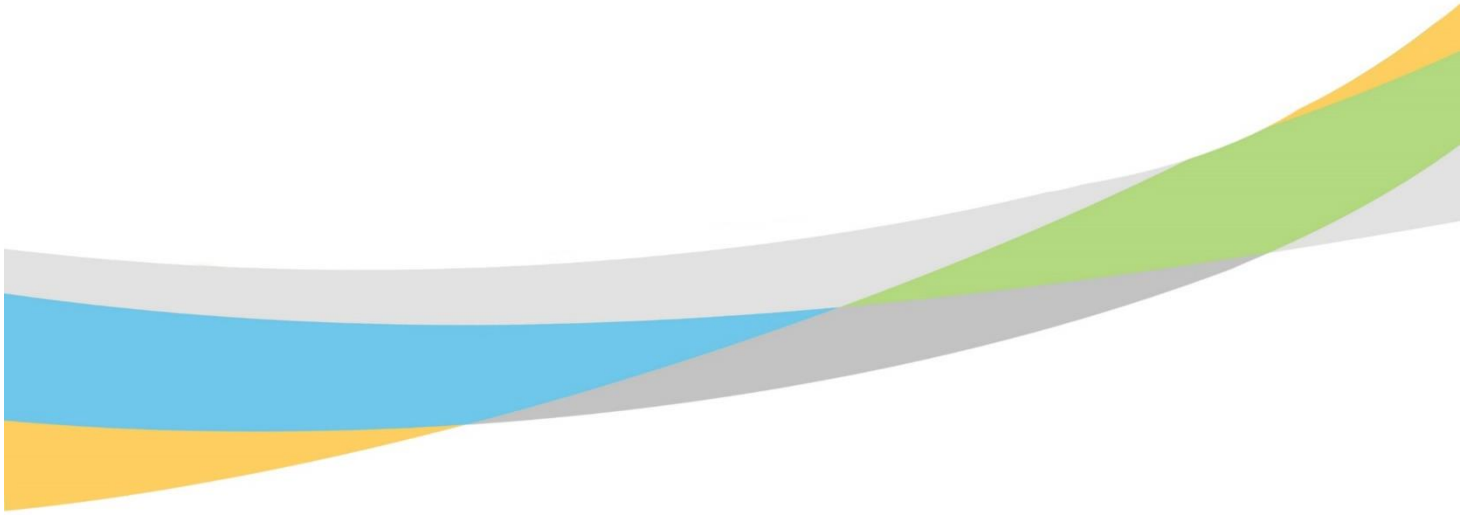

Toronto and Region Conservation Authority

2018 Annual Surface Water Quality Summary

Prepared by Environmental Monitoring and Data Management

May 2019

Table of Contents

1 Introduction

Since 2002, the Toronto and Region Conservation Authority (TRCA) has monitored stream water quality at selected locations within the watersheds in and around the Toronto region on a monthly basis. These activities have been undertaken as part of TRCA's Regional Watershed Monitoring Program (RWMP) in partnership with the Ministry of the Environment, Conservation and Parks (MECP) and the City of Toronto. The data collected are shared with partner municipalities and other external agencies. The results are used for planning, implementation and reporting activities including the development of watershed plans and report cards as well as watershed characterization reports in support of source water protection planning.

This report presents results for selected parameters from the 2018 surface water quality sampling. It provides a general overview and description of the range of water quality conditions across the TRCA jurisdiction during 2018. Results include data collected as part of the Provincial Water Quality Monitoring Network (PWQMN) and RWMP. This report and associated data can assist in identifying areas of concern, elevated levels of contaminants and can be used to affirm both poor and good water quality in different land use areas. The 2018 results should be interpreted with caution since water quality samples were collected independent of precipitation, and one year of data is insufficient to represent normal conditions at stations and watersheds. For example, 12 monthly samples from one site may be biased towards baseflow or stormwater runoff conditions. The 2011-2015 Surface Water Quality Summary report should be used as the most recent characterization of stream water quality across the region (TRCA 2017).

2 Methods

Surface water quality samples were collected at 47 stations throughout the TRCA's jurisdiction in 2018 (Figure 1). Thirteen stations were sampled by TRCA under the MECP's PWQMN and 34 stations were sampled by TRCA for the RWMP.

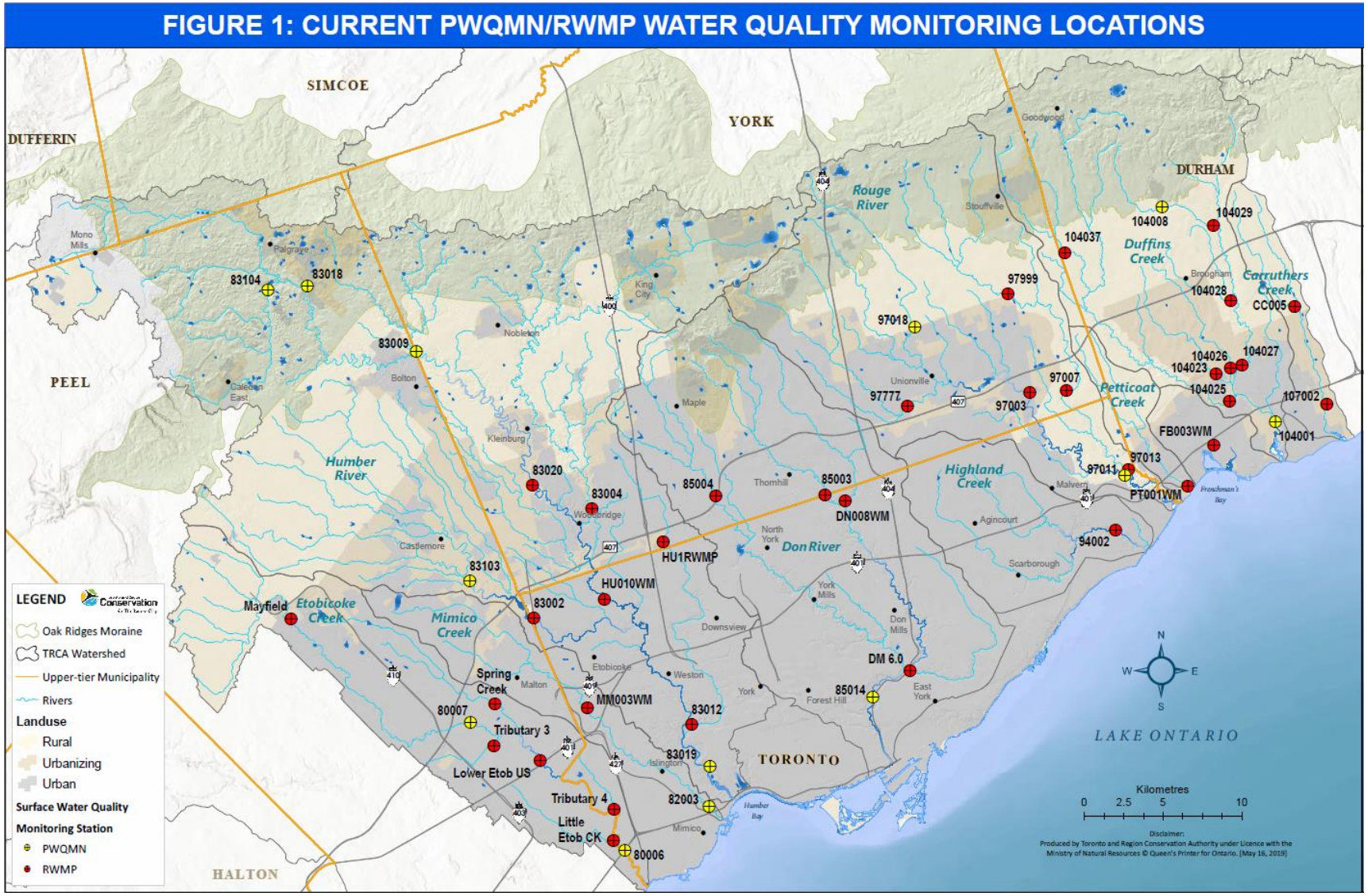

Figure 1. Current PWQMN/RWMP water quality monitoring locations 2018

Monthly samples were collected using in-stream “grab” techniques following the MECP PWQMN protocol (OMOE 2003) and also included in-situ measurements (e.g. water temperature, pH and dissolved oxygen) collected using a hand-held water quality multi-probe (YSI or ProDSS). Water quality samples were collected throughout the year, typically in the third week of each month, irrespective of precipitation. Samples from the 13 stations that are part of the PWQMN partnership were submitted to the MECP Rexdale Laboratory. The remaining samples from stations or months not included in the PWQMN (e.g. December to March) were submitted to the City of Toronto Dee Avenue Laboratory in order to augment water quality data from these stations, and to maintain a year-round dataset (Table 1).

The two laboratories analyzed a standard suite of nutrients, metals, microbiological and conventional water quality parameters (Table 2). The 16 parameters in boldface are those that were selected for discussion in this report including chloride, pH, total suspended solids, total phosphorus as well as additional forms of nitrogen (ammonia+ammonium, nitrate, nitrite and total Kjeldahl nitrogen), *Escherichia coli* and several metals. These parameters provide a quick but comprehensive overview of the water quality at each station. Elevated concentrations of these parameters may point to natural and/or anthropogenic sources within the watershed.

The results for each parameter were compared to the Provincial Water Quality Objective (PWQO) guidelines where applicable. The PWQOs are a set of numerical and narrative ambient surface water quality criteria that represent a desirable level of water quality. These guidelines were developed to protect all forms of aquatic life and all aspects of their aquatic life cycles during indefinite exposure to the water as well as protecting recreational water usage based on public health considerations and aesthetics (OMOEE 1994). When PWQO guidelines were not available, other objectives were used such as Canadian Water Quality Guidelines (CWQG; CCME 2007) and Recommended Water Quality Guidelines for the Protection of Aquatic Life under the Canadian Environmental Sustainability Indicators (CESI) Initiative (EC 2012). All laboratory results that were reported as less than the minimum detection limit (MDL) were set to the MDL value for the purposes of interpretation. Surface water quality data are maintained in a relational SQL database that is part of the TRCA’s corporate database web applications. For the purpose of this report, no project sites and/or their associated wet event sampling were included. Only method E3516A was used for the analysis of total phosphorus data from the MECP Rexdale Laboratory.

Water quality laboratory results for 2018 for each parameter are presented in box plots which summarize the distribution of values for each parameter over the course of the year (Figure 2). Box plot graphs display a range of results where the majority (50%) of results are located within the box section. The ends of the boxes represent the 25th and 75th quartiles and the difference between the quartiles is the interquartile range. The line across the middle of the box identifies the median sample value. Box plot graphs use median values because annual mean values can be skewed by one or two high values. The “whiskers” above and below the box represent the range of data plus or minus 1.5 times the interquartile range, excluding extreme values. Water quality stations are arranged along the x-axis of each graph from upstream to downstream (left to right) and grouped into watersheds which are arranged from west to east.

Table 1. TRCA surface water quality stations, associated laboratories and Environment Canada precipitation stations

Station	Watershed	Subwatershed	UTM Coordinates		Precipitation	Laboratory	
			Northing	Easting	Station	Dec-Mar	Apr-Nov
Mayfield	Etobicoke	Upper Etobicoke	4843488	595028	Pearson	TOR	TOR
80007	Etobicoke	Upper Etobicoke	4836746	606933	Pearson	TOR	OMOE
Tributary 3	Etobicoke	Tributary 3	4835477	607825	Pearson	TOR	TOR
Spring Creek	Etobicoke	Spring Creek	4838157	607990	Pearson	TOR	TOR
Lower Etob US	Etobicoke	Etobicoke Main	4834442	610933	Pearson	TOR	TOR
Little Etob CK	Etobicoke	Little Etobicoke	4829577	615520	Pearson	TOR	TOR
Tributary 4	Etobicoke	Tributary 4	4831543	615546	Pearson	TOR	TOR
80006	Etobicoke	Lower Etobicoke	4829016	616234	Pearson	OMOE	OMOE
MM003WM	Mimico	Lower Mimico	4837916	613849	Pearson	TOR	TOR
82003	Mimico	Lower Mimico	4831713	621585	Pearson	OMOE	OMOE
83104	Humber	Main Humber	4864112	593560	Pearson	TOR	OMOE
83018	Humber	Main Humber	4864329	595961	Pearson	TOR	OMOE
83009	Humber	Main Humber	4860243	602980	Pearson	TOR	OMOE
83103	Humber	West Humber	4845870	606385	Pearson	TOR	OMOE
83020	Humber	Main Humber	4851861	610386	Pearson	TOR	TOR
83002	Humber	West Humber	4843562	610459	Pearson	TOR	TOR
83004	Humber	East Humber	4850423	614148	Pearson	TOR	TOR
HU010WM	Humber	Lower Main	4844744	615027	Pearson	TOR	TOR
HU1RWMP	Humber	Black Creek	4848311	618678	Pearson	TOR	TOR
83012	Humber	Black Creek	4836845	620488	Buttonville	TOR	TOR
83019	Humber	Lower Main	4834265	621663	Buttonville	OMOE	OMOE
85004	Don	Upper West	4851207	622014	Buttonville	TOR	TOR
85003	Don	Upper East	4851256	628954	Buttonville	TOR	TOR
DN008WM	Don	German Mills	4850889	630236	Buttonville	TOR	TOR
85014	Don	Lower Don	4838576	632000	Buttonville	OMOE	OMOE
DM 6.0	Don	Taylor/Massey	4840251	634378	Buttonville	TOR	TOR
94002	Highland	Main Highland	4849056	647429	Buttonville	TOR	TOR
97777	Rouge	Middle Rouge	4856823	634214	Buttonville	TOR	TOR
97018	Rouge	Bruce Creek	4861770	634680	Buttonville	TOR	OMOE
97999	Rouge	Little Rouge	4863887	640589	Buttonville	TOR	TOR
97003	Rouge	Lower Rouge	4857669	641985	Buttonville	TOR	TOR
97007	Rouge	Little Rouge	4857816	644300	Buttonville	TOR	TOR
97011	Rouge	Lower Rouge	4852511	648007	Buttonville	OMOE	OMOE
97013	Rouge	Little Rouge	4852830	648243	Buttonville	TOR	TOR
PT001WM	Petticoat	Lower Petticoat	4851804	652005	Buttonville	TOR	TOR
FB003WM	Frenchman's	Frenchman's	4854151	653659	Buttonville	TOR	TOR
104037	Duffins	West Duffins	4866462	644191	Buttonville	TOR	TOR
104008	Duffins	East Duffins	4869299	650372	Buttonville	TOR	OMOE
104029	Duffins	East Duffins	4868158	653641	Buttonville	TOR	TOR
104028	Duffins	East Duffins	4863433	654742	Buttonville	TOR	TOR
104023	Duffins	Ganatsekiagon	4858867	653796	Buttonville	TOR	TOR
104026	Duffins	Urfe Creek	4859199	654730	Buttonville	TOR	TOR
104025	Duffins	West Duffins	4857115	654656	Buttonville	TOR	TOR
104027	Duffins	East Duffins	4859419	655458	Buttonville	TOR	TOR
104001	Duffins	Lower Main	4855880	657579	Buttonville	OMOE	OMOE
CC005	Carruthers	Carruthers	4863072	658808	Buttonville	TOR	TOR
107002	Carruthers	Carruthers	4856972	660850	Buttonville	TOR	TOR

Table 2. Standard suite of water quality parameters analyzed by City of Toronto and MECP laboratories. The results of the 16 parameters in boldface are discussed in this report

General Chemistry	Nutrients & Microbiological	Metals
Alkalinity	**Total ammonia**	**Aluminium**
Biochemical Oxygen Demand	***Nitrate (2.93 mg/L)**	**Arsenic (5 µg/L)**
Calcium	***Nitrite (0.06 mg/L)**	Barium
***Chloride (120 mg/L; 640 mg/L)**	**Nitrogen, Total Kjeldahl**	Beryllium
Conductivity	Phosphate	Cadmium
Dissolved Oxygen	***Total Phosphorus (0.03 mg/L)**	Chromium
Hardness	***E. coli* (100 CFU/100mL)**	Cobalt
Magnesium		***Copper (5 µg/L)**
pH (between 6.5 and 8.5)		**Iron (300 µg/L)**
Potassium		***Lead (5 µg/L)**
Sodium		Manganese
Total Dissolved Solids		Molybdenum
***Total Suspended Solids (30 mg/L)**		**Nickel (25 µg/L)**
Turbidity		Strontium
Water Temperature		Vanadium
		***Zinc (20 µg/L)**

Note: additional parameters may be analyzed on a site or project specific basis.
*PWQMN recommended indicator parameters

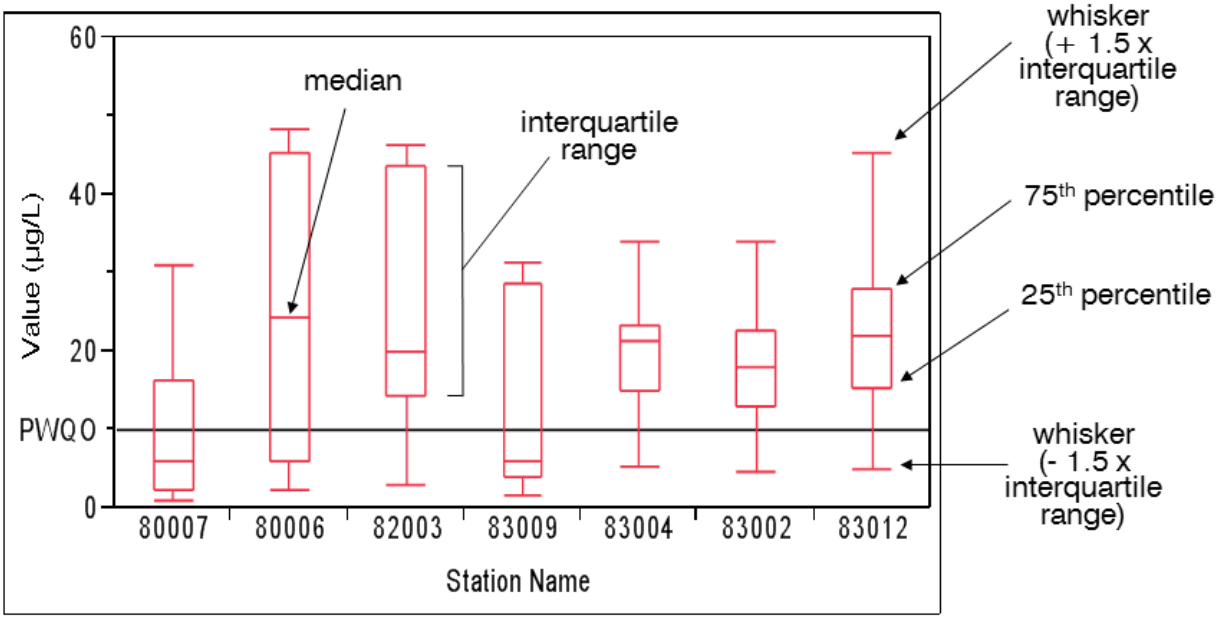

Figure 2. Box plot graphic example

Stream conditions were recorded at the time of sampling to help characterize the sample with respect to flow response to recent or occurring precipitation. These field notes (Appendix A) as well as 2018 precipitation data from Pearson International and Buttonville Airports were included in this report to provide context to assist with interpretation of results.

