



# 2022 Newfoundland and Labrador Cyanobacteria (Blue-Green Algae) Monitoring Report



Government of Newfoundland & Labrador  
Department of Environment and Climate Change  
Water Resources Management Division

Prepared by:

Adrian Rogers  
Environmental Scientist  
Water Resources Management Division  
Department of Environment and Climate Change  
4th Floor, Confederation Building, West Block  
PO Box 8700, St. John's NL A1B 4J6  
Ph. No.: (709) 729 - 0351  
[adrianrogers@gov.nl.ca](mailto:adrianrogers@gov.nl.ca)

## Background

Cyanobacteria, commonly called blue-green algae, are algae-like bacteria that occur naturally in many aquatic and terrestrial environments throughout the world. Cyanobacteria are naturally occurring and are considered one of the most ancient life forms on earth. Individual organisms are not visible to the human eye. Certain conditions can cause cyanobacteria populations to increase rapidly, and can result in dense accumulations of cells, commonly known as blooms. Cyanobacteria blooms can be easily observed and are often a distinct blue-green colour.

In temperate zones, blooms are most common in the summer and early fall, when surface waters are warmest. In addition to water temperature, a key factor contributing to the growth of blue-green algae and the formation of a bloom is the amount of available nutrients such as phosphorus and nitrogen.

Cyanobacteria is a concern because it can quickly dominate a waterscape and outcompete other key species. Many species of cyanobacteria can produce toxins, also known as cyanotoxins, which are harmful or potentially lethal to humans and animals. The most common cyanotoxins in Canadian waters are microcystins, a family of toxins that includes over 250 known variants. Health Canada has established separate guidelines for drinking and recreational waters regarding cyanobacterial cell counts and total microcystins. Total microcystins include toxins dissolved in the water as well as those contained within the cell of the cyanobacteria. These guidelines are used to help support cyanobacteria management in Newfoundland and Labrador. There are other toxins produced by cyanobacteria; unfortunately, testing for these toxins is not widely available.

The *Guidelines for Canadian Recreational Water Quality* was updated in February of 2022. The current guidelines recommend that total cyanobacteria cells do not exceed a density of **50,000 cells/mL** and total microcystins do not exceed **10 µg/L** for recreational waters involving primary contact recreation (swimming or other activities with direct exposure to water).

Cyanobacteria and their toxins are a major concern for drinking water in many areas; however, in Newfoundland and Labrador no blooms have been reported in drinking water supplies. Health Canada's *Guidelines for Canadian Drinking Water Quality* recommend that the seasonal maximum acceptable concentration of total microcystin is **1.5 µg/L**.

Summaries of blue-green algae monitoring in the province for the years 2007 to 2021, are available on the Department of Environment and Climate Change website at:

<https://www.gov.nl.ca/ecc/waterres/quality/background/bgalgae/>

## Summary of Newfoundland and Labrador Cyanobacterial monitoring in 2022

During the 2022 cyanobacteria season, Water Resources Management Division received a handful of reports relating to algal growth and responded to each with screening questionnaires and site visits. In 2022, there were no cases found to be caused by cyanobacteria blooms.

In 2021, there were two significant cyanobacteria blooms located on the Avalon Peninsula. The first bloom occurred in May 2021, at Miller's Pond, Portugal Cove. The second bloom began in mid June 2021 and was located in Forest Pond, Victoria. Millers Pond has had confirmed annual blooms since 2013, and there were reports of blooms in Forest Pond in prior years. The major cyanobacteria species responsible for both blooms was *Dolichospermum* (formerly called *Anabaena*). These two locations were identified for continued monitoring in 2022.

**Miller's Pond:** An Innovasea wireless BGA and Temperature AquaFluor was purchased in 2021 and deployed in Millers Pond for the season. This device is capable of detecting the concentration of phycocyanin, a pigment found in cyanobacteria. The instrument was deployed at Millers Pond again for the 2022 season from May until the end of September. The AquaFluor was deployed on May 3, 2022, before any cyanobacteria blooms were expected. At this time, a grab sample was taken to compare results. Throughout the summer, phycocyanin concentrations in Miller's Pond were relatively low and no blooms were observed. Grab samples indicated low cyanobacterial cell counts when samples were collected in May and June. The Innovasea wireless BGA and Temperature AquaFluor was removed in September when temperatures dropped.

**Forest Pond:** In early May, a nutrient scan was performed to determine the concentrations of nutrients essential for cyanobacteria growth. Six samples were taken above and below Forest Pond, where the 2021 bloom was most intense. At this time, samples to determine the cyanobacterial cell count and concentration of microcystin were also taken. Samples were then collected on a monthly basis from June to September. Throughout the summer, cyanobacteria levels at Forest Pond remained well below the Health Canada guidelines for recreational water. In addition to sampling efforts, the Forest Pond watershed was also mapped using unmanned aerial vehicles. No blooms were reported in Forest Pond for the 2022 season.

**Other Efforts:** Reports of algal-like growth were received from across the island, including on the Avalon Peninsula, and the west coast of the island. Photos, reports, and staff visits were used to determine if reports were cyanobacteria, plants, or algae. During the 2022 season, no cyanobacteria blooms were identified.

In 2021, Water Resources Management purchased their first Turner Handheld FluroSense to test concentrations of phycocyanin. In 2022, a second Turner Handheld FluroSense was purchased which was capable of testing chlorophyll. Throughout the 2022 season, these devices were used around the province to help determine background concentrations of phycocyanin and chlorophyll.