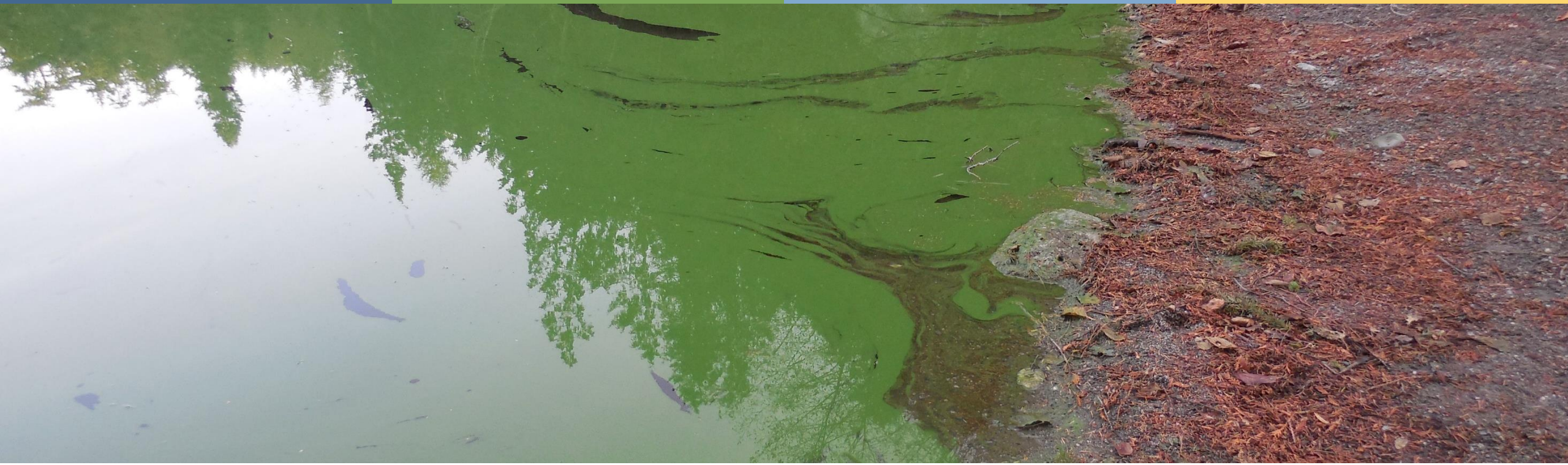


DEPARTMENT OF ECOLOGY
State of Washington

Department of Ecology's Freshwater Algae Control Program

Lizbeth Seebacher, PhD, PWS

Freshwater Algae Control Program

- Background and history of the program
- Program provides:
  - Cyanobacteria identification and toxicity testing
    - protocols for sampling
    - toxins sampled for
    - partners – city, county, state, federal
    - lake management recommendations
  - Searchable on-line database for toxin analysis and identification
    - NW Toxic Algae website data
  - Grants program
    - Lake Cyanobacteria Management Plan (LCMP) template and guidance
    - Current projects funded
- Statewide Lakes Program
- 303d List for water bodies with HABs
- 2023 cyanobacteria season – Snake River

Background

- The Washington State Legislature established funding for the Freshwater Algae Control Program (FACP) in 2005
- Under RCW 43.21A.667, created the FACP account and tasked DOE with program development
- Funds must be expended as follows:
  - As grants to cities, counties, tribes, special purpose districts and state agencies
  - To manage lakes with cyanobacteria problems, with priority for the treatment of lakes in which toxic cyanobacteria blooms have occurred within the past three years
  - Provide technical assistance to applicants and the public
  - Funded by a $1 license fee on boats

DEPARTMENT OF ECOLOGY
State of Washington

History of Ecology's Cyanobacteria Program

- 1995-2004 - Citizen action in response to animal deaths in Pierce County Lakes
- 2005 - State legislature funded the Freshwater Algae Control Program through Ecology
- 2006 - DOH and ECY held workshops around the state for stakeholder feedback
- 2007 - ECY incorporated the Freshwater Algae Grant Program
- 2008 - DOH produced recreational guidance values for microcystin (MCs) and anatoxin-a (ATX) and Three-Tiered Lake Management Protocol
- 2008 - King County Environmental Lab (KCEL) incorporated methods to test for MCs & AXT
- 2011 - KCEL incorporated methods to test for saxitoxin (STX) / cylindrospermopsin (CYL)
- 2011 - OH produced recreational guidance values for CYL and STX
- 2013 - DOH developed veterinary outreach posters and diagnostic cards
- 2019 - EPA finalized national recreational guidance values for MCs and CYL
- 2020 - WA adopted EPAs national recreational guidance values for MCs and CYL
- 2021 - DOH incorporated EPAs MC and CYL guidance values into an updated Two-Tiered Lake Management Protocol. DOH added Informational Sign for posting during bloom season or throughout the year.

Freshwater Algae Control Program (FACP)

- Cyanobacteria identification and toxicity testing - $85,000
- Grants program – ~$200k annually - $50,000 max per grant
- Cyanobacteria listserv
- Provide technical assistance to LHJ and the public on HABs
- Searchable on-line database for toxin analysis results and id
- Ecology is now using this database for potentially listing waterbodies on the 303D list for HABs

DEPARTMENT OF ECOLOGY
State of Washington

Partnerships

King County Environmental Lab (KCEL)

- Analyze freshwater samples for cyanotoxins and identification
- Manage the cyanobacteria data and website - Washington State Toxic Algae

DEPARTMENT OF ECOLOGY
State of Washington

Washington's Recreational Guidance Values/ EPA Recreational Guidance Values

Toxins	State Recreational Guidance	EPA Recreational Guidance
Microcystin	8 µg/L	8 µg/L
Anatoxin-a	1 µg/L	NA
Cylindrospermopsin	15 µg/L	15 µg/L
Saxitoxin	75 µg/L	NA




Laboratory Analysis

DEPARTMENT OF ECOLOGY
State of Washington

Routine

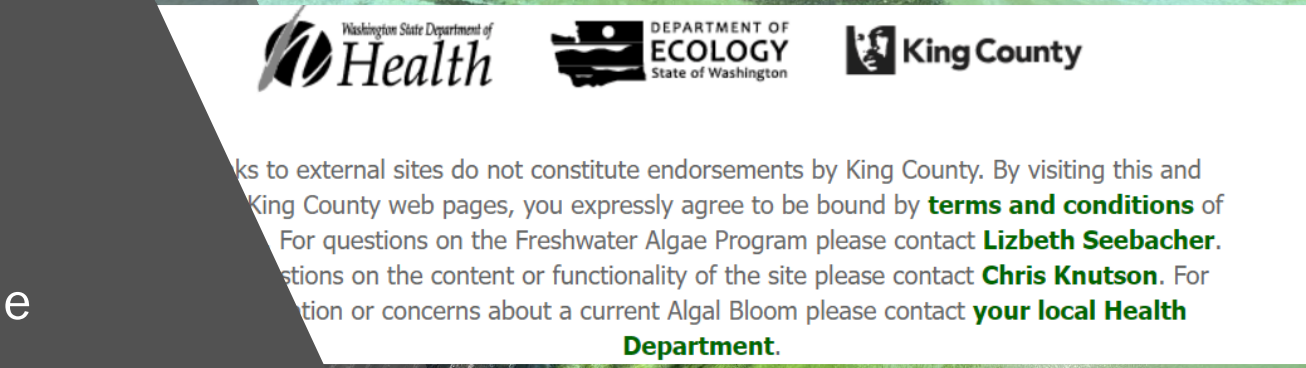
- Anatoxin-a LC/MS/MS
- Cylindrospermopsin LC/MS/MS
- Microcystins ADDA ELISA
- Saxitoxin ELISA
- Cyanobacteria ID

Expanded analysis list for Health Investigations

- Anatoxin-a
  - Homoanatoxin-a
  - Dihydroanatoxin-a
- Cylindrospermopsin
  - 7 Epi-Cylindrospermopsin

Protocol for Cyanobacteria Bloom Sampling, Reporting and Lake Management

- If a cyanobacteria bloom is observed – contact the county for which the lake is in
- If the reporter is unsure – cyanobacteria bloom – filamentous algae – pollen – email me several photos of the lake lsee461@ecy.wa.gov
- If it is a suspected cyanobacteria bloom, I will contact the county – sample?
- Depending on the water body, we may ask the person reporting the bloom or a local resident to send in a sample



Partnership with the Washington State Department of Health (DOH)

- Investigation of cyanobacteria-related human and animal illness.
- Funded DOH to develop state-wide human health standards with recreational guidelines for toxin levels.
- Ecology and DOH websites with information on cyanobacteria

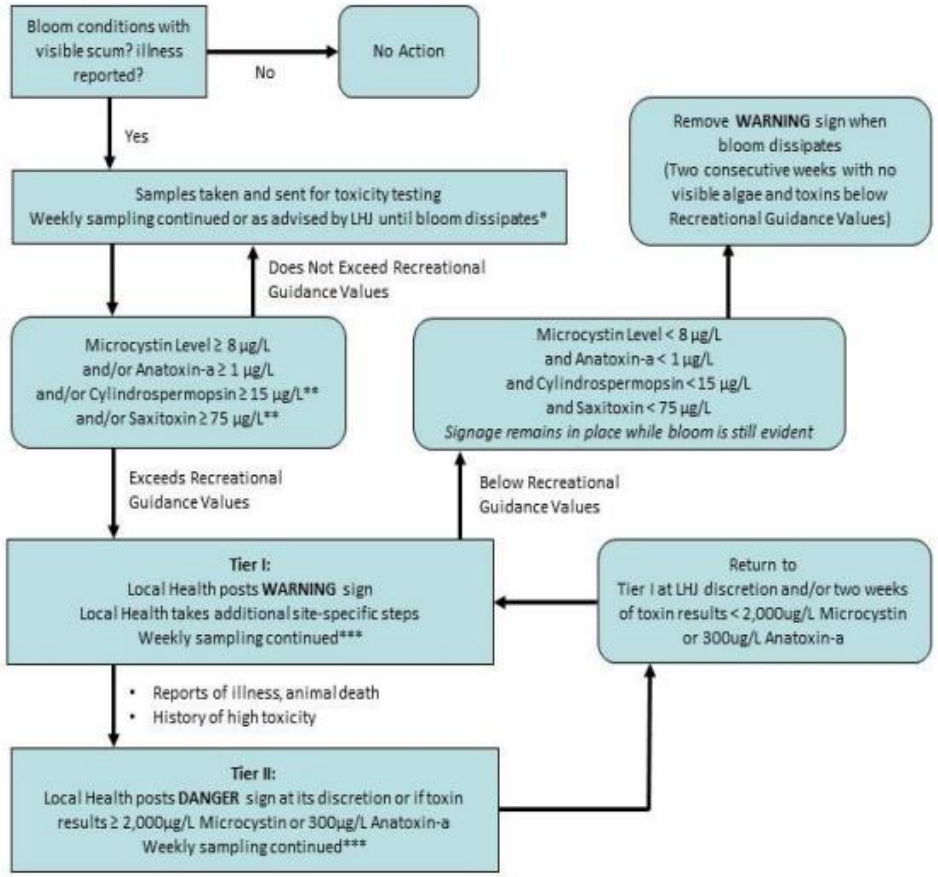
Lake Steilacoom, Pierce County

Two-Tiered Lake Management Protocol

Sign .pdfs are available under Communication Materials here: [Resources :: Washington State Department of Health]

DOH Waterborne Illness Reporting
DOH – One Health Harmful Algal Bloom System (OHHABS)
DOH works with Centers for Disease Control and Prevention (CDC) to report animal and human illnesses associated with HAB events. For questions on reporting and investigating illness incidents please contact DOH Waterborne Disease epidemiologists at waterborne-illness@doh.wa.gov.