Daily precipitation data were downloaded from the Environment Canada National Climate Data and Information Archive website (http://climate.weather.gc.ca/). Precipitation data from meteorological stations at Pearson International and Buttonville Airports were attributed to TRCA water quality stations based on which airport was closer to the stations (Table 1). Data from Pearson were attributed to 21 water quality stations in the Etobicoke, Mimico and Humber watersheds. Buttonville precipitation data were attributed to 26 stations in the Don, Highland, Rouge, Petticoat, Duffins and Carruthers watersheds, as well as the Frenchman's Bay area. For a general overview of precipitation in the TRCA jurisdiction, the Pearson and Buttonville data were averaged. When determining whether samples were collected during precipitation events, both precipitation on the day of sampling as well as the day prior to sampling were used. Wet events were assumed if there was greater than 10 mm of rain or 10 cm of snow on the day prior to sampling and before 3 pm on the day the sample was obtained. Dry events were assumed when there was less than 10 mm of rain or 10 cm of snow on the day prior to sampling and before 3 pm on the day the sample was obtained.

The results of the 2018 data are intended to provide a general characterization of TRCA surface water quality conditions. Due to the small annual sample size (n=12) for each station, only one or two high values (e.g. storm events) are required to skew results upwards. Therefore, one year of data cannot be assumed to represent normal conditions in the TRCA jurisdiction. The 2018 results should be considered a general overview of conditions and description of ranges of water quality parameters at stations across the jurisdiction. For more informative interpretation of results the MECP recommends a minimum sample size of 30 samples per station (or 2.5 years of monthly data) to reduce the influence of unusual conditions such as spills, extreme runoff events and drought (OMOEE 2003). The results of the 2011-2015 Surface Water Quality report (TRCA 2017) provides sufficient sample sizes to characterize conditions at stations, watersheds and across the jurisdiction, and can be considered the most current representation of typical conditions within the jurisdiction.

3 Results

3.1 Precipitation

The jurisdictional precipitation discussed in this section was an average of data from Environment Canada's Pearson and Buttonville Airport meteorological stations. In 2018, rainfall was slightly above average. The total amount of precipitation recorded in 2018 was 907 mm, which is 69 mm above the 17-year average of 838 mm (Figure 3).

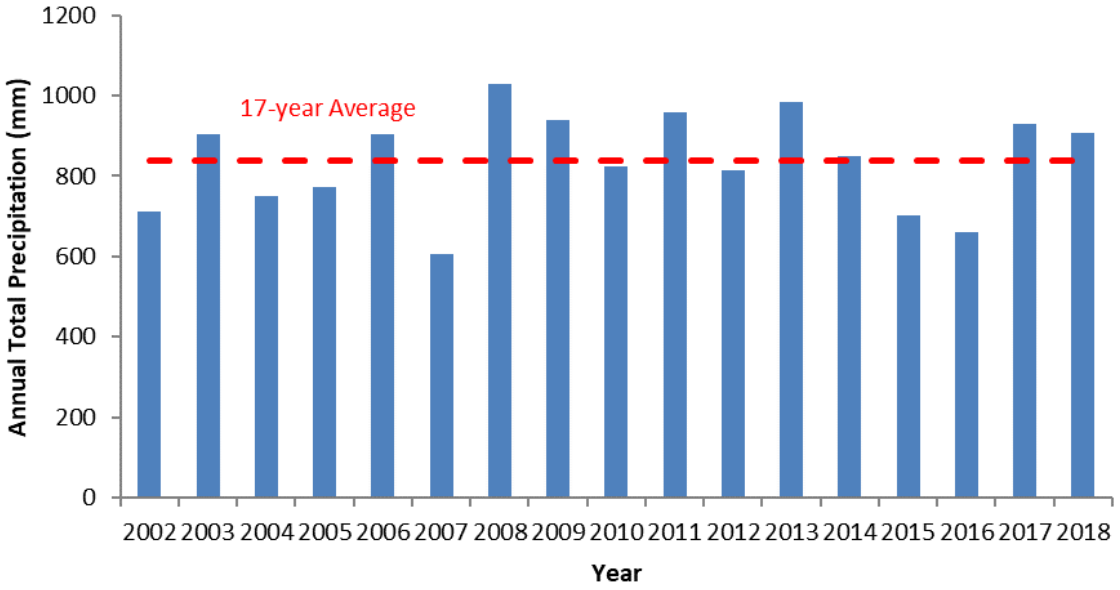

Figure 3. Annual precipitation for the TRCA jurisdiction from 2002 to 2018

To reduce the influence of annual variability in order to visualize longer term trends, 5-year moving averages of rainfall, snowfall and total precipitation were plotted (Figure 4). The data point for each year was an average of the previous five years. For example, the rainfall, snowfall and total precipitation values displayed in Figure 4 for the year 2002 were an average of values from 1998-2002. There was a significant increase in the 5-year moving averages for rainfall ($p=0.003$) and total precipitation ($p=0.012$) between 2002 and 2018 using the Mann-Kendall trend test. There was no significant change in snowfall between 2002 and 2018 ($p>0.05$).

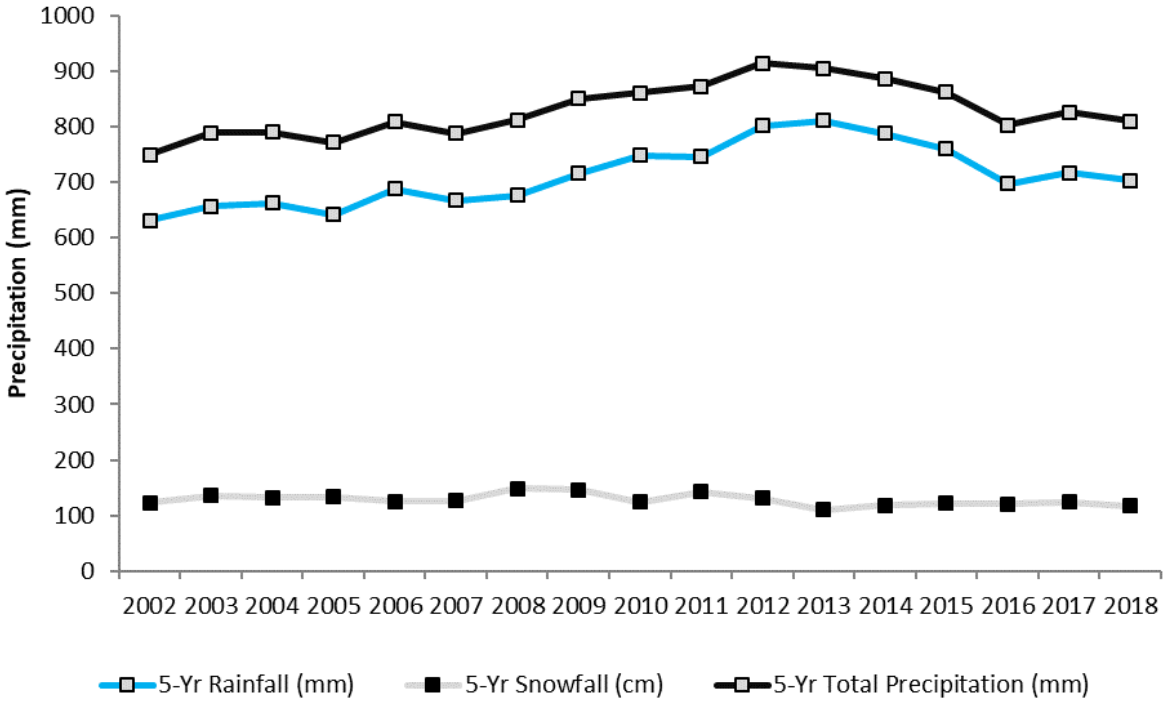

Figure 4. Five-year moving averages for rainfall, snowfall and total precipitation from 2002 to 2018

Figure 5 displays 2018 monthly precipitation and 17-year monthly precipitation averages. April, July, August and November had higher than average precipitation; however, every other month had lower than average precipitation. Stations may exhibit elevated concentrations of water quality parameters and pollutants as a result of high precipitation.

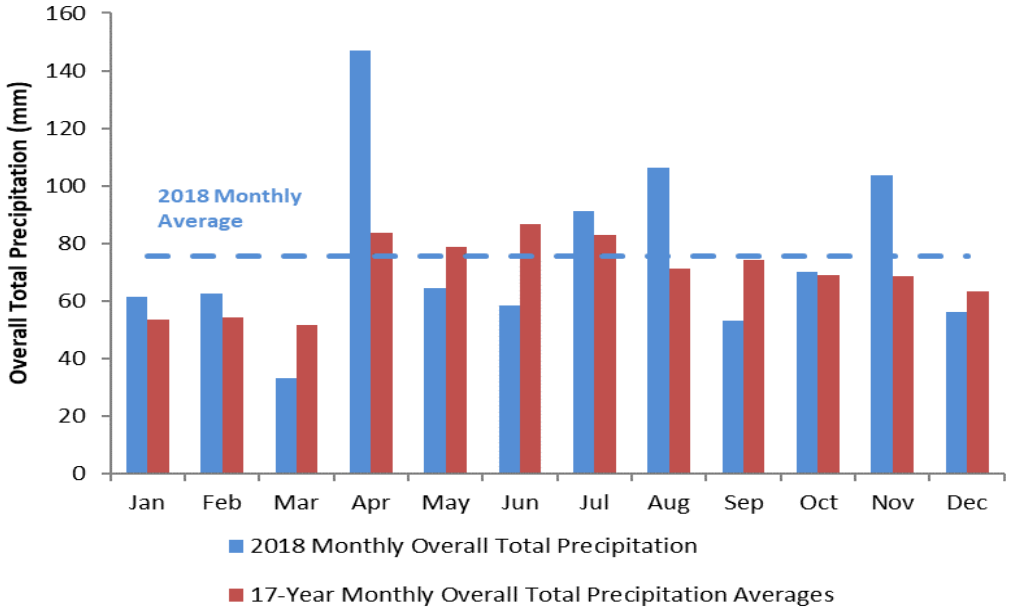

Figure 5. Monthly precipitation for 2018 compared to 16-year monthly precipitation averages

Snowfall in 2018 (119 cm) was only slightly below average (127 cm) while 2006, 2010, 2012 and 2015 showed snowfall well below average and only 2008 (1030 cm) showed snowfall amounts well above average (Figure 6).

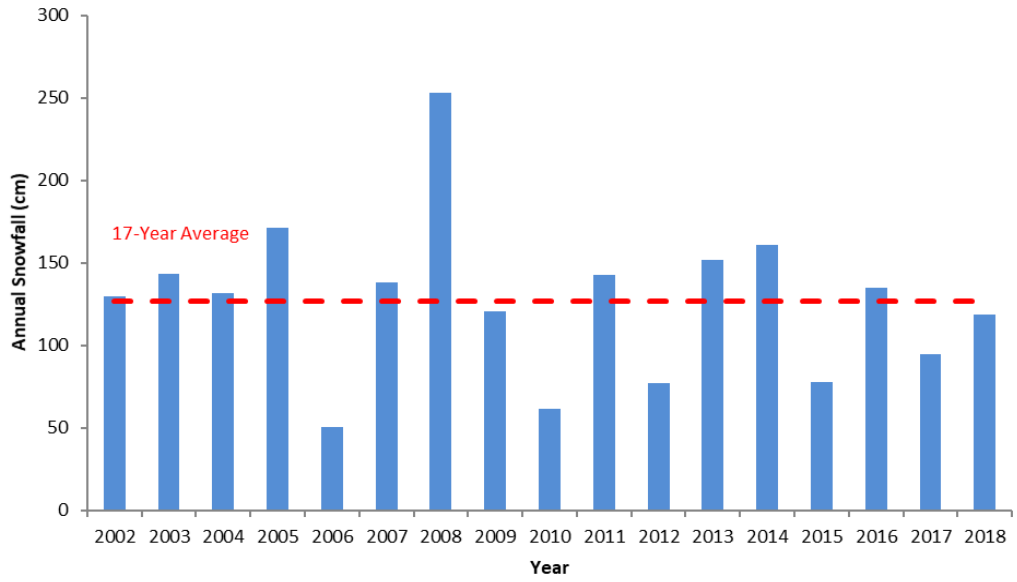

Figure 6. Annual snowfall from 2002 to 2018

Stations were sampled independent of precipitation; however, Environment Canada precipitation data from the day of and the day prior to sampling were used to calculate the percentage of wet and dry sampling events (Table 3). The annual total number of sampling events ranged from 433 in 2009 to 600 in 2013 and this is due to a general increase in the number of stations. Annual wet sampling events ranged from 11% in 2016 to 71% in 2011, with an average over the most recent five years of 32%. Dry events ranged from 29% in 2011 to 89% in 2016 and over the most recent five years averaged 68%.

Table 3. Wet and dry sampling events based on Environment Canada's Pearson and Buttonville Airports, from 2009 to 2014 and 2016 to 2018

Year	Wet Events	Dry Events	Total Events	Wet Event Percentage	Dry Event Percentage
2018	177	387	564	31.4	68.6
2017	67	497	564	11.9	88.1
2016	60	504	564	10.6	89.4
2014	259	284	543	47.7	52.3
2013	355	245	600	59.2	40.8
2012	255	237	492	51.8	48.2
2011	349	143	492	70.9	29.1
2010	300	156	456	65.8	34.2
2009	252	181	433	58.2	41.8
Average	**230.4**	**292.7**	**523.1**	**45.3**	**54.7**

3.2 General Chemistry Parameters

3.2.1 Chloride

Chloride does not readily absorb onto mineral surfaces, and thus concentrations can be high in surface water and shallow aquifers, the latter releasing chloride throughout the year (CCME 2011). It can be toxic to aquatic organisms with acute toxic effects at high concentrations and chronic effects (on growth and reproduction) at lower concentrations (OMOE 2003). The CCME has two guidelines for chloride: acute, or short-term, and chronic, or long-term. The short-term guideline is 640 mg/L and the long-term guideline is 120 mg/L. A primary source of chloride is the application of road salt in winter months.

Station HU1RWMP in the Black Creek had the highest median chloride value (1012 mg/L) while station 83009 in the upper reaches of the Main Humber River had the lowest median chloride value (33 mg/L; Figure 7). Most stations had concentrations above the chronic threshold except for stations in the upper Humber River, upper Rouge River and Duffins Creek watersheds. All stations in the Etobicoke Creek, Mimico Creek, Don River, Highland Creek, Petticoat Creek and Frenchman's Bay watersheds had chloride concentrations above the chronic threshold. Five stations had chloride concentrations above the acute guideline. These stations included Tributary 3 and Little Etob CK in Etobicoke Creek, MM003WM on Mimico Creek, 82003 at the mouth of Mimico Creek, and HU1RWMP in the lower Black Creek).

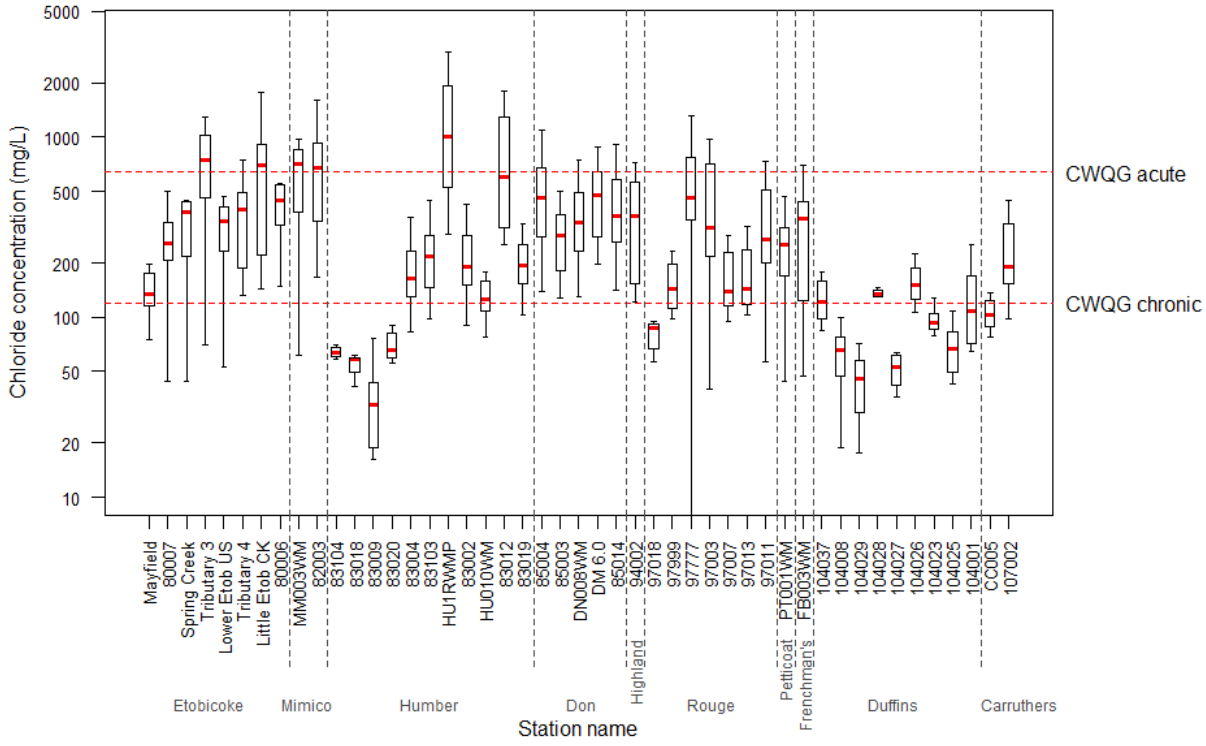

Figure 7. 2018 chloride concentrations (mg/L) at TRCA surface water quality monitoring stations (CWQG: long-term 120 mg/L (chronic) and short-term 640 mg/L (acute); CCME 2011)

3.2.2 Total Suspended Solids

Turbidity refers to the cloudiness of water due to suspended particles. Turbidity can be caused by stormwater runoff, erosion, increased stream flow, as well as by construction and agriculture. Higher turbidity can increase the likelihood that bacteria are present (which can attach to the particles), block light from penetrating to lower depths negatively affecting species dependent upon such light, reduce the absorption of oxygen by fish gills and impair stream aesthetics. Suspended particles can cause abrasion on fish gills and reduce the amount and quality of spawning habitat. Toxic organics and metals often adhere to suspended solids and may become available to benthic fauna when the solids settle (CCME 2007). The amount of total suspended solids (TSS) increases with higher precipitation, stream flow, erosion and higher agricultural or urban land uses. The Canadian Water Quality Guidelines contain a narrative guideline for TSS: the maximum increase of TSS should be no more than 25 mg/L from background concentrations (with TRCA using a background TSS concentration of 5 mg/L determined using data from the jurisdiction; CCME 2002).

