Lake Manitoba & Lake St. Martin Outlet Channels Project

Aquatic Environment Monitoring, Fall 2020 to Spring 2021 - Water Quality

REPORT

Prepared for Manitoba Transportation and Infrastructure
By North/South Consultants Inc. · 83 Scurfield Blvd. · Winnipeg, MB · R3Y 1G4

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A Data Report Prepared for

Manitoba Transportation and Infrastructure

By:

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EXECUTIVE SUMMARY

North/South Consultants Inc. (NSC) was retained by Manitoba Transportation and Infrastructure (MTI) to collect supplemental data with respect to the aquatic environment in support of the Lake Manitoba and Lake St. Martin Outlet Channel Project (the Project). An Aquatic Effects Monitoring Program (AEMP) was developed in 2020 to provide a plan for monitoring the effects of the Project on the aquatic environment, focusing on key issues identified in the Environmental Impact Statement (EIS). The AEMP identified the need for the collection of data to supplement existing information that had been presented in the EIS.

Water quality sampling was conducted four times from September 2020 to May 2021 to provide additional pre-construction data for the surface water quality study described in the AEMP. This report presents the results of this sampling and is an update of NSC (2021) which previously reported the results from fall 2020. The surface water quality monitoring study was designed to determine whether water quality conditions change due to channel operations, specifically whether the change in flow patterns affects water quality. As such, the AEMP includes sampling locations throughout the study area. In addition to the locations identified in the AEMP, sampling described in this report was conducted at supplemental locations where historical sampling has occurred or to characterize tributaries in the study area.

In situ water quality measurements and water samples were collected at 20 core sampling sites in the study area from Lake Manitoba to Lake Winnipeg three times during the open-water season, and once during the ice-cover season. Sampling dates were as follows: September 1-10 and October 13-14, 2020; and March 15-18 and May 17-18, 2021. Not all sites were sampled in October (11 sites sampled) and May (19 sites sampled) due to weather conditions. Additional sites were surveyed for the presence of water and *in situ* water quality, including: 10 sites along the alignments of the proposed Lake Manitoba Outlet Channel (LMOC) and Lake St. Martin Outlet Channel (LSMOC) in September 2020; four sites along the proposed LMOC in May 2021; and one site at the downstream end of Reach 1 of the Lake St. Martin Emergency Outlet Channel (LSMEOC) in March 2021.

Quality assurance/quality control (QA/QC) measures were incorporated into the monitoring program including standard sampling methods and QA/QC samples. All results were compared to the Manitoba Water Quality Standards, Objectives and Guidelines (MWQSOG) for the protection of aquatic life (PAL), as well as the Canadian Council of Ministers of the Environment (CCME) guidelines for PAL.

Based on the results of the monitoring that was conducted from September 2020 to May 2021, the water quality of the study area can be described as moderately nutrient-rich to nutrient-rich, low to moderately turbid, slightly alkaline, hard to very hard, and well-oxygenated. However, during the ice-cover season anoxic conditions were observed in Big Buffalo Lake and the eastern bay of Lake St. Martin near the proposed LSMOC.

In general, water quality was similar at sites sampled along the main flow path from Lake Manitoba through the Fairford River to Lake St. Martin and into the Dauphin River; however, during the ice-cover season water quality in the eastern bay of Lake St. Martin near the outlet of the proposed LSMOC had higher alkalinity, hardness, ammonia, carbon, colour, conductivity, TDS, and several metals and major ions compared to other areas of the lake. Additionally, differences in water quality were observed between the sites sampled along the main flow path and Birch Creek, Big Buffalo Lake, Buffalo Creek, and Sturgeon Bay, including:

- Birch Creek had higher alkalinity, hardness, total phosphorus (TP), carbon, colour, fluoride, magnesium and dissolved iron, and lower total dissolved solids (TDS), conductivity, chloride, molybdenum, sodium and strontium;
- Big Buffalo Lake had higher carbon, colour and aluminum, and lower conductivity, TDS, chloride, lithium, molybdenum, nickel, potassium, rubidium, sodium, strontium, sulphate and sulphur
- Buffalo Creek had higher carbon, colour, aluminum, chromium, copper, cesium and iron, and lower conductivity, TDS, boron, chloride, lithium, molybdenum, potassium, rubidium, sodium, strontium, sulphate, sulphur and uranium; and
- Sturgeon Bay had higher TP, aluminum, cesium, copper, iron, and nickel, and lower alkalinity, hardness, conductivity, TDS, total nitrogen, carbon, boron, chloride, fluoride, lithium, magnesium, molybdenum, potassium, sodium, strontium, sulphate, sulphur and uranium compared with sites along the main flow path.

Sampling for additional parameters was conducted at sites in the Fairford and Dauphin rivers, and Birch Creek in September 2020 which showed that *Escherichia coli* concentrations were higher in the Fairford River than in Birch Creek or the Dauphin River; and that blue-green algae (i.e., cyanobacteria) were most abundant in the Dauphin River and least abundant in Birch Creek. Sampling was also conducted at these locations for microcystin, hydrocarbons, and pesticides; all results were below analytical detection limits.

TP exceeded the MWQSOG narrative guideline for phosphorus for lakes and river mouths at several locations, including: Watchorn Bay; Watchorn Creek at Watchorn Bay; Mercer Creek at Watchorn Bay; Fairford River at Lake St. Martin; Birch Creek at Lake St. Martin; Lake St. Martin; Big Buffalo Lake; the Dauphin River at Sturgeon Bay; and Sturgeon Bay. TP was below the MWQSOG narrative guideline for rivers and streams in the Fairford and Dauphin rivers and in Birch and Buffalo creeks.

During the ice-cover season in March 2021, dissolved oxygen (DO) was below the MWQSOGs instantaneous minimums for cold-water and cool-water aquatic life and CCME PAL guidelines for cold and warm water biota in Big Buffalo Lake and the eastern bay of Lake St. Martin near the proposed LSMOC in March 2021.

Aluminum exceeded the MWQSOG and CCME guideline for PAL in approximately half of the samples collected, including samples from Watchorn and Sturgeon bays, Watchorn, Mercer, Birch and Buffalo creeks, the Fairford and Dauphin rivers, and Lake St. Martin. Iron exceeded the MWQSOG and CCME guideline for PAL in samples from Buffalo Creek and Sturgeon Bay. Chloride exceeded the CCME long-

term guideline in all samples collected from along the main flow path from Lake Manitoba through the Fairford River to Lake St. Martin and into the Dauphin River. Additionally, fluoride exceeded the CCME PAL, at most sites and times sampled; exceptions were Buffalo Creek and Sturgeon Bay where only some samples exceeded the guideline. Exceedances of these parameters are common in the region.

All other water quality variables measured for which there are MWQSOG and CCME PAL objectives or guidelines were within PAL objectives and guidelines at all core sampling sites.

Of the ten locations in natural waterbodies surveyed along the alignments of the proposed LMOC and LSMOC in September 2020, three were dry and elsewhere total water depths were less than half a metre. Sites along the alignment of the proposed LMOC were well oxygenated, alkaline, and had moderately high specific conductance; whereas, sites along the alignment of the proposed LSMOC were low to moderately oxygenated, circum-neutral, and had lower specific conductance. Turbidity was low at all sites sampled. *In situ* water quality was similar at the four sites along the proposed LMOC that were resampled in May 2021. In March 2021, the site at the downstream end of Reach 1 of the LSMEOC was circum-neutral, with moderately high specific conductance low turbidity and low DO.

At the time of the September survey, DO was below the MWQSOG 7-day objective for cold-water aquatic life, the MWQSOG instantaneous objective for cool-water aquatic life, and the CCME guidelines for warm water biota at the site located on Creek C upstream of the alignment of the proposed LSMOC. Similarly, DO was below the MWQSOGs instantaneous minimums for cold-water and cool-water aquatic life and CCME PAL guidelines for cold and warm water biota at the site sampled near the downstream end of Reach 1 in March 2021. Additionally, pH exceeded the MWQSOG/CCME upper limit for PAL at Water Lake in September 2020. DO and pH were within applicable MWQSOG/CCME PAL objectives/guidelines at all other sites sampled. There are no MWQSOG/CCME PAL guidelines for the other *in situ* parameters measured.

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ACRONYMS

AEMP	Aquatic Effects Monitoring Program
BCMELP	British Columbia Ministry of Environment, Lands, and Parks
BOD	Biological Oxygen Demand
CCME	Canadian Council of Ministers of the Environment
DIN	Dissolved Inorganic Nitrogen
DL	Analytical Detection Limit
DO	Dissolved Oxygen
DOC	Dissolved Organic Carbon
EIS	Environmental Impact Statement
FRWCS	Fairford Water Control Structure
LMOC	Lake Manitoba Outlet Channel
LSMOC	Lake St. Martin Outlet Channel
MTI	Manitoba Transportation and Infrastructure
MWQSOG	Manitoba Water Quality Standards, Objectives, and Guidelines
MWS	Manitoba Water Stewardship
NSC	North/South Consultants Inc.
PAL	Protection of Freshwater Aquatic Life
PRSD	Percent Standard Relative Deviation
QA/QC	Quality Assurance/Quality Control
SD	Standard Deviation
TDS	Total Dissolved Solids
TN	Total Nitrogen
TP	Total Phosphorus
TSS	Total Suspended Solids

1.0 INTRODUCTION

North/South Consultants Inc. (NSC) was retained by Manitoba Transportation and Infrastructure (MTI) to collect supplemental data with respect to the aquatic environment in support of the Lake Manitoba and Lake St. Martin Outlet Channel Project (the Project). The proposed Project is designed to manage flood waters on Lake Manitoba and Lake St. Martin by providing a channel by which flood waters can be conveyed, in addition to the natural outflow via the Fairford and Dauphin rivers (Figure 1). The Project consists of two outlet channels that are intended to work together:

- The 24 km Lake Manitoba Outlet Channel (LMOC) will work in tandem with the existing water control structure on the Fairford River (the Fairford Water Control Structure or FRWCS) to help regulate water levels and mitigate flooding on Lake Manitoba; and
- The 24 km Lake St. Martin Outlet Channel (LSMOC) will restore a more natural water regime to Lake St. Martin and will also provide flood protection by mitigating increased inflows from operation of the FRWCS, as well as additional inflows from the planned outlet from Lake Manitoba.

An Aquatic Effects Monitoring Program (AEMP) was developed in 2020 to provide a plan for monitoring the effects of the Project on the aquatic environment, focusing on key issues identified in the Environmental Impact Statement (EIS). The specific objectives of the AEMP were to:

- Verify the predicted effects presented in the surface water quality and fish and fish habitat sections of the EIS;
- Determine the effectiveness of mitigation measures;
- Assess the need for additional mitigation measures if initial measures are not adequate;
- Determine the effectiveness of any additional/adapted measure(s); and
- Confirm compliance with regulatory requirements relevant to surface water quality and fish and fish habitat set out in the Project approvals (e.g., Manitoba Environment Act License; Fisheries Act Authorization).
- The AEMP identified the need for the collection of data to supplement existing information that had been presented in the EIS.

Water quality sampling was conducted four times from September 2020 to May 2021 to provide additional pre-construction data for the surface water quality study described in the AEMP. This report presents the results of this sampling and is an update of NSC (2021) which previously reported the result from 2020. The surface water quality monitoring study was designed to determine whether water quality conditions change due to channel operations, specifically whether the change in flow patterns affects water quality. As such, the AEMP included sampling locations throughout the study area. In addition to the locations identified in the AEMP, sampling described in this report was conducted at supplemental locations where historical sampling has occurred or to characterize tributaries in the study area (Table 1).

2.0 METHODS

2.1 SAMPLING PERIODS

Water quality sampling was conducted four times from September 2020 to May 2021. Three times during the open-water season, and once during ice-cover season. Sampling periods were as follows:

- September 1-10, 2020;
- October 13 and 14, 2020;
- March 15-18, 2021; and
- May 16-19, 2021.

2.2 SAMPLING SITES

The study area for the monitoring program is comprised of Lake Manitoba, the Fairford and Dauphin rivers, Lake St. Martin, creeks and drains along the proposed LMOC alignment, the Buffalo Creek watershed, and Sturgeon Bay in Lake Winnipeg. With few exceptions, water quality sampling was conducted at 20 core sites in the study area; exceptions are noted below. Information on sampling locations is listed in Table 1 and illustrated in Figure 1 . Sampling sites were as follows:

- Two sites in Lake Manitoba in Watchorn Bay,
    - offshore of the proposed LMOC (WHB1), and
    - nearshore at the proposed LMOC (WHB2);
- One site in Watchorn Creek at Watchorn Bay (WHC-WB);
- One site in Mercer Creek at Watchorn Bay (MC-WB);
- Two sites in Birch Creek,
    - at PR 239 (BCD-2018-9), and
    - the outlet at Lake St. Martin (BC-LSM);
- Two sites in the Fairford River,
    - at highway 6 (FR1), and
    - near the outlet at Lake St. Martin (FR2);
- Five sites in Lake St. Martin,
    - Birch Bay (BB-LSM),
    - middle of the south basin (LSM5),
    - at the narrows (LSM4),
    - middle of the north basin (LSM1), and
    - the eastern bay near the proposed LSMOC (LSM3);
- Three sites in the Dauphin River,
    - at Lake St. Martin (DR-A),
    - near the provincial monitoring station at the “Big Bend” (DR-B), and
    - at Sturgeon Bay (DR-E);

- One site in Big Buffalo Lake (BBL);
- One site in Buffalo Creek at the Dauphin River (BC3); and
- Two sites in Lake Winnipeg in Sturgeon Bay,
    - nearshore at the proposed LSMOC (SB1), and
    - offshore of the proposed LSMOC (SB2).

Water quality sampling sites in Watchorn Bay (WHB1 and WHB2) and its associated creeks (WHC-WB and MC-WB), the south bay of Lake St. Martin (LSM5), two sites on the Dauphin River (DR-B and DR-E), and the sites in Sturgeon Bay (SB-1 and SB-2) were not sampled in October, 2020 due to poor weather conditions, including strong winds and the early and rapid formation of ice, which made accessing the sites unsafe. Additionally, the south bay of Lake St. Martin (LSM5) was not sampled in May 2021 due to strong winds which made accessing the site unsafe.

Besides the core sampling sites described above, additional locations along the alignments of the proposed LMOC and LSMOC were surveyed by helicopter on September 1, 2020 to ascertain the presence of water. If possible, *in situ* water quality parameters were measured. Four of these locations were revisited on May 16, 2021 and *in situ* water quality parameters were measured. Additionally, a site in Reach 1 of the LSMEOC was sampled for *in situ* water quality in March 2021. Location information for these sites is presented in Table 2 and Figure 1.

2.3 WATER QUALITY PARAMETERS

In situ measurements of physical and chemical parameters were collected at each sampling site, including: total depth; dissolved oxygen (DO); water temperature; specific conductance; pH; and turbidity. Secchi depth was also measured at sites with low water velocity.

At core sampling sites, water samples were collected for laboratory analysis of routine parameters (e.g., pH, conductivity), nutrients (e.g., nitrogen, phosphorus), chlorophyll *a*, water clarity (e.g., total suspended solids, turbidity), and metals and major ions (e.g., aluminum, iron, calcium). A detailed list of parameters analysed at core sampling sites is provided in Table 3.

In September 2020, selected sites were also sampled for additional parameters including: *Escherichia coli*; blue-green algae (i.e., cyanobacteria); microcystin; hydrocarbons; and pesticides. These additional parameters were analysed from samples collected at BC-LSM, FR1 and DR-A. Detailed lists of hydrocarbons and pesticides measured by the laboratory are presented in Tables 4 and 5, respectively.

In addition, samples for the laboratory analysis of biological oxygen demand (BOD) were collected from six sites during the September sampling period, including: WHC-WB; MC-WB; BCD-2018-9; BC-LSM; BBL; and BC3. An attempt was made to collect samples for BOD from these same sites in March 2021; however, samples for laboratory analysis were not collected as these sites were either frozen to the bottom, or there was insufficient water below the ice to collect a sample without disturbing the sediments.

2.4 FIELD METHODS

Sampling sites were accessed by truck, boat, or helicopter during the open-water season; and by snowmobile or truck during the ice-cover season. Sampling date and time were noted for each site. Sample locations were recorded using a handheld Garmin GPS receiver. Total water depth was recorded using a hand-held depth sounder where possible; at sites sampled from shore, total water depth was estimated. In winter, snow depth and ice-thickness were also recorded.

In situ measurements of water quality parameters including pH, specific conductance, DO, turbidity, and water temperature were collected using a YSI EXO^{TM}2 sonde. At river sites and those accessed from shore, *in situ* parameters were measured at approximately 0.3 m below the water's surface and 0.3 m below the ice in winter. At lake sites, *in situ* profiles were taken such that measurements were recorded near the surface (i.e., at 0.3 m) and at increments of either 0.5 m (if total water depth was less than 5 m) or 1.0 m. Secchi depth was measured at low velocity sites and was defined as the average of two depth readings: (1) the depth at which a circular black and white disk can no longer be seen when lowered into the water column; and (2) the depth at which the disk becomes visible again, when raised. Secchi depth was not recorded in winter. Weather conditions (i.e., wind and waves) prohibited the collection of profiles and Secchi depths at some lake sites in September 2020.

