

Bass Lake

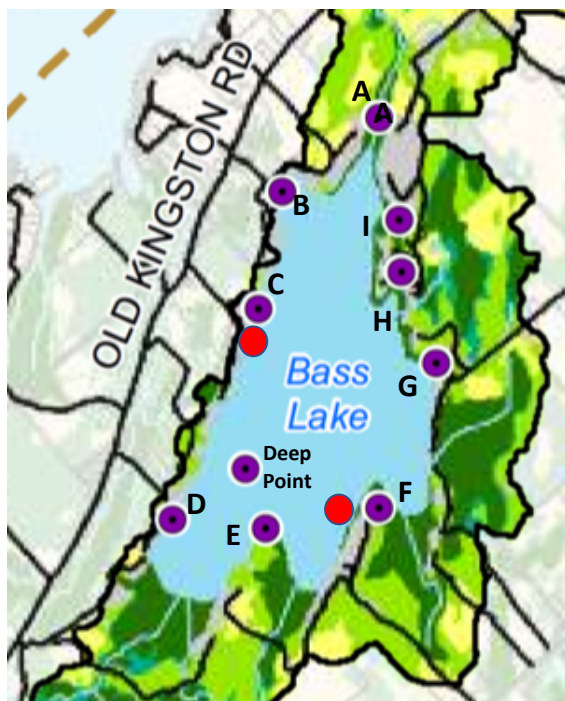
Latitude:44.49 –Longitude: 76.08

Lake Health Report – May 2023

Rideau Lakes Township	Rideau Valley Watershed
Surface Area: 2.9 square km - (716 acres)	Lower Rideau Catchment Area
Shoreline Perimeter: 10.94 km	Water Level Elevation – 134.5 MASL
Maximum Depth: 22.6 m	Mean Depth: 8.26 m
Wetland Area: 26% coverage	Water Quality Index (WQI) - Fair
Phosphorus – Average 2014-2022 - 0.016 mg/l	Secchi Depth – Average 2014-2022 – 5.57 metres

Surface Water Quality Sampling Programs

- RVCA's Watershed Watch Program 2005-2022
- Lake Partners Program – Active 2020-2021-2022
- BLPOA Supplemental Testing Program – First Year 2022



- RVCA Water Quality Site
- BLPOA Water Level Gauge
- Transportation
- Settlement
- Crop & Pasture
- Evaluated Wetland
- Wooded Area
- Water

Deep Point Site

Surface water quality conditions in Bass Lake have been monitored by RVCA's Watershed Watch Program since 2005. Data from one deep point site (DP1) has been used to calculate the Water Quality Index (WQI) rating for Bass Lake.

Nine Other Sites

RVCA also records data from nine additional sites that are regularly monitored around the lake. These sites have not been included in the calculation of the CCME WQI rating as they are not monitored with the same

frequency as deep point sites. However, they do provide important information on water quality conditions in the near shore areas. Please note that sites A, B, F and E are monitored each year while other sites are monitored every fifth year.

Water Quality Committee Report – 2022

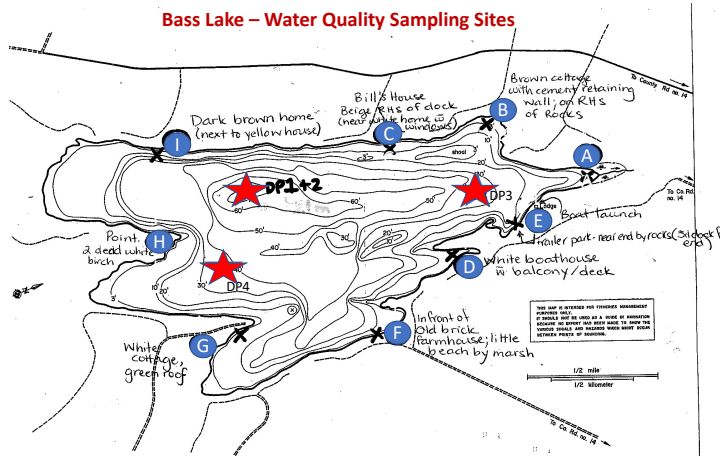
Depicted below are the water quality sampling results obtained by RVCA and the BLPOA supplementary program. Overall readings show we had a positive summer with normal results as compared to historical data. Nutrient levels (Phosphorous and Nitrogen) were below provincial guidelines, no E.coli and no major blue/green algae blooms. Based on reporting from around the lake it appears weed levels were down this year. Overall a much better year as compared to the results of 2020 and 2021.