Median TSS values exceeded the CWQG of 30 mg/L at stations 83004 and HU010WM on the main and lower Humber River, and station 85003 on the East Don River (Figure 8). These stations, and several others, had a wide range of values indicating that some samples were collected during turbid conditions which could have been caused by precipitation events or an unidentified source of sediments.

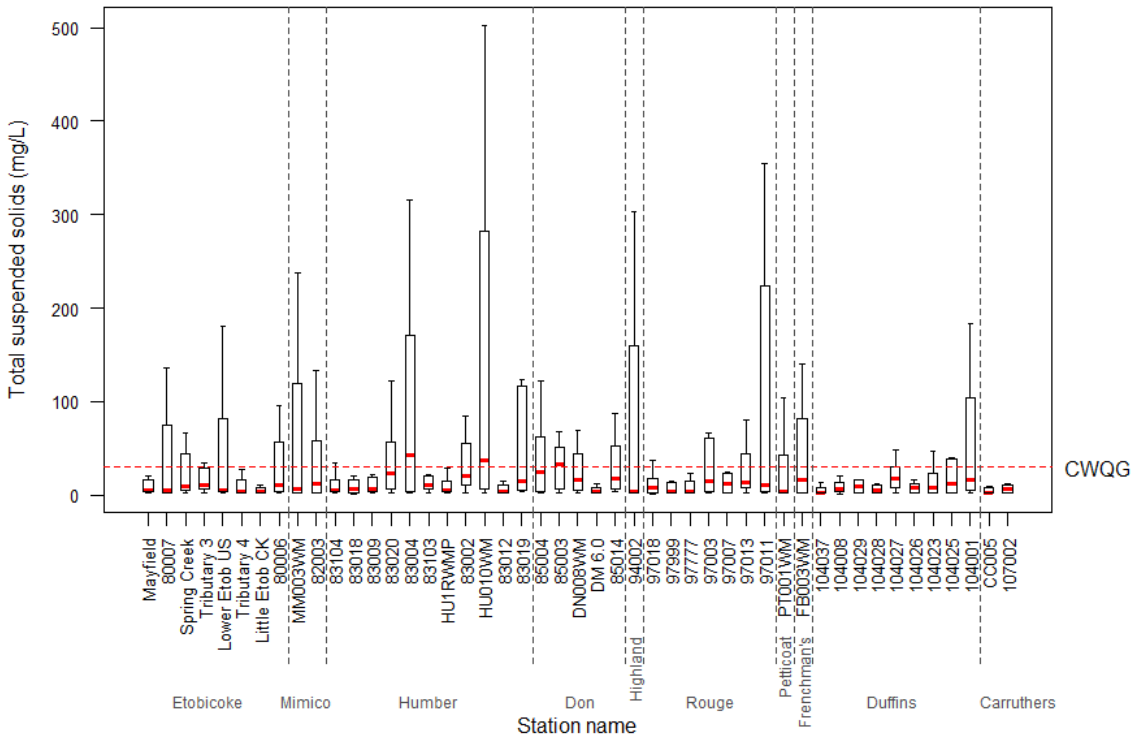

Figure 8. 2018 TSS concentrations (mg/L) at TRCA surface water quality monitoring stations (CWQG: 30 mg/L)

3.2.3 pH

pH is a measure of the acidity, neutrality or alkalinity of water. Fluctuations in pH can affect fish communities directly and indirectly by facilitating the release of organic and metal contaminants bonded to sediments. The pH of water also affects the toxicity of ammonia. Nutrient cycling, the discharge of industrial effluent and spills can result in pH fluctuations.

In 2018, no stations had median pH values that exceeded the upper PWQO guideline of 8.5 (Figure 9). The majority of stations exhibited limited variation in pH; however, Tributary 3 and Lower Etob US in the Etobicoke Creek watershed displayed the greatest range of data values.

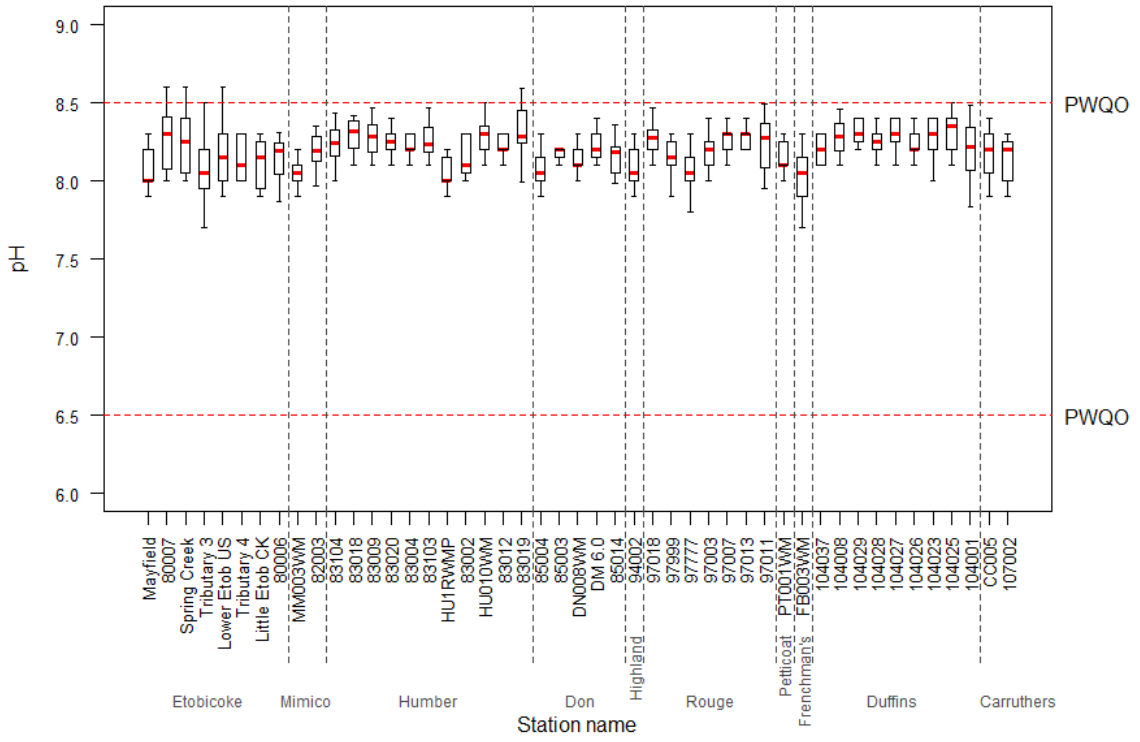

Figure 9. 2018 pH values at TRCA surface water quality monitoring stations (PWQO: 6.5-8.5)

3.3 Metals

Metals occur naturally in the environment usually in low concentrations. Industrial processes and increased stormwater runoff in urban areas can dramatically alter the distribution of metals and increase their concentration. High concentrations of metals can be toxic, cause disruptions to aquatic ecosystems and decrease the suitability of a waterbody to support aquatic life and supply water for domestic uses.

3.3.1 Aluminium

Since over 8% of the earth's crust is comprised of aluminium, the amount of aluminium in the environment from natural sources exceeds that from agriculture, industry and other anthropogenic sources. Acidic precipitation, poorly buffered soils and rapid spring snowmelts can increase concentrations of aluminium in streams (Wetzel 2001). Currently, there are no PWQO, CWQG or CESI guidelines which define the amount of allowable total aluminium for the protection of aquatic life.

In 2018, there was a wide degree of variation in aluminium concentrations although this is not unique to 2018 (Figure 10). The highest median aluminium value was at station 85003 in the east Don River. Four stations had noticeably large interquartile ranges and whiskers (MM003WM in middle Mimico Creek, 83004 in the middle Humber, HU010WM in lower main Humber River, and 94002 in Highland Creek).

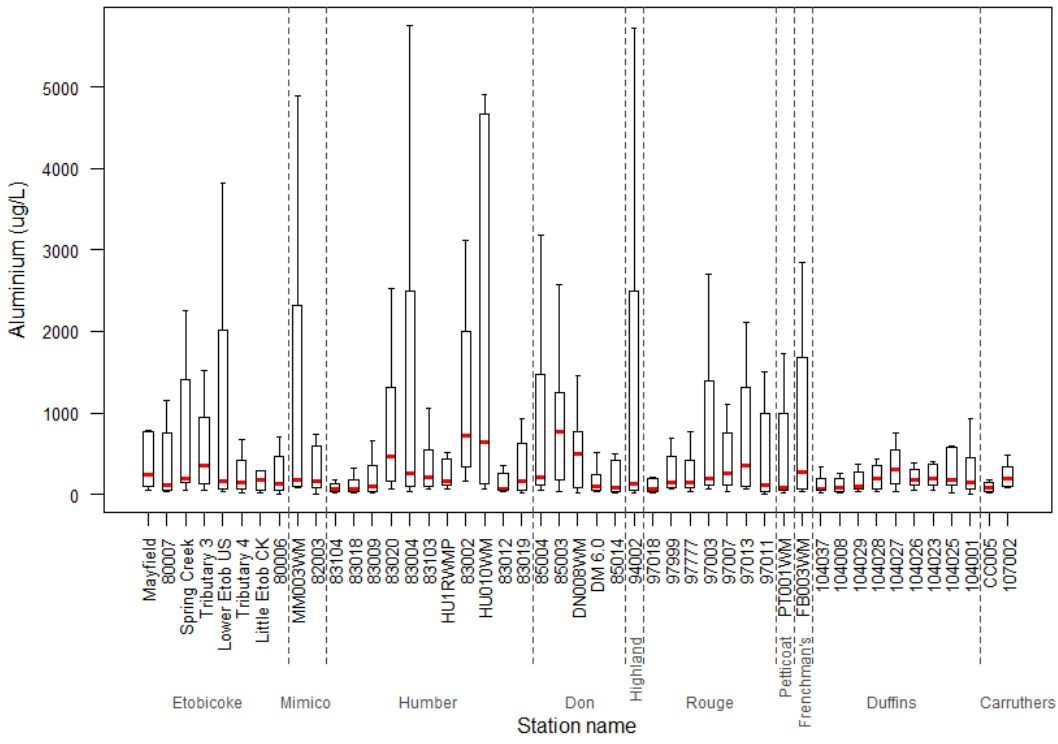

Figure 10. 2018 aluminium concentrations (ug/L) at TRCA surface water quality monitoring stations

3.3.2 Arsenic

The weathering of rocks and soils, and smelting and refining industries are sources of arsenic. Arsenic is an odourless, tasteless and toxic metal, for which the PWQO is 5 ug/L. Median arsenic concentrations at all stations in 2018 were well below the PWQO of 5 ug/L (Figure 11). Station 80007 on the west Branch of Etobicoke Creek had the highest median arsenic concentration of 1.0 ug/L.

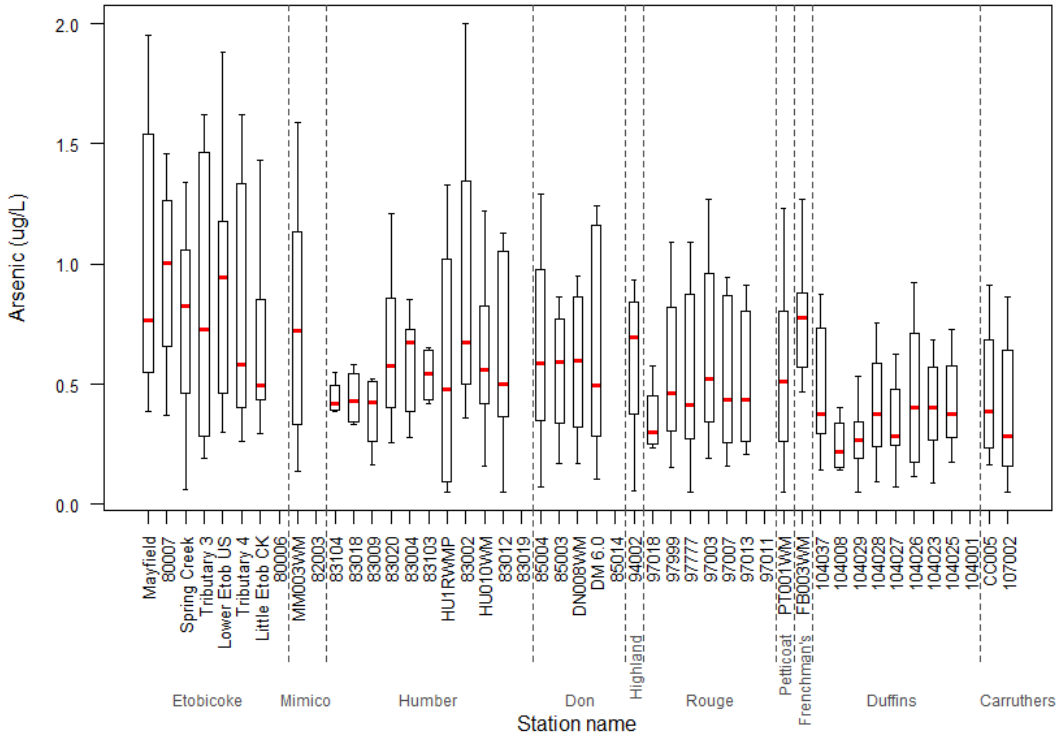

Figure 11. 2018 arsenic concentrations (ug/L) at TRCA surface water quality monitoring stations (PWQO: 5 ug/L)

3.3.3 Copper

Copper is a trace metal whose elevated concentrations are associated with urbanization. It may readily bind to soil particles (particularly organic matter) and is therefore relatively immobile. Anthropogenic sources of copper include textile manufacturing, paints, electrical conductors, plumbing fixtures and pipes, wood preservatives, pesticides, fungicides and sewage treatment plant effluent (OMOE 2003).

Median copper concentrations exceeded the PWQO guideline at four stations (80006 at the mouth of Etobicoke Creek, MM003WM in the middle Mimico Creek, 82003 at the mouth of Mimico Creek, and 85014 at the mouth of the Don River) (Figure 12). These stations are located in the urbanized middle to lower reaches of the Etobicoke Creek, Mimico Creek and Don River watersheds.

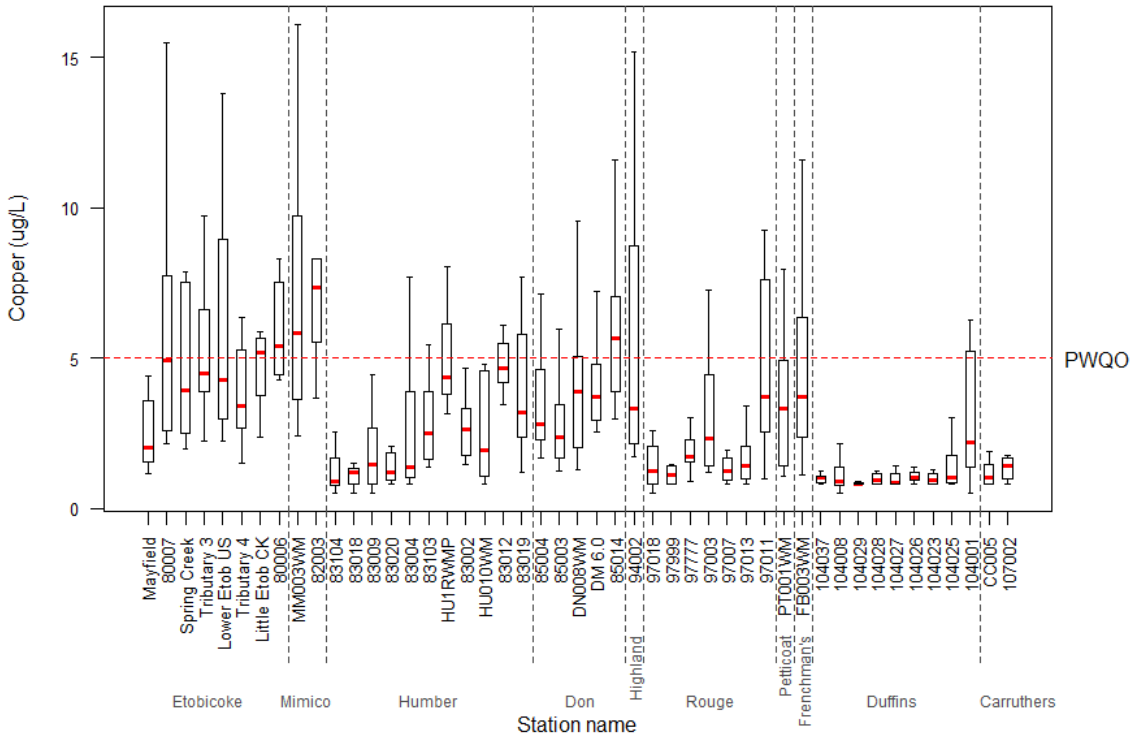

Figure 12. 2018 copper concentrations (ug/L) at TRCA surface water quality monitoring stations (PWQO: 5 ug/L)

3.3.4 Iron

Iron comes from various natural and anthropogenic sources in the environment. Natural sources include weathering of bedrock and anthropogenic sources include landfills, water purification and sewage treatment systems and pesticides and fertilizers (Dodson 2005). Iron is needed for proper ecosystem functioning as it is a necessary component of many biological processes for plants and animals; however, it can be toxic in higher concentrations (Dodson 2005).

Median iron concentrations for 17 of 47 stations in 2018 exceeded the PWQO of 300 ug/L (Figure 13). The highest median iron concentration was 517 ug/L at station DN008WM on German Mills Creek, a tributary of the east Don River. The lowest median iron concentration was 174 ug/L at station 97007 on the Little Rouge River.

