



March 2015

DOH 331-531

Fact Sheet

Harmful Algal Blooms

Water System Guidance

Cyanobacteria, or “blue-green algae,” occur naturally in freshwater lakes, ponds, and river impoundments. Some cyanobacteria blooms generate toxins called cyanotoxins. These toxins can harm people and pets that drink water containing cyanotoxins—or play, wade, swim, or water ski in lakes with toxic blooms.

Cyanotoxins may cause health effects such as skin rashes and lesions, vomiting, gastroenteritis, headaches, and eye, ear, and throat irritations. More severe symptoms affect the liver or the nervous system.

Washington hasn’t documented many incidents of toxic cyanobacteria in surface water sources used for drinking water, but this problem does occur. This publication explains how to protect your water system, how to get water samples tested for cyanotoxins, and common types of cyanotoxins. If you need help, call your local health jurisdiction or us. We work with local health to determine needed actions, if any, based on sampling results.



Photo by Gareth Munger

Blue-green algae occur naturally in freshwater lakes, ponds, and rivers.

Protecting your water system

Reduce introduction of cyanobacteria into the treatment plant.

- Don’t recycle backwash water.
- Use an alternate water source or adjust your intake to minimize the amount of cyanobacteria entering the treatment plant.

Optimize filtration to remove cyanobacteria intact. This will prevent release of toxins in cells.

- Don’t use an algaecide if a bloom is present. It will break cells and release toxins.
- Minimize preoxidation prior to filtration; it can break cells. Some preoxidation may still be needed for effective treatment performance.

Reduce or remove algal toxins by oxidation and adsorption.

Powdered activated carbon (PAC), granular activated carbon (GAC), and post filtration disinfection (chlorine and ozone) can effectively remove or chemically oxidize cyanotoxins.

Getting water samples tested for cyanotoxins

The Department of Ecology’s Freshwater Algae Control Program funds a laboratory to conduct toxicity tests of lake samples for four cyanotoxins: microcystins and cylindrospermopsins (liver toxins) and anatoxin-a and saxitoxins (nerve toxins). See sampling instructions on the next page.

Check NWToxicalgae.org for historical information and the latest data on Washington’s lakes.



HELPING TO ENSURE SAFE AND RELIABLE DRINKING WATER

How to sample for cyanotoxins

- Select sample sites. You should collect both raw and treated water samples.
- Generate a sample number and data sheet at <https://www.nwtoxicalgae.org/>
- Use clean glass containers with secure lids. Dark containers are best.
- Collect at least 250 milliliters of:
 - Raw water from the intake plumbing just prior to all treatment processes.
 - Treated water after all treatment processes at the entry point to distribution.
- Label the sample bottles (not the caps) with the date, time, your name, system name and sample location.
- Keep the samples cool.
- Deliver or mail to the King County Environmental Lab as soon as possible.
 - **Mail:** Use an overnight service and ship the sample at the beginning of the week (NOT Friday). Include ice or a frozen gel pack. If samples get too warm, the lab will have to throw them out.
 - **Delivery:** Drop samples off between 8 a.m. and 5:30 p.m., Monday-Friday, except holidays.

**King County
Environmental Lab**
322 West Ewing Street
Seattle, WA 98119-1507
Phone: 206-477-7200

Types of cyanotoxins

Microcystins are the most thoroughly investigated cyanobacterial toxins. Microcystin-LR is the most common of the many variants identified. Microcystins can be produced by *Anabaena*, *Microcystis*, *Oscillatoria* (*Planktothrix*), *Nostoc*, and *Anabaenopsis* species and from the terrestrial genus *Hapalosiphon*. More than one type of microcystin may occur in a particular cyanobacteria strain.

Microcystins primarily affect the liver in animals. A lethal dose of microcystins causes death in vertebrates by liver necrosis within hours or up to a few days.

Liver injury from a non-lethal dose is likely to go unnoticed. Noticeable symptoms occur only in severe cases. Other studies show that microcystin toxicity is cumulative. Researchers suspect microcystins are liver carcinogens, which could increase cancer risk to humans following continuous, low level exposure.

Anatoxin-a is one of three neurotoxic alkaloids isolated from cyanobacteria. It is produced by various species of cyanobacteria including *Anabaena*, *Planktothrix* (*Oscillatoria*), *Aphanizomenon*, *Cylindrospermum*, and *Microcystis*. Anatoxin-a was first detected in Canada in the 1960s. Since then, there have been reports of cattle, elk, cat, and dog poisonings.

Anatoxin-a degrades readily to nontoxic products in sunlight and at a high pH. In natural blooms in eutrophic lakes, anatoxin-a half-life is typically less than 24 hours.

Algal cells retain anatoxin-a in favorable growth conditions. However, cells release the toxin into the gastrointestinal tract if an animal consumes contaminated water. Therefore, pets that lick scum from their fur are at highest risk from anatoxin-a exposure. Ingestion of a sub-lethal dose of these neurotoxins leaves no chronic effects and recovery appears to be complete.

For more information:

Call our toxicology section at 360-236-3330 or one of our regional offices.

Eastern Region: Spokane (509) 329-2100

Northwest Region: Kent (253) 395-6750

Southwest Region: Tumwater (360) 236-3030

Visit Blue-Green Algae at <http://www.doh.wa.gov/CommunityandEnvironment/Contaminants/BlueGreenAlgae>

Our publications are online at <https://fortress.wa.gov/doh/eh/dw/publications/publications.cfm>

For people with disabilities, this document is available on request in other formats. To submit a request, please call 1-800-525-0127 (TDD/TTY call 711).



Cyanobacteria toxins found in Washington include two liver toxins and two nerve toxins.

Photo by Gene Williams

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND
HEALTHIER WASHINGTON