Alberta Health Services

Frequently Asked Questions

Blue-green algae (cyanobacteria)

1. What are blue-green algae (cyanobacteria)?

Blue-green algae (also called cyanobacteria) are a type of bacteria that occur naturally in many lakes, ponds and reservoirs. These bacteria can multiply rapidly during the summer, leading to extensive growth called a bloom. Some bloom-forming types of blue-green algae (cyanobacteria) produce toxins. When these blooms die and decay, these toxins may be released into the water.

2. What do blue-green algae (cyanobacteria) blooms look like?

Although often referred to as “blue-green” in color, blue-green algae (cyanobacteria) blooms often range in color from blue-green or greenish-brown, brown or red/pink, and often smell musty or grassy. Depending upon the species, composition, and age of the bloom, it may appear like grass clippings, globs, fuzz balls or paint/pea soup. Decomposing blooms can appear discolored (white, purple) and smell of ammonia.

3. Are blue-green algae (cyanobacteria) blooms a health risk?

Yes, people who come in contact with visible blooms can experience health concerns, including skin irritation/rash, sore throat, red eyes, swelling of the lips, and hay-fever like symptoms. People (as well as livestock and other animals) who drink this water are also at risk of headache, fever, diarrhea, vomiting and cramps, muscle and joint pain, liver damage and even death.

4. What are the health risks associated with exposure to a blue-green algae (cyanobacteria) bloom?

The following symptoms may appear within one to three hours of contact with a blue-green algae (cyanobacteria) bloom. Symptoms in children are often more pronounced; however, all humans are at risk.

Contact Exposure:

- skin irritation and rash
- sore throat
- sore, red eyes
- swelling of the lips
- hay fever symptoms (e.g., stuffy nose)

Consumption of blue-green algae (cyanobacteria)-contaminated water:

- headache
- diarrhea
- weakness
- liver damage
- fever (temperature over 38.5 °C or 101.3 °F)
- nausea and vomiting
- muscle and joint pain
- cramps in the abdomen

5. How can I know if blue-green algae (cyanobacteria) blooms are a risk at a lake I'm visiting?

Alberta Health Services (AHS) issues blue-green algae (cyanobacteria) Health Advisories for any lakes in which a blue-green algae (cyanobacteria) bloom has been identified. Health Advisories may be issued when routine water samples results exceed the satisfactory water quality benchmarks outlined in the Alberta Safe Beach Protocol, or in follow-up to complaints. Following the Alberta Safe Beach Protocol, beach operators complete visual inspections of lakes, and also collect water samples for lab testing. AHS issues blue-green algae (cyanobacteria) Health Advisories when blue-green algae (cyanobacteria) blooms are visually identified or confirmed through sample results, as their presence can pose a risk to human health.

All active blue-green algae (cyanobacteria) advisories are posted online at www.albertahealthservices.ca (Health Advisories section). Check this website information before visiting a recreational lake in Alberta. AHS also posts signage around lakes with a history of blue-green algae (cyanobacteria) blooms, so watch for signage alerting visitors to risk and/or presence of blue-green algae (cyanobacteria). Additionally, because blue-green algae (cyanobacteria) blooms can come and go throughout the season, and because not every lake is monitored, Albertans are encouraged to watch for blooms on the surface of any lake, and if spotted, to avoid contact with that area of the lake. Areas of the lake that do not have visible blooms can be used for recreational purposes, even when a blue-green algae (cyanobacteria) Health Advisory is in place.

6. What should I do if a blue-green algae (cyanobacteria) Health Advisory is in place for a lake I'm visiting?

If a blue-green algae (cyanobacteria) Health Advisory is in place for the lake you are visiting, or, if you can see a bloom (such as described in Question #2, above) on the surface of the lake:

- **Avoid all contact** with blue-green algae (cyanobacteria) blooms. If contact occurs, wash with tap water as soon as possible.
- **Do not swim or wade** (or allow your pets to swim or wade) in any areas where blue-green algae (cyanobacteria) is visible.
- **Do not** feed whole fish or fish trimmings from this lake to your pets.
- **Consider** limiting human consumption of whole fish and fish trimmings from this lake, as it is known that fish may store toxins in their liver. (people can safely consume fish fillets from this lake).
- **Never** drink or cook with untreated water directly from any lake, including a lake at which a blue-green algae Health Advisory is in place. Boiling lake water will not remove the toxins produced by blue-green algae (cyanobacteria), so, an alternate source of drinking water is required.
- **Notify** your local Environmental Public Health office if Health Advisory signage is not posted at the lake you are visiting.

