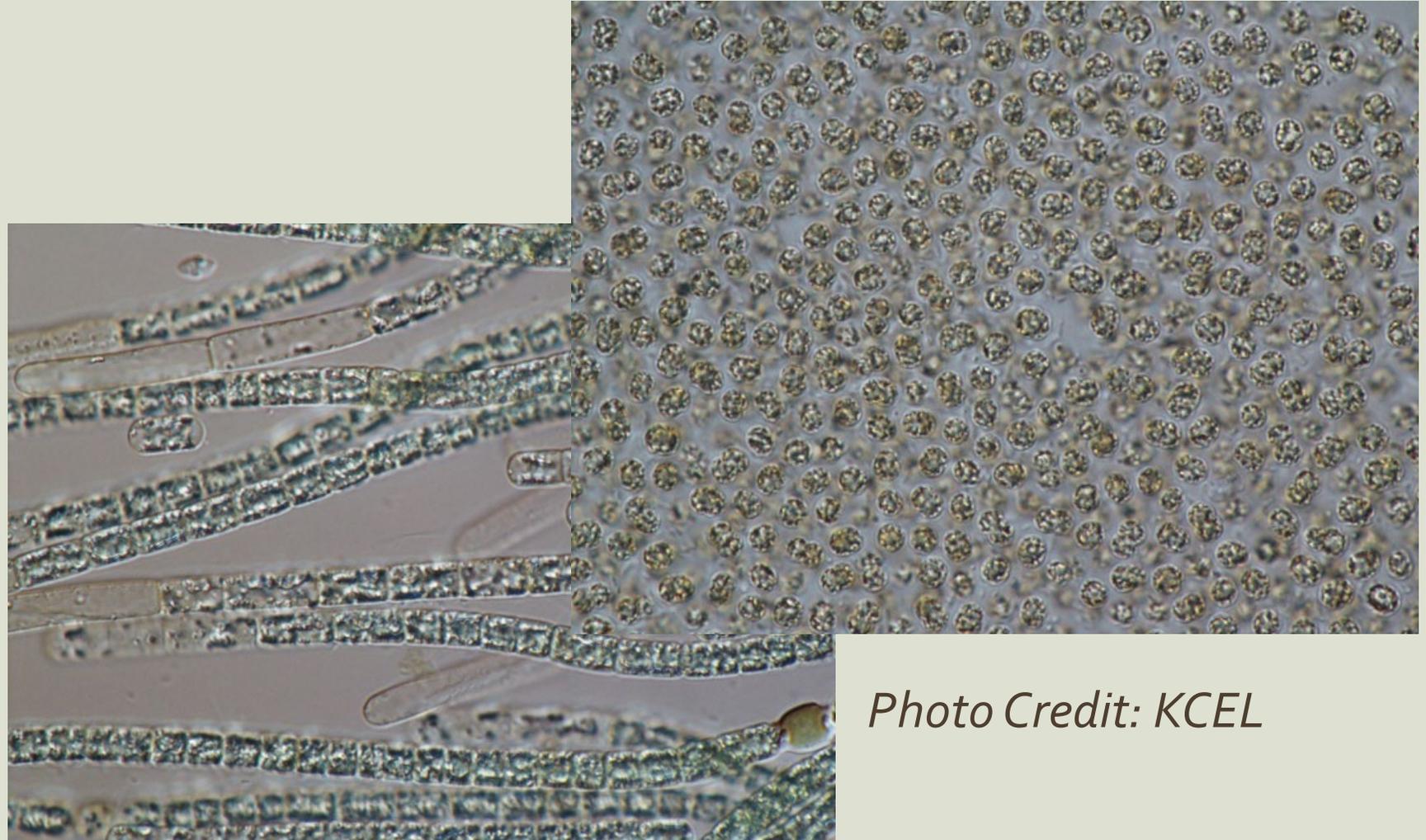
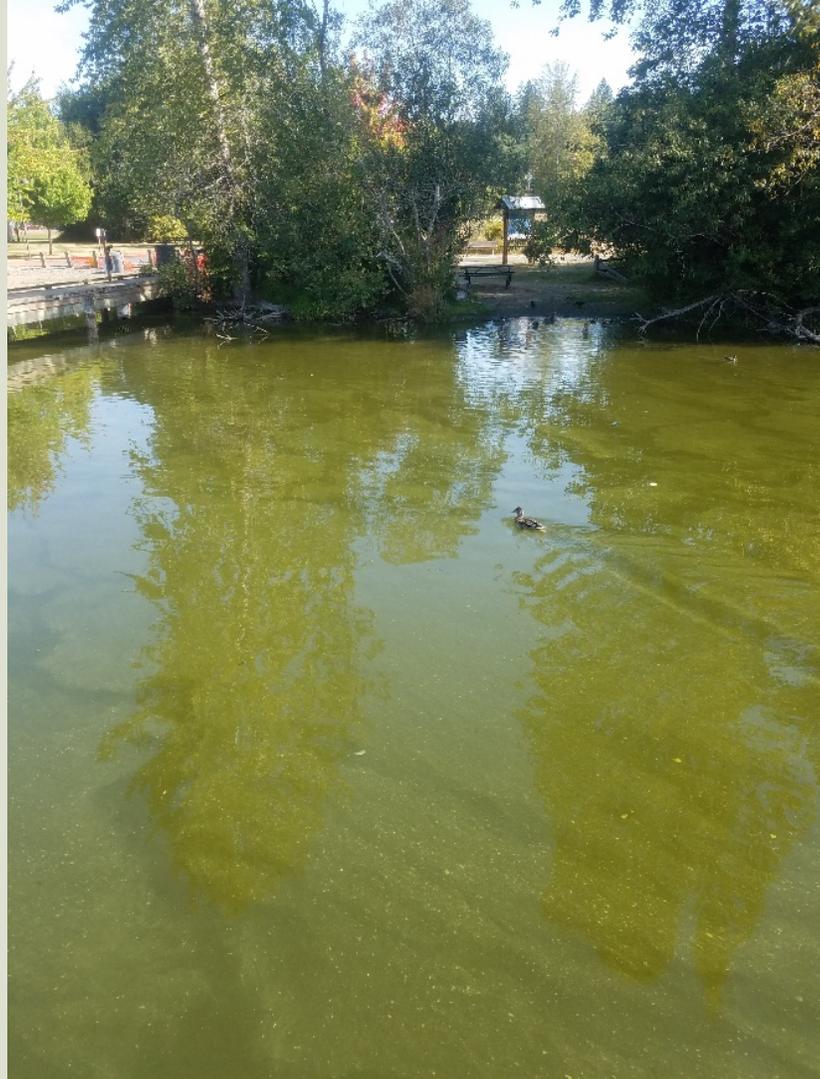


