

How blue-green algae is taking over Canadian lakes

Microscopic cyanobacteria cells can form soup-like layer on water surfaces

By Kathryn Weatherley, [CBC News](#) Posted: Feb 26, 2013 10:06 AM ET Last Updated: Feb 26, 2013 10:00 AM ET

When Lake Winnipeg was named the Threatened Lake of 2013 by the Global Nature Fund, it was largely a result of the blue-green algae, or cyanobacteria, that is lurking in its waters.

In order to restore Lake Winnipeg, [pollutants will have to be removed](#), an effort that could take decades and cost millions of dollars, Vicki Burns of the Lake Winnipeg Foundation told CBC News.

But Lake Winnipeg is not the only Canadian body of water facing this problem.

Research by the University of Alberta last year indicated that the cyanobacterial toxin microcystin had been found in 246 water bodies in Canada.

Over the last decade, microcystins were detected in every province and are becoming increasingly present in nutrient-rich waters, says the study, whose lead writer was Diane Orihel, an aquatic ecologist and PhD candidate at the University of Alberta.

Orihel says cyanobacteria aren't a new problem for bodies of water because the bacteria is ancient and a natural part of oceans and lakes, but what has changed is its increased frequency in freshwater lakes. Here's a closer look at the bacteria and some of the problems it causes.

What is it and where do you find it?

The bacteria that causes blue-green algae is present in almost all lakes in Canada, says David Schindler, a professor of ecology at the University of Alberta.

Blue-green algae is, however, a bigger problem in the Prairies, where much of the soil naturally has high levels of phosphorous, which fuels its growth, says Schindler.

In waterways where blue-green algae has become a problem in Canada, it's "not that they've invaded but that they've increased from nearly undetectable levels to nuisance levels," he adds.

Blue-green algae forms in water that is shallow, warm and slow-moving or still. It grows mostly in summer months and can contain the cyanobacterial toxins, which are poisonous.

The bacteria is not a true algae but rather a photosynthetic bacteria, which means it can produce energy through photosynthesis, according to the website of the British Columbia Ministry of Environment.

At one point, biologists grouped the bacteria with algae, possibly because the two have a similar appearance

and requirements for light, nutrients and carbon dioxide, but blue-green algae is now recognized as a separate phylum.

Collectively, the microscopic cyanobacteria cells can form a bloom, a soup-like layer on the water's surface that can grow so large it can be seen from space, says Orihel.

Sometimes it can be difficult to tell whether a body of water contains blooms, says Lewis Molot, a professor in the faculty of environmental studies at York University in Toronto.

That's because blue-green algae has gas bags that can be used to regulate the position in water. The bacteria can be a problem underneath the surface weeks before blooms can be detected from shore.

Where do all of the nutrients that fuel the algae come from?

Some lakes are naturally rich in nutrients. Others have become polluted with nutrients from sewage and septic fields and runoff from agricultural fields, manicured lawns and livestock operations.

Schindler also points to septic tanks as a source of phosphorus. The tanks eventually leak the nutrient, and some are poorly installed and maintained.

Failing to clean up after pets and activities along a shore, such as when homeowners chop down trees and then fertilize grass or flowers they've planted, can be harmful as well.

Trying to control a nutrient problem is more complicated than you might think, Schindler says.

"If you let a lake get too far, I'd say it's equivalent to trying to get toothpaste back into a tube."

What dangers does blue-green algae pose?

Cyanobacterial toxins are mainly released from the blue-green algae when the cells of the bacteria break open or die. Their destruction can be caused by cooler weather, rainfall and windy conditions. Some of the toxins can attack the liver or the nervous system, while some will only irritate the skin.

It is uncommon to be exposed to the toxins through drinking water because water sources are monitored for the algae, says Health Canada.

People may also be turned off by the distinct odour blue-green algae emits. It can smell like newly mown grass or, when it's older, like rotting garbage.

If water containing blue-green algae is ingested, it can cause headaches, fever, diarrhea, abdominal pain, nausea and vomiting. Swimming in water containing the toxin can irritate skin and eyes.

Health Canada recommends consulting a physician if anyone believes they may have come into contact with the bacteria.

Human contact with the bacteria can also arise through eating fish from contaminated water or by consuming blue-green algal products.

Blue-green algae can also affect the ecology within lakes. Blooms of the bacteria can suck out oxygen from the bottom water of the lake, which can result in massive fish kills, Orihel's research found.

However, the same press release explains no fatalities in Canada have been linked to blue-green algae.

How long has this been a problem?

Cyanobacteria has been around for 3.5 billion years, says Orihel.

In addition to the effect nutrient pollution has had on its spread, climate change has also contributed to its growth, some experts say.

The bacteria does well in warm water, so as temperatures rise, so does the number of cyanobacterial blooms, adds Orihel.

Molot sees another possible explanation behind the apparent increase of blue-green algae in recent years. He says it might be a result of better reporting and a better understanding of the bacteria.

Where else can the bacteria be found?

Blue-green algae is also used as a food supplement, often in tablet or caplet form. Marketers advertise a whole slew of benefits from the algae tablets, ranging from weight loss to its potential as a source of protein.

Health Canada cautions that the safety of these products has not been firmly established, although the supplements made with spirulina blue-green algae have been shown to be harmless.

There have also been reports that blue-green algal products can be an effective treatment for attention deficit disorder, but again, Health Canada cautions there is no scientific evidence showing this to be true.