Grab samples were collected from approximately 0.3 m below the water's surface into clean sample bottles supplied by ALS Laboratories. Samples from under the ice were collected from 0.3 m below the ice using a Kemmerer water sampler. Where necessary, samples were preserved according to instructions provided by the analytical laboratory. After collection, samples were placed in a cooler and kept cool using ice packs until submission (within 48 hours) to ALS Laboratories in Winnipeg, MB (a Canadian Association for Laboratory Accreditations, Inc. accredited laboratory) for analysis.

2.5 QUALITY ASSURANCE AND QUALITY CONTROL

Quality Assurance/Quality Control (QA/QC) measures were incorporated over the course of the monitoring program. Standard QA/QC measures were followed during sample collection (e.g., use of latex gloves, standard labelling practices, meter calibration, etc.). Additionally, QA/QC samples were collected for the list of parameters in Table 3 including field blanks, trip blanks, and replicate samples. With one exception, two field blanks, two trip blanks and two sets of triplicate samples were submitted to the analytical laboratory during each sampling period. Due to the shortened sampling period in October, only one set of QA/QC samples (blanks and triplicates) was submitted.

2.5.1 Field Blanks

Field blanks are intended to provide information on sample contamination from atmospheric exposure and sample handling techniques, as well as potential laboratory contamination and/or error (British Columbia Ministry of Environment, Lands, and Parks [BCMELP] 1998). Field blanks were prepared by filling sample bottles with deionized water (both provided by the analytical laboratory) in the field and submitting the blanks along with the environmental samples.

2.5.2 Trip Blanks

Trip blanks are used for evaluating the potential for sample contamination that may occur from the container or preservatives through transport and storage of the sample, as well as laboratory precision (BCMELP 1998). Trip blanks were prepared in the laboratory by filling sample bottles with deionized water. Trip blanks were transported to the field sampling sites, but remained sealed, and were then submitted to the analytical laboratory in conjunction with environmental samples for analysis.

2.5.3 Replicate Samples

Triplicate samples were collected at two sites during the September, May, and March sampling periods, and one site during the October sampling period. Replicate samples provide a measure of variability of environmental conditions and the overall precision associated with field methods and laboratory analyses.

2.6 QA/QC ASSESSMENT

All water quality data were examined qualitatively for potential outliers and/or transcription or analytical errors. Where one replicate sample differed notably from the others, the measurement was flagged as “suspect” and the laboratory was asked to verify the result.

QA/QC samples were assessed according to standard criteria to evaluate precision and identify potential sample contamination issues (BCMELP 1998). Percent relative standard deviation (PRSD) was calculated for triplicate samples as follows:

PRSD (%) = standard deviation (SD) of the triplicate values / mean of the triplicate values x 100

Precision of replicate samples was evaluated using the “rule of thumb” criteria for precision of 18% for triplicate samples (BCMELP 1998). Where one or more of the replicate values were less than five times the analytical detection limit (DL), an analysis of precision was not undertaken, in accordance with guidance provided in BCMELP (1998).

Field and trip blank results were also evaluated for evidence of sample contamination. Values for any parameter that exceeded five times the DL were considered to be indicative of sample contamination and/or laboratory error.

2.7 DATA ANALYSIS

All data analyses treated censured values (i.e., values reported as below the DL) as equal to one half the DL. In cases where triplicate samples were collected, sample means are presented. Dissolved inorganic nitrogen (DIN) was calculated as the sum of ammonia-N and nitrate/nitrite-N. Nitrogen to phosphorus molar ratios were also calculated.

2.8 COMPARISON TO WATER QUALITY OBJECTIVES AND GUIDELINES

Results were compared to the Manitoba Water Quality Standards, Objectives and Guidelines (MWQSOG; MWS 2011) for the protection of aquatic life (PAL) as well as the Canadian Council of Ministers of the Environment (CCME) guidelines for the protection of freshwater aquatic life (CCME 1999; updated to 2021). In general, the MWQSOG for PAL are similar to the CCME guidelines for PAL for parameters measured; however, there are CCME guidelines for some parameters which lack a provincial guideline/objective and others for which the CCME and provincial guidelines are different. Typically, the CCME guideline is more stringent than the provincial guideline. A summary of relevant water quality objectives and guidelines is presented in Appendix 1.

3.0 RESULTS

3.1 QA/QC RESULTS

QA/QC results are presented in Appendix 2.

3.1.1 Field and Trip Blanks

Field and trip blank results generally indicated high precision and no sample contamination. Although some parameters were occasionally detected in blank samples, all parameters were below the threshold of five times the DL.

3.1.2 Replicate Samples

PRSD values were not derived for several parameters due to low concentrations (i.e., concentrations less than five times the DL). In general, the results indicate good agreement between samples and acceptable levels of precision. The PRSD exceeded threshold values (18%) for six parameters, including: carbonate alkalinity; chlorophyll *a*; phaeophytin *a*; total and dissolved aluminum; and total titanium.

Additionally, PRSD exceeded the threshold value for TSS, turbidity, chlorophyll *a*, and phaeophytin *a* for the replicate samples collected at the outlet of the Fairford River (FR2) on May 18, 2021. This was due to the results for one replicate (Rep1B) which were anomalously high. Sampling was conducted from the shore at this site, and it is expected that the sediments may have been disturbed during the collection of this replicate. Out of an abundance of caution, all results for this replicate were considered suspect and were removed from the mean reported (i.e., n = 2 for FR2 on May 18, 2021).

3.2 ROUTINE VARIABLES AND LIMNOLOGY

This section discusses the results for routine and *in situ* water quality parameters measured at the core water quality sampling sites; results of the *in situ* surveys, are presented separately (see Section 3.5 *In Situ* Survey Results). Results for *in situ* and routine water quality parameters measured at core sampling sites are presented in Tables 6 and 7, respectively; the following is a summary of these results.

Based on the results of the sampling that was conducted from fall 2020 to spring 2021, the water quality of the study area can be generally described as moderately nutrient-rich to nutrient-rich, low to moderately turbid, slightly alkaline, hard to very hard, and well-oxygenated during the open-water season. In March 2021, anoxic conditions were observed in Big Buffalo Lake and the eastern bay of Lake St. Martin near the proposed LSMOC (LSM3); the remaining sites sampled in March 2021 were well-oxygenated. BOD was low at all six sites where samples were collected in September 2020, including: Watchorn (WHC-WB), Mercer (MC-WB), Birch (BCD-2018-9 and BC-LSM) and Buffalo (BC3) creeks; and Big Buffalo Lake (BBL).

In situ variables including, temperature, DO, turbidity, pH, and specific conductance were consistent across depth during the open-water season. In March 2021, temperature increased somewhat with

depth in Sturgeon Bay (SB1 and SB2), and at the two sites in Lake St. Martin (BB-LSM and LSM5) where depths were sufficient for profiles to be collected; however, thermal stratification (i.e., >1 °C change within 1 m) was only observed in the middle of the south basin of Lake St. Martin (LSM5). DO, turbidity, pH and specific conductance were similar across depth in Lake St. Martin (BB-LSM and LSM5) and at the nearshore site in Sturgeon Bay (SB1) in March 2021. Conversely, pH and DO were slightly lower and specific conductance was slightly higher near the sediments at the offshore site in Sturgeon Bay (SB2) in March 2021. *In situ* profiles could not be collected at Watchorn and Sturgeon bays in September 2020 due to wavy conditions at the time of sampling.

Total phosphorus (TP) concentrations in the study area were composed of a mix of dissolved and particulate forms. During the open-water season phosphorus was predominately in particulate form; whereas during the ice-cover season, dissolved forms of phosphorus were more prevalent at most sites. Most total nitrogen (TN) was present in organic form at all sites, with ammonia nitrogen generally comprising a greater amount of DIN than nitrate/nitrite nitrogen. Based on TN:TP molar ratios, all waterbodies sampled were phosphorus limited (i.e., TN:TP ratio > 20; Kalff 2002).

Routine water quality was generally similar at sites sampled along the main flow path from Lake Manitoba through the Fairford River to Lake St. Martin and into the Dauphin River, including WHB1, WHB2, WHC-WB, MC-WB, FR1, FR2, BB-LSM, LSM5, LSM4, LSM1, LSM3, DR-A, DR-B and DR-E. An exception to this trend occurred during the ice-cover season, when water quality in the eastern bay of Lake St. Martin near the outlet of the proposed LSMOC (i.e., LSM3) differed from the other sites sampled in the lake (BB-LSM, LSM5, LSM4 and LSM1). In March 2021, the eastern bay of Lake St. Martin (LSM3) had higher alkalinity (total and bicarbonate), hardness, ammonia, carbon (inorganic and organic forms), colour, conductivity and total dissolved solids (TDS) compared to other areas of the lake sampled.

Additionally, differences in water quality were observed between the sites sampled along the main flow path and Birch Creek, Big Buffalo Lake, Buffalo Creek, and Sturgeon Bay. The following spatial differences in routine water quality were observed:

- Birch Creek (BCD-2018-9 and BC-LSM) had higher alkalinity, hardness, TP, carbon and colour, and lower conductivity and TDS than sites along the main flow;
- Big Buffalo Lake (BBL) and Buffalo Creek (BC3) had higher carbon and colour, and lower conductivity and TDS than the sites sampled along the main flow; and
- Sturgeon Bay (SB1 and SB2) had lower alkalinity, hardness, conductivity, TDS, TN and carbon, and higher TP than upstream sites along the main flow path.

3.2.1 Comparison to Water Quality Guidelines and Objectives

TP exceeded the MWQSOG narrative guideline for phosphorus for lakes and river mouths (i.e., 0.025 mg/L) in several samples collected, including samples from the following locations:

- Watchorn Bay (WHB1 and WHB2);
- Watchorn Creek at Watchorn Bay (WHC-WB);

- Mercer Creek at Watchorn Bay (MC-WB);
- Fairford River at Lake St. Martin (FR2);
- Birch Creek at Lake St. Martin (BC-LSM);
- Lake St. Martin, at Birch Bay (BB-LSM), at the Narrows (LSM4), the north Basin (LSM1) and eastern bay (LSM3);
- Big Buffalo Lake (BBL);
- the Dauphin River at Sturgeon Bay (DR-E); and
- Sturgeon Bay (SB1 and SB2).

TP was below the MWQSOG narrative guideline for rivers and streams (0.05 mg/L) in all samples collected from sites where the guideline applies, including FR1, BCD-2018-9, DR-A, DR-B and BC3.

DO was below the CCME PAL for early life stages of cold-water biota (9.5 mg/L) at several sites sampled in September, at one site sampled in October, and 5 sites in May. It is unlikely that early life stages of cold-water species were present at the time the measurements were taken, as water temperatures were above 5°C in these cases. DO was within MWQSOG objectives and CCME guidelines for PAL at all other sites and times sampled during the open-water season.

DO was below the MWQSOGs instantaneous minimums for cold-water and cool-water aquatic life (8.0 mg/L and 3.0 mg/L, respectively), and CCME PAL guidelines for cold and warm water biota (5.5-9.5 mg/L; Appendix 1) in Big Buffalo Lake and the eastern bay of Lake St. Martin near the proposed LSMOC (LSM3) in March 2021. DO was within MWQSOG objectives and CCME guidelines for PAL at all other sites in March 2021.

All other routine water quality parameters for which there are MWQSOG and CCME PAL objectives/guidelines, including, pH (6.5-9.0 pH units), ammonia (sample specific based on pH and temperature), nitrate (2.93 mg N/L and 3.0 mg/L for MWQSOG and CCME, respectively), and nitrite (0.60 mg N/L) were within PAL objectives and guidelines.

3.3 METALS AND MAJOR IONS

Metal and major ion concentrations measured in the study area are presented in Table 8.

Beryllium, bismuth, silver, tellurium, and tungsten were not detected at any site. Additionally, some metals were not detected in dissolved form at any site, including: cesium; lead; thallium; thorium; and tin.

Total aluminum, arsenic, barium, boron, calcium, dissolved chloride, lithium, magnesium, total manganese, molybdenum, potassium, rubidium, silicon, sodium, strontium, dissolved sulphate, sulphur, uranium, and total vanadium were consistently detected. The remaining metals and major ions were detected in some samples.

Like routine parameters, with the exception the eastern bay of Lake St. Martin (LSM3) in winter, metals and major ions were similar at sites sampled along the main flow path from Lake Manitoba through the

Fairford River to Lake St. Martin and into the Dauphin River (WHB1, WHB2, WHC WB, MC-WB, FR1, FR2, BB-LSM, LSM5, LSM4, LSM1, LSM3, DR-A, DR-B and DR-E). In March 2021, several metals and major ions were higher at LSM3 than at other sites sampled in Lake St. Martin, including: arsenic, barium, boron, calcium, chloride, cobalt, fluoride, lithium, magnesium, manganese, nickel, potassium, rubidium, selenium, silicon, sodium and sulphate.

Again, differences were observed between the sites sampled along the main flow path and Birch Creek, Big Buffalo Lake, Buffalo Creek, and Sturgeon Bay. The following spatial differences in metals and major ions were observed:

- Birch Creek (BCD-2018-9 and BC-LSM) had lower chloride, molybdenum, sodium and strontium, and higher fluoride, magnesium and dissolved iron;
- Big Buffalo Lake (BBL) had lower chloride, lithium, molybdenum, nickel, potassium, rubidium, sodium, strontium, sulphate and sulphur, and higher aluminum;
- Buffalo Creek (BC3) had lower boron, chloride, lithium, molybdenum, potassium, rubidium, sodium, strontium, sulphate, sulphur and uranium, and higher aluminum, chromium, copper, cesium and iron; and
- Sturgeon Bay (SB1 and SB2) had lower, boron, chloride, fluoride, lithium, magnesium, molybdenum, potassium, sodium, strontium, sulphate, sulphur and uranium, and higher aluminum, cesium, copper, iron, and nickel than sites sampled along the flow path from Lake Manitoba through the Dauphin River.

3.3.1 Comparison to Water Quality Guidelines and Objectives

Metals and major ions for which there are MWQSOG or CCME guidelines for PAL were, with few exceptions, within objectives and guidelines at sites sampled from September 2020 to May 2021; PAL exceedances occurred for aluminum, iron, chloride, and fluoride, as described below. Exceedance of PAL guidelines for aluminum and iron are common in waterbodies throughout Manitoba (CAMP 2017) and exceedance of the CCME PAL guidelines for chloride and fluoride was regularly observed in the study area during the monitoring studies conducted for the Lake St. Martin Emergency Outlet Channel project (NSC and KGS Group 2016).

Aluminum exceeded the MWQSOG and CCME guideline for PAL (0.1 mg/L) in 27 of 62 samples collected, including samples from the following locations:

- Watchorn Bay (WHB1 and WHB2);
- Watchorn Creek (WHC-WB);
- Mercer Creek (MC-WB);
- Birch Creek at PR239 (BCD-2018-9);
- Fairford River (FR1 and FR2);
- Lake St. Martin (BB-LSM, LSM1 and LSM3);
- Buffalo Creek (BC3);
- Dauphin River (DR-A, DR-B and DR-E); and

- Sturgeon Bay (SB1 and SB2).

Iron exceeded the MWQSOG and CCME guideline for PAL (0.3 mg/L) in the samples collected from Buffalo Creek (BC3) and Sturgeon Bay (SB1 and SB2) in September 2020 and May 2021; these sites were not sampled in October. Iron was below PAL guidelines at all other sites and times sampled.

Chloride exceeded the CCME long-term guideline (120 mg/L) in all samples collected from Watchorn Bay (WHB1 and WHB2), Watchorn and Mercer creeks (WHC-WB and MC-WB), Lake St. Martin (BB-LSM, LSM5, LSM4, LSM1 and LSM3), and the Fairford (FR1 and FR2) and Dauphin (DR-A, DR-B and DR-E) rivers. Chloride was consistently below the CCME long-term guideline in Birch Creek, Big Buffalo Lake, and Sturgeon Bay. All concentrations were below the CCME short-term guideline (640 mg/L). There are no MWOSOG for PAL for chloride.

Fluoride exceeded the CCME PAL (0.120 mg/L) in most samples collected. The exceptions were samples collected from Buffalo Creek (BC3) and Sturgeon Bay (SB1 and SB2) in September 2020, and samples collected from Sturgeon Bay (SB1 and SB2) in May 2021.

3.4 ADDITIONAL PARAMETERS

This section presents the results for the additional parameters that were analyzed in samples collected from Birch Creek at Lake St. Martin (BC-LSM), the Fairford River at PTH 6 (FR1), and the Dauphin River at Lake St. Martin (DR-A) in September 2020, including: *E. coli*; blue-green algae; microcystin; hydrocarbons; and pesticides. Detailed results are available in Appendix 3, the following is a summary of these results:

- *E. coli* was detected at all three sites sampled and concentrations were higher in the Fairford River (308 MPN/100 mL) than in Birch Creek (9 MPN/100 mL) and the Dauphin River (2 MPN/100 mL);
- blue-green algae were most abundant in the Dauphin River and least abundant in Birch Creek (Figure 2);
- microcystin was not detected (DL = 0.20 µg/L) at any of the three sites;
- hydrocarbons and were not detected at any of the three sites; and
- pesticides were not detected at any of the three sites.
- For a list of hydrocarbons and pesticides measured including DLs, see Tables 4 and 5, respectively.