Photo Credit: KCEL

Cyanobacteria

- Aquatic
- Contain photosynthetic pigments
- Need N and P
- Buoyancy regulation
- Proliferate rapidly in warm water
- Benthic and planktonic species



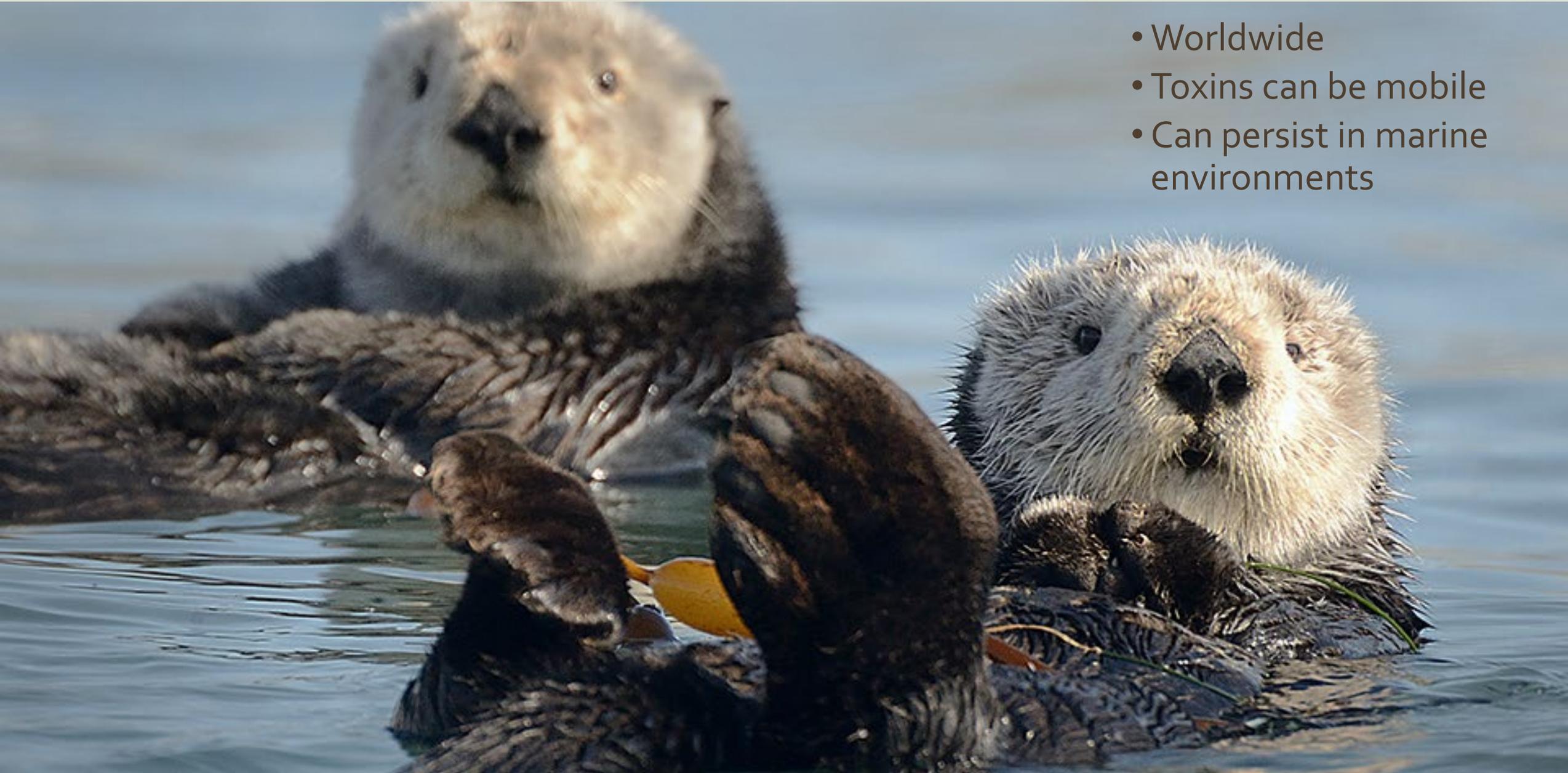
Eutrophication of Freshwater Systems and Increasing Temperatures

- Cultural eutrophication
- Climate change
- Bloom timing



HAB Occurrence and Distribution

- Worldwide
- Toxins can be mobile
- Can persist in marine environments



What Does a HAB Look Like?