Two-tiered approach to managing Washington water bodies with cyanobacterial blooms.



**Informational Sign posted at LHJ's discretion (all year, June 1 – October 31, etc.).*
***Cylindrospermopsin and saxitoxin will be dropped from future analyses if not detected in the first sample.*
****Sampling every 2 weeks is an option if there is an ongoing dense bloom (at KCEL's suggestion in order to lower number of samples/season).*

Clinic Posters and Vet Reference Cards

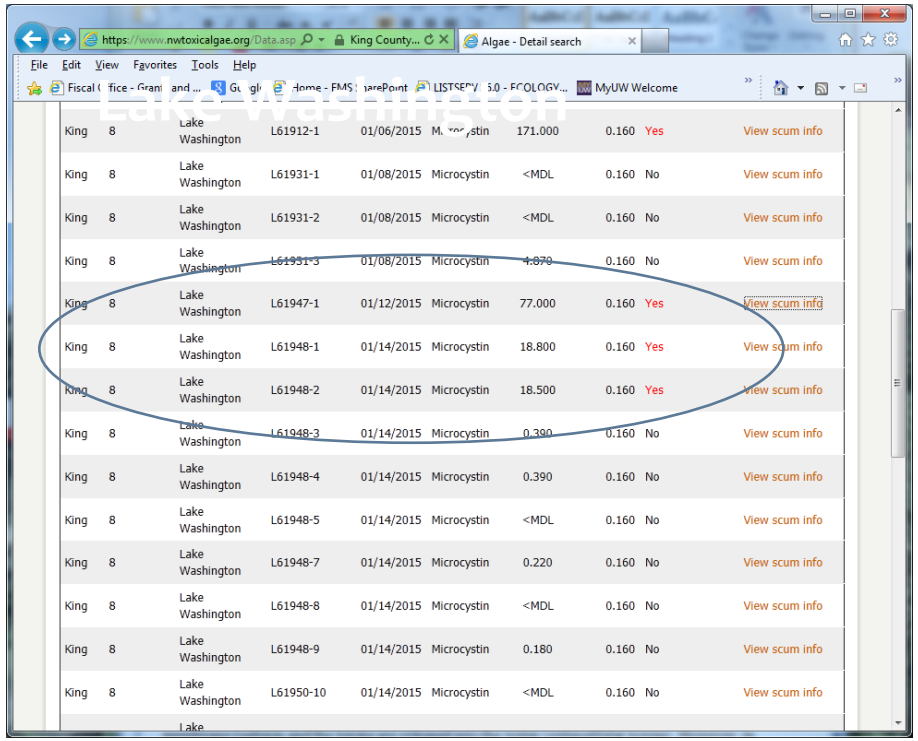
Blue-Green Algae Exposure and Clinical Information - There are no antidotes to these toxins. Medical care is supportive.

Exposure Route	Likely Signs	Onset to Signs	Differential Diagnosis	Possible Laboratory or Other Findings
Swallowing water with toxic blue-green algae (cyanobacteria) or other toxins **Licking fur or hair** contaminated with toxic blue-green algae	**Hepatotoxins** - Acute depression - Weakness & incoordination - Loss of appetite - Excess drooling - Vomiting and diarrhea - Abdominal tenderness - Jaundice - Dark urine	One or two hours, or more	Acetaminophen, nonsteroidal anti-inflammatories, aflatoxin, mushrooms, copper, zinc, iron, xylitol, sago palm	- Elevated bile acids & liver enzymes - Hypoglycemia - Prolonged clotting times - Proteinuria - Presence of toxin in clinical specimens (liver, gastrointestinal contents) collected from animals
	Neurotoxins - Excess drooling - Apprehension & anxiousness - Vomiting - Muscle twitching - Seizures - Respiratory failure	Minutes to hours	Organophosphate and carbamate insecticides, strychnine, metaldehyde, pyrethrins, moldy foods, chlorinated hydrocarbon pesticides, bromethalin, mushrooms	- Presence of toxin in clinical specimens from stomach contents taken from animals that became ill
Skin contact with toxic blue-green algae or other toxin(s)	**Dermal Toxins** - Rash, hives, allergic reaction	Minutes to hours	Other dermal allergens	- Blue-green staining of fur or hair

Monogastric animals appear less sensitive than ruminants or birds; however, the dose-response curve is very steep in dogs – up to 90% of a lethal dose may elicit no clinical signs. Surviving animals have a good chance for recovery. While therapies for cyanobacterial poisonings have not been investigated in detail, activated charcoal slurry is likely to be of benefit. Health effects from exposure are derived from reports of animal poisonings. For more information see Department of Health (www.doh.wa.gov/algae) or the Merck Veterinary Manual (www.vetmanual.com).

Helps clients identify:

- Toxic Blooms
- Poisoning Signs
- What to do if pet is sick
- Who to call



Lake Washington

https://www.nwtoxicalgae.org/Data.asp — King County... — Algae - Detail search

File Edit View Favorites Tools Help

MyUW Welcome

King	8	Lake Washington	L61912-1	01/06/2015	M. [illegible]stin	171.000	0.160	Yes	View scum info
King	8	Lake Washington	L61931-1	01/08/2015	Microcystin	<MDL	0.160	No	View scum info
King	8	Lake Washington	L61931-2	01/08/2015	Microcystin	<MDL	0.160	No	View scum info
King	8	Lake Washington	L61931-3	01/08/2015	Microcystin	4.870	0.160	No	View scum info
King	8	Lake Washington	L61947-1	01/12/2015	Microcystin	77.000	0.160	Yes	View scum info
King	8	Lake Washington	L61948-1	01/14/2015	Microcystin	18.800	0.160	Yes	View scum info
King	8	Lake Washington	L61948-2	01/14/2015	Microcystin	18.500	0.160	Yes	View scum info
King	8	Lake Washington	L61948-3	01/14/2015	Microcystin	0.390	0.160	No	View scum info
King	8	Lake Washington	L61948-4	01/14/2015	Microcystin	0.390	0.160	No	View scum info
King	8	Lake Washington	L61948-5	01/14/2015	Microcystin	<MDL	0.160	No	View scum info
King	8	Lake Washington	L61948-7	01/14/2015	Microcystin	0.220	0.160	No	View scum info
King	8	Lake Washington	L61948-8	01/14/2015	Microcystin	<MDL	0.160	No	View scum info
King	8	Lake Washington	L61948-9	01/14/2015	Microcystin	0.180	0.160	No	View scum info
King	8	Lake Washington	L61950-10	01/14/2015	Microcystin	<MDL	0.160	No	View scum info
King	8	Lake Washington							

DEPARTMENT OF ECOLOGY
State of Washington

Washington State Toxic Algae

Freshwater algae bloom monitoring program

Home | Find lake | Report a bloom | Signs and Health risks | About toxic algae | Summaries | Program

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Welcome to the freshwater algae site

The purpose of this site is to provide toxin data related to cyanobacteria blooms in Washington lakes, ponds and streams. Washington State Department of Ecology (Ecology) uses this site to share the data from their ongoing freshwater algae monitoring program.

Cyanobacteria (or blue-green algae) can produce toxins at levels that are harmful to humans, pets, domestic animals, and wildlife. There is no way to detect toxins in an algae bloom except through laboratory analysis. This website provides access to Ecology's results.

Find your lake

Use our database to locate a lake and find out the most recent testing.
Or find your lake >

Report a bloom

If you think that your lake has an algae bloom and you want to have the algae identified: Report a bloom.

See lakes with algae bloom

Examples of local lakes experiencing algae blooms.
View our gallery and descriptions.

Know Your Signs

If you see a Warning or Danger sign at a lake, make sure you know what to do.

Current lakes with values above guidelines

Location	Last Sample Date
Anderson Lake	10/02/2023
Cascade Park (Moses Lake)	10/03/2023
Clear Lake	10/05/2023
Echo Lake	10/09/2023
Gissberg Pond North	09/27/2023
Green Lake (Duck Island Launch)	10/10/2023
Howard Amon Park (Columbia River)	10/09/2023
Keogh Lake	10/03/2023
Lake Campbell	10/09/2023
Lower Granite Reservoir	10/09/2023
Moses Lake, BH Park	10/03/2023
Pass Lake	10/09/2023
Ronald Bog	10/09/2023
Rowland Lake	09/21/2023
Sagemoor Pond	10/04/2023
Scootney Reservoir	10/09/2023
Silver Lake	10/09/2023
Snake River	10/09/2023
Wiser Lake	10/10/2023

News and announcements

6/28/2023 KOMO
Toxic algae bloom at Lake Lawrence in Thurston County prompts health advisory

6/16/2023 KHQ
Toxic algae reported at Potholes Reservoir

5/25/2023 WA Dept of Ecology

DEPARTMENT OF ECOLOGY
State of Washington

Detailed search for your lake

This database contains the most current toxicity data available. All instances of values above the recreational guidelines are kept as up to date as possible, but values below the guidelines may be somewhat delayed in entry.Since there is a lag time from the date of sample to the date of analysis, be sure to check the sample date when looking at data or before you use the lake. Remember to use caution and avoid scums. "When in doubt, stay out!"

Your local jurisdiction may have more specific information about your lake. Questions? Contact Lizbeth Seebacher at Department of Ecology.

If a lake is not listed, it has not been tested for toxic algae through the Ecology program.

The pins on the map represent the center of small lakes, regardless of where the sample was taken. To find more precise location information, download the toxin data and click the "view scum info" link. That is where specific sampling location information will be if it was provided. On larger lakes, (such as Lake Washington, Moses Lake and Potholes) pins represent the location of the sample if provided.

County
--All Counties--

WRIA
--All WRIAs--

Site
--All sites--

Toxin
--All toxins--

Minimum Toxin Concentration

Maximum Toxin Concentration

Start Date (MM/DD/YYYY)

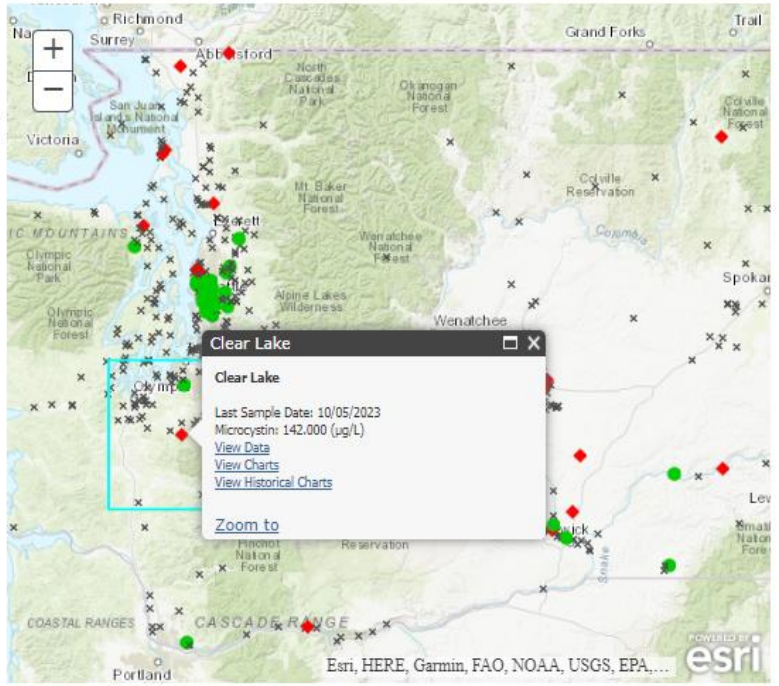
End Date (MM/DD/YYYY)

Lab Sample Number

Plot Map
Clear Selections

Get data
Get Toxins
Get Phytoplankton

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



How to report and test a bloom

Sampling a bloom event

This program is managed by the Washington State Department of Ecology. The King County Environmental Laboratory provides analytical testing and sample kit shipping under contract. The decision to accept or decline a sample request is made by the Washington State Department of Ecology, local health department and county lake experts. To report a bloom and start the sampling process please reach out to your local county representatives https://www.nwtoxicalgae.org/Contact.aspx. If a county representative is not available, please email a photo of the suspected cyanobacteria bloom to Lizbeth Seebacher at lsee461@ecy.wa.gov before generating a sample number.