3.4.1 Comparison to Water Quality Guidelines and Objectives

As all results for hydrocarbons and pesticides were below detection and the DLs were lower than MWQSOG and CCME PAL guidelines, all measurements were also within the PAL guidelines.

There are no MWQSOG or CCME guidelines for PAL for *E. coli*, blue-green algae, or microcystin.

3.5 *IN SITU* SURVEY RESULTS

This section presents the results of the *in situ* measurements taken at numerous locations to support fish habitat assessments. Results from these surveys are presented in Table 9.

Of the ten locations surveyed in September 2020, three sites along the alignment of the proposed LMOC were dry, including: Goodison Lake, Clarks Drain; and Woodale Drain. Water was present at the outlet of the drain at Goodison Lake; however, *in situ* parameters were not measured. All other sites surveyed in September 2020 were quite shallow with total water depths less than 0.5 m. Water was present at Reed, Clear, Water and Goodison lakes in May 2021; however, total depth was not recorded.

Sites along the alignment of the proposed LMOC where water was present in September 2020 (i.e., Reed, Clear and Water lakes) were well oxygenated, alkaline, and had low turbidity. *In situ* water quality was similar at these sites in May 2021, however, DO was somewhat lower at Clear Lake (7.42 mg/L; 77.1%) compared to conditions measured in September (9.82 mg/L; 94.1 %) and at other sites sampled in May (8.90-11.12 mg/L; 94.6-119.1 %). Specific conductance was moderately high and ranged from 470-802 µS/cm at sites along the LMOC.

In March 2021, the site sampled near the downstream end of Reach 1 was circum-neutral and had moderately high specific conductance (1021 µS/cm at 0.3 m), low turbidity and low oxygen (1.81 mg/L; 13.7 % at 0.3m). No other additional sites were surveyed for *in situ* water quality in March 2021.

Sites sampled along the alignment of the proposed LSMOC in September 2020 were low to moderately oxygenated, circum-neutral, and had low turbidity. Specific conductance at these sites was lower (8-367 µS/cm) than at the sites sampled along the alignment of the proposed LMOC. Sites along the LSMOC were not sampled in May 2021.

3.5.1 Comparison to Water Quality Guidelines and Objectives

DO was below the CCME PAL for early life stages of cold-water biota (9.5 mg/L) at Clear and Goodison lakes in May, 2021; however, It is unlikely that early life stages of cold-water species were present at this time. DO was within MWQSOG objectives and CCME guidelines for PAL at Reed and Water lakes in May, 2021, and at all sites sampled along the alignment of the proposed LMOC in September, 2020.

DO was below the MWQSOGs instantaneous minimums for cold-water and cool-water aquatic life (8.0 mg/L and 3.0 mg/L, respectively), and CCME PAL guidelines for cold and warm water biota (5.5-9.5 mg/L; Appendix 1) at the site sampled near the downstream end of Reach 1 in March 2021.

DO was below the MWQSOG 7-day objective for cold-water aquatic life (5.0 mg/L), the MWQSOG instantaneous objective for cool-water aquatic life (5.0 mg/L), and the CCME guidelines for warm water biota (6.0 mg/L and 5.5 mg/L for early life and all other stages, respectively) at the site located on Creek C upstream of the alignment of the proposed LSMOC (4.15 mg/L) in September 2020. Additionally, DO was below the CCME PAL for early life stages of cold-water biota (9.5 mg/L) at all sites sampled along the alignment of the proposed LSMOC in September 2020; however, it is unlikely that early life stages of

cold-water species were present at the time the measurements were taken (i.e., water temperatures were above 5°C in all instances where DO was less than 9.5 mg/L).

In situ pH exceeded the MWQSOG/CCME upper limit for PAL (9.0 pH units) at Water Lake in September 2020 (9.68 pH units); pH was within MWQSOG/CCME PAL guidelines (6.5-9.0 pH units) at all other sites and times.

There are no MWQSOG/CCME PAL guidelines for the other *in situ* parameters measured.

4.0 SUMMARY

Based on the results of the monitoring that was conducted from September 2020 to May 2021, the water quality of the study area can be described as moderately nutrient-rich to nutrient-rich, low to moderately turbid, slightly alkaline, hard to very hard, and well-oxygenated. However, during the ice-cover season anoxic conditions were observed in Big Buffalo Lake and the eastern bay of Lake St. Martin near the proposed LSMOC.

In general, water quality was similar at sites sampled along the main flow path from Lake Manitoba through the Fairford River to Lake St. Martin and into the Dauphin River; however, during the ice-cover season water quality in the eastern bay of Lake St. Martin near the outlet of the proposed LSMOC had higher alkalinity, hardness, ammonia, carbon, colour, conductivity, TDS, and higher concentrations of several metals and major ions compared to other areas of the lake. Additionally, differences in water quality were observed between the sites sampled along the main flow path and Birch Creek, Big Buffalo Lake, Buffalo Creek, and Sturgeon Bay, including:

- Birch Creek had higher alkalinity, hardness, TP, carbon, colour, fluoride, magnesium and dissolved iron, and lower TDS, conductivity, chloride, molybdenum, sodium and strontium;
- Big Buffalo Lake had higher carbon, colour and aluminum, and lower conductivity, TDS, chloride, lithium, molybdenum, nickel, potassium, rubidium, sodium, strontium, sulphate and sulphur;
- Buffalo Creek had higher carbon, colour, aluminum, chromium, copper, cesium and iron, and lower conductivity, TDS, boron, chloride, lithium, molybdenum, potassium, rubidium, sodium, strontium, sulphate, sulphur and uranium; and
- Sturgeon Bay had higher TP, aluminum, cesium, copper, iron, and nickel, and lower alkalinity, hardness, conductivity, TDS, TN, carbon, boron, chloride, fluoride, lithium, magnesium, molybdenum, potassium, sodium, strontium, sulphate, sulphur and uranium compared with sites along the main flow path.

The results of the additional sampling that was conducted in the Fairford and Dauphin rivers, and Birch Creek in September showed that *E. coli* concentrations were higher in the Fairford River than in Birch Creek or the Dauphin River; and that blue-green algae were most abundant in the Dauphin River and least abundant in Birch Creek. Microcystin, hydrocarbons, and pesticides were not detected.

TP exceeded the MWQSOG narrative guideline for phosphorus for lakes and river mouths at several locations, including: Watchorn Bay; Watchorn Creek at Watchorn Bay; Mercer Creek at Watchorn Bay; Fairford River at Lake St. Martin; Birch Creek at Lake St. Martin; Lake St. Martin; Big Buffalo Lake; the Dauphin River at Sturgeon Bay; and Sturgeon Bay. TP was below the MWQSOG narrative guideline for rivers and streams in the Fairford and Dauphin rivers and in Birch and Buffalo creeks.

During the ice-cover season in March 2021, DO was below the MWQSOGs instantaneous minimums for cold-water and cool-water aquatic life and CCME PAL guidelines for cold and warm water biota in Big Buffalo Lake and the eastern bay of Lake St. Martin near the proposed LSMOC in March 2021.

Aluminum exceeded the MWQSOG and CCME guideline for PAL in approximately half of the samples collected, including samples from Watchorn and Sturgeon bays, Watchorn, Mercer, Birch and Buffalo creeks, the Fairford and Dauphin rivers, and Lake St. Martin. Iron exceeded the MWQSOG and CCME guideline for PAL in samples from Buffalo Creek and Sturgeon Bay. Chloride exceeded the CCME long-term guideline in all samples collected from along the main flow path from Lake Manitoba through the Fairford River to Lake St. Martin and into the Dauphin River. Additionally, fluoride exceeded the CCME PAL, at most sites and times sampled; exceptions were Buffalo Creek and Sturgeon Bay where only some samples exceeded the guideline. Exceedances of these parameters are common in the region.

All other water quality variables measured for which there are MWQSOG and CCME PAL objectives or guidelines were within PAL objectives and guidelines at all core sampling sites.

The *in situ* survey that was conducted in September, 2020 found that, of the ten locations surveyed, three were dry (Goodison Lake, and Clarks and Woodale drains) and elsewhere total water depths were less than half a metre. Sites along the alignment of the proposed LMOC (where water was found) were well oxygenated, alkaline, and had moderately high specific conductance; whereas, sites along the alignment of the proposed LSMOC were low to moderately oxygenated, circum-neutral, and had lower specific conductance. Turbidity was low at all sites sampled. Four sites along the proposed LMOC (i.e., Reed Lake, Clear Lake, Water Lake, and Goodison Lake) were resampled in May 2021 and *in situ* water quality at these sites was similar to conditions recorded in September. Sites along the LSMOC were not sampled in May, 2021. In March 2021, a site near the downstream end of Reach 1 was sampled for *in situ* water quality and it was found to be circum-neutral, with moderately high specific conductance low turbidity and low DO. No other additional sites were surveyed for *in situ* water quality in March 2021.

At the time of the September survey, DO was below the MWQSOG 7-day objective for cold-water aquatic life, the MWQSOG instantaneous objective for cool-water aquatic life, and the CCME guidelines for warm water biota at the site located on Creek C upstream of the alignment of the proposed LSMOC. Similarly, DO was below the MWQSOGs instantaneous minimums for cold-water and cool-water aquatic life and CCME PAL guidelines for cold and warm water biota at the site sampled near the downstream end of Reach 1 in March 2021. Additionally, pH exceeded the MWQSOG/CCME upper limit for PAL at Water Lake in September 2020. DO and pH were within applicable MWQSOG/CCME PAL objectives/guidelines at all other sites sampled. There are no MWQSOG/CCME PAL guidelines for the other *in situ* parameters measured.

5.0 REFERENCES

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Table 1. Core water quality sampling sites, 2020-2021.

Waterbody	Location Description	Site ID	Sampling Date	UTM coordinates			AEMP Site [1]
				Zone	Easting	Northing	
Lake Manitoba	offshore at proposed LMOC	WHB1	1-Sep-20	14U	529544	5681689	-
	nearshore at proposed LMOC	WHB2	1-Sep-20	14U	529859	5681409	Yes
Watchorn Creek	at Watchorn Bay	WHC-WB	1-Sep-20	14U	530536	5681120	-
Mercer Creek	at Watchorn Bay	MC-WB	1-Sep-20	14U	528731	5682150	-
Birch Creek	at PR 239	BCD-2018-9	9-Sep-20	14U	531737	5697480	-
	at Lake St. Martin	BC-LSM	1-Sep-20	14U	533227	5702296	Yes
Fairford River	at Highway 6 bridge	FR1	1-Sep-20	14U	518844	5715212	Yes
	at Lake St. Martin	FR2	10-Sep-20	14U	527235	5717448	-
Lake St. Martin	Birch Bay	BB-LSM	10-Sep-20	14U	534236	5704268	Yes
	middle of south basin	LSM5	2-Sep-20	14U	536274	5724382	Yes
	at the narrows	LSM4	2-Sep-20	14U	541937	5733207	Yes
	middle of north basin	LSM1	2-Sep-20	14U	549677	5736337	-
	eastern bay near proposed LSMOC	LSM3	2-Sep-20	14U	555893	5737189	Yes
Dauphin River	at Lake St. Martin	DR-A	2-Sep-20	14U	547145	5742411	Yes
	at Big Bend	DR-B	3-Sep-20	14U	545990	5757471	-
	at Sturgeon Bay	DR-E	3-Sep-20	14U	564901	5757120	Yes
Big Buffalo Lake	Big Buffalo Lake	BBL	1-Sep-20	14U	557985	5745469	-
Buffalo Creek	at the Dauphin River	BC3	1-Sep-20	14U	562248	5754739	-
Lake Winnipeg	nearshore at LSMOC outlet	SB1	3-Sep-20	14U	574355	5751490	Yes
	offshore at LSMOC outlet	SB2	3-Sep-20	14U	576810	5753556	Yes
Birch Creek	at PR 239	BCD-2018-9	13-Oct-20	14U	531731	5697492	-
	at Lake St. Martin	BC-LSM	13-Oct-20	14U	533229	5702304	-
Fairford River	at Highway 6 bridge	FR1	13-Oct-20	14U	518732	5715287	Yes
	at Lake St. Martin	FR2	13-Oct-20	14U	527262	5717433	-
Lake St. Martin	Birch Bay on LSM	BB-LSM	13-Oct-20	14U	534252	5704286	Yes
	at the narrows	LSM4	14-Oct-20	14U	541802	5733290	Yes
	middle of north basin	LSM1	14-Oct-20	14U	549827	5736359	-
	eastern bay near proposed LSMOC	LSM3	14-Oct-20	14U	555975	5737080	Yes
Dauphin River	at Lake St. Martin	DR-A	14-Oct-20	14U	547384	5741997	Yes
Lake Manitoba	offshore at proposed LMOC	WHB1	15-Mar-21	14U	529067	5680745	-
	nearshore at proposed LMOC	WHB2	15-Mar-21	14U	529863	5681400	Yes
Watchorn Creek	at Watchorn Bay	WHC-WB	15-Mar-21	14U	530463	5681194	-
Mercer Creek	at Watchorn Bay	MC-WB	15-Mar-21	14U	528703	5682158	-
Birch Creek drain	at PR 239	BCD-2018-9	16-Mar-21	14U	531728	5697575	-
Birch Creek	at Lake St. Martin	BC-LSM	16-Mar-21	14U	533227	5702296	Yes
Fairford River	at Highway 6 bridge	FR1	16-Mar-21	14U	518732	5715287	Yes
	at Lake St. Martin	FR2	16-Mar-21	14U	527033	5717634	-
Lake St. Martin	Birch Bay	BB-LSM	16-Mar-21	14U	534244	5704276	Yes
	middle of south basin	LSM5	17-Mar-21	14U	536284	5724387	Yes
	at the narrows	LSM4	17-Mar-21	14U	541455	5733199	Yes
	middle of north basin	LSM1	17-Mar-21	14U	549692	5736341	-

Table 1. Continued.

Waterbody	Location Description	Site ID	Sampling Date	UTM coordinates			AEMP Site [1]
				Zone	Easting	Northing	
	eastern bay near proposed LSMOC	LSM3	17-Mar-21	14U	555893	5737189	Yes
Dauphin River	at Lake St. Martin	DR-A	17-Mar-21	14U	547232	5742330	Yes
	at Big Bend	DR-B	18-Mar-21	14U	546039	5757470	-
	at Sturgeon Bay	DR-E	18-Mar-21	14U	564930	5757084	Yes
Big Buffalo Lake	Big Buffalo Lake	BBL	17-Mar-21	14U	558203	5745551	-
Buffalo Creek	at the Dauphin River	BC3	18-Mar-21	14U	562326	5754803	-
Lake Winnipeg	nearshore at LSMOC outlet	SB1	18-Mar-21	14U	574362	5751487	Yes
	offshore at LSMOC outlet	SB2	18-Mar-21	14U	576805	5753572	Yes
Lake Manitoba	offshore at proposed LMOC	WHB1	17-May-21	14U	529060	5680732	-
	nearshore at proposed LMOC	WHB2	17-May-21	14U	529864	5681405	Yes
Watchorn Creek	at Watchorn Bay	WHC-WB	17-May-21	14U	530540	5681117	-
Mercer Creek	at Watchorn Bay	MC-WB	17-May-21	14U	528731	5682161	-
Birch Creek drain	at PR 239	BCD-2018-9	17-May-21	14U	531726	5697512	-
Birch Creek	at Lake St. Martin	BC-LSM	17-May-21	14U	533218	5702301	Yes
Fairford River	at Highway 6 bridge	FR1	18-May-21	14U	518793	5715305	Yes
	at Lake St. Martin	FR2	18-May-21	14U	527203	5717388	-
Lake St. Martin	Birch Bay	BB-LSM	17-May-21	14U	531422	5704309	Yes
	middle of south basin	LSM5 [2]	-	-	-	-	Yes
	at the narrows	LSM4	19-May-21	14U	541968	5733683	Yes
	middle of north basin	LSM1	19-May-21	14U	549671	5736374	-
	eastern bay near proposed LSMOC	LSM3	19-May-21	14U	555858	5737204	Yes
Dauphin River	at Lake St. Martin	DR-A	19-May-21	14U	547128	5742474	Yes
	at Big Bend	DR-B	18-May-21	14U	545996	5757477	-
	at Sturgeon Bay	DR-E	19-May-21	14U	564027	5756402	Yes
Big Buffalo Lake	Big Buffalo Lake	BBL	16-May-21	14U	558203	5745551	-
Buffalo Creek	at the Dauphin River	BC3	16-May-21	14U	562211	5754609	-
Lake Winnipeg	nearshore at LSMOC outlet	SB1	27-May-21	14U	574541	5751375	Yes
	offshore at LSMOC outlet	SB2	27-May-21	14U	576819	5753561	Yes

1 - Sampling sites that were identified for surface water quality monitoring in the AEMP.

2 - Site not sampled in May 2021 due to strong winds which made accessing the site unsafe.

Table 2. Locations surveyed for the presence of water and *in situ* parameters.