Note: *areas of the lake that do not have visible blooms can be used for recreational purposes, even when a blue-green algae Health Advisory is in place for the lake.*

7. Can I swim or play in lake water where blooms aren't visible?

Areas of the lake that do not have visible blue-green algae (cyanobacteria) blooms can be used for recreational purposes, even when a blue-green algae (cyanobacteria) Health Advisory is in place. It is always recommended to rinse off with clean tap water as soon as practically possible after leaving any lake and towel dry, at any time.

For a lake with a blue-green algae Health Advisory, look for a part of the swim area that:

- does not have a scum layer on top
- is not colored a significant green or bluish color
- has no significant suspended particles or globs
- as you wade out, ensure the swim area is visually clear to the bottom of the lake (seeing your toes at 1 meter is a reasonable indicator)

Note - *Reference photos of some types of blue-green algae (cyanobacterial) blooms are provided in Appendix A.*

8. If I get my drinking water from a lake with a blue-green algae (cyanobacteria) bloom, what should I do?

Albertans are reminded to never drink or cook with untreated water directly from any lake, at any time. Further, boiling lake water will not remove the toxins produced by blue-green algae (cyanobacteria). As such, an alternate source of drinking water should be used for drinking, and cooking. An alternate source of drinking water should also be provided for pets and livestock.

9. Is it safe to cook with water that might contain blue-green algae (cyanobacteria)?

No, it is not safe to cook with water that may contain blue-green algae (cyanobacteria). Albertans should never drink or cook with untreated water directly from any lake, at any time. Boiling lake water will not remove the toxins produced by blue-green algae (cyanobacteria). As such, an alternate source of drinking and cooking should be used.

10. What about watering my vegetable garden?

It is possible that fruits and vegetables could absorb toxins from blue-green algae (cyanobacteria) contaminated water. As such, Albertans should not use water contaminated with blue-green algae (cyanobacteria) to water edible plants. This is particularly important for plants with edible parts exposed to the ground surface (such as cabbage, lettuce, tomatoes, and other salad vegetables).

11. If I use this water for household purposes, but do NOT drink this water, is it safe?

Lake water that may contain blue-green algae (cyanobacteria) should not be used for household purposes that may result in contact with skin or consumption of water. Note that dishes, utensils and anything used for cooking, eating or drinking, should not be cleaned with blue-green algae (cyanobacteria) contaminated water.

12. How do blue-green algae (cyanobacteria) affect livestock and pets?

Although lakes are often a source of drinking water for livestock and pets, lakes contaminated with blue-green algae (cyanobacteria) can be deadly to livestock and pets, if algae (cyanobacteria) produced toxins are present. Some illnesses and deaths of livestock and wildlife have been linked to animals' drinking water containing blue-green algae (cyanobacteria). Animals aren't concerned about how water looks or smells. It is important to keep animals away from natural water sources that contain algae (cyanobacteria) blooms. It is also important that you do not let animals eat whole fish or trimmings (any waste from filleting a fish including the head, bones, intestines, or skin) from affected lakes.

13. Who issues blue-green algae (cyanobacteria) Health Advisories?
Alberta Health Services (AHS) issues blue-green algae (cyanobacteria) Health Advisories. All active blue-green algae (cyanobacteria) Health Advisories are posted online to www.albertahealthservices.ca (health advisories section). These advisories are also sent out to all local-area media surrounding a lake, and tweeted by AHS. Blue-green algae (cyanobacteria) related signage is also posted around lakes impacted by this issue.

14. Why does AHS issue blue-green algae (cyanobacteria) Health Advisories?
It is AHS' duty to protect the health of Albertans. This includes ensuring Albertans are aware of potential risks to their health, and of the steps that they can take to reduce their risk. Blue-green algae (cyanobacteria) blooms pose a risk to the health of Albertans. Issuing blue-green algae (cyanobacteria) Health Advisories is one way that AHS is ensuring Albertans have the information they need to protect their own health, while safely enjoying Alberta's lakes.

