

Blue-Green Algae (Cyanobacteria) Blooms

What is the Issue?

During the warm summer months some lakes experience algal blooms. This happens when the microscopic algae multiply and become so numerous that the water looks like thick soup. Most often what looks like algae blooms are actually caused by cyanobacteria. It is not possible to tell cyanobacteria apart from algae with the naked eye.

Cyanobacteria are always present in Alberta lakes, but become a problem when they bloom. Severe cyanobacterial (and algal) blooms can occur when excessive nutrients, especially phosphorus, enter the lake. This is often the result of human activities within the watershed. Cyanobacterial blooms can pose health risks to humans, pets, livestock and wildlife.

Councillors often receive complaints from residents regarding the presence of these blooms. They need to be aware of the signs of a cyanobacteria bloom, know why they occur, and be aware of the activities around their lake that may be contributing to these blooms. Councillors should also become familiar with the signs or symptoms of people or animals that have ingested toxic cyanobacteria.

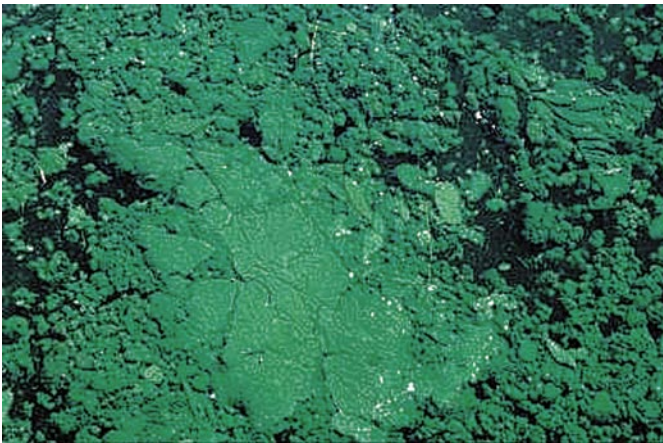


Photo credit: Ron Zurawell

Aphanizomenon bloom

Background

What are Cyanobacteria?

Cyanobacteria, commonly called blue-green algae, are not algae at all. They are classified as bacteria, but they do exhibit plant (algae)-like characteristics. Cyanobacteria live in the water and are photosynthetic, meaning that by converting energy from light they can manufacture their own food, using phosphorous and other available nutrients.

Under nutrient rich conditions, these microscopic organisms can grow rapidly to form extensive "blooms." They may eventually float to the surface and accumulate near shore as a bright green surface scum, which cannot be picked up like filamentous green algae mats can be.

Pigments in the cyanobacteria cause the water to appear colored. The cyan part of their name means blue-green. It is due to the combination of green chlorophyll pigment and a unique blue pigment (phycocyanin). Not all blue-green algae are blue-green in color. Their pigmentation can be yellow-green, green, grey-green, grey-black, or even red. The water can become paint-like and coat sand and rocks along the shore.

Problems Caused by Cyanobacterial Blooms

Cyanobacterial blooms are visually unattractive. Some bloom-forming species produce organic compounds responsible for giving off a bad smell. They also produce foul smelling masses as they die and decompose. The process of decomposition requires oxygen and can significantly reduce the amount of dissolved oxygen in the water. This can cause aquatic organisms to suffocate and can result in a “summerkill” of fish.

More importantly, a small number of bloom-forming species of cyanobacteria produce potent liver and nerve toxins. Toxic cyanobacteria can cause serious illness and possibly death in the pets, livestock, wildlife and humans that ingest them. Cyanobacteria are toxic throughout their life cycle. Some toxins are stable enough in the environment that surface waters may remain highly toxic for several weeks following the collapse of a bloom. For this reason, the disappearance of bloom material is no indication of safe, non-toxic water.

What Causes a Bloom?

Cyanobacteria can inhabit almost any aquatic environment. They thrive in alkaline lakes with sufficient nutrients to sustain their growth and reproduction. Blooms can occur in relatively undeveloped lakes, but in general, the more fertile, or nutrient rich, the lake is, the more likely it will support a bloom.

