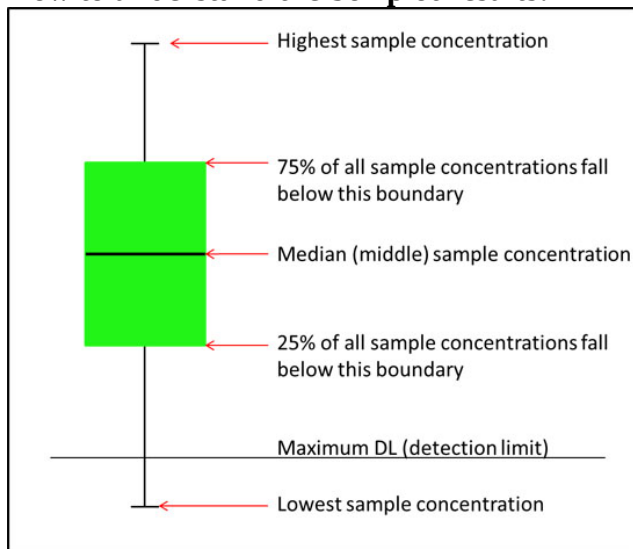


Kennisis Lakes - 2019 Water Quality Sampling Report (updated by Sarah Ariano) May 26, 2020

How to understand the box plot results:



Sampling Locations:

Sample data for both seasons (July and September) using data collected from the KLCOA sampling programme has been compiled to create a baseline dataset and to understand the possible range of observed nutrient concentrations across sampling locations (figure 1).

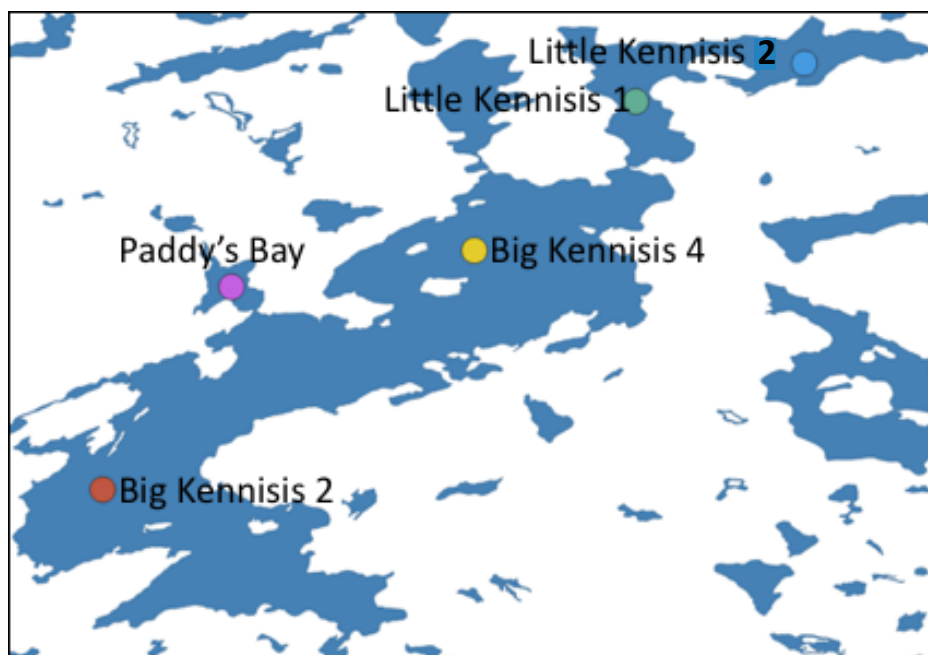


Figure 1: KLCOA water quality sampling locations.

Total Phosphorus:

Phosphorus can be present in three different forms (1) inorganic phosphorus, (2) particulate organic phosphorus, and (3) dissolved (soluble) organic phosphorus. Phosphorus is a limiting nutrient because aquatic plants take-up excess inorganic phosphate. As phosphorus is limiting, additions of this nutrient can dramatically alter aquatic ecosystems (i.e. algae blooms). KLCOA has determined the concentration of Total Phosphorus (the sum of all three forms of Phosphorus) in Kennisis and Little Kennisis Lake. It is important to note that Phosphate concentrations tend to increase with increases in total phosphorus (TP) and therefore can be used as a proxy for phosphate in aquatic systems.