Toxic algae caution sign at Lake Hicks

Directions can be found here about how to collect the sample and how to send or deliver it to the laboratory. It is very important for you to carefully follow the directions.

When collecting the sample, be sure to fill out the data sheet and send it along with your sample to the King County Environmental Lab.

To start the sampling process please use the automated sample number generator and follow the instructions.


Marisa Burghdoff â€" Lake Ketchum

Once a sample is at the laboratory, specialists will identify the algae species. If the sample contains an algae known to produce toxins, the laboratory will run a toxin analysis on the sample and you may be asked to send in more samples. Be aware that Ecology cannot reimburse postage or delivery costs but does pay for laboratory analyses.

Resampling a bloom event

If you are submitting a follow-up sample for a lake that has already been tested in previous week(s), please follow the directions above. Please sample only one week after the toxin levels return below recreational levels. Samples will be approved by Ecology before testing.

Please work through Ecology. The laboratory will not accept outside samples through the Ecology program unless they have been approved by Ecology.

For more information please contact:

Ecology

- Lizbeth Seebacher

To request sample bottle kit

- algaetoxinbottles@kingcounty.gov

DEPARTMENT OF ECOLOGY
State of Washington

Algae Sampling Data Supplemental Information

Date: _____ Time of Day: _____

Lake Name: _____ County: _____

Ecology Tracking Number: _____

Sample Location: (e.g. swim beach, north shore) _____

Latitude: _____ Longitude: _____

CONTACT INFO:

Name of Sampler: _____ Affiliation: _____

Phone Number: _____ Email Address: _____

WEATHER *check one*

- ☐ Sunny
- ☐ Partly Cloudy
- ☐ Overcast
- ☐ Dark Clouds
- ☐ Raining

WIND *check one*

- ☐ No Wind (Glassy Water)
- ☐ Slight Wind (Small Ripples)
- ☐ Breezy (Small Wavelets)
- ☐ Stormy (Waves/Whitecaps)

TEMPERATURE

Air: _____ °C
(to the nearest 0.5 °C)

LAKE USE

- # of boats on lake: _____
- # of swimmers at the lake: _____
- # of people wading/other: _____
- # of people fishing: _____
- # of dogs in/around lake: _____

NOTES: _____

POSTING DECISION:

☐ NONE ☐ CAUTION ☐ WARNING ☐ DANGER

SCUM PRESENT:

☐ NO ☐ YES

COLOR: _____

PICTURE TAKEN?

☐ No ☐ Yes Please send photos to:
Lizbeth Seebacher lsee461@ecy.wa.gov

REQUIRED for SAMPLE SUBMITTAL:
These requirements must be met for your sample to be accepted.

- ☐ Signed Chain of Custody (Relinquished)
- ☐ Proper Sampling Container

If Shipping:

- ☐ Frozen Ice Pack ☐ Overnighted

☐ If sample collected in response to human illness or animal illness/death, check box and send a copy of this form to waterborne-epi@doh.wa.gov or 206-364-1060 (fax).

Requested Analyses

- ☐ Microcystins
- ☐ Saxitoxin
- ☐ Cylindrospermopsin
- ☐ Anatoxin-a
- ☐ Qualitative Phyto ID

Chain of Custody

Relinquished Date/time:	Received Date/time:
Relinquished by: *(Signature)*	Received by: *(Signature)*
Printed Name:	Printed Name

Lab use only
Sample Temperature: _____

DEPARTMENT OF ECOLOGY
State of Washington

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Washington State Toxic Algae

Freshwater algae bloom monitoring program

Home | Find lake | Report a bloom | Signs and Health risks | About toxic algae | Summaries | Program

Detailed search for your lake

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Toxin:

County	WRIA Number	Site	Collect Date	Parameter	Toxin Conc. (µg/L)	MDL (µg/L)	Above State Guideline	Additional Information	Sample Location	Ecology Tracking Number
Thurston	13	Pattison Lake	09/19/2023	Microcystin	7.500	0.150	No	No	North basin, private residence	PATTTHUR064_23_303
Thurston	13	Pattison Lake	09/12/2023	Microcystin	0.190	0.150	No	No	North basin, private residence	PATTTHUR064_23_279
Thurston	13	Pattison Lake	09/06/2023	Microcystin	10.000	0.150	Yes	No	North basin, east side	PATTTHUR064_23_252
Thurston	13	Pattison Lake	08/29/2023	Microcystin	10.000	0.150	Yes	No	North basin, east side	PATTTHUR064_23_240
Thurston	13	Pattison Lake	08/21/2023	Microcystin	10.000	0.150	Yes	No	North basin, west side	PATTTHUR064_23_196
Thurston	13	Pattison Lake	08/15/2023	Microcystin	4.000	0.150	No	View		PATTTHUR064_23_177
Thurston	13	Pattison Lake	08/07/2023	Microcystin	31.000	0.150	Yes	View	North basin	PATTTHUR064_23_157
Thurston	13	Pattison Lake	08/01/2023	Anatoxin-a	<MDL	0.010	No	View	North basin, east side	PATTTHUR064_23_142
Thurston	13	Pattison Lake	08/01/2023	Microcystin	40.000	0.150	Yes	View	North basin, east side	PATTTHUR064_23_142
Thurston	13	Pattison	07/05/2023	Anatoxin-a	0.034	0.010	No	View	North basin,	PATTTHUR064_23_069

Washington State Toxic Algae

Freshwater algae bloom monitoring program

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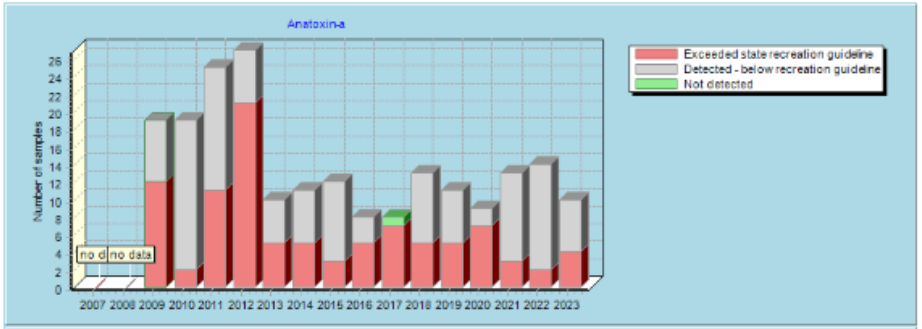
Phytoplankton:

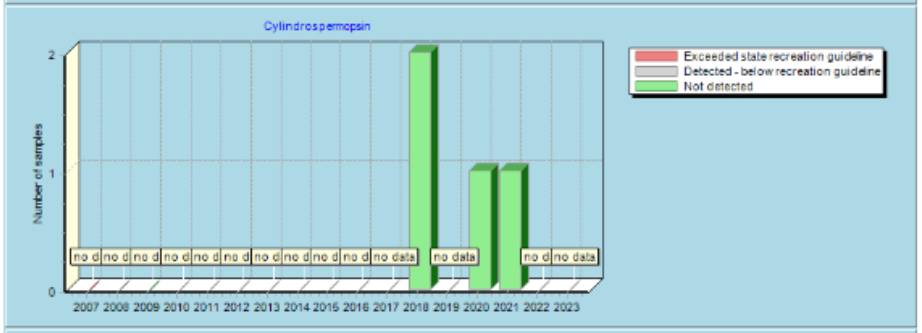
County	WRIA Number	Site	Lab Sample Number	Collect Date	Parameter	Dominance	SiteID
Thurston	13	Black	L80351-3	10/11/2022	Additional Info		142
Thurston	13	Black	L80351-3	10/11/2022	Anabaena: trichome straight		142
Thurston	13	Black	L80351-3	10/11/2022	Anabaenopsis sp.		142
Thurston	13	Black	L80351-3	10/11/2022	Aphanizomenon sp.	Present	142
Thurston	13	Black	L80351-3	10/11/2022	Cuspidothrix sp.		142
Thurston	13	Black	L80351-3	10/11/2022	Cylindrospermopsis sp.		142
Thurston	13	Black	L80351-3	10/11/2022	Cylindrospermum sp.		142
Thurston	13	Black	L80351-3	10/11/2022	Dolichospermum sp. - irregularly twisted	Present	142
Thurston	13	Black	L80351-3	10/11/2022	Dolichospermum sp. - regularly coiled	Present	142
Thurston	13	Black	L80351-3	10/11/2022	Dolichospermum sp. - straight	Present	142
Thurston	13	Black	L80351-3	10/11/2022	Few algae seen on microscopic exam		142
Thurston	13	Black	L80351-3	10/11/2022	Gloeotrichia sp.		142
Thurston	13	Black	L80351-3	10/11/2022	Limnoraphis sp.		142
Thurston	13	Black	L80351-3	10/11/2022	Microcystis sp.	Present	142
Thurston	13	Black	L80351-3	10/11/2022	Nostoc sp.		142
Thurston	13	Black	L80351-3	10/11/2022	Oscillatoria sp.		142
Thurston	13	Black	L80351-3	10/11/2022	Phormidium sp.		142
Thurston	13	Black	L80351-3	10/11/2022	Planktothrix sp.		142
Thurston	13	Black	L80351-3	10/11/2022	Undetermined Filament		142

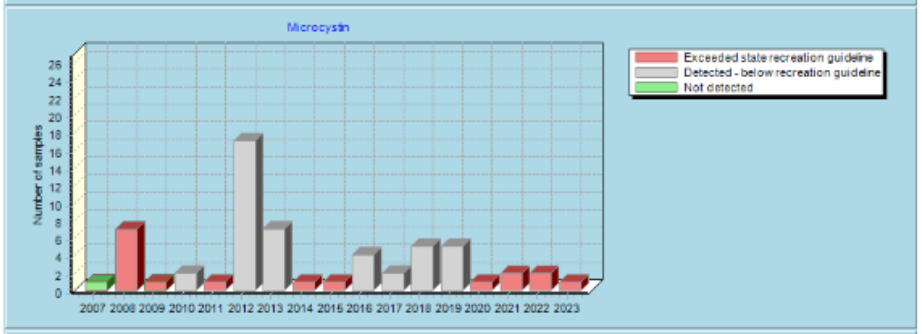
Historical summary of your lake

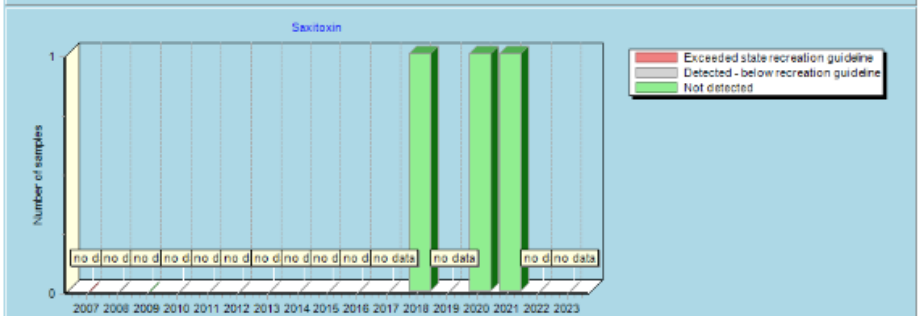
Pick the lake you are interested in to view charts about each toxin tested for the history of the lake:
Anderson Lake, Jefferson View Data

Note: Charts are based on number of samples taken for analysis of each toxin. Please pay attention to the y-axis when interpreting these charts.