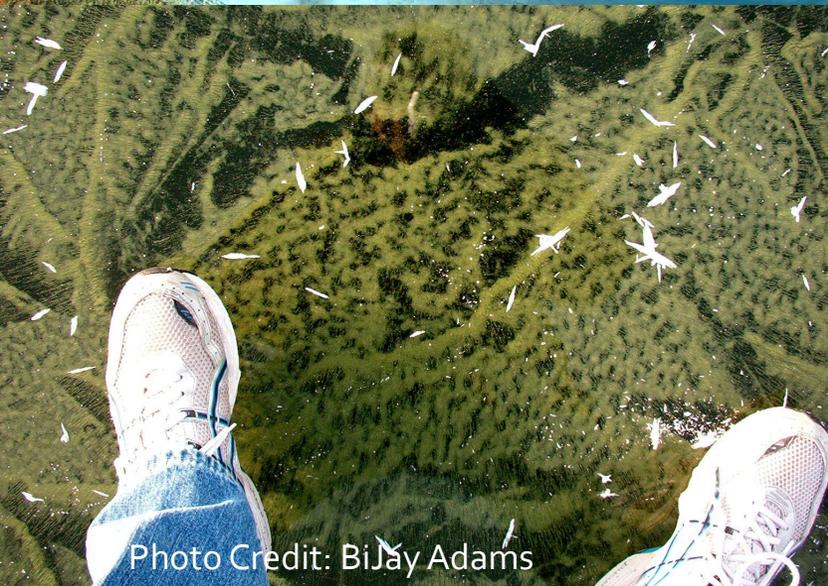


Photo Credit: BiJay Adams

Photo Credit Jason Perez

What Does a HAB Look Like?

Flecks



Clumps

What Does a HAB Look Like?

Thin films



Patches

What Does a HAB Look Like?

Thick scum



Cyanotoxins

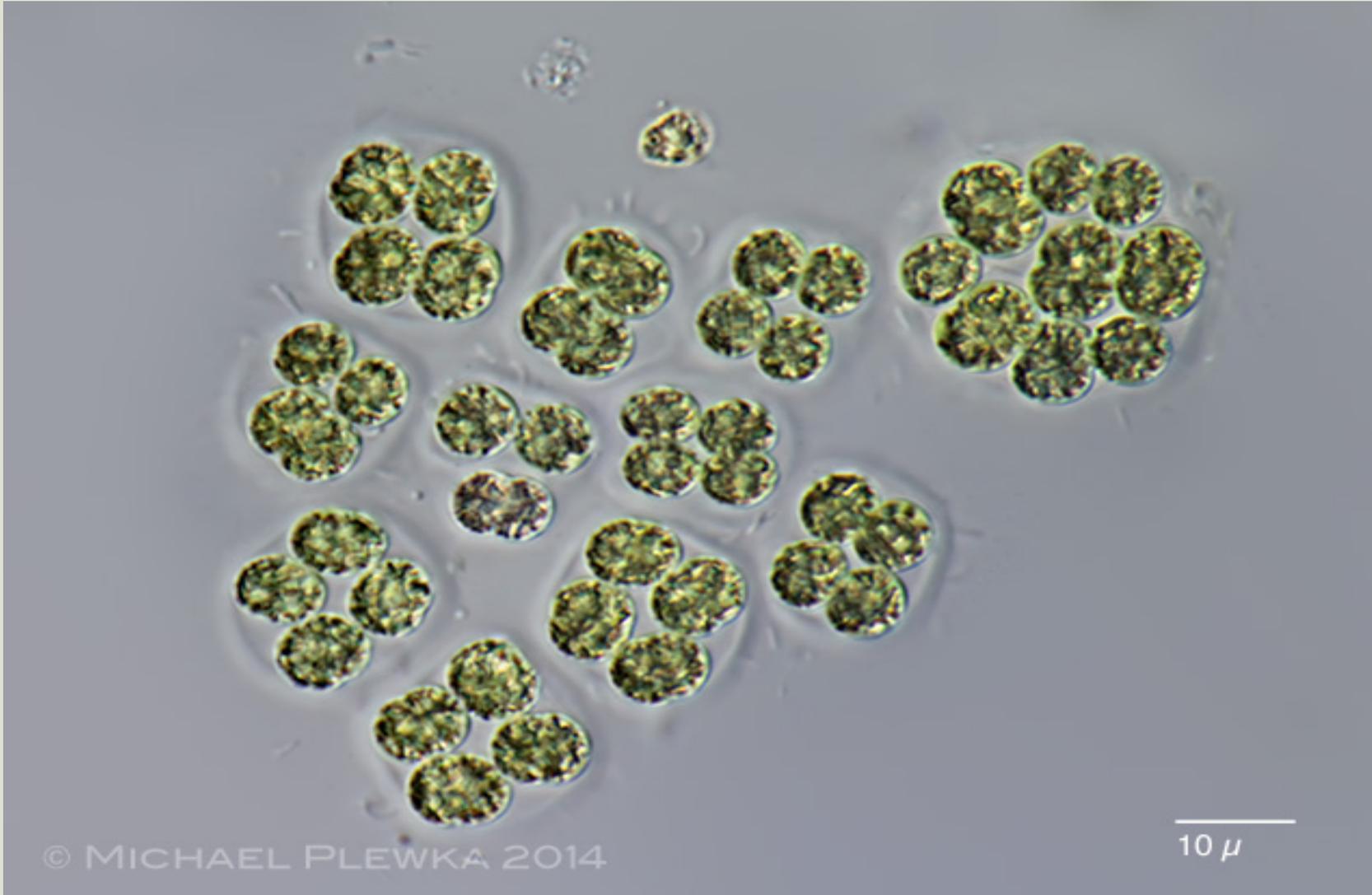
- Only produced sometimes by certain species
- Only lab tests can confirm toxicity
- Toxicity can vary
- Potent



Algal Toxins	LD ₅₀ (µg/kg)	Other toxins	LD ₅₀ (µg/kg)
Saxitoxin	9	Ricin	0.02
Anatoxin	20	Cobra toxin	20
Microcystin	50	Strychnine	2000

Cyanotoxins – Microcystin

- Hepatotoxin
- Chronic and acute effects



Microcystis

Cyanotoxins- Anatoxin-a

Anabaena (Dolichospermum)

- Neurotoxin
- Acute and potent



Photo credit: Karl Bruun, KCEL

Cyanotoxins

Aphanizomenon

- Saxitoxin-
 - Nerve toxin- PSP
- Cylindrospermopsin
 - Liver and kidney toxin
- Lipopolysaccharides
 - Dermal
- BMAA
 - Nerve toxin



