

Blue-Green Algae Monitoring Summary Report 2007-2015

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Background

Cyanobacteria or “blue-green algae” are microscopic, plant-like bacteria that occur naturally in ponds, rivers, lakes and streams, throughout the world. They are not normally visible in the water but populations can increase rapidly to form a large mass or scum called a bloom, when conditions are favourable.

Blooms most commonly occur in late summer or early fall, when surface waters are warmest, but they can also occur at other times during the year. In addition to water temperature a key factor contributing to the growth of blue-green algae is the amount of available nutrients such as phosphorus and nitrogen in the water.

Many varieties of blue-green algae can produce toxins that are potentially harmful to humans and animals. The most common blue-green algae toxins encountered and monitored in Canadian waters are microcystins. Health Canada has established guidelines for the cyanobacterial toxin “microcystin-LR” which appears to be the most commonly occurring microcystin. The guidelines are “believed to be protective of human health against exposure to other microcystins (total microcystins) that may also be present” (Health Canada).

Health Canada’s “*Guidelines for Canadian Drinking Water Quality*” recommend that microcystin-LR not exceed 1.5 ug/L. The “*Guidelines for Canadian Recreational Water Quality*” recommend that total cyanobacteria not exceed 100,000 cells/mL and total microcystins not exceed 20 ug/L (expressed as microcystin-LR).

Blue-green Algae in Newfoundland

The following is a summary of blue-green algae monitoring in Newfoundland from 2007 to 2015. To date, no drinking water supplies in Newfoundland have been affected by blue-green algae and all samples have been collected on the Avalon Peninsula. Figure 1, below, shows sampling locations.