Waterbody	Sampling Date	UTM coordinates		
		Zone	Easting	Northing
Reed Lake	01-Sep-20	14U	532101	5688016
Clear Lake	01-Sep-20	14U	531143	5690661
Water Lake	01-Sep-20	14U	531272	5692230
Goodison Lake	01-Sep-20	14U	531826	5695562
Clarks Drain	01-Sep-20	14U	532986	5699419
Woodale Drain	01-Sep-20	14U	532791	5699899
Creek C at LSMOC alignment	01-Sep-20	14U	566275	5749279
Creek C upstream of LSMOC alignment	01-Sep-20	14U	566666	5748941
Unnamed Creek at Buffalo Creek	01-Sep-20	14U	559977	5745858
Unnamed Creek at LSMOC alignment	01-Sep-20	14U	561564	5743054
Reach 1	17-Mar-21	14U	556803	5743909
Reed Lake	16-May-21	14U	532101	5688016
Clear Lake	16-May-21	14U	531143	5690661
Water Lake	16-May-21	14U	531272	5692230
Goodison Lake	16-May-21	14U	531826	5695562

Table 3. Laboratory parameters measured at core water quality sampling sites.

Routine Parameters	Metals (total and dissolved) and Major Ions	
Routine Chemistry	Aluminum	Nickel
Total alkalinity, as $CaCO_3$	Antimony	Phosphorus
Bicarbonate alkalinity as HCO_3	Arsenic	Potassium
Carbonate alkalinity, as CO_3	Barium	Rubidium
Hydroxide alkalinity, as OH	Beryllium	Selenium
pH	Bismuth	Silicon
Conductivity	Boron	Silver
Total Dissolved Solids	Cadmium	Sodium
Hardness, as $CaCO_3$	Calcium	Strontium
Nutrients	Cesium	Sulfate, dissolved
Total Ammonia (as N)	Chloride, dissolved	Sulfur
Nitrate (as N)	Chromium	Tellurium
Nitrite (as N)	Cobalt	Thallium
Nitrate and Nitrite (as N)	Copper	Thorium
Total Kjeldahl Nitrogen	Fluoride, dissolved [1]	Tin
Total Nitrogen	Iron	Titanium
Dissolved Phosphorus	Lead	Tungsten
Total Particulate Phosphorus	Lithium	Uranium
Total Phosphorus	Magnesium	Vanadium
Total Inorganic Carbon	Manganese	Zinc
Total Organic Carbon	Mercury	Zirconium
Dissolved Organic Carbon	Molybdenum	
Total Carbon		
Water Clarity		
Total Suspended Solids		
Turbidity		
True Colour		
Algal Pigments		
Chlorophyll *a*		
Phaeophytin *a*		

1 - Fluoride was not originally included in the analysis package for samples collected in September and October 2020 and therefore fluoride was not previously reported (NSC 2021). Where analytical data were available, laboratory reports were later updated to include fluoride.

Table 4. Hydrocarbon parameters measured at selected water quality sampling sites in September 2020.

Parameter	Unit	DL
Benzene	mg/L	0.00050
Ethyl benzene	mg/L	0.00050
Toluene	mg/L	0.0010
o-Xylene	mg/L	0.00050
m+p-Xylenes	mg/L	0.00040
Xylenes (Total)	mg/L	0.00064
F1 (C6-C10)	mg/L	0.10
F1-BTEX	mg/L	0.10
F2-Naphth	mg/L	0.10
F2 (C10-C16)	mg/L	0.10
F3-PAH	mg/L	0.25
F3 (C16-C34)	mg/L	0.25
F4 (C34-C50)	mg/L	0.25
Total Hydrocarbons (C6-C50)	mg/L	0.38
Acenaphthene	mg/L	0.000020
Acenaphthylene	mg/L	0.000020
Acridine	mg/L	0.000020
Anthracene	mg/L	0.000010
Benzo(a)anthracene	mg/L	0.000010
Benzo(a)pyrene	mg/L	0.0000050
Benzo(b&j)fluoranthene	mg/L	0.000010
Benzo(g,h,i)perylene	mg/L	0.000020
Benzo(k)fluoranthene	mg/L	0.000010
Chrysene	mg/L	0.000020
Dibenzo(a,h)anthracene	mg/L	0.0000050
Fluoranthene	mg/L	0.000020
Fluorene	mg/L	0.000020
Indeno(1,2,3-cd)pyrene	mg/L	0.000010
1-Methyl Naphthalene	mg/L	0.000020
2-Methyl Naphthalene	mg/L	0.000020
Naphthalene	mg/L	0.000050
Phenanthrene	mg/L	0.000050
Pyrene	mg/L	0.000010
Quinoline	mg/L	0.000020
B(a)P Total Potency Equivalent	mg/L	0.000030

Table 5. Pesticides measured at selected water quality sampling sites in September 2020.

Parameter	Unit	DL	Parameter	Unit	DL
Aldrin	µg/L	0.0080	Bromoxynil	mg/L	0.00010
alpha-BHC	µg/L	0.0080	Clopyralid	mg/L	0.00010
beta-BHC	µg/L	0.0080	2,4-D	mg/L	0.00010
gamma-hexachlorocyclohexane	µg/L	0.0080	Dicamba	mg/L	0.00010
delta-BHC	µg/L	0.0080	2,4-DB	mg/L	0.00010
a-chlordane	µg/L	0.0080	2,4-DP	mg/L	0.00010
g-chlordane	µg/L	0.0080	Dinoseb	mg/L	0.00010
o,p-DDD	µg/L	0.0040	MCPA	mg/L	0.00010
pp-DDD	µg/L	0.0040	MCPB	mg/L	0.00010
o,p-DDE	µg/L	0.0040	Mecoprop	mg/L	0.00010
pp-DDE	µg/L	0.0040	Picloram	mg/L	0.00010
op-DDT	µg/L	0.0040	2,4,5-T	mg/L	0.00010
pp-DDT	µg/L	0.0040	2,4,5-TP	mg/L	0.00010
Dieldrin	µg/L	0.0080	Triclopyr	mg/L	0.00010
Endosulfan I	µg/L	0.0070	Atrazine	µg/L	0.10
Endosulfan II	µg/L	0.0070	Atrazine+N-Dealkylated Metabolites	µg/L	0.20
Endosulfan Sulfate	µg/L	0.0070	Ethalfluralin	mg/L	0.00010
Endrin	µg/L	0.010	Atrazine Desethyl	µg/L	0.10
Endrin Aldehyde	µg/L	0.010	Fluazifop-p-butyl	mg/L	0.00010
Heptachlor	µg/L	0.0080	Glyphosate	µg/L	0.20
Heptachlor Epoxide	µg/L	0.0080	Diclofop-methyl	mg/L	0.00010
Hexachlorobenzene	µg/L	0.0080	Triallate	mg/L	0.00010
Hexachlorobutadiene	µg/L	0.0080	Trifluralin	mg/L	0.00010
Hexachloroethane	µg/L	0.0080			
Methoxychlor	µg/L	0.0080			
Mirex	µg/L	0.0080			
trans-Nonachlor	µg/L	0.010			
Oxychlordane	µg/L	0.0080			
Pentachloronitrobenzene	µg/L	0.010			
AMPA	µg/L	0.50			

Table 6. Results for *in situ* parameters measured at core sampling sites.

Waterbody	Site ID	Sampling Date	Sampling Time	Snow Depth (m)	Ice Thickness (m)	Total Water Depth[1] (m)	Sample Depth (m)	Temperature (°C)	Dissolved Oxygen (mg/L)	Oxygen Saturation (%)	Specific Conductance (µS/cm)	Turbidity (NTU)	pH	Secchi Disk Depth[2] (m)
Lake Manitoba	WHB1	1-Sep-20	13:15	-	-	2.1	0.3	15.31	9.37	93.8	1086	13.09	8.62	0.75
							0.7	15.26	9.37	93.8	1086	13.78	8.60	
							1.2	15.26	9.36	93.7	1086	13.64	8.59	
	WHB2	1-Sep-20	15:23	-	-	1.9	0.5	14.13	9.91	96.7	1085	16.47	8.70	0.55
							1.0	14.13	9.90	96.7	1085	16.66	8.69	
Watchorn Creek	WHC-WB	1-Sep-20	16:26	-	-	1.1	0.5	14.24	10.84	106.1	1018	7.22	8.75	>1.1
							0.9	14.24	10.85	106.2	1017	7.44	8.73	
Mercer Creek	MC-WB	1-Sep-20	14:19	-	-	0.7	0.3	13.79	8.92	86.5	1102	13.49	8.20	-
Birch Creek drain	BCD-2018-9	9-Sep-20	19:05	-	-	0.4	0.4	11.68	10.63	100.2	764	21.94	8.08	>0.4
Birch Creek	BC-LSM	1-Sep-20	18:13	-	-	0.4	0.2	14.42	10.76	107.2	680	1.45	8.74	>0.4
Fairford River	FR1	1-Sep-20	19:20	-	-	-	0.2	14.57	11.12	109.6	1079	10.08	8.65	-
	FR2	10-Sep-20	9:45	-	-	1.2	0.3	11.40	10.70	98.2	1089	13.41	8.53	0.55
							0.5	11.39	10.70	98.3	1089	13.40	8.54	
							1.0	11.40	10.70	98.3	1089	13.63	8.54	
Lake St. Martin	BB-LSM	10-Sep-20	11:45	-	-	2.6	0.3	11.90	10.78	100.1	1047	9.43	8.52	0.68
							0.5	11.88	10.78	100.1	1047	9.48	8.52	
							1.0	11.78	10.78	99.9	1047	9.50	8.52	
							1.5	11.78	10.75	99.2	1047	9.66	8.52	
							2.0	11.60	10.72	98.8	1048	9.84	8.52	
							2.5	11.46	10.64	97.8	1048	11.72	8.52	
	LSM5	2-Sep-20	17:13	-	-	3.8	1.0	16.21	9.46	96.5	1053	5.50	8.66	0.62
							2.0	16.20	9.45	96.5	1053	5.53	8.66	
							3.0	16.20	9.45	96.5	1053	5.52	8.66	
	LSM4	2-Sep-20	15:10	-	-	1.0	0.5	14.44	10.58	104.0	1052	3.96	8.75	>1.0
	LSM1	2-Sep-20	13:03	-	-	1.0	0.3	14.26	10.14	99.3	1058	8.68	8.68	0.55

Table 6. Continued.

Waterbody	Site ID	Sampling Date	Sampling Time	Snow Depth (m)	Ice Thickness (m)	Total Water Depth[1] (m)	Sample Depth (m)	Temperature (°C)	Dissolved Oxygen (mg/L)	Oxygen Saturation (%)	Specific Conductance (µS/cm)	Turbidity (NTU)	pH	Secchi Disk Depth[2] (m)
	LSM3	2-Sep-20	12:10	-	-	1.5	0.3	13.38	10.16	97.5	862	9.32	8.73	0.45
							1.0	13.29	10.28	98.5	863	9.14	8.74	
Dauphin River	DR-A	2-Sep-20	9:00	-	-	1.1	0.3	13.07	9.99	95.3	1058	6.25	8.80	0.68
							0.7	13.08	10.00	95.4	1058	6.34	8.79	
	DR-B	3-Sep-20	11:44	-	-	-	0.3	13.86	10.37	100.7	1055	8.67	8.75	-
	DR-E	3-Sep-20	10:09	-	-	2.5	1.0	13.75	9.28	89.9	1044	12.39	8.52	0.55
							2.0	13.64	9.37	90.5	1048	11.38	8.58	
Big Buffalo Lake	BBL	1-Sep-20	11:27	-	-	1.5	0.3	13.98	9.19	89.3	464	4.13	8.54	-
Buffalo Creek	BC3	1-Sep-20	12:16	-	-	<0.1	0.3	13.95	9.38	91.1	448	11.04	7.93	-
Lake Winnipeg	SB-1	3-Sep-20	9:09	-	-	3.8	1.0	15.90	9.04	91.4	531	22.48	8.33	-
							2.0	15.90	9.04	91.7	522	22.20	8.33	
	SB-2	3-Sep-20	8:39	-	-	6.5	1.0	15.90	9.22	93.4	384	17.10	8.31	-
Birch Creek drain	BCD-2018-9	13-Oct-20	10:30	-	-	-	0.3	5.90	7.20	57.9	920	0.38	7.62	-
Birch Creek	BC-LSM	13-Oct-20	11:00	-	-	<1 m	0.3	5.06	11.03	86.7	911	1.09	8.18	-
Fairford River	FR1	13-Oct-20	14:00	-	-	-	0.3	6.51	11.99	98.0	1114	32.00	8.32	-
	FR2	13-Oct-20	15:25	-	-	1.4	0.3	6.88	11.67	96.1	1107	19.76	8.1	0.35
Lake St. Martin	BB-LSM	13-Oct-20	12:20	-	-	2.6	0.3	7.76	11.13	93.7	1073	6.58	8.38	0.75
							1.0	7.76	11.12	93.7	1073	6.48	8.38	
	LSM4	14-Oct-20	9:50	-	-	1.0	0.3	5.41	11.41	90.7	1089	5.40	8.14	-
	LSM-1	14-Oct-20	8:40	-	-	1.4	0.3	5.05	11.56	90.9	1092	19.90	8.18	0.45
	LSM3	14-Oct-20	11:25	-	-	-	0.3	4.73	11.91	92.9	1137	17.80	8.12	-
Dauphin River	DR-A	14-Oct-20	12:00	-	-	0.9	0.3	4.84	12.08	94.5	1091	7.20	8.23	0.70
Lake Manitoba	WHB-1	15-Mar-21	13:00	0.05	0.94	1.7	0.3	1.47	13.32	95.4	1467	0.34	8.00	-
							1.0	1.82	14.41	104.1	1524	0.40	8.03	
	WHB2	15-Mar-21	15:00	0.05	0.95	0.2	0.2	0.46	14.27	99.4	1555	0.36	8.13	-
Watchorn Creek	WHC-WB	15-Mar-21	15:00	0.05	0.77	0.1 [3]	-	-	-	-	-	-	-	-

Table 6. Continued.

Waterbody	Site ID	Sampling Date	Sampling Time	Snow Depth (m)	Ice Thickness (m)	Total Water Depth[1] (m)	Sample Depth (m)	Temperature (°C)	Dissolved Oxygen (mg/L)	Oxygen Saturation (%)	Specific Conductance (µS/cm)	Turbidity (NTU)	pH	Secchi Disk Depth[2] (m)
Mercer Creek	MC-WB	15-Mar-21	14:20	0.05	-	-[3]	-	-	-	-	-	-	-	-
Birch Creek drain	BCD-2018-9	16-Mar-21	8:15	0.05	0.35	-[3]	-	-	-	-	-	-	-	-
Birch Creek	BC-LSM	16-Mar-21	8:47	0.00	-	-[3]	-	-	-	-	-	-	-	-
Fairford River	FR1	16-Mar-21	11:45	-	-[4]	-	0.3	1.27	13.26	94.4	1400	1.57	8.24	-
	FR2	16-Mar-21	12:00	-	-[4]	-	0.3	2.18	13.04	95.2	1362	1.22	8.23	
Lake St. Martin	BB-LSM	16-Mar-21	9:30	0.10	0.85	2.2	0.5	1.81	13.37	96.6	1489	3.08	8.07	-
							1.0	1.80	13.88	100.3	1485	3.23	8.09	
							1.5	2.17	14.33	104.6	1494	1.85	8.15	
	LSM5	17-Mar-21	10:00	0.12	0.97	3.3	0.3	0.75	12.69	89.0	1469	0.40	8.05	-
							1.0	1.62	12.54	90.2	1459	0.51	8.04	
							1.5	2.51	12.06	88.8	1450	0.46	8.02	
							2.0	2.88	11.85	88.2	1447	0.44	8.00	
							2.5	3.50	11.30	85.5	1449	0.54	7.98	
	LSM4	17-Mar-21	11:15	-	-[4]	-	0.3	0.60	11.49	80.4	1571	0.69	7.95	-
	LSM1	17-Mar-21	13:24	0.05	1.0	0.2	0.2	0.26	11.41	79.0	1451	0.71	8.07	-
	LSM3	17-Mar-21	14:15	0.05	0.85	0.95	0.3	1.84	1.83	13.6	2309	0.86	7.52	-
Dauphin River	DR-A	17-Mar-21	17:30	0.05	0.55	0.65	0.3	0.04	11.74	80.8	1476	0.50	8.09	-
	DR-B	18-Mar-21	8:15	0.00	0.17	0.56	0.3	-0.04	10.54	72.3	1521	0.89	8.01	-
	DR-E	18-Mar-21	14:00	0.10	0.7	1.1	0.3	0.02	10.32	71.0	1508	1.25	7.96	-
							1.0	0.01	10.31	70.8	1509	0.89	7.96	
Big Buffalo Lake	BBL	17-Mar-21	16:04	0.05	0.75	0.35	0.3	2.26	0.58	4.3	1985	7.64	7.49	-
Buffalo Creek	BC3	18-Mar-21	9:45	-	0.9	-[3]	-	-	-	-	-	-	-	-
Lake Winnipeg	SB1	18-Mar-21	12:00	0.10	1.0	3.3	0.3	0.46	16.53	114.7	520	4.59	8.36	-
							1.0	0.50	15.91	110.6	516	2.68	8.27	
							1.5	0.61	15.35	107.0	515	4.91	8.20	
							2.0	0.76	15.63	109.4	527	4.23	8.20	

Table 6. Continued.