Photo Credit: Karl Bruun, KCEL

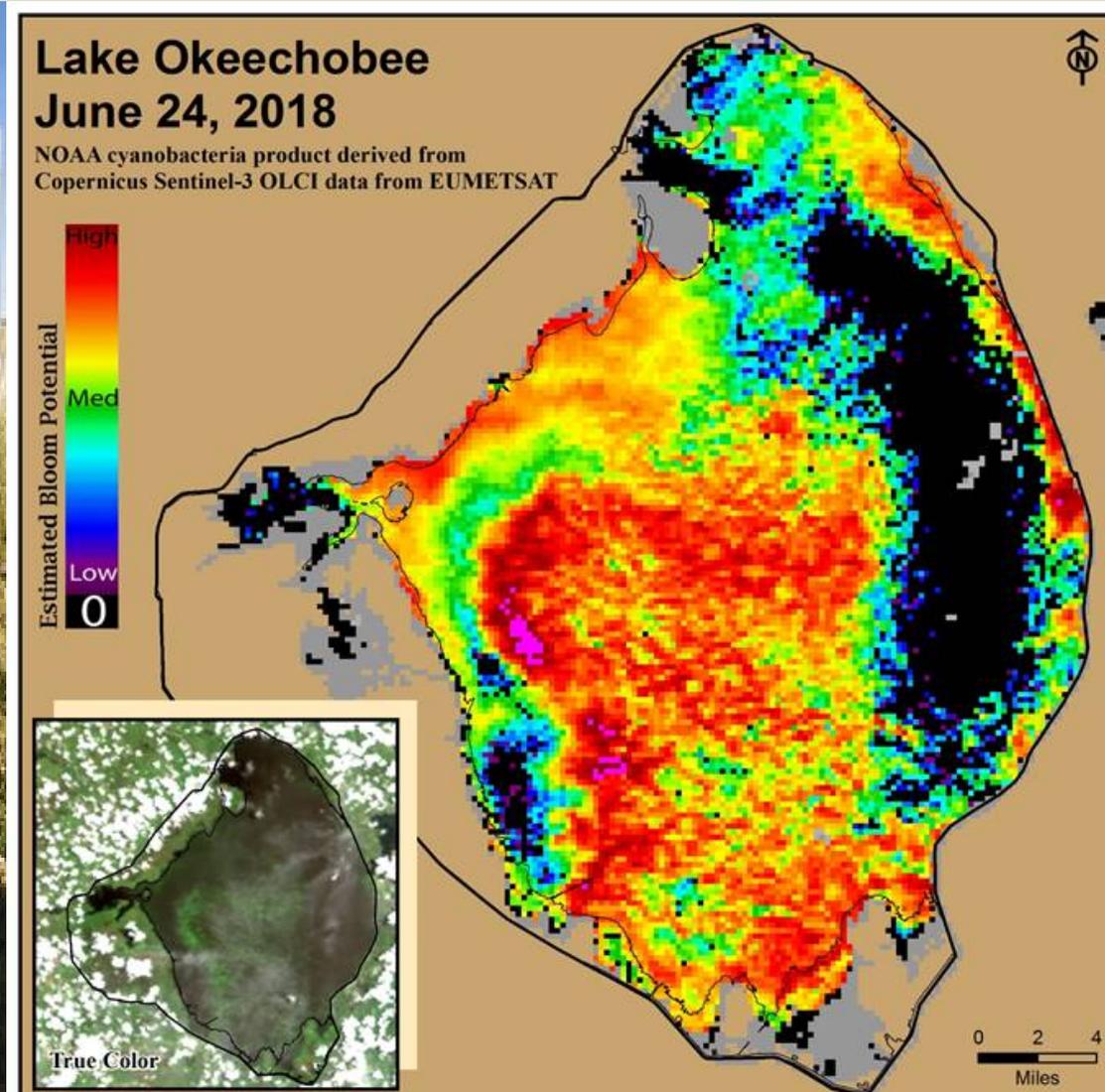
Exposure Pathways



Impacts of HABs

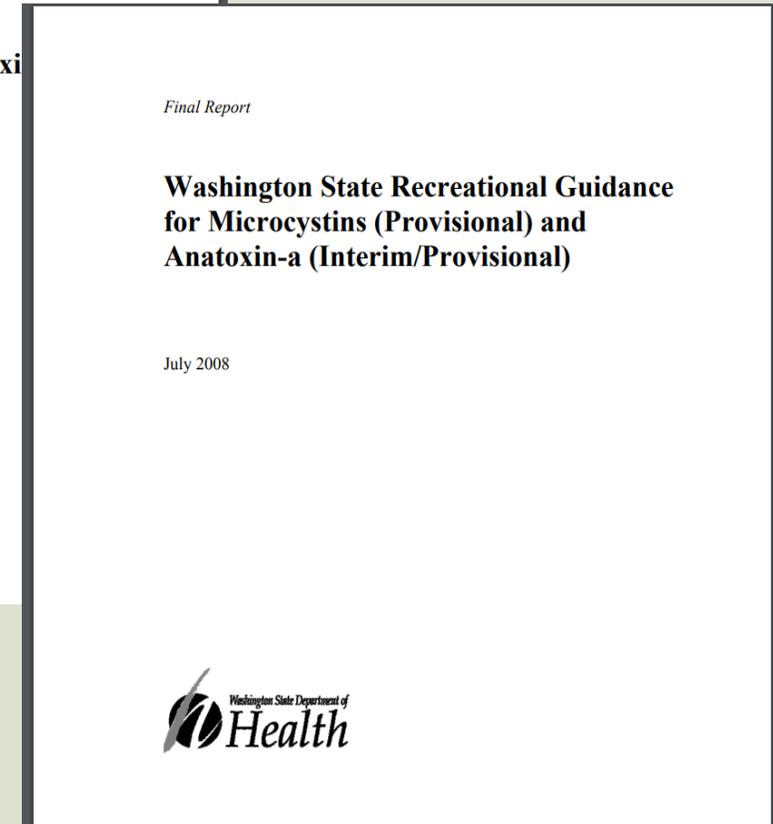