The BLPOA's total costs to conduct this initial supplementary \$1030 (\$425 for sampling equipment and \$605 for Caduceon lab analysis). Special thanks to our volunteers: Miles Barham/B12 and Peter McGann/B3.

Water Quality Guidelines & Recommendations		
Type	Guideline Source	Guideline
Total Phosphorus (TP)	Provincial Water Quality Objective (PWQO)	<0.020 mg/L
Total Nitrogen (TKN)	Secondary Indicator – MOE Guideline	<0.500 mg/L
E.coli	Provincial Water Quality Objective (PWQO)	<100 CFU/100ml

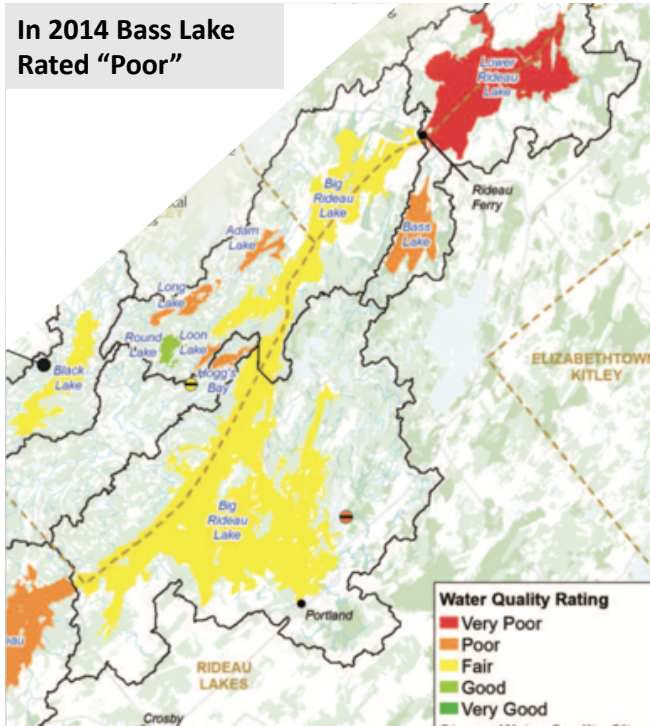
RVCA - Deep Point Samples					
Date Sampled	Site	Ecoli (CFU/100ml)	TP (mg/L)	TKN(mg/L)	Secchi (m)
5/6/22	DP1		0.003	0.32	5
6/8/22	DP1		0.004	0.36	5
8/4/22	DP1		0.014	0.40	5.5
10/7/22	DP1		0.004	0.38	4.5
RVCA - Shoreline Samples					
Date Sampled	Site	Ecoli (CFU/100ml)	TP (mg/L)	TKN(mg/L)	Secchi (m)
6/8/22	A	0	0.008	0.41	
8/4/22	A	2	0.009	0.40	
6/8/22	B	2	0.007	0.45	
8/4/22	B	2	0.009	0.40	
6/8/22	E	4	0.005	0.37	
8/4/22	E	1	0.012	0.50	
6/8/22	F	2	0.004	0.41	
8/4/22	F	0	0.010	0.40	

BLPOA - Deep Point Samples					
Date Sampled	Site	Ecoli (CFU/100ml)	TP (mg/L)	TKN(mg/L)	Secchi (m)
23/10/22	DP1		0.016	0.38	5.5
23/10/22	DP3		0.015	0.40	5
23/10/22	DP4		0.016	0.42	5
18/07/22	DP1		0.004	0.30	5.5
18/07/22	DP3		0.034	0.50	5
18/07/22	DP4		0.010	0.30	5
13/06/22	DP1		0.017	0.50	5.5
13/06/22	DP3		0.014	0.40	5
13/06/22	DP4		0.006	0.40	5



Bass Lake Property Owners Association

In 2014 Bass Lake Rated "Poor"