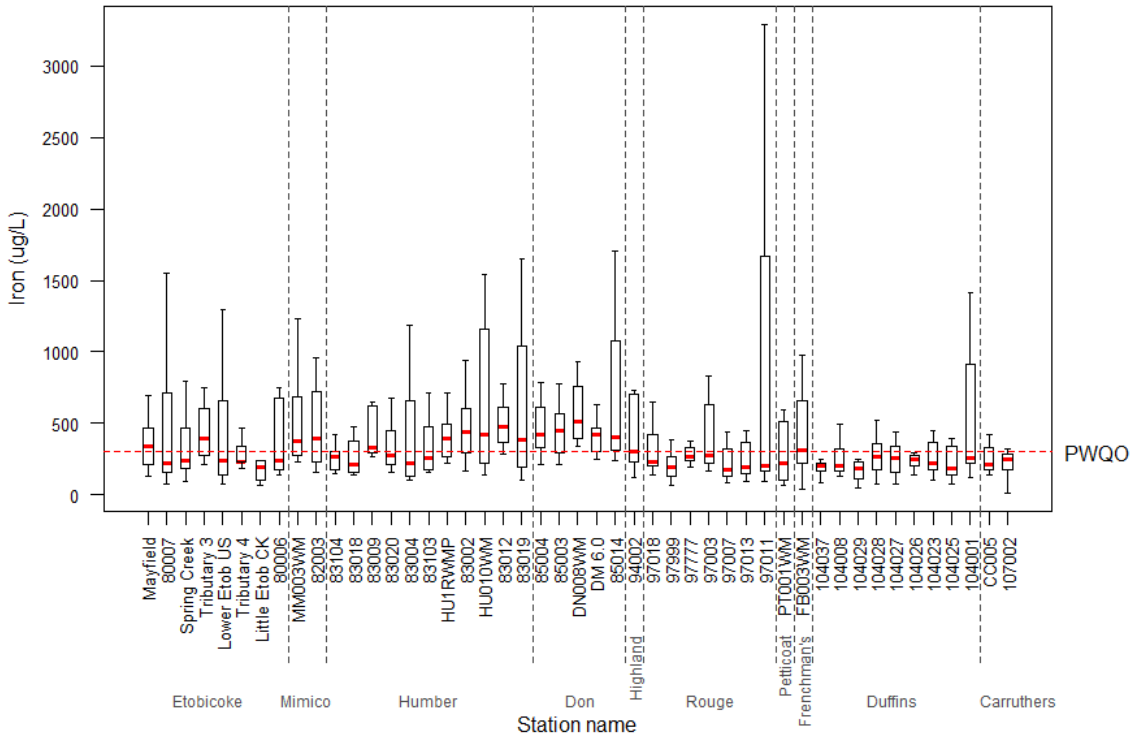

Figure 13. 2018 iron concentrations (ug/L) at TRCA surface water quality monitoring stations (PWQO: 300 ug/L)

3.3.5 Lead

Laboratory results for lead from the MECP were excluded from analysis because the MECP minimum detection limit (MDL) of 7 ug/L is much higher than the MDL for the City of Toronto (0.05 ug/L) and the PWQO of 5 ug/L. Lead results discussed here represent 41 stations whose samples were analyzed by the City of Toronto Dee Avenue laboratory.

All 41 stations had median lead concentrations well below the PWQO (Figure 14). Two stations had comparably high median lead concentrations including 80007 on the west branch of Etobicoke Creek (2.11 ug/L) and Tributary 3 in Etobicoke Creek (1.15 ug/L). Several stations had maximum lead concentrations above the PWQO including 80007 (12.8 ug/L), Spring Creek (13.9 ug/L), Lower Etob US (13.5 ug/L), and Little Etob CK (5.8 ug/L) all in the Etobicoke Creek watershed, MM003WM (11.4 ug/L) in the middle Mimico Creek, and 94002 (7.55 ug/L) in Highland Creek.

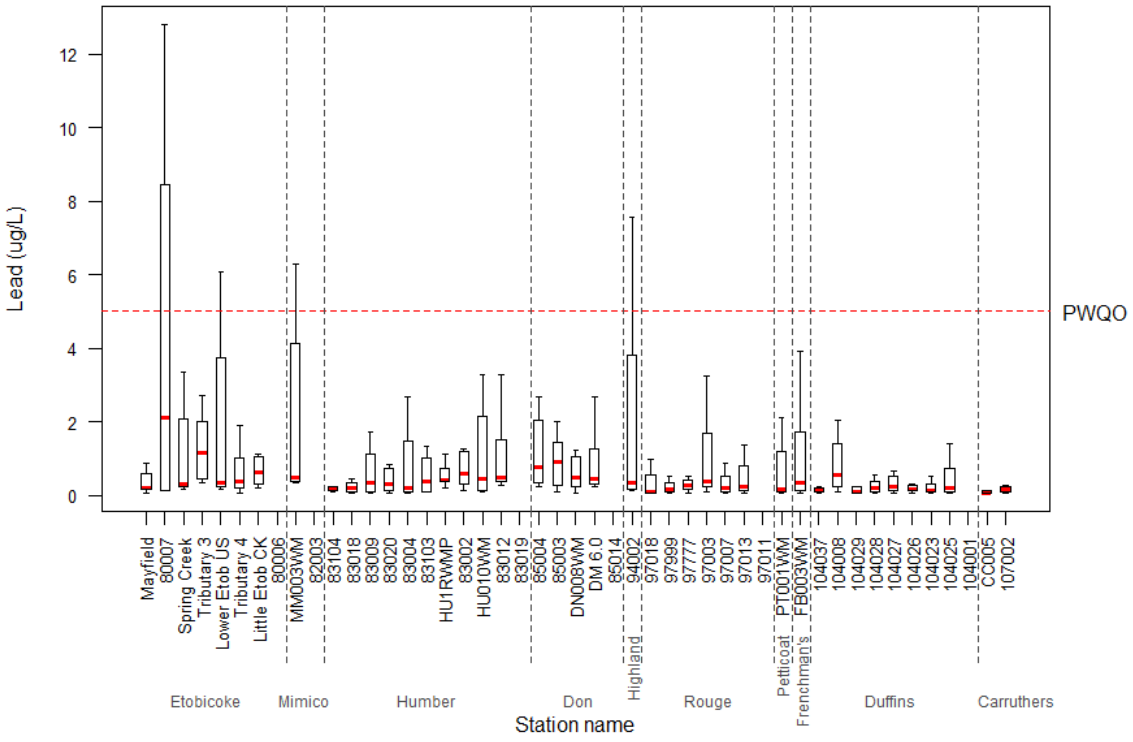

Figure 14. 2018 lead concentrations (ug/L) at TRCA surface water quality monitoring stations (PWQO: 5 ug/L)

3.3.6 Nickel

Due to a higher MDL, MECP laboratory results for 2018 were excluded and only City of Toronto results were analyzed. Median nickel concentrations were highest at stations Tributary 3 (1.96 ug/L) in Etobicoke Creek and 83012 (1.84 ug/L) in lower Black Creek. All stations were below the PWQO of 25 ug/L (Figure 15).

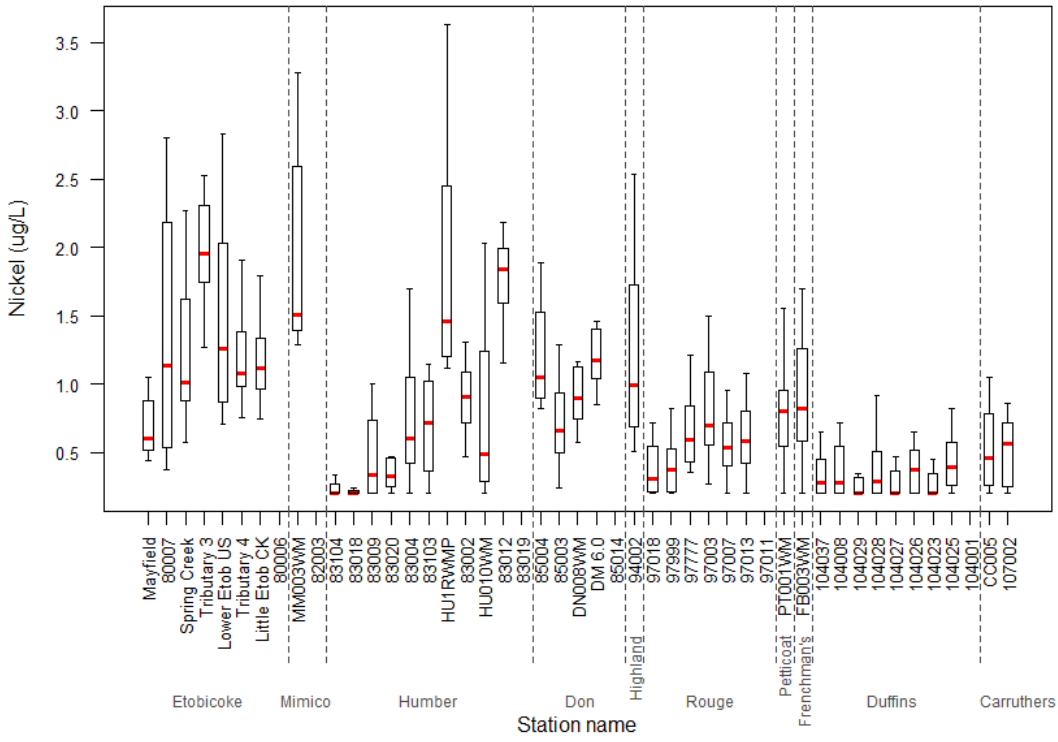

Figure 15. 2018 nickel concentrations (ug/L) at TRCA surface water quality monitoring stations (PWQO: 25 ug/L)

3.3.7 Zinc

Similar to other metals, the natural process of weathering makes zinc available in ecosystems. Anthropogenic sources include municipal wastewater, wood combustion, iron and steel production and waste incineration (OMOEE 2003).

The MDL for the City of Toronto laboratory was 10 ug/L and these appear as a straight line on the graph. Stations Tributary 3, 80006, 82003 and 85014 (in Etobicoke Creek, and at the mouths of the Etobicoke Creek, Mimico Creek and Don River, respectively) had median zinc concentrations above the PWQO in 2018 (Figure 16). Zinc concentrations tended to be the lowest in the Humber River, Rouge River, Duffins Creek and Carruthers Creek watersheds.

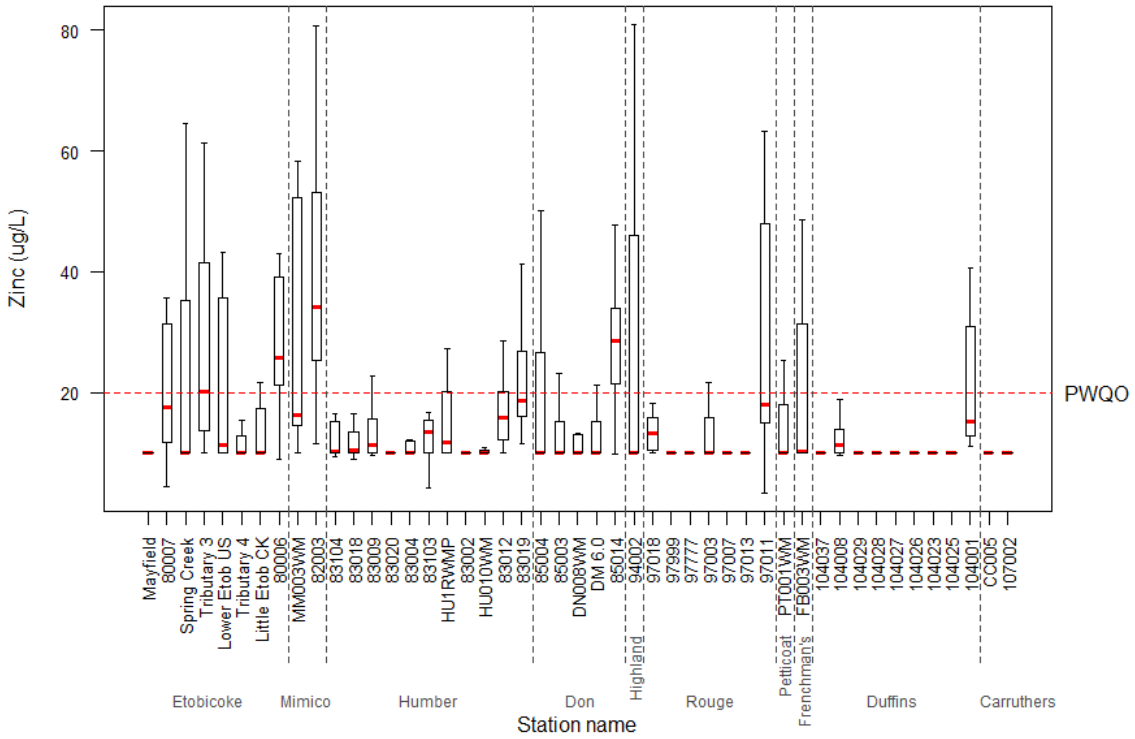

Figure 16. 2018 zinc concentrations (ug/L) at TRCA surface water quality monitoring stations (PWQO: 20 ug/L)

3.4 Bacteria

Escherichia coli are part of the coliform group of bacteria commonly found in the digestive systems of warm-blooded animals (Health Canada 2012). *E. coli* are used to indicate the presence of fecal contamination in water since it is not naturally found on plants or in soils and water. *E. coli* can affect human health by causing gastrointestinal illness and potentially more serious health problems (Health Canada 2012). *E. coli* levels may increase in urbanized areas due to inadequately designed combined sewer systems, illegal connections between storm and sanitary sewers and precipitation events that overflow those sewer systems (CCME 2003). Municipalities use *E. coli* as an indicator to ensure that drinking water and recreational bathing waters are safe; however, RWMP monitoring of *E. coli* levels in TRCA streams was designed to measure and track long-term watershed health.

Station 85014 in the lower Don River watershed had the highest median *E. coli* count of 27000 CFU/mL (Figure 17). This result is consistent with previous years and is due to station 85014 being located downstream of the North Toronto Wastewater Treatment Plant. The lowest *E. coli* counts were generally found in the upper reaches of the watersheds, but tended to be generally low in the Duffins Creek and Carruthers Creek watersheds.

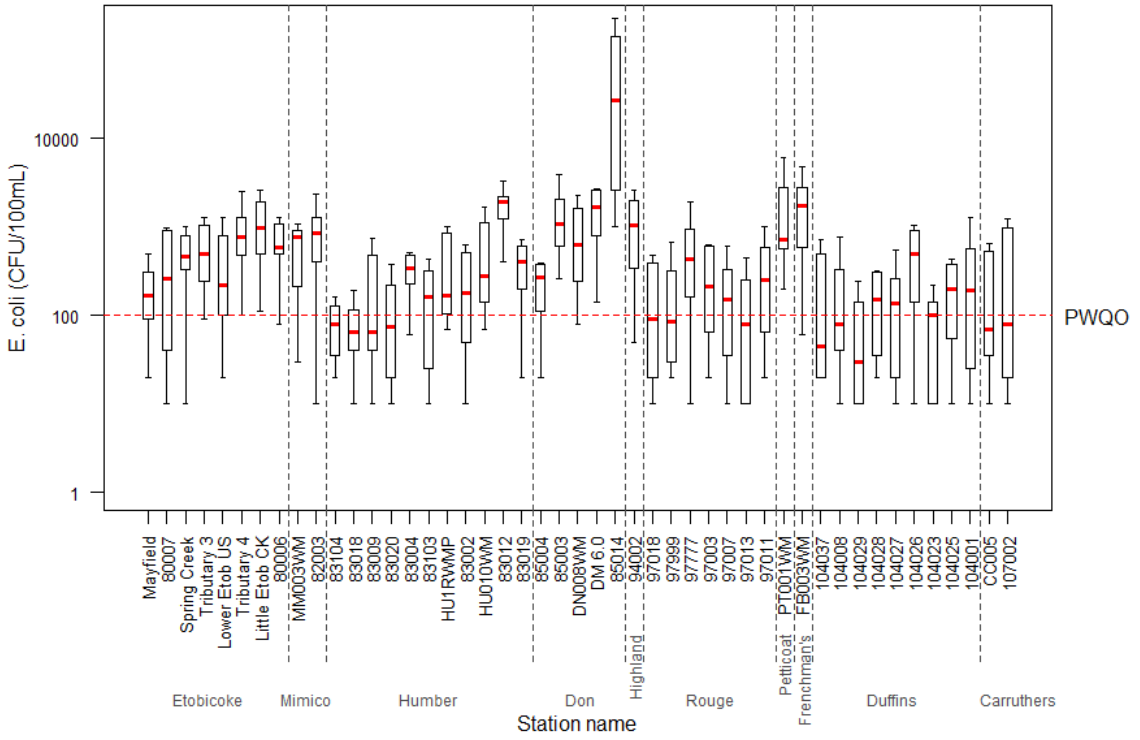

Figure 17. 2018 *E. coli* concentrations (CFU/100 mL) at TRCA surface water quality monitoring stations (PWQO: 100 CFU/100 mL)

3.5 Nutrients

Nitrogen and phosphorus are critical to plant and animal life and their concentrations determine the productivity of aquatic systems. Phosphorus is commonly the growth limiting nutrient in aquatic systems; however, if there are substantial phosphorus loadings, nitrogen becomes the limiting nutrient.

Nitrogen occurs in various forms such as nitrate, nitrite and ammonia. Nitrate is the most common form of nitrogen entering freshwater systems and is assimilated by plants. Upon the decomposition of plant matter, dissolved organic nitrogen is converted to ammonia, an energy-efficient source of nitrogen for plants (Dodson 2005). Bacteria convert ammonia into nitrate, nitrite and nitrogen. Nitrite is easily converted and rarely accumulates unless organic pollution is high (Wetzel 2001). Total Kjeldahl nitrogen (TKN) is a quantitative determination of nitrogen and ammonia that is required in the analysis of sewage treatment plant effluent.

Anthropogenic sources of nitrogen and phosphorus (agricultural fertilizer, animal wastes and municipal sewage) that move into aquatic systems can cause unusually high concentrations of these nutrients. This over-nutrition, or eutrophication, of aquatic environments can promote excessive plant and algae growth. Eutrophic lakes can be characterized by algal blooms which reduce recreational use and deplete oxygen levels to the detriment of other biota, especially fish. Excessive growth of aquatic plants in streams can cause dissolved oxygen concentrations to decrease during the night to levels that may not sustain certain aquatic species, as well as reduce the aesthetic appeal of the stream.

3.5.1 Ammonia

Currently, there are no PWQO, CWQG or CESI guidelines which define the amount of allowable total ammonia (ammonia + ammonium) for the protection of aquatic life. Very high median (1835 ug/L) and maximum (5790 ug/L) ammonia concentrations occurred at station 85014 in the lower Don River in 2018. The 2018 median concentration was more than 12 times higher than the median concentration for this station in 2017.

