

2009 Water Quality Report

Water quality monitoring on Go Home Lake for the past ten summers (2000-2009) has consisted primarily of biweekly bacteriological testing at 6 selected sites from mid June until mid September. This testing is made possible with financial assistance from the Township of Georgian Bay, the District of Muskoka, and Georgian Bay Forever (formerly GBA Foundation). The monitoring program measures Total Coliforms (TC), Escherichia coli (E. coli) and water clarity (Secchi depth) at each of the 6 sites 7 or 8 times over the summer.

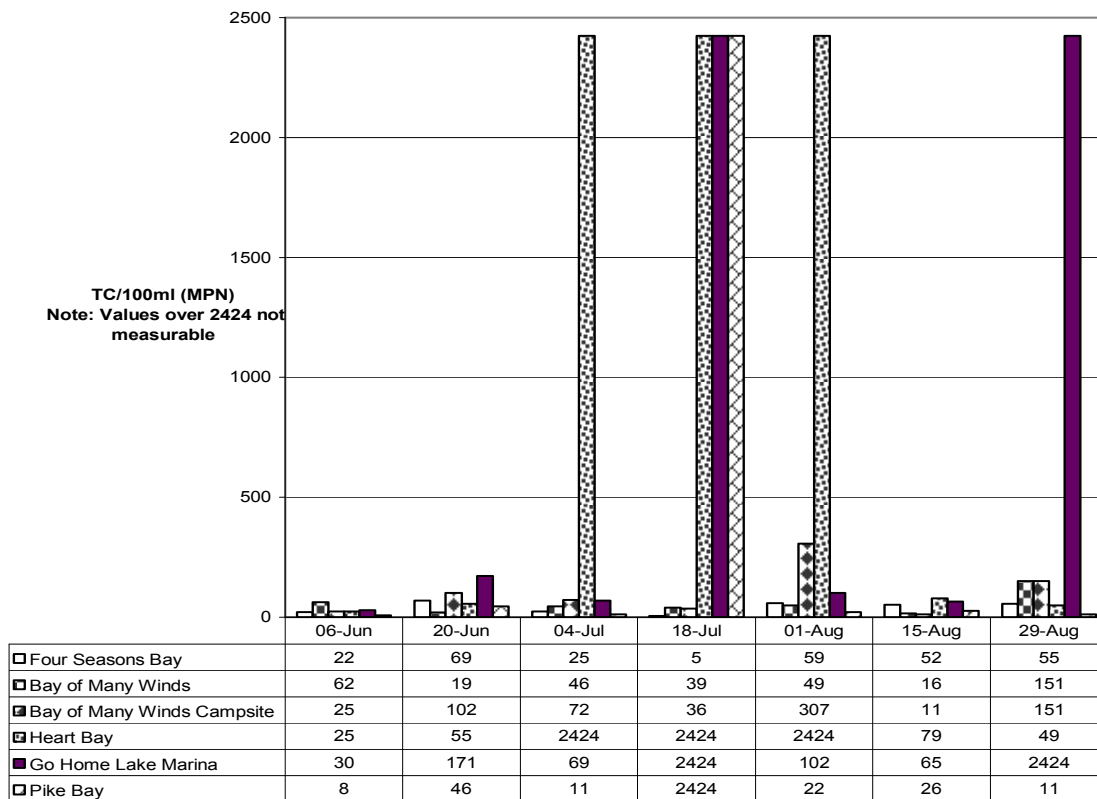
Once again this year, with the kind assistance of Paul Wiancko of Six Mile Lake, depth profiles to analyze water temperature, dissolved oxygen, conductivity (a measure of water source and circulation patterns), clarity and total phosphorus were conducted at 9 locations in early September.

Total Coliforms

Total Coliform readings during the summer of 2009 were generally lower than prior year averages, possibly due to higher than normal flows through the lake. Only six samples exceeded the Ontario recreational waters guideline of 1000 TC/100ml.

The majority of organisms measured by the TC test occur naturally in the environment, and enter the lake through soil runoff and decaying organic matter. There is little evidence that human activity contributes significantly to TC readings.