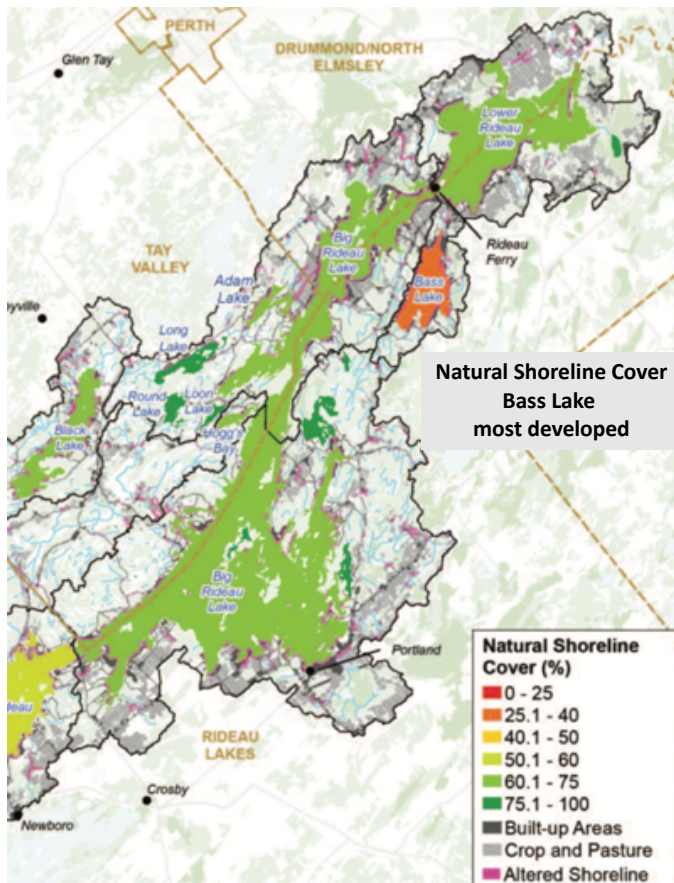
Water Quality Index

In the past the water quality rating for Bass Lake was "Poor" as determined by the CCME Water Quality Index. The calculation of this index was based on sampling data and parameters acquired by RVCA in years 2008-2013.

Nutrient exceedances, periods of limited fish habitat conditions, generally clear water and occasionally elevated pH levels contributed to the rating.

The WQ Index has not yet been updated to apply any of the RVCA data collected from the past 8 years (2014-2021).

RVCA is planning on updating its assessment of Lake Water Quality Indexes in 2023 using all data since 2014 and hopefully our WQ Index will be rated as "Fair".

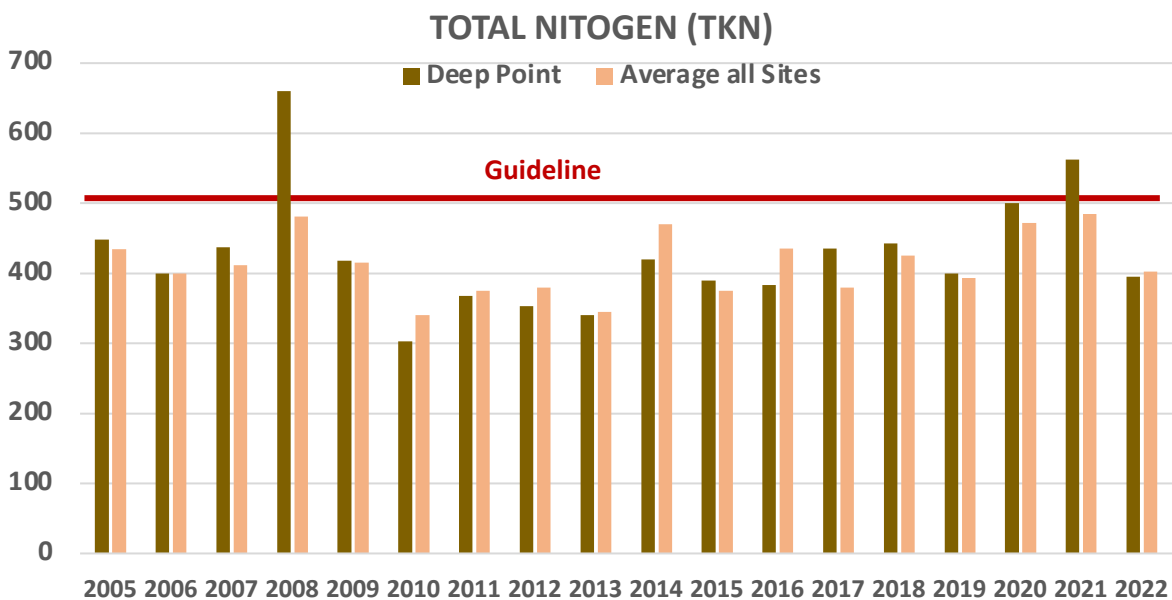


Bass Lake Shoreline Cover (25-40%)

