



MARATHON PALLADIUM PROJECT – WATER QUALITY BASELINE REPORT UPDATE

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**MARATHON PALLADIUM
PROJECT – WATER QUALITY
BASELINE REPORT UPDATE**

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EXECUTIVE SUMMARY

Ecometrix Incorporated (Ecometrix) has been retained by Generation PGM Inc. (GenPGM) to provide an updated assessment of water quality baseline conditions for the Marathon Palladium project (the Project) in the Town of Marathon, Ontario. The updated water quality baseline study provides information required to complete the Environmental Impact Statement (EIS) Addendum for the Project. The objectives of the water quality baseline study were to collect and analyze representative surface water quality samples from the watersheds within the vicinity of the Project to gain an understanding of the baseline conditions. Such an understanding of the baseline conditions of water quality is fundamental to undertaking an assessment of potential impacts due to Project development specific to surface water quality.

The original characterization of surface water quality for the Project study area included a desktop review of available data dating to the early 2000s as well as the establishment of a 58-station network, including headwater and downstream areas of all of the subwatersheds that traverse the Project site in 2008. This routine sampling occurred from 2008 to 2014. Sampling was conducted on a monthly basis through the ice-free season (roughly May through November) in 2008 and 2009. Sampling was conducted according to standardized protocols based on the Metal Mining Environmental Effect Monitoring Technical Guidance.

Water quality sampling was continued from 2015 to present three-times annually at a reduced number of sampling stations which are representative of watersheds within the study area. Water quality data were collected through these periods for general chemistry, anions and metals.

All water quality monitoring data are housed in database format (MS ACCESS™). The database, containing more than 80,000 records, includes spot measurements of water quality collected coincident with other sampling events dating back to 2001.

Previous chemical analysis of surface water showed that Project area waters are generally of high quality, with most parameters meeting Ontario Provincial Water Quality Objectives (PWQO) for the protection of aquatic life. Where exceedances of PWQO standards occur, the exceedances are generally small and typical of regional background conditions or reflected areas on the Project site where there are relatively high levels of mineralization associated with the Marathon Palladium Project ore body. Potential groundwater-surface water interactions were assessed by correlating concentrations of conservative chemical constituents in surface water with groundwater data from bedrock wells and overburden wells. No correlation between the surface water and bedrock groundwater and surface water and overburden groundwater was noted, suggesting little interaction between the surface and subsurface environments. A positive correlation was found in each of the subwatersheds between concentrations of conservative chemical constituents in surface water in the headwater areas of the subwatersheds and the downstream areas of the

subwatersheds. This result is further evidence that there is little, or limited, interaction between surface water and groundwater.

For the purposes of this update, water quality data from representative stations were compared for individual parameters over the duration of the sampling period (i.e. 2008 to 2019) to identify changes in concentration of the given parameter over time. This was done by plotting the water quality data over the time period (2008 to 2019) and applying a line of best fit (linear regression) to the data for each parameter. The resulting coefficient of determination (R^2 value) was examined to identify the level of relationship between the concentration of a given parameter to time (year).

Analysis of the data indicated a high level of consistency over time for the majority of constituents analyzed in surface water quality samples from 2008 to 2019. The year sampling occurred explained less than 2% of the variability seen in constituent concentrations for the majority of relationships investigated. Arsenic concentration showed a declining trend from 2008 to 2019 with little change in concentration detected between 2015 and 2019. Over all years sampled, arsenic was typically well below the Interim PWQO and Canadian Water Quality Guideline (CWQG) (both 5 µg/L) for the protection of aquatic life. Baseline water quality data collected from 2013 to 2019 had consistent seasonal exceedances of quality criteria for ammonia, copper, iron and dissolved oxygen.

Considering these results and the lack of appreciable natural or anthropogenic disturbance to the watersheds associated with the Project site, it can be concluded that the available surface water quality dataset, routinely collected and spanning 2008 to 2019 is sufficient for the purposes of providing an adequate baseline for conducting impact assessment and to support future environmental monitoring activities.

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1.0 INTRODUCTION

Generation PGM Inc. (GenPGM) proposes to develop the Marathon Palladium Project (the “Project”), which is a platinum group metals (PGM) and copper (Cu) open-pit mine and milling operation near the Town of Marathon, Ontario. The Project is being assessed in accordance with the *Canadian Environmental Assessment Act* (CEAA, 2012) and Ontario’s *Environmental Assessment Act* (EA Act) through a Joint Review Panel (the Panel) pursuant to the *Canada-Ontario Agreement on Environmental Assessment Cooperation* (2004).

Ecometrix Incorporated (Ecometrix) has been retained by GenPGM to provide an updated assessment of surface water quality baseline conditions for the Project north of the Town of Marathon, Ontario. This report provides an update to the baseline conditions as described in the information currently on the record, including:

- Supporting Information Document 3 (SID#3): Baseline Water Quality for The Marathon PGM-Cu Project prepared by Ecometrix (July 2012) (CIAR #227).
- Responses to IRs 12.1.1 (CIAR #403), 12.3 – 12.5 (CIAR #375) and SIR 5 (CIAR #583).

This water quality baseline study has been completed to inform the Addendum to the Marathon PGM-Cu Environmental Impact Statement (EIS Addendum) as input to the Joint Review Panel process. It has been prepared pursuant to the *Canadian Environmental Assessment Act, 2012* and in consideration of the *Guidelines for the Preparation of an Environmental Impact Statement – Marathon Platinum Group Metals and Copper Mine Project (EIS Guidelines)* (Canadian Environmental Assessment Agency (CEAA) and Ontario Ministry of Environment (MOE), 2011).

The information presented in this report is intended to summarize and document changes to the existing environmental conditions relating to surface water quality, relative to those conditions considered in the previous assessment, in order to support the updated assessment of potential environmental effects provided in the EIS Addendum. The information presented herein was obtained from a review of historical information and the updated design plans for the Project provided by GenPGM.

1.1 Project Location and Setting

The Project is located approximately 10 km north of the Town of Marathon, Ontario (**Figure 1-1**). Marathon is a community of approximately 3,300 people (Statistics Canada, 2017) located adjacent to the Trans-Canada Highway (Highway 17) on the northeast shore of Lake Superior approximately 300 km east of Thunder Bay and 400 km northwest of Sault Ste. Marie. The centre of the Project footprint sits at approximately 48° 47’ N latitude, 86° 19’ W longitude (UTM Easting 550197 and Northing 5403595). The footprint of the proposed mine location is roughly bounded by Highway 17 and the Marathon Airport to the

south, the Pic River and Camp 19 Road to the east, Hare Lake to the west, and Bamooos Lake to the north. Access is currently gained through Camp 19 Road.

The Project is proposed within an area characterized by relatively dense vegetation, comprised largely of a birch and spruce-dominated mixed wood forest. The terrain is moderate to steep, with frequent bedrock outcrops and prominent east-west oriented valleys. Several watercourses and lakes traverse the area, with drainage flowing either eastward to the Pic River or westward to Lake Superior. The climate of this area is typical of northern areas within the Canadian Shield, with long winters and short, warm summers.

The Project is proposed on Crown Land, with GenPGM holding mineral rights for the area. Regional land-use activities in the area include hunting, fishing, trapping and snowmobiling, as well as mineral exploration (and mining) and forestry. Other localized land uses in the area include several licensed aggregate pits, the Marathon Municipal Airport, the Marathon Landfill, a municipal works yard and several commercial and residential properties.

The primary industries in the area have historically been forestry, pulp and paper, mining and tourism. Exploration for copper and nickel deposits in the area extend as far back as the 1920s. A large copper-PGM deposit was discovered in 1963. Advanced exploration programs have continued across the site since then. These programs have been supported by various feasibility studies to confirm the economic viability of extracting the deposits.

Several Indigenous and Métis groups were originally identified as having a potential interest in the Project based on Treaty Rights, asserted traditional territory and proximity to the Project. Traditional uses which they have identified as occurring in the area include hunting, trapping, fishing and plant harvesting, with activities generally focused on the larger waterways, such as the Pic River, Bamooos Lake and Hare Lake.

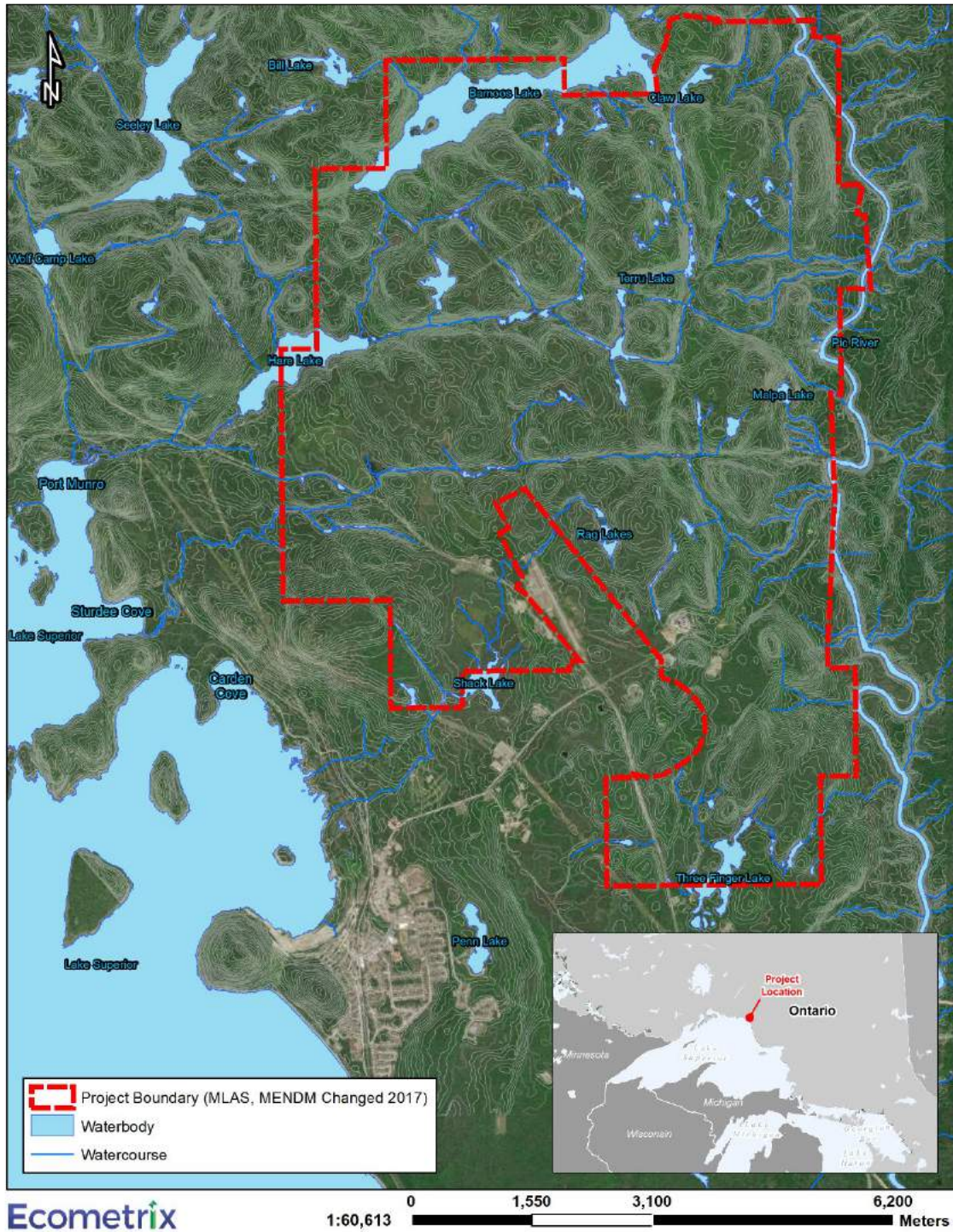


Figure 1.1: Regional Project Location

1.2 Project Overview

The Project is based on the development of an open pit mining and milling operation for copper and platinum group metals. Ore will be mined from the pits and processed (crushed, ground, concentrated) at an on-site processing facility. Final concentrates containing copper and platinum group metals will be transported off-site via existing roadways and/or rail to a smelter and refinery for subsequent metal extraction and separation. Iron sulfide magnetite and vanadium concentrates may also be produced, depending upon the results of further metallurgical testing and market conditions at that time.

The construction workforce will average approximately 450 – 550 people, with a peak workforce of an estimated 900 people, and will be required for between 18 and 24 months. During operations, the workforce will comprise an estimated 350 workers. The mine workforce will reside in local and surrounding communities, as well as in an accommodations complex that will be constructed off-site.

Most of the mine rock¹ produced through mining activities is non-acid generating (non-PAG) and will be permanently stored in a purposefully built Mine Rock Storage Area (MRSA). The non-PAG rock (also referred to as Type 1 mine rock) will also be used in the construction of access roads, dams and other site infrastructure, as needed. Drainage from the MRSA will be collected in a series of collection basins and treated, as necessary, to meet applicable water quality criteria prior to discharge to the Pic River. The remaining small portion of mine rock is considered to be potentially acid generating (PAG) (also referred to as Type 2 mine rock) and will be stored in the open pits or the Process Solids Management Facility (PSMF). This will ensure that drainage from the Type 2 mine rock will be contained during operations. Following closure, the Type 2 mine rock will be permanently stored below water by flooding the open pits and maintaining saturated conditions in the PSMF to prevent acid generation in the future.

Most of the process solids² produced at the site will be non-PAG (Type 1 process solids) with the minority being PAG (Type 2 process solids). Both the Type 1 and Type 2 process solids will be stored in the PSMF and potentially within the open pits. In both cases, the Type 2 process solids will be managed to prevent acid generation during both the operation and closure phases of the project. Water collected within the PSMF as well as water collected around the mine site (other than the MRSA), such as water pumped from the pits or run-off collected from the plant site, will be managed within the PSMF. Excess water not needed for processing ore will be discharged, following treatment as necessary, to Hare Lake.

¹ Mine rock: rock that has been excavated from active mining areas but does not have sufficient ore grades to process for mineral extraction.

² Process solids: solids generated during the ore milling process following extraction of the ore (minerals) from the host material.

Access to the Project site is currently provided by the Camp 19 Road, opposite Peninsula Road at Highway 17. The existing road will be upgraded and utilized from its junction with Highway 17 to a new road running north that will be constructed to access the Project site. The Project will also require the construction of a new 115 kV transmission line that will connect to either the Terrace Bay-Manitouwadge transmission line (M2W Line). The width of the transmission corridor will be approximately 30 m.

Disturbed areas of the Project footprint will be reclaimed in a progressive manner during all Project phases. Natural drainage patterns will be restored as much as possible. The ultimate goal of mine decommissioning will be to reclaim land within the Project footprint to permit future use by resident biota and as determined through consultation with the public, Indigenous people and government. A certified Closure Plan for the Project will be prepared as required by Ontario Regulation (O.Reg.) 240/00 as amended by O.Reg.194/06 “Mine Development and Closure under Part VII of the Mining Act” and “Mine Rehabilitation Code of Ontario”.

A further description of the Project and associated project activities and phases will be provided under separate cover in the EIS Addendum.

1.3 Study Objectives

This updated soil baseline study provides information to inform the EIS Addendum for the Project. The objectives of this update were to describe and present available information and characterize changes to the baseline conditions in the study area. The scope of the updated water quality baseline study includes the following:

- summary of findings of the existing baseline studies (**Section 2.0**).
- identification of regulatory guidance for the collection of baseline data (**Section 3.0**).
- confirmation of spatial boundaries (**Section 4.0**).
- describe the collection and review of available background information and data, including any additional and/or on-going data collection efforts (**Section 5.0**).
- analysis of information to characterize existing baseline conditions and to determine any changes that have occurred since publication of the original EIS and its supporting documentation (**Section 6.0**).
- provide an updated summary of baseline conditions in the Site Study Area (SSA), Local Study Area (LSA) and Regional Study Area (RSA) specific to conditions relevant to the effects being assessed in the EIS Addendum (**Section 7.0**).

2.0 PREVIOUS CHARACTERIZATION OF EXISTING CONDITIONS

2.1 Surface Water Quality Monitoring

The original characterization of surface water quality for the Project study area included a desktop review of available data dating to the early 2000s as well as the establishment of a 58-station network, including headwater and downstream areas of all of the subwatersheds that traverse the Project site, in 2008. This routine sampling occurred from 2008 to 2014. Sampling was conducted on a monthly basis through the ice-free season (roughly May through November) in 2008 and 2009. Sampling was conducted according to standardized protocols based on the Metal Mining Environmental Effect Monitoring Technical Guidance.

Water quality sampling was continued from 2015 to present three times annually at a reduced number of sampling stations which are representative of watersheds within the study area. Water quality data was collected through these periods for general chemistry, anions and metals.

All water quality monitoring data are housed in database format (MS ACCESS™). The database, containing more than 80,000 records, includes spot measurements of water quality collected coincident with other sampling events dating back to 2001.

The sampling program includes QA/QC components that assess the integrity of field collection activities (trip blanks, field blanks, field duplicates), laboratory analyses (laboratory blanks, laboratory duplicates, concentration standards) and data management (manual checks of database values with laboratory reports). All samples were submitted to and analyzed by Canadian Association for Laboratory Accreditation Inc. (CALA) accredited laboratories. The range of parameters for which analyses (or measurements) were completed is provided in **Table 2-1**. The development of the parameter list considered those substances listed in the Lake Superior Zero Discharge Demonstration Program including mercury, PCBs, dioxin, hexachlorobenzene, octachlorostyrene, dieldrin, chlordane, DDT and toxaphene. Of these nine substances, only mercury is relevant to the proposed mine development and was therefore included in the baseline program.

Ecometrix (2012) provided a detailed account of surface water quality data collected from 2008 to 2012. The report provided parameter-specific comparison to Ontario Provincial Water Quality Objectives (PWQO) and discussion of trends. It also provided a synopsis of surface water quality by subwatershed which is provided for context herein. Previous chemical analysis of surface water showed that Project area waters are generally of high quality, with most parameters meeting PWQO criteria for the protection of aquatic life.

Table 2-1: Parameters Analyzed for Routine Surface Water Quality Sampling on the Project Site³

Parameter Category	Analytes
Physical Tests	Colour, Conductivity, Hardness (as CaCO ₃), pH, TSS, TDS, Turbidity, DO, Temperature
Anions and Nutrients	Alkalinity, Total (as CaCO ₃), Ammonia-N, Total Bicarbonate, Carbonate, Chloride, Fluoride, Hydroxide, Nitrate-N, Nitrite-N, TKN, Phosphorus (total), Sulphate
Carbon	DOC
Metals	Total Metals (full ICP-MS scan), Dissolved Metals (full ICP-MS scan), Mercury, Hexavalent Chromium
Aggregate Organics	BOD, Tannin and Lignins
Radionuclides	Radium-226

A number of representative sampling stations within study area subwatersheds are discussed below, with emphasis on the six principal subwatersheds that are associated with the project site (subwatersheds 101, 102, 103, 104, 105 and 106) and the Pic River (**Figure 2-1**). These particular sampling sites were chosen because they are located at the downstream ends of their respective subwatersheds. These same representative sampling stations were sampled after 2012 providing a long-term data set for the parameters of interest. The summary of the background water chemistry for these representative stations collected up to 2012 is provided below. **Figure 2-2** through **Figure 2-8** identify the subwatershed divides and their orientation to major water bodies in the project site (i.e. the Pic River, Bamooos Lake and Hare Lake).

³ Samples for the characterization of chlorophyll a were also collected in larger water bodies in the study area. These data are reported in EcoMetrix (2012).