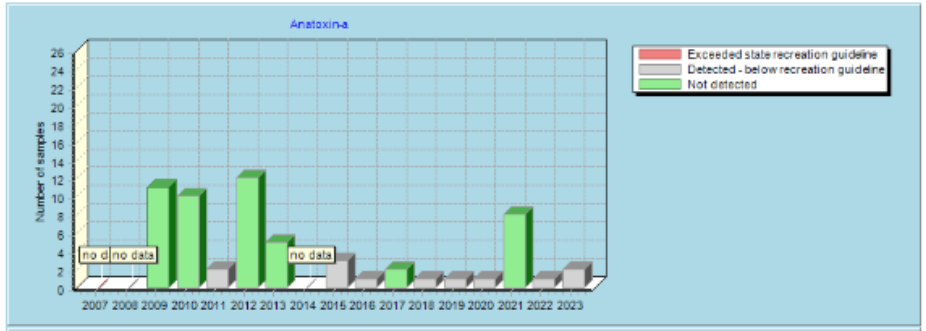


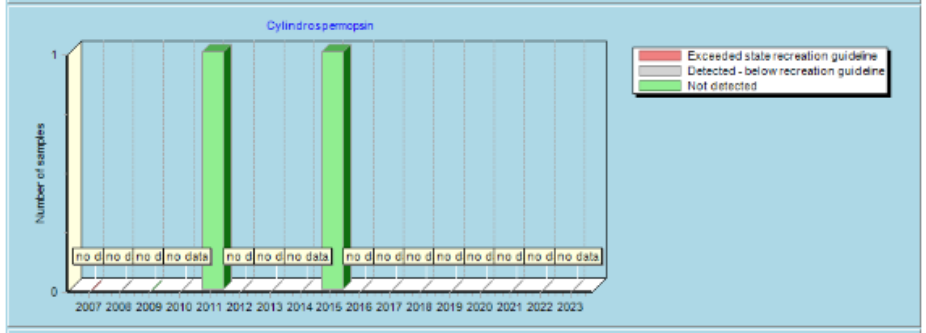


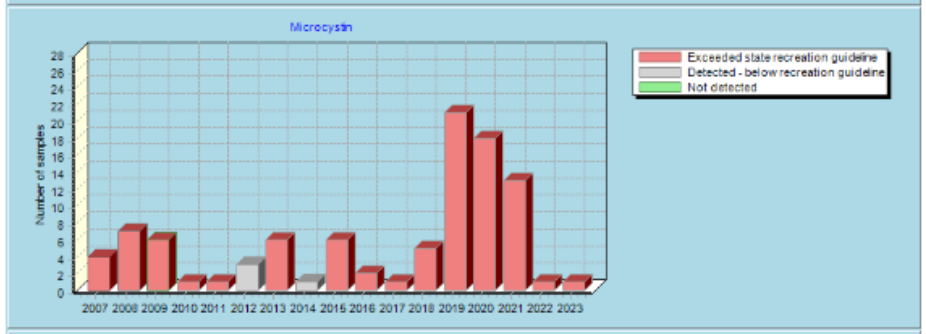
Historical summary of your lake

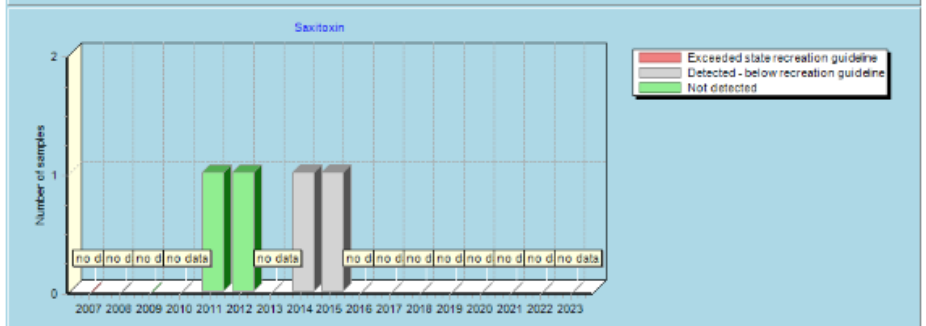
Pick the lake you are interested in to view charts about each toxin tested for the history of the lake:
Spanaway Lake, Pierce View Data

Note: Charts are based on number of samples taken for analysis of each toxin. Please pay attention to the y-axis when interpreting these charts.

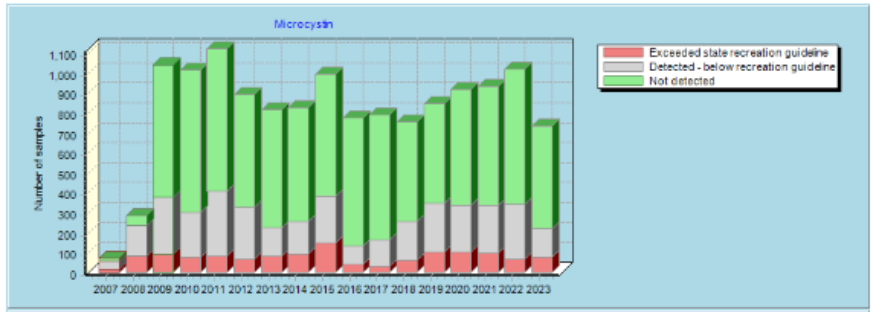


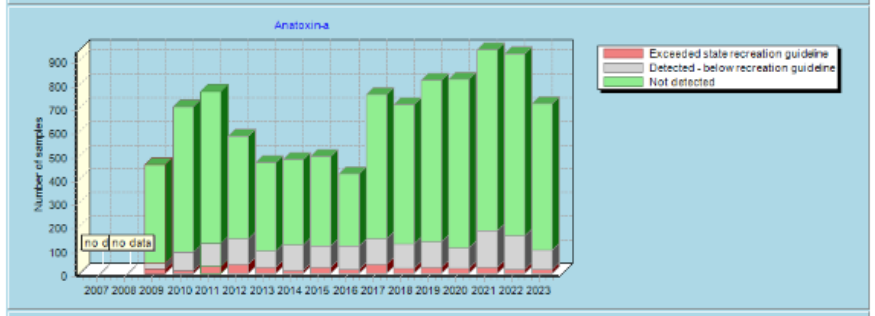


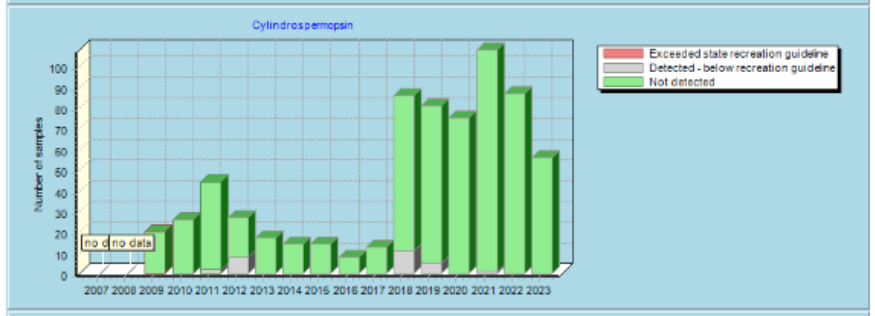


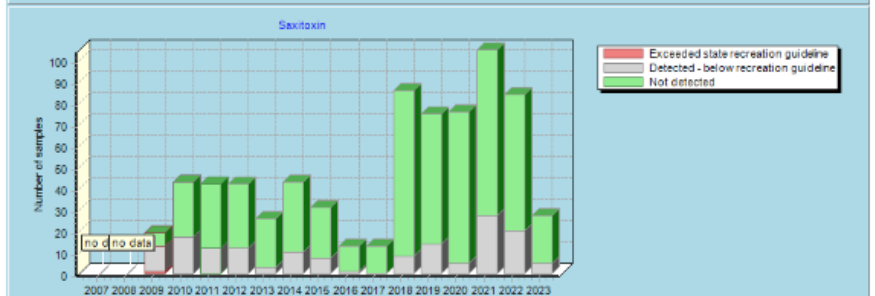


Parameter	Number of Samples	Number of Exceedings
Anatoxin-a	10086	358
Cylindrospermopsin	670	0
Microcystin	13823	1313
Saxitoxin	723	1









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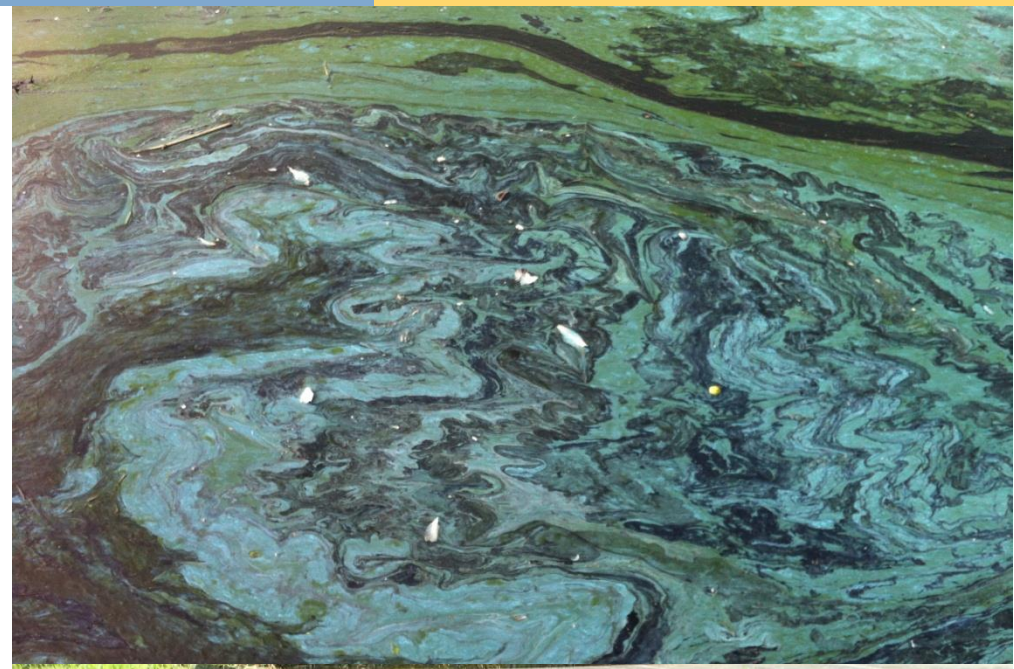

