Human Health Hazards

State of Wisconsin

Algae Blooms: Blue-Green Algae/Cyanobacteria

What are cyanobacteria or blue-green algae?

Blue-green algae, technically known as cyanobacteria, are microscopic organisms found naturally in Wisconsin lakes, streams and ponds at low levels. When conditions are favorable, and usually in the summer, the number of these blue-green algae can increase dramatically, or "bloom." Algae blooms may be visible as thick mats or scum on the surface of the water. The scum is often smelly, and can be bluish-green to red in color. While many types of cyanobacteria are associated with visible scum on the surface of lakes, some blooms are present without visible surface scums.

Algae blooms may be visible as thick mats or scum on the surface of the water. The scum is often smelly. It can be bluish-green to red in color, and can almost look like paint on the surface of the water.

Blue-green algae need warm temperatures, light, phosphorus, and nitrogen to reproduce. Phosphorus and nitrogen are commonly found in animal and human waste and in fertilizers. Some common ways for phosphorus and nitrogen to enter lakes and streams are from agricultural and lawn runoff, improperly functioning septic systems, and erosion of nutrient-rich soil.

While blue-green algae are not new to Wisconsin, the Wisconsin Department of Natural Resources has increased its cyanobacteria sampling efforts in selected state lakes in the past year.

Does the presence of an algae bloom always mean the water is contaminated?

No. Just as not all cyanobacteria have blooms that are visible, not all cyanobacteria produce harmful toxins. Between 30 and 50 percent of blooms are from non-toxic species of cyanobacteria.

Samples of the bloom must be analyzed in a laboratory before a body of water can be declared safe. All cyanobacterial blooms are potentially toxic, so it is best to stay away from contaminated water until it has been tested and declared safe.

Health effects of exposure to toxins

When cyanobacteria are present in high numbers, some bathers may experience eye, ear, or skin irritation, or gastrointestinal problems like vomiting and diarrhea.

Some species of cyanobacteria can also produce poisons or toxins. These toxins may cause nerve or liver problems in people or animals that are exposed to them in large amounts. Signs of poisoning appear between a couple of hours to several days following exposure. When large amounts of the toxins are ingested, it can kill animals. Poisoning is more severe the smaller the person or animal, and the larger the amount of toxin ingested. However, not all cyanobacteria are poisonous, and the bacteria which can produce poisonous toxins de not always do so.

The following table summarizes the symptoms produced by different toxins produced by species of cyanobacteria:

Type of Toxin	Species Producing These Toxins	Toxins Produced	Symptoms
Neurotoxins (affecting the nervous system)	Anabaena Oscillatoria	anatoxin-a anatoxin-a(s) saxitoxin	Muscle cramps, twitching, paralysis, cardiac or respiratory failure, death in animals
Hepatotoxins (affecting the liver)	Microcystis Cylindrospermopsis	microcystin cylindrospermopsin	Nausea, vomiting, acute liver failure

Simply swimming in water that is not visibly affected by a blue-green algae bloom is not expected to cause health effects. However, some species, such as Cylindrospermopsis, may produce high levels of toxins without a visible bloom. And some people, such as children, may be sensitive to even low levels of algae toxins and might experience mild symptoms.

How can people/animals be exposed to blue-green algae?

Humans or animals can be exposed to blue-green algae and/or the toxins they produce anytime people or animals come into contact with water containing cyanobacteria. Health effects can occur when surface scums or water containing high levels of blue-green algae toxins are swallowed, through contact with the skin (as when swimming, wading or showering), or when airborne droplets containing toxins are inhaled (also while swimming, bathing or showering).

Pets that have been swimming in an area with an algae bloom may ingest significant amounts of toxins by licking their fur after leaving the water.

How can people avoid or limit their exposure?

The presence of the algae does not mean water in a particular lake is toxic. However, large smelly blooms may indicate that blue-green algae are present in large numbers. Anytime there is a large bloom, toxins could be present at concentrations that may be a health threat. Therefore, DHFS recommends that residents not swim or wade in water with blooming algae, or allow their pets to enter the water when blooms are present.

Toxic blooms are unpredictable. Laboratory analysis is expensive and can be misleading. Therefore, approach the problem as you would changing weather conditions. If the water looks threatening, avoid it until a more "normal" appearance returns. A blue-green bloom should be avoided if it changes from "greenish water" to a thick, blue-green or green, paint-like scum. During a bloom, swimming, water-skiing, and other aquatic recreation in the area of the bloom should be suspended. Livestock and pets should be temporarily provided with a different water source. Often it is enough to move the livestock or recreational activity to the opposite side of the lake to avoid a bloom. The best way to reduce or avoid exposure is to follow posted signs and follow common sense. Here are some basic guidelines:

1. Never drink untreated surface water, whether or not algae blooms are present. Boiling the water will not remove toxins. Owners should always provide alternative sources of drinking water for domestic animals and pets, regardless of the presence of algae blooms.
2. If washing dishes in untreated surface water is unavoidable, rinsing with bottled water may reduce possible residues.
3. People, pets and livestock should avoid contact with water where algae are visible (e.g., pea soup, floating mats, scum layers, etc.) or where the water is discolored. Do not swim, dive, or wade in this water. Do not use the water to fill a pool or for an outdoor shower.
4. Always rinse off or rinse off your pet after swimming in any ponds, lakes or streams in Wisconsin, regardless of the presence of visible algae blooms. Pay close attention to the bathing suit area and pet's fur.
5. Contact your local health department or department of natural resources office to report any large algae blooms on public or private lakes, streams or ponds.
6. Never allow children or pets to play in or drink scummy water. Do not allow pets to eat dried scum or algae on the shoreline.
7. Do not water-ski or jet-ski over algae mats.
8. Reduce sources of nitrogen and phosphorus that can enter the water. Use fewer pesticides and fertilizers (for grass and agriculture), and eliminate wastewater discharge (residential, agricultural, and municipal) that may enter Wisconsin ponds, lakes and streams.
9. Do not use algaecides to kill the cyanobacteria. When the cyanobacteria cells die, the toxins within the cells are released.
10. Obey posted signs for beach closings. Wait at least one to two weeks after the disappearance of cyanobacteria before returning to the water for wading, bathing or other activities.

What to do if you are exposed?

If you come into contact with water with blue-green algae bloom, wash thoroughly with clean water, paying special attention to the swimsuit area. When pets have been swimming or wading in water where blue-green algae mats are present, owners should thoroughly rinse off their pet's fur. Pets can ingest algae when they groom themselves after bathing (i.e. licking their fur).

If you develop symptoms consistent with cyanotoxin exposure (see above) following contact with scummy water, contact your physician or the Poison Control Center at 1-800-222-1222. If your pet has been wading or swimming in a pond, lake or stream, or has eaten dried algae, and is experiencing any seizure-like symptoms, or any of the other symptoms described, call your veterinarian immediately.

Report exposures to your local health department or local natural resources office. They can track exposures, and use this information to determine when sampling efforts need to be increased, or if water bodies should be closed to the public.

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