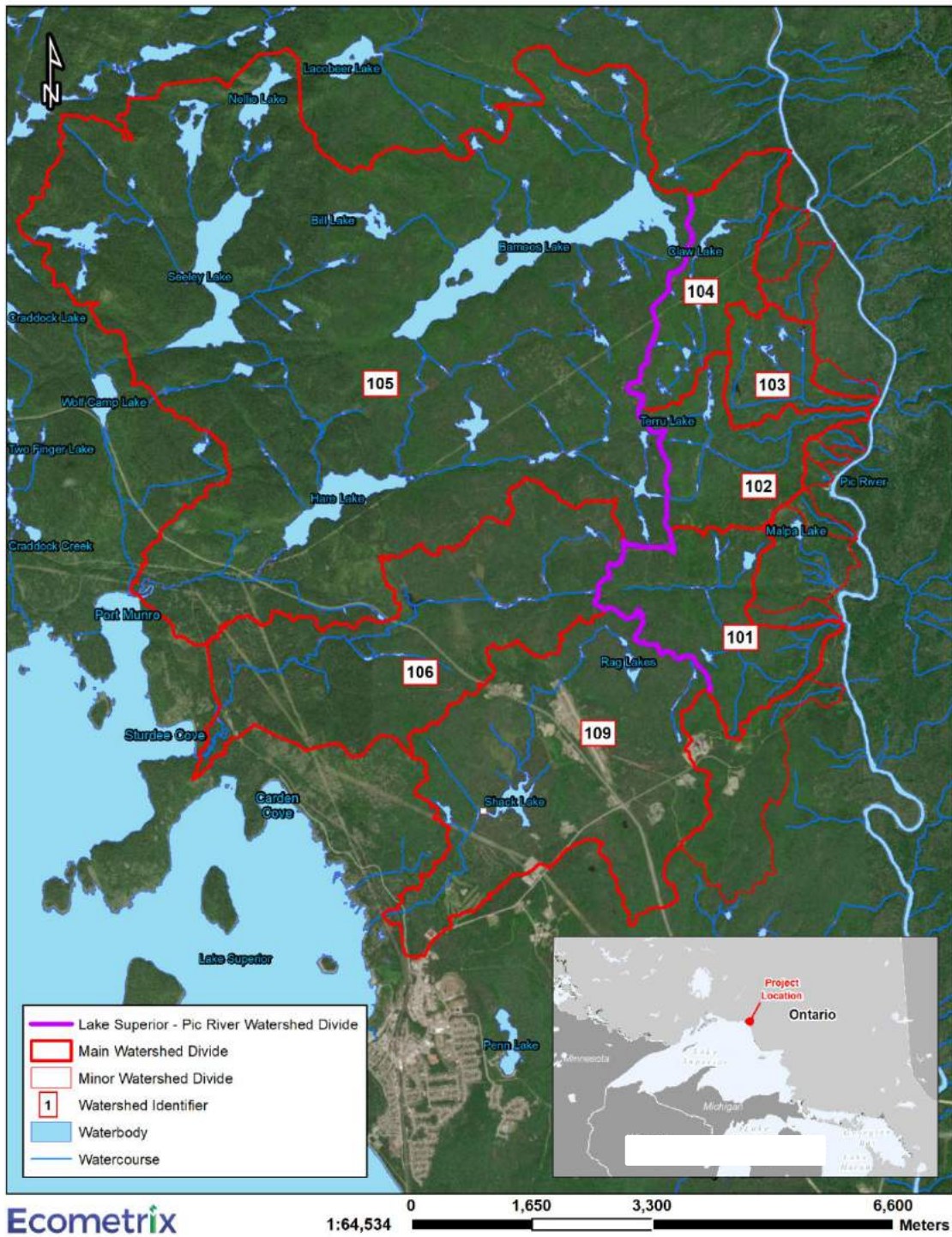


Figure 2.1: Major Watersheds Draining the Marathon Palladium Project Site

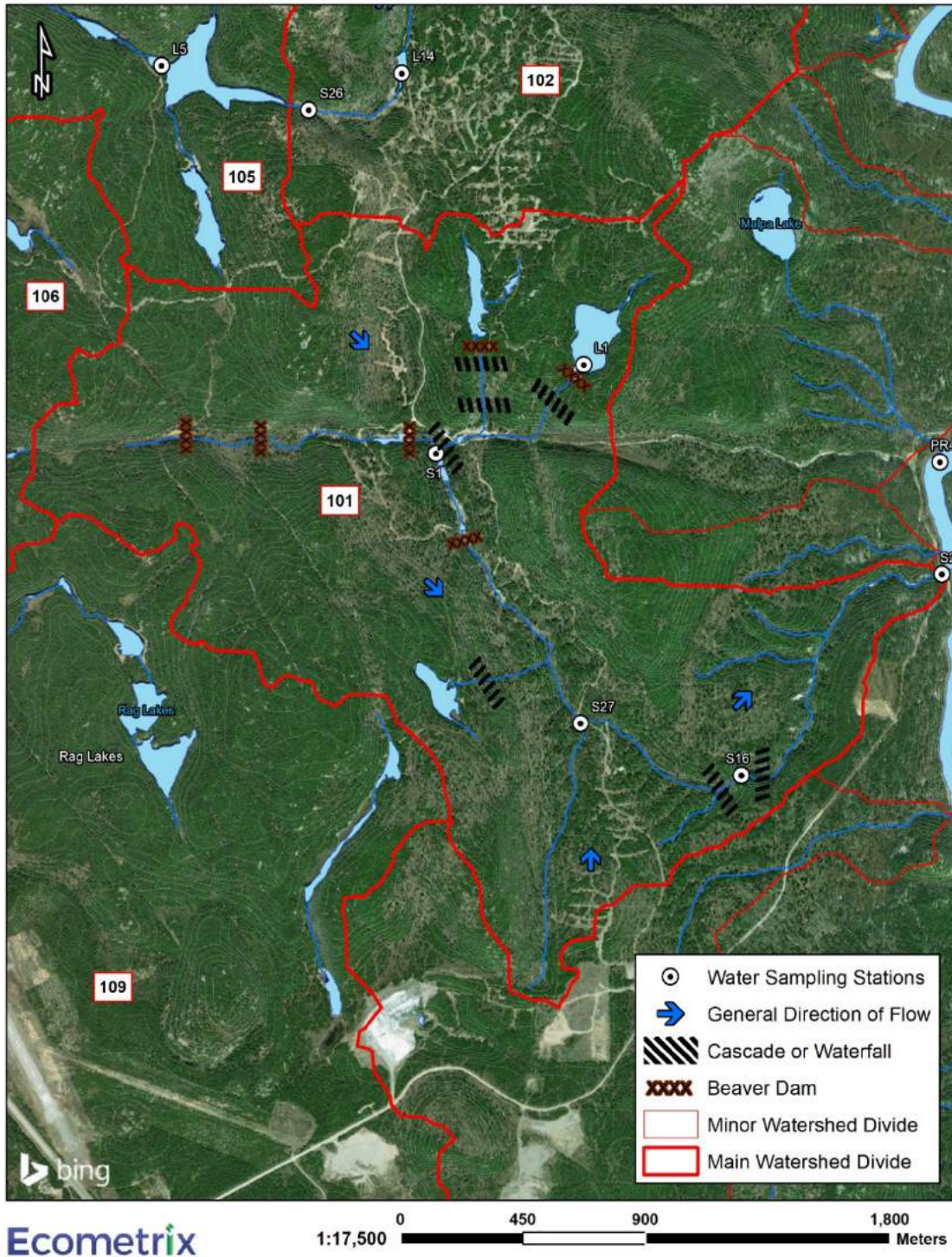


Figure 2.2: Water Quality Stations in the Stream 101 Subwatershed

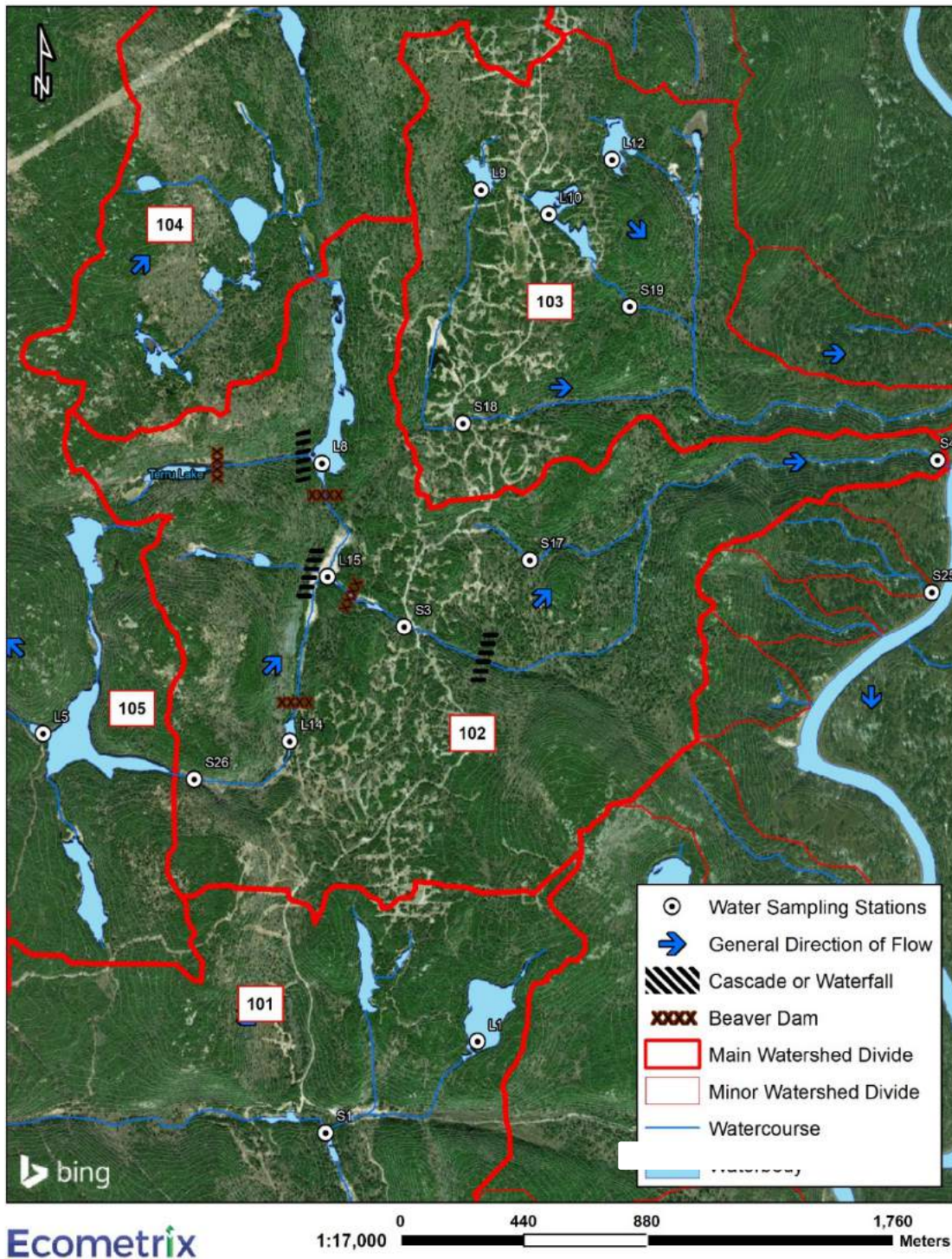


Figure 2.3: Water Quality Stations in the Stream 102 Watershed

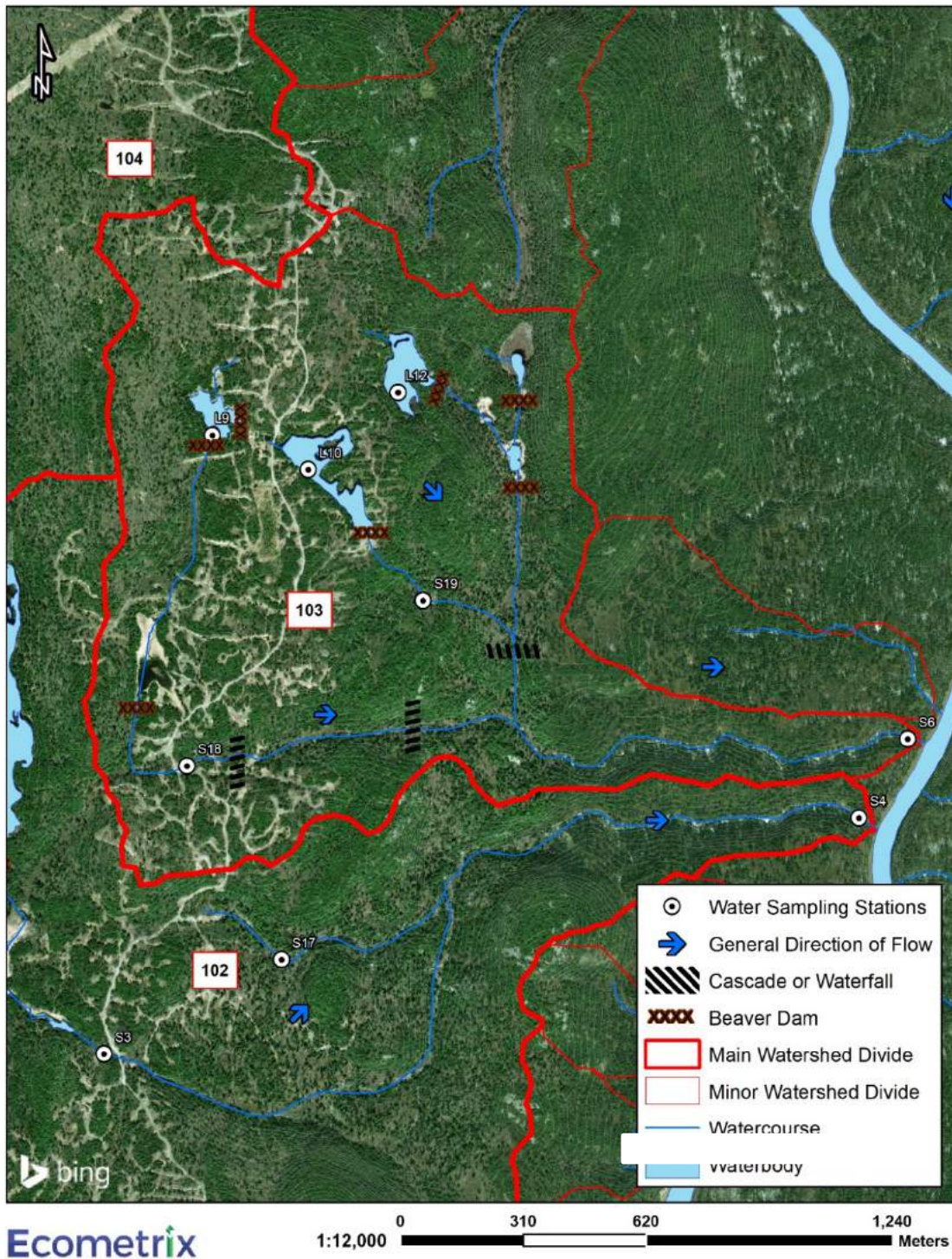


Figure 2.4: Water Quality Stations in the Stream 103 Watershed

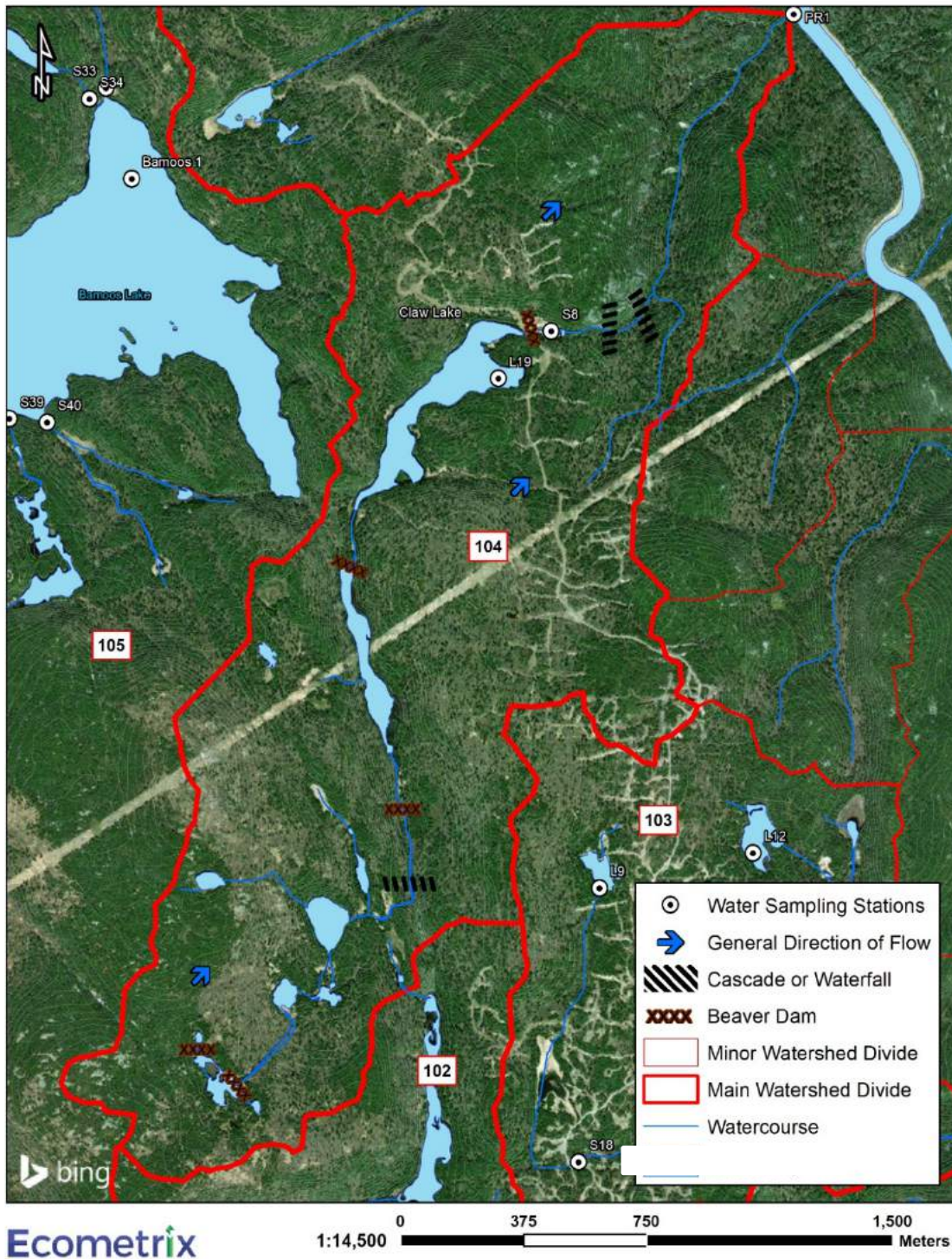


Figure 2.5: Water Quality Stations in the Stream 104 Watershed

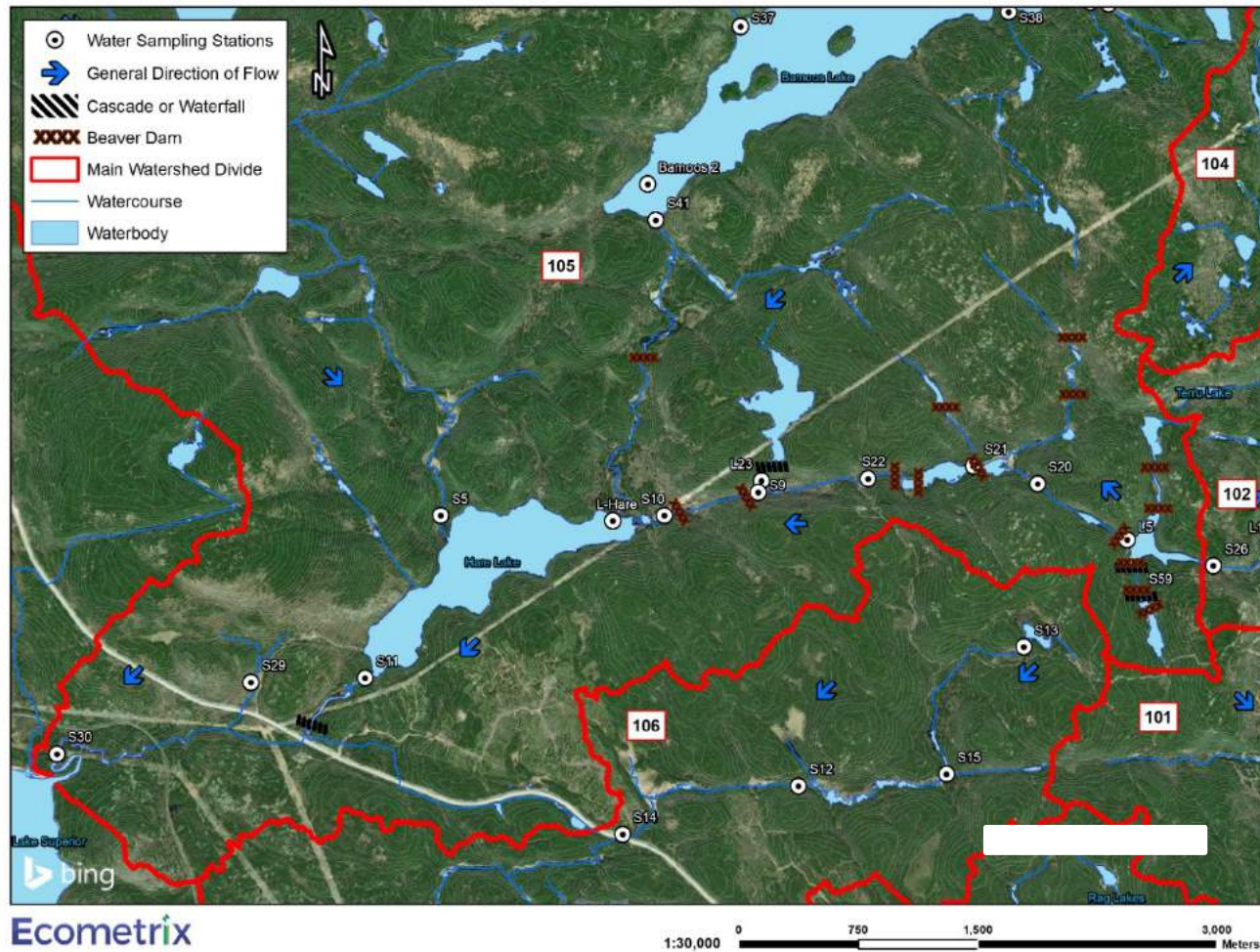


Figure 2.6: Water Quality Stations in the Stream 105 Watershed

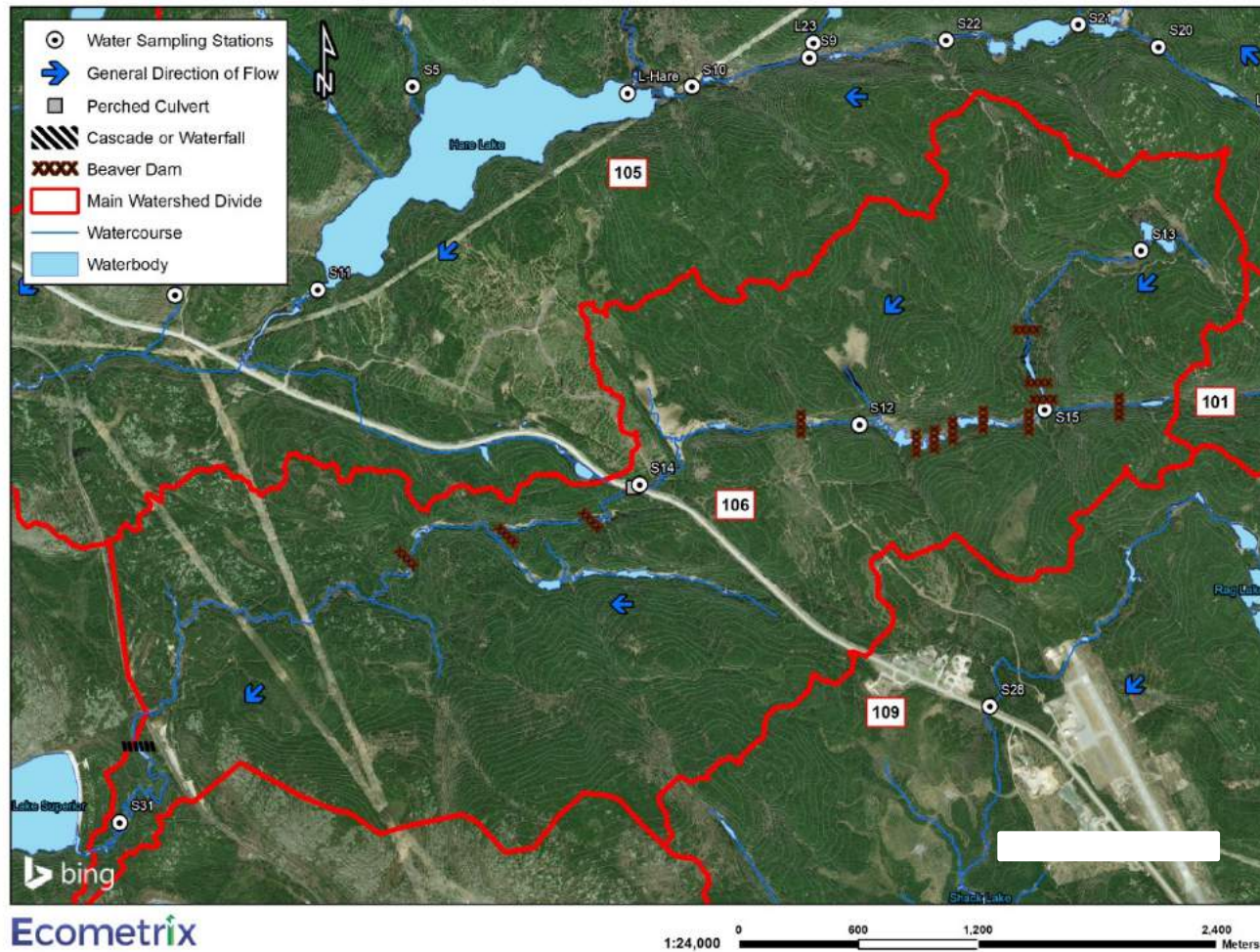


Figure 2.7: Water Quality Stations in the Stream 106 Watershed

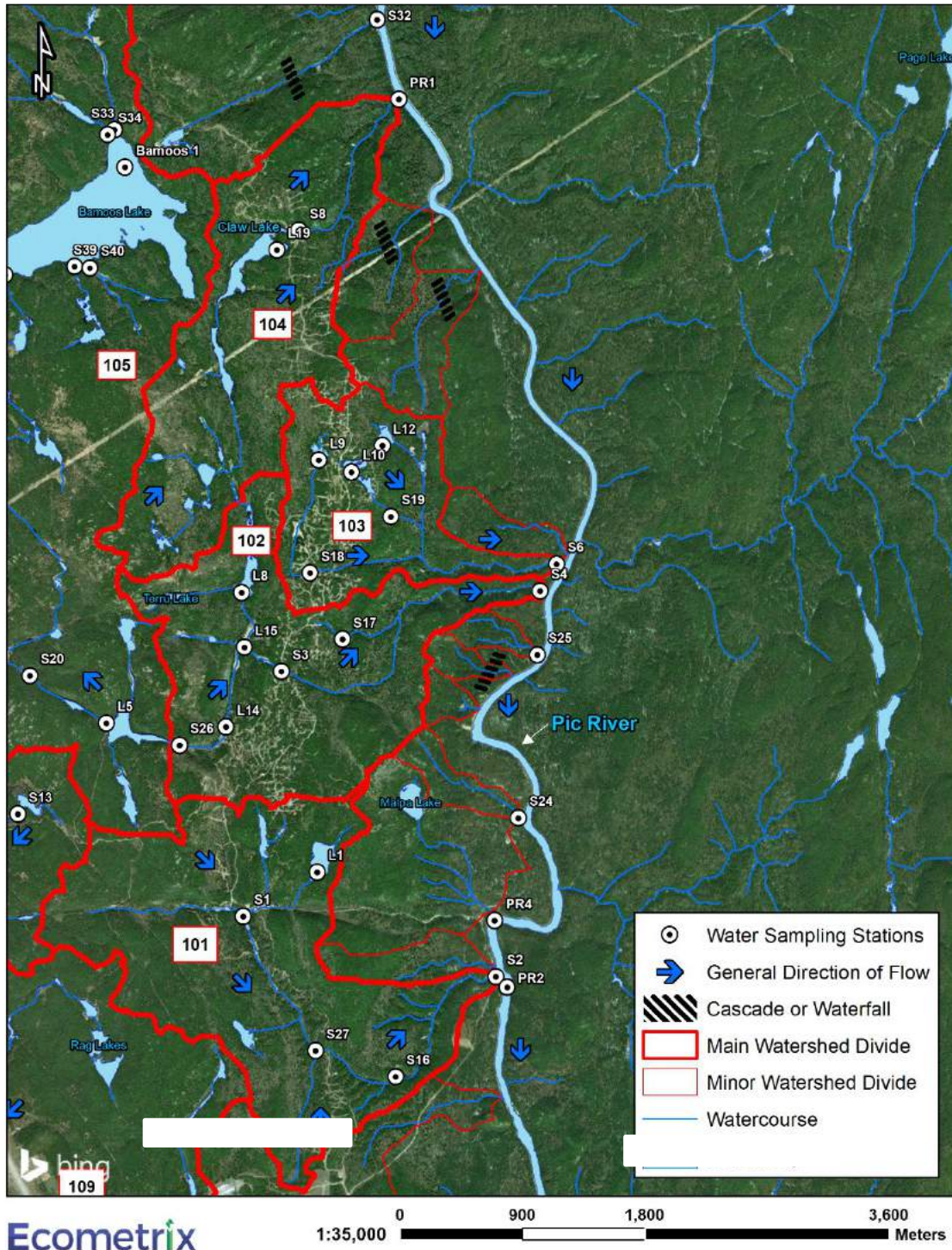


Figure 2.8: Water Quality Stations on the Pic River and Tributaries

2.2 Background Water Chemistry of the Stream 101, 102, 103 and 104 Subwatersheds

The Stream 101 through 104 subwatersheds discharge into the Pic River and parts of each are located within the proposed Project footprint. A number of representative sampling stations within these subwatersheds are discussed below. These particular sampling sites were chosen because they are located at the downstream ends of their respective subwatersheds.

2.2.1 Subwatershed 101

Station S2 represents the downstream end of subwatershed 101. General water quality based on data collected at monitoring station S2 is provided in **Table 2-2**.

Table 2-2: Water Chemistry in Subwatershed 101, Station S2

Analyte	PWQO (mg/L)	Maximum (mg/L)	Average (mg/L)
Alkalinity (as CaCO ₃)	-	265	118
Dissolved Aluminum	0.075	0.190	0.062
Ammonia (as N)	1.5	0.110	0.032
Arsenic	0.1 or 0.005 (Interim)	0.0100	0.0015
Cadmium	0.0002 or 0.0005 (Interim)	0.0009	0.0001
Cobalt	0.0009	0.00500	0.00083
Copper	0.005	0.0100	0.0031
Dissolved Organic Carbon	-	11.5	6.6
Iron	0.3	4.03	0.80
Lead	0.025 or 0.005 (Interim)	0.010	0.0015
Mercury	0.0002	0.0001	0.0001
Molybdenum	0.04	0.0100	0.0015
Nickel	0.025	0.0200	0.0034
Nitrate (as N)	-	0.400	0.142
pH	6.5-8.5	8.3	7.8
Phosphorus	0.03	0.071	0.022
Selenium	0.1	0.0050	0.0011
Sulphate	-	5.40	3.77
Total Hardness (as CaCO ₃)	-	263	122
Total Kjeldahl Nitrogen	-	0.397	0.275
Total Suspended Solids	-	86	18
Zinc	0.03 or 0.02 (Interim)	0.1300	0.0108

Several analytes including arsenic, mercury, molybdenum, and selenium were not detected above their respective method detection limits (MDL). Concentrations of dissolved aluminum were below the PWQO value of 0.075 mg/L with the exception of one exceedance occurring in May 2011 with a concentration of 0.19 mg/L. The average concentration was 0.062 mg/L. Concentrations of ammonia did not exceed the site-specific objective of 1.5 mg/L NH₃-N for any of the samples, with an average concentration of 0.03 mg/L. Concentrations of cadmium were consistently below the MDL of 0.0009 mg/L with the exception of the sample collected in November 2008 that had a concentration of 0.0012 mg/L. Cobalt concentrations were consistently below the MDL, with the exception of the sample collected in July 2009 that exceeded the PWQO value with a concentration of 0.002 mg/L. This concentration was an order of magnitude higher than all other samples and most likely represents an anomalous value. Concentrations of copper were 0.003 mg/L on average. Samples collected from S2 exhibited one exceedance of the PWQO value in July 2009 with a concentration of 0.007 mg/L. Concentrations of iron were 0.8 mg/L on average and exceeded the PWQO value in 16 of 19 samples collected. Concentrations of lead were consistently below the MDL with the exception of the sample collected in July 2009 with a concentration of 0.002 mg/L. Concentrations of nickel were only above the MDL in 4 of the 19 samples collected and exhibited an average concentration of 0.003 mg/L. Concentrations of total phosphorus were above the MDL on average and exceeded the PWQO value during five sampling events including May and July 2009, July and August 2010, and May 2011. Concentrations of zinc were 0.01 mg/L on average and exceeded the PWQO value for one sampling event in July 2008.

Samples collected from station S2 exhibited consistent pH values ranging from 7.1 to 8.3 with an average value of 7.8. All pH measures were within the PWQO range of 6.5 to 8.5.

Alkalinity averaged 118 mg/L with a minimum level of 24.2 mg/L occurring in May 2009 and a maximum level of 265 mg/L occurring in August 2008. Dissolved organic carbon (DOC) averaged 7 mg/L with a minimum concentration of 4 mg/L in July and August 2008 and a maximum concentration of 11.5 mg/L in August 2009. Nitrate (as N) averaged 0.1 mg/L with a minimum concentration less than 0.03 mg/L on three occasions and a maximum concentration of 0.4 mg/L in November 2008 and May 2010. Sulphate averaged 3.8 mg/L with a minimum concentration of 2.1 mg/L in August 2010 and a maximum concentration of 5.4 mg/L in November 2008. Total hardness averaged 122 mg/L and ranged from 31.8 mg/L in May 2009 to 263 mg/L in August 2010. Total Kjeldahl nitrogen (TKN) showed little variation and was on average 0.28 mg/L. When above the MDL, total suspended solids (TSS) ranged from 3.5 mg/L in November 2009 to 86.2 mg/L in July 2008. TSS averaged 18 mg/L.

2.2.2 Subwatershed 102

Station S4 represents the downstream end of subwatershed 102. General water quality based on data collected at monitoring station S4 is provided in **Table 2-3**

Table 2-3: Water Chemistry in Subwatershed 102, Station S4

Analyte	PWQO (mg/L)	Maximum (mg/L)	Average (mg/L)
Alkalinity (as CaCO ₃)	-	150	91
Dissolved Aluminum	0.075	0.151	0.050
Ammonia (as N)	1.0	0.040	0.023
Arsenic	0.1 or 0.005 (Interim)	0.0100	0.0016
Cadmium	0.0002 or 0.0001 (Interim)	0.00090	0.00014
Cobalt	0.0009	0.00500	0.00096
Copper	0.005	0.0100	0.0049
Dissolved Organic Carbon	-	10.8	7.1
Iron	0.3	4.45	1.52
Lead	0.025 or 0.005 (Interim)	0.0100	0.0017
Mercury	0.0002	0.0001	0.0001
Molybdenum	0.04	0.010	0.0016
Nickel	0.025	0.0200	0.0038
Nitrate (as N)	-	0.471	0.141
pH	6.5-8.5	8.3	7.9
Phosphorus	0.03	0.223	0.045
Selenium	0.1	0.0050	0.0012
Sulphate	-	6.29	5.00
Total Hardness (as CaCO ₃)	-	229	109
Total Kjeldahl Nitrogen	-	0.550	0.312
Total Suspended Solids	-	436	66
Zinc	0.03 or 0.02 (Interim)	0.3700	0.0289

At sampling station S4, several analytes including arsenic, cadmium, mercury, molybdenum, and selenium were present in concentrations below their respective MDL.

Concentrations of dissolved aluminum were consistently above the MDL value and exhibited an average concentration of 0.05 mg/L. An exceedance of the PWQO value occurred in May 2011 with a dissolved aluminum concentration of 0.15 mg/L. Concentrations of ammonia did not exceed the site-specific objective of 1 mg/L NH₃-N for any of the samples. Concentrations of cobalt were consistently below the MDL value with the exception of two exceedances occurring in May of 2009 and May of 2011 with concentrations of 0.0015 and 0.002 mg/L, respectively. Concentrations of copper exceeded the PWQO value in 6 of the 16 samples collected with an average concentration of 0.005 mg/L. Concentrations of lead were consistently below the MDL value with the exception of three sampling events in May of 2009, 2010 and 2011 with concentrations of 0.0014 mg/L, 0.0011 mg/L and 0.002 mg/L. Concentrations of lead at location S4 did not exceed the PWQO value for any of the samples collected. Concentrations of nickel were 0.004 mg/L on average and did not exceed the PWQO value. Concentrations of total

phosphorus were above the MDL on average and exceeded the PWQO value during 6 of the 15 sampling events. Concentrations of zinc were 0.03 mg/L on average and did not exceed the PWQO value for any of the samples collected.

Samples collected from station S4 exhibited consistent pH values ranging from 7.3 to 8.3 with an average value of 7.9.

Alkalinity averaged 91 mg/L with a minimum level of 49 mg/L occurring in May 2009 and a maximum level of 150 mg/L occurring in July 2011. DOC averaged 7.1 mg/L with a minimum concentration of 5 mg/L in both August and October 2008 and a maximum concentration of 10.8 mg/L in August 2009. Sulphate concentrations averaged 5 mg/L with a minimum concentration of 3.9 mg/L in July 2008 and a maximum concentration of 6.3 mg/L in July 2010. Total hardness averaged 109 mg/L and ranged from 50.3 to 229 mg/L in May and 2011, respectively. Nitrate concentrations ranged from 0.034 to 0.471 mg/L with an average of 0.14 mg/L. TKN was consistent throughout the sampling period, averaging 0.3 mg/L and ranging from 0.22 mg/L in July 2011 to 0.55 mg/L in July 2008. TSS varied widely from below the MDL of 2 mg/L in October 2009 to 436 mg/L in May 2011.

2.2.3 Subwatershed 103

Station S6 represents the downstream end of subwatershed 103. General water quality based on data collected at monitoring station S6 is provided in **Table 2-4**.

Table 2-4: Water Chemistry in Subwatershed 103, Station S6

Analyte	PWQO (mg/L)	Maximum (mg/L)	Average (mg/L)
Alkalinity (as CaCO ₃)	-	241	88
Dissolved Aluminum	0.075	0.130	0.046
Ammonia (as N)	0.9	0.220	0.037
Arsenic	0.1 or 0.005 (Interim)	0.0010	0.0010
Cadmium	0.0002 or 0.0001 (Interim)	0.00009	0.00009
Cobalt	0.0009	0.00113	0.00056
Copper	0.005	0.0138	0.0069
Dissolved Organic Carbon	-	11.0	6.6
Iron	0.3	2.49	0.82
Lead	0.025 or 0.005 (Interim)	0.0011	0.0010
Mercury	0.0002	0.0001	0.0001
Molybdenum	0.04	0.001	0.0010
Nickel	0.025	0.0050	0.0027
Nitrate (as N)	-	0.434	0.171
pH	6.5-8.5	8.4	8.0
Phosphorus	0.03	0.109	0.025

Analyte	PWQO (mg/L)	Maximum (mg/L)	Average (mg/L)
Selenium	0.1	0.0050	0.0010
Sulphate	-	6.29	4.76
Total Hardness (as CaCO ₃)	-	238	99
Total Kjeldahl Nitrogen	-	0.420	0.287
Total Suspended Solids	-	162	25
Zinc	0.03 or 0.02 (Interim)	0.1510	0.0138

At sampling station S6, several analytes including arsenic, cadmium, mercury, molybdenum, and selenium were not detected at or above their respective MDL. Concentrations of dissolved aluminum were 0.046 mg/L on average. An exceedance of the PWQO value occurred in May 2011 with a dissolved aluminum concentration of 0.13 mg/L. Concentrations of ammonia did not exceed the site-specific objective of 0.9 mg/L NH₃-N for any of the samples. Concentrations ranged from below detection to 0.22 mg/L with an average concentration of 0.04 mg/L. Concentrations of cobalt were consistently below the MDL with the exception of four samples. An exceedance above the cobalt PWQO value occurred in May of 2011 with a concentration of 0.001 mg/L. Concentrations of copper exceeded the PWQO value in 13 of the 15 samples collected with an average concentration of 0.007 mg/L. Concentrations of iron were 0.8 mg/L on average, reaching a maximum concentration of 2.5 mg/L. Concentrations of iron exceeded the PWQO value of 0.3 mg/L in 5 of the 15 samples collected. Concentrations of nickel were 0.003 mg/L on average and did not exceed the PWQO value of 0.025 mg/L for any of the sampling events. Concentrations of total phosphorus were 0.03 mg/L on average and ranged from 0.006 to 0.109 mg/L. Two exceedances of the PWQO value were associated with the May 2010 and May 2011 sampling events with concentrations of 0.037 and 0.109 mg/L, respectively. Concentrations of zinc were 0.01 mg/L on average and with the exception of the August 2008 sampling event, did not exceed the PWQO value for any of the samples collected.

Samples collected from S6 exhibited consistent pH values ranging from 7.3 to 8.3 with an average value of 8.0. All pH measurements were within the PWQO range of 6.5 to 8.5.

Alkalinity averaged 88 mg/L, with a minimum level of 40.5 mg/L in May 2009 and a maximum level of 241 mg/L in August 2008. DOC had an average concentration of 6.6 mg/L, with a minimum concentration of 4 mg/L in July, August and October 2008 and a maximum concentration of 11 mg/L in August 2009. Sulphate concentrations averaged 4.8 mg/L, with a minimum concentration of 4.0 mg/L in July 2008 and a maximum concentration of 6.3 mg/L in October 2008. Total hardness averaged 99 mg/L and ranged from 42.2 mg/L in May 2009 to 238 mg/L in August 2008. The mean nitrate concentration was 0.17 mg/L ranging from 0.06 mg/L in September 2010 to 0.43 mg/L in May 2010. TKN showed little variability, averaging 0.3 mg/L and ranging from 0.2 mg/L in October 2008 to 0.4 mg/L in August 2009. TSS ranged from < 2 mg/L in August 2008 and September 2010 to 162 mg/L in May 2011. Mean TSS was 25 mg/L.

2.2.4 Subwatershed 104

Station S8 is downstream of Claw Lake, and represents the downstream end of subwatershed 104. A summary of the general water quality based on data collected at monitoring station S8, downstream of Claw Lake (L19) at the downstream end of the subwatershed, is provided in **Table 2-5**.

Table 2-5: Water Chemistry in Subwatershed 104, Station S8

Analyte	PWQO (mg/L)	Maximum (mg/L)	Average (mg/L)
Alkalinity (as CaCO ₃)	-	38	15
Dissolved Aluminum	0.075	0.152	0.053
Ammonia (as N)	0.4	0.100	0.033
Arsenic	0.1 or 0.005 (Interim)	0.0010	0.0010
Cadmium	0.0002 or 0.0001 (Interim)	0.00019	0.00010
Cobalt	0.0009	0.01020	0.00120
Copper	0.005 or 0.001 (Interim)	0.0220	0.0064
Dissolved Organic Carbon	-	10.3	6.6
Iron	0.3	5.31	1.08
Lead	0.005 or 0.001 (Interim)	0.0010	0.0010
Mercury	0.0002	0.0001	0.0001
Molybdenum	0.04	0.001	0.0010
Nickel	0.025	0.0036	0.0021
Nitrate (as N)	-	0.202	0.062
pH	6.5-8.5	7.8	7.3
Phosphorus	0.03	0.132	0.023
Selenium	0.1	0.0050	0.0009
Sulphate	-	9.17	4.49
Total Hardness (as CaCO ₃)	-	47	19
Total Kjeldahl Nitrogen	-	1.890	0.462
Total Suspended Solids	-	28	4.8
Zinc	0.03 or 0.02 (Interim)	0.1040	0.0164

At sampling station S8, several analytes including arsenic, mercury, molybdenum, and lead were not detected at their respective MDL. Concentrations of dissolved aluminum were 0.053 mg/L on average. Three exceedances of the PWQO value were associated with the sampling events in July 2008, August 2010 and May 2011 with concentrations of 0.14, 0.15 and 0.08 mg/L respectively. Concentrations of ammonia did not exceed the site-specific objective of 0.4 mg/L NH₃-N for any of the samples. Concentrations of ammonia were 0.03 mg/L on average. Concentrations of cadmium were above the MDL for two sampling events, August 2010 and July 2011, with concentrations of 0.002 and 0.0001 mg/L respectively. The August 2010 samples also exceeded the interim PWQO criterion for

cadmium of 0.0001 mg/L. Concentrations of cobalt were consistently below the MDL value with the exception of five samples ranging from 0.0006 to 0.01 mg/L. Concentrations that exceed the PWQO value occurred in September 2008, August 2010 and July 2011 with values of 0.0025, 0.010, and 0.0017 mg/L, respectively. Concentrations of copper exceeded the PWQO value in 12 of the 19 samples collected, ranging from 0.004 to 0.022 mg/L with an average concentration of 0.006 mg/L. Concentrations of iron were 1.1 mg/L on average, reaching a maximum concentration of 5.3 mg/L. Concentrations of iron exceeded the PWQO value of 0.3 mg/L in all of the samples collected from this station. Concentrations of nickel were consistently below the MDL value with the exception of one sample collected in August 2010 with a concentration of 0.0036 mg/L. Concentrations of total phosphorus were 0.023 mg/L on average and ranged from 0.007 to 0.03 mg/L. Three exceedances of the PWQO value were associated with the July 2009, August 2010 and July 2011 sampling events with concentrations of 0.13, 0.08 and 0.43 mg/L, respectively. A selenium concentration of 0.0006 mg/L was reported in August 2010. All other samples exhibited concentrations of selenium that were below the MDL. Concentrations of zinc ranged from 0.003 to 0.1 mg/L and were 0.016 mg/L on average. With the exception of the September and October 2008 and the August 2010 sampling events, zinc concentrations did not exceed the PWQO value for any of the samples collected.

Samples collected from station S8 exhibited consistent pH values ranging from 6.6 to 7.8 with an average value of 7.3. All values were within the PWQO range of 6.5 to 8.5.

Alkalinity was low, averaging 15 mg/L with a minimum level of 8 mg/L occurring in May 2009 and a maximum level of 39 mg/L occurring in August 2010. DOC averaged 6.6 mg/L with a minimum concentration of 5 mg/L and a maximum concentration of 10.3 mg/L. Sulphate concentrations averaged 4.5 mg/L with a minimum concentration of 3.7 mg/L in October 2009 and a maximum concentration of 9.2 mg/L in August 2010. Total hardness averaged only 19 mg/L and ranged from 11 mg/L in May 2009 to 47 mg/L in August 2010. TKN was consistent at Station S8, averaging 0.29 mg/L and ranging from 0.23 mg/L in October 2008 to 0.42 mg/L in August 2009. Nitrate concentrations averaged 0.062 mg/L and range from less than 0.03 mg/L to 0.20 mg/L. TSS displayed little variability, averaging 4.8 mg/L with a minimum concentration below the MDL (2.0 mg/L) occurring on several occasions. The maximum concentration was 28.4 mg/L, sampled in July 2009.

2.2.5 Pic River

Water quality in the Pic River is represented by data from two monitoring stations, one upstream of the Project site (PR1) and one downstream of the Project site (PR2). General water quality based on data collected at monitoring stations PR1 and PR2 is summarized in below. At PR1 and PR2, several analytes including cadmium, mercury, molybdenum, and selenium were not detected.

Station PR1 is in the Pic River, just to the north of the Project site. General water quality based on data collected at monitoring station PR1 is provided in **Table 2-6**.