15. On what basis does AHS issue blue-green algae (cyanobacteria) Health Advisories?
AHS identifies blue-green algae (cyanobacteria) blooms proactively through its Routine Recreational Water Quality Monitoring Program, and in follow-up to complaints. Through the Routine Recreational Water Quality Monitoring Program, beach operators complete visual inspections of lakes, and also collect water samples for lab testing. AHS issues blue-green algae (cyanobacteria) Health Advisories when blue-green algae (cyanobacteria) blooms are identified, as that presence can pose a risk to human health. These Health Advisories remain in place for the duration of the health risk.

16. When will AHS lift a blue-green algae (cyanobacteria) Health Advisory? On what basis?
AHS lifts (or "rescinds") a blue-green algae (cyanobacteria) Health Advisory once conditions in the lake are such that the blue-green algae (cyanobacteria) can no longer grow and the risk of toxin often released by the cells after death, has passed. Typically, the Health Advisories are lifted in late autumn, several weeks after water temperatures cool to such an extent as to no longer support blue-green algae (cyanobacteria) growth. This approach ensures that the Health Advisories remain in place until such time as AHS is certain that the risks associated with blue-green algae (cyanobacteria) blooms, and/or their toxin, is extremely minimal.
Note: *areas of the lake that do not have visible blooms can be used for recreational purposes, even when a blue-green algae Health Advisory is in place for the lake.*

17. Why do blue-green algae (cyanobacteria) Health Advisories remain in place for a whole season, once issued?
Weather and wind conditions can cause blue-green algae (cyanobacteria) blooms to move rapidly from one location in a lake to another, and may even temporarily sink below the surface; however, this doesn't mean that the risks of the bloom are gone. Further, if a lake has a bloom at any point in one season, it is likely that that bloom will reappear throughout the season, and it is important that Albertans remain vigilant in avoiding blooms that do reappear. For this reason, AHS keeps the Health Advisories in place until lake water and weather conditions are such that the blue-green algae (cyanobacteria) can no longer grow, and that the risk of toxin often released by the blue-green algae (cyanobacteria) after death, has passed. In other words, AHS keeps the Health Advisories in place until the risk to human health has passed.
Note: *areas of the lake that do not have visible blooms can be used for recreational purposes, even when a blue-green algae Health Advisory is in place for the lake.*

18. Why does lake water quality need to be monitored?

From time to time, lake water can be impacted by bacteriological concerns (including fecal contamination), and by natural growth of blue-green algae blooms (which are an accumulation of cyanobacteria). These concerns can impact the quality of the water to such an extent as to present potential risks to the health of lake users. Monitoring ensures that these risks are identified, quickly, and that Albertans are informed. By keeping Albertans informed, we are ensuring that the lakes of Alberta continue to be enjoyed, safely.

19. How many lakes are monitored by AHS?

The number of public recreational beaches monitored through the Routine Recreational Water Quality Monitoring Program varies from year to year; however, on average, over the past several years, between 30 and 40 bodies of water with public beaches have been included in the monitoring program, each summer season.

20. How often are the lakes monitored by AHS?

Through the Routine Recreational Water Quality Monitoring Program, recreational water site operators are able to submit samples weekly. This frequency can vary between lakes, and over the course of the whole summer season. AHS will investigate all complaints received regarding poor recreational water quality, including notification of a blue-green algae bloom.

21. How does AHS decide which public recreational beaches to monitor?

The public beaches included in the Routine Recreational Water Quality Monitoring Program are selected based on a number of factors. Beach popularity is a notable influence on inclusion in the program, as more individuals could be at risk at popular beaches than at one that is rarely used for recreational purposes. As well, history of blue-green algae (cyanobacterial) bacteriological contamination, and related environmental conditions are also factors for inclusion in the program.

22. Should I be concerned about blue-green algae (cyanobacteria) blooms?

Blue-green algae (cyanobacteria) blooms can present a risk to your health (please see symptoms in Question #4), so it's important to avoid contact with blue-green algae (cyanobacteria) blooms. You can help limit the growth of blue-green algae (cyanobacteria) in a lake by limiting use of fertilizer around the lake, and by using pump-out tanks rather than septic fields, for waste water disposal.

23. Why do blue-green algae (cyanobacteria) grow in a lake? What factors impact lake water quality?

A number of factors – including water temperature, weather conditions and the amount of nutrients available can influence the growth of blue-green algae (cyanobacteria). The best way to control blue-green algae (cyanobacteria) in natural waters is to limit nutrients that go into the water body, such as sewage and fertilizers. By limiting use of fertilizer around the lake, and using pump-out tanks instead of septic fields to dispose of waste water, you can help protect the health of the lake.