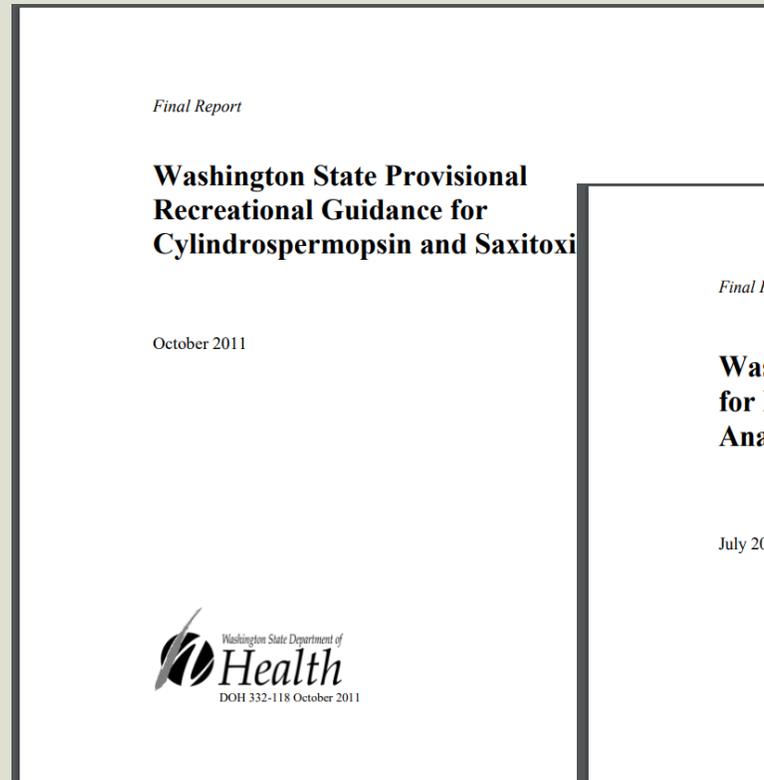


Are HABs Increasing?



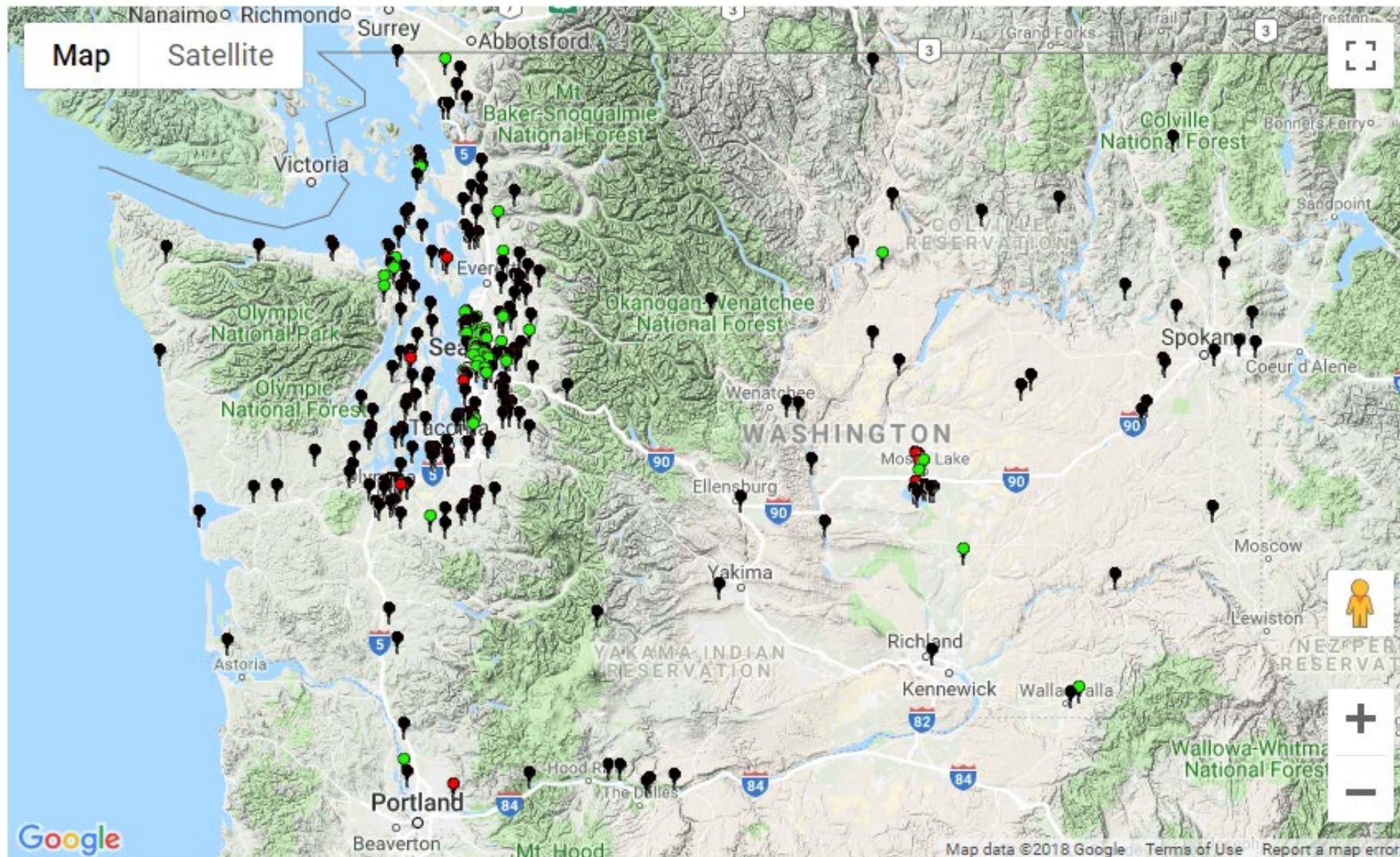
Washington State Provisional Recreational Guidelines