Table 2-6: Water Chemistry in the Pic River, Station PR1

Analyte	PWQO (mg/L)	Maximum (mg/L)	Average (mg/L)
Alkalinity (as CaCO ₃)	-	139	112
Dissolved Aluminum	0.075	0.071	0.037
Ammonia (as N)	0.8	0.053	0.024
Arsenic	0.1 or 0.005 (Interim)	0.0100	0.0016
Cadmium	0.0002 or 0.0005 (Interim)	0.00090	0.00014
Cobalt	0.0009	0.00500	0.00121
Copper	0.005	0.0100	0.0033
Dissolved Organic Carbon	-	15.1	10.1
Iron	0.3	5.84	1.99
Lead	0.025 or 0.005 (Interim)	0.0100	0.0018
Mercury	0.0002	0.0001	0.0001
Molybdenum	0.04	0.010	0.0016
Nickel	0.025	0.0200	0.0046
Nitrate (as N)	-	0.131	0.051
pH	6.5-8.5	8.4	8.0
Phosphorus	0.03	0.214	0.072
Selenium	0.1	0.0050	0.0012
Sulphate	-	3.09	2.16
Total Hardness (as CaCO ₃)	-	212	120
Total Kjeldahl Nitrogen	-	0.580	0.436
Total Suspended Solids	-	389	118
Zinc	0.03 or 0.02 (Interim)	0.0300	0.0082

Average dissolved aluminum concentrations were 0.0368 mg/L and all values were below the PWQO.

Arsenic was only detected once in June of 2009 just above the MDL and was not above the PWQO. Cobalt was detected in half of the sampling events. The detected concentrations ranged from 0.0006 to 0.005 mg/L. The PWQO was exceeded on five occasions: May June, August and September of 2009 and May 2011. Copper concentrations ranged from 0.001 to 0.01 mg/L with an average of 0.0033 mg/L; the PWQO was exceeded twice; June 2009 and May 2011. All iron concentrations were above the PWQO with a mean of 1.99 mg/L and a range of 0.311 to 5.84 mg/L. Lead concentrations were generally close to the MDL of 0.001 mg/L and no values exceeded guidelines. All zinc concentrations were below the PWQO and ranged from 0.003 to 0.018 mg/L. Ammonia concentrations were always below the station-specific PWQO (0.8 mg/L). Ammonia ranged from below detection (0.02 mg/L) to 0.05 mg/L. The mean nickel concentration was 0.0046 mg/L and all measured levels were below the PWQO. Nickel concentrations ranged from 0.002 mg/L to 0.02 mg/L. The mean phosphorus concentration was 0.0716 mg/L and exceeds the PWQO guideline.

Overall the range was 0.0078 to 0.214 mg/L of total phosphorus in 15 samples. Individual exceedances occurred in the spring and summer of 2009 (May to September) and 2010 (May, July).

Samples collected from the PR1 station exhibited consistent pH values ranging from 6.7 to 8.4 with an average value of 8.0.

Alkalinity averaged 112 mg/L with a minimum concentration of 81.5 mg/L occurring in May 2009 and a maximum concentration of 139 mg/L occurring in October 2011. DOC averaged 10.1 mg/L with a minimum concentration of 7.0 mg/L occurring in August 2008 and a maximum concentration of 15.1 mg/L occurring in August 2009. Sulphate concentrations did not vary greatly, averaging 2.2 mg/L with a minimum concentration of 1.4 mg/L in September 2010 and a maximum concentration of 3.1 mg/L in June 2009. Total hardness averaged 120 mg/L and ranged from 64.7 mg/L in May 2009 to 212 mg/L in May 2011. TKN showed little variability, averaging 0.44 mg/L and ranging from less than 0.25 mg/L in October 2011 to 0.58 mg/L in July 2008. TSS averaged 18 mg/L and ranged widely from 12 mg/L to 389 mg/L.

Station PR2 is in the Pic River, just to the south of the outlet of Stream 1. General water quality based on data collected at monitoring station PR2 is provided in **Table 2-7**.

Table 2-7: Water Chemistry in the Pic River, Station PR2

Analyte	PWQO (mg/L)	Maximum (mg/L)	Average (mg/L)
Alkalinity (as CaCO ₃)	-	137	107
Dissolved Aluminum	0.075	0.122	0.035
Ammonia (as N)	0.6	0.034	0.022
Arsenic	0.1 or 0.005 (Interim)	0.0100	0.0015
Cadmium	0.0002 or 0.0005 (Interim)	0.00090	0.00014
Cobalt	0.0009	0.00500	0.00105
Copper	0.005	0.0100	0.0030
Dissolved Organic Carbon	-	14.7	8.8
Iron	0.3	5.47	1.53
Lead	0.025 or 0.005 (Interim)	0.0100	0.0017
Mercury	0.0002	0.0001	0.0001
Molybdenum	0.04	0.010	0.0015
Nickel	0.025	0.0200	0.0040
Nitrate (as N)	-	0.166	0.058
Analyte	PWQO (mg/L)	Maximum (mg/L)	Average (mg/L)
pH	6.5-8.5	9.2	8.1
Phosphorus	0.03	0.170	0.050

Analyte	PWQO (mg/L)	Maximum (mg/L)	Average (mg/L)
Radium-226	1.0 Bq/L	0.01 Bq/L	0.01 Bq/L
Selenium	0.1	0.0050	0.0011
Sulphate	-	3.54	2.55
Total Hardness (as CaCO ₃)	-	217	115
Total Kjeldahl Nitrogen	-	0.662	0.411
Total Suspended Solids	-	302	83
Zinc	0.03 or 0.02 (Interim)	0.0400	0.0078

The mean dissolved aluminum concentration was 0.035 mg/L and ranged from below the MDL to 0.122 mg/L. The maximum level measured in May 2011 was the only exceedance of the PWQO. Ammonia concentrations were generally between 0.02 and 0.03 mg/L and none exceeded the station-specific PWQO of 0.65 mg/L. All arsenic concentrations were generally near the MDL (0.001 mg/L). Only two measured concentrations exceeded the MDL and neither value exceeded the PWQO. The mean cobalt concentration was 0.001 mg/L. Cobalt levels ranged from below the MDL (0.005 mg/L) to 0.0035 mg/L. Measured cobalt concentrations in May and June 2009 and May 2011 exceeded the PWQO with concentration of 0.0017, 0.0025 and 0.0021 mg/L, respectively. Copper concentrations averaged 0.003 mg/L with a minimum of 0.001 mg/L and a maximum of 0.006 mg/L. In June 2009 and May 2011, the copper concentrations were both 0.006 mg/L, exceeding the PWQO. All other copper concentrations were less than PWQO. All iron concentration exceeded the PWQO. The average iron level was 1.53 mg/L with a range of 0.31 to 5.47 mg/L. Nickel concentrations averaged 0.004 mg/L and all values were below the PWQO. Lead was only above the MDL on three occasions: June 2009, May 2010, and May 2011. None of the measured lead concentrations exceeded the PWQO. Zinc levels averaged 0.0078 mg/L, ranging from less than 0.003 to 0.04 mg/L. The maximum value measured in July 2008 exceeded the PWQO whereas all other samples were below the 0.02 mg/L guideline. Phosphorus concentration ranged from 0.0059 to 0.17 mg/L with a mean of 0.05 mg/L. Eight of the 17 samples exceeded the PWQO for phosphorus.

The average pH was 8.1. The May 2010 pH value was 9.2 exceeding the upper bound of the guideline range. All other measurements were within the 6.5 to 8.5 PWQO range.

Alkalinity averaged 107 mg/L with a maximum level of 137 mg/L occurring in October 2011 and a minimum level of 57 mg/L occurring in September 2009. DOC had an average concentration of 8.8 mg/L with a minimum concentration of 6 mg/L occurring in September 2008 and a maximum concentration of 14.7 mg/L occurring in August 2009. Sulphate concentrations did not vary greatly, averaging 2.6 mg/L with a maximum concentration of 3.5 mg/L in September 2009 and a minimum concentration of 1.8 mg/L in August 2010. Total hardness averaged 115 mg/L and ranged from 61.9 mg/L in September 2009 to 217 mg/L in May 2011. TKN averaged 0.4 mg/L and ranged from less than 0.3 mg/L in October 2011 to 0.66 mg/L in July 2009. Nitrate (as N) concentrations ranged from less

than 0.03 mg/L to 0.17 mg/L with an average of 0.058 mg/L. TSS ranged widely from 2.1 mg/L in October 2011 to 302 mg/L in June 2009 and averaged 83 mg/L.

2.3 Background Water Chemistry of Stream 105 and 106 Subwatersheds

The stream 105 and 1066 subwatersheds drain naturally to Lake Superior. During mine operations, water that is not needed to support the milling process will be discharged (following treatment as appropriate) to Hare Lake, which is in the stream 1055 subwatershed. The PSMF will occupy the upper portion of the stream 106 subwatershed and water that naturally drains this area will be managed therein. The natural drainage pattern of the stream 1066 subwatershed will be restored following mine closure.

The discussion of water quality at sampling sites within these subwatersheds is not limited to the downstream areas, as was the case for the stream 101 to 104 subwatersheds; rather, the discussion considers stations throughout each sub-basin.

2.3.1 Stream 105 Subwatershed

Data from four sampling locations are provided to represent the water quality in the stream 105 subwatershed. Station S41 is located in the Bamooos Lake outlet creek in the upper part of the subwatershed. S10 is located on an inlet to Hare Lake that drains the northwest portion of the Project site (i.e., Stream 5). S11 is located on the Hare Lake outlet creek downstream of Hwy 17 and S30 is located near where Hare Creek flows into Lake Superior (Port Munro).

General water quality based on data collected at monitoring station S41 is provided in **Table 2-8**.

Table 2-8: Water Chemistry in Subwatershed 105, Station S41

Analyte	PWQO (mg/L)	Maximum (mg/L)	Average (mg/L)
Alkalinity (as CaCO ₃)	-	7.8	6.5
Dissolved Aluminum	0.075	0.037	0.036
Ammonia (as N)	0,4	0.021	0.020
Arsenic	0.1 or 0.005 (Interim)	0.0010	0.0010
Cadmium	0.0002 or 0.0001 (Interim)	0.00009	0.00009
Cobalt	0.0009	0.00050	0.00050
Copper	0.005 or 0.001 (Interim)	0.0050	0.0022
Dissolved Organic Carbon	-	5.3	4.6
Iron	0.3	0.10	0.07
Lead	0.005 or	0.0010	0.0010

Analyte	PWQO (mg/L)	Maximum (mg/L)	Average (mg/L)
	0.001 (Interim)		
Mercury	0.0002	0.0001	0.0001
Molybdenum	0.04	0.001	0.0010
Nickel	0.025	0.0020	0.0020
Nitrate (as N)	-	0.219	0.138
pH	6.5-8.5	7.0	6.8
Phosphorus	0.03	0.014	0.007
Selenium	0.1	0.0004	0.0004
Sulphate	-	4.21	3.92
Total Hardness (as CaCO ₃)	-	10	9.7
Total Kjeldahl Nitrogen	-	0.230	0.205
Total Suspended Solids	-	4	2.3
Zinc	0.03 or 0.02 (Interim)	0.0042	0.0032

At S41, several analytes including arsenic, cadmium, cobalt, mercury, molybdenum, lead, nickel, and selenium, were not detected at their respective MDL. Dissolved aluminum concentrations in July and August 20010 were both around 0.036 mg/L and did not exceed the PWQO. The S41 station-specific PWQO for ammonia was determined to be 0.4 mg/L. No samples exceeded this value and only a single sample from November 2009 (0.021 mg/L) was above the MDL. Copper concentrations averaged 0.002 mg/L and ranged from 0.0015 to 0.005 mg/L, all equal to or below the PWQO. Only three of the seven samples resulted in total phosphorus concentrations above the MDL, none of which exceeded the PWQO of 0.02 mg/L.

Samples collected from station S41 exhibited consistent pH values ranging from 6.5 to 7.0 with an average value of 6.8. All values were within the PWQO range.

Alkalinity averaged 6.5 mg/L, with a minimum level of 5.2 mg/L occurring in May 2010 and a maximum level of 7.8 mg/L occurring in August 2009. DOC averaged 4.6 mg/L, with a minimum concentration of 3.8 mg/L in November 2009 and a maximum concentration of 5.3 mg/L in May 2010. Nitrate (as N) averaged 0.1 mg/L, with a minimum concentration of 0.07 mg/L and maximum concentration of 0.2 mg/L. Sulphate and hardness concentrations did not vary greatly, averaging 3.9 mg/L and 9.7 mg/L, respectively. TKN exhibited almost no variability and with concentrations around 0.2 mg/L throughout the sampling period. TSS values were consistently low with a mean of 2.3 mg/L.

General water quality based on data collected at monitoring station S10 is provided in **Table 2-9**.

Table 2-9: Water Chemistry in Subwatershed 105, Station S10

Analyte	PWQO (mg/L)	Maximum (mg/L)	Average (mg/L)
Alkalinity (as CaCO ₃)	-	21	7.5
Dissolved Aluminum	0.075	0.394	0.174
Ammonia (as N)	13.2	0.320	0.052
Arsenic	0.1 or 0.005 (Interim)	0.0010	0.0010
Cadmium	0.0002 or 0.0001 (Interim)	0.00011	0.00009
Cobalt	0.0009	0.00330	0.00070
Copper	0.005 or 0.001 (Interim)	0.0018	0.0011
Dissolved Organic Carbon	-	10.7	8.4
Iron	0.3	6.37	1.48
Lead	0.005 or 0.001 (Interim)	0.0030	0.0011
Mercury	0.0002	0.0001	0.0001
Molybdenum	0.04	0.001	0.0010
Nickel	0.025	0.0020	0.0020
Nitrate (as N)	-	0.111	0.056
pH	6.5-8.5	7.9	6.8
Phosphorus	0.03	0.042	0.017
Selenium	0.1	0.0050	0.0009
Sulphate	-	3.72	2.83
Total Hardness (as CaCO ₃)	-	21	9.1
Total Kjeldahl Nitrogen	-	1.140	0.440
Total Suspended Solids	-	14	4.4
Zinc	0.03 or 0.02 (Interim)	0.0123	0.0063

At sampling station S10, several analytes including arsenic, mercury, molybdenum, nickel, and selenium were not detected at their respective MDL. Dissolved aluminum had an average concentration 0.174 mg/L. The concentrations ranged from a minimum of 0.08 mg/L to a maximum of 0.394 mg/L. All samples exceeded the PWQO of 0.075 mg/L. The station specific PWQO for ammonia was 13.2 mg/L. Eleven of 19 measures were above the MDL and ranged in concentration from 0.027 to 0.32 with an average of 0.05 mg/L. All samples were at least an order of magnitude below the PWQO. Only one sample exceeded the MDL for cadmium and had a concentration of 0.00011 mg/L (July 2011) which slightly exceeds the PWQO of 0.0001 mg/L. About half of the cobalt samples were below the MDL. The samples above the MDL ranged from 0.0006 mg/L to 0.0033 mg/L. One sample, the maximum from August 2008, exceeded the PWQO. Three samples exceeded the PWQO for copper. These exceedances occurred in May 2010, September 2010, and July 2011 with concentrations of 0.0018, 0.0011, 0.0011 mg/L, respectively. Iron averaged 1.48 mg/L and ranged from 0.316 to 6.37 mg/L and all samples exceeded the PWQO of 0.3 mg/L. Lead was only over the MDL once with a concentration of 0.003 mg/L.

which exceeds the interim PWQO of 0.001 mg/L. Zinc concentrations averaged 0.006 mg/L with a range of 0.0034 to 0.012 mg/L. None of the measured concentrations exceeded the PWQO of 0.02 mg/L. Phosphorus concentrations averaged 0.0171 mg/L with a concentration range of 0.007 to 0.042 mg/L. The August 2008, October 2009 and September 2010 samples were above PWQO with levels of 0.032, 0.039, and 0.035 mg/L, respectively.

Three of the eight pH measurements were below the lower bound of the PWQO range. The overall mean pH was 6.8.

Alkalinity was low, averaging 7.5 mg/L with a minimum level below the MDL (5.0 mg/L) occurring on several occasions and a maximum level of 21 mg/L occurring in August 2008. DOC averaged 8.4 mg/L, had a minimum concentration of 6 mg/L in November 2008 and a maximum concentration of 10.7 mg/L in May 2009. Nitrate (as N) averaged 0.06 mg/L ranging from below the MDL (0.03 mg/L) on several occasions, to a maximum concentration of 0.11 mg/L in May 2010. Sulphate averaged 2.8 mg/L with a minimum concentration of 1.3 mg/L in August 2008 and a maximum concentration of 3.7 mg/L in May 2010. Total hardness did not vary greatly, averaging 9.1 mg/L. TKN averaged 0.4 mg/L and ranged from less than the MDL, 0.25 mg/L, in October 2011 to 1.1 mg/L in August 2008. TSS averaged 4.4 mg/L, had a minimum concentration below the MDL of 2.0 mg/L occurring on several occasions and a maximum concentration of 14.3 mg/L in July 2011.

General water quality based on data collected at monitoring station S11 is provided in **Table 2-10**.

Table 2-10: Water Chemistry in Subwatershed 105, Station S11

Analyte	PWQO (mg/L)	Maximum (mg/L)	Average (mg/L)
Alkalinity (as CaCO ₃)	-	10.5	8.1
Dissolved Aluminum	0.075	0.230	0.088
Ammonia (as N)	1.4	0.030	0.022
Arsenic	0.1 or 0.005 (Interim)	0.0010	0.0010
Cadmium	0.0002 or 0.0001 (Interim)	0.00009	0.00009
Cobalt	0.0009	0.00050	0.00050
Copper	0.005 or 0.001 (Interim)	0.0014	0.0010
Dissolved Organic Carbon	-	11.9	6.4
Iron	0.3	0.43	0.21
Lead	0.005 or 0.001 (Interim)	0.0010	0.0010
Mercury	0.0002	0.0001	0.0001
Molybdenum	0.04	0.001	0.0010
Nickel	0.025	0.0020	0.0020
Nitrate (as N)	-	0.311	0.120

pH	6.5-8.5	10.2	7.8
Phosphorus	0.03	0.049	0.008
Selenium	0.1	0.0050	0.0008
Sulphate	-	4.71	3.37
Total Hardness (as CaCO ₃)	-	13	11
Total Kjeldahl Nitrogen	-	0.310	0.249
Total Suspended Solids	-	3	2.2
Zinc	0.03 or 0.02 (Interim)	0.0067	0.0041

At sampling station S11, several analytes including arsenic, cadmium, cobalt, mercury, molybdenum, nickel, and selenium were not detected below their respective MDL. Dissolved aluminum concentration ranged from 0.039 to 0.23 mg/L with a mean of 0.088 mg/L. Seven of the 11 samples measurement for dissolved aluminum exceeded the PWQO or 0.075 mg/L. Ammonia concentrations ranged from below the MDL (i.e., 0.02 mg/L) to 0.03 mg/L. Concentrations were below the station specific PWQO of 1.4 mg/L. All copper concentrations were around 0.001 mg/L which is equal to the MDL. The July, October and November, 2009 samples all slightly exceeded the PWQO (0.001 mg/L). Iron concentrations averaged 0.21 mg/L and ranged from 0.097 to 0.43 mg/L. The November 2008 and 2009 concentrations were 0.38 mg/L and 0.43 mg/L both exceeding the PWQO. Generally, lead concentrations at S11 were below detection, however a single sample (July, 2010) resulted in a concentration equal to the 0.001 MDL. This value is equal to the PWQO given the hardness in the sample. Approximately two-thirds of the 20 samples had phosphorus concentrations below the MDL (0.005 mg/L). For the remaining third the range was between 0.005 and 0.0491 mg/L. Overall, the mean was 0.008 mg/L. The maximum value from November 2009 exceeded the PWQO of 0.03 mg/L.

The range in pH was 5.7 to 10.6 with these two values being lower than and greater than the PWQO range, respectively. Overall, the mean pH was 7.7.

Alkalinity varied little, averaging 8.1 mg/L and ranging from a concentration below the MDL (5 mg/L) in June and October 2009 to a concentration of 10.5 mg/L in July 2009. DOC averaged 6.4 mg/L, had a minimum concentration of 5 mg/L occurring numerous times, and a maximum concentration of 11.9 mg/L occurring in May 2011. Nitrate (as N) averaged 0.1 mg/L, had a minimum concentration of 0.03 mg/L in September 2010 and a maximum concentration of 0.3 mg/L in June 2009. Sulphate concentrations averaged 3.4 mg/L, had a minimum concentration of 2.7 mg/L in September 2010 and a maximum concentration of 4.7 mg/L in June 2009. Total hardness averaged 11.2 mg/L and ranged from 9 mg/L in August 2009 to 13.2 mg/L in August 2008. TKN and TSS were consistent, averaging at 0.2 and 2.2 mg/L, respectively.

General water quality based on data collected at monitoring station S30 is provided in **Table 2-11**.

Table 2-11: Water Chemistry in Subwatershed 105, Station S30

Analyte	PWQO (mg/L)	Maximum (mg/L)	Average (mg/L)
Alkalinity (as CaCO ₃)	-	36	16
Dissolved Aluminum	0.075	0.120	0.067
Ammonia (as N)	2.9	0.040	0.022
Arsenic	0.1 or 0.005 (Interim)	0.0120	0.0020
Cadmium	0.0002 or 0.0001 (Interim)	0.00031	0.00010
Cobalt	0.0009	0.00050	0.00050
Copper	0.005 or 0.001 (Interim)	0.0020	0.0011
Dissolved Organic Carbon	-	8.8	6.2
Iron	0.3	0.59	0.27
Lead	0.005 or 0.001 (Interim)	0.0010	0.0010
Mercury	0.0002	0.001	0.00028
Molybdenum	0.04	0.001	0.0009
Nickel	0.025	0.0020	0.0020
Nitrate (as N)	-	0.130	0.102
pH	6.5-8.5	7.9	7.4
Phosphorus	0.03	0.239	0.028
Selenium	0.1	0.0050	0.0011
Sulphate	-	4.00	3.51
Total Hardness (as CaCO ₃)	-	43	20
Total Kjeldahl Nitrogen	-	0.360	0.217
Total Suspended Solids	-	13	2.8
Zinc	0.03 or 0.02 (Interim)	0.0060	0.0038

At sampling station S30, several analytes including cobalt, mercury, molybdenum, lead, nickel, and selenium and were not detected at their respective MDL. The mean dissolved aluminum concentration was 0.0671 mg/L with a range of 0.018 to 0.12 mg/L. All values were below PWQO. No sample concentrations exceeded the ammonia as N PWQO developed for S30. Fifteen of 21 samples were below the MDL (0.02 mg/L) and the highest concentration reported was 0.04 mg/L. Only the 30 July 2008 had a cadmium concentration above the MDL of 0.00009 mg/L with a level of 0.00031 mg/L. This single value exceeds the interim PWQO of 0.0001 mg/L. Half of the samples collected had copper concentrations below the 0.001 mg/L MDL. The remaining samples ranged from 0.0001 mg/L to 0.002 mg/L. After accounting for hardness eight of the 11 samples with copper concentrations at or above the MDL were also equal to or exceeded the PWQO. Iron concentrations averaged 0.26 mg/L and ranging from 0.10 mg/L and 0.59 mg/L. Iron exceeded the PWQO seven times. A single pH measurement in June 2009, 6.4, was below the 6.5 bound outlined in the PWQO. Phosphorus concentrations ranged from below MDL

(0.005 mg/L) to 0.24 mg/L. The maximum value was the only instance of a concentration exceeding the PWQO.

The maximum pH was 7.9 and the mean was 7.4. All values were within the PWQO.

Alkalinity averaged 16 mg/L with a minimum level of 9.5 mg/L occurring in May 2011 and a maximum concentration of 36 mg/L occurring in August 2008. DOC averaged 6.2 mg/L with a minimum concentration of 5 mg/L on all sample dates from August to November 2008 and a maximum concentration of 8.8 mg/L in August 2009. Nitrate (as N) averaged 0.1 mg/L, had a minimum concentration of 0.04 mg/L in September 2010 and a maximum concentration of 0.13 mg/L in October 2008. Sulphate concentrations did not vary greatly, averaging 3.5 mg/L with a minimum concentration of 2.7 mg/L in September 2010 and a maximum concentration of 4 mg/L in July 2008. Total hardness averaged 20 mg/L and ranged from a minimum concentration of 13 mg/L in November 2008 to a maximum concentration of 43 mg/L in August 2008. TKN showed little variability, averaging 0.2 mg/L with a minimum concentration below the MDL (0.005 mg/L) in September 2009 and May 2010 and maximum concentration of 0.36 mg/L in July 2008. TSS averaged 2.8 mg/L with a minimum concentration below the MDL (2 mg/L) occurring on several occasions and a maximum concentration of 13 mg/L in July 2009.

2.3.2 Stream 106 Subwatershed

Data from two sampling locations are provided to represent the water quality in the stream 106 subwatershed. Station S14 is at the Stream 6 (Angler Creek) crossing with Highway 17. S31 is near the mouth of Stream 6 (Angler Creek) at Lake Superior (Sturdee Cove).

General water quality based on data collected at monitoring station S14 is provided in **Table 2-12**.

Table 2-12: Water Chemistry in Subwatershed 106, Station S14

Analyte	PWQO (mg/L)	Maximum (mg/L)	Average (mg/L)
Alkalinity (as CaCO ₃)	-	43	18
Dissolved Aluminum	0.075	0.490	0.181
Ammonia (as N)	2.9	0.060	0.031
Arsenic	0.1 or 0.005 (Interim)	0.0010	0.0010
Cadmium	0.0002 or 0.0001 (Interim)	0.00131	0.00015
Cobalt	0.0009	0.00108	0.00054
Copper	0.005	0.0026	0.0011
Dissolved Organic Carbon	-	16.9	11.2
Iron	0.3	2.72	1.13
Lead	0.005 or 0.001 (Interim)	0.0018	0.0010

Analyte	PWQO (mg/L)	Maximum (mg/L)	Average (mg/L)
Mercury	0.0002	0.0001	0.0001
Molybdenum	0.04	0.001	0.0010
Nickel	0.025	0.0020	0.0020
Nitrate (as N)	-	0.130	0.054
pH	6.5-8.5	8.2	7.4
Phosphorus	0.03	0.023	0.010
Selenium	0.1	0.0050	0.0009
Sulphate	-	4.30	2.69
Total Hardness (as CaCO ₃)	-	47	23
Total Kjeldahl Nitrogen	-	0.570	0.425
Total Suspended Solids	-	21	4.4
Zinc	0.03 or 0.02 (Interim)	0.0125	0.0066

In S14, several analytes including arsenic, mercury, molybdenum, nickel, and selenium were not detected at their respective MDLs. Mean dissolved aluminum was 0.182 mg/L exceeding the PWQO. Eight of ten samples exceeded the PWQO and the ranged from 0.04 to 0.49 mg/L. The station specific PWQO for ammonia at S14 of 2.9 mg/L was at least an order of magnitude higher than any of the measured ammonia concentrations. Cadmium was generally below the MDL (0.00009 mg/L). The exception was July 2009 when the cadmium concentration was 0.0013 mg/L, exceeding the PWQO but likely an anomalous data point not representative of the station conditions. Generally, cobalt was below the MDL of 0.0005 mg/L. Twice cobalt concentrations were measured at levels above the MDL and above the PWQO, however similar to cadmium it is not likely these measures indicate the normal cadmium levels in this location. Copper concentrations were below the MDL with the exception of July 2008 and 2009 and May and October 2011. The range of values above the MDL was 0.001 to 0.0026 mg/L with the only instance of copper exceeding the PWQO occurring in May 2011. The mean iron concentration (1.27 mg/L) and all individual samples exceeded the PWQO. Lead was generally below the MDL and was only measured once, in July 2009. In Jul 2009 the measured lead concentration was 0.0018 mg/L a value less than the PWQO. Phosphorus was measured above its respective MDL in 16 of 18 samples analyzed. Levels ranged from less than 0.005 to 0.023 mg/L. The mean was 0.001 mg/L. There were no exceedances of the PWQO of phosphorus at this station.

Samples collected at S14 exhibited relatively consistent pH values with a mean of 7.4. A single measure was 6.3, less than the PWQO range.

Alkalinity averaged 18 mg/L with a minimum level of 6 mg/L occurring in May 2011 and a maximum level of 43 mg/L occurring in August 2008. DOC averaged 11.2 mg/L, had a minimum concentration of 8 mg/L in July, August and October 2008 and a maximum concentration of 16.9 mg/L in July 2010. Nitrate (as N) averaged 0.05 mg/L, had a minimum concentration that was below MDL (0.03 mg/L) occurring on several occasions,

and a maximum concentration of 0.13 mg/L in November 2008. Sulphate concentrations averaged 2.7 mg/L with a minimum concentration of 1.4 mg/L in August 2008 and a maximum concentration of 4.3 mg/L in November 2008. Total hardness averaged 22.7 mg/L and ranged from 7.3 mg/L in May 2009 to 47.2 mg/L in August 2008. TKN showed little variability, averaging 0.42 mg/L and ranging from 0.31 mg/L in May 2009 to 0.57 mg/L in July 2008. TSS averaged 4.4 mg/L, had a minimum concentration that was below the MDL (2.0 mg/L) occurring on several occasions and a maximum concentration of 20.8 mg/L in October 2009.

General water quality based on data collected at monitoring station S31 is provided in **Table 2-13**.

Table 2-13: Water Chemistry in Subwatershed 106, Station S31

Analyte	PWQO (mg/L)	Maximum (mg/L)	Average (mg/L)
Alkalinity (as CaCO ₃)	-	99	52
Dissolved Aluminum	0.075	0.158	0.088
Ammonia (as N)	4.3	0.054	0.028
Arsenic	0.1 or 0.005 (Interim)	0.0010	0.0010
Cadmium	0.0002 or 0.0001 (Interim)	0.00009	0.00009
Cobalt	0.0009	0.01000	0.00110
Copper	0.005	0.0080	0.0015
Dissolved Organic Carbon	-	23.0	10.0
Iron	0.3	1.68	0.67
Lead	0.02 or 0.003 (Interim)	0.0049	0.0012
Mercury	0.0002	0.001	0.00025
Molybdenum	0.04	0.001	0.0009
Nickel	0.025	0.0020	0.0020
Nitrate (as N)	-	0.182	0.079
pH	6.5-8.5	7.7	7.3
Phosphorus	0.03	0.402	0.052
Selenium	0.1	0.0050	0.0013
Sulphate	-	5.11	4.07
Total Hardness (as CaCO ₃)	-	106	57
Total Kjeldahl Nitrogen	-	0.590	0.296
Total Suspended Solids	-	38	6.7
Zinc	0.03 or 0.02 (Interim)	0.0090	0.0038

In S31, several analytes including arsenic, cadmium, mercury, molybdenum, nickel and selenium were not detected at their respective MDL. Dissolved aluminum concentrations averaged 0.088 mg/L and range from 0.028 to 0.158 mg/L. In 6 of the 10 samples dissolved aluminum was higher than the PWQO value of 0.075 mg/L. All concentrations for ammonia as N were lower than the station specific developed PWQO (2.9 mg/L) by an

order of magnitude. Cobalt was below the MDL in all but on instance. In October 2008 the concentration was 0.0006 mg/L which is below the PWQO. Lead was only above the MDL in on instance (August 2009) with a concentration of 0.0049 mg/L which is above the PWQO. Copper concentrations varied from below the MDL to 0.008 mg/L (August 2008) which was the only exceedance of the PWQO. All iron concentrations exceeded the PWQO. The concentrations ranged from 0.305 to 1.68 mg/L with a mean of 0.67 mg/L. Phosphorus was generally above the MDL and detected values ranged from 0.0064 to 0.402 mg/L. Only the maximum value from May 2010 exceeded the PWQO. Zinc was detected in 8 of the 16 sampling events. The concentrations ranged from 0.003 to 0.009 mg/L. All concentrations were an order of magnitude lower than the PWQO.

Samples collected from the Stream 6 watershed exhibited consistent pH values ranging from 6.6 to 7.7 with an average value of 7.3.

Alkalinity averaged 52 mg/L with a minimum level of 24 mg/L occurring in May 2010 and a maximum level of 99 mg/L occurring in August 2008. DOC averaged 10 mg/L with a minimum concentration of 5 mg/L in August 2008 and a maximum concentration of 23 mg/L in September 2009. Nitrate (as N) averaged 0.08 mg/L, had a minimum concentration below the MDL (0.03 mg/L) in September 2010 and a maximum concentration of 0.18 mg/L in May 2010. Sulphate concentrations averaged 4 mg/L with a minimum concentration of 3 mg/L in August 2009 and a maximum concentration of 5 mg/L in September 2008. Total hardness averaged 57 mg/L and ranged from 29 mg/L in September 2009 to 106 mg/L in August 2008. TKN averaged 0.3 mg/L and ranged from 0.008 mg/L in September 2009 to 0.6 mg/L in October 2008. The majority of TSS measures were relatively low and consistent. In October 2008 and May 2011 TSS was 38.3 and 35.6 mg/L whereas the remainder of the 16 samples were less than 4 mg/L. Overall, the average was 6.7 mg/L.

3.0 REGULATORY SETTING

There are no regulatory requirements, policies, nor guidance, *per se*, that are specifically associated with characterization of baseline surface water quality at the project site. For reference purposes, water quality data were screened against the CWQGs and PWQOs for the protection of aquatic life. It is noted that these guideline and objective values do change from time to time based on updated science.

4.0 STUDY AREA

For the purpose of this assessment, the spatial boundaries considered in this assessment include the direct and indirect effects related to site preparation, construction, operation, and decommissioning / project closure of the Project. These areas are generally consistent with the spatial boundaries used in the EIS (2012) and associated supporting information documents, with appropriate revisions / refinements and rationale provided below.