Alberta’s prairie and boreal lakes are naturally productive, or “green,” to some degree, primarily due to the soils they sit on and that surround them. Excessive nutrients, especially phosphorous and to some degree nitrogen, entering the water, can tip the scale in favour of these blooms. When conditions are right, blooms of cyanobacteria can occur, usually appearing from mid-summer through mid-autumn as thick green scum covering the water’s surface.



Photo credit: Ron Zurawell

The Affect of Human Activities

Human activities within the watershed are often the source of the extra nutrients that get carried into the lake. Besides being naturally present in the lake, phosphorous can be added in various ways.

Fertilizers – even really good ones – are never totally taken up by the grass they are put on. When people with property at the lake fertilize their lawns some of the fertilizer will end up in the lake with surface water runoff. If fertilizer is “good” for land plants such as grass, it is also “good” for aquatic plants.

Laundry and dishwashing detergents can also have high concentrations of phosphorus. If they manage to get into the lake, they will also add to “nutrient loading.”

Runoff from faulty septic systems and **manure** from agricultural lands can also add to the problem.

What Should I Do?

Municipalities and cottagers are advised to monitor lakes for the detection of cyanobacterial blooms through weekly visual inspections along shorelines.

Through local publications or meetings, advise residents to avoid recreational contact with severe blooms and to keep pets from entering these waters. **It is very difficult to tell if a bloom is toxic.** The best thing to do when there is a bloom at your lake is to err on the side of caution.

- Treat any intense bloom with suspicion.
- Do not drink water from bloom-infested lakes or reservoirs.
- Do not swim or wade in water containing concentrated algae or cyanobacteria.
- Watch children carefully, as they are more likely to drink lake water than adults are.
- Provide alternative sources of drinking water for pets and livestock.
- Contact your local Public Health Department.

Note:

It is not the purpose of this chapter to give medical information or advice. Councillors can get this from the Regional Health Authority or from a medical doctor.



Photo credit: Ron Zurawell

Education and Information

During a bloom, chances are that many residents will be contacting Summer Village councillors and administrators about it. Councillors can use this as an opportunity to explain the human activities that are likely contributing to this problem.

Some residents may suggest poisoning these plants, but this is not a viable solution in something as large as a lake. Many of the chemicals that would be used to kill these organisms are also toxic to other forms of life. The best long-term solution is to reduce the amount of nutrients entering the lake.

Management Strategies

For more information on management strategies that can help reduce nutrient inputs into the lake, see the **Fertilizer Use** chapter of this guide.



Photo credit: Ron Zurawell

Who Can I Contact?

- For information regarding algae/cyanobacterial blooms at your lake, contact the regional office of Alberta Environment.
- For information on health matters and cyanobacterial blooms, contact your Regional Health Authority.
- If someone experiences symptoms that may be related to a cyanobacterial bloom, contact a physician immediately.
- If a pet has symptoms, contact a veterinarian as soon as possible.

Are There Any Resources Available?

- Alberta Environment provides educational materials on toxic cyanobacterial blooms at: <http://www3.gov.ab.ca/env/water/swq/brochures/algalblooms.html> and, <http://www3.gov.ab.ca/env/water/swq/brochures/algaltoxicity.html>.
- The Soil and Water Conservation Society of Metro Halifax has information on cyanobacteria at: <http://www.lakes.chebucto.org/cyano.html>
- The Minnesota Pollution Control Agency has information on cyanobacteria at: <http://www.pca.state.mn.us/water/clmp-toxicalgae.html>
- **Managing Phosphorus to Protect Water Quality** from Alberta Agriculture at: [http://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/agdex929](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/agdex929)
- **Managing Nitrogen to Protect Water Quality** from Alberta Agriculture at: [http://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/agdex928](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/agdex928)
- **A Primer on Water Quality: Pollutant Pathways** from Alberta Agriculture at: [http://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/wat3350](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/wat3350)
- The Alberta Lake Management Society (ALMS) has information on lake monitoring on their web-site at: (<http://www.alms.ca>).
- General information on lake fertility can be obtained by calling the Evaluation and Reporting Section of Alberta Environment at 780-427-6278.