Waterbody	Site ID	Sampling Date	Sampling Time	Snow Depth (m)	Ice Thickness (m)	Total Water Depth[1] (m)	Sample Depth (m)	Temperature (°C)	Dissolved Oxygen (mg/L)	Oxygen Saturation (%)	Specific Conductance (µS/cm)	Turbidity (NTU)	pH	Secchi Disk Depth[2] (m)
							2.5	1.12	16.91	119.4	526	4.05	8.44	
	SB2	18-Mar-21	11:00	0.10	0.98	5.6	0.3	0.27	15.29	105.5	514	4.54	8.22	-
							1.0	0.44	14.87	103.2	510	4.76	8.17	
							2.0	0.59	14.53	101.2	506	4.92	8.13	
							3.0	0.85	15.45	108.3	531	4.18	8.20	
							4.0	1.84	13.25	95.6	543	4.69	7.96	
							5.0	2.75	8.61	63.8	701	6.56	7.72	
Lake Manitoba	WHB1	17-May-21	11:25	-	-	2.4	0.3	14.07	11.21	109.4	1156	1.76	8.54	1.65
							1.0	14.07	11.20	109.2	1156	1.90	8.50	
							1.5	14.07	11.20	109.2	1156	1.89	8.50	
							2.0	14.08	11.26	109.7	1140	2.06	8.37	
Lake Manitoba	WHB2	17-May-21	12:40	-	-	1.2	0.3	15.57	10.46	105.6	1165	3.12	8.58	-
Watchorn Creek	WHC-WB	17-May-21	13:20	-	-	0.8	0.3	16.77	10.74	110.9	1177	3.59	8.51	0.85
Mercer Creek	MC-WB	17-May-21	12:10	-	-	1.0	0.3	17.40	9.76	102.4	1159	12.2	8.51	>1.0
Birch Creek drain	BCD-2018-9	17-May-21	14:55	-	-	0.75	0.3	14.66	7.36	72.6	691	0.16	7.97	>0.75
Birch Creek	BC-LSM	17-May-21	15:25	-	-	0.9	0.3	20.10	11.72	129.4	687	2.09	8.38	>0.9
Fairford River	FR1	18-May-21	10:15	-	-	1.9	0.3	14.89	10.04	99.7	1148	8.63	8.53	1.05
Fairford River	FR2	18-May-21	11:05	-	-	0.5	0.3	16.89	9.96	103.1	1157	8.08	8.56	>0.5
Lake St. Martin	BB-LSM	17-May-21	16:15	-	-	1.8	0.3	14.60	10.92	107.5	861	2.99	8.60	1.45
							1.0	14.61	10.93	107.6	861	4.00	8.60	
							1.5	14.60	10.93	107.6	861	4.32	8.61	
	LSM5[5]	May 2021	-	-	-	-	-	-	-	-	-	-	-	-
	LSM4	19-May-21	11:20	-	-	0.6	0.3	17.33	9.37	97.9	1108	3.75	8.36	>0.6
	LSM1	19-May-21	14:00	-	-	0.75	0.3	18.93	9.37	101.2	1150	10.7	8.55	>0.75
	LSM3	19-May-21	15:40	-	-	1.2	0.3	18.60	9.63	103.2	821	5.49	8.60	0.85

Table 6. Continued.

Waterbody	Site ID	Sampling Date	Sampling Time	Snow Depth (m)	Ice Thickness (m)	Total Water Depth[1] (m)	Sample Depth (m)	Temperature (°C)	Dissolved Oxygen (mg/L)	Oxygen Saturation (%)	Specific Conductance (µS/cm)	Turbidity (NTU)	pH	Secchi Disk Depth[2] (m)
Dauphin River	DR-A	19-May-21	13:10	-	-	0.6	0.3	18.28	8.93	95.2	1168	15.9	8.43	0.28
	DR-B	18-May-21	12:45	-	-	0.6	0.3	18.81	9.53	101.4	1214	9.77	8.58	>0.6
	DR-E	19-May-21	9:50	-	-	1.1	0.3	17.72	8.58	90.4	1209	7.93	8.44	0.55
Big Buffalo Lake	BBL	16-May-21	11:00	-	-	-	-	15.5 [6]	- [7]	- [7]	- [7]	- [7]	- [7]	-
Buffalo Creek	BC3	16-May-21	9:43	-	-	1.8	-	18.0 [6]	- [7]	- [7]	- [7]	- [7]	- [7]	0.90
Lake Winnipeg	SB1	27-May-21	13:00	-	-	3.8	0.3	7.87	11.45	96.6	517	9.72	8.25	0.45
							1.0	7.90	11.43	96.5	517	9.60	8.25	
							1.5	7.80	11.43	96.2	516	9.86	8.25	
							2.0	7.78	11.42	96.1	515	9.46	8.25	
							2.5	7.76	11.41	95.9	514	9.72	8.25	
							3.0	7.76	11.41	95.9	514	9.57	8.25	
	SB2	27-May-21	12:35	-	-	6.4	0.3	8.91	11.21	97.1	474	32.9	8.28	0.25
							1.0	8.81	11.21	96.7	475	33.0	8.30	
							2.0	8.76	11.18	96.1	474	33.0	8.30	
							3.0	8.59	11.15	95.7	472	32.3	8.30	
							4.0	8.49	11.14	95.4	470	32.6	8.29	
							5.0	8.47	11.13	95.2	470	30.7	8.29	

1 - Effective depth during ice-cover

2 - Not measured in March 2021

3 - Site was frozen to the bottom or effective depth was too shallow to accurately measure *in situ* water quality.

4 - Open-water

5 - Site not sampled in May 2021 due to strong winds which made accessing the site unsafe.

6 - Measured with a hand-held thermometer.

7 - Sonde batteries died on site, no *in situ* measurements recorded.

Table 7. Laboratory results for routine parameters measured at core sampling sites.

Waterbody	Site ID	Sampling Date	ALS ID	Alkalinity				Nitrogen			
				Total Alkalinity as $CaCO_3$ (mg/L)	Bicarbonate, HCO_3 (mg/L)	Carbonate, CO_3 (mg/L)	Hydroxide, OH (mg/L)	Total Ammonia (mg N/L)	Nitrate (mg N/L)	Nitrite (mg N/L)	Nitrate/ nitrite (mg N/L)
Analytical DL				*1.0*	*1.2*	*0.60*	*0.34*	*0.010*	*0.0050 /0.010*	*0.0010 /0.0020*	*0.0051 /0.010*
Lake Manitoba	WHB1	1-Sep-20	L2497954-1	170	193	7.20	<0.34	<0.010	<0.010	<0.0020	<0.010
	WHB2	1-Sep-20	L2497954-2	169	191	7.08	<0.34	<0.010	<0.010	<0.0020	<0.010
Watchorn Creek	WHC-WB	1-Sep-20	L2497954-3	184	206	9.24	<0.34	<0.010	<0.010	<0.0020	<0.010
Mercer Creek	MC-WB	1-Sep-20	Mean	190	231	<0.60	<0.34	0.031	<0.010	<0.0020	<0.010
Birch Creek drain	BCD-2018-9	9-Sep-20	L2501445-3	379	440	11.00	<0.34	0.010	<0.0050	<0.0010	<0.0051
Birch Creek	BC-LSM	1-Sep-20	L2497954-5	320	347	21.2	<0.34	0.024	0.0059	<0.0010	0.0059
Fairford River	FR1	1-Sep-20	L2497954-6	170	192	7.32	<0.34	<0.010	<0.010	0.0035	<0.010
	FR2	10-Sep-20	L2501445-2	201	232	6.60	<0.34	<0.010	<0.010	<0.0020	<0.010
Lake St. Martin	BB-LSM	10-Sep-20	L2501445-1	216	250	6.84	<0.34	<0.010	<0.010	<0.0020	<0.010
	LSM5	2-Sep-20	L2498786-4	209	237	9.24	<0.34	<0.010	<0.010	<0.0020	<0.010
	LSM4	2-Sep-20	L2498786-3	170	188	9.96	<0.34	<0.010	<0.010	<0.0020	<0.010
	LSM1	2-Sep-20	Mean	188	211	8.80	<0.34	<0.010	<0.010	<0.0020	<0.010
	LSM3	2-Sep-20	L2498786-2	193	213	10.9	<0.34	<0.010	<0.0050	<0.0010	<0.0051
Dauphin River	DR-A	2-Sep-20	L2497954-7	163	181	8.76	<0.34	<0.010	<0.010	<0.0020	<0.010
	DR-B	3-Sep-20	L2498784-1	184	206	8.64	<0.34	<0.010	<0.010	<0.0020	<0.010
	DR-E	3-Sep-20	L2498784-2	194	223	6.96	<0.34	<0.010	<0.010	<0.0020	<0.010
Big Buffalo Lake	BBL	1-Sep-20	L2497371-1	283	311	16.9	<0.34	0.017	<0.0050	<0.0010	<0.0051
Buffalo Creek	BC3	1-Sep-20	L2497371-2	226	270	3.00	<0.34	0.010	<0.0050	<0.0010	<0.0051
Lake Winnipeg	SB1	3-Sep-20	L2498784-3	128	156	<0.60	<0.34	<0.010	0.0206	<0.0010	0.0206
	SB2	3-Sep-20	L2498784-4	113	138	<0.60	<0.34	<0.010	0.0215	<0.0010	0.0215
Birch Creek drain	BCD-2018-9	13-Oct-20	L2516048-1	381	429	17.4	<0.34	0.026	<0.010	<0.0020	<0.010
Birch Creek	BC-LSM	13-Oct-20	L2516048-2	383	427	19.8	<0.34	0.024	<0.010	<0.0020	<0.010
Fairford River	FR1	13-Oct-20	Mean	183	213	4.60	<0.34	<0.010	<0.010	<0.0020	<0.010
	FR2	13-Oct-20	L2516048-5	181	212	4.32	<0.34	<0.010	<0.010	<0.0020	<0.010

Table 7 Continued.

Waterbody	Site ID	Sampling Date	ALS ID	Alkalinity				Nitrogen			
				Total Alkalinity as $CaCO_3$ (mg/L)	Bicarbonate, HCO_3 (mg/L)	Carbonate, CO_3 (mg/L)	Hydroxide, OH (mg/L)	Total Ammonia (mg N/L)	Nitrate (mg N/L)	Nitrite (mg N/L)	Nitrate/ nitrite (mg N/L)
Lake St. Martin	BB-LSM	13-Oct-20	L2516048-3	180	207	5.88	<0.34	<0.010	<0.010	<0.0020	<0.010
	LSM4	14-Oct-20	L2516868-3	179	210	4.20	<0.34	0.013	<0.010	<0.0020	<0.010
	LSM1	14-Oct-20	L2516868-1	181	210	5.28	<0.34	0.011	<0.010	<0.0020	<0.010
	LSM3	14-Oct-20	L2516868-2	207	239	6.48	<0.34	0.029	<0.010	<0.0020	<0.010
Dauphin River	DR-A	14-Oct-20	L2516868-4	181	212	4.32	<0.34	0.025	<0.010	<0.0020	<0.010
Lake Manitoba	WHB1	15-Mar-21	L2567238-1	237	290	<0.60	<0.34	0.163	<0.010	<0.0020	<0.010
	WHB2	15-Mar-21	L2567238-2	251	306	<0.60	<0.34	0.135	0.017	<0.0020	0.017
Watchorn Creek	WHC-WB [1]	15-Mar-21	-	-	-	-	-	-	-	-	-
Mercer Creek	MC-WB [1]	15-Mar-21	-	-	-	-	-	-	-	-	-
Birch Creek drain	BCD-2018-9 [1]	16-Mar-21	-	-	-	-	-	-	-	-	-
Birch Creek	BC-LSM [1]	16-Mar-21	-	-	-	-	-	-	-	-	-
Fairford River	FR1	16-Mar-21	L2567806-2	225	274	<0.60	<0.34	0.130	0.012	0.0025	0.015
	FR2	16-Mar-21	L2567806-3	217	264	<0.60	<0.34	0.131	0.011	0.0055	0.017
Lake St. Martin	BB-LSM	16-Mar-21	L2567806-1	245	298	<0.60	<0.34	0.125	0.015	<0.0020	0.015
	LSM5	17-Mar-21	L2568173-5	235	278	4.20	<0.34	0.190	0.014	0.0031	0.017
	LSM4	17-Mar-21	L2568173-1	256	302	4.68	<0.34	0.178	0.012	<0.0020	0.012
	LSM1	17-Mar-21	L2568173-2	235	280	3.60	<0.34	0.139	0.024	0.0030	0.027
	LSM3	17-Mar-21	L2568173-3	433	528	<0.60	<0.34	0.336	0.014	<0.0020	0.014
Dauphin River	DR-A	17-Mar-21	L2568173-4	240	282	5.52	<0.34	0.200	0.014	0.0034	0.017
	DR-B	18-Mar-21	Mean	248	297	2.90	<0.34	0.149	0.029	<0.0020	0.030
	DR-E	18-Mar-21	L2568772-2	246	300	<0.60	<0.34	0.169	0.021	<0.0020	0.021
Big Buffalo Lake	BBL [1]	17-Mar-21	-	-	-	-	-	-	-	-	-
Buffalo Creek	BC3 [1]	18-Mar-21	-	-	-	-	-	-	-	-	-
Lake Winnipeg	SB1	18-Mar-21	Mean	138	164	2.04	<0.34	0.026	0.0240	<0.0010	0.0243
	SB2	18-Mar-21	L2568772-4	136	165	<0.60	<0.34	0.030	0.0464	0.0013	0.0477

Table 7 Continued.

Waterbody	Site ID	Sampling Date	ALS ID	Alkalinity				Nitrogen			
				Total Alkalinity as $CaCO_3$ (mg/L)	Bicarbonate, HCO_3 (mg/L)	Carbonate, CO_3 (mg/L)	Hydroxide, OH (mg/L)	Total Ammonia (mg N/L)	Nitrate (mg N/L)	Nitrite (mg N/L)	Nitrate/ nitrite (mg N/L)
Lake Manitoba	WHB1	17-May-21	L2588908-1	183	209	6.48	<0.34	0.013	<0.010	<0.0020	<0.010
	WHB2	17-May-21	L2588908-2	187	214	6.48	<0.34	0.016	<0.010	<0.0020	<0.010
Watchorn Creek	WHC-WB	17-May-21	L2588908-3	203	236	5.64	<0.34	0.051	<0.0050	<0.0010	<0.0051
Mercer Creek	MC-WB	17-May-21	L2588908-4	192	222	6.12	<0.34	0.018	<0.0050	<0.0010	<0.0051
Birch Creek drain	BCD-2018-9	17-May-21	L2588908-5	292	350	3.24	<0.34	<0.010	<0.0050	<0.0010	<0.0051
Birch Creek	BC-LSM	17-May-21	L2588908-6	318	357	14.9	<0.34	0.013	<0.0050	<0.0010	<0.0051
Fairford River	FR1	18-May-21	L2590207-1	181	210	5.64	<0.34	0.024	<0.010	<0.0020	<0.010
	FR2	18-May-21	Mean (n=2) [2]	182	208	6.84	<0.34	0.041	<0.010	<0.0020	<0.010
Lake St. Martin	BB-LSM	17-May-21	L2588908-7	145	169	3.72	<0.34	0.012	<0.0050	<0.0010	<0.0051
	LSM5 [3]	May 2021	-	-	-	-	-	-	-	-	-
	LSM4	19-May-21	Mean	182	210	5.60	<0.34	0.024	<0.0050	<0.0010	<0.0051
	LSM1	19-May-21	L2590206-2	186	214	6.60	<0.34	0.069	<0.010	<0.0020	<0.010
	LSM3	19-May-21	L2590206-3	176	203	5.64	<0.34	0.018	<0.0050	<0.0010	<0.0051
Dauphin River	DR-A	19-May-21	L2590206-4	189	220	5.16	<0.34	0.066	<0.0050	<0.0010	<0.0051
	DR-B	18-May-21	L2590207-3	191	219	6.96	<0.34	0.038	<0.010	<0.0020	<0.010
	DR-E	19-May-21	L2590206-5	195	226	5.76	<0.34	0.064	<0.010	<0.0020	<0.010
Big Buffalo Lake	BBL	16-May-21	L2588908-8	190	222	4.56	<0.34	0.155	<0.0050	<0.0010	<0.0051
Buffalo Creek	BC3	16-May-21	L2588908-9	186	227	<0.60	<0.34	0.053	<0.0050	<0.0010	<0.0051
Lake Winnipeg	SB1	27-May-21	L2593508-1	126	154	<0.60	<0.34	0.147	<0.0050	<0.0010	<0.0051
	SB2	27-May-21	L2593508-2	124	151	<0.60	<0.34	0.023	<0.0050	<0.0010	<0.0051

Table 7 Continued.