4.1 Site Study Area (SSA)

The Site Study Area (SSA) is the direct footprint of the Project. Based on refinements to the Project footprint, and in recognition of project components originally located outside of the SSA, a revised SSA has been developed that encompasses the immediate area in which Project activities and components may occur and, as such, represents the area within which direct physical disturbance may occur as a result of the Project, whether temporary or permanent. The SSA is consistent for all VECs as depicted on **Figure 4-1**.

4.2 Local Study Area (LSA)

The Local Study Area (LSA) is the maximum area within which environmental effects from Project activities and components can be predicted or measured with a reasonable degree of accuracy and confidence. It consists of the PDA and adjacent areas where Project-related environmental effects are reasonably expected to occur based on available information and professional judgment. The LSA for water quality is depicted in **Figure 4-2**. The LSA was established as the watercourses/watersheds that are potentially affected (in terms of water quality or quantity) by the Project.

The LSA used in this baseline report is the same as that used in the original EIS documentation.

4.3 Regional Study Area (RSA)

The Regional Study Area (RSA) is the area within which residual environmental effects from Project activities and components may interact cumulatively with the residual environmental effects of other past, present and future (i.e., certain or reasonably foreseeable) physical activities. The RSA is based on the potential for interactions between the Project and other existing or future potential projects. The RSA for water quality includes the whole of the Pic River watershed and the whole of the east end of the Lake Superior Watershed.

The RSA used in this baseline is the same as that used in the original EIS documentation.

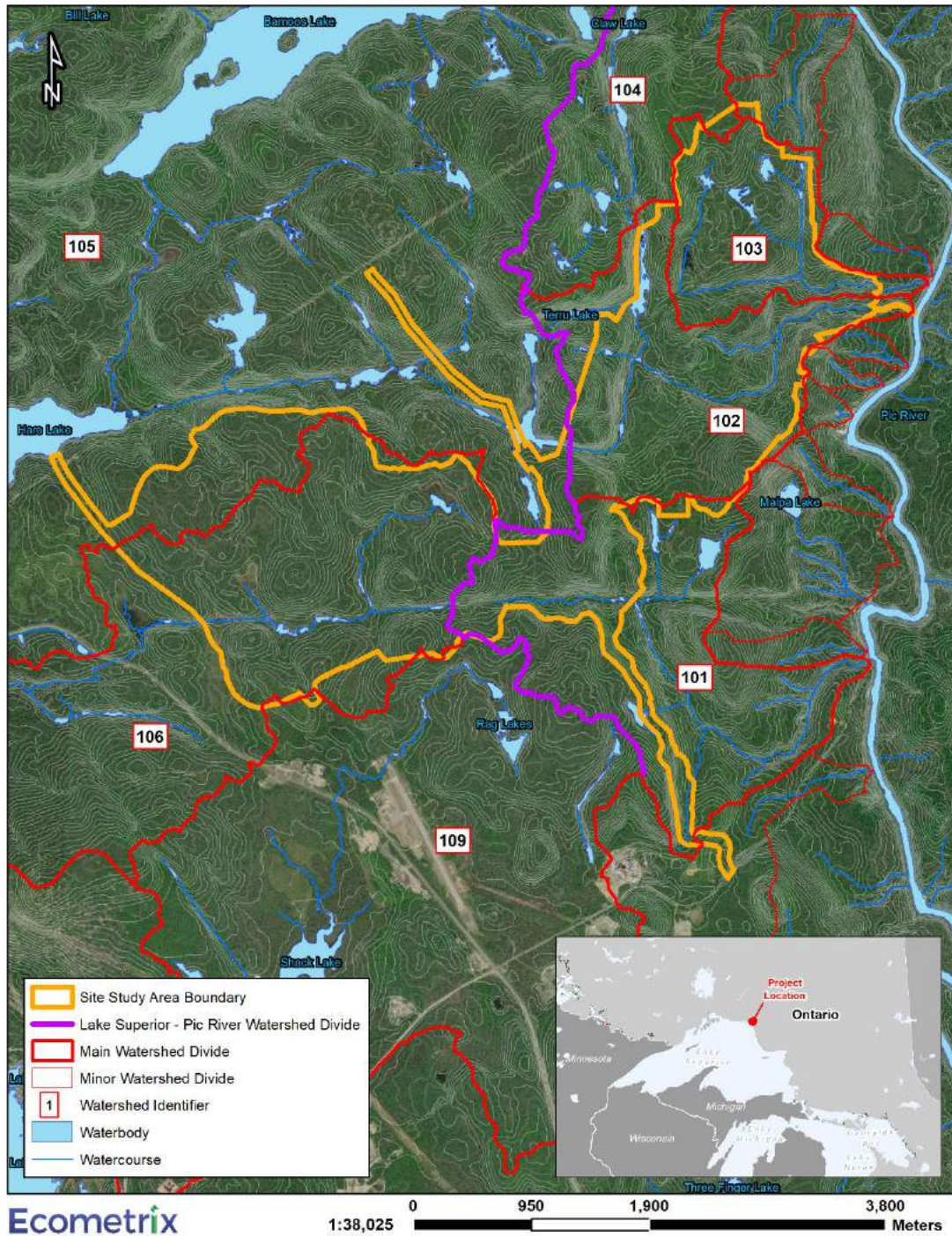


Figure 4-1: SSA for the Water Quality Baseline Characterization

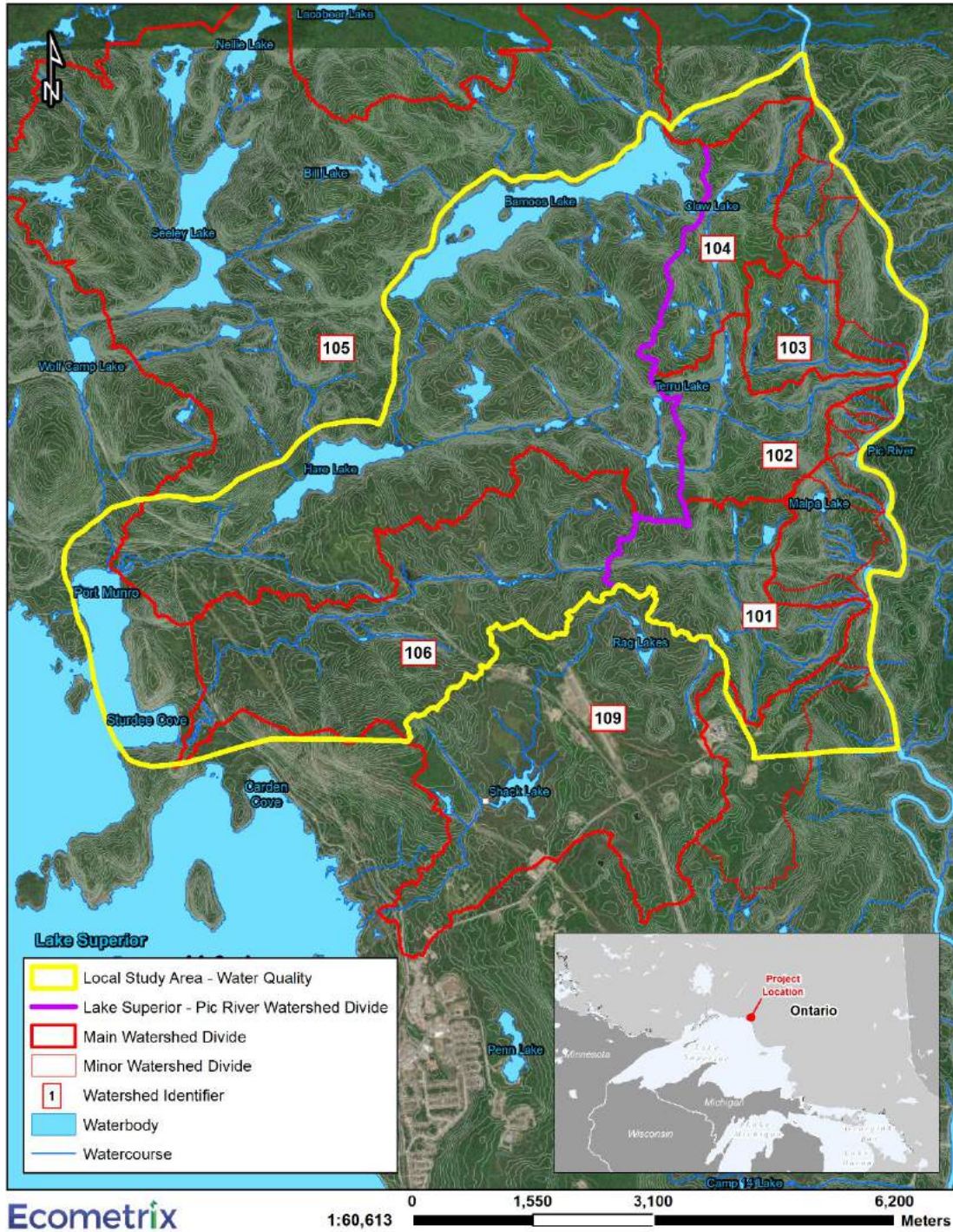


Figure 4-2: LSA for the Water Quality Baseline Characterization

5.0 METHODOLOGY

5.1 Chemical Characterization of Surface Waters (2013 to 2019)

The surface water quality data collected from 2013 to 2019 were assessed to identify its consistency with water quality data collected in the previous period (i.e., 2008 to 2012) and with respect to its status when compared to CWQGs and PWQOs. This was undertaken by the following:

- Identification of those sampling stations for which a long-term (2008 to 2019) dataset is available for trend analysis and specifically within the context of the representative stations for each of the subwatersheds as identified in **Section 2.0**;
- Assessment of changes to the surface water quality at subwatershed representative stations; and,
- Comparison of 2013 to 2019 period surface water concentrations of parameters of interest to the established CWQG and PWQO.

As summary of the sampling stations for which a long-term data set exist for further assessment and comparison between sampling periods (2008- 2012 vs. 2013-2019) is provided in **Table 5-1**.

Table 5-1: Surface Water Quality Samples Summarized by Subwatershed, Station and Year

Sub-water-shed	Station	Year												Tot.
		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	
1	Total	28	38	12	15	14	14	9	3	3	3	3	3	145
	L1	5	8	3	3	3	3	3						28
	L2		1											1
	L29		1											1
	S1	6	7	3	3	3	2	3						27
	S16	6	7	2	3	3	3							24
	S2	6	7	3	3	3	3	3	3	3	3	3	3	43
	S27	5	7	1	3	2	3							21
2	Total	42	59	22	23	23	24	11	3	3	3	3	3	219
	L14	6	8	3	3	3	3	3						29
	L15	6	7	3	3	3	3							25
	L20		1											1
	L3		1											1
	L5	6	8	3	3	3	3							26
	L7		1											1

Sub-water-shed	Station	Year												Tot.
		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	
	L8	6	7	3	3	3	3	3						28
	S17	2	6	1	2	2	3							16
	S26	6	7	3	3	3	3	3						28
	S3	6	7	3	3	3	3		3	3	3	3	3	40
	S4	4	6	3	3	3	3	2						24
3	Total	28	43	18	18	18	18	2	3	3	3	3	3	160
	L10	6	9	3	3	3	3							27
	L11		1											1
	L12		5	3	3	3	3							17
	L9	6	8	3	3	3	3							26
	S18	6	7	3	3	3	3							25
	S19	6	7	3	3	3	3							25
	S52								3	3	3	3	3	15
	S6	4	6	3	3	3	3	2						24
4	Total	12	18	6	6	9	9	5	3	3	3	3	3	80
	L18		1											1
	L19	6	8	3	3	3	3	3						29
	L21		1											1
	L22		1											1
	S43					3	3	2						8
S8	6	7	3	3	3	3		3	3	3	3	3	40	
5	Total	63	123	65	32	32	33	12	6	6	6	6	7	391
	Bamboos 1		4	3										7
	Bamboos 2		4	3										7
	L23	6	8	3	2	2	3							24
	L27		1											1
	LHARE	5	9	3	3	3	3							26
	S10	5	7	3	3	3	3	3						27
	S11	6	7	3	3	3	3	3	3	3	3	3	3	43
	S20	6	7	3	3	3	3							25
	S21	6	7	2	3	3	3						1	25
	S22	6	7	3	3	3	3							25
	S29	6	7	3	3	3	3							25
	S30	6	5	3	3	3	3	3	3	3	3	3	3	41
	S33		4	3										7
S34		4	3										7	
S35		4	3										7	
S36		4	3										7	

Sub-water-shed	Station	Year												Tot.
		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	
	S37		4	3										7
	S38		4	3										7
	S39		4	3										7
	S40		4	3										7
	S41		4	3										7
	S5	5	7	3	3	3	3	3						27
	S9	6	7	3	3	3	3							25
6	Total	27	33	15	15	17	18	5	3	3	3	3	3	145
	S12	6	7	3	3	3	3							25
	S13	4	7	3	3	3	3							23
	S14	6	7	3	3	3	3	2	3	3	3	3	3	42
	S15	6	7	3	3	2	3							24
	S31	5	5	3	3	3	3	3						25
	S42					3	3							6
7	Total	9	12	4	7	5	6	3	3	2	2	2	2	57
	S23	6	5	3	3	3	3							23
	S28	3	7	1	4	2	3	3	3	2	2	2	2	34
PR	Total	30	40	17	21	17	21	5						151
	PR1	4	6	3	3	3	3							22
	PR2	6	6	3	3	3	3							24
	PR3	6	6	3	3	3	3	1						25
	PR4	6	6	3	3	3	3	3						27
	S24	5	6		3		3							17
	S25	3	6	2	3	2	3							19
	S32		4	3	3	3	3	1						17
Grand Total		239	366	159	137	135	143	52	24	23	23	23	24	1348

The following sites were identified as long-term baseline data collection stations for water quality as specified above: S2, S3, S52/S6, S8, S11, S30, S14 and S28.

In the case of subwatershed 103, stations S52 and S6 are situated in close proximity to one another (S52 approximately one kilometre upstream of S6) and, therefore, for the purposes of this assessment data collected from these stations were pooled to provide an adequate time series for assessment.

For each of these stations, the long-term dataset for each parameter was plotted and fitted with a line of best fit (linear model). The use of linear trend assessment is useful in determining the overall change over the time period with respect to concentrations of

parameters. This was done by plotting the water quality data over the time period (2008 to 2019) and applying a line of best fit (linear regression) to the data for each parameter. The resulting coefficient of determination (R^2 value) was examined to identify the level of relationship between the concentration of a given parameter to time (year). There is no ‘hard and fast’ rule or convention to be applied regarding appropriate effect sizes (for linear modelling approaches, effect size refers to the strength of the relationship between a predictor and explanatory variable) (Cohen 1988). For the purposes of this document, effects sizes of “small”, “medium” and “high” were assessed as represented by a coefficient of determination (R^2) value. For example, a “Medium Effect Size” is represented by a coefficient of determination (R^2) value of 0.15 (an R^2 value of 0.15 means that the model explains 15% of the observed variation), which is generally considered a rather modest relationship in the ecological literature. The following indicates the coefficient of determination values which coincide with a designated effect size for an assumed power of 0.8, an alpha of 0.1, and a single predictor variable.

Effect Size (as per Cohen 1988)		
Small ($R^2=0.02$)	Medium ($R^2=0.15$)	Large ($R^2=0.35$)

In cases where the coefficient of determination is below the “small effect size”, it is expected that the variability in parameter concentration explained by year is negligible and, therefore, the data for those parameters throughout the time series is indicative of background conditions within the subwatershed.

For those R^2 values that are of “small to effect size” ($0.02 > R^2 < 0.15$), between 2 and 15% of the variability in parameter concentrations is explained by year and, as such, little correlation is identified. Therefore, parameters within this group have generally similar water quality over the time series.

In cases where the coefficient of determination is of “medium effect size” and greater ($R^2 > 0.15$), the trend in water quality parameter change in concentration is correlated to some degree with year. In these cases, a further discussion of trend direction (positive or negative) and any known drivers for the relationship are discussed.

Assessment of the second period of the long-term data set (i.e. 2013 to 2019) also included the screening of chemical parameters against current CWQG and PWQO for the purposes of characterizing the surface water quality during baseline. Exceedances are presented to provide a point of reference for future impact assessment.

6.0 UPDATED BASELINE CONDITIONS

As indicated in **Section 5.0**, additional water quality data was collected at representative stations for each subwatershed in the Project footprint between 2013 and 2019 that was not previously summarized in the former surface water quality baseline report (EcoMetrix, 2012). The following presents rationale for the comparability of water quality data from 2013 to 2019 when assessed against the same parameters from 2008 to 2012 with some discussion on the quality within the context of quality criteria for the later period.

6.1 Water Quality Trend Results

Parameter-specific data plots with associated trends (linear line of best fit equation) and coefficient of determination (R^2) values are provided in Appendix A. A summary of coefficient of determination for assessed parameters are provided in **Table 6-1**. These provide a visual comparison of water quality between 2008 and 2019. The results of this analysis were used to identify relationships that were highly correlated or had a “small, medium or large” effect size (Cohen, 1988).

Of the 47 parameters with data spanning the long-term period, greater than half (25) had R^2 values less than or equal to 0.02, indicating that less than or equal to 2% of the variability associated with the concentration of that parameter in surface water was influenced by the year it was sampled, or a “small effect size”. As such, no appreciable trend of change was discerned for these parameters indicating general consistency in concentrations overall. Parameters in this group included hardness, conductivity, TSS, TDS, turbidity, arsenic, copper, iron, zinc and several other parameters.

Another group of parameters including temperature, dissolved organic carbon, TKN, total phosphorus, cadmium and selenium had a linear relationship with an R^2 value of less than 0.15. This indicated that less than 15% of the variability in parameter concentration was influenced by the year of collection at the representative sampling stations. As such, parameters within this group have generally similar water quality over the time series.

The third group of parameters had R^2 values greater than 15%. These include dissolved oxygen, sulphate, chromium, lead, nickel, vanadium and zirconium. In the case of dissolved oxygen, an R^2 value of 0.37 was identified for the period from 2008 to 2019, but this is indicative of highly variable DO concentrations in 2008 and 2009. When reducing the assessment to the years between 2010 to 2019, the R^2 is reduced to less than 0.005 indicating no change in DO over this period at representative water quality monitoring stations. Sulphate showed a negative relationship over time with the slope of the trend line being very slight (-0.0003x) (**Appendix A**). The remainder of the parameters in this group had elevated detection limits from 2008 to 2013 when compared to 2014 to 2019 and direct comparisons over this time period are more difficult resulting in linear relationships that are

not necessarily indicative of the likely consistency in surface water concentrations that was observed for the majority of other parameters analyzed from the same samples.

The final group of parameters are those that generally had results that were below detection limits for the duration of the period that has been sampled. These include a number of metals including mercury, hexavalent and trivalent species of chromium, and boron.

Table 6-1: Surface Water Quality Parameter Coefficient of Determination Values for Linear Relationships of Parameter Concentration vs. Year

Category	Parameter	R ² Value	Notes
General Chemistry	Temperature	0.0415	
	Conductivity	0.0005	
	Dissolved Oxygen	0.3727	2008 to 2019
	Dissolved Oxygen	1.00E-05	2010 to 2019
	Color, True	0.0016	
	pH	0.0344	
	Hardness (as CaCO ₃)	0.0024	
	Total Suspended Solids	0.0016	
	Total Dissolved Solids	0.0195	
	Turbidity	0.0048	
	Chemical Oxygen Demand	0.0660	
	Dissolved Organic Carbon	0.0500	
	Tannin & Lignin	0.0035	
Anions and Nutrients	Alkalinity, Total (as CaCO ₃)	0.0027	
	Ammonia-N, Total	0.1285	
	Chloride (Cl)	0.0010	
	Fluoride (F)	0.0570	
	Nitrate-N (NO ₃ -N)	0.0182	
	Nitrite-N (NO ₂ -N)		results available as of 2019
	Sulfur (S)		results available as of 2019

Category	Parameter	R ² Value	Notes
	Total Kjeldahl Nitrogen	0.0688	
	Phosphorus (P)-Total	0.0728	
	Sulphate (SO4)	0.1661	
Metals	Aluminum (Al)	0.0501	
	Aluminum (Al)-Dissolved	0.0043	
	Antimony (Sb)		generally below detection
	Arsenic (As)	0.0174	2008 to 2019 (2008 to 2013 generally < MDL)
	Arsenic (As)	0.0008	2014 to 2019
	Barium (Ba)	0.0176	
	Beryllium (Be)		generally below detection
	Bismuth (Bi)		generally below detection
	Boron (B)		generally below detection
	Cadmium (Cd)	0.1426	
	Calcium (Ca)	0.0036	
	Chromium (Cr)	0.2034	
	Chromium, Hexavalent		generally below detection
	Chromium, Trivalent		generally below detection
	Cobalt (Co)	0.1412	
	Copper (Cu)	0.0065	
	Iron (Fe)	0.0098	
	Lead (Pb)	0.3842	generally below detection (0.001 mg/L) before 2015
	Lithium (Li)		generally below detection
	Magnesium (Mg)	0.0003	
Manganese (Mn)	0.0015		
Mercury (Hg)		generally below detection (0.0001 mg/L)	
Mercury (Hg)-Dissolved		generally below detection (0.0001 mg/L)	

Category	Parameter	R ² Value	Notes
	Molybdenum (Mo)	0.0056	
	Nickel (Ni)	0.3813	
	Potassium (K)	2.0E-05	
	Rubidium (Rb)		results available as of 2019
	Selenium (Se)	0.1108	
	Silicon (Si)	0.0009	
	Silver (Ag)		generally below detection
	Sodium (Na)	0.0028	
	Strontium (Sr)	0.0012	
	Tellurium (Te)		results available as of 2019
	Thallium (Tl)		generally below detection
	Thorium (Th)		results available as of 2019
	Tin (Sn)		generally below detection
	Titanium (Ti)	0.0362	
	Tungsten (W)		generally below detection
	Uranium (U)		generally below detection
	Vanadium (V)	0.1585	
	Zinc (Zn)	0.0227	
Zirconium (Zr)	0.4010	declining trend with variability observed at some stations in May from 2008 to 2013	
Organic Parameters	Chlorophyll a	0.1118	

Notes:

	Small effect size ($R^2 < 0.02$) Thresholds for effect size as represented by a coefficient of determination (R^2) based on Cohen (1988) for a power of 0.8 and alpha of 0.1
	Small to medium effect size ($0.02 > R^2 < 0.15$)
	Medium effect size ($0.15 > R^2 < 0.35$)
	Large effect size ($R^2 > 0.35$)

6.2 Water Quality Screening Results

The screening of surface water quality results from 2013 to 2019 provides context with respect to future impact assessment. **Table 6-2** provides a summary of the percentage of instances that water quality samples showed an exceedance for a parameter during the period from 2013 to 2019. Further details with respect to the season this exceedance occurred is provided in **Appendix B**.

Ammonia (N) and un-ionized ammonia exceeded the CWQG on a number of occasions and many of these occurred during the summer (July) sampling period over the long-term. The highest concentrations observed for ammonia occurred in 2017, yet concentrations were much reduced in the same season in 2018 and 2019.

Copper, iron and fluoride were consistently above the CWQG and PWQO for the protection of aquatic life at representative subwatershed stations throughout the sampling period (2013 to 2019).

Dissolved oxygen was below the CWQG for cold water biota (early life stages = 9.5 mg/L and other life stages = 6.5 mg/L) on several occasions, but most typically during summer (July-August) at representative subwatershed sampling stations. Such low oxygen events were more prevalent in 2016, 2018 and 2019. Similar results were observed in the earlier portion of the time series (i.e. 2008 to 2009).

Other parameters had infrequent exceedances of quality criteria which are likely indicative of natural variability within the subwatershed systems over time.

Table 6-2: Summary of Surface Water Quality Exceedances (2013 to 2019)

Benchmark	Parameter	Location	Total Count	Count of Exceedance	Percentage of Exceedance (%)
CWQG (CCME)	Aluminum (Al)	S14	5	5	100.0
		S2	7	7	100.0
		S3	3	2	66.67
		S30	6	6	100.0
		S6	5	5	100.0
		S8	3	2	66.67
	Ammonia (N)	S11	15	1	6.67
		S14	15	2	13.33
		S2	15	1	6.67
		S3	15	2	13.33
		S30	15	2	13.33
		S52	15	2	13.33

Benchmark	Parameter	Location	Total Count	Count of Exceedance	Percentage of Exceedance (%)
		S8	15	2	13.33
	Chromium (Cr)	S6	5	1	20.0
	Copper (Cu)	S2	22	19	86.36
		S3	18	18	100.0
		S52	15	15	100.0
		S6	5	5	100.0
		S8	18	18	100.0
		Dissolved Oxygen	S11	21	11
	S14		19	12	63.16
	S2		20	5	25.0
	S3		17	9	52.94
	S30		21	11	52.38
	S52		14	4	28.57
	S6		5	1	20.0
	S8		17	11	64.71
	Fluoride (F)	S11	20	20	100.0
		S14	19	19	100.0
		S2	21	21	100.0
		S3	18	18	100.0
		S30	20	20	100.0
		S52	15	15	100.0
		S6	4	4	100.0
		S8	18	18	100.0
	Iron (Fe)	S11	21	5	23.81
		S14	20	20	100.0
		S2	22	12	54.55
		S3	18	15	83.33
		S30	21	1	4.76
		S52	15	4	26.67
		S6	5	4	80.0
		S8	18	18	100.0
	Lead (Pb)	S2	22	1	4.55
		S6	5	1	20.0
	Manganese (Mn)	S14	20	4	20.0
		S2	22	1	4.55
		S3	18	2	11.11
	Nitrite-N (NO2-N)	S30	6	6	100.0

Benchmark	Parameter	Location	Total Count	Count of Exceedance	Percentage of Exceedance (%)
	pH	S11	21	1	4.76
		S14	20	5	25.0
		S2	21	2	9.52
		S3	18	1	5.56
		S30	21	3	14.29
		S6	5	2	40.0
		S8	18	1	5.56
	pH (field)	S11	15	5	33.33
		S14	15	3	20.0
		S2	15	1	6.67
		S3	15	1	6.67
		S30	15	3	20.0
		S52	15	4	26.67
		S8	15	4	26.67
	Un-ionized Ammonia (N)	S11	15	8	53.33
		S14	15	9	60.0
		S2	15	7	46.67
		S3	15	6	40.0
		S30	15	7	46.67
		S52	15	7	46.67
		S8	15	6	40.0
Zinc (Zn)	S14	20	5	25.0	
	S2	22	2	9.09	
	S3	18	1	5.56	
	S30	21	1	4.76	
	S52	15	1	6.67	
	S6	5	1	20.0	
Interim PWQO	Aluminum (Al)-Dissolved	S11	21	17	80.95
		S14	15	15	100.0
		S2	15	5	33.33
		S3	15	3	20.0
		S30	15	12	80.0
		S52	15	7	46.67
		S8	15	1	6.67
	Cobalt (Co)	S14	20	3	15.0
		S2	22	1	4.55
		S3	18	3	16.67

Benchmark	Parameter	Location	Total Count	Count of Exceedance	Percentage of Exceedance (%)	
		S6	5	1	20.0	
		S8	18	1	5.56	
	Copper (Cu)	S2	22	1	4.55	
		S3	18	13	72.22	
		S52	15	15	100.0	
		S6	5	5	100.0	
		S8	18	18	100.0	
		Phosphorus (P)- Total	S14	20	1	5.0
	S2		22	6	27.27	
	S3		18	6	33.33	
	S6		5	3	60.0	
	S8		18	6	33.33	
	Vanadium (V)	S2	22	1	4.55	
		S6	5	1	20.0	
	Zinc (Zn)	S2	22	1	4.55	
		S3	18	1	5.56	
	PWQO	Chromium (Cr)	S6	5	1	20.0
		Copper (Cu)	S2	22	1	4.55
S3			18	13	72.22	
S52			15	15	100.0	
S6			5	5	100.0	
S8			18	18	100.0	
Iron (Fe)		S11	21	5	23.81	
		S14	20	20	100.0	
		S2	22	12	54.55	
		S3	18	15	83.33	
		S30	21	1	4.76	
		S52	15	4	26.67	
		S6	5	4	80.0	
		S8	18	18	100.0	
pH		S11	21	2	9.52	
		S14	20	5	25.0	
		S2	21	3	14.29	
		S3	18	1	5.56	
		S30	21	3	14.29	
		S6	5	3	60.0	
	S8	18	1	5.56		

Benchmark	Parameter	Location	Total Count	Count of Exceedance	Percentage of Exceedance (%)
	pH (field)	S11	15	5	33.33
		S14	15	3	20.0
		S2	15	1	6.67
		S3	15	1	6.67
		S30	15	3	20.0
		S52	15	4	26.67
		S8	15	4	26.67

Notes:

Un-ionized ammonia concentrations were screened against the criteria bounded by a pH of 7.5 and water temperature of 15 degrees Celsius.

Where criteria are derived from hardness, an average hardness of 40 mg/L was used for calculation of metal specific quality criteria.

7.0 SUMMARY AND CONCLUSIONS

The original characterization of surface water quality as previously presented has been supplemented by more recent data (up to 2019) from representative sampling stations generally located near the terminus of subwatersheds situated within the Project footprint. The information collected throughout the long-term data set indicates that surface water quality has not changed appreciably. This is likely indicative of a lack of development or appreciable change to the subwatersheds over this period. Generally, this information continues to be relevant and sufficient to support the updated effects assessment.

