

TOWNSHIP OF THE ARCHIPELAGO REVIEW OF 2011 WATER QUALITY RESULTS

PURPOSE

This review is to complement the Volunteer Water Quality Monitoring Program Data Report – 2011 and provide an overview assessment of the data noting any trends or hot spots. The volunteer water quality monitoring program has operated in The Archipelago for 13 seasons and reviews such as these are useful to assess and provide commentary on the general quality of the water given the provided results and known characteristics of the various sampled bodies of water.

It is important to recognize that water quality does change for a number of reasons both within the season and between seasons. When looking at the data it is important to think about all the different things that might cause variations in your water quality data, both natural and human-caused, and be careful not to rush to any one conclusion. When looking at the data for an area and/or comparing areas, you should keep in mind a number of factors:

- differences in the watershed where a lake is located will cause natural variations to occur between lakes;
- seasonal differences in water temperature, rainfall, average temperatures etc., will all result in seasonal variations in data;
- bacterial populations can be highly variable. *E.Coli* are much more specific to fecal sources from warm-blooded animals and as such are used as an indicator of human influences to water. But, not only humans can introduce *E.Coli* to water. So, we must carefully consider long term averages and the location of water samples (i.e. sampling near wetlands may result in increased *E.Coli* counts simply because of the higher likelihood of animal life);
- bacterial populations can also quickly change in numbers over a very short period of time (days). It is often difficult to determine the source of bacteria, hence our primary concern is with areas that demonstrate ongoing high levels of *E.Coli* which may imply a constant source.
- The bacterial objectives of 100TC and 10EC for recreational waters in the Township of The Archipelago have proven to be quite useful and accurate for many (but not all) areas of the Township given long term averages. However, some natural variation away from these areas may be due to the characteristics of the areas and not necessarily a result of a pollution source. Areas that exhibit high TC and a concurrent high EC should be examined more carefully for the potential of a human-caused introduction of bacteria if the results continue on an ongoing basis.

INLAND LAKES

Although each inland lake has its unique characteristics in terms of water depth and shape, there is a certain advantage to looking at the results between the various lakes monitored within the Township. Five inland lakes are monitored including: Kapikog Lake, Healey Lake, Crane Lake, Blackstone Lake in the South Archipelago and Naiscoot (or Six Mile Lake) in the North Archipelago.

Water Clarity

In general water clarity results for the inland lakes are quite good and typical of the type of lakes located in The Archipelago. Variations between the lakes are characteristic to and natural to each of the individual lakes. In **Blackstone Lake**, water clarity had a good average throughout the year at 5.3 metres. Secchi depths have ranged from 4.5 to 6.0 metres in past years. This should be deemed to be excellent water clarity. This water clarity corresponds with a low long term Total Phosphorus average of 6 ug/L as provided through the MOE Lake Partner Program. Phosphorus levels in 2006 were trending downward in Blackstone Lake though no data is available since 2006.

In **Crane Lake**, water clarity is similarly good with water clarity results improving from the previous year at all locations. Average Secchi depths ranged from 4.0 to 5.5 metres which is excellent, especially considering that it is downstream of other developed lakes. This water clarity is consistent with the historic low phosphorus average of 4.7 ug/L since sampling began with 1997 as part of the Lake Partner Program. 2011 spring phosphorus levels at 4.8 ug/L are slightly up from previous years but are still quite appropriate.

Kapikog Lake's water clarity continues to be quite good ranging from 4.4 to 5.2 metres throughout the year. This water clarity has been consistent over many years although it is slightly better than in previous years. This corresponds to a historically low Total Phosphorus level of 5.6 ug/L.

Healey Lake's water clarity is typically lower than the other southern Archipelago lakes with water clarity depths ranging from 1.7 to 3.4 metres in all locations except Station 7, but has not measurably changed in the past five years of sampling. Although Station 7 is lower with an average of 1.7 metres, this level has been consistent for the past 5 years of sampling. The location of Station 7 in a back shallow bay with a good quantity of upstream wetlands may very well explain the reduced water clarity for this Station. The lower water clarity in Healey Lake may be a result of the generally shallow nature of the basin, the greater amount of development, and its location nearer the bottom of the watershed. The lower overall Secchi depths of Healey Lake are somewhat, but not entirely, corroborated by a slightly higher total phosphorus level for Healey Lake, which was measured at 7.1 ug/L in the 2006 season.

Naiscoot Lake continues to have good water clarity. Although not as high as some of the larger lakes in the South Archipelago, ranges of 2.8 to 5.2 represent a good water clarity for the lake which is not a headwater lake and has a good amount of

development. Averages have not changed markedly in the five years of sampling though some declines are indicated at a few of the stations.

Bacterial Monitoring

In all cases, bacterial levels are appropriate for recreational purposes in these lakes and do not strongly indicate any concerns.

Blackstone Lake continues to have quite elevated TC levels. EC levels however continue to be quite low and under the standards for the Township. This year only two stations had EC averages above the Township standards for bacteria on two sampling occasions. There are times when TC can be elevated for the lake (see previous results for Crane Lake), however, because EC levels remain low results here indicate that water is still safe and good for recreational use.