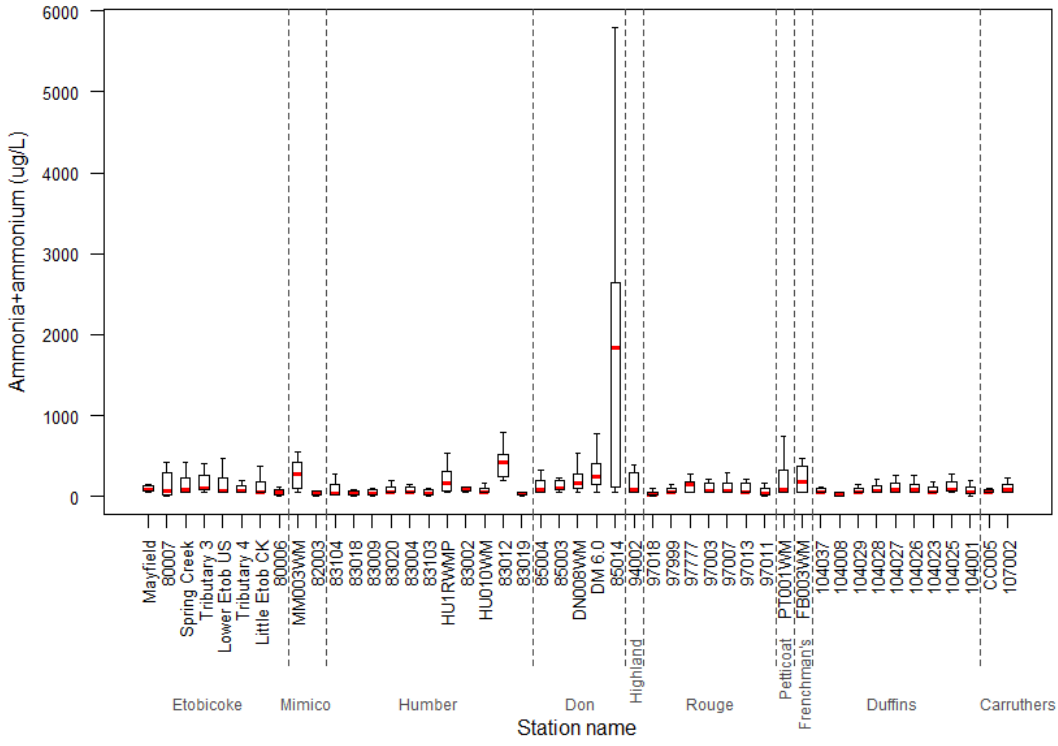

Figure 18. 2018 ammonia concentrations (ug/L) at TRCA surface water quality monitoring stations

3.5.2 Nitrate

There were no stations with median nitrate concentrations above the CWQG guideline of 2.93 mg/L (Figure 19). Station DM 6.0 in Taylor Massey Creek in the Lower Don had the highest nitrate concentration of 1.60 mg/L followed by 83012 in the Lower Humber (1.37 mg/L) and 85014 also in the Lower Don (1.34 mg/L). Most stations exhibited large interquartile ranges which may be indicative of infrequent pulses of nitrate.

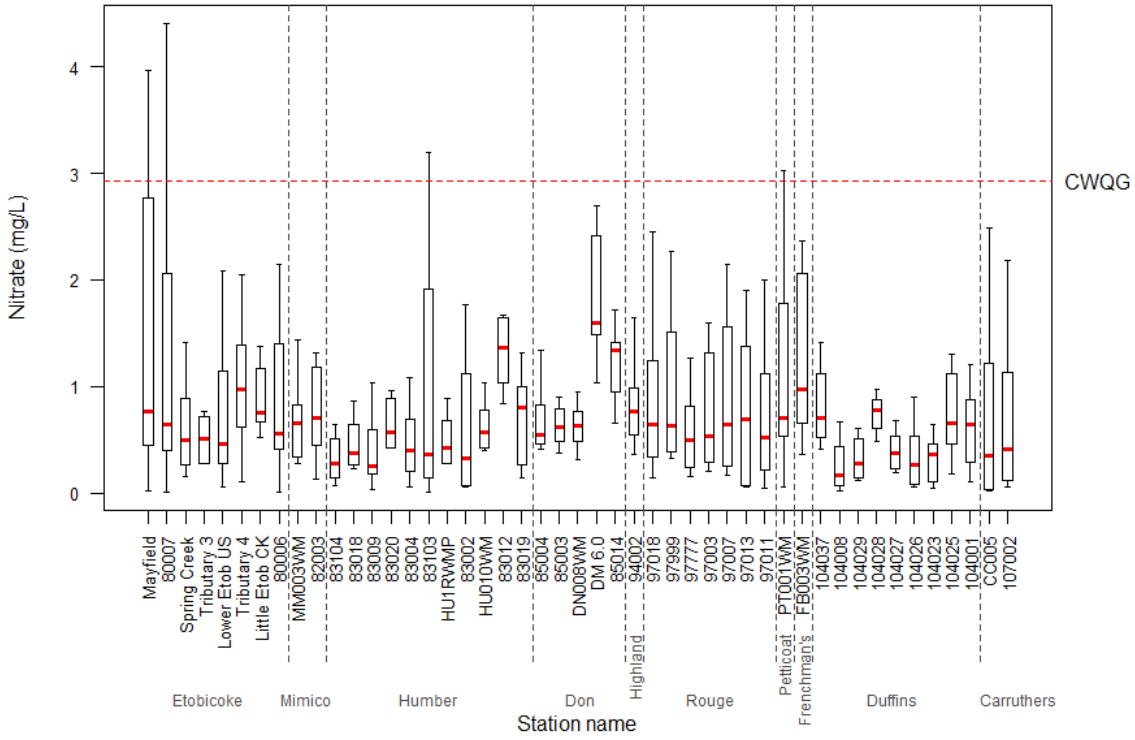

Figure 19. 2018 nitrate concentrations (mg/L) at TRCA surface water quality monitoring stations (CWQG: 2.93 mg/L)

3.5.3 Nitrite

Median nitrite concentrations exceeded the CWQG of 0.06 mg/L at stations DM 6.0 (Taylor Massey Creek) and 85014, both in the lower Don River watershed (Figure 20). Several other stations had interquartile ranges suggesting higher nitrite concentrations including HU1RWMP on the upper Black Creek, 83012 on the lower Black Creek and MM003WM in middle Mimico Creek. The upper Humber River, Rouge River, Duffins Creek and Carruthers Creek watersheds had the lowest nitrite levels and Etobicoke Creek, Mimico Creek, lower Humber River and Don River had higher nitrite levels.

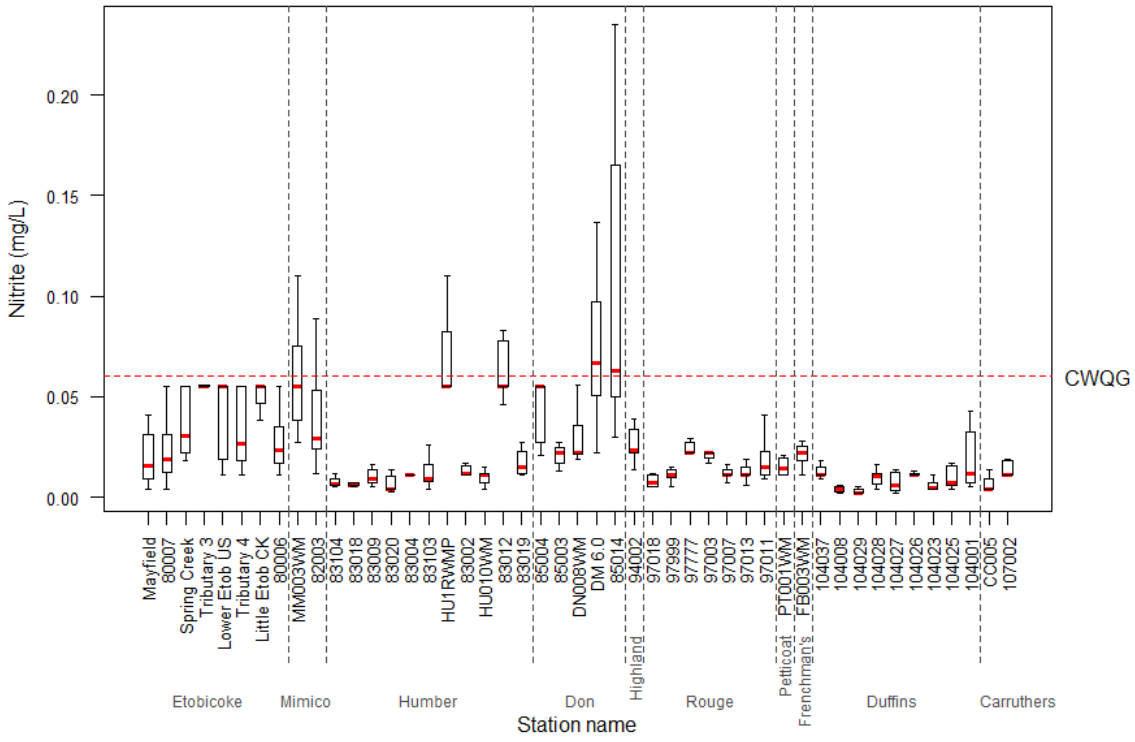

Figure 20. 2018 nitrite concentrations (mg/L) at TRCA surface water quality monitoring stations (CWQG: 0.06 mg/L)

3.5.4 Total Kjeldahl Nitrogen

The MECP stopped providing TKN values with its lab results in 2015 so there is a limited site list with missing values for stations analyzed year-round by the MECP laboratory (80006, 82003, 83019, 85014, 97011 and 104001). The highest median TKN concentrations were found at 80007 (1.64 mg/L) on the west branch of Etobicoke Creek and MM003WM (1.40 mg/L) in the Mimico Creek watershed. The lowest median concentrations were found at station 104029 (0.45 mg/L) on Mitchell Creek in the east Duffins and 104023 (0.51 mg/L) on Ganateskiagon Creek in the lower Duffins Creek watershed.

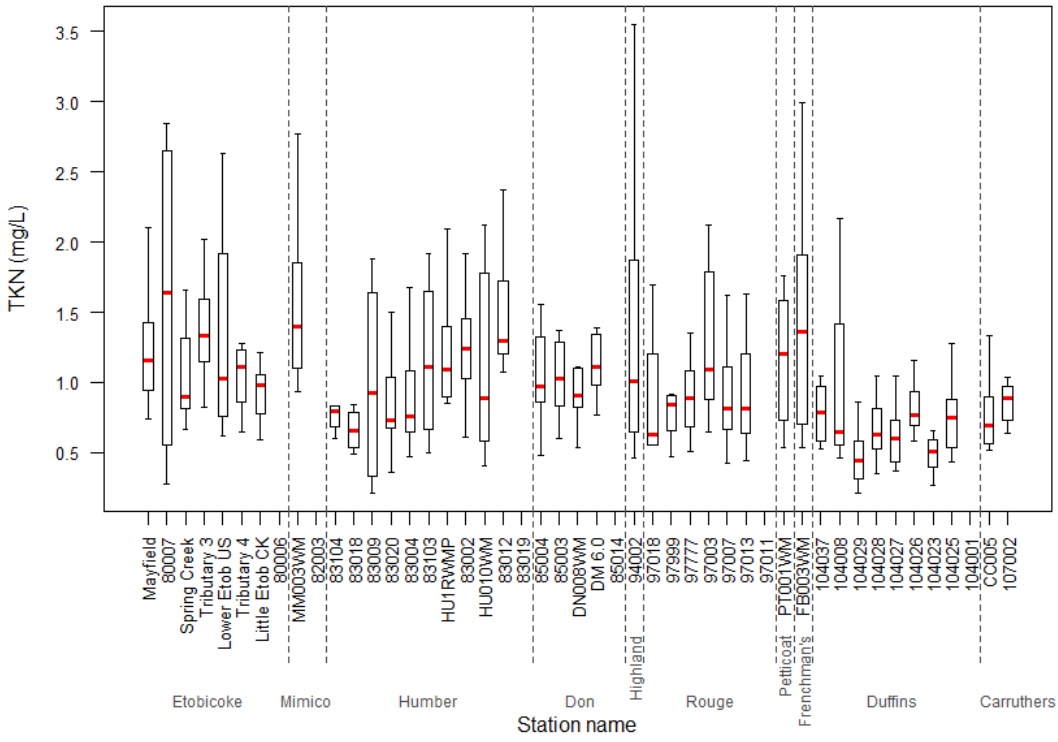

Figure 21. 2018 TKN concentrations (mg/L) at TRCA surface water quality monitoring stations

3.5.5 Total Phosphorus

Phosphorus readily binds to sediment particles and increases in phosphorus concentrations are typically associated with storm events and elevated levels of turbidity. The highest median phosphorus concentrations were at stations 85014 (0.217 mg/L) and DM 6.0 (0.167) in the lower Don River watershed (Figure 22). Thirty-eight stations had median phosphorus concentrations above the PWQO of 0.03 mg/L, and 9 stations were below the guideline.

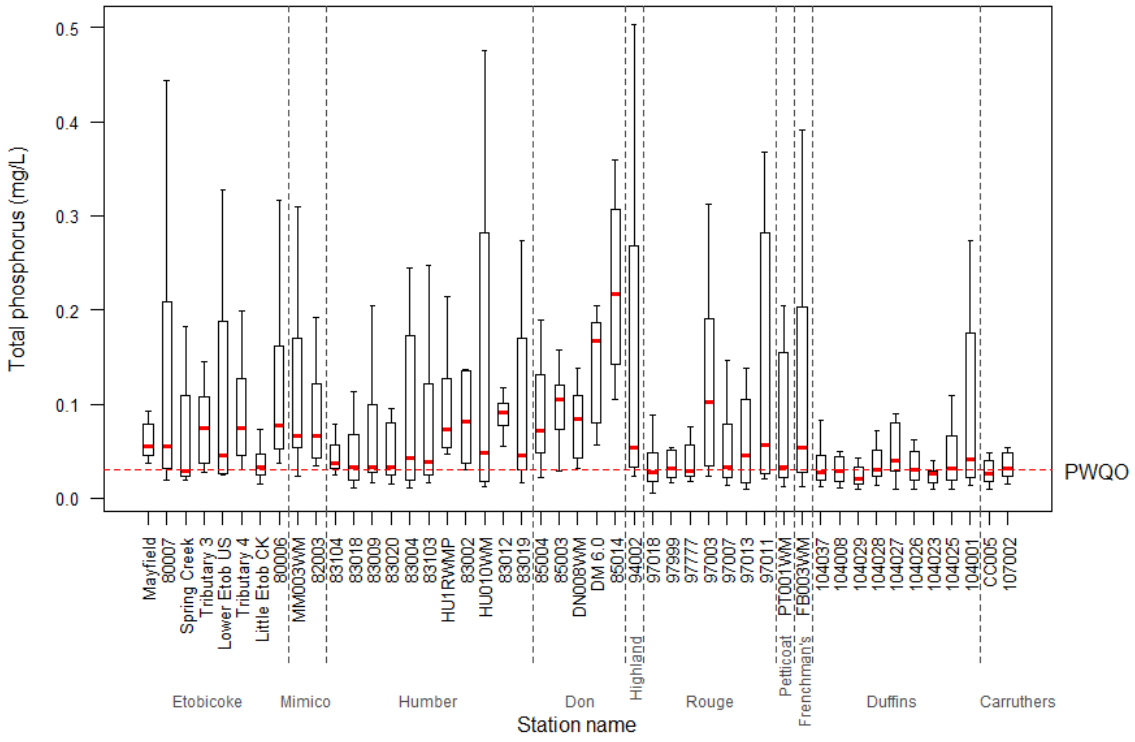

Figure 22. 2018 total phosphorus concentrations (mg/L) at TRCA surface water quality monitoring stations (PWQO: 0.03 mg/L)

4 Summary

This report represents a summary assessment and characterization of 47 water quality stations based on 16 water quality parameters collected throughout 2018. Annual total precipitation in 2018 was slightly above the 17-year average. Monthly precipitation in April, July, August and November was higher than the monthly 17-year average but all other months were lower with March being especially dry. Snowfall in 2018 was slightly below the 17-year average. Sampling was performed irrespective of precipitation, and it should be expected that levels of many of the parameters presented in this report would be higher when mobilized by storm events.

Chloride concentrations appear to be highest in areas of each watershed that are known to be urbanized. This observation has been supported in the literature and can also be specifically related to the Toronto region (Williams et al. 1999, Kaushal et al. 2005, Findlay and Kelly 2011). Stations with the highest chloride concentrations were in the Etobicoke, Mimico and lower Humber watersheds (Little Etob CK, Tributary 3, MM003WM, 82003, HU1RWMP). Stations with the lowest chloride concentrations were in the upper Humber River, upper Rouge River and Duffins Creek watersheds.

Stations with particularly high median concentrations of multiple metals include MM003WM in the Mimico Creek watershed and HU1RWMP and 83012 in the middle to lower Humber River watershed and many of the stations in the Etobicoke Creek watershed. Metals did not show clear and consistent patterns among stations and this could be due to the variability in the location of point-sources and/or temporal variation in when they are discharged. Arsenic and lead are two metals that are not required for biological activity and are toxic to aquatic organisms (Dodson 2005). Several stations had maximum lead values exceeding the PWQO of 5 ug/L and these were 80007, Spring Creek, Lower Etob US, and Little Etob CK in Etobicoke Creek, MM003WM in Mimico Creek, 85004 in the Don watershed and 94002 in Highland Creek. Metals were consistently the lowest in the upper Humber River watershed.

Median nutrient and *E. coli* values were highest at stations DM 6.0 (Taylor Massey Creek) and 85014 in the lower Don River watershed and at station 83012 in the lower Humber River watershed. Station 85014 is downstream of the North Toronto Wastewater Treatment Plant and stations DM 6.0 and 83012 are in the lower Don River and Humber River watersheds, respectively. The highest median TKN concentration was found at station 80007 in the middle Etobicoke Creek watershed which is inconsistent with these lower watershed trends and could reflect an unknown point source within this already industrialized and urbanized area. The upper Humber River, Duffins Creek and Carruthers Creek watersheds had the lowest median nutrient concentrations and *E. coli* counts. The upper Rouge River watershed also had low nutrients and *E. coli* in general; however, nitrate concentrations were higher and compared more closely to the Etobicoke Creek watershed with moderate concentrations.