Lake Cyanobacteria Management Plan (LCMP)

https://apps.ecology.wa.gov/publications/documents/1910038.pdf

Now required before funding control work

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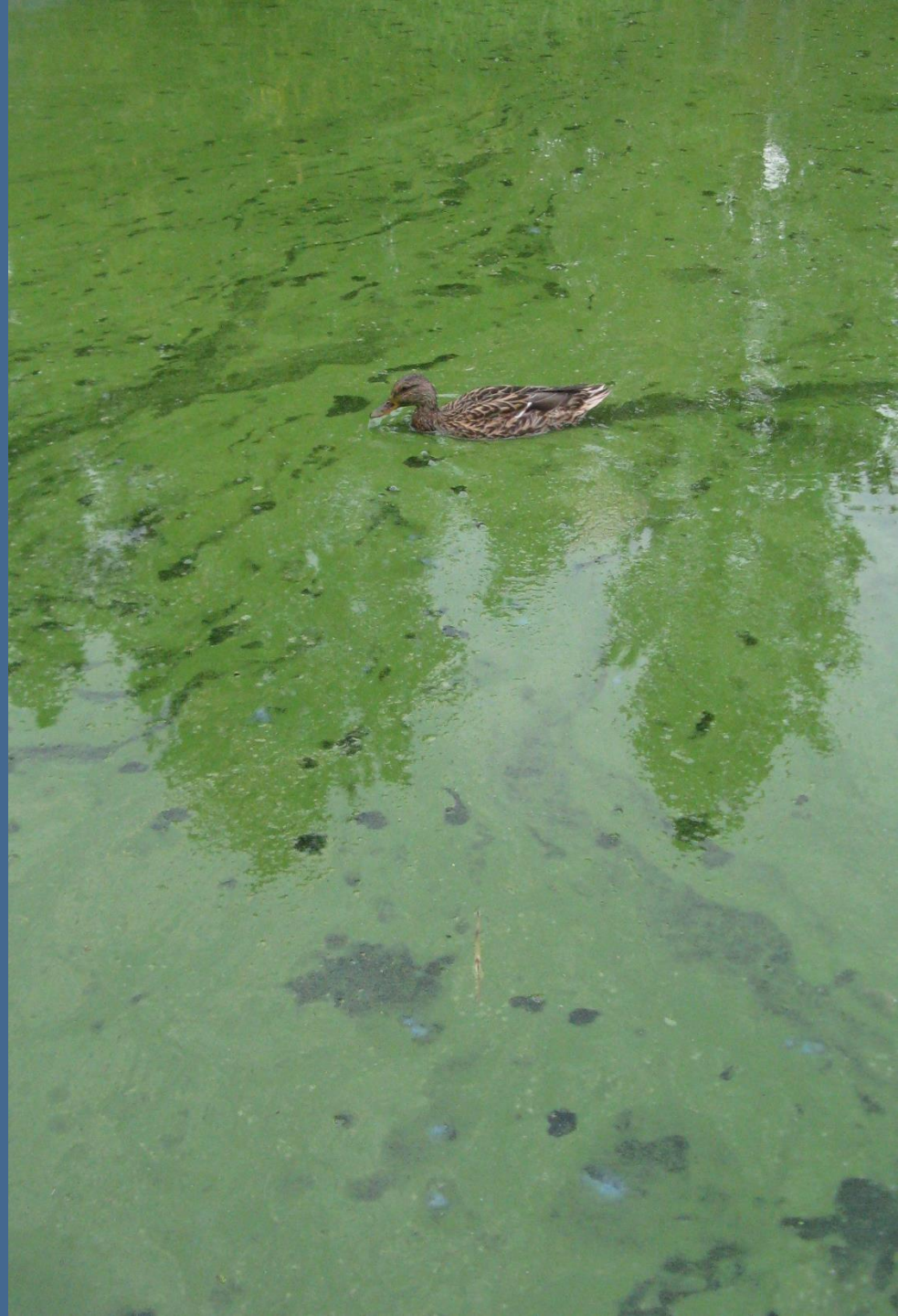
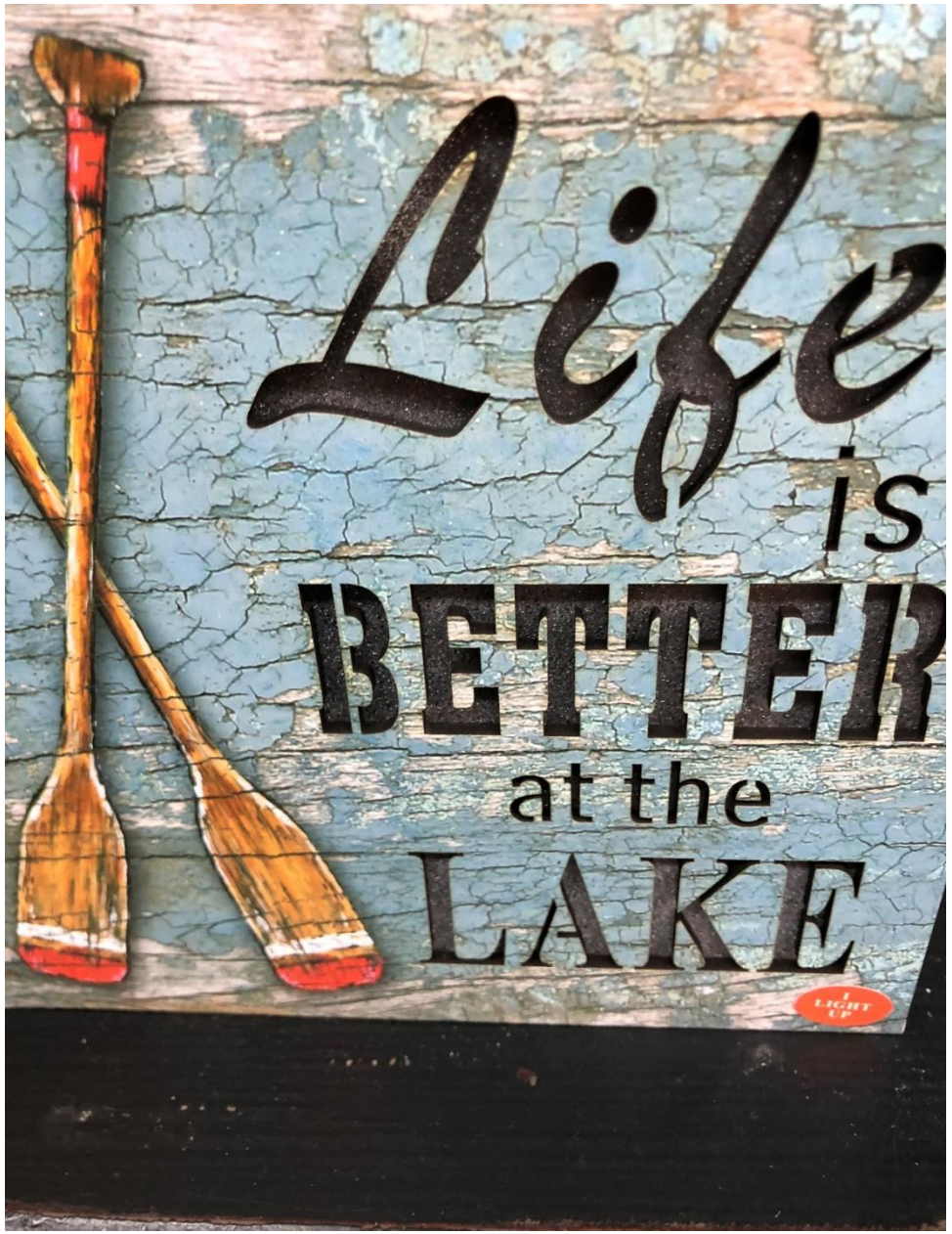


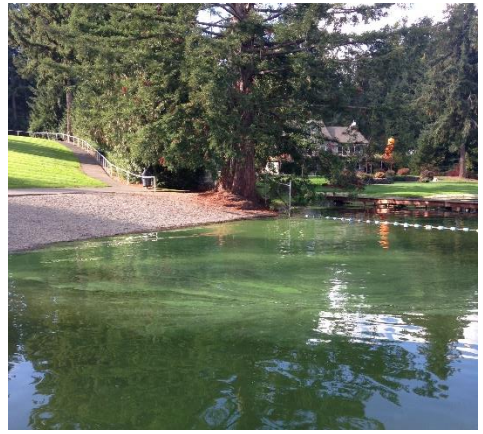
Lake Cyanobacteria Management Plan Template

A. Title Page with Approvals
   a. Lake Name Cyanobacteria Management Plan
   b. Lake, County
   c. Organization
   d. Date prepared
   e. Signature page
B. Table of Contents
C. Table of Figures and Tables
D. Executive Summary
E. Background
   a. Study Area
      i. Lake and Watershed
      ii. Beneficial uses of the lake
      iii. Current and historical land uses
      iv. Number and location of houses on septic
      v. Water use
      vi. Water withdrawals
      vii. Fisheries
      viii. Aquatic plants
      ix. Endangered/rare species
   b. Water Quality History
      i. Past water quality conditions
      ii. Efforts to improve water quality
   c. Current Conditions
      i. Water quality
      ii. Stormwater entry untreated?
      iii. Contaminants of concern
         a. Cyanotoxins
         b. 303 d list status
         c. TMDLs
         d. Regulatory criteria of contaminants and cyanotoxins
   d. Community Involvement
      i. Public participation
      ii. Public support
F. Project Description
   a. Project goals and objectives
   b. Project schedule
G. Monitoring Methods and Results
   a. Lake level, stream inflows/outflows, groundwater & precipitation/evaporation
      i. Monitoring methods
      ii. Monitoring results
   b. Lake water quality profile monitoring – Field measurements
      i. Monitoring methods
      ii. Monitoring results
   c. Lake water quality sampling – Lab samples
      i. Monitoring methods
      ii. Monitoring results
   d. Stream water quality sampling – Lab samples and field measurements
      i. Monitoring methods
      ii. Monitoring results
   e. Phytoplankton sampling
      i. Monitoring methods
      ii. Monitoring results
   f. Zooplankton sampling
      i. Monitoring methods
      ii. Monitoring results
   g. Waterfowl survey
   h. Vegetation survey
      i. Submersed plants
      ii. Emergent plants
      iii. Shoreline plants
   i. Shoreline modification survey
   j. Lake sediment sampling
      i. Monitoring methods
      ii. Monitoring results
H. Hydrologic Budget
   a. Description of water budget components
   b. Inflows
   c. Outflows
I. Nutrient Budget and Phosphorus Model
   a. External phosphorus loading
   b. Internal phosphorus loading
   c. Phosphorus model
      i. Model description
      ii. Model results
J. Management Methods for Cyanobacteria Control and Lake Restoration
   a. Direct algae control methods
   b. Internal loading control methods
   c. External loading control methods
K. Management / Restoration Methods Rejected
L. Recommended Management / Lake Restoration Plan
M. Future Monitoring and Adaptive Management
   a. Evaluation
   b. Adaptive changes
N. Funding Strategy
O. Roles and Responsibilities
P. References