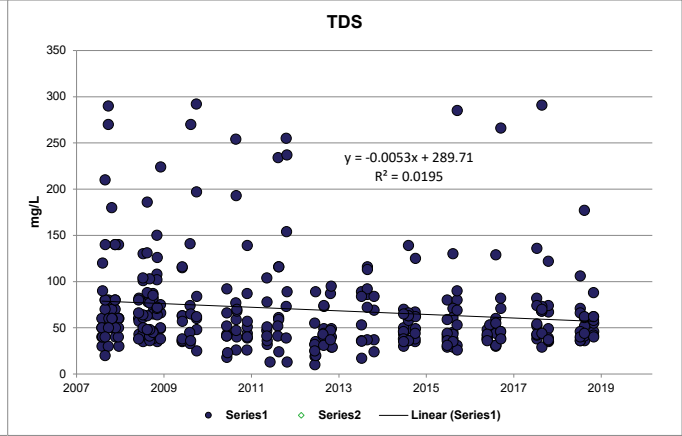
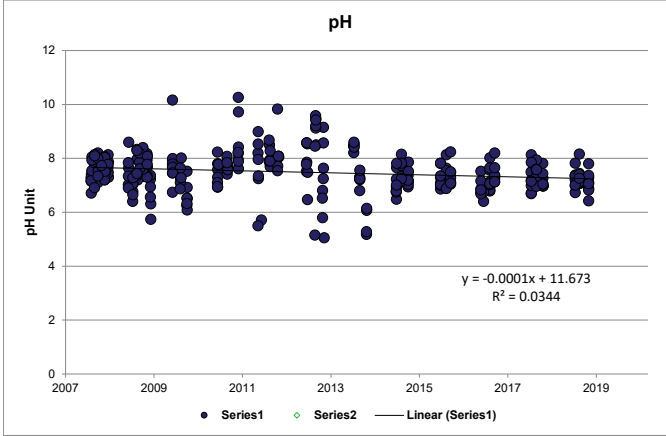
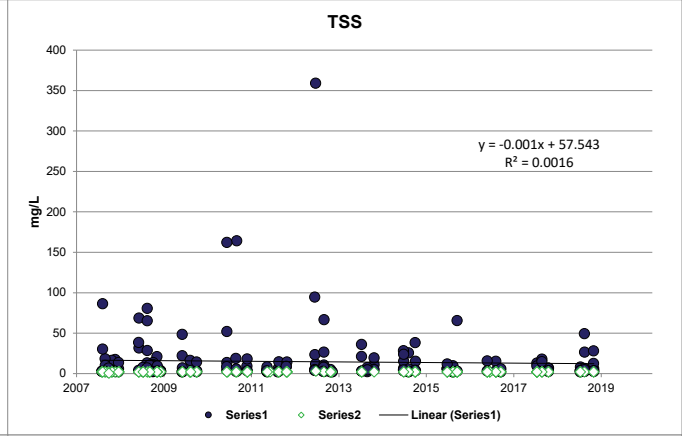
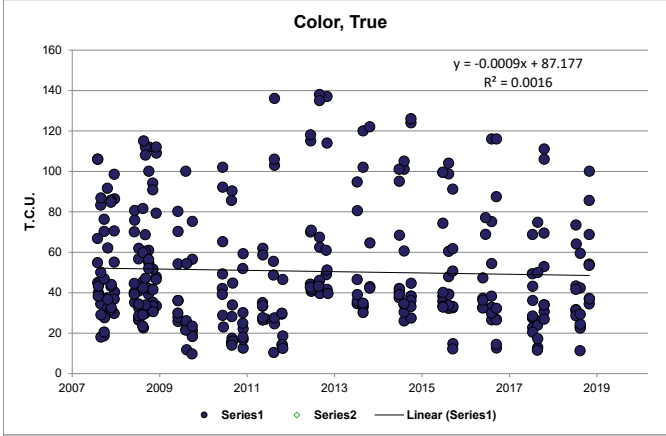
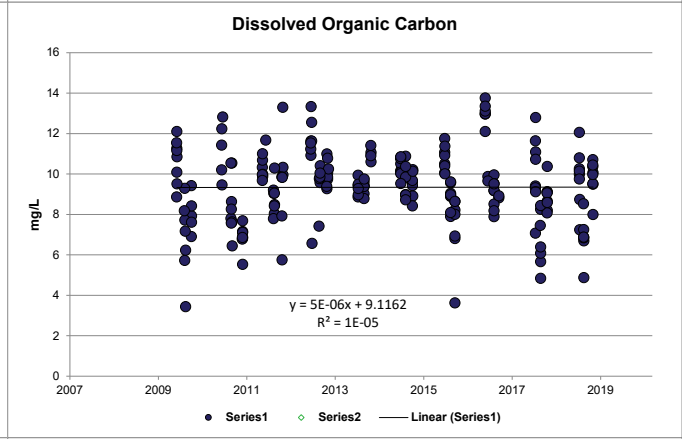
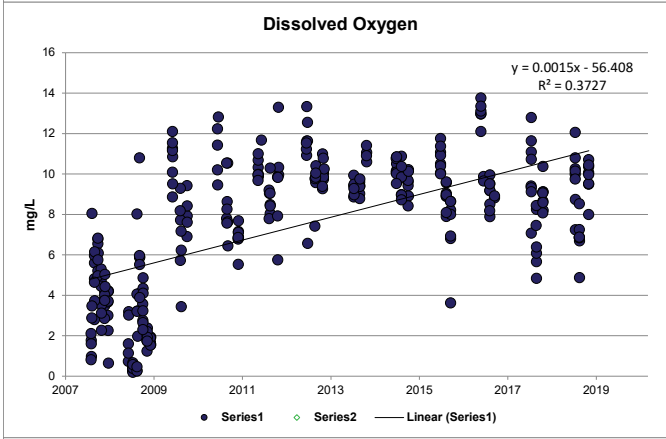
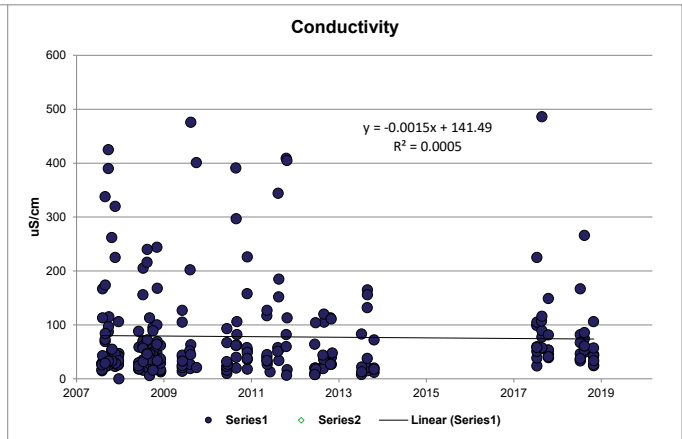
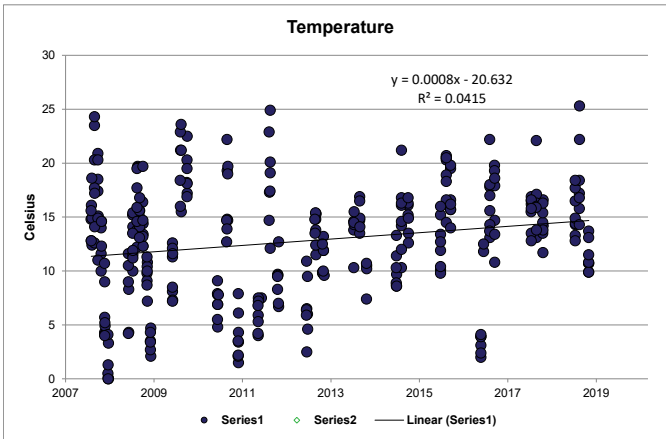
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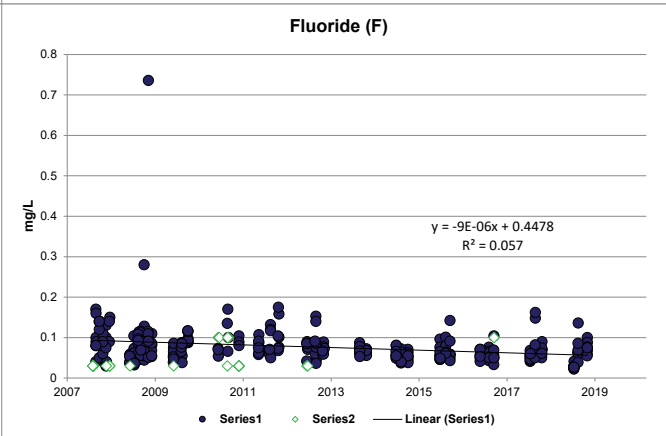
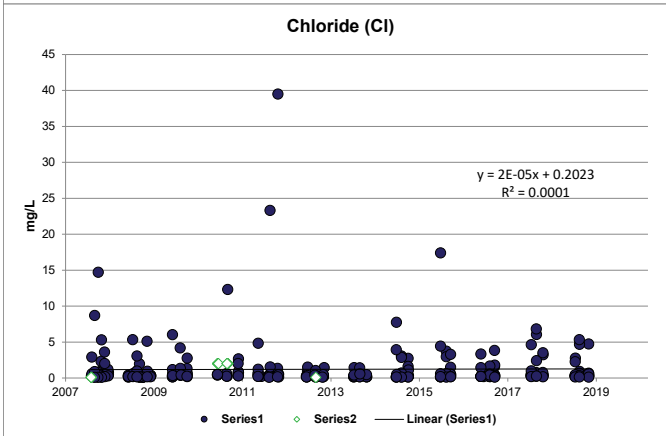
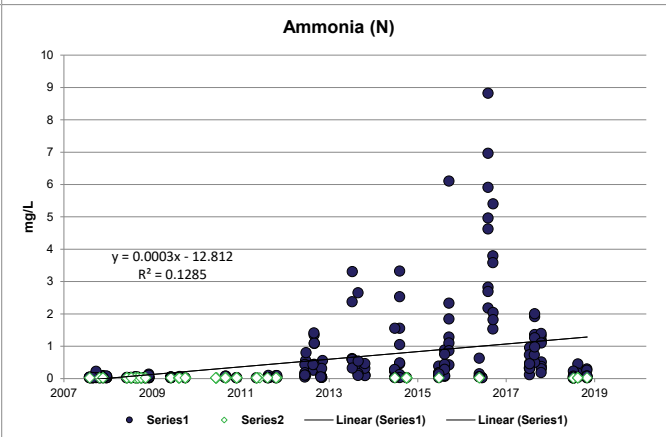
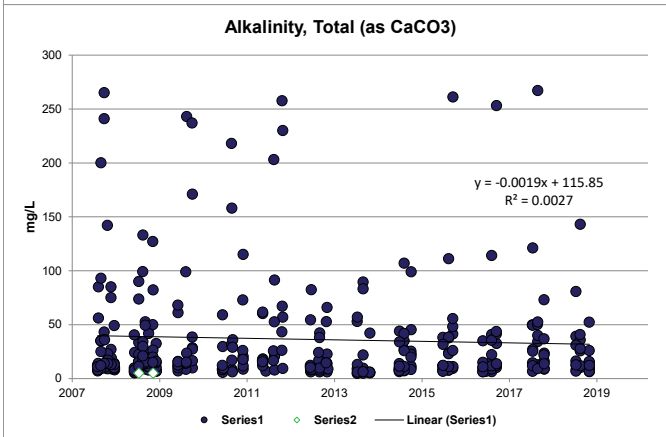
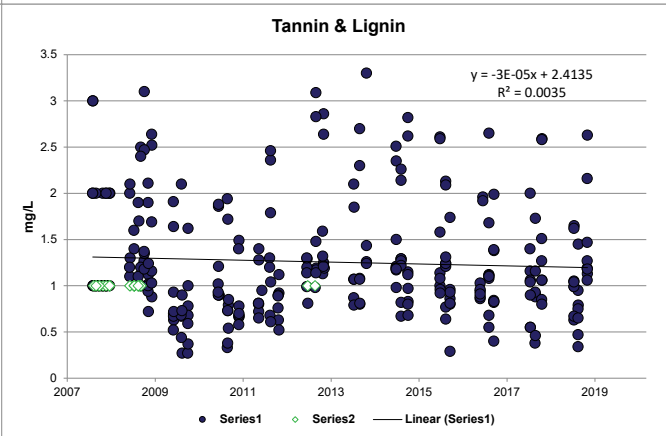
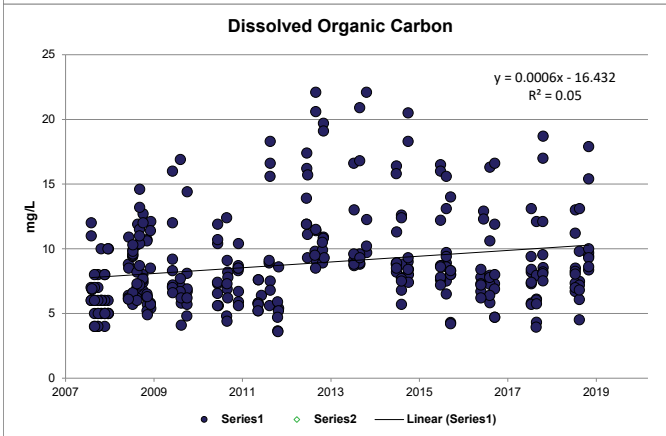
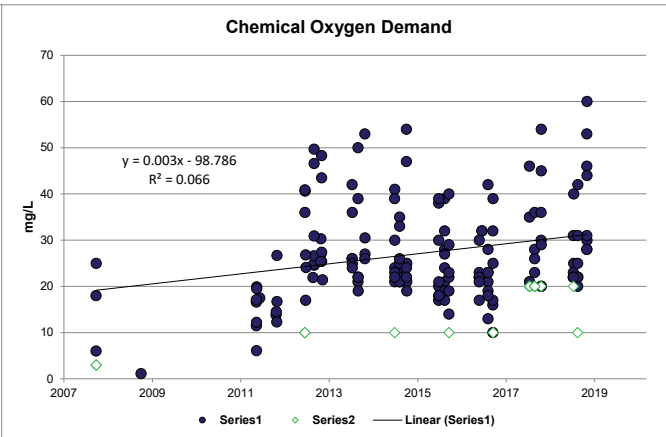
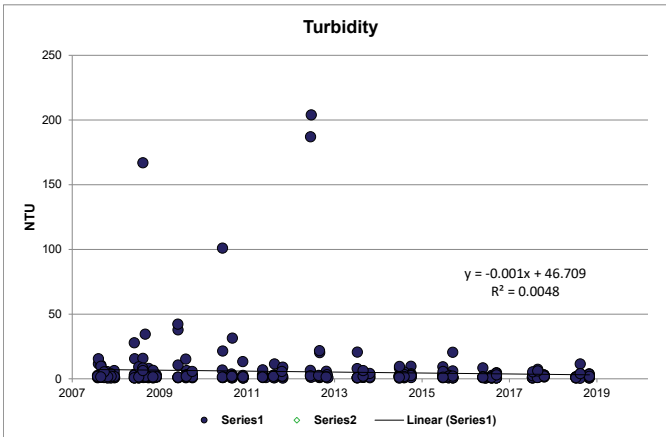
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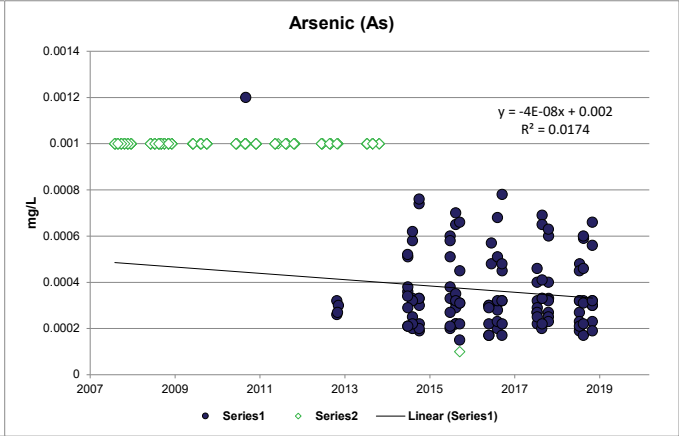
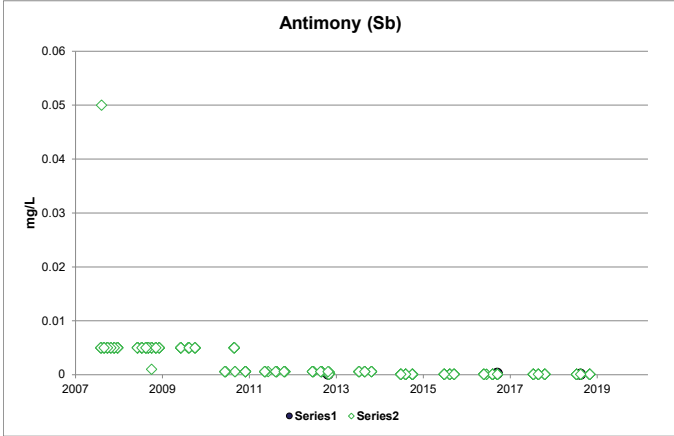
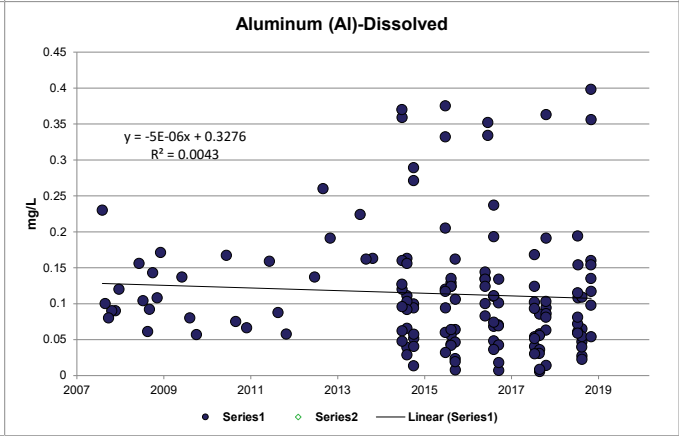
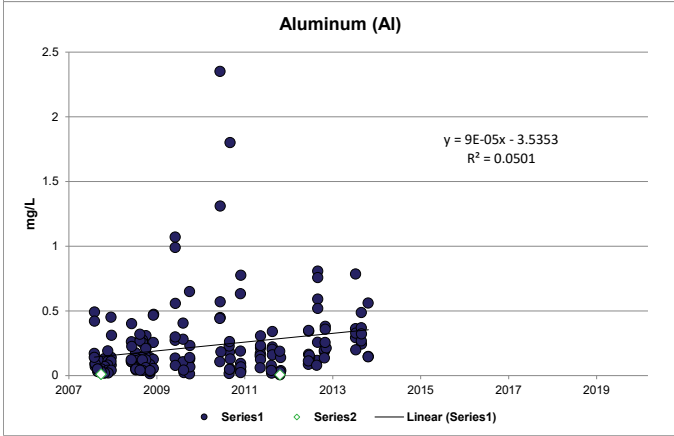
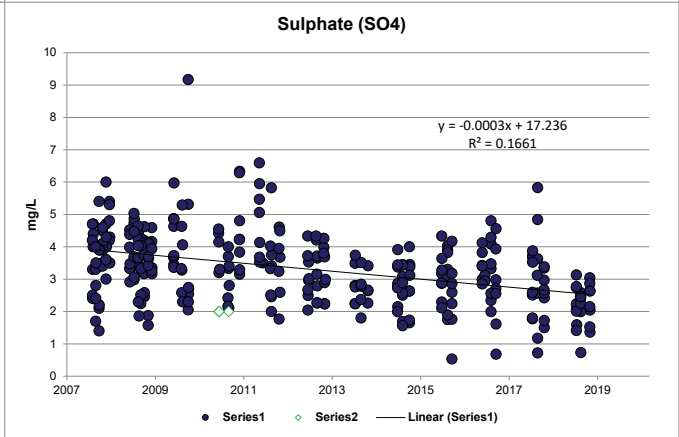
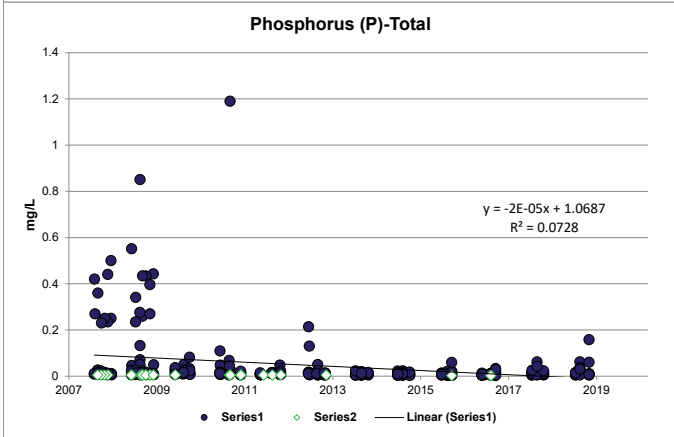
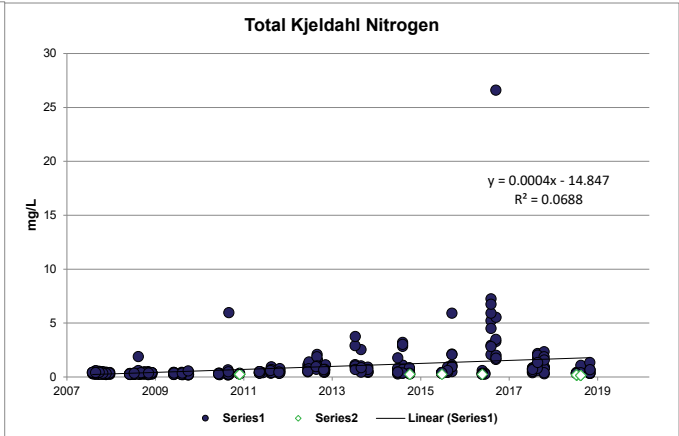
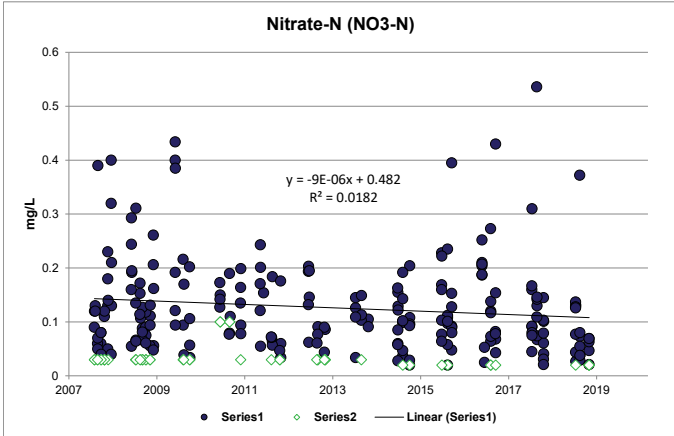
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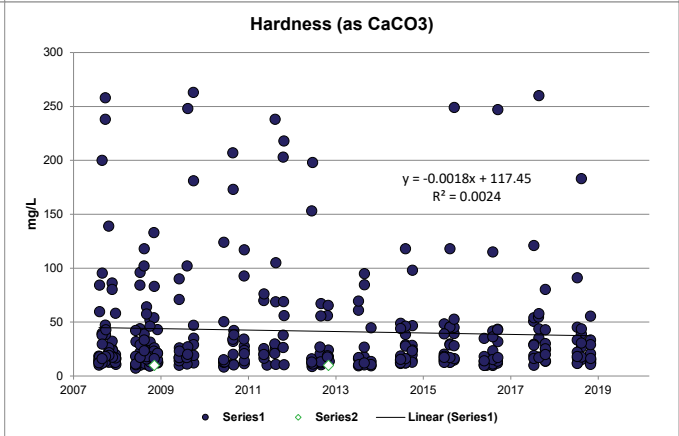
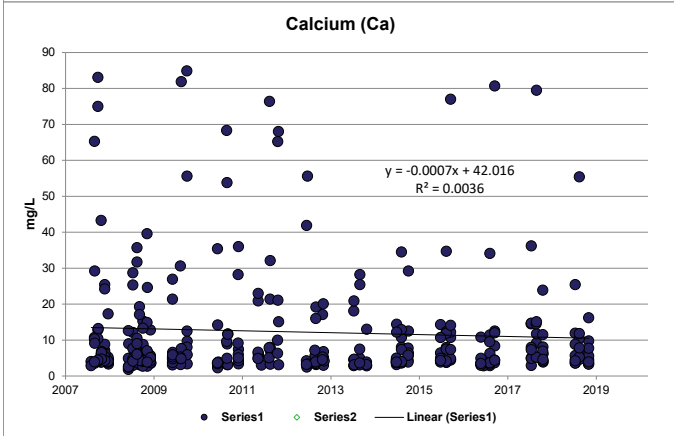
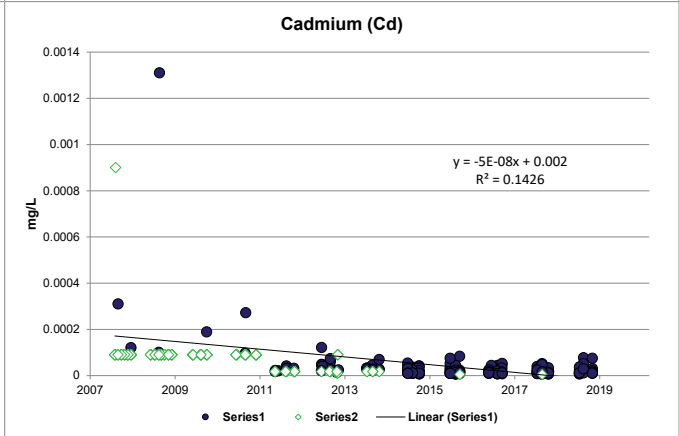
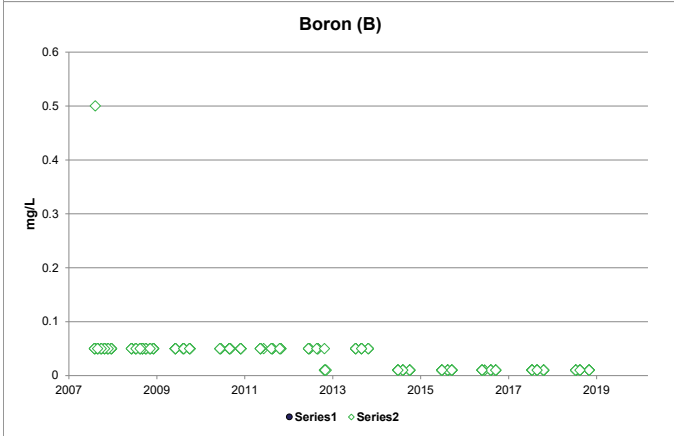
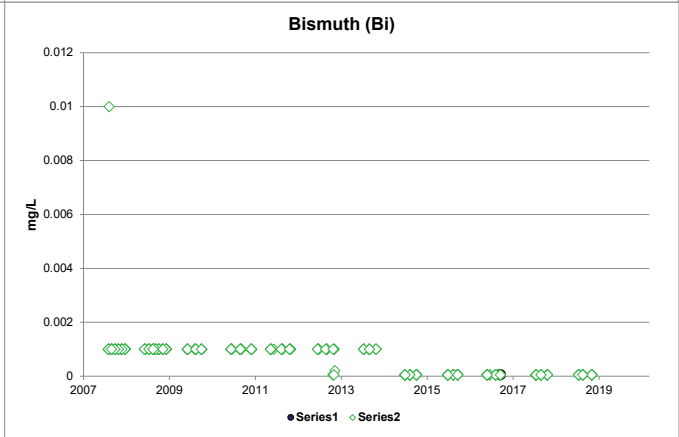
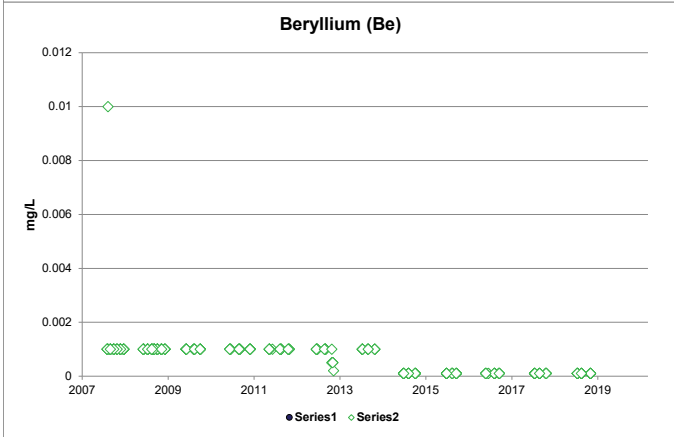
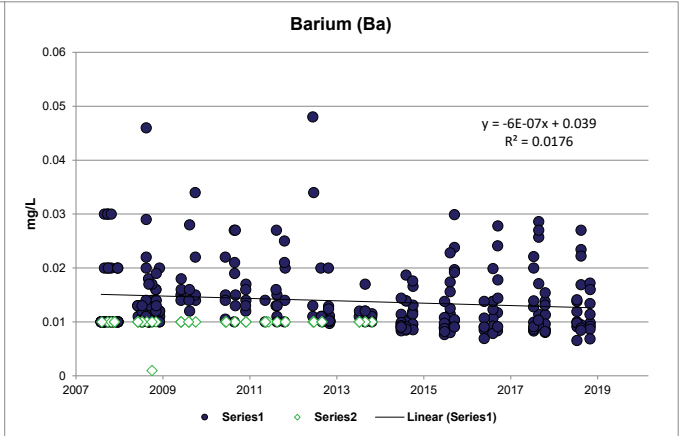
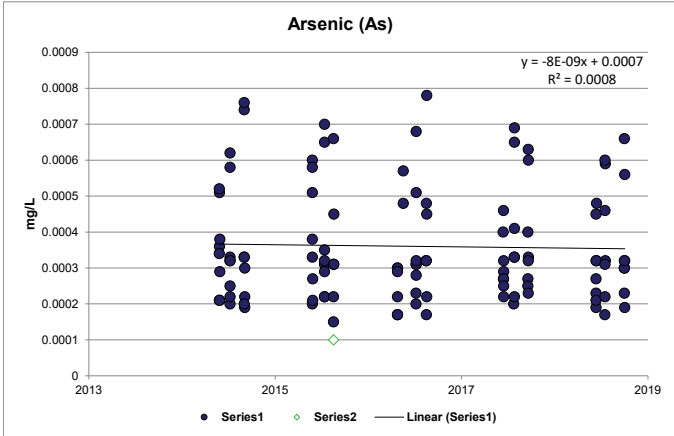
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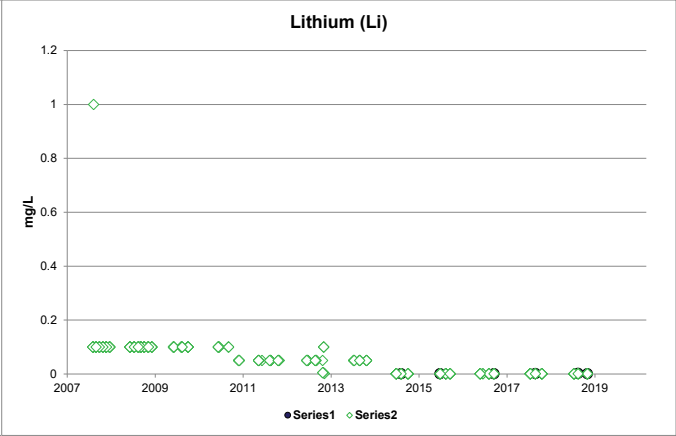
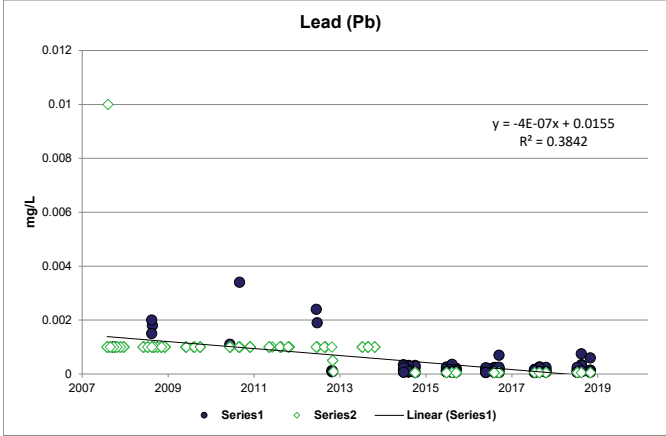
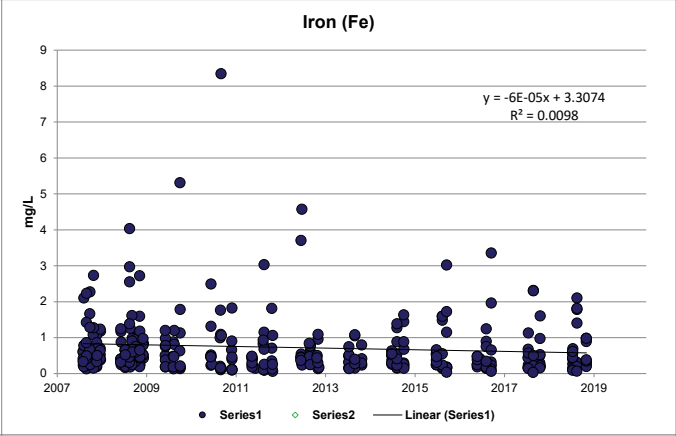
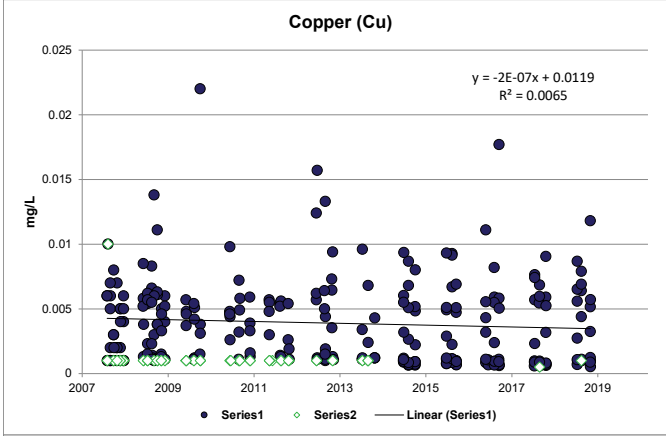
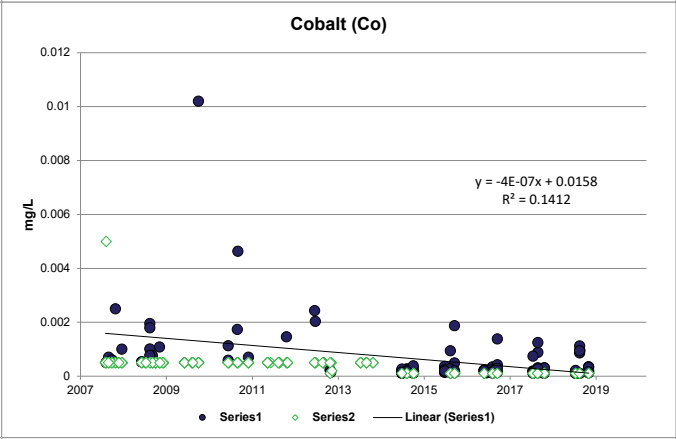
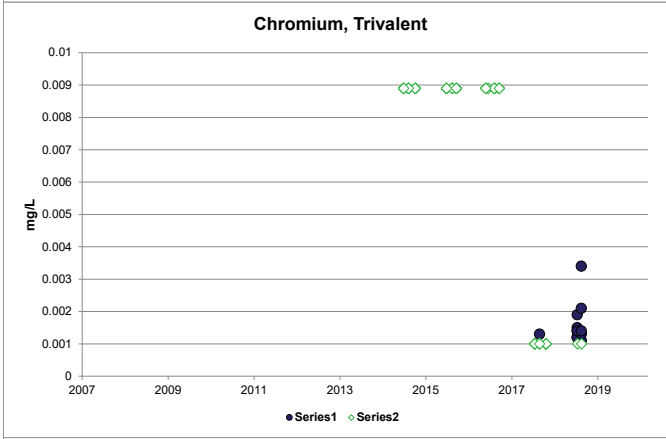
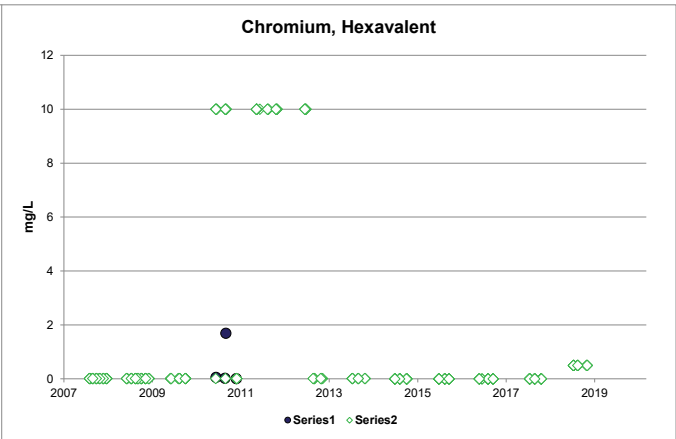
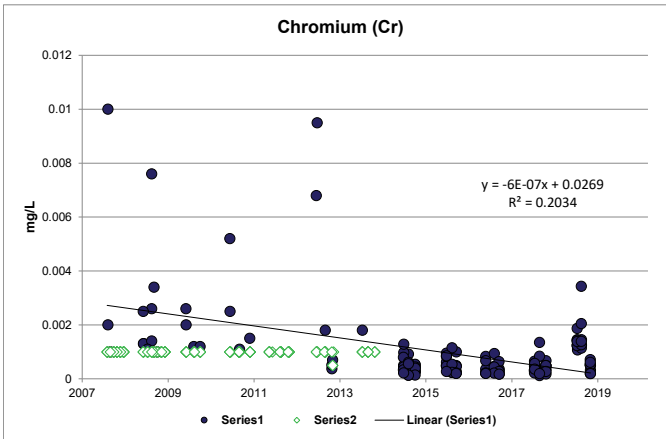
APPENDIX A
SURFACE WATER QUALITY TREND PLOTS