The Canadian Council of Ministers of the Environment (CCME) guideline for Total Phosphorus is 4ug/L for ultra-oligotrophic lakes and 4-10ug/L for oligotrophic lakes. This is good for preventing the growth of algae in the water column. Total Phosphorus concentrations are on average higher for Paddy's Bay, which is to be expected due to the size and depth of the bay. TP is currently not a concern as concentrations are well below the threshold of 10 ug/L for all sampling periods (Figure 2) however Lake Partners Program data for Little Kennisis reveal an increase in TP from the historic mean (Figure 3) indicating that continuous monitoring of TP is necessary.

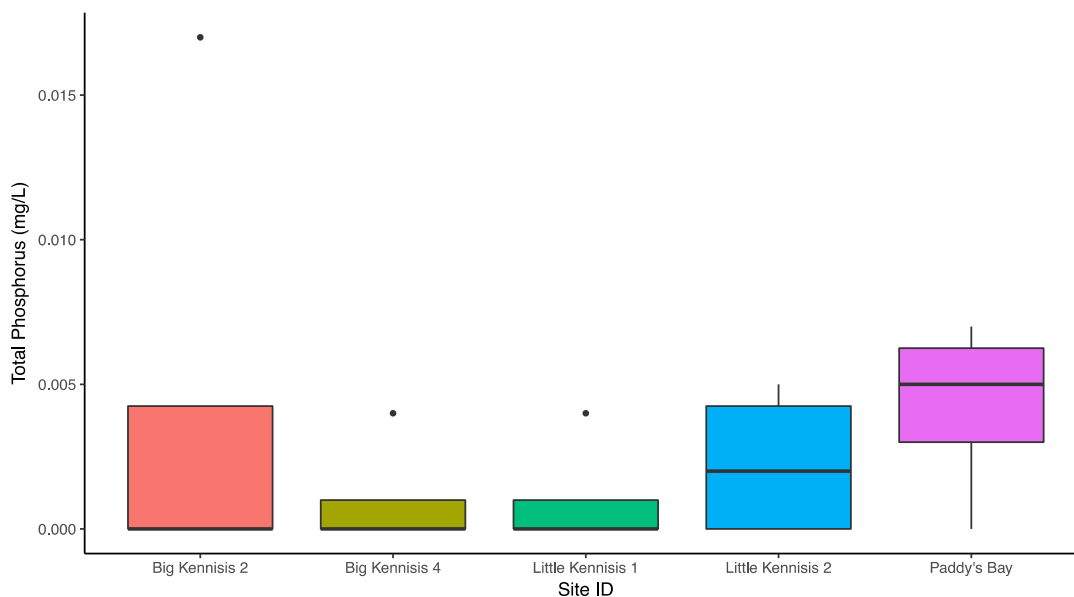


Figure 2: Total Phosphorus concentrations observed during the 2018-2019 sampling periods.

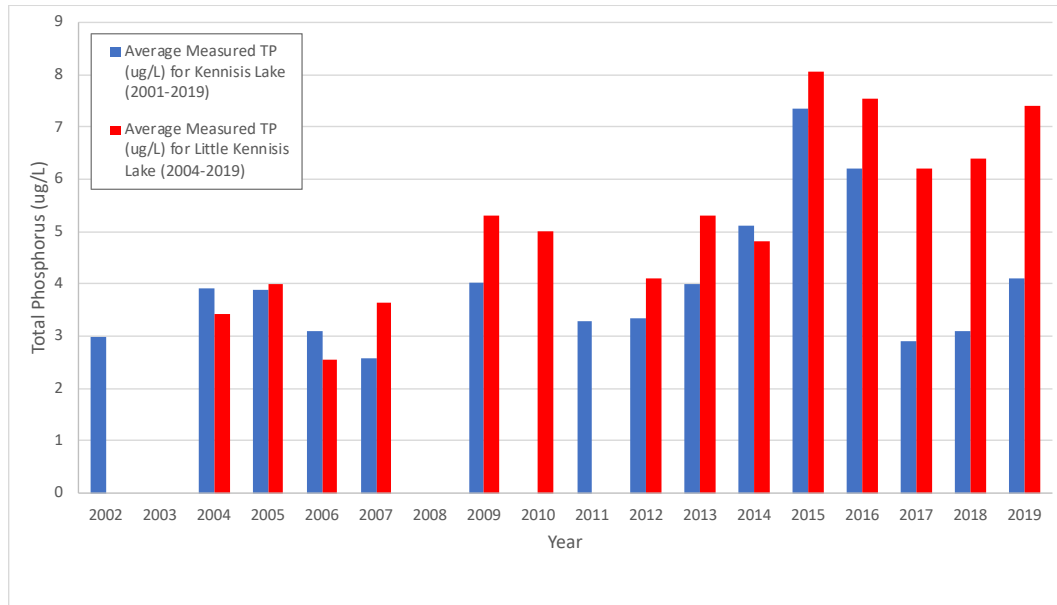


Figure 3: Lake Partners Program, change in TP on an annual basis.