24. What can I do to prevent blue-green algae (cyanobacteria) blooms?

There are many factors that contribute to the growth of blue-green algae blooms in lake water; however, limiting nutrients that go into the water body, such as sewage and fertilizers, helps to protect the lake. By limiting use of fertilizer around the lake, and using pump-out tanks instead of septic fields to dispose of waste water, you can help protect the health of the lake.

25. Will there be blue-green algae (cyanobacteria) in the lake water every summer?
Because of several factors including water temperature, weather conditions and the amount of nutrients available can influence the growth of blue-green algae (cyanobacteria) bloom activity, development of blue-green algae blooms can fluctuate. Lakes with a history of consecutive (year over year) blue-green algae (cyanobacteria) blooms are likely to experience blooms during the summer months. At lakes where there have been consecutive blooms over a number of years, AHS puts up permanent signage informing Albertans of the potential for blue-green algae (cyanobacteria) blooms to be present. You can contribute to the health of lake water by limiting use of fertilizer around the lake, and using pump-out tanks instead of septic fields, to dispose of waste water.

26. Who do I call if I want to report a blue-green algae (cyanobacteria) bloom in a lake in Alberta?
If you suspect a blue-green algae (cyanobacteria) bloom in a body of water in Alberta, please report this concern to the local AHS Environmental Public Health Office. Look-up the closest Environmental Public Health Office online, at: http://www.albertahealthservices.ca/eph.asp

27. What should I do if have been exposed to a blue-green algae (cyanobacteria) bloom in a lake in Alberta?
If you have been exposed to a blue-green algae (cyanobacteria) bloom, shower promptly with clean tap water. If symptoms outlined in Question #4 develop, please contact Health Link Alberta, 24/7, at 811.

Appendix A: Blue-green algae (cyanobacteria) Reference Guide

Areas of the lake that do not have visible blue-green algae (cyanobacteria) blooms can be used for recreational purposes, even when a blue-green algae (cyanobacteria) Health Advisory is in place. Use the reference guide to help confirm that no signs of a bloom are present before entering the water for swimming. The reference guide is broken down into two sections:

- ***Part 1: Identification of common blue-green algae (cyanobacteria)***
- ***Part 2: Common misidentifications of blue-green algae (cyanobacteria)***

When getting out of any lake, rinse off with clean tap water as soon as possible and towel dry.
For a lake with a blue-green algae Health Advisory, look for a part of the swim area that:

- does not have a scum layer on top
- is not coloured a significant green or bluish colour
- has no significant suspended particles or globs
- as you wade out ensure you can see your toes at 1 meter depth of lake water

Part 1: Identification of blue-green algae (cyanobacteria)

Identifying blue-green algae (cyanobacteria) blooms can be challenging. Some blooms can be very easy to identify while at other times a bloom can be more difficult to spot, especially when other aquatic plant life or green algae are present alongside a blue-green algae (cyanobacteria) bloom.

Possible signs of a blue-green algae (cyanobacteria) bloom:

Water Visibility and Colour:

- Discoloured or cloudy water.
- Water may be murky and coloured a brownish green, milky green or blue.
- The accumulated bloom mass may be pale green, greenish-blue or blue in colour;
- The bottom of the lake may not be visible close to shore.

Bloom Colony Formation and Consistency:

- Particles may have accumulated near the surface or along the shoreline.
- Particles may be found in a thick layer at the surface or along the shoreline. The water may look like a paint spill or pea soup.
- Particles might be seen suspended throughout the water column.
- Blue-green algae (cyanobacteria) colonies may resemble tiny hairs, pinheads, or globs.
- A bloom mass can be separated easily using a stick (the bloom mass is not connected or firmly attached).

Frequently Asked Questions

Blue-green algae (cyanobacteria)

Photographs of common blue-green algae (cyanobacteria) in Alberta
Photos courtesy of Ron Zurawell, AEP (unless otherwise noted)

Microcystis spp.
Microcystis spp. are typically small green balls that clump into large groups visible to the naked eye.

Microcystis/Aphanizomenon

Microcystis/Aphanizomenon

Anabena spp.
Anabaena spp. are stringy cyanobacteria.