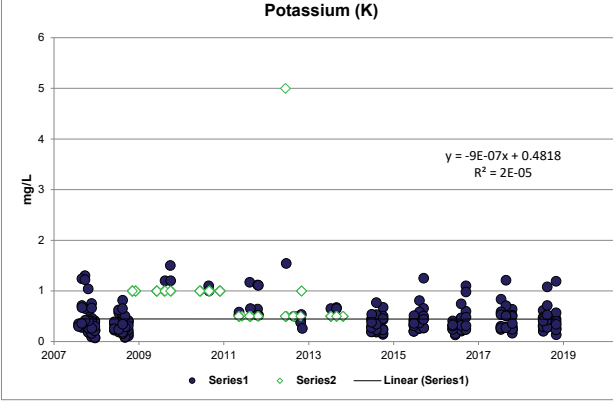
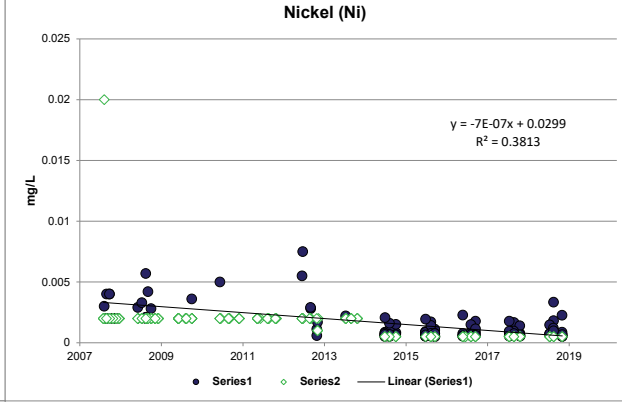
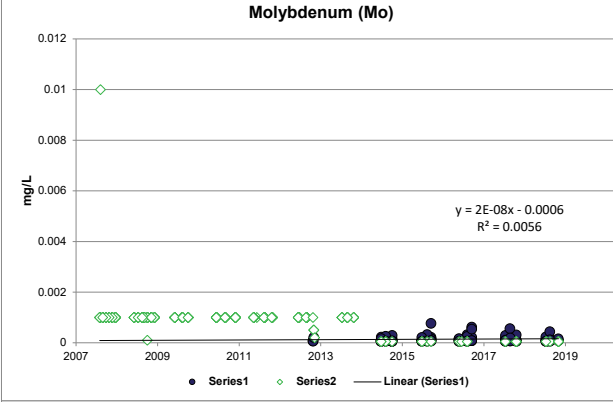
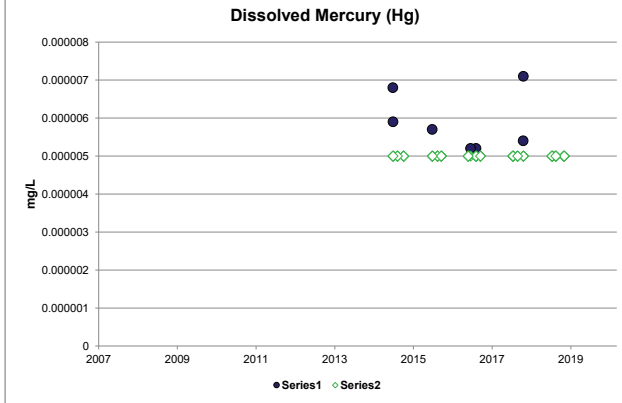
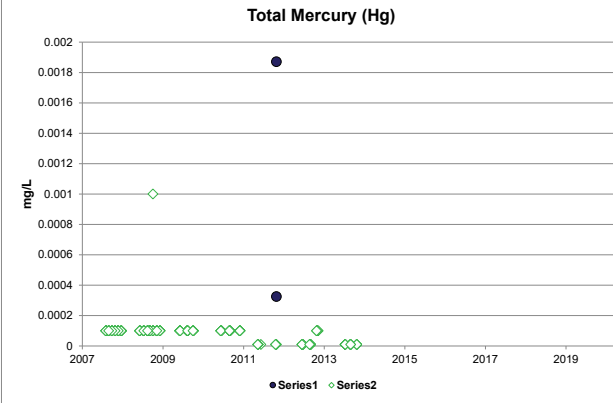
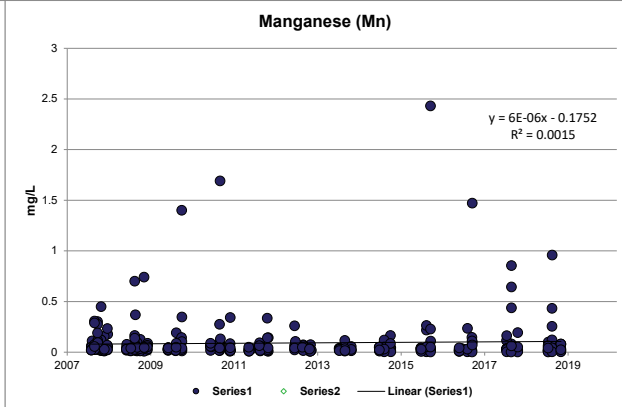
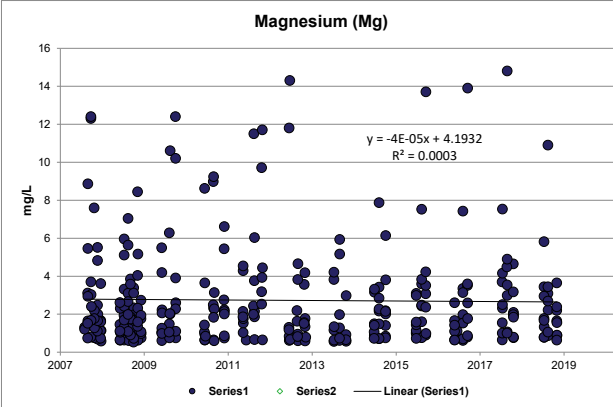


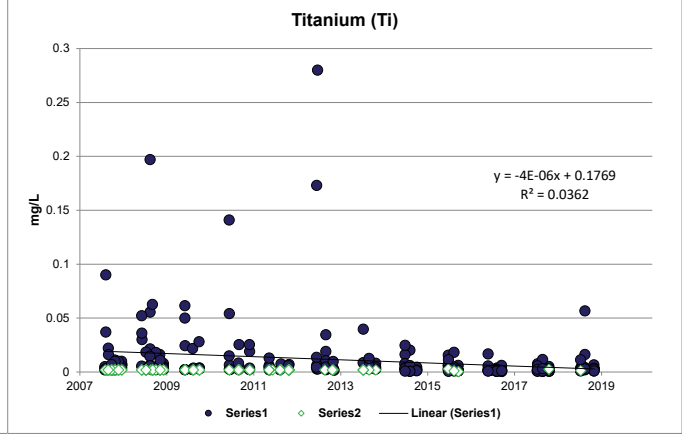
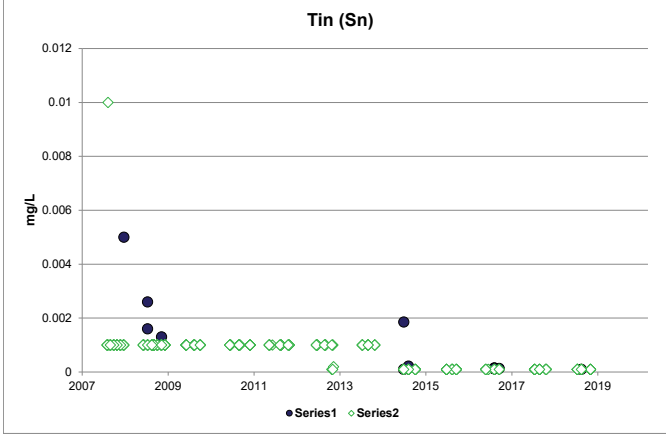
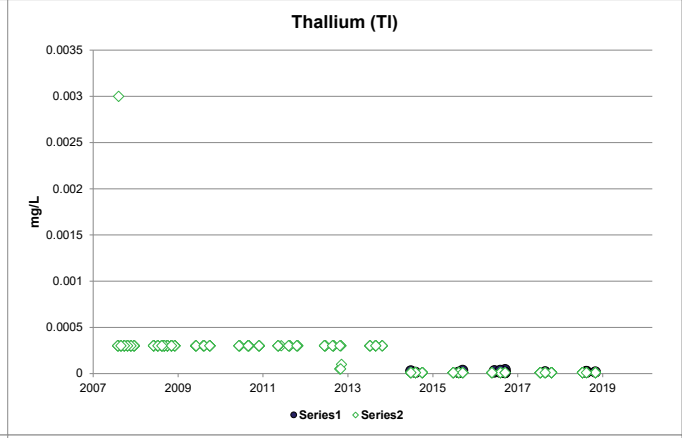
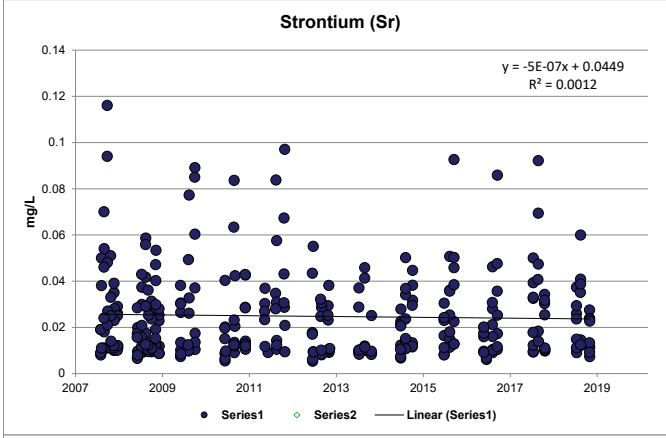
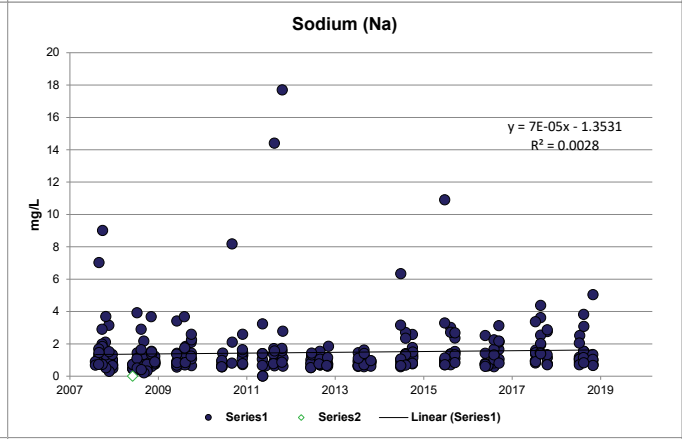
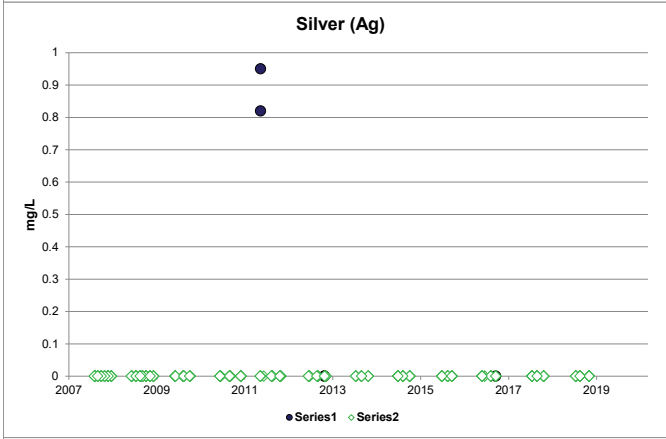
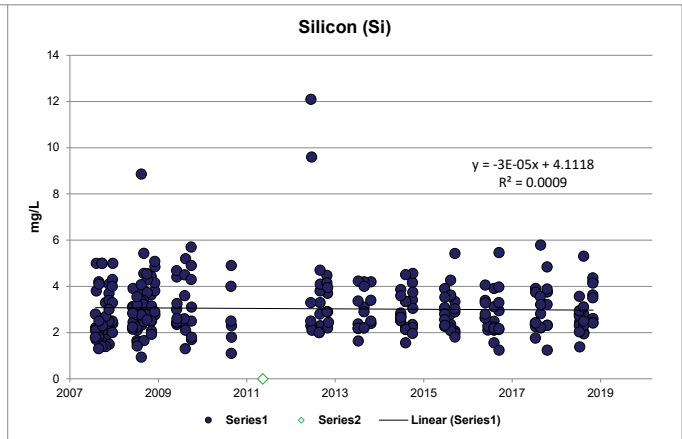
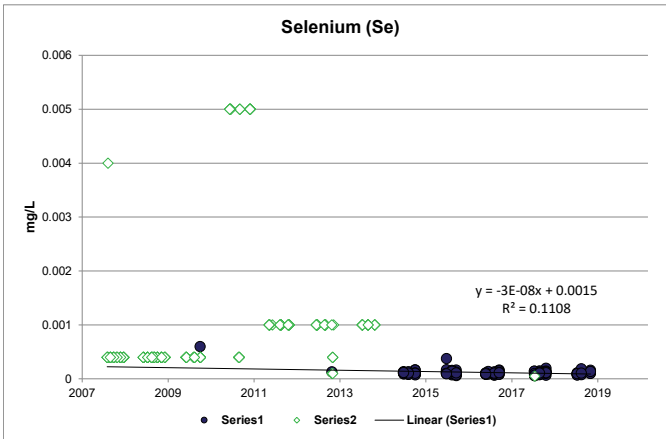


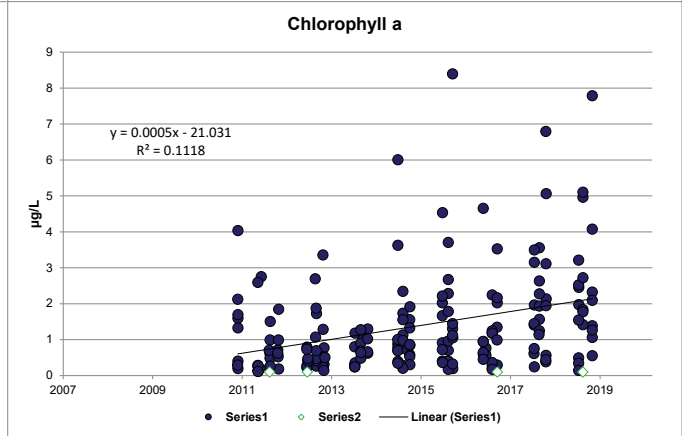
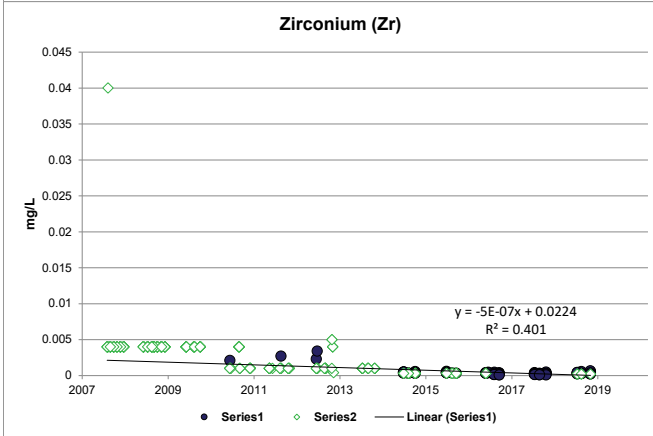
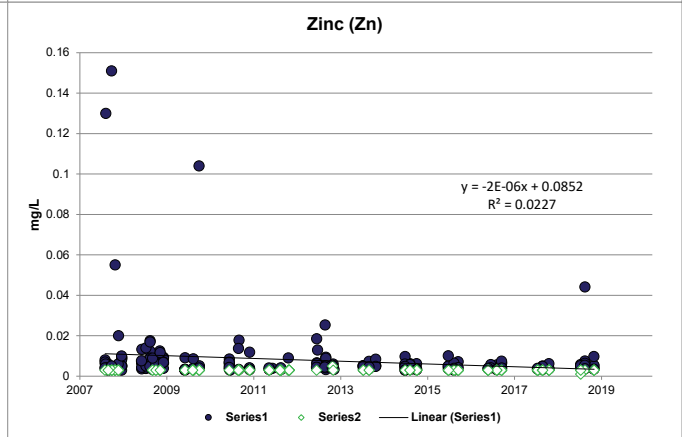
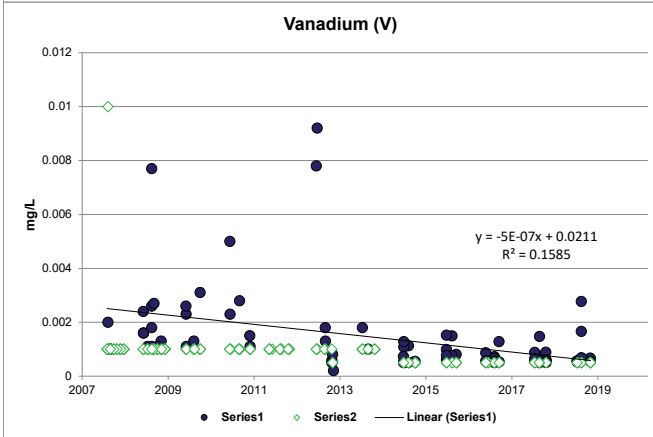
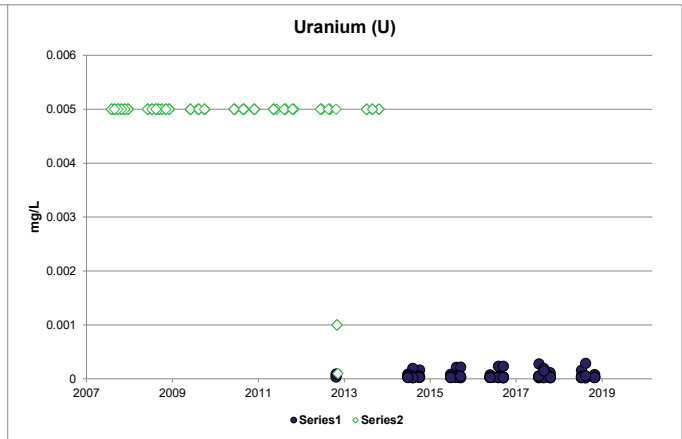
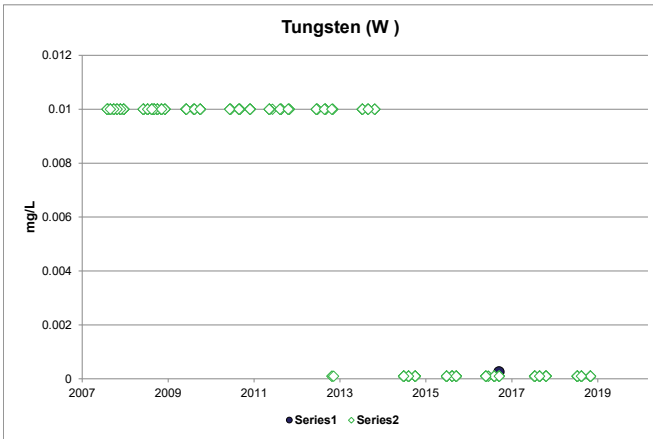












APPENDIX B
SURFACE WATER QUALITY SCREENING DATA (2014 TO 2019)

Exceedance of Benchmarks

Site Name	Media Name	Benchmark	Parameter	Exposure Level	Location	Units	Sample Time	Sample Value	Benchmark Minimum	Benchmark Maximum
Marathon	Surface Water	CWQG (CCME)	Aluminum (Al)	Exposure 3	S14	mg/L	28-Jul-2014	0.487		0.1
Marathon	Surface Water	CWQG (CCME)	Aluminum (Al)	Exposure 3	S14	mg/L	09-Jun-2014	0.362		0.1
Marathon	Surface Water	CWQG (CCME)	Aluminum (Al)	Exposure 3	S14	mg/L	01-Oct-2013	0.38		0.1
Marathon	Surface Water	CWQG (CCME)	Aluminum (Al)	Exposure 3	S14	mg/L	30-Jul-2013	0.59		0.1
Marathon	Surface Water	CWQG (CCME)	Aluminum (Al)	Exposure 3	S14	mg/L	17-May-2013	0.342		0.1
Marathon	Surface Water	CWQG (CCME)	Aluminum (Al)	Exposure 3	S2	mg/L	23-Sep-2014	0.146		0.1
Marathon	Surface Water	CWQG (CCME)	Aluminum (Al)	Exposure 3	S2	mg/L	23-Sep-2014	0.148		0.1
Marathon	Surface Water	CWQG (CCME)	Aluminum (Al)	Exposure 3	S2	mg/L	29-Jul-2014	0.243		0.1
Marathon	Surface Water	CWQG (CCME)	Aluminum (Al)	Exposure 3	S2	mg/L	09-Jun-2014	0.293		0.1
Marathon	Surface Water	CWQG (CCME)	Aluminum (Al)	Exposure 3	S2	mg/L	24-Sep-2013	0.185		0.1
Marathon	Surface Water	CWQG (CCME)	Aluminum (Al)	Exposure 3	S2	mg/L	31-Jul-2013	0.519		0.1
Marathon	Surface Water	CWQG (CCME)	Aluminum (Al)	Exposure 3	S2	mg/L	15-May-2013	0.164		0.1
Marathon	Surface Water	CWQG (CCME)	Aluminum (Al)	Exposure 3	S3	mg/L	24-Sep-2013	0.197		0.1
Marathon	Surface Water	CWQG (CCME)	Aluminum (Al)	Exposure 3	S3	mg/L	24-Jul-2013	0.117		0.1
Marathon	Surface Water	CWQG (CCME)	Aluminum (Al)	Exposure 3	S30	mg/L	22-Sep-2014	0.144		0.1
Marathon	Surface Water	CWQG (CCME)	Aluminum (Al)	Exposure 3	S30	mg/L	28-Jul-2014	0.268		0.1
Marathon	Surface Water	CWQG (CCME)	Aluminum (Al)	Exposure 3	S30	mg/L	11-Jun-2014	0.198		0.1
Marathon	Surface Water	CWQG (CCME)	Aluminum (Al)	Exposure 3	S30	mg/L	08-Oct-2013	0.212		0.1
Marathon	Surface Water	CWQG (CCME)	Aluminum (Al)	Exposure 3	S30	mg/L	29-Jul-2013	0.257		0.1
Marathon	Surface Water	CWQG (CCME)	Aluminum (Al)	Exposure 3	S30	mg/L	24-May-2013	0.138		0.1
Marathon	Surface Water	CWQG (CCME)	Aluminum (Al)	Exposure 3	S6	mg/L	29-Jul-2014	0.321		0.1
Marathon	Surface Water	CWQG (CCME)	Aluminum (Al)	Exposure 3	S6	mg/L	10-Jun-2014	0.785		0.1
Marathon	Surface Water	CWQG (CCME)	Aluminum (Al)	Exposure 3	S6	mg/L	30-Sep-2013	0.255		0.1
Marathon	Surface Water	CWQG (CCME)	Aluminum (Al)	Exposure 3	S6	mg/L	30-Jul-2013	0.757		0.1
Marathon	Surface Water	CWQG (CCME)	Aluminum (Al)	Exposure 3	S6	mg/L	22-May-2013	0.155		0.1
Marathon	Surface Water	CWQG (CCME)	Aluminum (Al)	Exposure 3	S8	mg/L	23-Sep-2013	0.136		0.1
Marathon	Surface Water	CWQG (CCME)	Aluminum (Al)	Exposure 3	S8	mg/L	14-May-2013	0.112		0.1
Marathon	Surface Water	CWQG (CCME)	Ammonia (N)	Exposure 3	S11	mg/L	14-Aug-2017	3.79		2.681024
Marathon	Surface Water	CWQG (CCME)	Ammonia (N)	Exposure 3	S14	mg/L	16-Aug-2017	5.4		2.681024
Marathon	Surface Water	CWQG (CCME)	Ammonia (N)	Exposure 3	S14	mg/L	06-Jul-2017	4.96		2.681024
Marathon	Surface Water	CWQG (CCME)	Ammonia (N)	Exposure 3	S2	mg/L	06-Jul-2017	2.82		2.681024
Marathon	Surface Water	CWQG (CCME)	Ammonia (N)	Exposure 3	S3	mg/L	15-Aug-2017	3.58		2.681024
Marathon	Surface Water	CWQG (CCME)	Ammonia (N)	Exposure 3	S3	mg/L	06-Jul-2017	6.96		2.681024

Exceedance of Benchmarks

Site Name	Media Name	Benchmark	Parameter	Exposure Level	Location	Units	Sample Time	Sample Value	Benchmark Minimum	Benchmark Maximum
Marathon	Surface Water	CWQG (CCME)	Ammonia (N)	Exposure 3	S30	mg/L	06-Jul-2017	5.91		2.681024
Marathon	Surface Water	CWQG (CCME)	Ammonia (N)	Exposure 3	S30	mg/L	07-Jul-2015	3.32		2.681024
Marathon	Surface Water	CWQG (CCME)	Ammonia (N)	Exposure 3	S52	mg/L	15-Aug-2017	30.4		2.681024
Marathon	Surface Water	CWQG (CCME)	Ammonia (N)	Exposure 3	S52	mg/L	05-Jul-2017	4.62		2.681024
Marathon	Surface Water	CWQG (CCME)	Ammonia (N)	Exposure 3	S8	mg/L	05-Jul-2017	2.69		2.681024
Marathon	Surface Water	CWQG (CCME)	Ammonia (N)	Exposure 3	S8	mg/L	16-Aug-2016	6.1		2.681024
Marathon	Surface Water	CWQG (CCME)	Chromium (Cr)	Exposure 3	S6	mg/L	22-May-2013	0.0095		0.0089
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S11	mg/L	01-Oct-2019	<0.5		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S11	mg/L	17-Jul-2019	<0.5		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S11	mg/L	13-Jun-2019	<0.5		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S11	mg/L	23-Sep-2014	<0.01		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S11	mg/L	28-Jul-2014	<0.01		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S11	mg/L	09-Jun-2014	<0.01		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S11	mg/L	01-Oct-2013	<0.01		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S11	mg/L	01-Aug-2013	<0.01		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S11	mg/L	22-May-2013	<10		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S14	mg/L	01-Oct-2019	<0.5		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S14	mg/L	17-Jul-2019	<0.5		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S14	mg/L	13-Jun-2019	<0.5		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S14	mg/L	28-Jul-2014	<0.01		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S14	mg/L	09-Jun-2014	<0.01		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S14	mg/L	01-Oct-2013	<0.01		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S14	mg/L	30-Jul-2013	<0.01		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S14	mg/L	17-May-2013	<10		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S2	mg/L	30-Sep-2019	<0.5		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S2	mg/L	16-Jul-2019	<0.5		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S2	mg/L	11-Jun-2019	<0.5		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S2	mg/L	23-Sep-2014	<0.01		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S2	mg/L	23-Sep-2014	<0.01		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S2	mg/L	29-Jul-2014	<0.01		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S2	mg/L	09-Jun-2014	<0.01		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S2	mg/L	24-Sep-2013	<0.01		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S2	mg/L	31-Jul-2013	<0.01		0.001

Exceedance of Benchmarks

Site Name	Media Name	Benchmark	Parameter	Exposure Level	Location	Units	Sample Time	Sample Value	Benchmark Minimum	Benchmark Maximum
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S2	mg/L	15-May-2013	<10		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S3	mg/L	30-Sep-2019	<0.5		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S3	mg/L	16-Jul-2019	<0.5		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S3	mg/L	11-Jun-2019	<0.5		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S3	mg/L	24-Sep-2013	<0.01		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S3	mg/L	24-Jul-2013	<0.01		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S3	mg/L	14-May-2013	<10		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S30	mg/L	30-Sep-2019	<0.5		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S30	mg/L	16-Jul-2019	<0.5		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S30	mg/L	11-Jun-2019	<0.5		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S30	mg/L	22-Sep-2014	<0.01		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S30	mg/L	28-Jul-2014	<0.01		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S30	mg/L	11-Jun-2014	<0.01		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S30	mg/L	08-Oct-2013	<0.01		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S30	mg/L	29-Jul-2013	<0.01		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S30	mg/L	24-May-2013	<10		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S52	mg/L	30-Sep-2019	<0.5		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S52	mg/L	15-Jul-2019	<0.5		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S52	mg/L	11-Jun-2019	<0.5		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S6	mg/L	29-Jul-2014	<0.01		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S6	mg/L	10-Jun-2014	<0.01		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S6	mg/L	30-Sep-2013	<0.01		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S6	mg/L	30-Jul-2013	<0.01		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S6	mg/L	22-May-2013	<10		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S8	mg/L	01-Oct-2019	<0.5		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S8	mg/L	16-Jul-2019	<0.5		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S8	mg/L	11-Jun-2019	<0.5		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S8	mg/L	23-Sep-2013	<0.01		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S8	mg/L	22-Jul-2013	<0.01		0.001
Marathon	Surface Water	CWQG (CCME)	Chromium, Hexavalent	Exposure 3	S8	mg/L	14-May-2013	<10		0.001
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S2	mg/L	30-Sep-2019	0.00325		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S2	mg/L	16-Jul-2019	0.0044		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S2	mg/L	11-Jun-2019	0.00273		0.002

Exceedance of Benchmarks

Site Name	Media Name	Benchmark	Parameter	Exposure Level	Location	Units	Sample Time	Sample Value	Benchmark Minimum	Benchmark Maximum
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S2	mg/L	17-Sep-2018	0.00318		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S2	mg/L	14-Jun-2018	0.00231		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S2	mg/L	06-Jul-2017	0.00239		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S2	mg/L	24-Apr-2017	0.00319		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S2	mg/L	12-Jul-2016	0.00224		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S2	mg/L	25-May-2016	0.00288		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S2	mg/L	03-Sep-2015	0.00222		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S2	mg/L	07-Jul-2015	0.00265		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S2	mg/L	28-May-2015	0.00319		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S2	mg/L	23-Sep-2014	0.0044		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S2	mg/L	23-Sep-2014	0.0042		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S2	mg/L	29-Jul-2014	0.0024		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S2	mg/L	09-Jun-2014	0.0034		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S2	mg/L	24-Sep-2013	0.00354		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S2	mg/L	31-Jul-2013	0.0044		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S2	mg/L	15-May-2013	0.0124		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S3	mg/L	30-Sep-2019	0.00516		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S3	mg/L	16-Jul-2019	0.0079		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S3	mg/L	11-Jun-2019	0.00558		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S3	mg/L	17-Sep-2018	0.0059		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S3	mg/L	26-Jul-2018	0.00685		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S3	mg/L	14-Jun-2018	0.00569		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S3	mg/L	15-Aug-2017	0.00582		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S3	mg/L	06-Jul-2017	0.0059		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S3	mg/L	24-Apr-2017	0.00431		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S3	mg/L	16-Aug-2016	0.00472		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S3	mg/L	12-Jul-2016	0.00927		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S3	mg/L	25-May-2016	0.00492		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S3	mg/L	03-Sep-2015	0.00483		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S3	mg/L	07-Jul-2015	0.00681		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S3	mg/L	27-May-2015	0.00603		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S3	mg/L	24-Sep-2013	0.00645		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S3	mg/L	24-Jul-2013	0.005		0.002

Exceedance of Benchmarks

Site Name	Media Name	Benchmark	Parameter	Exposure Level	Location	Units	Sample Time	Sample Value	Benchmark Minimum	Benchmark Maximum
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S3	mg/L	14-May-2013	0.0057		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S52	mg/L	30-Sep-2019	0.0118		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S52	mg/L	15-Jul-2019	0.0064		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S52	mg/L	11-Jun-2019	0.00868		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S52	mg/L	17-Sep-2018	0.00905		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S52	mg/L	23-Jul-2018	0.00545		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S52	mg/L	14-Jun-2018	0.00763		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S52	mg/L	15-Aug-2017	0.0177		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S52	mg/L	05-Jul-2017	0.00819		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S52	mg/L	24-Apr-2017	0.0111		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S52	mg/L	16-Aug-2016	0.00508		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S52	mg/L	12-Jul-2016	0.00914		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S52	mg/L	26-May-2016	0.00931		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S52	mg/L	03-Sep-2015	0.00801		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S52	mg/L	07-Jul-2015	0.00867		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S52	mg/L	28-May-2015	0.00936		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S6	mg/L	29-Jul-2014	0.0068		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S6	mg/L	10-Jun-2014	0.0096		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S6	mg/L	30-Sep-2013	0.0094		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S6	mg/L	30-Jul-2013	0.0133		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S6	mg/L	22-May-2013	0.0157		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S8	mg/L	01-Oct-2019	0.00571		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S8	mg/L	16-Jul-2019	0.0069		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S8	mg/L	11-Jun-2019	0.00651		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S8	mg/L	18-Sep-2018	0.00524		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S8	mg/L	26-Jul-2018	0.00596		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S8	mg/L	14-Jun-2018	0.00742		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S8	mg/L	16-Aug-2017	0.00505		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S8	mg/L	05-Jul-2017	0.00549		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S8	mg/L	24-Apr-2017	0.00554		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S8	mg/L	16-Aug-2016	0.0069		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S8	mg/L	12-Jul-2016	0.00669		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S8	mg/L	26-May-2016	0.0051		0.002