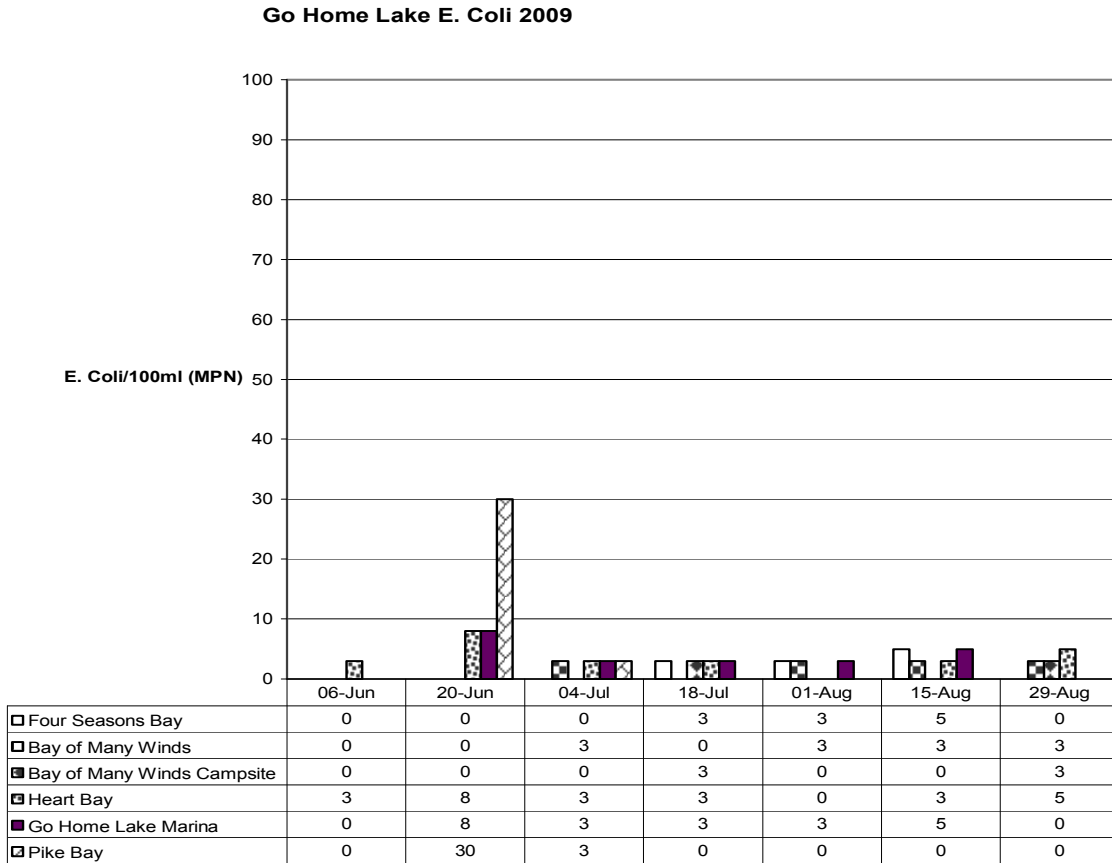
Go Home Lake Total Coliforms 2009



E. Coli

E. Coli, an organism which is abundant in human and animal excreta, is now favoured as an indicator of fecal contamination. Studies have shown that illness rates among recreational water users increase with fecal-associated bacteria levels in the water. Health Canada has established a guideline of 0 E. Coli/100ml for drinking water, while Ontario uses 100 E. Coli/100ml as the recreational water guideline. Because children typically ingest quantities of lake water while swimming or playing, the GBA has proposed an objective of 10 E. Coli/100ml for our recreational waters.

E. Coli readings during the summer of 2009 improved significantly as compared to prior year averages, with no results exceeding the provincial guideline. Only one result exceeded the GBA objective, compared to six in 2008 and an average of five in prior years.



Water Quality Analysis

Detailed water quality analysis has been conducted annually for the past 5 years in late summer, including vertical (top to bottom) temperature and oxygen profiles taken at every meter, conductivity and total phosphorous above and below the thermocline, and water clarity at the surface.