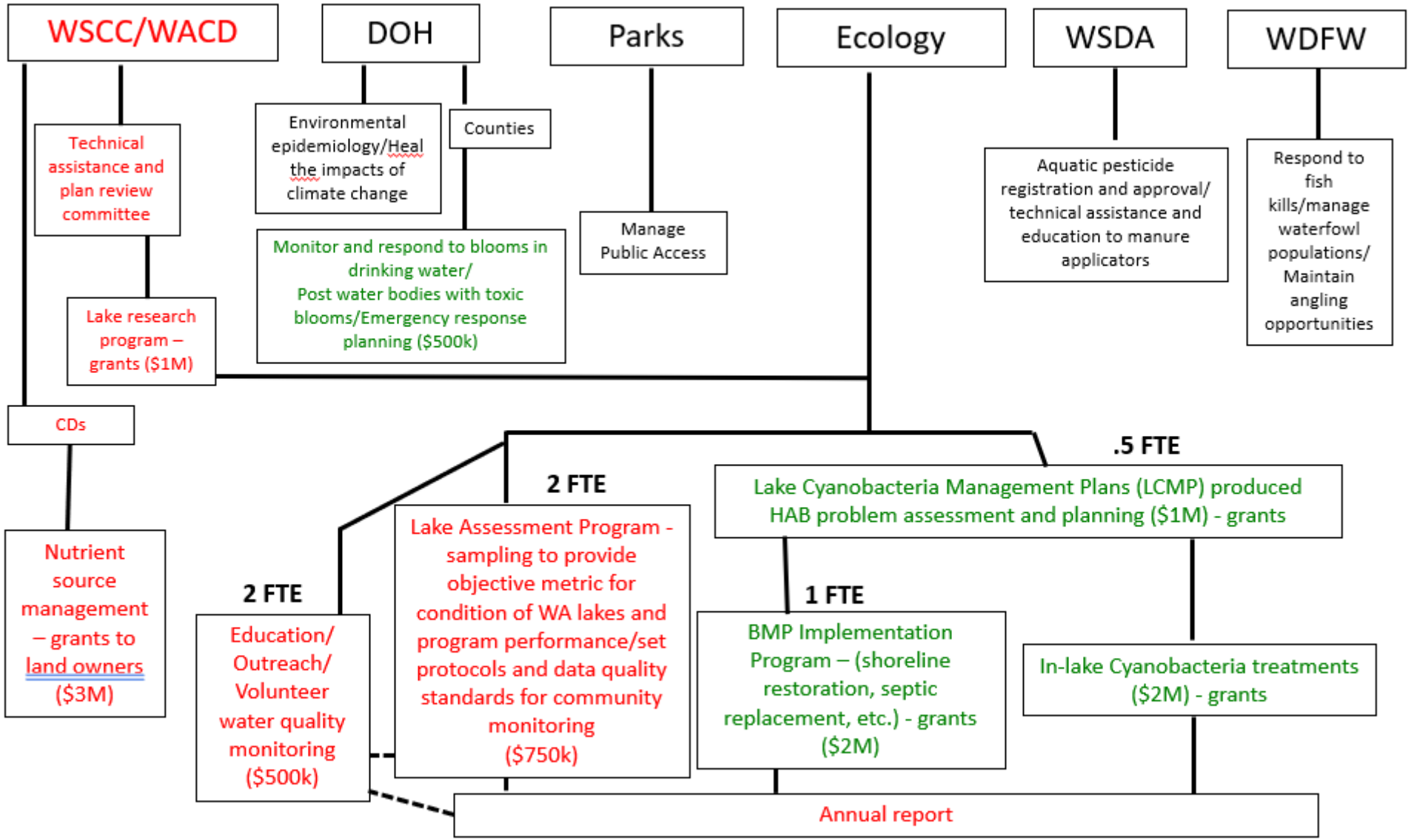
Current Freshwater Algae Control Program Projects

FY2021 – Moses Lake, Grant County – Lake Cyanobacteria Management Plan
FY2021 – Lone Lake, Island County – Community Outreach Project
FY2022 – Lacamas Lake, Clark County – Lake Cyanobacteria Management Plan
FY2022 – Lake Marcel, King County – Lake Cyanobacteria Management Plan
FY2022 – Spanaway Lake, Pierce County – update Lake Management Plan – proviso funded
FY2022 – Vancouver Lake, Clark County – Lake Management Plan – proviso funded
FY2023 – Wiser Lake, Whatcom County – Lake Cyanobacteria Management Plan
FY2023 – Curlew Lake, Ferry County – Lake Cyanobacteria Management Plan
FY2023 – Echo Lake, King County – Lake Cyanobacteria Management Plan
FY2024 – Moses Lake, Grant County – Lake Cyanobacteria Management Plan – continued
FY2024 – Campbell Lake, Skagit County – Lake Cyanobacteria Management Plan
FY2024 – Blackmans Lake, Snohomish County – Lake Cyanobacteria Management Plan


Life
is
BETTER
at the
LAKE



WA Freshwater HAB Program



Requires legislation to establish and appropriation of funding

Requires additional funding for existing programs

$xxx = recommended funding level/biennium. Required FTEs TBD

Washington State Lakes Program

- History of attempts to fund a state-wide Lakes Program
- States with successful Lake Programs – Maine, Vermont, New York, Wisconsin
  - Lake resident education program, including water quality monitoring and technical assistance
  - Fund Lake Cyanobacteria Management Plan (LCMP) for effected lakes
  - Provide assistance to lake residents and local entities on implementing BMPs recommended in LCMP
- Currently - Conservation Districts (CDs) appealing directly to the legislators

Summary Whole-of-Government Biennial Costs for HABs Program

	Function	FTE	FTE Cost*	Grants and other costs	Total Cost*
WSCC	Coordination committee	0.3	$66,000	$75,000	$141,000
	Technical assistance	0.2	$44,000	$100,000	$144,000
	Research program	0.25	$55,000	$1,000,000	$1,055,000
	Agricultural Nutrient Source Reduction	0.25	$55,000	$3,000,000	$3,055,000
		1	$220,000	$4,175,000	$4,395,000
WDOE	Watershed BMPs	0.5	$110,000	$2,000,000	$2,110,000
	In-water treatment and prevention	0.5	$110,000	$3,000,000	$3,110,000
	Detailed characterization and planning	1	$220,000	$1,500,000	$1,720,000
	Volunteer monitoring	1	$220,000	$500,000	$720,000
		3	$660,000	$7,000,000	$7,660,000
WDOH	Environmental epidemiology of HABs	0.5	$110,000		$110,000
	Drinking water HABs and local assistance	0.5	$110,000	$1,500,000	$1,610,000
	Climate change impacts	0.5	$110,000		$110,000
		1.5	$330,000	$1,500,000	$1,830,000
Totals		5.5	$1,210,000	$12,675,000	$13,885,000

*Assumes $110,000 for salaries and benefits/FTE/year

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State of Washington

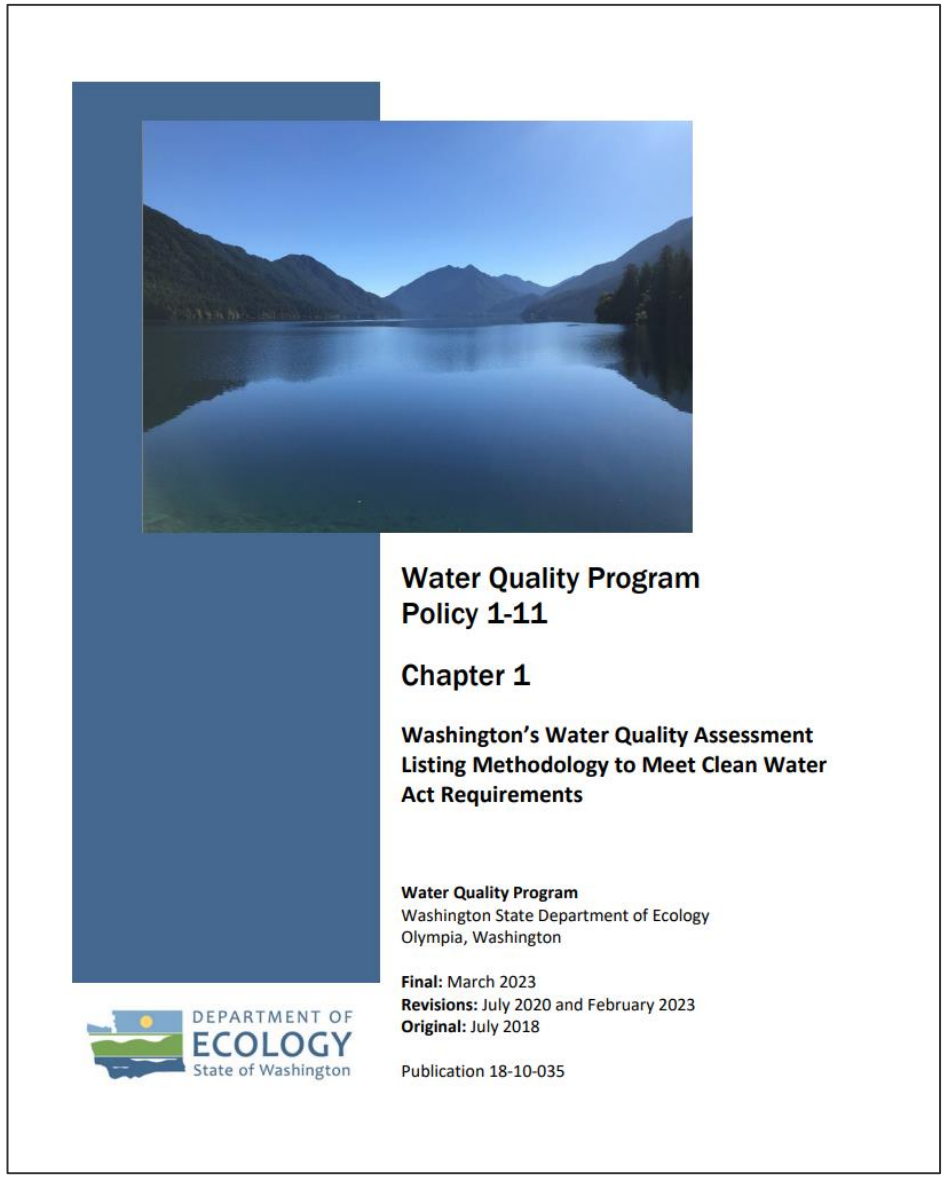
The Water Quality Assessment

- Water quality standards protect designated uses (WAC 173-201A)
  - Aquatic life
  - Contact recreation
  - Water supply
  - Shellfish harvesting
  - Miscellaneous

- Clean Water Act requirement to provide “Integrated Report” on Water Quality to EPA every two years
  - 305(b) report – General report on water quality
  - 303(d) list– Impaired waters not supporting designated uses

Water Quality Policy 1-11

- Chapter 1: Parameter specific methodologies to assess waterbodies.
- Chapter 2: Credible data for water quality management.
- Chapter 1 updated March 2023 after public review
  - Non-substantial revisions
  - Overall accessibility update
  - Harmful Algae Blooms Methodology (HABs)



Harmful Algae Blooms

Designated Use: Water Contact Recreation

Water Quality Standard: WAC 201A-260 (Narrative Criteria)

Data & Information Used to Evaluate HABs

- Public health advisories

Washington State Recreational Guidance for Microcystins, Anatoxin-a, Cylindrospermopsin and Saxitoxin

June 2021

Washington State Department of Health

To request this document in another format, call 1-800-525-0127. Deaf or hard of hearing customers, please call 711 (Washington Relay) or email civil.rights@doh.wa.gov.

Publication Number 333-279

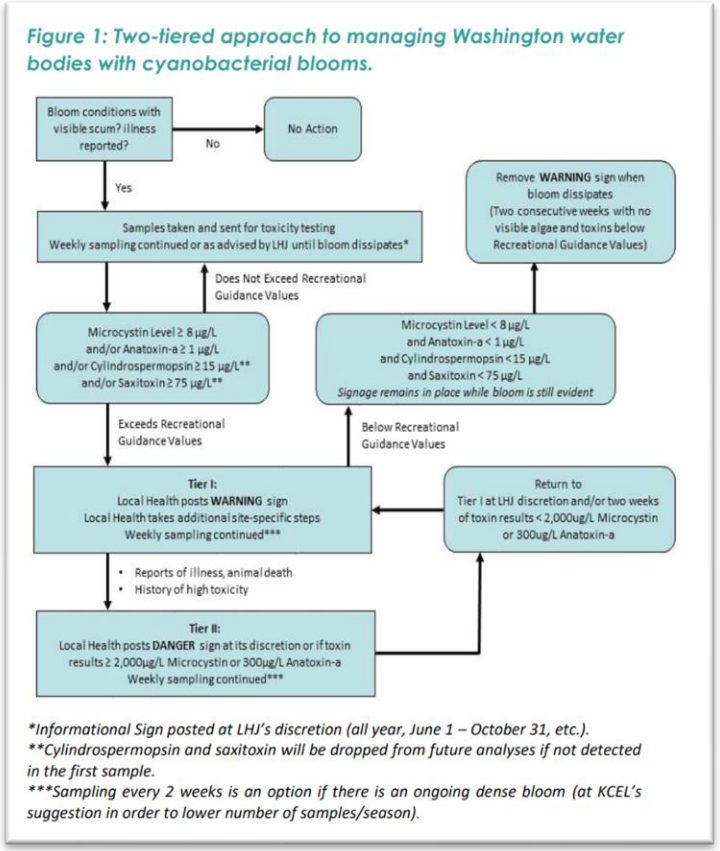


Figure 1: Two-tiered approach to managing Washington water bodies with cyanobacterial blooms.