Exceedance of Benchmarks

Site Name	Media Name	Benchmark	Parameter	Exposure Level	Location	Units	Sample Time	Sample Value	Benchmark Minimum	Benchmark Maximum
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S8	mg/L	01-Sep-2015	0.00517		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S8	mg/L	07-Jul-2015	0.00509		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S8	mg/L	27-May-2015	0.0055		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S8	mg/L	23-Sep-2013	0.0073		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S8	mg/L	22-Jul-2013	0.0064		0.002
Marathon	Surface Water	CWQG (CCME)	Copper (Cu)	Exposure 3	S8	mg/L	14-May-2013	0.0062		0.002
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S11	mg/L	01-Oct-2019	9.49	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S11	mg/L	17-Jul-2019	6.69	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S11	mg/L	13-Jun-2019	8.74	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S11	mg/L	19-Sep-2018	9.12	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S11	mg/L	26-Jul-2018	8.25	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S11	mg/L	14-Aug-2017	8.82	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S11	mg/L	06-Jul-2017	9.17	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S11	mg/L	16-Aug-2016	8.64	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S11	mg/L	12-Jul-2016	9.04	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S11	mg/L	28-Jul-2014	9.02	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S11	mg/L	09-Jun-2014	9.42	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S14	mg/L	17-Jul-2019	4.87	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S14	mg/L	13-Jun-2019	7.24	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S14	mg/L	19-Sep-2018	8.2	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S14	mg/L	26-Jul-2018	4.84	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S14	mg/L	13-Jun-2018	7.07	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S14	mg/L	06-Jul-2017	7.89	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S14	mg/L	16-Aug-2016	6.81	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S14	mg/L	12-Jul-2016	7.9	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S14	mg/L	01-Sep-2015	9.42	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S14	mg/L	07-Jul-2015	8.98	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S14	mg/L	28-Jul-2014	8.78	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S14	mg/L	09-Jun-2014	8.86	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S2	mg/L	16-Jul-2019	7.25	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S2	mg/L	17-Sep-2018	9.1	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S2	mg/L	26-Jul-2018	5.66	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S2	mg/L	17-Aug-2016	3.62	9.5	

Exceedance of Benchmarks

Site Name	Media Name	Benchmark	Parameter	Exposure Level	Location	Units	Sample Time	Sample Value	Benchmark Minimum	Benchmark Maximum
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S2	mg/L	29-Jul-2014	9.41	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S3	mg/L	16-Jul-2019	6.84	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S3	mg/L	17-Sep-2018	8.07	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S3	mg/L	26-Jul-2018	6.08	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S3	mg/L	06-Jul-2017	8.51	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S3	mg/L	16-Aug-2016	8.22	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S3	mg/L	12-Jul-2016	8.91	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S3	mg/L	03-Sep-2015	8.91	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S3	mg/L	07-Jul-2015	8.96	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S3	mg/L	24-Sep-2013	9.27	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S30	mg/L	16-Jul-2019	6.86	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S30	mg/L	18-Sep-2018	8.65	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S30	mg/L	25-Jul-2018	8.44	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S30	mg/L	13-Jun-2018	9.32	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S30	mg/L	14-Aug-2017	8.92	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S30	mg/L	06-Jul-2017	9.18	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S30	mg/L	17-Aug-2016	8.64	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S30	mg/L	12-Jul-2016	8.97	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S30	mg/L	28-Jul-2014	9.38	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S30	mg/L	11-Jun-2014	9.49	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S30	mg/L	24-May-2013	6.57	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S52	mg/L	15-Jul-2019	8.53	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S52	mg/L	17-Sep-2018	9.06	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S52	mg/L	23-Jul-2018	7.45	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S52	mg/L	16-Aug-2016	8	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S6	mg/L	10-Jun-2014	9.28	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S8	mg/L	01-Oct-2019	7.99	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S8	mg/L	18-Sep-2018	8.59	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S8	mg/L	26-Jul-2018	6.39	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S8	mg/L	14-Jun-2018	9.12	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S8	mg/L	05-Jul-2017	8.18	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S8	mg/L	16-Aug-2016	6.93	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S8	mg/L	12-Jul-2016	8.09	9.5	

Exceedance of Benchmarks

Site Name	Media Name	Benchmark	Parameter	Exposure Level	Location	Units	Sample Time	Sample Value	Benchmark Minimum	Benchmark Maximum
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S8	mg/L	01-Sep-2015	8.42	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S8	mg/L	07-Jul-2015	8.72	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S8	mg/L	23-Sep-2013	9.39	9.5	
Marathon	Surface Water	CWQG (CCME)	Dissolved Oxygen	Exposure 3	S8	mg/L	22-Jul-2013	7.42	9.5	
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S11	mg/L	01-Oct-2019	0.1		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S11	mg/L	17-Jul-2019	0.063		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S11	mg/L	13-Jun-2019	0.03		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S11	mg/L	19-Sep-2018	0.07		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S11	mg/L	26-Jul-2018	0.078		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S11	mg/L	13-Jun-2018	0.041		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S11	mg/L	14-Aug-2017	0.056		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S11	mg/L	06-Jul-2017	0.046		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S11	mg/L	24-Apr-2017	0.071		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S11	mg/L	16-Aug-2016	0.058		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S11	mg/L	12-Jul-2016	0.066		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S11	mg/L	25-May-2016	0.096		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S11	mg/L	01-Sep-2015	0.064		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S11	mg/L	07-Jul-2015	0.045		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S11	mg/L	27-May-2015	0.08		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S11	mg/L	23-Sep-2014	0.064		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S11	mg/L	28-Jul-2014	0.061		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S11	mg/L	01-Oct-2013	0.074		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S11	mg/L	01-Aug-2013	0.044		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S11	mg/L	22-May-2013	0.071		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S14	mg/L	01-Oct-2019	0.088		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S14	mg/L	17-Jul-2019	0.136		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S14	mg/L	13-Jun-2019	0.041		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S14	mg/L	19-Sep-2018	0.09		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S14	mg/L	26-Jul-2018	0.148		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S14	mg/L	13-Jun-2018	0.068		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S14	mg/L	16-Aug-2017	0.104		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S14	mg/L	06-Jul-2017	0.076		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S14	mg/L	16-May-2017	0.068		0.00012

Exceedance of Benchmarks

Site Name	Media Name	Benchmark	Parameter	Exposure Level	Location	Units	Sample Time	Sample Value	Benchmark Minimum	Benchmark Maximum
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S14	mg/L	16-Aug-2016	0.142		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S14	mg/L	12-Jul-2016	0.101		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S14	mg/L	25-May-2016	0.076		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S14	mg/L	01-Sep-2015	0.071		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S14	mg/L	07-Jul-2015	0.072		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S14	mg/L	27-May-2015	0.081		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S14	mg/L	28-Jul-2014	0.087		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S14	mg/L	01-Oct-2013	0.089		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S14	mg/L	30-Jul-2013	0.153		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S14	mg/L	17-May-2013	0.09		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S2	mg/L	30-Sep-2019	0.068		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S2	mg/L	16-Jul-2019	0.064		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S2	mg/L	11-Jun-2019	0.025		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S2	mg/L	17-Sep-2018	0.07		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S2	mg/L	26-Jul-2018	0.06		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S2	mg/L	14-Jun-2018	0.05		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S2	mg/L	16-Aug-2017	<0.1		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S2	mg/L	06-Jul-2017	0.057		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S2	mg/L	24-Apr-2017	0.057		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S2	mg/L	17-Aug-2016	0.05		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S2	mg/L	12-Jul-2016	0.067		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S2	mg/L	25-May-2016	0.056		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S2	mg/L	03-Sep-2015	0.053		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S2	mg/L	07-Jul-2015	0.048		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S2	mg/L	28-May-2015	0.056		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S2	mg/L	23-Sep-2014	0.056		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S2	mg/L	23-Sep-2014	0.055		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S2	mg/L	29-Jul-2014	0.069		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S2	mg/L	24-Sep-2013	0.073		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S2	mg/L	31-Jul-2013	0.036		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S2	mg/L	15-May-2013	<0.03		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S3	mg/L	30-Sep-2019	0.059		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S3	mg/L	16-Jul-2019	0.06		0.00012

Exceedance of Benchmarks

Site Name	Media Name	Benchmark	Parameter	Exposure Level	Location	Units	Sample Time	Sample Value	Benchmark Minimum	Benchmark Maximum
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S3	mg/L	11-Jun-2019	0.022		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S3	mg/L	17-Sep-2018	0.056		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S3	mg/L	26-Jul-2018	0.075		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S3	mg/L	14-Jun-2018	0.044		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S3	mg/L	15-Aug-2017	0.049		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S3	mg/L	06-Jul-2017	0.048		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S3	mg/L	24-Apr-2017	0.05		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S3	mg/L	16-Aug-2016	0.059		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S3	mg/L	12-Jul-2016	0.061		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S3	mg/L	25-May-2016	0.046		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S3	mg/L	03-Sep-2015	0.045		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S3	mg/L	07-Jul-2015	0.043		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S3	mg/L	27-May-2015	0.049		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S3	mg/L	24-Sep-2013	0.061		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S3	mg/L	24-Jul-2013	0.06		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S3	mg/L	14-May-2013	0.042		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S30	mg/L	30-Sep-2019	0.077		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S30	mg/L	16-Jul-2019	0.069		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S30	mg/L	11-Jun-2019	0.025		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S30	mg/L	18-Sep-2018	0.074		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S30	mg/L	25-Jul-2018	0.082		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S30	mg/L	13-Jun-2018	0.05		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S30	mg/L	14-Aug-2017	0.069		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S30	mg/L	06-Jul-2017	0.062		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S30	mg/L	24-Apr-2017	0.071		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S30	mg/L	17-Aug-2016	0.058		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S30	mg/L	12-Jul-2016	0.064		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S30	mg/L	25-May-2016	0.065		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S30	mg/L	01-Sep-2015	0.053		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S30	mg/L	07-Jul-2015	0.044		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S30	mg/L	26-May-2015	0.066		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S30	mg/L	22-Sep-2014	0.068		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S30	mg/L	28-Jul-2014	0.067		0.00012

Exceedance of Benchmarks

Site Name	Media Name	Benchmark	Parameter	Exposure Level	Location	Units	Sample Time	Sample Value	Benchmark Minimum	Benchmark Maximum
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S30	mg/L	08-Oct-2013	0.073		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S30	mg/L	29-Jul-2013	0.076		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S30	mg/L	24-May-2013	0.076		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S52	mg/L	30-Sep-2019	0.055		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S52	mg/L	15-Jul-2019	0.039		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S52	mg/L	11-Jun-2019	0.028		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S52	mg/L	17-Sep-2018	0.05		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S52	mg/L	23-Jul-2018	0.05		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S52	mg/L	14-Jun-2018	0.047		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S52	mg/L	15-Aug-2017	0.033		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S52	mg/L	05-Jul-2017	0.043		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S52	mg/L	24-Apr-2017	0.041		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S52	mg/L	16-Aug-2016	0.043		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S52	mg/L	12-Jul-2016	0.055		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S52	mg/L	26-May-2016	0.046		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S52	mg/L	03-Sep-2015	0.038		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S52	mg/L	07-Jul-2015	0.037		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S52	mg/L	28-May-2015	0.049		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S6	mg/L	29-Jul-2014	0.053		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S6	mg/L	30-Sep-2013	0.059		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S6	mg/L	30-Jul-2013	0.086		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S6	mg/L	22-May-2013	<0.03		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S8	mg/L	01-Oct-2019	0.075		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S8	mg/L	16-Jul-2019	0.086		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S8	mg/L	11-Jun-2019	0.027		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S8	mg/L	18-Sep-2018	0.061		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S8	mg/L	26-Jul-2018	0.162		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S8	mg/L	14-Jun-2018	0.06		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S8	mg/L	16-Aug-2017	0.05		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S8	mg/L	05-Jul-2017	0.05		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S8	mg/L	24-Apr-2017	0.053		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S8	mg/L	16-Aug-2016	0.091		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S8	mg/L	12-Jul-2016	0.061		0.00012

Exceedance of Benchmarks

Site Name	Media Name	Benchmark	Parameter	Exposure Level	Location	Units	Sample Time	Sample Value	Benchmark Minimum	Benchmark Maximum
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S8	mg/L	26-May-2016	0.049		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S8	mg/L	01-Sep-2015	0.055		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S8	mg/L	07-Jul-2015	0.04		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S8	mg/L	27-May-2015	0.055		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S8	mg/L	23-Sep-2013	0.067		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S8	mg/L	22-Jul-2013	0.091		0.00012
Marathon	Surface Water	CWQG (CCME)	Fluoride (F)	Exposure 3	S8	mg/L	14-May-2013	0.085		0.00012
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S11	mg/L	01-Oct-2019	0.331		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S11	mg/L	17-Jul-2019	0.311		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S11	mg/L	14-Aug-2017	0.32		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S11	mg/L	25-May-2016	0.373		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S11	mg/L	27-May-2015	0.37		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S14	mg/L	01-Oct-2019	0.978		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S14	mg/L	17-Jul-2019	1.78		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S14	mg/L	13-Jun-2019	0.688		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S14	mg/L	19-Sep-2018	1.6		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S14	mg/L	26-Jul-2018	2.31		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S14	mg/L	13-Jun-2018	0.672		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S14	mg/L	16-Aug-2017	3.35		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S14	mg/L	06-Jul-2017	1.24		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S14	mg/L	16-May-2017	0.388		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S14	mg/L	16-Aug-2016	3.02		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S14	mg/L	12-Jul-2016	1.59		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S14	mg/L	25-May-2016	0.547		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S14	mg/L	01-Sep-2015	1.44		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S14	mg/L	07-Jul-2015	1.27		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S14	mg/L	27-May-2015	0.497		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S14	mg/L	28-Jul-2014	1.05		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S14	mg/L	09-Jun-2014	0.49		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S14	mg/L	01-Oct-2013	0.954		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S14	mg/L	30-Jul-2013	0.614		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S14	mg/L	17-May-2013	0.54		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S2	mg/L	16-Jul-2019	1.4		0.3

Exceedance of Benchmarks

Site Name	Media Name	Benchmark	Parameter	Exposure Level	Location	Units	Sample Time	Sample Value	Benchmark Minimum	Benchmark Maximum
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S2	mg/L	26-Jul-2018	0.379		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S2	mg/L	24-Apr-2017	0.481		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S2	mg/L	25-May-2016	0.531		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S2	mg/L	07-Jul-2015	0.546		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S2	mg/L	28-May-2015	0.496		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S2	mg/L	23-Sep-2014	0.402		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S2	mg/L	23-Sep-2014	0.418		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S2	mg/L	29-Jul-2014	0.368		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S2	mg/L	09-Jun-2014	0.317		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S2	mg/L	31-Jul-2013	0.544		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S2	mg/L	15-May-2013	3.7		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S3	mg/L	30-Sep-2019	0.976		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S3	mg/L	16-Jul-2019	2.1		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S3	mg/L	11-Jun-2019	0.406		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S3	mg/L	17-Sep-2018	0.497		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S3	mg/L	26-Jul-2018	2.3		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S3	mg/L	14-Jun-2018	0.569		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S3	mg/L	15-Aug-2017	1.96		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S3	mg/L	06-Jul-2017	0.75		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S3	mg/L	16-Aug-2016	1.72		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S3	mg/L	12-Jul-2016	1.59		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S3	mg/L	03-Sep-2015	0.676		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S3	mg/L	07-Jul-2015	0.881		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S3	mg/L	24-Sep-2013	0.499		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S3	mg/L	24-Jul-2013	0.467		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S3	mg/L	14-May-2013	0.44		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S30	mg/L	11-Jun-2019	0.445		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S52	mg/L	30-Sep-2019	0.344		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S52	mg/L	24-Apr-2017	0.386		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S52	mg/L	26-May-2016	0.308		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S52	mg/L	28-May-2015	0.528		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S6	mg/L	29-Jul-2014	0.394		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S6	mg/L	10-Jun-2014	0.742		0.3

Exceedance of Benchmarks

Site Name	Media Name	Benchmark	Parameter	Exposure Level	Location	Units	Sample Time	Sample Value	Benchmark Minimum	Benchmark Maximum
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S6	mg/L	30-Jul-2013	0.763		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S6	mg/L	22-May-2013	4.57		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S8	mg/L	01-Oct-2019	0.382		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S8	mg/L	16-Jul-2019	1.81		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S8	mg/L	11-Jun-2019	0.613		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S8	mg/L	18-Sep-2018	0.526		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S8	mg/L	26-Jul-2018	0.5		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S8	mg/L	14-Jun-2018	1.13		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S8	mg/L	16-Aug-2017	0.653		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S8	mg/L	05-Jul-2017	0.338		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S8	mg/L	24-Apr-2017	0.476		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S8	mg/L	16-Aug-2016	1.15		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S8	mg/L	12-Jul-2016	0.547		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S8	mg/L	26-May-2016	0.47		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S8	mg/L	01-Sep-2015	0.885		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S8	mg/L	07-Jul-2015	0.41		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S8	mg/L	27-May-2015	0.549		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S8	mg/L	23-Sep-2013	0.434		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S8	mg/L	22-Jul-2013	0.839		0.3
Marathon	Surface Water	CWQG (CCME)	Iron (Fe)	Exposure 3	S8	mg/L	14-May-2013	0.365		0.3
Marathon	Surface Water	CWQG (CCME)	Lead (Pb)	Exposure 3	S2	mg/L	15-May-2013	0.0024		0.001
Marathon	Surface Water	CWQG (CCME)	Lead (Pb)	Exposure 3	S6	mg/L	22-May-2013	0.0019		0.001
Marathon	Surface Water	CWQG (CCME)	Manganese (Mn)	Exposure 3	S14	mg/L	17-Jul-2019	0.958		0.43
Marathon	Surface Water	CWQG (CCME)	Manganese (Mn)	Exposure 3	S14	mg/L	26-Jul-2018	0.854		0.43
Marathon	Surface Water	CWQG (CCME)	Manganese (Mn)	Exposure 3	S14	mg/L	16-Aug-2017	1.47		0.43
Marathon	Surface Water	CWQG (CCME)	Manganese (Mn)	Exposure 3	S14	mg/L	16-Aug-2016	2.43		0.43
Marathon	Surface Water	CWQG (CCME)	Manganese (Mn)	Exposure 3	S2	mg/L	26-Jul-2018	0.437		0.43
Marathon	Surface Water	CWQG (CCME)	Manganese (Mn)	Exposure 3	S3	mg/L	16-Jul-2019	0.432		0.43
Marathon	Surface Water	CWQG (CCME)	Manganese (Mn)	Exposure 3	S3	mg/L	26-Jul-2018	0.643		0.43
Marathon	Surface Water	CWQG (CCME)	Nitrite-N (NO2-N)	Exposure 3	S30	mg/L	22-Sep-2014	0.104		0.06
Marathon	Surface Water	CWQG (CCME)	Nitrite-N (NO2-N)	Exposure 3	S30	mg/L	28-Jul-2014	0.126		0.06
Marathon	Surface Water	CWQG (CCME)	Nitrite-N (NO2-N)	Exposure 3	S30	mg/L	11-Jun-2014	0.136		0.06
Marathon	Surface Water	CWQG (CCME)	Nitrite-N (NO2-N)	Exposure 3	S30	mg/L	08-Oct-2013	0.092		0.06

Exceedance of Benchmarks

Site Name	Media Name	Benchmark	Parameter	Exposure Level	Location	Units	Sample Time	Sample Value	Benchmark Minimum	Benchmark Maximum
Marathon	Surface Water	CWQG (CCME)	Nitrite-N (NO2-N)	Exposure 3	S30	mg/L	29-Jul-2013	0.082		0.06
Marathon	Surface Water	CWQG (CCME)	Nitrite-N (NO2-N)	Exposure 3	S30	mg/L	24-May-2013	0.151		0.06
Marathon	Surface Water	CWQG (CCME)	pH	Exposure 3	S11	pH unit	23-Sep-2014	6.07	6.5	9
Marathon	Surface Water	CWQG (CCME)	pH	Exposure 3	S14	pH unit	01-Oct-2019	6.42	6.5	9
Marathon	Surface Water	CWQG (CCME)	pH	Exposure 3	S14	pH unit	16-May-2017	6.4	6.5	9
Marathon	Surface Water	CWQG (CCME)	pH	Exposure 3	S14	pH unit	27-May-2015	6.48	6.5	9
Marathon	Surface Water	CWQG (CCME)	pH	Exposure 3	S14	pH unit	01-Oct-2013	9.15	6.5	9
Marathon	Surface Water	CWQG (CCME)	pH	Exposure 3	S14	pH unit	30-Jul-2013	9.12	6.5	9
Marathon	Surface Water	CWQG (CCME)	pH	Exposure 3	S2	pH unit	23-Sep-2014	6.14	6.5	9
Marathon	Surface Water	CWQG (CCME)	pH	Exposure 3	S2	pH unit	31-Jul-2013	9.47	6.5	9
Marathon	Surface Water	CWQG (CCME)	pH	Exposure 3	S3	pH unit	24-Sep-2013	5.8	6.5	9
Marathon	Surface Water	CWQG (CCME)	pH	Exposure 3	S30	pH unit	22-Sep-2014	5.28	6.5	9
Marathon	Surface Water	CWQG (CCME)	pH	Exposure 3	S30	pH unit	08-Oct-2013	5.05	6.5	9
Marathon	Surface Water	CWQG (CCME)	pH	Exposure 3	S30	pH unit	29-Jul-2013	9.58	6.5	9
Marathon	Surface Water	CWQG (CCME)	pH	Exposure 3	S6	pH unit	30-Jul-2013	9.42	6.5	9
Marathon	Surface Water	CWQG (CCME)	pH	Exposure 3	S6	pH unit	22-May-2013	6.47	6.5	9
Marathon	Surface Water	CWQG (CCME)	pH	Exposure 3	S8	pH unit	22-Jul-2013	5.15	6.5	9
Marathon	Surface Water	CWQG (CCME)	pH (field)	Exposure 3	S11	pH unit	01-Oct-2019	6.16	6.5	9
Marathon	Surface Water	CWQG (CCME)	pH (field)	Exposure 3	S11	pH unit	24-Apr-2017	6.27	6.5	9
Marathon	Surface Water	CWQG (CCME)	pH (field)	Exposure 3	S11	pH unit	25-May-2016	6.05	6.5	9
Marathon	Surface Water	CWQG (CCME)	pH (field)	Exposure 3	S11	pH unit	01-Sep-2015	5.88	6.5	9
Marathon	Surface Water	CWQG (CCME)	pH (field)	Exposure 3	S11	pH unit	27-May-2015	5.54	6.5	9
Marathon	Surface Water	CWQG (CCME)	pH (field)	Exposure 3	S14	pH unit	01-Oct-2019	6.16	6.5	9
Marathon	Surface Water	CWQG (CCME)	pH (field)	Exposure 3	S14	pH unit	16-May-2017	5.15	6.5	9
Marathon	Surface Water	CWQG (CCME)	pH (field)	Exposure 3	S14	pH unit	01-Sep-2015	6.02	6.5	9
Marathon	Surface Water	CWQG (CCME)	pH (field)	Exposure 3	S2	pH unit	24-Apr-2017	6.18	6.5	9
Marathon	Surface Water	CWQG (CCME)	pH (field)	Exposure 3	S3	pH unit	24-Apr-2017	6.36	6.5	9
Marathon	Surface Water	CWQG (CCME)	pH (field)	Exposure 3	S30	pH unit	24-Apr-2017	6.31	6.5	9
Marathon	Surface Water	CWQG (CCME)	pH (field)	Exposure 3	S30	pH unit	01-Sep-2015	5.98	6.5	9
Marathon	Surface Water	CWQG (CCME)	pH (field)	Exposure 3	S30	pH unit	26-May-2015	5.92	6.5	9
Marathon	Surface Water	CWQG (CCME)	pH (field)	Exposure 3	S52	pH unit	15-Jul-2019	6.3	6.5	9
Marathon	Surface Water	CWQG (CCME)	pH (field)	Exposure 3	S52	pH unit	11-Jun-2019	5.94	6.5	9
Marathon	Surface Water	CWQG (CCME)	pH (field)	Exposure 3	S52	pH unit	23-Jul-2018	6.13	6.5	9

Exceedance of Benchmarks

Site Name	Media Name	Benchmark	Parameter	Exposure Level	Location	Units	Sample Time	Sample Value	Benchmark Minimum	Benchmark Maximum
Marathon	Surface Water	CWQG (CCME)	pH (field)	Exposure 3	S52	pH unit	24-Apr-2017	4.88	6.5	9
Marathon	Surface Water	CWQG (CCME)	pH (field)	Exposure 3	S8	pH unit	01-Oct-2019	6.14	6.5	9
Marathon	Surface Water	CWQG (CCME)	pH (field)	Exposure 3	S8	pH unit	14-Jun-2018	6.47	6.5	9
Marathon	Surface Water	CWQG (CCME)	pH (field)	Exposure 3	S8	pH unit	24-Apr-2017	4.15	6.5	9
Marathon	Surface Water	CWQG (CCME)	pH (field)	Exposure 3	S8	pH unit	01-Sep-2015	6.36	6.5	9
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S11	mg/L	01-Oct-2019	6.1		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S11	mg/L	17-Jul-2019	26.3		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S11	mg/L	13-Jun-2019	8		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S11	mg/L	19-Sep-2018	6.7		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S11	mg/L	26-Jul-2018	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S11	mg/L	13-Jun-2018	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S11	mg/L	14-Aug-2017	4.8		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S11	mg/L	06-Jul-2017	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S11	mg/L	24-Apr-2017	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S11	mg/L	16-Aug-2016	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S11	mg/L	12-Jul-2016	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S11	mg/L	25-May-2016	6.4		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S11	mg/L	01-Sep-2015	38.2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S11	mg/L	07-Jul-2015	2.1		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S11	mg/L	27-May-2015	6.4		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S11	mg/L	23-Sep-2014	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S11	mg/L	28-Jul-2014	5		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S11	mg/L	09-Jun-2014	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S11	mg/L	01-Oct-2013	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S11	mg/L	01-Aug-2013	2.4		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S11	mg/L	22-May-2013	11.7		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S14	mg/L	01-Oct-2019	2.4		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S14	mg/L	17-Jul-2019	2.8		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S14	mg/L	13-Jun-2019	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S14	mg/L	19-Sep-2018	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S14	mg/L	26-Jul-2018	3.3		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S14	mg/L	13-Jun-2018	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S14	mg/L	16-Aug-2017	<2		0

Exceedance of Benchmarks

Site Name	Media Name	Benchmark	Parameter	Exposure Level	Location	Units	Sample Time	Sample Value	Benchmark Minimum	Benchmark Maximum
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S14	mg/L	06-Jul-2017	15.2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S14	mg/L	16-May-2017	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S14	mg/L	16-Aug-2016	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S14	mg/L	12-Jul-2016	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S14	mg/L	25-May-2016	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S14	mg/L	01-Sep-2015	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S14	mg/L	07-Jul-2015	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S14	mg/L	27-May-2015	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S14	mg/L	28-Jul-2014	2.3		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S14	mg/L	09-Jun-2014	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S14	mg/L	01-Oct-2013	2.2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S14	mg/L	30-Jul-2013	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S14	mg/L	17-May-2013	4		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S2	mg/L	30-Sep-2019	27.9		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S2	mg/L	16-Jul-2019	2.4		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S2	mg/L	11-Jun-2019	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S2	mg/L	17-Sep-2018	4.4		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S2	mg/L	26-Jul-2018	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S2	mg/L	14-Jun-2018	12.9		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S2	mg/L	16-Aug-2017	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S2	mg/L	06-Jul-2017	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S2	mg/L	24-Apr-2017	15.5		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S2	mg/L	17-Aug-2016	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S2	mg/L	12-Jul-2016	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S2	mg/L	25-May-2016	5.8		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S2	mg/L	03-Sep-2015	15.2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S2	mg/L	07-Jul-2015	25.5		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S2	mg/L	28-May-2015	15.1		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S2	mg/L	23-Sep-2014	11.3		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S2	mg/L	23-Sep-2014	10.4		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S2	mg/L	29-Jul-2014	5.2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S2	mg/L	09-Jun-2014	36		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S2	mg/L	24-Sep-2013	4.8		0

Exceedance of Benchmarks

Site Name	Media Name	Benchmark	Parameter	Exposure Level	Location	Units	Sample Time	Sample Value	Benchmark Minimum	Benchmark Maximum
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S2	mg/L	31-Jul-2013	66.5		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S2	mg/L	15-May-2013	944		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S3	mg/L	30-Sep-2019	12.4		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S3	mg/L	16-Jul-2019	49.3		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S3	mg/L	11-Jun-2019	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S3	mg/L	17-Sep-2018	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S3	mg/L	26-Jul-2018	17.7		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S3	mg/L	14-Jun-2018	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S3	mg/L	15-Aug-2017	2.1		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S3	mg/L	06-Jul-2017	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S3	mg/L	24-Apr-2017	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S3	mg/L	16-Aug-2016	65.4		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S3	mg/L	12-Jul-2016	2.1		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S3	mg/L	25-May-2016	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S3	mg/L	03-Sep-2015	3.4		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S3	mg/L	07-Jul-2015	5.5		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S3	mg/L	27-May-2015	3.2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S3	mg/L	24-Sep-2013	2.1		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S3	mg/L	24-Jul-2013	4.2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S3	mg/L	14-May-2013	4.9		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S30	mg/L	30-Sep-2019	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S30	mg/L	16-Jul-2019	6.3		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S30	mg/L	11-Jun-2019	2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S30	mg/L	18-Sep-2018	6.4		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S30	mg/L	25-Jul-2018	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S30	mg/L	13-Jun-2018	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S30	mg/L	14-Aug-2017	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S30	mg/L	06-Jul-2017	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S30	mg/L	24-Apr-2017	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S30	mg/L	17-Aug-2016	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S30	mg/L	12-Jul-2016	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S30	mg/L	25-May-2016	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S30	mg/L	01-Sep-2015	4		0

Exceedance of Benchmarks

Site Name	Media Name	Benchmark	Parameter	Exposure Level	Location	Units	Sample Time	Sample Value	Benchmark Minimum	Benchmark Maximum
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S30	mg/L	07-Jul-2015	2.5		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S30	mg/L	26-May-2015	4.4		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S30	mg/L	22-Sep-2014	19.2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S30	mg/L	28-Jul-2014	4.5		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S30	mg/L	11-Jun-2014	2.8		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S30	mg/L	08-Oct-2013	2.1		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S30	mg/L	29-Jul-2013	7.7		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S30	mg/L	24-May-2013	<3		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S52	mg/L	30-Sep-2019	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S52	mg/L	15-Jul-2019	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S52	mg/L	11-Jun-2019	3.5		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S52	mg/L	17-Sep-2018	2.4		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S52	mg/L	23-Jul-2018	4.8		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S52	mg/L	14-Jun-2018	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S52	mg/L	15-Aug-2017	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S52	mg/L	05-Jul-2017	3.3		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S52	mg/L	24-Apr-2017	3.2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S52	mg/L	16-Aug-2016	2.8		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S52	mg/L	12-Jul-2016	9.6		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S52	mg/L	26-May-2016	11.8		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S52	mg/L	03-Sep-2015	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S52	mg/L	07-Jul-2015	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S52	mg/L	28-May-2015	23.8		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S6	mg/L	29-Jul-2014	4.4		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S6	mg/L	10-Jun-2014	21.1		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S6	mg/L	30-Sep-2013	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S6	mg/L	30-Jul-2013	26.3		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S6	mg/L	22-May-2013	359		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S8	mg/L	01-Oct-2019	3.6		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S8	mg/L	16-Jul-2019	4.7		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S8	mg/L	11-Jun-2019	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S8	mg/L	18-Sep-2018	3.5		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S8	mg/L	26-Jul-2018	14.7		0

Exceedance of Benchmarks

Site Name	Media Name	Benchmark	Parameter	Exposure Level	Location	Units	Sample Time	Sample Value	Benchmark Minimum	Benchmark Maximum
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S8	mg/L	14-Jun-2018	9.3		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S8	mg/L	16-Aug-2017	5.8		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S8	mg/L	05-Jul-2017	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S8	mg/L	24-Apr-2017	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S8	mg/L	16-Aug-2016	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S8	mg/L	12-Jul-2016	2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S8	mg/L	26-May-2016	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S8	mg/L	01-Sep-2015	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S8	mg/L	07-Jul-2015	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S8	mg/L	27-May-2015	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S8	mg/L	23-Sep-2013	<2		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S8	mg/L	22-Jul-2013	2.6		0
Marathon	Surface Water	CWQG (CCME)	Total Suspended Solids	Exposure 3	S8	mg/L	14-May-2013	3.7		0
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S11	mg/L	26-Jul-2018	0.112		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S11	mg/L	14-Aug-2017	0.068		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S11	mg/L	16-Aug-2016	<0.02		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S11	mg/L	12-Jul-2016	<0.02		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S11	mg/L	25-May-2016	<0.02		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S11	mg/L	01-Sep-2015	<0.02		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S11	mg/L	07-Jul-2015	<0.02		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S11	mg/L	27-May-2015	<0.02		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S14	mg/L	26-Jul-2018	0.028		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S14	mg/L	16-Aug-2017	0.031		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S14	mg/L	06-Jul-2017	0.033		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S14	mg/L	16-Aug-2016	<0.02		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S14	mg/L	12-Jul-2016	<0.02		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S14	mg/L	25-May-2016	<0.02		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S14	mg/L	01-Sep-2015	<0.02		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S14	mg/L	07-Jul-2015	<0.02		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S14	mg/L	27-May-2015	<0.02		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S2	mg/L	16-Aug-2017	0.037		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S2	mg/L	17-Aug-2016	<0.02		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S2	mg/L	12-Jul-2016	<0.02		0.019