Overall, stations in areas known to be more heavily urbanized or industrialized had poorer water quality with higher concentrations of chloride, metals, nutrients and *E. coli*. Stations in watersheds with less urbanization/industry or in more rural areas of watersheds tended to have better water quality with lower concentrations of chloride, metals, nutrients and *E. coli*. Stream water quality varied across the Toronto region and demonstrates the diversity of land uses and point-sources affecting streams and potential opportunities for further investigation, remediation/restoration and protection.

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6 Appendix

6.1 Appendix A. Water quality stream conditions from field notes for 2018

Station	January	February	March	April	May	June	July	August	September	October	November	December
104001	turbid, slightly frozen	high, turbid due to rain	clear	high slightly, turbid	clear	turbid, high slightly	high, turbid	clear	turbid slightly, not high	clear	clear	turbid slighlty, partially frozen
104008	clear, partially frozen	high, turbid due to rain	clear, partially frozen	high slightly, clear	clear	clear	slightly high	clear	clear, not high	clear	clear	clear, partially frozen
104023	partially frozen, slightly turbid	high, turbid due to rain	clear	turbid slightly, high slightly	clear	slightly turbid	slightly turbid	turbid slightly	clear, not high	clear	clear	clear, partially frozen
104025	partially frozen, slightly turbid	high, turbid due to rain	clear, partially frozen	turbid, high	clear	turbid	turbid, high	clear	clear, not high	clear	clear	clear, partially frozen
104026	clear, partially frozen	high, turbid due to rain	clear	turbid, high slightly	clear	turbid	high slightly	clear	clear, not high	clear	clear	clear, partially frozen
104027	partially frozen, slightly turbid	high, turbid due to rain	clear	turbid, high slightly	clear	slightly turbid	turbid, high slightly	clear	turbid slightly, not high	clear, lots of dead salmon	clear	turbid slighlty, partially frozen
104028	partially frozen, slightly turbid	high, turbid due to rain	clear	high slightly, clear	clear	clear	turbid	turbid slightly	turbid, not high	clear	clear	clear
104029	clear, partially frozen	high, turbid due to rain	clear, partially frozen	high slightly, clear	clear	clear	high slightly, turbid slightly	clear	clear, not high	clear	clear	clear, partially frozen
104037	clear, partially frozen	high, turbid due to rain	clear, partially frozen	high slightly, clear	clear	clear	slightly high, slightly turbid	clear	clear, not high	clear	clear	clear, partially frozen
107002	partially frozen, slightly turbid	high, turbid due to rain	clear	turbid slightly, high slightly	clear	turbid	high, slightly turbid	clear	clear, not high	clear	clear	clear, partially frozen
80006	slightly high, turbid	high/turbid	clear	high, turbid	clear	clear	turbid, high slightly	high, turbid slightly	turbid slightly, high slightly	clear	clear	clear
80007	turbid, high slightly	high, turbid/swift flow	clear	clear	high, slightly turbid	clear	clear	high, turbid	clear, not high	clear	clear	clear, partially frozen
82003	turbid, high slightly	high/turbid	clear	high, turbid	slightly turbid	clear	taken 500 m upstream due to construction, high and turbid	high slightly, turbid slightly	turbid slightly, high slightly	clear	clear	clear
83002	turbid, high slightly	high/turbid	clear	high slightly, turbid slightly	slightly turbid	clear	turbid, high slightly	slightly high, turbid	turbid slightly, not high	clear	clear	clear
83004	turbid, high, partially frozen	high/turbid	clear	high slightly, turbid	slightly turbid	clear	clear	high, turbid	clear, not high	clear	clear	clear, partially frozen
83009	high slightly, turbid slightly	high/turbid	clear	high turbid	turbid	clear	clear	high, turbid	clear, not high	clear	clear	clear
83012	slightly high, slightly turbid	turbid/high	clear	high turbid	clear	clear	clear	turbid slightly	clear, not high	clear	clear	turbid
83018	clear, partially frozen, slightly high	high	clear		clear	clear	high	high, turbid	clear, not high	clear	clear, frozen slightly	clear
83019	turbid, high	turbid/high	clear	turbid, high	clear	clear	turbid, high	high, turbid	clear, not high	clear	clear	clear
83020	turbid, high slightly, partially frozen	high/turbid	clear	high slightly, turbid	slightly turbid	slightly turbid	turbid slightly, high slightly	turbid slightly	turbid slightly, not high	clear	clear	turbid slighlty, partially frozen
83103	high slightly, turbid slightly	turbid/high	clear	high turbid	clear	clear	clear	high slightly, turbid	turbid slightly, not high	clear	clear	clear
83104	clear, partially frozen, high	high	clear	high turbid	clear	clear	turbid, slightly high	high, turbid	clear, not high	clear	clear, frozen slightly	clear
85003	turbid, high slightly	high/turbid	clear	high turbid	slightly turbid	turbid slightly	turbid, high	high, slightly turbid	clear, not high	clear	turbid slightly	turbid from tributary, main channel clear
85004	turbid, high slightly	high/turbid	clear	high turbid	turbid	turbid slightly	turbid, high	high slightly, turbid slightly	clear, not high	clear	clear	clear
85014	turbid	turbid/high	slightly turbid	slightly high, turbid	clear	clear	turbid slightly	high, turbid	clear, not high	clear	clear	clear
94002	turbid	sewage smell/high/turbid	clear	clear	high water, turbid	clear	clear	high, turbid	clear, not high	clear	clear	clear
97003	turbid, high slightly	high/turbid	clear	turbid slightly, high slightly	high, slightly turbid	clear	turbid	high, turbid	clear, not high	clear	clear	clear
97007	turbid, very high	high/turbid	clear	turbid slightly, high slightly	high, slightly turbid	clear	turbid slightly	high, turbid	clear, not high	clear	clear	clear, partially frozen
97011	turbid, high slightly	high/turbid	clear	turbid, high slightly	high water, turbid	clear	turbid slightly	high, turbid	clear, not high	clear	clear	clear
97013	turbid, very high	very high/turbid/partially frozen	clear, partially frozen	turbid slightly, high slightly	high water, turbid	clear	turbid slightly	high, turbid	clear, not high	clear	clear	clear, partially frozen
97018	clear, partially frozen	high, turbid due to rain	clear	high slightly	clear	clear	clear	clear	clear, not high	clear	clear	clear
97777	partially frozen, slightly turbid	high, turbid due to rain	clear	clear, high slightly	clear	clear	turbid, high slightly	clear	clear, not high	clear	clear	clear
97999	frozen, clear	high, turbid due to rain	clear, partially frozen	high slightly, turbid	clear	clear	high slightly, turbid slightly	clear	clear, not high	clear	clear	clear, partially frozen
CC005	partially frozen, slightly turbid	high, turbid due to rain	clear	clear	clear	clear	high slightly	clear	clear, not high	clear	clear	clear, partially frozen
DM 6.0	clear, partially frozen	clear, high slightly	clear	slightly high, turbid	clear	clear	clear	clear	clear, not high	clear	clear	clear
DN008WM	turbid, high slightly	high/turbid	clear	high turbid	clear	clear	turbid, high	high slightly, turbid slightly	clear, not high	clear	turbid slightly, whiteish colour	clear
FB003WM	turbid slightly, high slightly	high/sewage smell	clear	clear	turbid, high water	clear	clear	high, turbid	clear, not high	beaver dam, turbid, high	clear	clear
HU010WM	turbid, high slightly	high turbid, slight sewer smell	clear	high turbid	turbid, slightly high	clear	very turbid, high	high, turbid	turbid slightly, not high	clear	clear	clear, fast slightly
HU1RWMP	high slightly, turbid slightly, partially frozen	turbid/high	clear, partially frozen	high turbid	clear	turbid slightly	clear	high, turbid slightly	clear, not high	clear	clear, frozen	turbid
Little Etob CK	clear, high slightly	high/turbid	clear	high	clear	clear	clear	high, slightly clear	clear, not high	clear	clear	clear
Lower Etob US	turbid, high	high/turbid	clear	clear, high slightly	high, slightly turbid	clear	clear	high, turbid	clear, not high	clear	clear	clear
Mayfield	high slightly, turbid, partially frozen	high/turbid	clear	high slightly, turbid slightly	clear	clear	clear	turbid slightly	clear, not high	clear	clear	clear
MM003WM	turbid, high	very high/turbid	clear	clear	turbid, high water	clear	clear	high, turbid	clear, not high	clear	clear	clear
PT001WM	turbid slightly, high slightly	high/turbid	clear	clear	slightly turbid, high water	clear	clear	high, turbid	clear, not high	turbid, high	clear, high / beaver dam	high slightly, clear
Spring Creek	turbid	high/turbid	clear	clear	high, slightly turbid	clear	clear	high, turbid	clear, not high	clear	clear	clear
Tributary 3	turbid, high slightly	high/turbid	clear	clear	high, slightly turbid	clear	clear	high, turbid	turbid slightly, high slightly	turbid slightly	turbid slightly	clear
Tributary 4	clear, partially frozen	high/turbid	clear	high slightly	clear	clear	clear	slightly high, clear	clear, not high	clear - very	clear	clear

6.2 Appendix B. Stations sampled in 2018 and associated weather

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	# Wet samples	# Dry samples
104001	Wet	Wet	Dry	Dry	Dry	Wet	Wet	Dry	Dry	Dry	Dry	Dry	4	8
104008	Wet	Wet	Dry	Dry	Dry	Wet	Wet	Dry	Dry	Dry	Dry	Dry	4	8
104023	Wet	Wet	Dry	Dry	Dry	Wet	Wet	Dry	Dry	Dry	Dry	Dry	4	8
104025	Wet	Wet	Dry	Dry	Dry	Wet	Wet	Dry	Dry	Dry	Dry	Dry	4	8
104026	Wet	Wet	Dry	Dry	Dry	Wet	Wet	Dry	Dry	Dry	Dry	Dry	4	8
104027	Wet	Wet	Dry	Dry	Dry	Wet	Wet	Dry	Dry	Dry	Dry	Dry	4	8
104028	Wet	Wet	Dry	Dry	Dry	Wet	Wet	Dry	Dry	Dry	Dry	Dry	4	8
104029	Wet	Wet	Dry	Dry	Dry	Wet	Wet	Dry	Dry	Dry	Dry	Dry	4	8
104037	Wet	Wet	Dry	Dry	Dry	Wet	Wet	Dry	Dry	Dry	Dry	Dry	4	8
107002	Wet	Wet	Dry	Dry	Dry	Wet	Wet	Dry	Dry	Dry	Dry	Dry	4	8
80006	Dry	Wet	Dry	Wet	Wet	Dry	Dry	Wet	Dry	Dry	Dry	Dry	4	8
80007	Wet	Wet	Dry	Dry	Wet	Dry	Dry	Wet	Dry	Dry	Dry	Dry	4	8
82003	Dry	Wet	Dry	Wet	Wet	Dry	Dry	Wet	Dry	Dry	Dry	Dry	4	8
83002	Dry	Wet	Dry	Wet	Wet	Dry	Dry	Wet	Dry	Dry	Dry	Dry	4	8
83004	Wet	Wet	Dry	Dry	Wet	Dry	Dry	Wet	Dry	Dry	Dry	Dry	4	8
83009	Dry	Dry	Dry	Wet	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	1	11
83012	Dry	Dry	Dry	Wet	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	1	11
83018	Dry	Dry	Dry	Wet	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	1	11
83019	Dry	Dry	Dry	Wet	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	1	11
83020	Wet	Wet	Dry	Dry	Wet	Dry	Dry	Wet	Dry	Dry	Dry	Dry	4	8
83103	Dry	Dry	Dry	Wet	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	1	11
83104	Dry	Dry	Dry	Wet	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	1	11
85003	Dry	Wet	Dry	Wet	Wet	Dry	Wet	Wet	Dry	Dry	Dry	Dry	5	7
85004	Dry	Wet	Dry	Wet	Wet	Dry	Wet	Wet	Dry	Dry	Dry	Dry	5	7
85014	Dry	Dry	Dry	Wet	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	1	11
94002	Wet	Wet	Dry	Dry	Wet	Wet	Wet	Wet	Dry	Dry	Dry	Dry	6	6
97003	Wet	Wet	Dry	Dry	Wet	Wet	Wet	Wet	Dry	Dry	Dry	Dry	6	6
97007	Wet	Wet	Dry	Dry	Wet	Wet	Wet	Wet	Dry	Dry	Dry	Dry	6	6
97011	Wet	Wet	Dry	Dry	Wet	Wet	Wet	Wet	Dry	Dry	Dry	Dry	6	6
97013	Wet	Wet	Dry	Dry	Wet	Wet	Wet	Wet	Dry	Dry	Dry	Dry	6	6
97018	Wet	Wet	Dry	Dry	Dry	Wet	Wet	Dry	Dry	Dry	Dry	Dry	4	8
97777	Wet	Wet	Dry	Dry	Dry	Wet	Wet	Dry	Dry	Dry	Dry	Dry	4	8
97999	Wet	Wet	Dry	Dry	Dry	Wet	Wet	Dry	Dry	Dry	Dry	Dry	4	8
CC005	Wet	Wet	Dry	Dry	Dry	Wet	Wet	Dry	Dry	Dry	Dry	Dry	4	8
DM 6.0	Dry	Dry	Dry	Wet	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	1	11
DN008WM	Dry	Wet	Dry	Wet	Wet	Dry	Wet	Wet	Dry	Dry	Dry	Dry	5	7
FB003WM	Wet	Wet	Dry	Dry	Wet	Wet	Wet	Wet	Dry	Dry	Dry	Dry	6	6
HU010WM	Dry	Dry	Dry	Wet	Wet	Dry	Dry	Wet	Dry	Dry	Dry	Dry	3	9
HU1RWMP	Dry	Dry	Dry	Wet	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	1	11
Little Etob CK	Dry	Wet	Dry	Wet	Wet	Dry	Dry	Wet	Dry	Dry	Dry	Dry	4	8
Lower Etob US	Wet	Wet	Dry	Dry	Wet	Dry	Dry	Wet	Dry	Dry	Dry	Dry	4	8
Mayfield	Dry	Wet	Dry	Wet	Wet	Dry	Dry	Wet	Dry	Dry	Dry	Dry	4	8
MM003WM	Wet	Wet	Dry	Dry	Wet	Dry	Dry	Wet	Dry	Dry	Dry	Dry	4	8
PT001WM	Wet	Wet	Dry	Dry	Wet	Wet	Wet	Wet	Dry	Dry	Dry	Dry	6	6
Spring Creek	Wet	Wet	Dry	Dry	Wet	Dry	Dry	Wet	Dry	Dry	Dry	Dry	4	8
Tributary 3	Wet	Wet	Dry	Dry	Wet	Dry	Dry	Wet	Dry	Dry	Dry	Dry	4	8
Tributary 4	Dry	Wet	Dry	Wet	Wet	Dry	Dry	Wet	Dry	Dry	Dry	Dry	4	8

6.3 Appendix C. Descriptive statistics for 2018 water quality data

		AVERAGE															
		Aluminium (ug/L)	Arsenic (ug/L)	Chloride (mg/L)	Copper (ug/L)	E. coli (CFU/100mL)	Iron (ug/L)	Lead (ug/L)	Nickel (ug/L)	Nitrate (mg/L)	Nitrite (mg/L)	TKN (mg/L)	Ammonia (ug/L)	pH	Total phosphorus (mg/L)	TSS (mg/L)	Zinc (ug/L)
Etobicoke Creek	Mayfield	854	0.99	140	2.45	197	344	0.39	0.68	1.74	0.019	1.225	135	8.07	0.114	15.4	10.19
	80007	1053	0.96	290	6.67	578	560	4.29	1.36	1.41	0.023	1.603	146	8.26	0.145	57.5	29.29
	Spring Creek	1143	0.84	387	5.72	707	393	1.97	1.35	0.60	0.037	1.128	152	8.23	0.098	56.5	28.33
	Tributary 3	713	1.00	860	5.28	823	431	1.46	2.10	0.51	0.057	1.361	202	8.09	0.083	21.4	27.68
	Lower Etob US	1251	0.91	349	6.62	664	425	2.46	1.48	0.82	0.045	1.299	153	8.19	0.129	52.4	30.02
	Tributary 4	315	0.84	407	3.79	962	276	0.69	1.20	1.02	0.034	1.046	108	8.13	0.091	9.4	13.02
	Little Etob CK	336	0.65	723	5.56	1218	230	1.25	1.28	0.88	0.053	0.933	121	8.12	0.043	11.3	18.26
	80006	431		459	7.31	749	707			0.86	0.028		57	8.14	0.147	53.4	36.93
Mimico Creek	MM003WM	1247	0.94	724	7.14	857	532	2.42	1.93	0.65	0.152	1.533	276	8.06	0.125	64.2	37.10
	82003	359		768	8.36	1038	643			0.77	0.040		65	8.19	0.105	45.1	49.08
Humber River	83104	82	0.44	64	1.20	103	253	0.18	0.23	0.33	0.008	0.758	89	8.24	0.045	10.2	13.90
	83018	113	0.44	54	1.22	98	297	0.22	0.21	0.45	0.007	0.660	59	8.29	0.044	12.5	11.71
	83009	395	0.38	36	1.78	452	521	0.61	0.47	0.39	0.010	0.985	89	8.27	0.076	33.5	13.25
	83020	913	0.63	86	1.48	110	380	0.45	0.44	0.64	0.008	0.838	93	8.25	0.068	48.4	10.26
	83004	1392	0.59	191	2.68	850	462	1.00	0.77	0.45	0.014	0.975	119	8.21	0.116	90.8	12.64
	83103	524	0.54	230	2.80	325	337	0.55	0.69	1.00	0.014	1.160	77	8.26	0.079	22.1	13.43
	HU1RWMP	303	0.58	1264	4.96	874	394	0.65	1.86	0.49	0.069	1.275	206	8.06	0.097	10.3	16.52
	83002	1516	1.02	233	2.72	411	465	0.79	0.90	0.73	0.015	1.287	115	8.15	0.124	40.8	11.15
	HU010WM	2683	0.63	131	2.55	750	638	1.09	0.78	0.61	0.010	1.130	98	8.28	0.157	134.0	10.48
	83012	261	0.63	778	4.79	1814	497	1.05	1.83	1.32	0.094	1.503	433	8.22	0.089	9.7	18.58
	83019	381		205	3.93	535	773			0.70	0.017		65	8.32	0.124	84.4	21.48
Don River	85004	1060	0.66	518	3.89	428	514	1.42	1.26	0.67	0.045	1.095	153	8.08	0.110	52.0	18.55
	85003	1170	0.56	316	3.04	1418	523	1.15	0.78	0.64	0.025	1.098	174	8.20	0.126	46.2	14.17
	DN008WM	652	0.59	412	4.52	907	576	1.00	1.04	0.63	0.029	1.005	203	8.13	0.100	39.8	15.52
	DM 6.0	176	0.65	486	4.06	2015	396	0.86	1.31	1.86	0.127	1.168	306	8.22	0.138	6.3	13.13
	85014	196		430	5.99	137600	688			1.23	0.106		1945	8.14	0.270	28.2	28.86
Highland Creek	94002	1461	0.81	382	5.59	1396	561	1.85	1.33	0.87	0.032	1.323	193	8.08	0.156	78.0	26.54
Rouge River	97018	294	0.35	80	1.40	201	435	0.31	0.38	0.87	0.009	0.878	72	8.27	0.048	12.8	14.07
	97999	355	0.55	154	1.39	188	234	0.35	0.41	0.97	0.011	0.859	82	8.16	0.053	11.7	10.83
	97777	371	0.55	549	2.20	561	304	0.47	0.66	1.87	0.025	1.050	203	8.06	0.050	14.3	11.43
	97003	754	0.63	433	3.13	637	404	1.01	0.81	2.37	0.025	1.298	165	8.18	0.118	54.4	13.50
	97007	426	0.53	166	1.39	213	240	0.33	0.59	0.90	0.014	0.901	118	8.28	0.055	17.3	10.40
	97013	687	0.52	174	1.60	117	273	0.44	0.65	0.77	0.014	0.913	133	8.28	0.062	31.8	10.00
	97011	448		379	4.81	692	907			0.72	0.018		89	8.24	0.133	94.9	27.44
Petticoat Creek	PT001WM	514	0.56	252	3.45	1853	281	0.67	0.77	1.19	0.020	1.344	213	8.15	0.095	33.6	14.28
Frenchmans Bay	FB003WM	858	0.80	314	4.73	1884	433	1.02	0.90	1.52	0.065	41.128	1812	8.03	0.122	54.2	20.12
Duffins Creek	104037	183	0.48	143	1.18	229	218	0.23	0.34	0.81	0.013	0.838	103	8.19	0.041	8.1	10.00
	104008	279	0.25	62	1.14	157	293	0.81	0.37	0.25	0.005	0.983	54	8.28	0.046	16.5	12.16
	104029	377	0.28	47	0.98	79	232	0.28	0.28	0.32	0.004	0.563	96	8.29	0.041	20.4	10.00
	104028	747	0.41	142	1.29	148	341	0.45	0.46	0.75	0.010	0.828	109	8.23	0.078	37.5	10.54
	104027	450	0.35	56	1.12	155	283	0.43	0.30	0.39	0.011	0.624	114	8.28	0.057	25.6	10.00
	104026	286	0.45	156	1.15	504	263	0.23	0.38	0.34	0.012	0.844	123	8.23	0.038	10.5	10.00
	104023	450	0.41	100	1.13	138	291	0.31	0.29	0.32	0.006	0.522	126	8.28	0.039	26.1	10.48
	104025	610	0.42	75	1.37	143	256	0.42	0.43	0.76	0.011	0.758	144	8.31	0.055	39.6	10.43
	104001	269		173	4.45	337	595			0.62	0.019		89	8.20	0.093	55.2	31.13
Carruthers Creek	CC005	144	0.46	105	1.15	243	243	0.16	0.52	0.73	0.006	0.759	86	8.18	0.033	7.8	10.00
	107002	291	0.40	237	1.50	320	241	0.24	0.52	0.70	0.016	0.894	183	8.13	0.040	9.1	10.28