Around Bass Lake, the shoreline buffer is made up of settlement areas (65 percent), woodland (16 percent), wetland (15 percent), transportation routes (three percent) and crop and pastureland (less than one percent)

Total Kjeldahl Nitrogen (TKN)

Nitrogen in various forms is an abundant and essential nutrient in aquatic ecosystems. In addition to fertilizers, agricultural waste and wastewater contribute nitrogen into lakes. In large amounts, ammonia and nitrates can be toxic to aquatic organisms. Total Kjeldahl Nitrogen (TKN) determines the concentration of all forms of nitrogen in the lake. While there are no precise guidelines for acceptable levels of TKN, according to RVCA, TKN in water bodies not influenced by excessive organic typically range from 100 to 500 µg/L. Total Kjeldahl nitrogen (TKN) is used as a secondary indicator of nutrient loading.

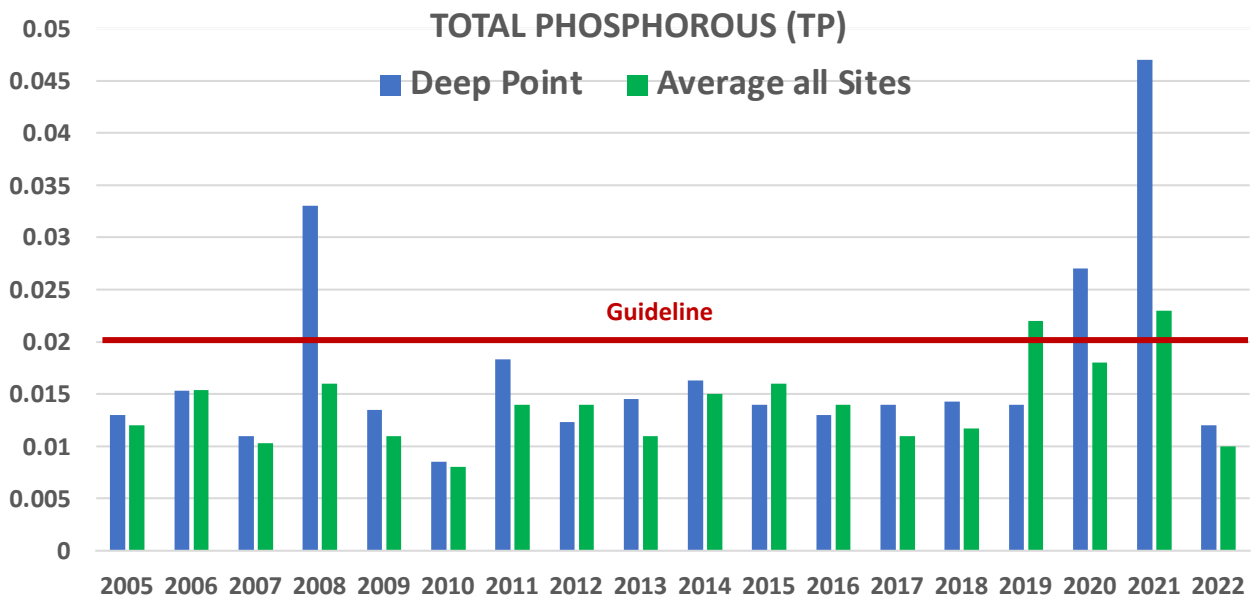


Note: This historical chart was based on only 3-4 Deep Point (DP) readings per year for Total Phosphorous (TP) and a total of 12-15 readings taken by RVCA at all the lake sites tested that year. It only takes one very high reading at the DP (perhaps after a major rainfall event) to skew the average amongst so few samples. That is why the BLPOA instituted a supplementary testing program in 2022 to significantly increase the level of data collection. Our program increased the number of DP testing from 4 to 13 samples per year.

The Water Quality Committee is very encouraged by the overall results for 2022, especially as compared to the concerning results of 2020 and 2021.

Total Phosphorus

Total Phosphorus (TP) is used as a primary indicator of nutrient loading and may contribute to abundant aquatic vegetation growth and depleted dissolved oxygen levels. The Provincial Water Quality Objective (PWQO) is used as the TP Guideline and states that in lakes, concentrations greater than 0.020 mg/l indicate an excessive amount of TP within the water column. Regular testing will identify changes in the nutrient status and/or the water clarity of the lake due to the impacts of shoreline development, climate change and other possible stresses.