Exceedance of Benchmarks

Site Name	Media Name	Benchmark	Parameter	Exposure Level	Location	Units	Sample Time	Sample Value	Benchmark Minimum	Benchmark Maximum
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S2	mg/L	25-May-2016	<0.02		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S2	mg/L	03-Sep-2015	<0.02		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S2	mg/L	07-Jul-2015	<0.02		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S2	mg/L	28-May-2015	<0.02		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S3	mg/L	16-Aug-2016	<0.02		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S3	mg/L	12-Jul-2016	<0.02		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S3	mg/L	25-May-2016	<0.02		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S3	mg/L	03-Sep-2015	<0.02		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S3	mg/L	07-Jul-2015	<0.02		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S3	mg/L	27-May-2015	<0.02		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S30	mg/L	06-Jul-2017	0.021		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S30	mg/L	17-Aug-2016	<0.02		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S30	mg/L	12-Jul-2016	<0.02		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S30	mg/L	25-May-2016	<0.02		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S30	mg/L	01-Sep-2015	<0.02		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S30	mg/L	07-Jul-2015	<0.02		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S30	mg/L	26-May-2015	<0.02		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S52	mg/L	15-Aug-2017	<0.02		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S52	mg/L	16-Aug-2016	<0.02		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S52	mg/L	12-Jul-2016	<0.02		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S52	mg/L	26-May-2016	<0.02		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S52	mg/L	03-Sep-2015	<0.02		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S52	mg/L	07-Jul-2015	<0.02		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S52	mg/L	28-May-2015	<0.02		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S8	mg/L	16-Aug-2016	<0.02		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S8	mg/L	12-Jul-2016	<0.02		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S8	mg/L	26-May-2016	<0.02		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S8	mg/L	01-Sep-2015	<0.02		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S8	mg/L	07-Jul-2015	<0.02		0.019
Marathon	Surface Water	CWQG (CCME)	Un-ionized Ammonia (N)	Exposure 3	S8	mg/L	27-May-2015	<0.02		0.019
Marathon	Surface Water	CWQG (CCME)	Zinc (Zn)	Exposure 3	S14	mg/L	17-Jul-2019	0.0075		0.007
Marathon	Surface Water	CWQG (CCME)	Zinc (Zn)	Exposure 3	S14	mg/L	16-Aug-2016	0.0071		0.007
Marathon	Surface Water	CWQG (CCME)	Zinc (Zn)	Exposure 3	S14	mg/L	27-May-2015	0.0097		0.007

Exceedance of Benchmarks

Site Name	Media Name	Benchmark	Parameter	Exposure Level	Location	Units	Sample Time	Sample Value	Benchmark Minimum	Benchmark Maximum
Marathon	Surface Water	CWQG (CCME)	Zinc (Zn)	Exposure 3	S14	mg/L	28-Jul-2014	0.0073		0.007
Marathon	Surface Water	CWQG (CCME)	Zinc (Zn)	Exposure 3	S14	mg/L	30-Jul-2013	0.0094		0.007
Marathon	Surface Water	CWQG (CCME)	Zinc (Zn)	Exposure 3	S2	mg/L	16-Jul-2019	0.0441		0.007
Marathon	Surface Water	CWQG (CCME)	Zinc (Zn)	Exposure 3	S2	mg/L	15-May-2013	0.0185		0.007
Marathon	Surface Water	CWQG (CCME)	Zinc (Zn)	Exposure 3	S3	mg/L	24-Jul-2013	0.0253		0.007
Marathon	Surface Water	CWQG (CCME)	Zinc (Zn)	Exposure 3	S30	mg/L	25-May-2016	0.0101		0.007
Marathon	Surface Water	CWQG (CCME)	Zinc (Zn)	Exposure 3	S52	mg/L	15-Aug-2017	0.0074		0.007
Marathon	Surface Water	CWQG (CCME)	Zinc (Zn)	Exposure 3	S6	mg/L	22-May-2013	0.0129		0.007
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S11	mg/L	01-Oct-2019	0.117		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S11	mg/L	13-Jun-2019	0.108		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S11	mg/L	19-Sep-2018	0.0943		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S11	mg/L	13-Jun-2018	0.102		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S11	mg/L	06-Jul-2017	0.11		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S11	mg/L	24-Apr-2017	0.135		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S11	mg/L	12-Jul-2016	0.124		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S11	mg/L	25-May-2016	0.12		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S11	mg/L	01-Sep-2015	0.0996		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S11	mg/L	07-Jul-2015	0.111		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S11	mg/L	27-May-2015	0.12		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S11	mg/L	23-Sep-2014	0.163		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S11	mg/L	28-Jul-2014	0.162		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S11	mg/L	09-Jun-2014	0.224		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S11	mg/L	01-Oct-2013	0.191		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S11	mg/L	01-Aug-2013	0.26		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S11	mg/L	22-May-2013	0.137		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S14	mg/L	01-Oct-2019	0.356		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S14	mg/L	17-Jul-2019	0.109		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S14	mg/L	13-Jun-2019	0.154		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S14	mg/L	19-Sep-2018	0.191		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S14	mg/L	26-Jul-2018	0.0852		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S14	mg/L	13-Jun-2018	0.168		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S14	mg/L	16-Aug-2017	0.134		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S14	mg/L	06-Jul-2017	0.237		0.075

Exceedance of Benchmarks

Site Name	Media Name	Benchmark	Parameter	Exposure Level	Location	Units	Sample Time	Sample Value	Benchmark Minimum	Benchmark Maximum
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S14	mg/L	16-May-2017	0.334		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S14	mg/L	16-Aug-2016	0.162		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S14	mg/L	12-Jul-2016	0.129		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S14	mg/L	25-May-2016	0.332		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S14	mg/L	01-Sep-2015	0.289		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S14	mg/L	07-Jul-2015	0.163		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S14	mg/L	27-May-2015	0.359		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S2	mg/L	30-Sep-2019	0.16		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S2	mg/L	17-Sep-2018	0.103		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S2	mg/L	24-Apr-2017	0.144		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S2	mg/L	25-May-2016	0.205		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S2	mg/L	28-May-2015	0.16		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S3	mg/L	30-Sep-2019	0.0978		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S3	mg/L	15-Aug-2017	0.101		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S3	mg/L	24-Apr-2017	0.1		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S30	mg/L	30-Sep-2019	0.135		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S30	mg/L	11-Jun-2019	0.115		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S30	mg/L	18-Sep-2018	0.086		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S30	mg/L	13-Jun-2018	0.0933		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S30	mg/L	06-Jul-2017	0.111		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S30	mg/L	24-Apr-2017	0.134		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S30	mg/L	17-Aug-2016	0.106		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S30	mg/L	12-Jul-2016	0.124		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S30	mg/L	25-May-2016	0.117		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S30	mg/L	01-Sep-2015	0.0941		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S30	mg/L	07-Jul-2015	0.103		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S30	mg/L	26-May-2015	0.127		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S52	mg/L	30-Sep-2019	0.154		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S52	mg/L	11-Jun-2019	0.081		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S52	mg/L	17-Sep-2018	0.0812		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S52	mg/L	24-Apr-2017	0.124		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S52	mg/L	26-May-2016	0.0941		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S52	mg/L	07-Jul-2015	0.0918		0.075

Exceedance of Benchmarks

Site Name	Media Name	Benchmark	Parameter	Exposure Level	Location	Units	Sample Time	Sample Value	Benchmark Minimum	Benchmark Maximum
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S52	mg/L	28-May-2015	0.0959		0.075
Marathon	Surface Water	Interim PWQO	Aluminum (Al)-Dissolved	Exposure 3	S8	mg/L	24-Apr-2017	0.0828		0.075
Marathon	Surface Water	Interim PWQO	Cobalt (Co)	Exposure 3	S14	mg/L	17-Jul-2019	0.00096		0.0009
Marathon	Surface Water	Interim PWQO	Cobalt (Co)	Exposure 3	S14	mg/L	16-Aug-2017	0.00138		0.0009
Marathon	Surface Water	Interim PWQO	Cobalt (Co)	Exposure 3	S14	mg/L	16-Aug-2016	0.00187		0.0009
Marathon	Surface Water	Interim PWQO	Cobalt (Co)	Exposure 3	S2	mg/L	15-May-2013	0.00243		0.0009
Marathon	Surface Water	Interim PWQO	Cobalt (Co)	Exposure 3	S3	mg/L	16-Jul-2019	0.00112		0.0009
Marathon	Surface Water	Interim PWQO	Cobalt (Co)	Exposure 3	S3	mg/L	26-Jul-2018	0.00125		0.0009
Marathon	Surface Water	Interim PWQO	Cobalt (Co)	Exposure 3	S3	mg/L	12-Jul-2016	0.00094		0.0009
Marathon	Surface Water	Interim PWQO	Cobalt (Co)	Exposure 3	S6	mg/L	22-May-2013	0.00203		0.0009
Marathon	Surface Water	Interim PWQO	Cobalt (Co)	Exposure 3	S8	mg/L	16-Jul-2019	0.00094		0.0009
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S2	mg/L	15-May-2013	0.0124		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S3	mg/L	30-Sep-2019	0.00516		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S3	mg/L	16-Jul-2019	0.0079		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S3	mg/L	11-Jun-2019	0.00558		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S3	mg/L	17-Sep-2018	0.0059		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S3	mg/L	26-Jul-2018	0.00685		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S3	mg/L	14-Jun-2018	0.00569		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S3	mg/L	15-Aug-2017	0.00582		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S3	mg/L	06-Jul-2017	0.0059		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S3	mg/L	12-Jul-2016	0.00927		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S3	mg/L	07-Jul-2015	0.00681		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S3	mg/L	27-May-2015	0.00603		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S3	mg/L	24-Sep-2013	0.00645		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S3	mg/L	14-May-2013	0.0057		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S52	mg/L	30-Sep-2019	0.0118		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S52	mg/L	15-Jul-2019	0.0064		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S52	mg/L	11-Jun-2019	0.00868		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S52	mg/L	17-Sep-2018	0.00905		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S52	mg/L	23-Jul-2018	0.00545		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S52	mg/L	14-Jun-2018	0.00763		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S52	mg/L	15-Aug-2017	0.0177		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S52	mg/L	05-Jul-2017	0.00819		0.005

Exceedance of Benchmarks

Site Name	Media Name	Benchmark	Parameter	Exposure Level	Location	Units	Sample Time	Sample Value	Benchmark Minimum	Benchmark Maximum
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S52	mg/L	24-Apr-2017	0.0111		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S52	mg/L	16-Aug-2016	0.00508		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S52	mg/L	12-Jul-2016	0.00914		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S52	mg/L	26-May-2016	0.00931		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S52	mg/L	03-Sep-2015	0.00801		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S52	mg/L	07-Jul-2015	0.00867		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S52	mg/L	28-May-2015	0.00936		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S6	mg/L	29-Jul-2014	0.0068		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S6	mg/L	10-Jun-2014	0.0096		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S6	mg/L	30-Sep-2013	0.0094		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S6	mg/L	30-Jul-2013	0.0133		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S6	mg/L	22-May-2013	0.0157		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S8	mg/L	01-Oct-2019	0.00571		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S8	mg/L	16-Jul-2019	0.0069		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S8	mg/L	11-Jun-2019	0.00651		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S8	mg/L	18-Sep-2018	0.00524		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S8	mg/L	26-Jul-2018	0.00596		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S8	mg/L	14-Jun-2018	0.00742		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S8	mg/L	16-Aug-2017	0.00505		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S8	mg/L	05-Jul-2017	0.00549		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S8	mg/L	24-Apr-2017	0.00554		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S8	mg/L	16-Aug-2016	0.0069		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S8	mg/L	12-Jul-2016	0.00669		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S8	mg/L	26-May-2016	0.0051		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S8	mg/L	01-Sep-2015	0.00517		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S8	mg/L	07-Jul-2015	0.00509		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S8	mg/L	27-May-2015	0.0055		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S8	mg/L	23-Sep-2013	0.0073		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S8	mg/L	22-Jul-2013	0.0064		0.005
Marathon	Surface Water	Interim PWQO	Copper (Cu)	Exposure 3	S8	mg/L	14-May-2013	0.0062		0.005
Marathon	Surface Water	Interim PWQO	Phosphorus (P)-Total	Exposure 3	S14	mg/L	17-Jul-2019	0.028		0.02
Marathon	Surface Water	Interim PWQO	Phosphorus (P)-Total	Exposure 3	S2	mg/L	16-Jul-2019	0.0619		0.02
Marathon	Surface Water	Interim PWQO	Phosphorus (P)-Total	Exposure 3	S2	mg/L	26-Jul-2018	0.0335		0.02

Exceedance of Benchmarks

Site Name	Media Name	Benchmark	Parameter	Exposure Level	Location	Units	Sample Time	Sample Value	Benchmark Minimum	Benchmark Maximum
Marathon	Surface Water	Interim PWQO	Phosphorus (P)-Total	Exposure 3	S2	mg/L	17-Aug-2016	0.0208		0.02
Marathon	Surface Water	Interim PWQO	Phosphorus (P)-Total	Exposure 3	S2	mg/L	07-Jul-2015	0.0226		0.02
Marathon	Surface Water	Interim PWQO	Phosphorus (P)-Total	Exposure 3	S2	mg/L	31-Jul-2013	0.05		0.02
Marathon	Surface Water	Interim PWQO	Phosphorus (P)-Total	Exposure 3	S2	mg/L	15-May-2013	0.214		0.02
Marathon	Surface Water	Interim PWQO	Phosphorus (P)-Total	Exposure 3	S3	mg/L	30-Sep-2019	0.158		0.02
Marathon	Surface Water	Interim PWQO	Phosphorus (P)-Total	Exposure 3	S3	mg/L	16-Jul-2019	0.0361		0.02
Marathon	Surface Water	Interim PWQO	Phosphorus (P)-Total	Exposure 3	S3	mg/L	26-Jul-2018	0.0615		0.02
Marathon	Surface Water	Interim PWQO	Phosphorus (P)-Total	Exposure 3	S3	mg/L	15-Aug-2017	0.033		0.02
Marathon	Surface Water	Interim PWQO	Phosphorus (P)-Total	Exposure 3	S3	mg/L	16-Aug-2016	0.0597		0.02
Marathon	Surface Water	Interim PWQO	Phosphorus (P)-Total	Exposure 3	S3	mg/L	12-Jul-2016	0.0216		0.02
Marathon	Surface Water	Interim PWQO	Phosphorus (P)-Total	Exposure 3	S6	mg/L	10-Jun-2014	0.0226		0.02
Marathon	Surface Water	Interim PWQO	Phosphorus (P)-Total	Exposure 3	S6	mg/L	30-Jul-2013	0.0246		0.02
Marathon	Surface Water	Interim PWQO	Phosphorus (P)-Total	Exposure 3	S6	mg/L	22-May-2013	0.13		0.02
Marathon	Surface Water	Interim PWQO	Phosphorus (P)-Total	Exposure 3	S8	mg/L	01-Oct-2019	0.0605		0.02
Marathon	Surface Water	Interim PWQO	Phosphorus (P)-Total	Exposure 3	S8	mg/L	16-Jul-2019	0.0303		0.02
Marathon	Surface Water	Interim PWQO	Phosphorus (P)-Total	Exposure 3	S8	mg/L	18-Sep-2018	0.0227		0.02
Marathon	Surface Water	Interim PWQO	Phosphorus (P)-Total	Exposure 3	S8	mg/L	26-Jul-2018	0.0421		0.02
Marathon	Surface Water	Interim PWQO	Phosphorus (P)-Total	Exposure 3	S8	mg/L	14-Jun-2018	0.0252		0.02
Marathon	Surface Water	Interim PWQO	Phosphorus (P)-Total	Exposure 3	S8	mg/L	16-Aug-2017	0.027		0.02
Marathon	Surface Water	Interim PWQO	Vanadium (V)	Exposure 3	S2	mg/L	15-May-2013	0.0078		0.006
Marathon	Surface Water	Interim PWQO	Vanadium (V)	Exposure 3	S6	mg/L	22-May-2013	0.0092		0.006
Marathon	Surface Water	Interim PWQO	Zinc (Zn)	Exposure 3	S2	mg/L	16-Jul-2019	0.0441		0.02
Marathon	Surface Water	Interim PWQO	Zinc (Zn)	Exposure 3	S3	mg/L	24-Jul-2013	0.0253		0.02
Marathon	Surface Water	PWQO	Chromium (Cr)	Exposure 3	S6	mg/L	22-May-2013	0.0095		0.0089
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S11	mg/L	01-Oct-2019	<0.5		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S11	mg/L	17-Jul-2019	<0.5		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S11	mg/L	13-Jun-2019	<0.5		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S11	mg/L	23-Sep-2014	<0.01		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S11	mg/L	28-Jul-2014	<0.01		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S11	mg/L	09-Jun-2014	<0.01		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S11	mg/L	01-Oct-2013	<0.01		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S11	mg/L	01-Aug-2013	<0.01		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S11	mg/L	22-May-2013	<10		0.001

Exceedance of Benchmarks

Site Name	Media Name	Benchmark	Parameter	Exposure Level	Location	Units	Sample Time	Sample Value	Benchmark Minimum	Benchmark Maximum
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S14	mg/L	01-Oct-2019	<0.5		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S14	mg/L	17-Jul-2019	<0.5		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S14	mg/L	13-Jun-2019	<0.5		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S14	mg/L	28-Jul-2014	<0.01		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S14	mg/L	09-Jun-2014	<0.01		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S14	mg/L	01-Oct-2013	<0.01		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S14	mg/L	30-Jul-2013	<0.01		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S14	mg/L	17-May-2013	<10		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S2	mg/L	30-Sep-2019	<0.5		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S2	mg/L	16-Jul-2019	<0.5		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S2	mg/L	11-Jun-2019	<0.5		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S2	mg/L	23-Sep-2014	<0.01		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S2	mg/L	23-Sep-2014	<0.01		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S2	mg/L	29-Jul-2014	<0.01		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S2	mg/L	09-Jun-2014	<0.01		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S2	mg/L	24-Sep-2013	<0.01		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S2	mg/L	31-Jul-2013	<0.01		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S2	mg/L	15-May-2013	<10		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S3	mg/L	30-Sep-2019	<0.5		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S3	mg/L	16-Jul-2019	<0.5		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S3	mg/L	11-Jun-2019	<0.5		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S3	mg/L	24-Sep-2013	<0.01		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S3	mg/L	24-Jul-2013	<0.01		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S3	mg/L	14-May-2013	<10		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S30	mg/L	30-Sep-2019	<0.5		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S30	mg/L	16-Jul-2019	<0.5		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S30	mg/L	11-Jun-2019	<0.5		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S30	mg/L	22-Sep-2014	<0.01		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S30	mg/L	28-Jul-2014	<0.01		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S30	mg/L	11-Jun-2014	<0.01		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S30	mg/L	08-Oct-2013	<0.01		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S30	mg/L	29-Jul-2013	<0.01		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S30	mg/L	24-May-2013	<10		0.001

Exceedance of Benchmarks

Site Name	Media Name	Benchmark	Parameter	Exposure Level	Location	Units	Sample Time	Sample Value	Benchmark Minimum	Benchmark Maximum
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S52	mg/L	30-Sep-2019	<0.5		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S52	mg/L	15-Jul-2019	<0.5		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S52	mg/L	11-Jun-2019	<0.5		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S6	mg/L	29-Jul-2014	<0.01		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S6	mg/L	10-Jun-2014	<0.01		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S6	mg/L	30-Sep-2013	<0.01		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S6	mg/L	30-Jul-2013	<0.01		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S6	mg/L	22-May-2013	<10		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S8	mg/L	01-Oct-2019	<0.5		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S8	mg/L	16-Jul-2019	<0.5		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S8	mg/L	11-Jun-2019	<0.5		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S8	mg/L	23-Sep-2013	<0.01		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S8	mg/L	22-Jul-2013	<0.01		0.001
Marathon	Surface Water	PWQO	Chromium, Hexavalent	Exposure 3	S8	mg/L	14-May-2013	<10		0.001
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S2	mg/L	15-May-2013	0.0124		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S3	mg/L	30-Sep-2019	0.00516		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S3	mg/L	16-Jul-2019	0.0079		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S3	mg/L	11-Jun-2019	0.00558		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S3	mg/L	17-Sep-2018	0.0059		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S3	mg/L	26-Jul-2018	0.00685		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S3	mg/L	14-Jun-2018	0.00569		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S3	mg/L	15-Aug-2017	0.00582		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S3	mg/L	06-Jul-2017	0.0059		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S3	mg/L	12-Jul-2016	0.00927		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S3	mg/L	07-Jul-2015	0.00681		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S3	mg/L	27-May-2015	0.00603		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S3	mg/L	24-Sep-2013	0.00645		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S3	mg/L	14-May-2013	0.0057		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S52	mg/L	30-Sep-2019	0.0118		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S52	mg/L	15-Jul-2019	0.0064		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S52	mg/L	11-Jun-2019	0.00868		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S52	mg/L	17-Sep-2018	0.00905		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S52	mg/L	23-Jul-2018	0.00545		0.005

Exceedance of Benchmarks

Site Name	Media Name	Benchmark	Parameter	Exposure Level	Location	Units	Sample Time	Sample Value	Benchmark Minimum	Benchmark Maximum
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S52	mg/L	14-Jun-2018	0.00763		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S52	mg/L	15-Aug-2017	0.0177		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S52	mg/L	05-Jul-2017	0.00819		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S52	mg/L	24-Apr-2017	0.0111		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S52	mg/L	16-Aug-2016	0.00508		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S52	mg/L	12-Jul-2016	0.00914		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S52	mg/L	26-May-2016	0.00931		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S52	mg/L	03-Sep-2015	0.00801		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S52	mg/L	07-Jul-2015	0.00867		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S52	mg/L	28-May-2015	0.00936		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S6	mg/L	29-Jul-2014	0.0068		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S6	mg/L	10-Jun-2014	0.0096		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S6	mg/L	30-Sep-2013	0.0094		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S6	mg/L	30-Jul-2013	0.0133		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S6	mg/L	22-May-2013	0.0157		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S8	mg/L	01-Oct-2019	0.00571		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S8	mg/L	16-Jul-2019	0.0069		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S8	mg/L	11-Jun-2019	0.00651		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S8	mg/L	18-Sep-2018	0.00524		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S8	mg/L	26-Jul-2018	0.00596		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S8	mg/L	14-Jun-2018	0.00742		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S8	mg/L	16-Aug-2017	0.00505		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S8	mg/L	05-Jul-2017	0.00549		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S8	mg/L	24-Apr-2017	0.00554		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S8	mg/L	16-Aug-2016	0.0069		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S8	mg/L	12-Jul-2016	0.00669		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S8	mg/L	26-May-2016	0.0051		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S8	mg/L	01-Sep-2015	0.00517		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S8	mg/L	07-Jul-2015	0.00509		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S8	mg/L	27-May-2015	0.0055		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S8	mg/L	23-Sep-2013	0.0073		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S8	mg/L	22-Jul-2013	0.0064		0.005
Marathon	Surface Water	PWQO	Copper (Cu)	Exposure 3	S8	mg/L	14-May-2013	0.0062		0.005

Exceedance of Benchmarks

Site Name	Media Name	Benchmark	Parameter	Exposure Level	Location	Units	Sample Time	Sample Value	Benchmark Minimum	Benchmark Maximum
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S11	mg/L	01-Oct-2019	0.331		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S11	mg/L	17-Jul-2019	0.311		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S11	mg/L	14-Aug-2017	0.32		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S11	mg/L	25-May-2016	0.373		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S11	mg/L	27-May-2015	0.37		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S14	mg/L	01-Oct-2019	0.978		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S14	mg/L	17-Jul-2019	1.78		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S14	mg/L	13-Jun-2019	0.688		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S14	mg/L	19-Sep-2018	1.6		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S14	mg/L	26-Jul-2018	2.31		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S14	mg/L	13-Jun-2018	0.672		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S14	mg/L	16-Aug-2017	3.35		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S14	mg/L	06-Jul-2017	1.24		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S14	mg/L	16-May-2017	0.388		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S14	mg/L	16-Aug-2016	3.02		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S14	mg/L	12-Jul-2016	1.59		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S14	mg/L	25-May-2016	0.547		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S14	mg/L	01-Sep-2015	1.44		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S14	mg/L	07-Jul-2015	1.27		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S14	mg/L	27-May-2015	0.497		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S14	mg/L	28-Jul-2014	1.05		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S14	mg/L	09-Jun-2014	0.49		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S14	mg/L	01-Oct-2013	0.954		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S14	mg/L	30-Jul-2013	0.614		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S14	mg/L	17-May-2013	0.54		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S2	mg/L	16-Jul-2019	1.4		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S2	mg/L	26-Jul-2018	0.379		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S2	mg/L	24-Apr-2017	0.481		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S2	mg/L	25-May-2016	0.531		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S2	mg/L	07-Jul-2015	0.546		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S2	mg/L	28-May-2015	0.496		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S2	mg/L	23-Sep-2014	0.418		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S2	mg/L	23-Sep-2014	0.402		0.3

Exceedance of Benchmarks

Site Name	Media Name	Benchmark	Parameter	Exposure Level	Location	Units	Sample Time	Sample Value	Benchmark Minimum	Benchmark Maximum
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S2	mg/L	29-Jul-2014	0.368		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S2	mg/L	09-Jun-2014	0.317		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S2	mg/L	31-Jul-2013	0.544		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S2	mg/L	15-May-2013	3.7		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S3	mg/L	30-Sep-2019	0.976		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S3	mg/L	16-Jul-2019	2.1		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S3	mg/L	11-Jun-2019	0.406		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S3	mg/L	17-Sep-2018	0.497		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S3	mg/L	26-Jul-2018	2.3		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S3	mg/L	14-Jun-2018	0.569		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S3	mg/L	15-Aug-2017	1.96		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S3	mg/L	06-Jul-2017	0.75		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S3	mg/L	16-Aug-2016	1.72		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S3	mg/L	12-Jul-2016	1.59		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S3	mg/L	03-Sep-2015	0.676		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S3	mg/L	07-Jul-2015	0.881		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S3	mg/L	24-Sep-2013	0.499		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S3	mg/L	24-Jul-2013	0.467		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S3	mg/L	14-May-2013	0.44		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S30	mg/L	11-Jun-2019	0.445		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S52	mg/L	30-Sep-2019	0.344		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S52	mg/L	24-Apr-2017	0.386		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S52	mg/L	26-May-2016	0.308		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S52	mg/L	28-May-2015	0.528		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S6	mg/L	29-Jul-2014	0.394		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S6	mg/L	10-Jun-2014	0.742		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S6	mg/L	30-Jul-2013	0.763		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S6	mg/L	22-May-2013	4.57		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S8	mg/L	01-Oct-2019	0.382		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S8	mg/L	16-Jul-2019	1.81		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S8	mg/L	11-Jun-2019	0.613		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S8	mg/L	18-Sep-2018	0.526		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S8	mg/L	26-Jul-2018	0.5		0.3

Exceedance of Benchmarks

Site Name	Media Name	Benchmark	Parameter	Exposure Level	Location	Units	Sample Time	Sample Value	Benchmark Minimum	Benchmark Maximum
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S8	mg/L	14-Jun-2018	1.13		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S8	mg/L	16-Aug-2017	0.653		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S8	mg/L	05-Jul-2017	0.338		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S8	mg/L	24-Apr-2017	0.476		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S8	mg/L	16-Aug-2016	1.15		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S8	mg/L	12-Jul-2016	0.547		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S8	mg/L	26-May-2016	0.47		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S8	mg/L	01-Sep-2015	0.885		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S8	mg/L	07-Jul-2015	0.41		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S8	mg/L	27-May-2015	0.549		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S8	mg/L	23-Sep-2013	0.434		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S8	mg/L	22-Jul-2013	0.839		0.3
Marathon	Surface Water	PWQO	Iron (Fe)	Exposure 3	S8	mg/L	14-May-2013	0.365		0.3
Marathon	Surface Water	PWQO	pH	Exposure 3	S11	pH unit	23-Sep-2014	6.07	6.5	8.5
Marathon	Surface Water	PWQO	pH	Exposure 3	S11	pH unit	22-May-2013	8.54	6.5	8.5
Marathon	Surface Water	PWQO	pH	Exposure 3	S14	pH unit	01-Oct-2019	6.42	6.5	8.5
Marathon	Surface Water	PWQO	pH	Exposure 3	S14	pH unit	16-May-2017	6.4	6.5	8.5
Marathon	Surface Water	PWQO	pH	Exposure 3	S14	pH unit	27-May-2015	6.48	6.5	8.5
Marathon	Surface Water	PWQO	pH	Exposure 3	S14	pH unit	01-Oct-2013	9.15	6.5	8.5
Marathon	Surface Water	PWQO	pH	Exposure 3	S14	pH unit	30-Jul-2013	9.12	6.5	8.5
Marathon	Surface Water	PWQO	pH	Exposure 3	S2	pH unit	23-Sep-2014	6.14	6.5	8.5
Marathon	Surface Water	PWQO	pH	Exposure 3	S2	pH unit	31-Jul-2013	9.47	6.5	8.5
Marathon	Surface Water	PWQO	pH	Exposure 3	S2	pH unit	15-May-2013	8.57	6.5	8.5
Marathon	Surface Water	PWQO	pH	Exposure 3	S3	pH unit	24-Sep-2013	5.8	6.5	8.5
Marathon	Surface Water	PWQO	pH	Exposure 3	S30	pH unit	22-Sep-2014	5.28	6.5	8.5
Marathon	Surface Water	PWQO	pH	Exposure 3	S30	pH unit	08-Oct-2013	5.05	6.5	8.5
Marathon	Surface Water	PWQO	pH	Exposure 3	S30	pH unit	29-Jul-2013	9.58	6.5	8.5
Marathon	Surface Water	PWQO	pH	Exposure 3	S6	pH unit	10-Jun-2014	8.6	6.5	8.5
Marathon	Surface Water	PWQO	pH	Exposure 3	S6	pH unit	30-Jul-2013	9.42	6.5	8.5
Marathon	Surface Water	PWQO	pH	Exposure 3	S6	pH unit	22-May-2013	6.47	6.5	8.5
Marathon	Surface Water	PWQO	pH	Exposure 3	S8	pH unit	22-Jul-2013	5.15	6.5	8.5
Marathon	Surface Water	PWQO	pH (field)	Exposure 3	S11	pH unit	01-Oct-2019	6.16	6.5	8.5
Marathon	Surface Water	PWQO	pH (field)	Exposure 3	S11	pH unit	24-Apr-2017	6.27	6.5	8.5

Exceedance of Benchmarks

Site Name	Media Name	Benchmark	Parameter	Exposure Level	Location	Units	Sample Time	Sample Value	Benchmark Minimum	Benchmark Maximum
Marathon	Surface Water	PWQO	pH (field)	Exposure 3	S11	pH unit	25-May-2016	6.05	6.5	8.5
Marathon	Surface Water	PWQO	pH (field)	Exposure 3	S11	pH unit	01-Sep-2015	5.88	6.5	8.5
Marathon	Surface Water	PWQO	pH (field)	Exposure 3	S11	pH unit	27-May-2015	5.54	6.5	8.5
Marathon	Surface Water	PWQO	pH (field)	Exposure 3	S14	pH unit	01-Oct-2019	6.16	6.5	8.5
Marathon	Surface Water	PWQO	pH (field)	Exposure 3	S14	pH unit	16-May-2017	5.15	6.5	8.5
Marathon	Surface Water	PWQO	pH (field)	Exposure 3	S14	pH unit	01-Sep-2015	6.02	6.5	8.5
Marathon	Surface Water	PWQO	pH (field)	Exposure 3	S2	pH unit	24-Apr-2017	6.18	6.5	8.5
Marathon	Surface Water	PWQO	pH (field)	Exposure 3	S3	pH unit	24-Apr-2017	6.36	6.5	8.5
Marathon	Surface Water	PWQO	pH (field)	Exposure 3	S30	pH unit	24-Apr-2017	6.31	6.5	8.5
Marathon	Surface Water	PWQO	pH (field)	Exposure 3	S30	pH unit	01-Sep-2015	5.98	6.5	8.5
Marathon	Surface Water	PWQO	pH (field)	Exposure 3	S30	pH unit	26-May-2015	5.92	6.5	8.5
Marathon	Surface Water	PWQO	pH (field)	Exposure 3	S52	pH unit	15-Jul-2019	6.3	6.5	8.5
Marathon	Surface Water	PWQO	pH (field)	Exposure 3	S52	pH unit	11-Jun-2019	5.94	6.5	8.5
Marathon	Surface Water	PWQO	pH (field)	Exposure 3	S52	pH unit	23-Jul-2018	6.13	6.5	8.5
Marathon	Surface Water	PWQO	pH (field)	Exposure 3	S52	pH unit	24-Apr-2017	4.88	6.5	8.5
Marathon	Surface Water	PWQO	pH (field)	Exposure 3	S8	pH unit	01-Oct-2019	6.14	6.5	8.5
Marathon	Surface Water	PWQO	pH (field)	Exposure 3	S8	pH unit	14-Jun-2018	6.47	6.5	8.5
Marathon	Surface Water	PWQO	pH (field)	Exposure 3	S8	pH unit	24-Apr-2017	4.15	6.5	8.5
Marathon	Surface Water	PWQO	pH (field)	Exposure 3	S8	pH unit	01-Sep-2015	6.36	6.5	8.5

Notes:

1. The summary time is between 01-Jan-2013 and 31-Dec-2019.
2. The comparison historical time is between 01-Jan-1900 and 31-Dec-2012.
3. The reporting locations are: "EL1", "PR1", "PR2", "PR3 ("PR-3")", "PR4", "L1", "S2", "S16", "S27", "S28", "S13", "S15", "S12", "S14", "S30", "S29", "S5", "LHARE", "S10", "S9", "S22", "S21", "S20", "S41", "Bamoos1", "Bamoos2", "S37", "S36", "S35", "S38", "S39", "S33", "S34", "S8", "L19", "L9", "L12", "S6", "S18", "S19", "S4", "S17", "S3", "L8", "L14", "L15", "S26", "S24", "S25", "S7", "S31", "S23", "S11", "S1", "S11_(samp)", "S32", "S40", "L13", "L13a", "L16", "L17", "L18", "L2", "L20", "L23", "L24", "L25", "L26", "L27", "L3", "L4", "L6", "L7", "L22", "L21", "S44", "S45", "S60", "S61", "S62", "S46", "S52", "S53", "S47", "S48", "S59", "Malpa Lake", "S49", "S58", "S64", "S54", "S55", "S56", "S57", "S50", "L5", "S42", "S43", "S63", "EL5", "EL6", "EL7", "EL8", "EL9", "ES1", "ES2", "ES3", "ES4", "ES7", "ES8", "ES9", "ES10", "ES11", "ES13", "ES14", "L10", "L11", "L28", "G-L1", "GS-1", "G-S3", "G-S4", "G-S5", "G-S6", "G-S7", "G-S9", "G-S11", "G-S13", "G-S14", "G-S16", "17-EL7", "L29".