Results in **Crane Lake** have been elevated for a number of years with a number of stations being above the standards for the Township however conditions in 2011 are not substantively different than recent years of sampling. Station 5 has improved over previous years with only one sample date being above the township standard. Regardless, water quality remains acceptable for recreational water use on Crane Lake.

Healey Lake bacterial levels continue to be good despite having some of the highest concentration of development of the inland lakes. EC levels are in line with previous year's results with only two stations being just above the municipal standard (though only by a small margin. Water quality remains in good condition for recreational purposes in Healey Lake.

Kapikog Lake bacteria levels have returned to historic levels over those found in 2009. Only one location is just above the municipal standard but this is consistent with historic data. TC levels continue to be elevated as in previous years. Water quality conditions on Kapikog Lake remain suitable for recreational uses and the notable improvement in 2010 and 2011 over 2009 is encouraging.

Results for **Naiscoot Lake** continue to demonstrate good water quality conditions with EC levels consistently low and TC levels at suitable levels throughout the summer. It was noted that none of the sites have average TC levels above the Township standard. EC levels are well below the Township standard at all locations. Naiscoot Lake is good for recreational water use.

GEORGIAN BAY

Georgian Bay sites have also been characterized in a manner that recognizes a range of water body types from enclosed embayments (i.e. Woods Bay, Sturgeon Bay) through to outer islands (i.e. Sans Souci, Pointe au Baril Islands) with areas in between (i.e. Skerryvore, South Channel). The largest difference between these areas has to do with the amount of water circulation and mixing with open Georgian Bay waters that each of these sites might experience.

Water Clarity

Water clarity in the rather enclosed embayment of **Sturgeon Bay** remains quite poor as the area struggles with chronic algae blooms. Secchi depths ranged from 1.0 to 3.5 metres for this past year. This is consistent with the ongoing algae issues in Sturgeon Bay. This is corroborated by the provincial Lake Partner program data (collected by volunteers) with ongoing high phosphorus levels being at the heart of the algae issues.

Woods Bay is similarly enclosed but has the advantage of significant flushing from Moon River. As such, water clarity Secchi depths are much higher with the average depths ranging from 3 to 4 metres. These depths have not dramatically changed over many years. Overall, the water clarity of Woods Bay is good and typical for its location and water chemistry.

South Channel sampling provides a broad range of sampling locations with typical water clarity being quite good and representative of the diversity of sampling locations. Average Secchi Depths ranged from 2.9 to 6.5 metres, a slight decrease from previous years. None of the stations have changed markedly from previous years with small increases at many stations.

Water clarity measurements in **Pointe au Baril Islands** began in 2008. As such there is limited long term data for this area. However, given the location of some of the sites it would be expected that water clarity would be fairly high. Water clarity results for all the stations ranged from 3.7 to 8.5 metres. These results represent good water clarity and are typical of the near-mainland islands.

Water clarity in the outer areas such as **Sans Souci** is quite good as it benefits from the frequent flushing and exchange with the open waters of Georgian Bay. Secchi depths ranged from 4.9 metres in some of the enclosed sampling bays to 12.5 metres in the more open areas. The lower Secchi depth areas are consistent with past results and do not indicate a declining water quality condition.

Bacterial Monitoring

Sturgeon Bay bacterial levels were elevated over previous years though predominantly because of the first round of sampling in June. A number of the sites had average EC levels higher than the standards and should be watched in subsequent years. At most of the sites the elevated bacterial levels are not chronic in

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that they are not constantly elevated throughout the season. Sturgeon Bay remains a concern for recreational use more because of the presence of blue green algae blooms with the potential of producing toxins than due to the presence of bacteria.

Woods Bay bacteria levels have improved over past years. All sites are at or very near to the municipal standards and are indicative of good water quality from a bacterial perspective. The water quality in Woods Bay remains good for recreational use.

Bacteria levels in **South Channel** continue to be consistent with historic levels. Station 1 continues to have elevated EC levels but this is not surprising given its location at the bottom of the Seguin River in Parry Sound Harbour. The rest of the areas remain quite good with no stations being above the municipal standard for EC except Station 13 which has been consistently higher. Bacterial levels throughout the South Channel sites, with the exception of Parry Sound Harbour, would be deemed to be safe for recreational use given the Township standard guidelines.

Skerryvore bacterial levels are a bit mixed with some sites showing a slight improvement and others showing a slight decline. Some of the sites were above the Township standard although only on one or two of the sampling dates. Station 6, continues to have levels higher than the municipal standard and now higher than long term averages. Water quality conditions are generally fine for recreational purposes though some sites continue to indicate periodic higher bacteria levels than the Township standards and should be watched.

Bacteria levels in **Pointe au Baril Islands** continue to be quite low. Some of the results are higher than previous years mostly because of one sampling period. The generally good results are expected for this area because it experiences good flushing and exchange with outer Georgian Bay. Recreation water quality in Pointe au Baril Islands continues to be excellent.

Bayfield Inlet are all below the Township standard and exhibit excellent water quality for recreational purposes. A few individual results are higher but they are not indicative of the seasonal averages.

Sans Souci bacteria levels remain quite good and among the lowest in the Township. Only one location exhibited an average above the Township standard for EC however this was a result of one sampling session. Most of the other stations did not approach the Township standards. The recreational water quality in Sans Souci remains excellent for recreational use.