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Bass Lake Nutrients Results 2008-2013

Nutrient	No. DP Samples	Average (mg/l)	Standard (mg/l)	% Guideline
Total Phosphorous	23	0.016	0.020	80%
Total Nitrogen	23	0.397	0.500	79%

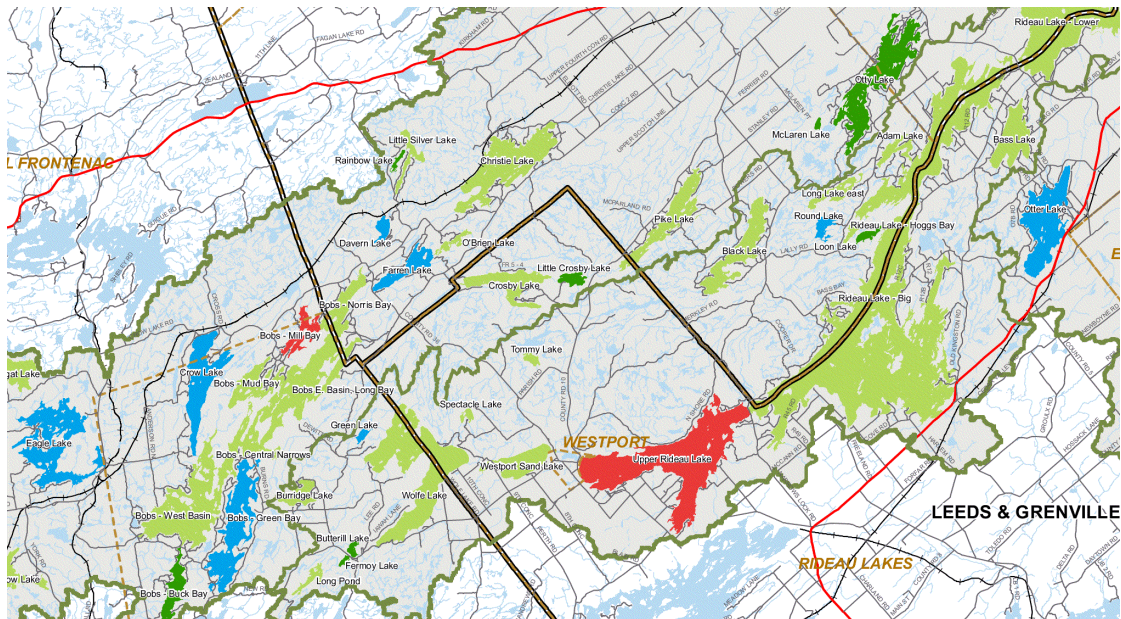
Publication: 2014 RVCA Subwatershed Report – Lower Rideau Catchment

Bass Lake Nutrients Results 2014-2022

Nutrient	No. DP Samples	Average (mg/l)	Standard (mg/l)	% Guideline
Total Phosphorous	41	0.016	0.020	80%
Total Nitrogen	41	0.440	0.500	88%

Overall, the data presented indicates that phosphorus concentrations are moderate in the mid lake deep waters of Bass Lake which may lead to impairment such as algal blooms and excessive aquatic plant growth.

Average year to year concentrations have varied for both TP and TKN but do indicate a worrisome trend. While the average yearly readings remain below the Guideline, in 2020 and 2021 there were an increased number of DP readings above the guideline.