- Microcystin **6 µg/L**
- Anatoxin-a **1 µg/L**
- Cylindrospermopsin **4.5 µg/L**
- Saxitoxin **75 µg/L**

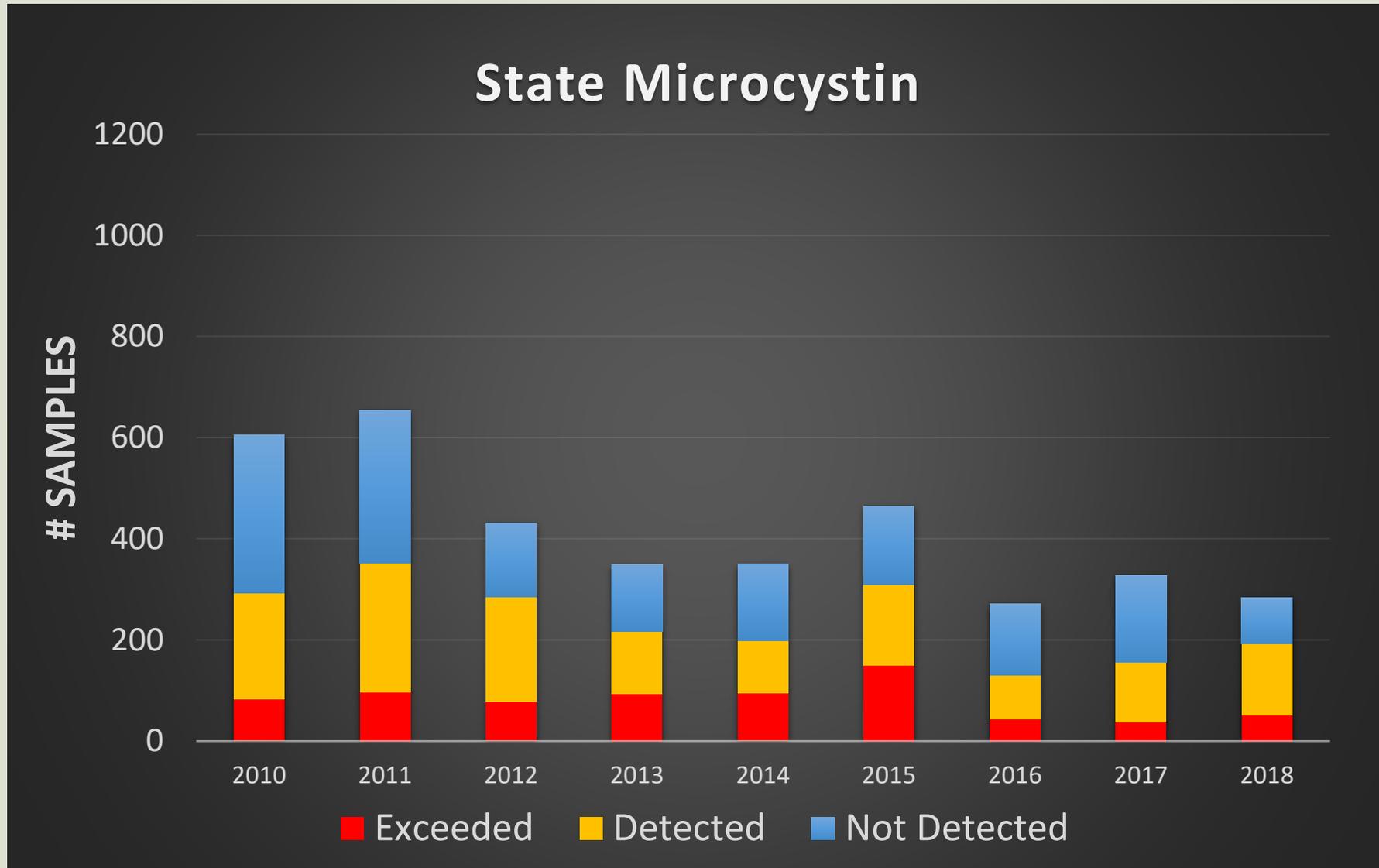


Freshwater Algae Monitoring Program

Map Legend:  Exceeded state recreation guideline  Within state recreation guideline  No data is available for the past 4 weeks.