*Informational Sign posted at LHJ's discretion (all year, June 1 – October 31, etc.).
**Cylindrospermopsin and saxitoxin will be dropped from future analyses if not detected in the first sample.
***Sampling every 2 weeks is an option if there is an ongoing dense bloom (at KCEL's suggestion in order to lower number of samples/season).

Data & Information Used to Evaluate HABs

- Public health advisories
- Exposure event health assessments

Table 1. One Health Harmful Algal Bloom System (OHHABS) definition of a human HAB-associated case

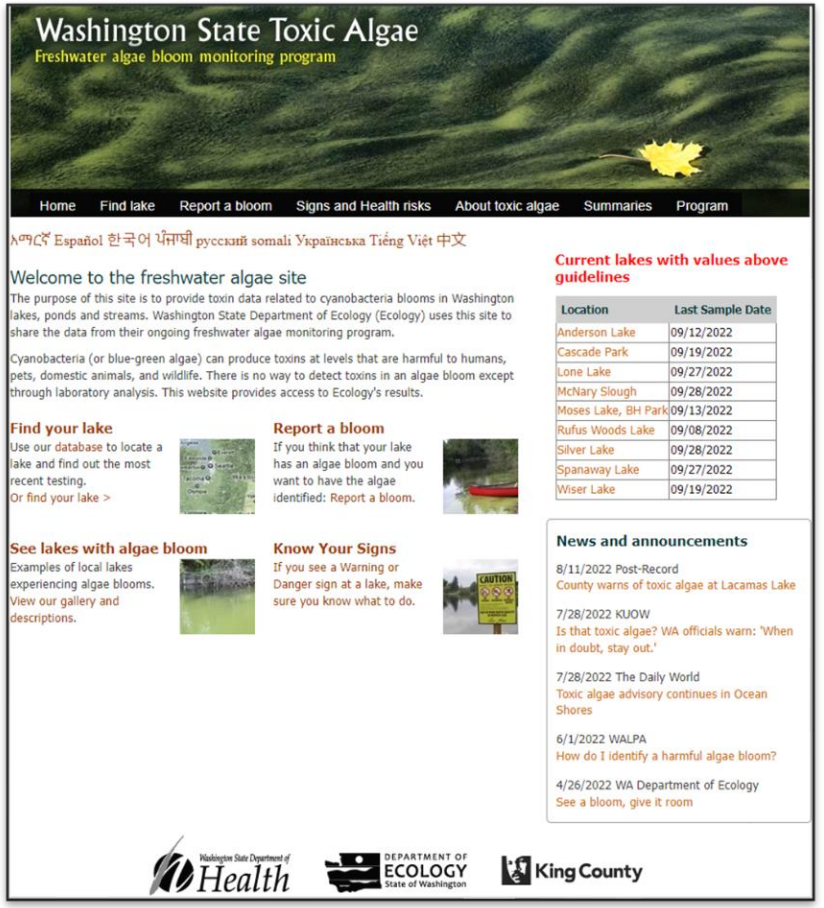
Definition	Criteria							
Human HAB-associated Case	**Exposure[1]**	**Signs/ symptoms[2]**	**Public health assessment[3]**	**Professional medical diagnosis[4]**	**Other causes of illness ruled out[5]**	**Observational or environmental data[6]**	**Laboratory- based HAB data[7]**	**Clinical data[8]**
1. Suspect	Required	Required	Required					
2. Probable	Required	Required	Required			Required to have 1		
3. Probable	Required	Required	Required	Required	+/-	+/-	+/-	
4. Confirmed	Required	Required	Required	Required to have 1		+/-	+/-	Required
5. Confirmed	Required	Required	Required	Required	Required		Required	

[1] Exposure (i.e. physical contact, inhalation, ingestion) to water, algae, seafood, or dietary supplements
[2] Self-reported signs/symptoms after exposure
[3] Public health assessment is defined as the action of compiling all data available and deciding that the illness in question is likely HAB-related
[4] Professional medical diagnosis being provided by a medical practitioner (e.g., doctor, nurse, physician assistant) based on his or her medical assessment of the patient's symptoms, medical history, exposure, etc.
[5] Other more likely causes of illness ruled out based on case data from the investigation (e.g., professional medical assessment, clinical testing, other health and exposure data)
[6] Observational (e.g., scum, algae, water color change, sheen, photographic evidence, satellite data) or environmental (e.g., pH, chlorophyll, nutrient levels) data from a water body to support the presence of an algal bloom
[7] Laboratory detection of cyanobacteria or other potentially toxin-producing algae, (e.g., microscopic confirmation or DNA analyses) or algal/cyanobacterial toxins (e.g., bioassay, HPLC) in a water body, finished drinking water supply, seafood or dietary supplements
[8] Laboratory documentation of cyanobacteria, other potentially toxin-producing algae, or algal/cyanobacterial toxins in a clinical specimen

CDC. 2019. One Health Harmful Algal Bloom System–Public Health Assessment Considerations Tool .

Data & Information Used to Evaluate HABs

- Public health advisories
- Exposure event health assessments
- Cyanotoxin/toxin data
  - Microcystins
  - Anatoxin-a
  - Cylindrospermopsin
  - Saxitoxin



Data & Information Used to Evaluate HABs

- Public health advisories
- Exposure event health assessments
- Cyanotoxin/toxin data

- Algae cell counts
- Photographs
- Historical toxicity info

A 250-year history of cyanobacteria in Anderson Lake, Jefferson County

BY WILLIAM HOBBS AND SIANA WONG, WASHINGTON STATE DEPARTMENT OF ECOLOGY
ROLF VINEBROOKE, UNIVERSITY OF ALBERTA

Category 5 – Impaired (303d list)

1. 2 cyanotoxin sampling events meet DOH recommendations for a WARNING or DANGER public health advisory in each of two or more years.
    - Samples a minimum of one week apart
    - Years do not need to be consecutive

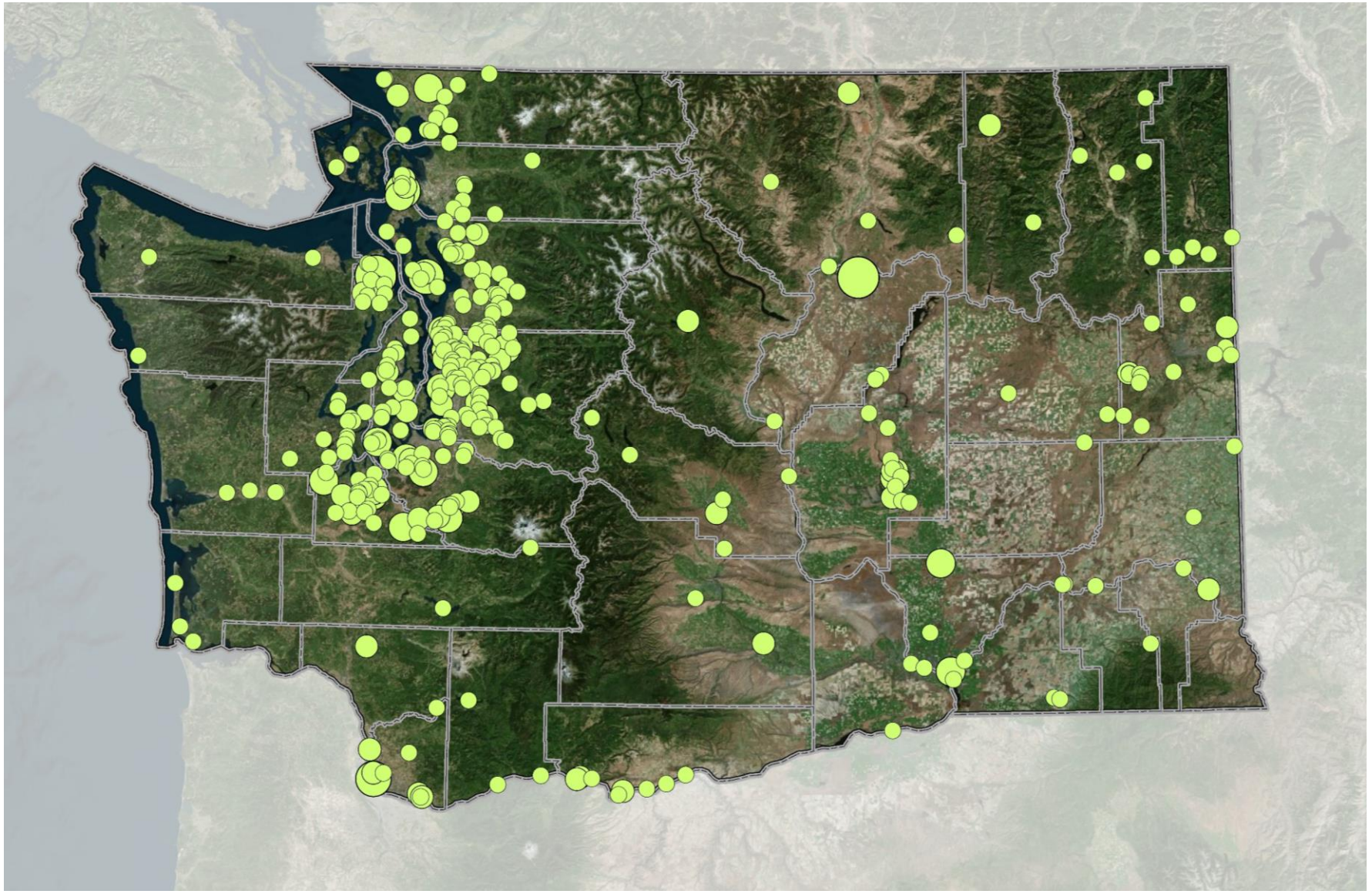
OR

2. A WARNING or DANGER public health advisory for potentially toxin-producing cyanobacteria or algae has been issued by a local or state health jurisdiction in two or more years.
    - Advisory in place for a minimum of 3 weeks
    - Advisory supported by cyanotoxin or other toxicity data.
    - Years do not need to be consecutive

OR

3. DOH public health assessment has identified one or more probable or confirmed human or animal HABs exposure events resulting in illness or death.