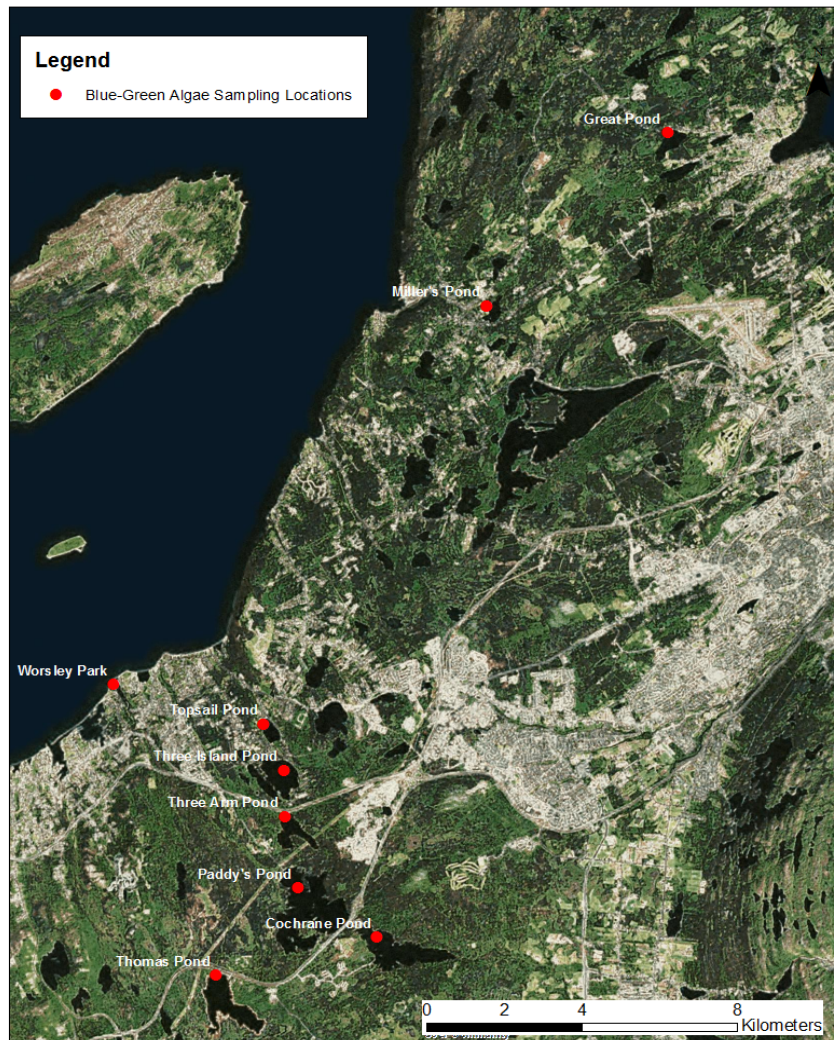


Figure 1: Blue-Green Algae Sampling Locations, 2007-2015

2007

The first recorded blue-green algae bloom in Newfoundland and Labrador occurred in mid-August 2007, persisting until early October. This bloom, detected at Paddy's Pond, Cochrane Pond, Three Arm Pond and Three Island Pond, near St. John's, may have been triggered by a large influx of nutrients as a result of heavy rains and runoff from tropical storm Chantal on August 1 (Figure 2).

The highest concentration of microcystin-LR measured from samples collected in 2007 was 0.36 ug/L, well below the recreational water guideline of 20 ug/L. The laboratory detection limit for microcystin-LR was 0.22 ug/L.



Figure 2: Blue-Green Algae Bloom in Paddy's Pond, September 2007

2008

During the summer of 2008, the four ponds sampled in 2007 as well as Thomas Pond and Topsail Pond were monitored for blue-green algae. Water samples were collected monthly from May to September. The blue-green algae bloom observed in 2008 was sporadic and much less intense than was seen in 2007.

Microcystin-LR was detected in small concentrations in all samples collected from the pond outlets in May. Concentrations ranged from 0.27 ug/L to 0.61 ug/L, again well below the recreational water guideline of 20 ug/L. Samples collected from June to September 2008 did not contain detectable levels of microcystin-LR. As in 2007, the laboratory detection limit was 0.22 ug/L

2009

There were no reports or observances of blue-green algae blooms on the Avalon Peninsula in 2009 and few samples were collected. Only one sample, collected in July, had a detectable level of microcystin-LR at 0.25 ug/L, well below the recreational water guideline of 20 ug/L. The laboratory detection limit was 0.22 ug/L. Samples were not collected after July.

A suspected bloom was photographed by a member of the public at Badger Lake in central Newfoundland in July (Figure 3). The bloom dispersed before samples could be collected by WRMD staff.



Figure 3: Suspected Blue-Green Algae Bloom in Badger Lake, July 2009

2010

In 2010 Cochrane Pond, Paddy's Pond, Three Arm Pond, Three Island Pond and Topsail Pond were inspected monthly from June through September. No blue-green algae blooms were observed or reported and no samples were collected.

2011

Monthly monitoring continued in 2011. No blue-green algae blooms were observed or reported in 2011 and no samples were collected.

2012

A blue-green algae bloom was reported in Great Pond in Torbay in June 2012. Blue-green algae cells were present in samples collected in June, July and September; however microcystin-LR levels were less than the laboratory detection limit of 0.05 ug/L.

Monthly monitoring of other locations continued during the summer of 2012, however no blooms were observed. Blue-green algae were detected at low levels in most samples. Microcystin-LR levels were less than the laboratory detection limit of 0.05 ug/L in all samples collected.

2013

Samples were collected from Miller's Pond in Portugal Cove-St. Phillips in response to a reported bloom in August. The total microcystin level was below the laboratory detection limit of 0.05 ug/L.

2014

Samples were collected from Miller's Pond in Portugal Cove-St Phillips and Great Pond in Torbay in June and July (Figure 4). Total microcystin levels were below the laboratory detection limit of 0.20 ug/L in all samples collected.

Following reports of possible blooms occurring, samples were collected at Worsley Park, Conception Bay South and Paddy's Pond in August. Blue-green algae was present at low levels, however, microcystin was below the detection limit of 0.20 ug/L.



Figure 4: Great Pond, June 19, 2014

2015

A blue-green algae bloom was reported and observed in Miller's Pond and Great Pond in late June (Figure 5). Microcystin levels were below the detection limit of 0.20 ug/L, in samples collected in July. No further blooms were reported or observed in 2015.



Figure 5: Miller's Pond, June 26, 2015