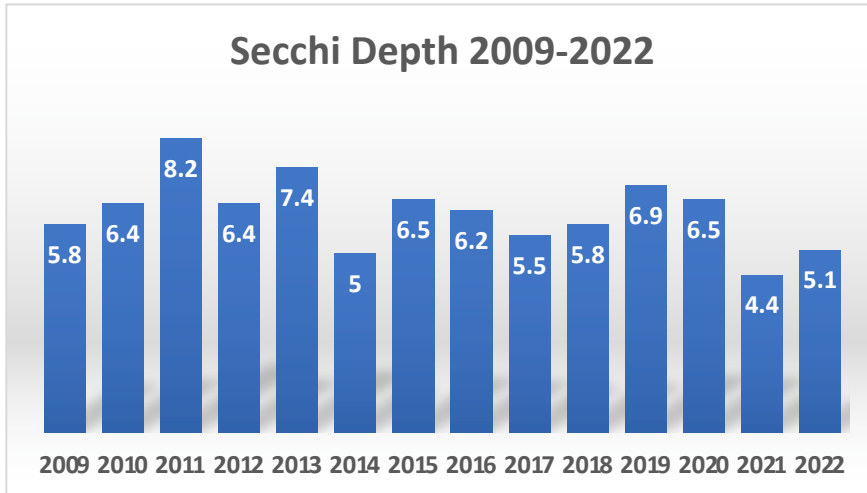


Rideau Valley Phosphorus Levels – Rating

As part of its Watershed Watch Program RVCA has put together a map of water quality (based on total phosphorous levels) of all the lakes in the Rideau valley catchment area that are surveyed annually. This map is shown above. Lakes with phosphorous levels of less than 10 µg/L are shown in light blue, 10 - 15 µg/L in light green, 15 - 20 µg/L in dark green and over 20 µg/L in red.

Water Clarity

Water clarity is measured during each Deep Point sample. using a Secchi disk. Clarity is measured by a simple visual test using a Secchi Disk, a 20 centimeter black and white disk attached to a measured line. The disk is then lowered into the lake until it is no longer visible and the depth recorded. It is influenced by the amount of soil sediment and phytoplankton, or microscopic algae, present in the water. The Figure below shows that no reading has been below the guideline; measured depths range from 5 metres to 8.2 metres. It should also be noted that Secchi depths in many waterbodies have been influenced by the colonization of zebra mussels resulting in clearer waters than may have been seen prior to the introduction of this species in Bass Lake.



Bass Lake Secchi Depth				
Sampling Period	No. DP Samples	Average (meter)	Standard (meter)	Above Guideline
2008-2013	17	6.9	2	100%
2014-2022	39	5.57	2	100%

Bacteria/E.coli

Bacteria are present in all lakes, they will be found in the feces of the wildlife (fish, waterfowl, beavers, etc.) that inhabit the lake. Coliforms are bacteria found in the large intestine of humans and other mammals and are usually present in soil. While some strains of coliforms do produce toxins, most are not harmful to humans. Some such as *Escherichia coli* (*E. Coli*) do produce pathogenic toxins. Therefore levels of *E. Coli* are often used as indicators of possible contamination by fecal matter. Thus high *E. Coli* levels in lakes or rivers can be an indication of septic pollution. The recommended safety level of *E. Coli* in a lake for recreational safety is not more than 100 colony-forming units (cfu) per 100ml of water. *E.coli* at any level is unacceptable for drinking water, therefore some form of treatment and purification is necessary for anyone who draws water from the lake for drinking purposes.

Bass Lake: *E. coli* is sampled at monitored shoreline sites twice each sampling season. *E. coli* data was not used in the calculations of the WQI rating for the lake due to differences in sampling frequency and site locations. All samples taken during period 2014-2022 were below the *E. coli* guideline of 100 colony forming units (CFU) per 100 ml set by the PWQO.

Reports of Possible Harmful Algal Bloom - Bass Lake

Major Outbreak October/November 2018

Bass Lake experienced a very disturbing outbreak of Blue-Green algae blooms in the Fall of 2018. Although they were awful to experience they did not test to be toxic. While nutrient concentration levels are the main factor, in 2018 our lake experienced record low water level and higher water temperatures which are a suspected contributing cause of these outbreaks and excessive aquatic plant growth, which thrive in areas where the water is shallow, slow moving and warm.



Reported Outbreaks September/October 2021

In early Fall 2021, the Ministry of the Environment, Conservation and Parks' Kingston District Office received notification and photos of possible harmful algal blooms in Bass Lake. Majority of these reports were from East/South side of lake (B6, B7, B8, B9, B10, B12). The concern is that these various shoreline swaths of Algae blooms were suspected of being the more concerning Blue-Green Algae variety. Ministry staff collected samples on 06 Oct and they were analyzed by the Ministry's laboratory. The MECP Lab results confirmed that these shoreline blooms were verified as blue-green algae and the sample tested did contain very high levels of toxins.



Climate and Lake conditions, especially in the early Fall months, can develop that support the creation of Blue – Green algae blooms. Periods of incredibly calm/still water, warm temperatures and an abundance of nutrients such as nitrogen and phosphorous can lead to an outbreak of blooms. An Information Sheet on blue-green algae is posted on our website www.rideaubasslake.com under the “Lake Health” heading.