In early spring, lake water temperatures and oxygen levels tend to be uniform from top to bottom. As the surface waters warm up in late spring and summer, lakes stratify whereby a thermocline is formed at about the 5-8 meter depth. A thermocline is a horizontal layer of water about 3 meters wide where temperature and oxygen levels suddenly drop. This thermocline prevents the mixing of the top and bottom water columns. It is also a barrier to vertical fish movement and chemical mixing.

Total Phosphorous (TP) above the thermocline tends to be a result of local surface runoff (wetlands, septic systems, storm runoff, etc.), while TP below the thermocline tends to be dominated by the release from bottom sediments. This TP release from the bottom happens when oxygen levels are <1 mg/l (anoxic conditions). TP levels < 10 µg/L are considered good, 10-20 µg/L moderate and > 20 µg/L of concern.

Conductivity is used as an indicator of water movement and mixing throughout a lake. Thermoclines prevent this mixing and thus conductivity can be used to determine surface and bottom horizontal water movements.

Clarity is measured to determine the turbidity of the surface waters. High turbidity is usually the result of high biological productivity (algae growth) which is a result of higher nutrient (TP) levels. It can also be caused by sediments from storm runoff.

Nine locations were sampled on September 4th, 2009 – Southern Control Dam, Blue Lagoon, Four Seasons Bay, Bay of Many Winds, Crystal Bay, Swallow Bay, Manning Bay, the wetlands north of Manning Bay, and the stream that enters this wetlands from Irvine Lake.

Similar to previous years, only Four Seasons Bay and Manning Bay were stratified by a thermocline. TP levels above and below the thermocline for Four Seasons Bay were 6 µg/L above and 9µg/L below. Manning Bay was 6 µg/L above the thermocline and 23µg/L below. This value of 23µg/L (last year 41 µg/L) is a little disconcerting since it indicates that phosphorous is still being released back into the water column from bottom sediments. This happens when oxygen levels are < 1.0 mg/L. For Manning Bay, oxygen levels were 0.42 mg/L at 5 meters below the surface and 0.17 mg/L at 8 meters. If these waters ever reached the surface sunlight on a sudden lake turnover, a major algal plume could occur. To further understand Manning Bay, we sampled its source water to the north this year.

Manning Bay receives its surface water from the wetlands to the north, which in turn receives its water from a small stream from Irvine Lake. TP in the wetlands was 5 µg/L and Irwin Lake 12µg/L. This inflow water does not influence the surface nutrient levels in Manning Bay. However, the lower conductivity levels in Manning Bay (45.5 µg/cm compared to the main lake of 55 µg/cm) is influenced by the wetlands (27.2 µg/cm) and Irwin Lake (17.9 µg/cm). Manning Bay is basically a lake unto itself and is showing signs of nutrient enrichment.

Nutrient levels throughout the rest of the lake were surprisingly very similar. From a TP value of 8 µg/L at the north inlet of Swallow Bay, the levels did not vary more then 1 or 2 µg/L, with the south outlet value of 7 µg/L at the Control Dam. Even the bottom waters of Blue Lagoon and Four Seasons Bay only reached 9 µg/L.

Oxygen levels throughout the lake and back bays remained good (6-9 mg/L), except for Manning Bay as mentioned above.

Conductivity/mixing throughout the lake was again very uniform with values at the inlet (Swallow Bay) of 55.0 µS/cm and outfall (Control Dam) of 54.8 µg/cm. These values are exactly the same as lasts year's values (within 1 µS/cm).

Overall, clarity was very uniform throughout the lake this year with depth visibility of between 4.1 to 4.6 meters except in Four Seasons Bay with a value of 5.8 meters and Bay of Many Winds and Manning Bay of 3.9 meters.

Summary

In summary, water quality conditions were generally very good in Go Home Lake during the summer of 2009, especially as a downward trend in average seasonal E. Coli levels which began in 2008 has continued, although the unusually high flow rates through the lake this summer may have influenced this year's results.

We hope to continue the water quality monitoring program in future years to enable us to track the effectiveness of our efforts to preserve this important natural resource. For further information on the program contact Simon Edwards, Lot 172.