Total Ammonia

Total ammonia is the sum of ammonia (NH_3) and ammonium (NH_4^+) concentrations. Nitrate serves as the primary source of nitrogen for aquatic plants in well oxygenated systems, and as nitrate levels increase, there is an increasing risk of algal blooms and eutrophication in surface waters. The CCME guideline for Nitrate is for protection from direct toxic effects for both short and long-term exposure, however the guidelines do not consider indirect effects due to eutrophication. Concentrations of total ammonia in lakes is generally less than 0.1 mg/L according to the CCME. Where levels exceeding this threshold often indicate some form of organic pollution. This parameter should still be monitored to see if decreases in Total Ammonia can be attributed to the effectiveness of the Septic Inspection Program. Current concentrations are below the 0.1mg/L threshold (Figure 3).

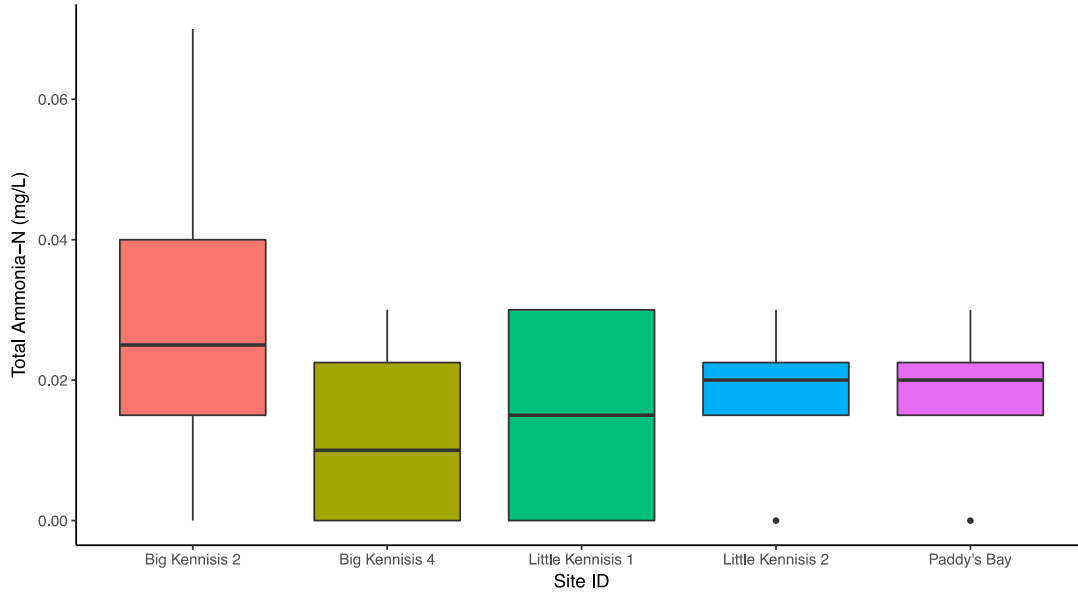


Figure 4: Total Ammonia concentrations observed during the 2018-2019 sampling period.

Faecal Coliform Counts

A 1-year pilot spot testing program of Faecal Coliform Counts was undertaken by KLCOA in 2019 (Figure 4). This information was collected to identify current lake baseline conditions prior to the completion of the Septic Inspection Program. However, concentrations were below the detection limit of 10 CFU/100ml at all sampling locations with the exception of one. The concentrations are well below the 100CFU/100ml guideline for fishing and boating, however consumption of lake water without treatment is not recommended as concentrations exceeded 1 CFU/100ml. Currently Faecal Coliform is not a concern, data is presented in a column plot.