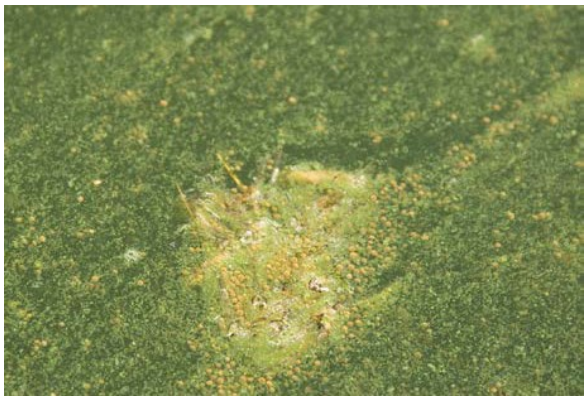
Aphanizomenon spp. stringy cyanobacteria that look like small 'grass-clippings'

Aphanizomenon flos-aquae bloom with appearance of 'grass clippings' (Alberta Health Services)

Gleotrichia spp.

Gleotrichia spp. are a type of stringy cyanobacteria that form groups that look like the sun (a glob in the middle with rays flowing out). They appear as golden/brown balls with dark centres and light perimeters and can be seen with the unaided eye as floating 'fuzz-balls'.

Gleotrichia bloom



Gleotrichia/Anabaena bloom

Lyngbya spp.

Lyngbya spp. are another stringy cyanobacteria that are usually found in large clumps or mats when conditions are right for a bloom to form. They can range from brown to green and shades in between.

Healthy *Lyngbya* bloom

Off-shore *Lyngbya* bloom

Slow die-off and rotting *Lyngbya* bloom

Planktothrix spp.

Planktothrix spp. are also stringy cyanobacteria. This type is a characteristic red or pink colour.

Planktothrix bloom (Dan Pearson)

Planktothrix bloom (Dan Pearson)

Planktothrix rubescens bloom frozen into lake ice. Total microcystin concentration was approximately 50 mg/L

Planktothrix bloom (Richard Holmes, Provost News)

***Part 2: Common misidentifications of* blue-green algae (cyanobacteria).** The following may be signs of tree pollen, duckweed, aquatic plants or green algae which are not blue-green algae (cyanobacteria):

- leaf-like structures or roots.
- long and stringy material that can be lifted out of the water on a stick or boat paddle.
- Material firmly attached to plants, rock or the bottom of the water body.
- material is made of small bright mustard yellow or grass green particles.

Pollen

Pollen can accumulate at the surface of lakes and recreational areas. When this happens, water can turn murky and often has a yellow or beige appearance.

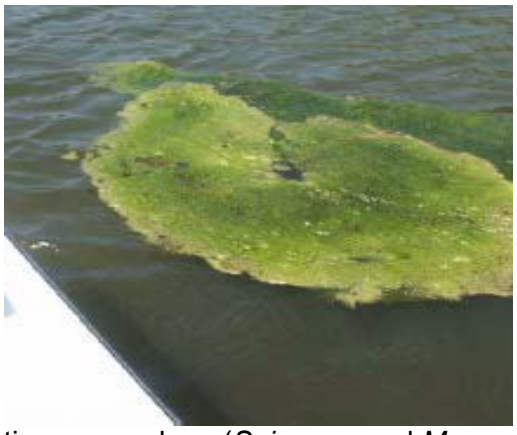
Accumulation of pine pollen.

Frequently Asked Questions

Blue-green algae (cyanobacteria)

Green Algae

Green algae, which are sometimes called moss or pond scum, have long, bright green, hair-like strands of attached cells. Just like cyanobacteria, they can form large floating mats and blooms. This material can often be lifted out of the water with a stick of boat paddle. Green algae are non-toxic but can produce bad odors (sewage smell) upon decomposition.



Floating green algae (*Spirogyra* and *Mougeotia)*

Shoreline accumulation of green algae (*Spirogyra*)

Filamentous green algae

Duckweed

Duckweed is a very small bright light green flowering aquatic plant. They have 1 to 3 small leaves. Giant duckweed (*Spirodela polyrhiza*) has 1 to 4 leaves and is light green in colour. In general, duckweed grows in dense mats and float on or just below the surface of still or slow-moving bodies of water.

Duckweed

References:

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