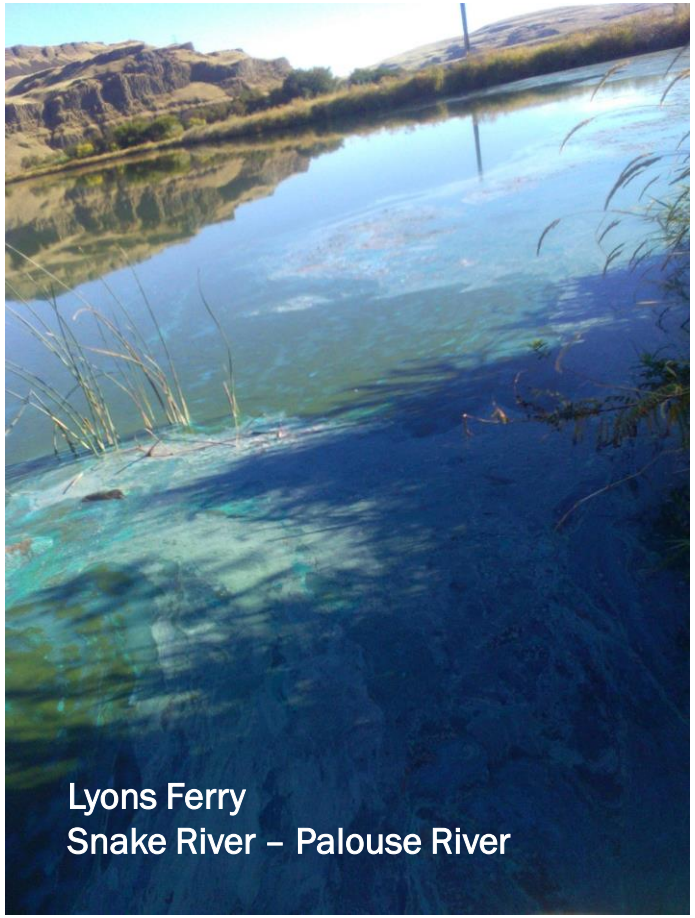
Water bodies exceeding DOH guidance values



Snake River
Washington State

Sample ID: SnakWhit000_23_338
Location: Central Ferry, WA - Whitman County

Photo Credit – Madison Lucas



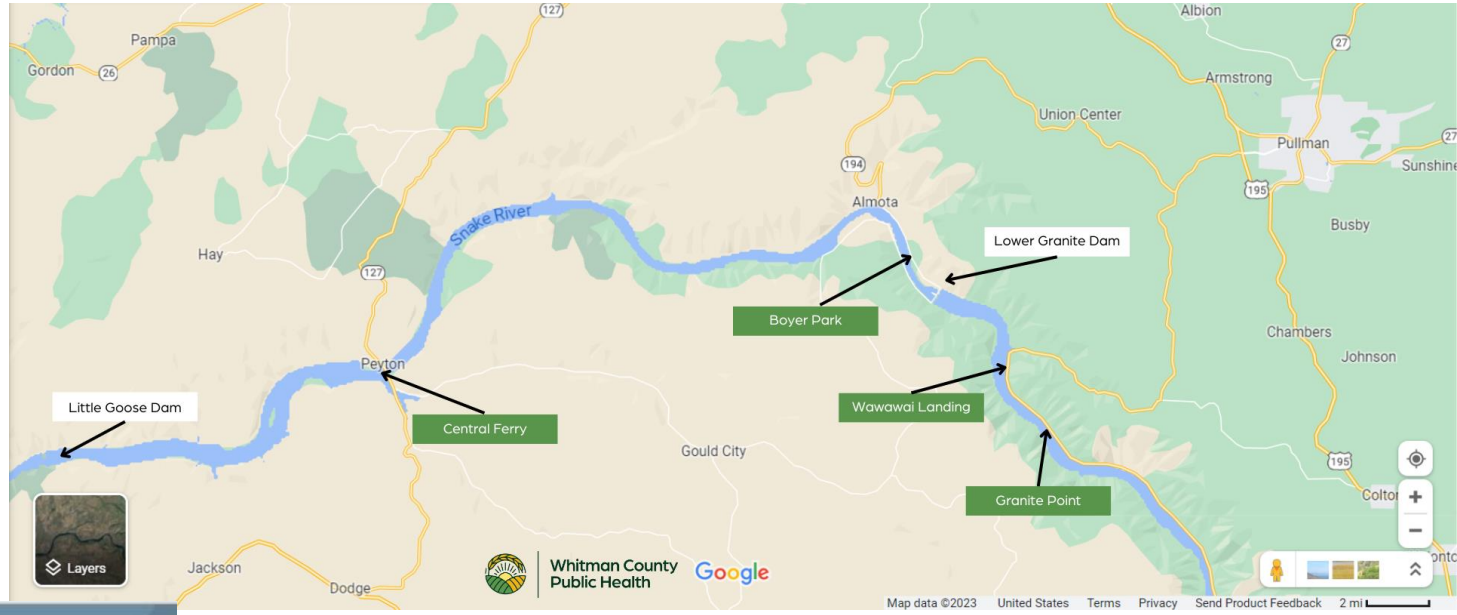
Lyons Ferry
Snake River – Palouse River

Sample ID: LoweWhit344_23_337 Location:
Wawawai Landing - Whitman County

Snake River Toxin Analysis - 2023

Date	Waterbody	Microcystin	Anatoxin-a
7/27/23	Snake River – Palouse River – Lyons Ferry	<MDL	<MDL
9/12/23	Snake River - Lower Granite	0.73	<MDL
9/12/23	Snake River – Lower Granite	>10	<RDL (0.016)
9/18/23	Snake River – Hood Park	<MDL	<MDL
9/25/23	Snake River - Lower Granite	0.8	<MDL
9/25/23	Snake River – Lower Granite	<MDL	<MDL
10/2/23	Snake River – Central Ferry	>10	<MDL
10/2/23	Snake River – Lower Granite	>10	<MDL
10/9/23	Snake River – Central Ferry	25	<MDL
10/9/23	Snake River – Wawawai Landing	139	<MDL
10/10/23	Snake River – Palouse River – Lyons Ferry	<MDL	<MDL
10/16/23	Snake River – Central Ferry	61	<MDL

Snake River sampling sites

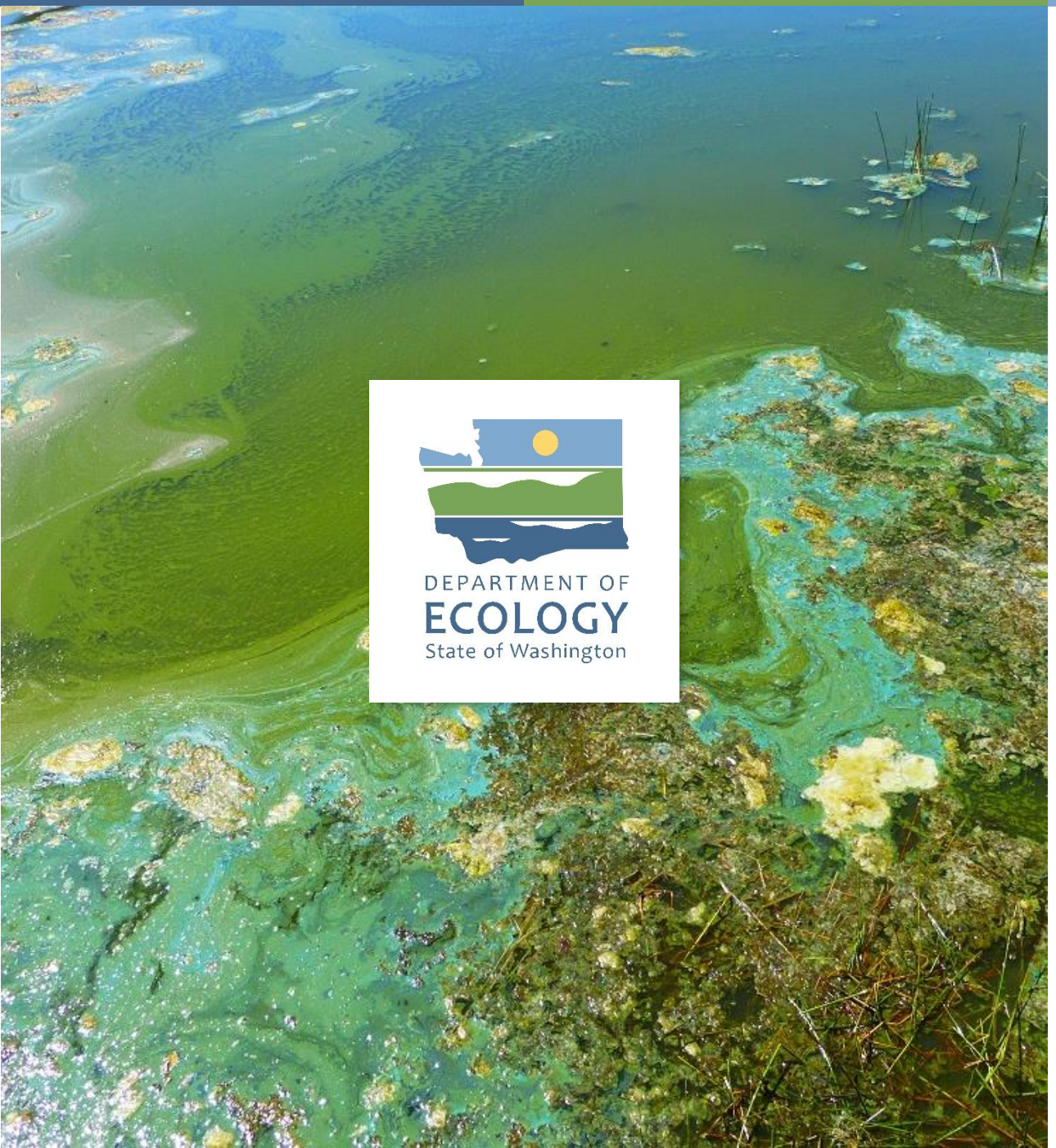


Columbia River sampling sites

	Water and Mat analysis - Columbia River		Anatoxin-a
9/11/23	Howard Amon – water – shoreline - swim	NA	16.44
9/11/23	Howard Amon – water – Lee St dock	NA	0.588
9/11/23	Howard Amon – mat – brown	NA	756
9/11/23	Howard Amon – mat – green	NA	265
9/11/23	Howard Amon – swim dock	NA	10.2
9/11/23	Howard Amon – boat launch dock	NA	0.528
9/12/23	Columbia River – Columbia Pt -dog death	NA	0.344
9/12/23	Columbia River – Leslie Groves	NA	1.39
9/11/23	Columbia River – Wade Park shoreline	NA	4.66

Columbia River Toxin Analysis - 2023

Date	Waterbody	Microcystin	Anatoxin-a
8/16/23	Columbia River – Columbia Park Beach	NA	<RDL (0.038)
8/16/23	Columbia River – Howard Amon Park	NA	11.4
8/16/23	Columbia River – Ringold	NA	<MDL
8/16/23	Columbia River – Leslie Groves	NA	0.160
8/21/23	Columbia River – Howard Amon Park	NA	1.04
8/28/23	Columbia River – Howard Amon Park	NA	58.5
9/4/23	Columbia River – Howard Amon Park	NA	1.03
9/12/23	Columbia River – Howard Amon Park Swim	NA	10.2
9/12/23	Columbia River – Howard Amon Park Boat dock	NA	0.528
9/18/23	Columbia River – Quarry Pond	<MDL	<MDL
9/19/23	Columbia River – Howard Amon Park	NA	0.147
9/19/23	Columbia River – Columbia Pt	NA	0.175
9/19/23	Columbia River – Leslie Groves	NA	0.517
9/19/23	Columbia River – Wade Park	NA	0.159
9/25/23	Columbia River – Howard Amon Park	NA	0.317
9/25/23	Columbia River – Leslie Groves	NA	0.307
9/25/23	Columbia River – Wade Park	NA	0.081
10/3/23	Columbia River – Howard Amon Park	NA	1.52
10/9/23	Columbia River – Howard Amon Park	<MDL	3.17



Thank You!

Feel free to contact me at

lsee461@ecy.wa.gov