Waterbody	Site ID	Sampling Date	Nitrogen			Phosphorus				Molar N:P Ratios		
			Dissolved Inorganic Nitrogen (mg/L)[4]	Total Kjeldahl Nitrogen (mg/L)	Total Nitrogen (mg/L)	Dissolved Phosphorus (mg/L)	Total Particulate Phosphorus (mg/L)	Total Phosphorus (mg/L)	Dissolved Fraction (%)	TN:TP	DIN:DP	DIN:TP
Analytical DL			*0.010*	*0.20*	*0.20*	*0.0010 /0.0030*	*0.0028 /0.0042*	*0.0010 /0.0030*				
Lake Manitoba	WHB1	1-Sep-20	<0.010	1.23	1.23	0.0058	0.0205	0.0263	22	103	2	0
	WHB2	1-Sep-20	<0.010	1.28	1.28	0.0067	0.0223	0.0289	23	98	2	0
Watchorn Creek	WHC-WB	1-Sep-20	<0.010	1.26	1.26	0.0077	0.0213	0.0290	27	96	1	0
Mercer Creek	MC-WB	1-Sep-20	0.036	1.15	1.15	0.0123	0.0262	0.0386	32	66	6	2
Birch Creek drain	BCD-2018-9	9-Sep-20	0.013	1.82	1.82	0.0122	0.0210	0.0332	37	121	2	1
Birch Creek	BC-LSM	1-Sep-20	0.030	2.35	2.36	0.0235	0.0102	0.0337	70	155	3	2
Fairford River	FR1	1-Sep-20	<0.010	1.10	1.10	0.0068	0.0167	0.0235	29	104	2	0
	FR2	10-Sep-20	<0.010	1.31	1.31	0.0054	0.0187	0.0241	22	120	2	0
Lake St. Martin	BB-LSM	10-Sep-20	<0.010	1.81	1.81	0.0061	0.0161	0.0222	27	180	2	0
	LSM5	2-Sep-20	<0.010	1.45	1.45	0.0081	0.0137	0.0218	37	147	1	1
	LSM4	2-Sep-20	<0.010	1.17	1.17	0.0079	0.0186	0.0265	30	98	1	0
	LSM1	2-Sep-20	<0.010	1.29	1.29	0.0086	0.0169	0.0254	34	112	1	0
	LSM3	2-Sep-20	<0.010	1.46	1.46	0.0096	0.0121	0.0217	44	149	1	1
Dauphin River	DR-A	2-Sep-20	<0.010	1.29	1.29	0.0078	0.0175	0.0253	31	113	1	0
	DR-B	3-Sep-20	<0.010	1.20	1.20	0.0091	0.0169	0.0260	35	102	1	0
	DR-E	3-Sep-20	<0.010	1.33	1.33	0.0088	0.0224	0.0311	28	95	1	0
Big Buffalo Lake	BBL	1-Sep-20	0.020	1.79	1.79	0.0106	0.0473	0.0579	18	68	4	1
Buffalo Creek	BC3	1-Sep-20	0.013	0.99	0.99	0.0081	0.0127	0.0208	39	105	3	1
Lake Winnipeg	SB1	3-Sep-20	0.026	0.64	0.66	0.0208	0.0229	0.0437	48	33	3	1
	SB2	3-Sep-20	0.027	0.46	0.48	0.0266	0.0221	0.0487	55	22	2	1
Birch Creek drain	BCD-2018-9	13-Oct-20	0.031	1.67	1.67	0.0074	<0.0042	0.0106	70	348	9	6
Birch Creek	BC-LSM	13-Oct-20	0.029	1.70	1.70	0.0114	0.0091	0.0204	56	184	6	3
Fairford River	FR1	13-Oct-20	<0.010	1.39	1.39	0.0061	0.0291	0.0352	17	87	2	0
	FR2	13-Oct-20	<0.010	1.08	1.08	0.0070	0.0257	0.0326	21	73	2	0

Table 7 Continued.

Waterbody	Site ID	Sampling Date	Nitrogen			Phosphorus				Molar N:P Ratios		
			Dissolved Inorganic Nitrogen (mg/L)[4]	Total Kjeldahl Nitrogen (mg/L)	Total Nitrogen (mg/L)	Dissolved Phosphorus (mg/L)	Total Particulate Phosphorus (mg/L)	Total Phosphorus (mg/L)	Dissolved Fraction (%)	TN:TP	DIN:DP	DIN:TP
Lake St. Martin	BB-LSM	13-Oct-20	<0.010	1.15	1.15	0.0064	0.0164	0.0228	28	112	2	0
	LSM4	14-Oct-20	0.018	1.13	1.13	0.0059	0.0158	0.0218	27	115	7	2
	LSM1	14-Oct-20	0.016	1.49	1.49	0.0062	0.0267	0.0329	19	100	6	1
	LSM3	14-Oct-20	0.034	1.42	1.42	0.0056	0.0235	0.0291	19	108	13	3
Dauphin River	DR-A	14-Oct-20	0.030	1.17	1.17	0.0060	0.0166	0.0226	27	114	11	3
Lake Manitoba	WHB1	15-Mar-21	0.168	1.27	1.27	0.0081	0.0093	0.0173	47	162	21	21
	WHB2	15-Mar-21	0.152	1.49	1.50	0.0088	0.0073	0.0161	55	206	21	21
Watchorn Creek	WHC-WB [1]	15-Mar-21	-	-	-	-	-	-	-	-	-	-
Mercer Creek	MC-WB [1]	15-Mar-21	-	-	-	-	-	-	-	-	-	-
Birch Creek drain	BCD-2018-9 [1]	16-Mar-21	-	-	-	-	-	-	-	-	-	-
Birch Creek	BC-LSM [1]	16-Mar-21	-	-	-	-	-	-	-	-	-	-
Fairford River	FR1	16-Mar-21	0.145	1.31	1.33	0.0072	0.0086	0.0158	46	186	20	20
	FR2	16-Mar-21	0.148	1.27	1.29	0.0082	0.0098	0.0180	46	159	18	18
Lake St. Martin	BB-LSM	16-Mar-21	0.140	1.30	1.32	0.0084	0.0083	0.0167	50	175	19	19
	LSM5	17-Mar-21	0.207	1.44	1.46	0.0071	0.0069	0.0140	51	231	33	33
	LSM4	17-Mar-21	0.190	1.50	1.51	0.0095	0.0060	0.0155	61	216	27	27
	LSM1	17-Mar-21	0.166	1.47	1.50	0.0079	0.0134	0.0213	37	156	17	17
	LSM3	17-Mar-21	0.350	2.36	2.37	0.0110	0.0101	0.0211	52	248	37	37
Dauphin River	DR-A	17-Mar-21	0.217	1.38	1.40	0.0081	<0.0042	0.0121	67	256	40	40
	DR-B	18-Mar-21	0.179	1.35	1.38	0.0111	0.0082	0.0199	56	154	20	20
	DR-E	18-Mar-21	0.190	1.49	1.52	0.0095	0.0066	0.0161	59	209	26	26
Big Buffalo Lake	BBL [1]	17-Mar-21	-	-	-	-	-	-	-	-	-	-
Buffalo Creek	BC3 [1]	18-Mar-21	-	-	-	-	-	-	-	-	-	-
Lake Winnipeg	SB1	18-Mar-21	0.051	0.55	0.58	0.0188	0.0130	0.0318	59	40	4	4
	SB2	18-Mar-21	0.078	0.51	0.56	0.0219	0.0072	0.0292	75	42	6	6

Table 7 Continued.

Waterbody	Site ID	Sampling Date	Nitrogen			Phosphorus				Molar N:P Ratios		
			Dissolved Inorganic Nitrogen (mg/L)[4]	Total Kjeldahl Nitrogen (mg/L)	Total Nitrogen (mg/L)	Dissolved Phosphorus (mg/L)	Total Particulate Phosphorus (mg/L)	Total Phosphorus (mg/L)	Dissolved Fraction (%)	TN:TP	DIN:DP	DIN:TP
Lake Manitoba	WHB1	17-May-21	0.018	1.12	1.12	0.0130	0.0084	0.0214	61	116	2	2
	WHB2	17-May-21	0.021	1.15	1.15	0.0148	0.0141	0.0289	51	88	2	2
Watchorn Creek	WHC-WB	17-May-21	0.054	1.55	1.55	0.0163	0.0242	0.0405	40	85	3	3
Mercer Creek	MC-WB	17-May-21	0.021	1.62	1.62	0.0093	0.0310	0.0403	23	89	1	1
Birch Creek drain	BCD-2018-9	17-May-21	<0.010	1.40	1.40	0.0115	0.0087	0.0202	57	153	1	1
Birch Creek	BC-LSM	17-May-21	0.016	1.22	1.22	0.0102	0.0125	0.0227	45	119	2	2
Fairford River	FR1	18-May-21	0.029	1.12	1.12	0.0086	0.0124	0.0210	41	118	3	3
	FR2	18-May-21	0.046	1.25	1.25	0.011	0.0222	0.0336	34	82	3	3
Lake St. Martin	BB-LSM	17-May-21	0.015	0.97	0.97	0.0066	0.0187	0.0252	26	85	1	1
	LSM5 [3]	May 2021	-	-	-	-	-	-	-	-	-	-
	LSM4	19-May-21	0.026	1.28	1.28	0.009	0.0192	0.0284	33	99	2	2
	LSM1	19-May-21	0.074	1.34	1.34	0.0050	0.0215	0.0266	19	111	6	6
	LSM3	19-May-21	0.021	1.24	1.24	0.0080	0.0169	0.0249	32	110	2	2
Dauphin River	DR-A	19-May-21	0.069	1.58	1.58	0.0071	0.0334	0.0404	18	87	4	4
	DR-B	18-May-21	0.043	1.34	1.34	0.0104	0.0168	0.0272	38	109	3	3
	DR-E	19-May-21	0.069	1.69	1.69	0.0085	0.0268	0.0353	24	106	4	4
Big Buffalo Lake	BBL	16-May-21	0.158	1.26	1.26	0.0131	0.0242	0.0373	35	75	9	9
Buffalo Creek	BC3	16-May-21	0.056	0.95	0.95	0.0085	0.0381	0.0465	18	45	3	3
Lake Winnipeg	SB1	27-May-21	0.150	0.74	0.74	0.0070	0.0209	0.0279	25	59	12	12
	SB2	27-May-21	0.026	0.61	0.61	0.0062	0.0401	0.0462	13	29	1	1

Table 7 Continued.

Waterbody	Site ID	Sampling Date	Carbon				Routine Chemistry				
			Total Inorganic Carbon (mg/L)	Total Organic Carbon (mg/L)	Dissolved Organic Carbon (mg/L)	Total Carbon (mg/L)	Laboratory pH (pH units)	Laboratory Conductivity (µmhos/cm)	Total Dissolved Solids (mg/L)	Hardness, as $CaCO_3$ (mg/L)	Biochemical Oxygen Demand (mg/L) [5]
Analytical DL			*0.50*	*0.50*	*0.50*	*1.0*	*0.10*	*1*	*4.0/20*	*0.2*	*2*
Lake Manitoba	WHB1	1-Sep-20	30.2	13.0	12.4	43.2	8.56	1050	624	237	-
	WHB2	1-Sep-20	37.1	13.0	12.4	50.1	8.57	1060	603	236	-
Watchorn Creek	WHC-WB	1-Sep-20	39.3	14.4	13.9	53.7	8.62	1010	583	248	<2.0
Mercer Creek	MC-WB	1-Sep-20	41.2	13.6	13.3	54.8	8.05	1090	632	256	<2.0
Birch Creek drain	BCD-2018-9	9-Sep-20	77.0	32.1	31.6	109	8.41	766	503	458	2.2
Birch Creek	BC-LSM	1-Sep-20	65.4	35.1	34.6	101	8.72	666	460	383	<2.0
Fairford River	FR1	1-Sep-20	37.5	13.1	12.7	50.6	8.56	1060	615	233	-
	FR2	10-Sep-20	36.8	13.0	12.3	49.8	8.43	1090	604	249	-
Lake St. Martin	BB-LSM	10-Sep-20	39.0	13.4	13.1	52.4	8.45	1050	586	238	-
	LSM5	2-Sep-20	36.6	13.4	12.9	50.1	8.54	1040	606	241	-
	LSM4	2-Sep-20	36.2	13.4	12.9	49.6	8.59	1030	582	249	-
	LSM1	2-Sep-20	34.4	13.3	13.1	47.6	8.54	1047	612	237	
	LSM3	2-Sep-20	38.9	18.5	16.8	57.4	8.58	852	534	234	-
Dauphin River	DR-A	2-Sep-20	35.1	13.8	13.6	48.8	8.66	1030	590	226	-
	DR-B	3-Sep-20	34.0	13.8	13.9	47.8	8.55	1040	612	234	-
	DR-E	3-Sep-20	36.5	13.8	13.4	50.3	8.50	1040	578	232	-
Big Buffalo Lake	BBL	1-Sep-20	58.0	27.5	27.6	85.5	8.63	565	382	279	3.4
Buffalo Creek	BC3	1-Sep-20	49.8	24.4	24.4	74.3	8.31	419	285	229	2.0
Lake Winnipeg	SB1	3-Sep-20	25.0	9.14	9.29	34.1	8.29	521	307	167	-
	SB2	3-Sep-20	22.9	7.47	7.43	30.4	8.26	384	230	144	-
Birch Creek drain	BCD-2018-9	13-Oct-20	70.4	30.4	28.6	101	8.49	937	642	519	-
Birch Creek	BC-LSM	13-Oct-20	74.4	30.6	31.0	105	8.54	936	618	508	-
Fairford River	FR1	13-Oct-20	34.4	12.4	11.9	46.8	8.33	1147	623	246	
	FR2	13-Oct-20	32.4	13.2	11.8	45.6	8.31	1140	588	240	-

Table 7 Continued.

Waterbody	Site ID	Sampling Date	Carbon				Routine Chemistry				
			Total Inorganic Carbon (mg/L)	Total Organic Carbon (mg/L)	Dissolved Organic Carbon (mg/L)	Total Carbon (mg/L)	Laboratory pH (pH units)	Laboratory Conductivity (µmhos/cm)	Total Dissolved Solids (mg/L)	Hardness, as $CaCO_3$ (mg/L)	Biochemical Oxygen Demand (mg/L) [5]
Lake St. Martin	BB-LSM	13-Oct-20	35.4	13.1	12.5	48.5	8.38	1110	593	241	-
	LSM4	14-Oct-20	33.5	14.3	13.3	47.8	8.33	1130	633	251	-
	LSM1	14-Oct-20	33.8	14.6	13.4	48.3	8.36	1130	637	250	-
	LSM3	14-Oct-20	39.4	16.7	16.2	56.1	8.39	1010	580	266	-
Dauphin River	DR-A	14-Oct-20	33.0	14.0	13.4	47.0	8.34	1130	632	252	-
Lake Manitoba	WHB1	15-Mar-21	51.9	15.1	15.0	67.0	8.17	1490	852	342	-
	WHB2	15-Mar-21	54.6	16.2	15.9	70.8	8.21	1570	905	364	-
Watchorn Creek	WHC-WB [1]	15-Mar-21	-	-	-	-	-	-	-	-	-
Mercer Creek	MC-WB [1]	15-Mar-21	-	-	-	-	-	-	-	-	-
Birch Creek drain	BCD-2018-9 [1]	16-Mar-21	-	-	-	-	-	-	-	-	-
Birch Creek	BC-LSM [1]	16-Mar-21	-	-	-	-	-	-	-	-	-
Fairford River	FR1	16-Mar-21	48.0	15.0	14.2	63.0	8.27	1410	788	331	-
	FR2	16-Mar-21	46.6	14.9	14.0	61.5	8.22	1390	759	324	-
Lake St. Martin	BB-LSM	16-Mar-21	55.4	15.8	15.5	71.2	8.27	1510	839	375	-
	LSM5	17-Mar-21	54.1	14.9	14.6	69.0	8.33	1480	841	349	-
	LSM4	17-Mar-21	52.5	16.2	15.4	68.7	8.32	1570	885	385	-
	LSM1	17-Mar-21	54.2	15.3	14.3	69.5	8.30	1460	824	348	-
	LSM3	17-Mar-21	103	24.8	23.4	128	8.17	2280	1320	597	-
Dauphin River	DR-A	17-Mar-21	56.2	15.3	15.0	71.4	8.33	1480	849	353	-
	DR-B	18-Mar-21	57.0	16.0	15.9	73.0	8.30	1533	833	347	
	DR-E	18-Mar-21	57.6	15.5	15.7	73.1	8.25	1520	854	347	-
Big Buffalo Lake	BBL [1]	17-Mar-21	-	-	-	-	-	-	-	-	-
Buffalo Creek	BC3 [1]	18-Mar-21	-	-	-	-	-	-	-	-	-
Lake Winnipeg	SB1	18-Mar-21	31.3	9.31	9.26	40.6	8.27	530	297	173	
	SB2	18-Mar-21	30.8	9.0	9.05	39.9	8.24	520	290	171	-

Table 7 Continued.