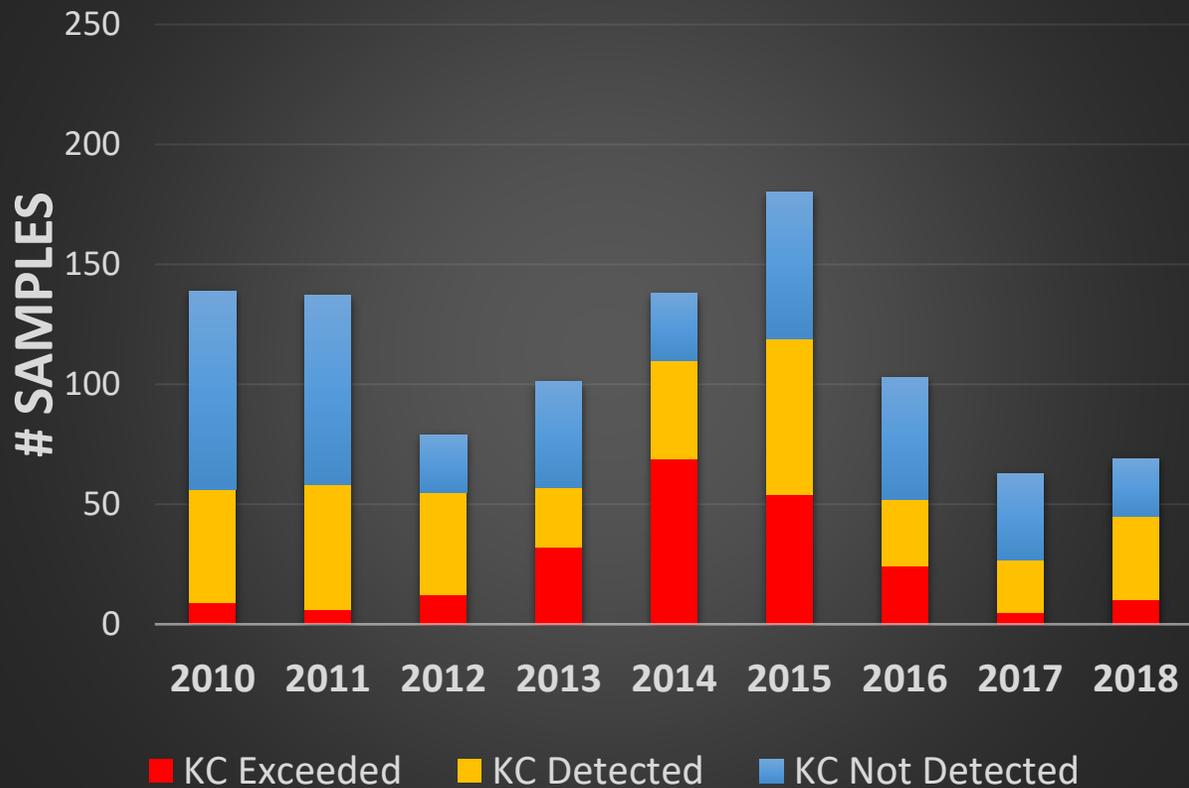


Presence of Microcystin in Washington State

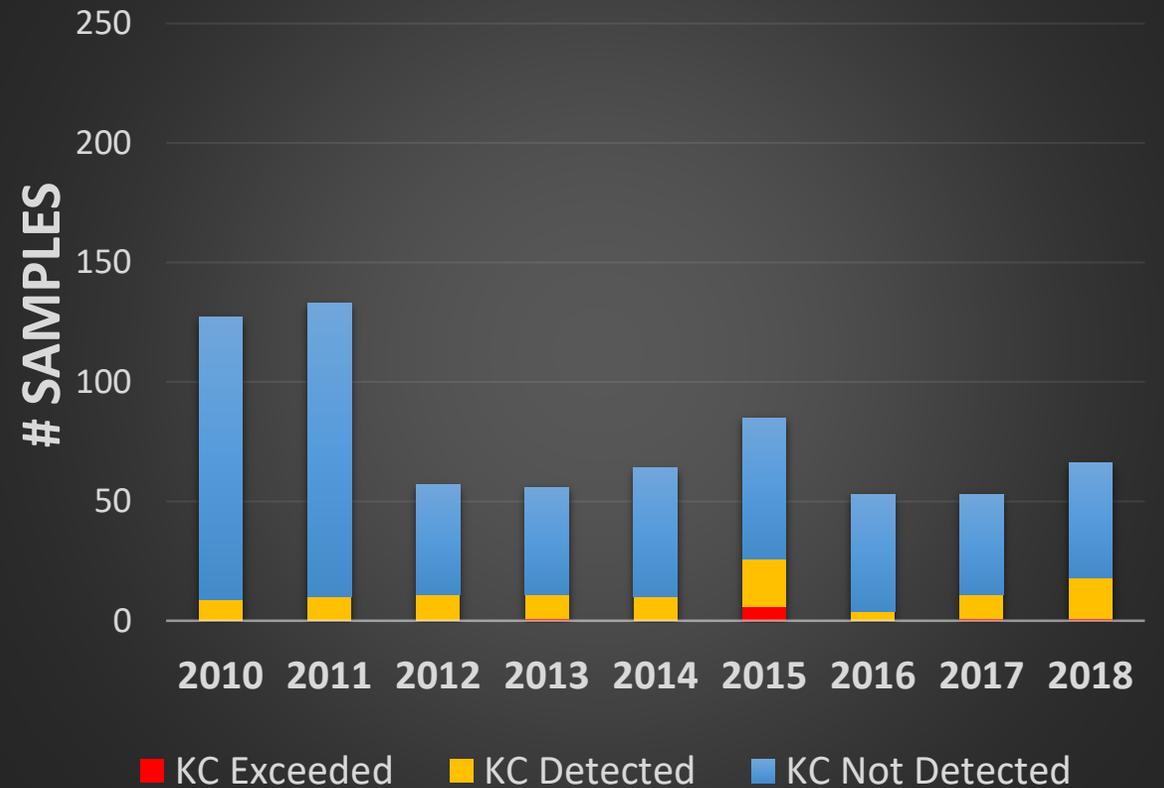


Presence of Cyanotoxins in King County

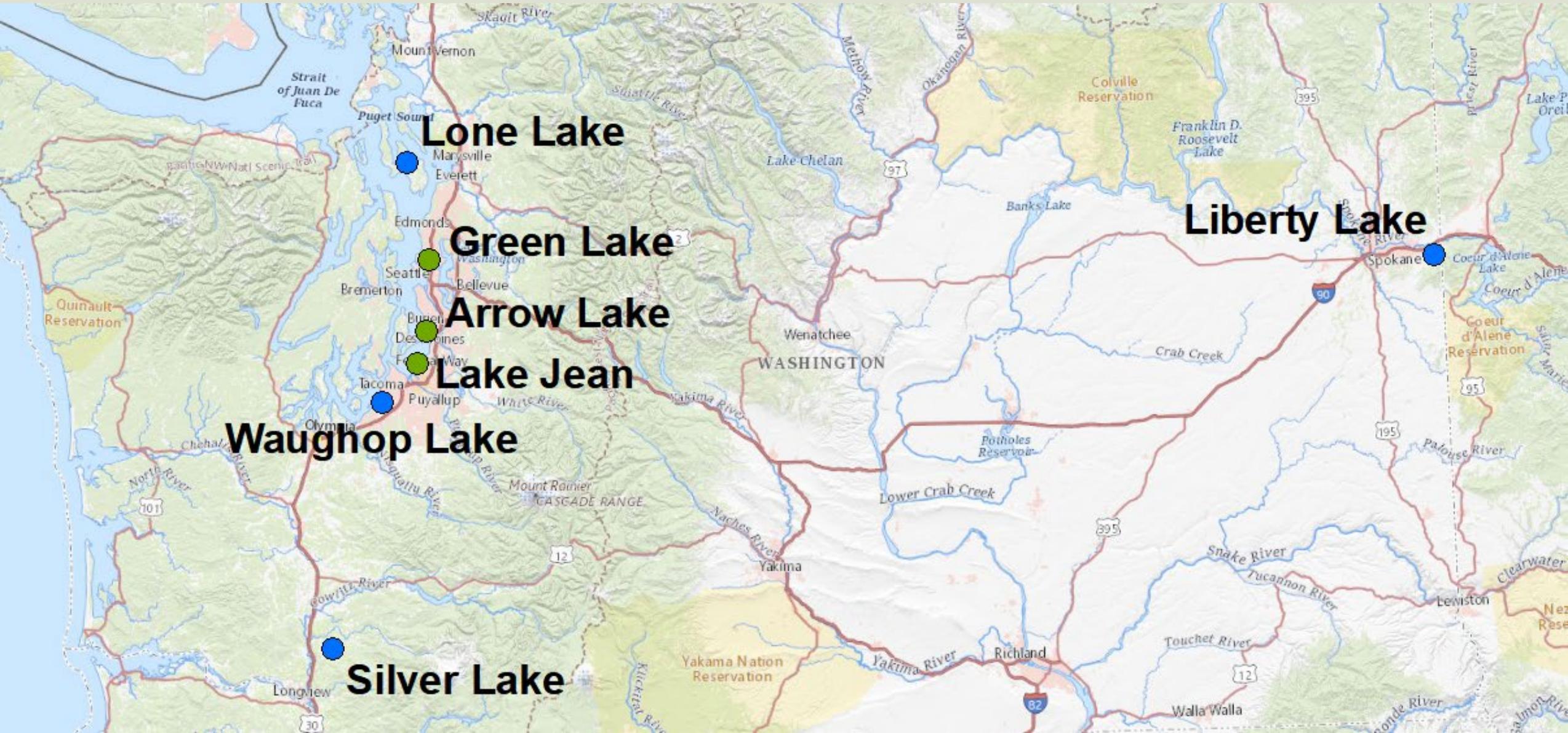
County Microcystins - Blooms Only



County Anatoxin - Blooms Only



Peak Cyanotoxin Values



King County Response to HAB



- Notification
- Sample collection
- Toxin analysis



King County Response to HAB



TOXIC ALGAE

Stay Alert!

There are toxic algae growing in this lake that accumulate in areas along the shoreline.

These harmful algae are a health risk to you, your family, and your pets.



DO NOT go into water where there are visible algae accumulations, streaks, or scum on the top.

People and pets with allergies or sensitive reactions to substances may experience rashes or skin irritation, as well as allergic reactions after exposure.



If you are In doubt, stay safe and stay out!

For more information on toxic algae and symptoms of poisoning, you can visit NWtoxicalgae.org. If you feel ill after being in the water, consult your physician as soon as possible.

Logos for Washington State Department of Health, Department of Ecology, and King County are at the bottom.

WARNING

TOXIC ALGAE PRESENT

Lake unsafe for people and pets

Until further notice:

- Do not swim or water ski.
- Do not drink lake water.
- Keep pets and livestock away.
- Clean fish well and discard guts.
- Avoid areas of scum when boating.

Call your doctor or veterinarian if you or your animals have sudden or unexplained sickness or signs of poisoning.

Report new algae blooms to Department of Ecology: **360-407-6000**

For more information: www.doh.wa.gov/ehp/algae/ www.ecy.wa.gov/programs/wq/plants/algae/index.html

DANGER

LAKE CLOSED

due to toxic algae

KEEP OUT OF LAKE