		MEDIAN															
		Aluminium (ug/L)	Arsenic (ug/L)	Chloride (mg/L)	Copper (ug/L)	E. coli (CFU/100mL)	Iron (ug/L)	Lead (ug/L)	Nickel (ug/L)	Nitrate (mg/L)	Nitrite (mg/L)	TKN (mg/L)	Ammonia (ug/L)	pH	Total phosphorus (mg/L)	TSS (mg/L)	Zinc (ug/L)
Etobicoke Creek	Mayfield	247	0.76	134	2.00	105	340	0.19	0.60	0.77	0.016	1.160	80	8.00	0.055	5.0	10.00
	80007	111	1.00	259	4.95	260	217	2.11	1.13	0.65	0.019	1.640	76	8.30	0.055	5.0	17.60
	Spring Creek	196	0.82	382	3.94	470	242	0.32	1.01	0.50	0.031	0.895	85	8.25	0.029	9.0	10.00
	Tributary 3	356	0.73	749	4.50	490	393	1.15	1.96	0.51	0.055	1.330	110	8.05	0.074	11.0	20.10
	Lower Etob US	159	0.95	341	4.26	180	243	0.32	1.26	0.46	0.055	1.030	75	8.15	0.046	6.0	11.40
	Tributary 4	145	0.58	398	3.40	785	233	0.37	1.08	0.98	0.027	1.110	70	8.10	0.075	4.5	10.00
	Little Etob CK	176	0.49	700	5.21	965	193	0.62	1.12	0.75	0.055	0.980	50	8.15	0.033	4.0	10.00
	80006	137		446	5.40	585	242			0.56	0.024		49	8.20	0.077	10.3	25.80
Mimico Creek	MM003WM	183	0.72	715	5.85	640	375	0.47	1.51	0.66	0.055	1.395	275	8.05	0.066	6.5	16.20
	82003	168		676	7.34	860	397			0.71	0.030		44	8.19	0.066	11.8	34.20
Humber River	83104	61	0.42	63	0.89	60	263	0.19	0.20	0.27	0.007	0.800	43	8.24	0.037	5.4	10.25
	83018	74	0.43	58	1.21	65	211	0.19	0.20	0.37	0.006	0.655	43	8.32	0.033	7.4	10.50
	83009	95	0.43	33	1.44	65	331	0.32	0.34	0.26	0.010	0.925	47	8.28	0.033	6.9	11.40
	83020	467	0.58	66	1.20	35	277	0.30	0.33	0.57	0.004	0.730	50	8.25	0.034	23.0	10.00
	83004	265	0.67	164	1.37	340	217	0.18	0.60	0.40	0.011	0.755	55	8.20	0.043	43.5	10.00
	83103	212	0.54	218	2.51	140	256	0.39	0.71	0.36	0.010	1.110	38	8.24	0.039	11.1	13.45
	HU1RWMP	163	0.48	1012	4.37	155	397	0.42	1.46	0.43	0.055	1.095	175	8.00	0.073	5.5	11.75
	83002	726	0.68	190	2.63	180	436	0.58	0.90	0.33	0.012	1.245	80	8.10	0.081	20.0	10.00
	HU010WM	641	0.56	127	1.93	225	425	0.44	0.49	0.58	0.011	0.885	50	8.30	0.049	37.0	10.00
	83012	75	0.50	600	4.66	1955	479	0.47	1.84	1.37	0.055	1.300	420	8.20	0.091	4.5	15.85
	83019	159		194	3.21	410	383			0.81	0.015		47	8.28	0.045	15.8	18.55
Don River	85004	209	0.59	464	2.81	270	423	0.74	1.05	0.55	0.055	0.970	95	8.05	0.071	25.0	10.00
	85003	767	0.59	283	2.38	1090	446	0.90	0.65	0.63	0.022	1.025	105	8.20	0.105	33.5	10.00
	DN008WM	495	0.60	338	3.89	640	517	0.49	0.90	0.63	0.022	0.905	175	8.10	0.084	17.0	10.00
	DM 6.0	100	0.50	478	3.71	1700	417	0.45	1.18	1.60	0.067	1.115	250	8.20	0.167	4.5	10.00
	85014	77		362	5.67	27000	402			1.34	0.063		1835	8.18	0.217	17.3	28.60
Highland Creek	94002	127	0.69	365	3.30	1030	301	0.33	0.99	0.77	0.024	1.010	90	8.05	0.053	4.5	10.00
Rouge River	97018	73	0.30	88	1.25	50	234	0.11	0.30	0.65	0.008	0.630	31	8.28	0.027	7.6	13.15
	97999	142	0.46	145	1.10	85	197	0.17	0.37	0.63	0.011	0.840	60	8.15	0.032	4.0	10.00
	97777	144	0.41	464	1.72	305	264	0.25	0.59	0.50	0.022	0.885	145	8.05	0.028	4.5	10.00
	97003	195	0.52	316	2.31	155	280	0.38	0.70	0.53	0.022	1.095	75	8.20	0.103	14.5	10.00
	97007	259	0.44	140	1.23	120	174	0.20	0.53	0.65	0.011	0.810	70	8.30	0.034	12.0	10.00
	97013	349	0.44	143	1.41	55	189	0.22	0.59	0.69	0.011	0.815	60	8.30	0.046	13.5	10.00
	97011	109		273	3.71	250	200			0.53	0.015		42	8.28	0.056	11.5	18.05
Petticoat Creek	PT001WM	89	0.51	253	3.30	720	224	0.16	0.80	0.71	0.015	1.205	95	8.10	0.034	4.5	10.00
Frenchmans Bay	FB003WM	281	0.78	355	3.72	1750	311	0.35	0.82	0.98	0.022	1.365	185	8.05	0.054	16.5	10.25
Duffins Creek	104037	67	0.38	123	1.00	45	203	0.13	0.28	0.70	0.011	0.790	50	8.20	0.028	2.0	10.00
	104008	89	0.22	65	0.90	55	204	0.54	0.28	0.17	0.004	0.650	24	8.28	0.030	7.3	11.20
	104029	101	0.27	45	0.80	15	181	0.08	0.20	0.28	0.002	0.445	50	8.30	0.020	10.0	10.00
	104028	200	0.37	135	0.94	25	267	0.18	0.29	0.78	0.011	0.630	70	8.25	0.030	6.0	10.00
	104027	306	0.29	53	0.84	35	256	0.25	0.20	0.38	0.006	0.605	95	8.30	0.040	18.0	10.00
	104026	174	0.40	150	1.04	140	248	0.16	0.37	0.27	0.011	0.770	80	8.20	0.031	8.0	10.00
	104023	191	0.40	93	0.94	10	218	0.12	0.20	0.37	0.005	0.510	50	8.30	0.026	7.5	10.00
	104025	184	0.37	67	1.01	55	186	0.19	0.39	0.66	0.007	0.745	85	8.35	0.032	12.5	10.00
	104001	142		108	2.18	120	261			0.65	0.012		60	8.22	0.041	16.8	15.25
Carruthers Creek	CC005	88	0.38	103	1.03	70	211	0.06	0.45	0.36	0.004	0.690	50	8.20	0.026	3.0	10.00
	107002	191	0.28	190	1.43	60	251	0.17	0.57	0.42	0.011	0.885	85	8.20	0.032	6.5	10.00

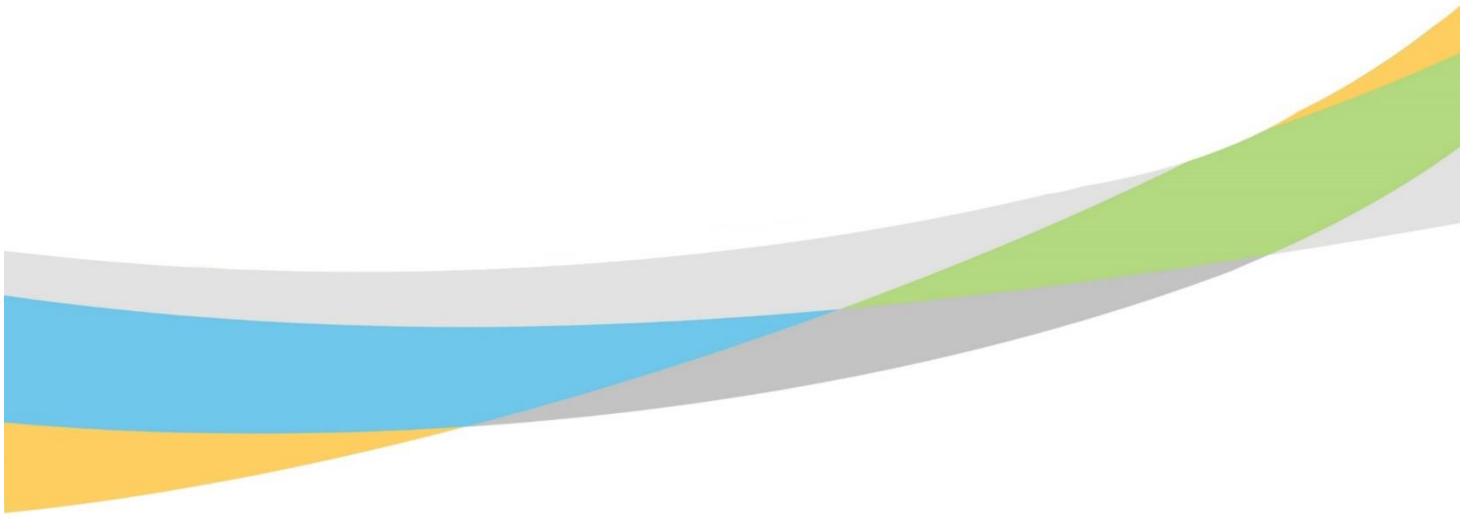
		MINIMUM															
		Aluminium (ug/L)	Arsenic (ug/L)	Chloride (mg/L)	Copper (ug/L)	E. coli (CFU/100mL)	Iron (ug/L)	Lead (ug/L)	Nickel (ug/L)	Nitrate (mg/L)	Nitrite (mg/L)	TKN (mg/L)	Ammonia (ug/L)	pH	Total phosphorus (mg/L)	TSS (mg/L)	Zinc (ug/L)
Etobicoke Creek	Mayfield	51	0.39	75	1.16	0	133	0.05	0.44	0.02	0.004	0.740	50	7.90	0.037	2.0	10.00
	80007	29	0.37	44	2.14	0	75	0.13	0.37	0.02	0.004	0.280	10	8.00	0.019	2.0	4.39
	Spring Creek	49	0.06	44	1.99	10	94	0.17	0.57	0.16	0.018	0.670	50	8.00	0.019	2.0	10.00
	Tributary 3	49	0.19	71	2.25	90	213	0.33	1.27	0.28	0.033	0.820	50	7.70	0.027	2.0	10.00
	Lower Etob US	35	0.30	53	2.25	0	71	0.16	0.70	0.06	0.011	0.620	50	7.90	0.024	3.0	10.00
	Tributary 4	25	0.26	133	1.51	100	187	0.05	0.76	0.11	0.011	0.650	50	8.00	0.031	2.0	10.00
	Little Etob CK	25	0.29	143	2.36	110	65	0.21	0.75	0.52	0.022	0.590	50	7.90	0.015	2.0	10.00
	80006	2		149	4.29	0	141			0.01	0.011		10	7.87	0.037	2.3	8.87
Mimico Creek	MM003WM	80	0.14	61	2.42	0	226	0.32	1.29	0.28	0.027	0.930	50	7.70	0.023	2.0	10.00
	82003	2		166	3.65	10	153			0.13	0.012		13	7.97	0.035	2.5	11.60
Humber River	83104	20	0.39	44	0.50	0	144	0.09	0.20	0.08	0.005	0.600	16	8.00	0.025	2.0	9.42
	83018	13	0.33	33	0.50	10	136	0.06	0.20	0.23	0.005	0.490	11	8.10	0.011	1.0	8.88
	83009	16	0.17	16	0.50	10	268	0.06	0.20	0.03	0.005	0.210	11	8.10	0.017	2.0	9.66
	83020	72	0.26	55	0.80	0	155	0.06	0.20	0.42	0.003	0.360	50	8.00	0.016	3.0	10.00
	83004	32	0.28	83	0.81	0	106	0.05	0.20	0.06	0.011	0.470	50	8.00	0.011	2.0	10.00
	83103	63	0.42	98	1.36	0	160	0.09	0.20	0.02	0.004	0.500	8	8.10	0.017	2.0	4.09
	HU1RWMP	71	0.05	288	3.16	0	223	0.21	1.12	0.28	0.055	0.850	50	7.90	0.047	2.0	10.00
	83002	162	0.36	90	1.45	10	169	0.12	0.47	0.06	0.011	0.610	50	8.00	0.030	2.0	10.00
	HU010WM	75	0.16	77	0.80	0	141	0.08	0.20	0.40	0.004	0.410	50	8.10	0.013	2.0	10.00
	83012	38	0.05	251	3.44	410	285	0.28	1.15	0.84	0.046	1.070	200	8.10	0.055	2.0	10.00
	83019	25		103	1.21	20	100			0.14	0.011		12	7.99	0.016	3.8	11.50
Don River	85004	48	0.07	139	1.68	20	207	0.21	0.82	0.41	0.021	0.480	50	7.90	0.022	2.0	10.00
	85003	32	0.17	128	1.24	260	210	0.10	0.24	0.38	0.013	0.600	50	8.10	0.029	2.0	10.00
	DN008WM	25	0.17	131	1.29	80	336	0.05	0.58	0.31	0.019	0.540	50	8.00	0.032	2.0	10.00
	DM 6.0	30	0.10	196	2.55	140	251	0.23	0.85	1.03	0.022	0.770	50	8.10	0.057	2.0	10.00
	85014	25		141	2.96	1000	241			0.66	0.030		58	7.98	0.105	3.6	9.85
Highland Creek	94002	25	0.05	122	1.71	50	122	0.11	0.51	0.37	0.014	0.460	50	7.90	0.023	2.0	10.00
Rouge River	97018	16	0.23	57	0.50	0	139	0.05	0.20	0.15	0.005	0.550	13	8.10	0.005	1.7	10.00
	97999	61	0.15	98	0.80	20	69	0.06	0.20	0.33	0.004	0.470	50	7.90	0.017	2.0	10.00
	97777	28	0.05	2	0.91	0	43	0.07	0.36	0.16	0.014	0.510	50	7.80	0.017	2.0	10.00
	97003	60	0.19	40	1.20	0	164	0.10	0.27	0.21	0.011	0.650	50	8.00	0.023	2.0	10.00
	97007	37	0.16	94	0.80	0	88	0.07	0.20	0.17	0.007	0.420	50	8.10	0.013	2.0	10.00
	97013	61	0.21	103	0.80	0	93	0.06	0.20	0.06	0.006	0.440	50	8.20	0.010	2.0	10.00
	97011	2		57	1.00	20	92			0.05	0.009		6	7.95	0.020	2.4	3.31
Petticoat Creek	PT001WM	25	0.05	44	1.05	200	65	0.05	0.20	0.06	0.011	0.540	50	8.00	0.012	2.0	10.00
Frenchmans Bay	FB003WM	37	0.08	47	1.10	60	41	0.05	0.20	0.37	0.011	0.540	50	7.70	0.013	2.0	10.00
Duffins Creek	104037	25	0.14	85	0.80	20	84	0.05	0.20	0.41	0.004	0.530	50	8.10	0.012	2.0	10.00
	104008	20	0.14	19	0.50	0	130	0.09	0.20	0.02	0.002	0.460	11	8.10	0.011	1.7	9.49
	104029	32	0.05	18	0.80	0	48	0.05	0.20	0.12	0.002	0.210	50	8.00	0.010	2.0	10.00
	104028	36	0.10	129	0.80	0	78	0.05	0.20	0.49	0.004	0.350	50	7.90	0.014	2.0	10.00
	104027	44	0.07	36	0.80	0	73	0.05	0.20	0.19	0.002	0.370	50	7.90	0.010	2.0	10.00
	104026	58	0.12	107	0.80	0	136	0.07	0.20	0.06	0.009	0.580	50	7.90	0.010	2.0	10.00
	104023	48	0.09	78	0.80	0	106	0.06	0.20	0.05	0.004	0.270	50	8.00	0.010	2.0	10.00
	104025	27	0.18	43	0.80	0	77	0.05	0.20	0.18	0.004	0.430	50	8.10	0.010	2.0	10.00
	104001	10		65	0.50	0	123			0.10	0.005		14	7.83	0.014	1.9	11.10
Carruthers Creek	CC005	25	0.16	77	0.80	10	135	0.05	0.20	0.02	0.004	0.520	50	7.90	0.010	2.0	10.00
	107002	79	0.05	98	0.80	0	10	0.05	0.20	0.06	0.011	0.640	50	7.90	0.016	2.0	10.00