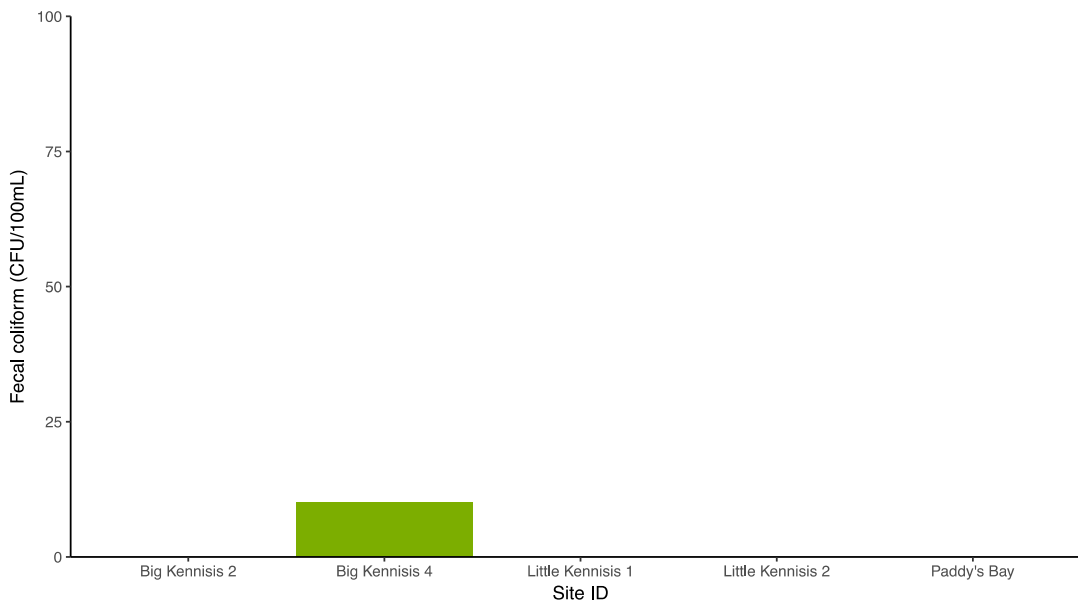


Figure 5: Faecal Coliform Counts observed during the 2019 pilot program.

Calcium

Calcium is an essential nutrient for plants and aquatic species and is critical for maintaining healthy lakes. Calcium enters our freshwater systems by the weathering of rocks (i.e. limestone and from leaching and runoff of forest soils). Maintaining calcium in lakes is important for buffering the effects of acid rain on ecosystem health.

Calcium concentrations for Kennisis and Little Kennisis Lake have historically been above the threshold for zooplankton which is important for maintaining a healthy ecosystem (Figure 5). However, in 2019 Lake Partners Program results indicated a decline in Calcium concentrations to 1.3mg/L. Continuous monitoring of lake Calcium concentrations in future years will reveal if this decline continues.

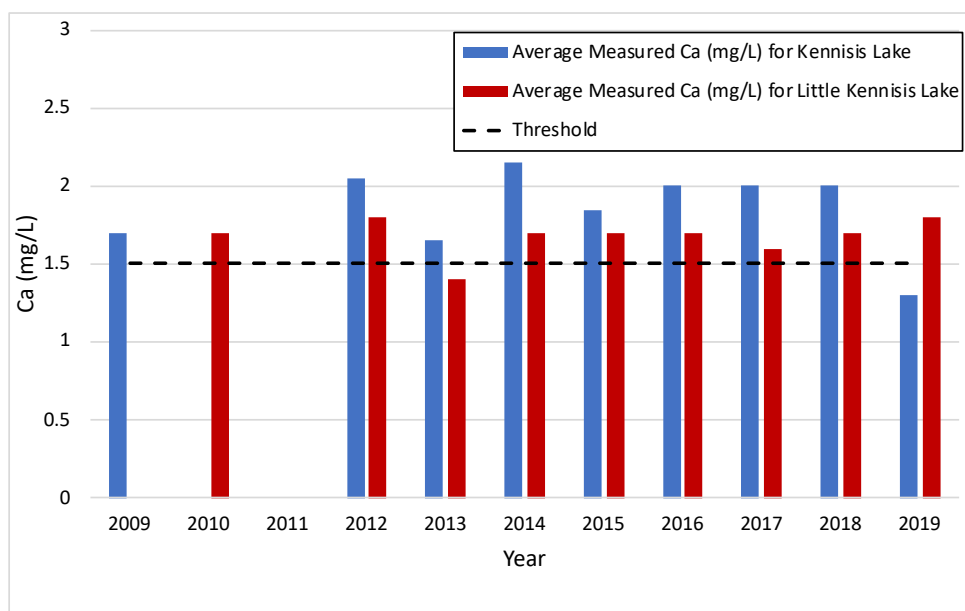


Figure 5: Lake Partners Program, change in Calcium on an annual basis.

KLCOA Water Quality Program Volunteers

The KLCOA Water Quality Testing Program is delivered by a team of dedicated volunteers. A big shout out to our Water Quality test volunteers:

Julie Bramm
Sarah Ariano
Randy Burch
Margaret Cox
Natalie Wood
Tracy Stewart
Tony Lepine
Carol Leighton
Jim Prince