Call your doctor or veterinarian if you or your animals have sudden or unexplained sickness or signs of poisoning.

Report new algae blooms to Department of Ecology: **360-407-6000** Call your local health department:

For more information: www.doh.wa.gov/ehp/algae/ www.ecy.wa.gov/programs/wq/plants/algae/index.html

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What Can We Do?

Reduce nutrient inputs

- BMP's
- Policies
- Infrastructure



What Can We Do?

- Avoid cyanobacteria scums
- Report potential blooms
- Educate others about HAB's



Washington State Toxic Algae
Freshwater algae bloom monitoring program

Home Find lake Report a bloom Health risks About toxic algae

How to report and test a bloom

Animal Safety Alert

TOXIC Blue-Green Algae



When in Doubt... Stay Out!

If you see a bloom, do not let your pet in the water.

- Toxic algal blooms can poison animals, wildlife, and people.
- Toxic blooms can be different colors: green, blue, red, or brown.
- Blooms appear as foam, scum, or streaks on the surface of water.
- Look for blooms in lakes, ponds, and rivers.

If your pets go in the water:

- Do not let them lick their fur.
- Rinse them with clean water.
- Rinse your hands and any exposed skin.

Dogs can have severe signs within minutes to hours.

Look for these signs:

- Low energy
- Weakness
- Not eating
- Drooling
- Vomiting
- Diarrhea
- Stumbling
- Paralysis
- Seizures
- Tremors

If your pet becomes ill - Call your veterinarian immediately.

Report animal poisonings to your local health department:

WA Dept of Health Ph: 360-236-3330
www.doh.wa.gov/algae

Health
DCM 352.1.7 Jun-20.2



King County



Thank you.

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Water and Land Resources Division
King County Department of Natural Resources and Parks