Waterbody	Site ID	Sampling Date	Carbon				Routine Chemistry				
			Total Inorganic Carbon (mg/L)	Total Organic Carbon (mg/L)	Dissolved Organic Carbon (mg/L)	Total Carbon (mg/L)	Laboratory pH (pH units)	Laboratory Conductivity (µmhos/cm)	Total Dissolved Solids (mg/L)	Hardness, as $CaCO_3$ (mg/L)	Biochemical Oxygen Demand (mg/L) [5]
Lake Manitoba	WHB1	17-May-21	36.3	12.5	12.7	48.8	8.38	1160	642	266	-
	WHB2	17-May-21	37.7	13.2	13.2	50.9	8.38	1170	637	270	-
Watchorn Creek	WHC-WB	17-May-21	40.7	14.6	13.8	55.3	8.35	1180	641	290	-
Mercer Creek	MC-WB	17-May-21	38.3	14.6	13.1	52.9	8.37	1190	649	274	-
Birch Creek drain	BCD-2018-9	17-May-21	59.0	22.2	22.0	81.2	8.30	685	434	400	-
Birch Creek	BC-LSM	17-May-21	64.3	20.8	20.3	85.1	8.49	680	421	413	-
Fairford River	FR1	18-May-21	35.9	13.4	13.8	49.3	8.39	1150	650	266	-
	FR2	18-May-21	36.5	14.7	13.3	51.2	8.40	1165	651	263	
Lake St. Martin	BB-LSM	17-May-21	29.7	10.5	9.9	40.1	8.32	863	465	205	-
	LSM5 [3]	May 2021	-	-	-	-	-	-	-	-	-
	LSM4	19-May-21	36.8	14.5	14.0	51.3	8.37	1120	586	260	
	LSM1	19-May-21	38.0	14.8	14.7	52.8	8.38	1160	618	264	-
	LSM3	19-May-21	34.8	13.1	13.5	47.9	8.38	831	428	223	-
Dauphin River	DR-A	19-May-21	37.3	16.0	15.8	53.3	8.37	1170	628	274	-
	DR-B	18-May-21	39.2	15.4	15.6	54.6	8.42	1220	691	283	-
	DR-E	19-May-21	39.9	15.9	15.0	55.8	8.36	1230	644	288	-
Big Buffalo Lake	BBL	16-May-21	39.0	12.2	11.6	51.2	8.33	436	252	212	-
Buffalo Creek	BC3	16-May-21	38.4	15.7	15.2	54.0	8.28	398	253	207	-
Lake Winnipeg	SB1	27-May-21	26.2	8.27	8.0	34.5	8.20	502	288	168	-
	SB2	27-May-21	25.2	7.32	8.3	32.5	8.24	487	276	159	-

Table 7 Continued.

Waterbody	Site ID	Sampling Date	Water Clarity			Algal Pigments	
			Total Suspended Solids (mg/L)	Turbidity (NTU)	True Colour (CU)	Chlorophyll a (µg/L)	Phaeophytin a (µg/L)
Analytical DL			*1.0*	*0.1*	*5.0*	*0.10*	*0.10*
Lake Manitoba	WHB1	1-Sep-20	22.4	17.8	<5.0	9.39	2.08
	WHB2	1-Sep-20	28.1	20.1	<5.0	8.56	1.96
Watchorn Creek	WHC-WB	1-Sep-20	14.0	10.5	14.2	6.55	2.44
Mercer Creek	MC-WB	1-Sep-20	7.9	5.73	17.5	6.98	4.73
Birch Creek drain	BCD-2018-9	9-Sep-20	12.9	3.13	113	7.95	5.68
Birch Creek	BC-LSM	1-Sep-20	3.5	2.17	117	3.30	3.22
Fairford River	FR1	1-Sep-20	18.6	13.8	7.0	7.54	1.95
	FR2	10-Sep-20	19.4	15.0	<5.0	6.41	1.43
Lake St. Martin	BB-LSM	10-Sep-20	13.7	7.76	5.7	9.94	1.88
	LSM5	2-Sep-20	13.0	6.59	<5.0	7.99	2.04
	LSM4	2-Sep-20	9.2	5.00	<5.0	6.91	1.70
	LSM1	2-Sep-20	17.3	11.5	5.8	7.79	2.10
	LSM3	2-Sep-20	15.3	10.8	16.8	7.49	2.16
Dauphin River	DR-A	2-Sep-20	12.3	7.53	9.2	10.5	2.80
	DR-B	3-Sep-20	15.4	10.1	7.8	9.17	2.32
	DR-E	3-Sep-20	18.7	13.8	14	9.92	3.04
Big Buffalo Lake	BBL	1-Sep-20	16.1	6.21	61.0	20.7	5.83
Buffalo Creek	BC3	1-Sep-20	3.5	9.94	60.7	1.14	1.33
Lake Winnipeg	SB1	3-Sep-20	20.8	22.0	13.2	2.58	2.52
	SB2	3-Sep-20	19.6	16.6	13.1	2.63	1.58
Birch Creek drain	BCD-2018-9	13-Oct-20	<1.0	0.83	106	3.13	2.32
Birch Creek	BC-LSM	13-Oct-20	1.5	1.62	109	3.97	2.36
Fairford River	FR1	13-Oct-20	43.0	32.4	6.6	10.9	2.53
	FR2	13-Oct-20	31.9	22.7	7.0	9.68	2.59

Table 7 Continued.

Waterbody	Site ID	Sampling Date	Water Clarity			Algal Pigments	
			Total Suspended Solids (mg/L)	Turbidity (NTU)	True Colour (CU)	Chlorophyll a (µg/L)	Phaeophytin a (µg/L)
Lake St. Martin	BB-LSM	13-Oct-20	12.9	7.82	8.0	9.46	2.22
	LSM4	14-Oct-20	11.0	5.49	7.5	7.36	2.40
	LSM1	14-Oct-20	30.8	21.3	7.0	7.43	2.51
	LSM3	14-Oct-20	25.4	19.3	15.2	8.36	2.78
Dauphin River	DR-A	14-Oct-20	11.0	7.24	<5.0	6.29	1.77
Lake Manitoba	WHB1	15-Mar-21	1.1	0.77	<5.0	5.03	4.20
	WHB2	15-Mar-21	1.2	1.01	<5.0	6.80	5.04
Watchorn Creek	WHC-WB [1]	15-Mar-21	-	-	-	-	-
Mercer Creek	MC-WB [1]	15-Mar-21	-	-	-	-	-
Birch Creek drain	BCD-2018-9 [1]	16-Mar-21	-	-	-	-	-
Birch Creek	BC-LSM [1]	16-Mar-21	-	-	-	-	-
Fairford River	FR1	16-Mar-21	2.1	1.65	<5.0	2.38	1.25
	FR2	16-Mar-21	1.9	1.55	<5.0	2.22	1.33
Lake St. Martin	BB-LSM	16-Mar-21	<1.0	0.93	<5.0	3.48	1.39
	LSM5	17-Mar-21	1.2	0.77	<5.0	2.95	1.40
	LSM4	17-Mar-21	4.0	1.51	<5.0	2.76	2.17
	LSM1	17-Mar-21	11.0	3.76	<5.0	4.82	2.37
	LSM3	17-Mar-21	5.2	1.52	14.2	3.35	2.49
Dauphin River	DR-A	17-Mar-21	1.8	1.04	<5.0	1.64	1.59
	DR-B	18-Mar-21	1.9	1.30	<5.0	1.80	1.48
	DR-E	18-Mar-21	2.0	1.42	<5.0	1.94	1.51
Big Buffalo Lake	BBL [1]	17-Mar-21	-	-	-	-	-
Buffalo Creek	BC3 [1]	18-Mar-21	-	-	-	-	-
Lake Winnipeg	SB1	18-Mar-21	1.1	4.71	7.6	9.50	2.62
	SB2	18-Mar-21	<1.0	4.26	7.2	3.47	1.27

Table 7 Continued.

Waterbody	Site ID	Sampling Date	Water Clarity			Algal Pigments	
			Total Suspended Solids (mg/L)	Turbidity (NTU)	True Colour (CU)	Chlorophyll a (µg/L)	Phaeophytin a (µg/L)
Lake Manitoba	WHB1	17-May-21	4.7	2.63	6.3	5.05	1.68
	WHB2	17-May-21	7.9	5.13	8.6	5.90	1.78
Watchorn Creek	WHC-WB	17-May-21	7.7	3.90	12.5	8.81	3.78
Mercer Creek	MC-WB	17-May-21	30.9	18.4	9.8	8.36	3.15
Birch Creek drain	BCD-2018-9	17-May-21	1.1	0.63	81.4	10.7	3.18
Birch Creek	BC-LSM	17-May-21	2.3	2.02	74.4	2.68	1.92
Fairford River	FR1	18-May-21	21.9	12.3	<5.0	7.25	3.00
	FR2	18-May-21	16.2	9.39	<5.0	8.95	4.14
Lake St. Martin	BB-LSM	17-May-21	5.7	4.40	7.5	5.09	1.50
	LSM5 [3]	May 2021	-	-	-	-	-
	LSM4	19-May-21	7.9	5.16	<5.0	10.2	5.82
	LSM1	19-May-21	16.5	13.0	<5.0	9.83	3.54
	LSM3	19-May-21	11.1	7.95	<5.0	15.4	5.80
Dauphin River	DR-A	19-May-21	29.2	22.4	6.1	23.4	9.31
	DR-B	18-May-21	20.7	15.0	<5.0	12.9	5.77
	DR-E	19-May-21	10.5	7.76	<5.0	14.2	4.84
Big Buffalo Lake	BBL	16-May-21	7.9	4.05	29.6	6.89	3.67
Buffalo Creek	BC3	16-May-21	11.3	17.1	42.4	2.36	2.09
Lake Winnipeg	SB1	27-May-21	10.0	13.6	13.0	2.16	1.33
	SB2	27-May-21	27.5	44.9	13.8	5.36	3.93

1 - No sample collected, site was frozen to the bottom or effective depth was too shallow to collect a sample.

2 - Site not sampled in May 2021 due to strong winds which made accessing the site unsafe.

3 - One of the replicates was considered suspect and was removed from the sample mean; see Section 3.1.2 and Appendix 2 for details.

4 - Calculated as the sum of total ammonia and nitrate/nitrite

5 - Samples for BOD were only collected during the September sampling period and only from selected sites.

Table 8. Laboratory results for metals and major ions measured at core sampling sites. All units are mg/L.

Waterbody	Site ID	Sampling Date	ALS ID	Aluminum (Al)		Antimony (Sb)		Arsenic (As)		Barium (Ba)	
				Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Analytical DL				*0.0010*	*0.0030*	*0.00010*	*0.00010*	*0.00010*	*0.00010*	*0.00010*	*0.00010*
Lake Manitoba	WHB1	1-Sep-20	L2497954-1	0.0027	0.107	0.00017	0.00018	0.00222	0.00236	0.0414	0.0443
	WHB2	1-Sep-20	L2497954-2	0.0041	0.190	0.00016	0.00018	0.00217	0.00230	0.0409	0.0452
Watchorn Creek	WHC-WB	1-Sep-20	L2497954-3	0.0030	0.101	0.00015	0.00017	0.00198	0.00209	0.0387	0.0410
Mercer Creek	MC-WB	1-Sep-20	Mean	0.0040	0.0686	0.00018	0.00017	0.00213	0.00214	0.0452	0.0453
Birch Creek drain	BCD-2018-9	9-Sep-20	L2501445-3	<0.0010	0.108	<0.00010	<0.00010	0.00152	0.00157	0.0361	0.0402
Birch Creek	BC-LSM	1-Sep-20	L2497954-5	0.0639	0.0912	0.00011	0.00011	0.00271	0.00258	0.0330	0.0337
Fairford River	FR1	1-Sep-20	L2497954-6	0.0046	0.0982	0.00019	0.00019	0.00214	0.00222	0.0386	0.0415
	FR2	10-Sep-20	L2501445-2	0.0033	0.123	0.00017	0.00021	0.00228	0.00219	0.0406	0.0424
Lake St. Martin	BB-LSM	10-Sep-20	L2501445-1	0.0072	0.109	0.00022	0.00022	0.00245	0.00239	0.0413	0.0424
	LSM5	2-Sep-20	L2498786-4	0.0025	0.0358	0.00017	0.00018	0.00224	0.00226	0.0400	0.0407
	LSM4	2-Sep-20	L2498786-3	0.0019	0.0160	0.00016	0.00017	0.00224	0.00221	0.0367	0.0378
	LSM1	2-Sep-20	Mean	0.0041	0.0957	0.00016	0.00020	0.00230	0.00226	0.0379	0.0407
	LSM3	2-Sep-20	L2498786-2	0.0073	0.117	0.00014	0.00015	0.00225	0.00226	0.0328	0.0357
Dauphin River	DR-A	2-Sep-20	L2497954-7	0.0047	0.039	0.00017	0.00022	0.00219	0.00224	0.0338	0.0354
	DR-B	3-Sep-20	L2498784-1	0.0048	0.0757	0.00018	0.0002	0.00229	0.00234	0.0365	0.0384
	DR-E	3-Sep-20	L2498784-2	0.0058	0.215	0.00017	0.00018	0.00231	0.00233	0.0343	0.0394
Big Buffalo Lake	BBL	1-Sep-20	L2497371-1	0.0041	0.0706	0.00011	0.00012	0.00189	0.00179	0.0410	0.0408
Buffalo Creek	BC3	1-Sep-20	L2497371-2	0.0320	0.433	<0.00010	<0.00010	0.00155	0.0015	0.0230	0.0260
Lake Winnipeg	SB1	3-Sep-20	L2498784-3	0.0495	0.825	0.00011	0.00013	0.00205	0.00208	0.0361	0.0422
	SB2	3-Sep-20	L2498784-4	0.0432	0.700	0.0001	0.00012	0.00183	0.00186	0.0335	0.0413
Birch Creek drain	BCD-2018-9	13-Oct-20	L2516048-1	0.0028	0.0281	<0.00010	<0.00010	0.00110	0.00101	0.0481	0.0465
Birch Creek	BC-LSM	13-Oct-20	L2516048-2	0.0045	0.0449	<0.00010	<0.00010	0.00126	0.00123	0.0561	0.0517
Fairford River	FR1	13-Oct-20	Mean	0.0128	0.215	0.00019	0.00020	0.00206	0.00217	0.0447	0.0475
	FR2	13-Oct-20	L2516048-5	0.0102	0.163	0.00019	0.00019	0.00210	0.00216	0.0439	0.0448

Table 8. Continued.

Waterbody	Site ID	Sampling Date	ALS ID	Aluminum (Al)		Antimony (Sb)		Arsenic (As)		Barium (Ba)	
				Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Lake St. Martin	BB-LSM	13-Oct-20	L2516048-3	0.0082	0.0813	0.00021	0.00023	0.00216	0.00218	0.0439	0.0438
	LSM4	14-Oct-20	L2516868-3	0.0024	0.0333	0.00018	0.0002	0.00202	0.00221	0.0380	0.0415
	LSM1	14-Oct-20	L2516868-1	0.0030	0.178	0.00018	0.00019	0.00203	0.00220	0.0385	0.0448
	LSM3	14-Oct-20	L2516868-2	0.0078	0.224	0.00015	0.00018	0.00183	0.00194	0.0355	0.0418
Dauphin River	DR-A	14-Oct-20	L2516868-4	0.0032	0.046	0.00019	0.00019	0.00195	0.00209	0.0368	0.0404
Lake Manitoba	WHB1	15-Mar-21	L2567238-1	0.0014	0.0053	0.00024	0.00023	0.00282	0.00264	0.0562	0.0571
	WHB2	15-Mar-21	L2567238-2	0.0019	0.0086	0.0006	0.00100	0.00314	0.00290	0.0587	0.0593
Watchorn Creek	WHC-WB [1]	15-Mar-21	-	-	-	-	-	-	-	-	-
Mercer Creek	MC-WB [1]	15-Mar-21	-	-	-	-	-	-	-	-	-
Birch Creek drain	BCD-2018-9 [1]	16-Mar-21	-	-	-	-	-	-	-	-	-
Birch Creek	BC-LSM [1]	16-Mar-21	-	-	-	-	-	-	-	-	-
Fairford River	FR1	16-Mar-21	L2567806-2	0.0024	0.0218	0.00020	0.00023	0.00254	0.00233	0.0512	0.0512
	FR2	16-Mar-21	L2567806-3	0.0016	0.0141	0.00020	0.00021	0.00255	0.00234	0.0507	0.0509
Lake St. Martin	BB-LSM	16-Mar-21	L2567806-1	0.0012	0.0091	0.00023	0.00025	0.00285	0.00254	0.0574	0.0570
	LSM5	17-Mar-21	L2568173-5	<0.0010	0.006	0.00023	0.00025	0.00261	0.00246	0.0531	0.0552
	LSM4	17-Mar-21	L2568173-1	0.0012	0.0118	0.00025	0.00027	0.00282	0.00253	0.0584	0.0590
	LSM1	17-Mar-21	L2568173-2	0.0017	0.0563	0.00023	0.00028	0.00266	0.00242	0.0538	0.0564
	LSM3	17-Mar-21	L2568173-3	<0.0010	0.0270	0.00040	0.00066	0.00402	0.00327	0.0848	0.0836
Dauphin River	DR-A	17-Mar-21	L2568173-4	0.0015	0.0086	0.00032	0.00044	0.00269	0.00244	0.0546	0.0563
	DR-B	18-Mar-21	Mean	0.0013	0.0118	0.00024	0.00027	0.00247	0.00243	0.0575	0.0574
	DR-E	18-Mar-21	L2568772-2	0.0023	0.0144	0.00031	0.00061	0.00256	0.00246	0.0566	0.0573
Big Buffalo Lake	BBL [1]	17-Mar-21	-	-	-	-	-	-	-	-	-
Buffalo Creek	BC3 [1]	18-Mar-21	-	-	-	-	-	-	-	-	-
Lake Winnipeg	SB1	18-Mar-21	Mean	0.0362	0.217	0.00018	0.00042	0.00186	0.00188	0.0423	0.0442
Lake Winnipeg	SB2	18-Mar-21	L2568772-4	0.0329	0.240	0.00019	0.00025	0.00188	0.00186	0.0413	0.0434

Table 8. Continued.