		MAXIMUM															
		Aluminium (ug/L)	Arsenic (ug/L)	Chloride (mg/L)	Copper (ug/L)	E. coli (CFU/100mL)	Iron (ug/L)	Lead (ug/L)	Nickel (ug/L)	Nitrate (mg/L)	Nitrite (mg/L)	TKN (mg/L)	Ammonia (ug/L)	pH	Total phosphorus (mg/L)	TSS (mg/L)	Zinc (ug/L)
Etobicoke Creek	Mayfield	4310	1.95	197	4.40	850	693	1.42	1.05	6.59	0.041	2.100	440	8.30	0.419	100.0	12.30
	80007	6470	1.46	607	18.70	3020	2310	12.80	2.80	4.91	0.055	2.850	430	8.60	0.549	312.0	93.00
	Spring Creek	7320	1.99	797	21.40	3200	1400	13.90	3.48	1.41	0.055	2.490	420	8.60	0.568	428.0	125.00
	Tributary 3	3110	3.46	2700	9.73	3750	746	4.82	4.16	0.77	0.097	2.020	690	8.50	0.220	66.0	61.30
	Lower Etob US	6150	1.88	876	19.40	3930	1300	13.50	2.83	2.64	0.120	2.630	470	8.60	0.541	244.0	103.00
	Tributary 4	1490	1.62	1050	6.35	2520	469	2.32	1.91	2.05	0.055	1.280	310	8.30	0.199	27.0	27.40
	Little Etob CK	1600	1.43	1780	10.90	2580	642	5.80	2.99	1.38	0.110	1.210	370	8.30	0.139	56.0	55.80
	80006	1870		1030	18.00	1980	2960			2.15	0.055		127	8.31	0.592	377.0	123.00
Mimico Creek	MM003WM	4890	3.54	2160	16.10	4670	1230	11.10	3.28	1.44	1.200	2.770	550	8.50	0.386	238.0	117.00
	82003	1440		1990	19.70	3010	2920			1.31	0.089		238	8.35	0.398	233.0	173.00
Humber River	83104	183	0.55	84	2.54	340	421	0.23	0.33	0.65	0.012	0.830	280	8.43	0.079	34.2	29.70
	83018	324	0.58	61	2.94	350	868	0.45	0.24	0.86	0.011	0.840	200	8.42	0.113	41.4	16.40
	83009	2910	0.52	77	4.44	3340	1330	1.73	1.00	1.03	0.016	1.880	310	8.47	0.276	229.0	22.80
	83020	3450	1.21	245	3.58	380	1100	1.62	1.24	0.96	0.022	1.500	260	8.50	0.235	224.0	13.10
	83004	5750	0.85	360	7.70	5500	1680	4.74	1.70	1.08	0.034	2.550	460	8.30	0.531	316.0	26.00
	83103	2960	0.65	448	5.43	1420	711	1.34	1.14	3.19	0.052	1.920	310	8.47	0.247	86.8	27.50
	HU1RWMP	1050	1.33	2950	8.04	4710	713	2.26	3.63	0.89	0.110	2.550	530	8.20	0.214	29.0	38.50
	83002	6980	2.64	492	4.68	2250	943	2.67	1.31	2.96	0.033	2.180	290	8.30	0.456	172.0	19.20
	HU010WM	13700	1.22	178	4.81	3810	1540	3.28	2.03	1.03	0.021	2.120	280	8.50	0.475	502.0	12.70
	83012	1180	1.13	1790	6.11	3350	772	3.26	2.81	1.67	0.328	2.370	790	8.30	0.117	36.0	43.80
	83019	1560		332	7.69	1700	3280			1.31	0.027		207	8.59	0.553	357.0	41.30
Don River	85004	4840	1.29	1100	9.95	1530	1060	6.05	2.57	1.34	0.055	2.160	550	8.30	0.422	264.0	50.10
	85003	5740	0.86	771	7.78	3880	1560	4.89	1.87	0.90	0.052	2.270	600	8.40	0.477	252.0	36.40
	DN008WM	2860	0.95	1090	12.10	2260	931	4.59	1.97	0.95	0.056	1.680	530	8.30	0.368	184.0	43.80
	DM 6.0	514	1.24	884	7.22	7300	632	2.67	2.34	2.69	0.764	1.880	780	8.40	0.204	21.0	24.40
	85014	497		912	11.60	680000	1710			1.72	0.235		5790	8.36	0.897	87.4	47.80
Highland Creek	94002	6190	3.28	720	15.20	5090	1730	7.55	3.51	1.86	0.110	3.550	680	8.30	0.503	303.0	80.90
Rouge River	97018	1950	0.58	95	2.59	950	2080	0.98	0.71	2.45	0.021	1.700	420	8.47	0.237	46.0	25.10
	97999	1670	1.09	231	4.79	680	665	2.19	0.82	2.27	0.019	1.530	190	8.30	0.222	70.0	19.90
	97777	2010	1.09	1310	6.53	1900	808	2.60	1.21	16.60	0.051	3.120	970	8.30	0.212	90.0	27.10
	97003	2700	1.27	968	7.27	4260	828	3.24	1.50	21.00	0.052	2.120	560	8.40	0.313	254.0	25.20
	97007	1110	0.94	286	3.06	790	660	0.88	1.32	2.15	0.029	1.620	300	8.40	0.146	78.0	14.80
	97013	2110	0.91	318	3.39	450	757	1.36	1.61	1.90	0.026	1.630	450	8.40	0.138	138.0	10.00
	97011	1510		1070	9.27	4840	3290			2.00	0.041		324	8.49	0.367	354.0	63.30
Petticoat Creek	PT001WM	1730	1.23	470	7.96	6100	590	2.11	1.55	3.02	0.062	3.910	750	8.30	0.371	156.0	30.10
Frenchmans Bay	FB003WM	2850	2.11	703	11.60	4800	975	3.91	1.70	5.60	0.480	479.000	19000	8.30	0.391	277.0	48.60
Duffins Creek	104037	993	0.88	283	3.45	730	569	1.09	0.65	1.41	0.022	1.710	490	8.30	0.141	34.0	10.00
	104008	2070	0.40	100	2.57	760	884	2.05	0.72	0.66	0.011	2.170	330	8.46	0.241	110.0	18.90
	104029	2940	0.54	102	2.82	390	1020	2.14	0.82	0.61	0.014	1.880	370	8.40	0.247	126.0	10.00
	104028	6230	0.75	214	4.48	920	1260	3.14	1.64	0.98	0.024	2.850	330	8.40	0.565	360.0	16.50
	104027	1940	0.63	122	3.10	550	743	2.18	0.63	0.68	0.036	1.050	270	8.40	0.171	104.0	10.00
	104026	1300	0.92	225	2.24	2900	604	0.86	0.65	0.90	0.017	1.380	360	8.40	0.106	42.0	10.00
	104023	3130	0.68	162	2.94	1020	836	1.80	0.65	0.65	0.015	1.000	640	8.40	0.213	178.0	15.70
	104025	3700	0.73	174	3.03	430	758	1.39	0.83	1.31	0.030	1.280	450	8.50	0.219	226.0	15.20
	104001	922		778	15.90	1300	2140			1.20	0.043		261	8.48	0.274	184.0	104.00
Carruthers Creek	CC005	615	0.91	137	1.89	650	417	0.69	1.05	2.49	0.014	1.330	250	8.40	0.107	35.0	10.00
	107002	1200	0.86	445	3.57	1240	555	1.22	0.86	2.18	0.029	1.390	890	8.30	0.116	39.0	13.40

		STANDARD DEVIATION															
		Aluminium (ug/L)	Arsenic (ug/L)	Chloride (mg/L)	Copper (ug/L)	E. coli (CFU/100mL)	Iron (ug/L)	Lead (ug/L)	Nickel (ug/L)	Nitrate (mg/L)	Nitrite (mg/L)	TKN (mg/L)	Ammonia (ug/L)	pH	Total phosphorus (mg/L)	TSS (mg/L)	Zinc (ug/L)
Etobicoke Creek	Mayfield	1364	0.57	36	1.21	256	168	0.41	0.23	1.98	0.013	0.389	122	0.13	0.139	27.3	0.66
	80007	2044	0.45	149	5.32	859	717	5.97	1.09	1.66	0.016	1.245	158	0.20	0.187	102.4	29.76
	Spring Creek	2100	0.52	224	5.40	844	377	3.91	0.82	0.39	0.016	0.524	144	0.20	0.158	121.1	35.14
	Tributary 3	881	0.94	679	2.19	999	176	1.33	0.75	0.21	0.014	0.342	188	0.22	0.057	22.3	18.40
	Lower Etob US	2006	0.48	202	5.34	1109	419	4.03	0.72	0.81	0.030	0.687	158	0.22	0.166	83.3	33.89
	Tributary 4	422	0.51	271	1.60	687	88	0.74	0.37	0.57	0.019	0.232	81	0.13	0.053	9.5	6.04
	Little Etob CK	485	0.33	528	2.69	882	183	1.71	0.61	0.30	0.022	0.185	112	0.16	0.034	17.5	15.98
	80006	653		225	4.58	557	967			0.65	0.014		39	0.14	0.161	107.5	30.81
Mimico Creek	MM003WM	1795	0.93	531	4.34	1265	342	3.41	0.73	0.34	0.331	0.540	176	0.19	0.115	89.0	38.72
	82003	425		556	4.56	893	759			0.40	0.025		64	0.11	0.104	71.6	43.29
Humber River	83104	57	0.07	9	0.69	115	92	0.06	0.07	0.20	0.002	0.109	87	0.12	0.018	10.6	6.57
	83018	105	0.12	9	0.61	94	213	0.17	0.02	0.23	0.002	0.156	55	0.11	0.032	14.4	2.45
	83009	821	0.16	20	1.24	943	378	0.78	0.38	0.34	0.004	0.787	105	0.11	0.083	66.4	4.26
	83020	1075	0.30	55	0.79	134	274	0.45	0.31	0.22	0.006	0.308	75	0.13	0.071	64.9	0.89
	83004	2020	0.20	88	2.27	1564	508	1.44	0.50	0.32	0.008	0.598	130	0.09	0.155	107.4	5.40
	83103	827	0.12	105	1.31	502	197	0.59	0.42	1.10	0.013	0.623	99	0.11	0.082	28.1	5.58
	HU1RWMP	282	0.48	919	1.50	1499	143	0.57	0.91	0.23	0.025	0.535	153	0.10	0.058	9.9	8.99
	83002	1946	0.71	121	1.12	622	227	0.72	0.25	0.90	0.007	0.442	79	0.12	0.129	48.2	2.86
	HU010WM	3996	0.34	31	1.70	1112	518	1.17	0.63	0.20	0.005	0.650	90	0.12	0.177	171.5	0.91
	83012	378	0.39	540	0.83	890	156	1.08	0.42	0.32	0.085	0.449	200	0.07	0.017	12.1	9.55
	83019	477		74	2.24	523	938			0.42	0.006		62	0.18	0.157	131.0	8.33
Don River	85004	1513	0.38	294	2.44	515	291	1.70	0.53	0.30	0.015	0.457	154	0.13	0.110	75.9	13.28
	85003	1615	0.24	179	1.97	1078	365	1.33	0.45	0.18	0.012	0.445	163	0.09	0.116	68.5	8.37
	DN008WM	814	0.29	275	3.26	822	198	1.34	0.46	0.20	0.014	0.324	144	0.10	0.091	59.1	11.49
	DM 6.0	174	0.43	224	1.50	1887	115	0.77	0.43	0.56	0.203	0.295	224	0.09	0.058	5.7	5.09
	85014	194		239	2.65	228977	508			0.35	0.076		2045	0.12	0.216	27.2	10.81
Highland Creek	94002	2356	0.82	218	4.78	1425	531	2.55	0.94	0.46	0.026	0.919	195	0.13	0.185	127.7	26.76
Rouge River	97018	561	0.15	14	0.71	290	542	0.45	0.24	0.70	0.005	0.553	113	0.11	0.063	14.8	4.47
	97999	465	0.32	45	1.10	214	162	0.59	0.21	0.69	0.004	0.309	46	0.12	0.058	19.0	2.86
	97777	563	0.36	373	1.47	670	180	0.70	0.27	4.65	0.009	0.697	252	0.14	0.054	25.0	4.94
	97003	864	0.37	311	2.16	1213	250	1.06	0.41	5.89	0.012	0.552	188	0.12	0.093	82.3	6.39
	97007	400	0.31	66	0.65	264	172	0.29	0.32	0.73	0.007	0.341	94	0.09	0.047	21.1	1.39
	97013	764	0.28	73	0.79	143	191	0.46	0.39	0.70	0.006	0.357	136	0.07	0.048	41.7	0.00
	97011	584		288	2.88	1340	1191			0.62	0.010		111	0.18	0.141	131.4	19.44
Petticoat Creek	PT001WM	614	0.36	119	2.26	2230	201	0.78	0.38	0.98	0.015	0.913	217	0.10	0.109	49.3	7.53
Frenchmans Bay	FB003WM	1014	0.53	205	3.38	1556	304	1.21	0.45	1.44	0.133	137.896	5421	0.18	0.130	82.9	14.89
Duffins Creek	104037	271	0.26	66	0.73	292	119	0.29	0.15	0.36	0.005	0.332	125	0.09	0.037	11.6	0.00
	104008	578	0.12	23	0.65	233	212	0.87	0.24	0.23	0.003	0.797	89	0.11	0.063	30.0	2.89
	104029	815	0.14	24	0.58	123	257	0.59	0.18	0.19	0.004	0.451	94	0.12	0.066	35.1	0.00
	104028	1748	0.22	23	1.04	270	314	0.86	0.43	0.17	0.006	0.663	84	0.13	0.154	101.9	1.88
	104027	517	0.17	23	0.66	195	181	0.59	0.14	0.17	0.011	0.229	73	0.15	0.044	28.2	0.00
	104026	336	0.30	38	0.38	838	116	0.21	0.16	0.30	0.002	0.235	100	0.14	0.027	11.0	0.00
	104023	853	0.18	24	0.59	287	204	0.49	0.14	0.21	0.004	0.193	168	0.12	0.055	49.6	1.65
	104025	1045	0.19	37	0.73	176	189	0.47	0.19	0.39	0.008	0.255	120	0.13	0.059	64.9	1.50
	104001	293		199	5.05	424	651			0.36	0.014		77	0.20	0.097	70.3	33.49
Carruthers Creek	CC005	174	0.27	21	0.38	258	96	0.21	0.29	0.91	0.004	0.259	66	0.16	0.026	10.3	0.00
	107002	313	0.28	113	0.73	482	131	0.31	0.25	0.72	0.007	0.200	255	0.16	0.027	10.1	0.98

6.4 Appendix D. Mean monthly parameter values for 2018

	Mean Monthly Analyte Values															
Month	**Aluminium (ug/L)**	**Arsenic (ug/L)**	**Chloride (mg/L)**	**Copper (ug/L)**	**E. coli (CFU/100mL)**	**Iron (ug/L)**	**Lead (ug/L)**	**Nickel (ug/L)**	**Nitrate (mg/L)**	**Nitrite (mg/L)**	**TKN (mg/L)**	**Ammonia (ug/L)**	**pH**	**Total phosphorus (mg/L)**	**TSS (mg/L)**	**Zinc (ug/L)**
January	1069	0.40	575	4.38	1235	681	1.35	1.00	1.56	0.07	1.295	316.9	8.11	0.138	46.95	23.43
February	2655	0.50	418	7.15	10327	1073	3.49	1.40	0.81	0.03	1.730	385.3	8.10	0.291	144.22	36.81
March	122	0.25	605	2.35	14619	358	0.22	0.68	0.71	0.03	0.655	221.4	8.32	0.053	9.82	13.10
April	750	0.32	241	4.14	1631	476	0.82	0.61	1.42	0.02	0.869	110.9	8.27	0.084	55.71	16.90
May	459	0.31	247	3.19	5247	268	0.77	1.05	0.50	0.03	1.193	215.6	8.18	0.070	32.19	16.71
June	217	0.85	338	2.96	1359	255	0.44	0.80	0.41	0.04	1.056	199.2	8.21	0.070	18.09	12.31
July	702	1.00	164	2.62	941	309	0.59	0.94	0.39	0.02	1.047	63.2	8.25	0.081	32.63	14.09
August	1050	0.93	100	4.28	1632	633	1.32	1.10	0.73	0.03	1.174	69.9	8.25	0.127	71.81	24.26
September	159	0.91	165	2.78	795	217	0.27	0.82	0.41	0.02	0.850	64.7	8.15	0.052	6.70	13.03
October	130	0.79	240	2.08	1059	226	0.27	0.70	0.37	0.02	0.950	235.8	8.19	0.051	5.86	13.19
November	125	0.39	318	2.22	423	245	0.22	0.70	1.20	0.03	14.826	491.5	8.10	0.042	5.36	12.63
December	163	0.85	347	1.84	383	259	0.22	0.65	1.56	0.02	0.841	164.4	8.21	0.038	8.55	12.17



Toronto and Region Conservation Authority

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