Waterbody	Site ID	Sampling Date	ALS ID	Aluminum (Al)		Antimony (Sb)		Arsenic (As)		Barium (Ba)	
				Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Lake Manitoba	WHB1	17-May-21	L2588908-1	0.0012	0.0185	0.00017	0.00019	0.00192	0.00194	0.0440	0.0440
	WHB2	17-May-21	L2588908-2	0.0015	0.0479	0.00018	0.00020	0.00207	0.00202	0.0458	0.0451
Watchorn Creek	WHC-WB	17-May-21	L2588908-3	<0.0010	0.0516	0.00018	<0.00010	0.00206	0.00205	0.0447	0.0446
Mercer Creek	MC-WB	17-May-21	L2588908-4	0.0026	0.150	0.00021	0.00022	0.00209	0.00209	0.0456	0.0483
Birch Creek drain	BCD-2018-9	17-May-21	L2588908-5	<0.0010	0.0246	<0.00010	0.00011	0.00081	0.00082	0.0336	0.0343
Birch Creek	BC-LSM	17-May-21	L2588908-6	0.0022	0.0668	<0.00010	<0.00010	0.00105	0.00105	0.0334	0.0339
Fairford River	FR1	18-May-21	L2590207-1	0.0019	0.121	0.00017	0.00019	0.00196	0.00185	0.0409	0.0422
	FR2	18-May-21	Mean (n=2) [2]	0.0024	0.157	0.00017	0.00020	0.00193	0.0020	0.0413	0.045
Lake St. Martin	BB-LSM	17-May-21	L2588908-7	0.0031	0.0601	0.00013	0.00014	0.00135	0.00138	0.0329	0.0337
	LSM5 [3]	May 2021	-	-	-	-	-	-	-	-	-
	LSM4	19-May-21	Mean	0.0032	0.062	0.0002	0.0002	0.00207	0.0020	0.0426	0.045
	LSM1	19-May-21	L2590206-2	0.0049	0.115	0.00021	0.00020	0.00211	0.00210	0.0431	0.0471
	LSM3	19-May-21	L2590206-3	0.0044	0.0976	0.00012	0.00015	0.00149	0.00149	0.0342	0.0365
Dauphin River	DR-A	19-May-21	L2590206-4	0.0065	0.216	0.00020	0.00023	0.00220	0.00217	0.0458	0.0501
	DR-B	18-May-21	L2590207-3	0.0040	0.171	0.00019	0.00022	0.00210	0.00210	0.0444	0.0476
	DR-E	19-May-21	L2590206-5	0.0036	0.109	0.00019	0.00023	0.00234	0.00329	0.0460	0.0485
Big Buffalo Lake	BBL	16-May-21	L2588908-8	0.0013	0.0408	<0.00010	<0.00010	0.00083	0.00085	0.0272	0.0273
Buffalo Creek	BC3	16-May-21	L2588908-9	0.0195	0.590	<0.00010	<0.00010	0.00096	0.00119	0.0230	0.0277
Lake Winnipeg	SB1	27-May-21	L2593508-1	0.0225	0.484	0.00014	0.00012	0.00148	0.00156	0.0331	0.0376
	SB2	27-May-21	L2593508-2	0.0416	1.57	0.00013	0.00012	0.00131	0.00159	0.0327	0.0468

Table 8. Continued.

Waterbody	Site ID	Sampling Date	Beryllium (Be)		Bismuth (Bi)		Boron (B)		Cadmium (Cd)	
			Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Analytical DL			*0.00010*	*0.00010*	*0.000050*	*0.000050*	*0.010*	*0.010*	*0.0000050*	*0.0000050*
Lake Manitoba	WHB1	1-Sep-20	<0.00010	<0.00010	<0.000050	<0.000050	0.096	0.086	<0.0000050	0.0000089
	WHB2	1-Sep-20	<0.00010	<0.00010	<0.000050	<0.000050	0.096	0.086	<0.0000050	<0.0000050
Watchorn Creek	WHC-WB	1-Sep-20	<0.00010	<0.00010	<0.000050	<0.000050	0.093	0.081	<0.0000050	<0.0000050
Mercer Creek	MC-WB	1-Sep-20	<0.00010	<0.00010	<0.000050	<0.000050	0.092	0.083	<0.0000050	<0.0000050
Birch Creek drain	BCD-2018-9	9-Sep-20	<0.00010	<0.00010	<0.000050	<0.000050	0.132	0.150	<0.0000050	0.0000073
Birch Creek	BC-LSM	1-Sep-20	<0.00010	<0.00010	<0.000050	<0.000050	0.146	0.129	<0.0000050	<0.0000050
Fairford River	FR1	1-Sep-20	<0.00010	<0.00010	<0.000050	<0.000050	0.095	0.083	<0.0000050	<0.0000050
	FR2	10-Sep-20	<0.00010	<0.00010	<0.000050	<0.000050	0.109	0.122	<0.0000050	0.0000070
Lake St. Martin	BB-LSM	10-Sep-20	<0.00010	<0.00010	<0.000050	<0.000050	0.110	0.118	<0.0000050	<0.0000050
	LSM5	2-Sep-20	<0.00010	<0.00010	<0.000050	<0.000050	0.098	0.091	<0.0000050	<0.0000050
	LSM4	2-Sep-20	<0.00010	<0.00010	<0.000050	<0.000050	0.094	0.090	<0.0000050	<0.0000050
	LSM1	2-Sep-20	<0.00010	<0.00010	<0.000050	<0.000050	0.092	0.088	<0.0000050	<0.0000050
	LSM3	2-Sep-20	<0.00010	<0.00010	<0.000050	<0.000050	0.072	0.076	<0.0000050	<0.0000050
Dauphin River	DR-A	2-Sep-20	<0.00010	<0.00010	<0.000050	<0.000050	0.091	0.079	<0.0000050	<0.0000050
	DR-B	3-Sep-20	<0.00010	<0.00010	<0.000050	<0.000050	0.087	0.090	<0.0000050	<0.0000050
	DR-E	3-Sep-20	<0.00010	<0.00010	<0.000050	<0.000050	0.092	0.089	<0.0000050	0.0000059
Big Buffalo Lake	BBL	1-Sep-20	<0.00010	<0.00010	<0.000050	<0.000050	0.094	0.098	0.0000105	0.0000205
Buffalo Creek	BC3	1-Sep-20	<0.00010	<0.00010	<0.000050	<0.000050	0.043	0.043	<0.0000050	<0.0000050
Lake Winnipeg	SB1	3-Sep-20	<0.00010	<0.00010	<0.000050	<0.000050	0.048	0.046	<0.0000050	0.0000053
	SB2	3-Sep-20	<0.00010	<0.00010	<0.000050	<0.000050	0.034	0.034	<0.0000050	0.0000056
Birch Creek drain	BCD-2018-9	13-Oct-20	<0.00010	<0.00010	<0.000050	<0.000050	0.090	0.108	<0.0000050	<0.0000050
Birch Creek	BC-LSM	13-Oct-20	<0.00010	<0.00010	<0.000050	<0.000050	0.112	0.114	<0.0000050	<0.0000050
Fairford River	FR1	13-Oct-20	<0.00010	<0.00010	<0.000050	<0.000050	0.112	0.111	<0.0000050	0.00000843
	FR2	13-Oct-20	<0.00010	<0.00010	<0.000050	<0.000050	0.115	0.108	<0.0000050	0.0000054

Table 8. Continued.

Waterbody	Site ID	Sampling Date	Beryllium (Be)		Bismuth (Bi)		Boron (B)		Cadmium (Cd)	
			Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Analytical DL			*0.00010*	*0.00010*	*0.000050*	*0.000050*	*0.010*	*0.010*	*0.0000050*	*0.0000050*
Lake St. Martin	BB-LSM	13-Oct-20	<0.00010	<0.00010	<0.000050	<0.000050	0.106	0.104	<0.0000050	<0.0000050
	LSM4	14-Oct-20	<0.00010	<0.00010	<0.000050	<0.000050	0.093	0.104	<0.0000050	<0.0000050
	LSM1	14-Oct-20	<0.00010	<0.00010	<0.000050	<0.000050	0.090	0.101	<0.0000050	0.0000057
	LSM3	14-Oct-20	<0.00010	<0.00010	<0.000050	<0.000050	0.076	0.085	<0.0000050	0.0000073
Dauphin River	DR-A	14-Oct-20	<0.00010	<0.00010	<0.000050	<0.000050	0.089	0.102	<0.0000050	<0.0000050
Lake Manitoba	WHB1	15-Mar-21	<0.00010	<0.00010	<0.000050	<0.000050	0.143	0.135	0.000046	0.000111
	WHB2	15-Mar-21	<0.00010	<0.00010	<0.000050	<0.000050	0.153	0.149	0.000022	0.000039
Watchorn Creek	WHC-WB [1]	15-Mar-21	-	-	-	-	-	-	-	-
Mercer Creek	MC-WB [1]	15-Mar-21	-	-	-	-	-	-	-	-
Birch Creek drain	BCD-2018-9 [1]	16-Mar-21	-	-	-	-	-	-	-	-
Birch Creek	BC-LSM [1]	16-Mar-21	-	-	-	-	-	-	-	-
Fairford River	FR1	16-Mar-21	<0.00010	<0.00010	<0.000050	<0.000050	0.148	0.124	<0.0000050	<0.0000050
	FR2	16-Mar-21	<0.00010	<0.00010	<0.000050	<0.000050	0.137	0.122	<0.0000050	<0.0000050
Lake St. Martin	BB-LSM	16-Mar-21	<0.00010	<0.00010	<0.000050	<0.000050	0.164	0.130	0.0000085	0.0000145
	LSM5	17-Mar-21	<0.00010	<0.00010	<0.000050	<0.000050	0.164	0.133	0.0000109	0.0000168
	LSM4	17-Mar-21	<0.00010	<0.00010	<0.000050	<0.000050	0.170	0.138	<0.0000050	<0.0000050
	LSM1	17-Mar-21	<0.00010	<0.00010	<0.000050	<0.000050	0.155	0.129	<0.0000050	0.0000174
	LSM3	17-Mar-21	<0.00010	<0.00010	<0.000050	<0.000050	0.234	0.176	<0.0000050	0.0000102
Dauphin River	DR-A	17-Mar-21	<0.00010	<0.00010	<0.000050	<0.000050	0.165	0.133	<0.0000050	0.0000068
	DR-B	18-Mar-21	<0.00010	<0.00010	<0.000050	<0.000050	0.149	0.144	<0.0000050	<0.0000050
	DR-E	18-Mar-21	<0.00010	<0.00010	<0.000050	<0.000050	0.135	0.141	0.0000064	0.0000085
Big Buffalo Lake	BBL [1]	17-Mar-21	-	-	-	-	-	-	-	-
Buffalo Creek	BC3 [1]	18-Mar-21	-	-	-	-	-	-	-	-
Lake Winnipeg	SB1	18-Mar-21	<0.00010	<0.00010	<0.000050	<0.000050	0.046	0.047	<0.0000050	0.0000057
Lake Winnipeg	SB2	18-Mar-21	<0.00010	<0.00010	<0.000050	<0.000050	0.046	0.049	0.0000051	0.0000057

Table 8. Continued.

Waterbody	Site ID	Sampling Date	Beryllium (Be)		Bismuth (Bi)		Boron (B)		Cadmium (Cd)	
			Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Analytical DL			*0.00010*	*0.00010*	*0.000050*	*0.000050*	*0.010*	*0.010*	*0.0000050*	*0.0000050*
Lake Manitoba	WHB1	17-May-21	<0.00010	<0.00010	<0.000050	<0.000050	0.114	0.105	<0.0000050	0.0000051
	WHB2	17-May-21	<0.00010	<0.00010	<0.000050	<0.000050	0.116	0.105	<0.0000050	0.0000054
Watchorn Creek	WHC-WB	17-May-21	<0.00010	<0.00010	<0.000050	<0.000050	0.120	0.111	<0.0000050	0.0000082
Mercer Creek	MC-WB	17-May-21	<0.00010	<0.00010	<0.000050	<0.000050	0.117	0.108	<0.0000050	0.0000105
Birch Creek drain	BCD-2018-9	17-May-21	<0.00010	<0.00010	<0.000050	<0.000050	0.095	0.083	<0.0000050	0.0000083
Birch Creek	BC-LSM	17-May-21	<0.00010	<0.00010	<0.000050	<0.000050	0.099	0.080	<0.0000050	0.0000050
Fairford River	FR1	18-May-21	<0.00010	<0.00010	<0.000050	<0.000050	0.105	0.106	<0.0000050	<0.0000050
	FR2	18-May-21	<0.00010	<0.00010	<0.000050	<0.000050	0.110	0.112	<0.0000050	0.0000068
Lake St. Martin	BB-LSM	17-May-21	<0.00010	<0.00010	<0.000050	<0.000050	0.083	0.077	<0.0000050	0.0000052
	LSM5 [3]	May 2021	-	-	-	-	-	-	-	-
	LSM4	19-May-21	<0.00010	<0.00010	<0.000050	<0.000050	0.105	0.099	<0.0000050	<0.0000050
	LSM1	19-May-21	<0.00010	<0.00010	<0.000050	<0.000050	0.109	0.104	<0.0000050	<0.0000050
	LSM3	19-May-21	<0.00010	<0.00010	<0.000050	<0.000050	0.070	0.067	<0.0000050	0.0000061
Dauphin River	DR-A	19-May-21	<0.00010	<0.00010	<0.000050	<0.000050	0.113	0.104	<0.0000050	0.0000073
	DR-B	18-May-21	<0.00010	<0.00010	<0.000050	<0.000050	0.118	0.121	<0.0000050	0.0000070
	DR-E	19-May-21	<0.00010	<0.00010	<0.000050	<0.000050	0.121	0.108	<0.0000050	0.0000060
Big Buffalo Lake	BBL	16-May-21	<0.00010	<0.00010	<0.000050	<0.000050	0.066	0.057	<0.0000050	0.0000052
Buffalo Creek	BC3	16-May-21	<0.00010	<0.00010	<0.000050	<0.000050	0.053	0.043	<0.0000050	0.0000054
Lake Winnipeg	SB1	27-May-21	<0.00010	<0.00010	<0.000050	<0.000050	0.047	0.045	<0.0000050	0.0000058
	SB2	27-May-21	<0.00010	<0.00010	<0.000050	<0.000050	0.042	0.043	<0.0000050	0.0000089

Table 8. Continued.

Waterbody	Site ID	Sampling Date	Calcium (Ca)		Cesium (Cs)		Chloride (Cl)	Chromium (Cr)		Cobalt (Co)	
			Dissolved	Total	Dissolved	Total	Dissolved	Dissolved	Total	Dissolved	Total
Analytical DL			*0.05*	*0.050*	*0.000010*	*0.000010*	*0.10/0.20*	*0.00010*	*0.00010*	*0.00010*	*0.00010*
Lake Manitoba	WHB1	1-Sep-20	34.2	38.3	<0.000010	0.000014	206	<0.00010	0.00026	<0.00010	0.00011
	WHB2	1-Sep-20	34.6	38.8	<0.000010	0.000033	203	<0.00010	0.00041	<0.00010	0.00015
Watchorn Creek	WHC-WB	1-Sep-20	33.9	35.3	<0.000010	0.000014	185	<0.00010	0.00022	<0.00010	0.00011
Mercer Creek	MC-WB	1-Sep-20	39.0	39.5	<0.000010	<0.000010	200	<0.00010	0.00018	<0.00010	<0.00010
Birch Creek drain	BCD-2018-9	9-Sep-20	62.0	63.7	<0.000010	0.000014	11.8	<0.00010	0.00058	<0.00010	0.00017
Birch Creek	BC-LSM	1-Sep-20	35.0	35.9	<0.000010	<0.000010	15.4	0.00017	0.00025	0.00023	0.00025
Fairford River	FR1	1-Sep-20	33.4	35.1	<0.000010	<0.000010	200	<0.00010	0.00022	<0.00010	0.00010
	FR2	10-Sep-20	37.4	39.0	<0.000010	0.000035	205	<0.00010	0.00030	<0.00010	0.00014
Lake St. Martin	BB-LSM	10-Sep-20	35.2	38.8	<0.000010	0.000017	198	<0.00010	0.00024	<0.00010	0.00014
	LSM5	2-Sep-20	35.5	35.7	<0.000010	<0.000010	198	<0.00010	0.00014	<0.00010	<0.00010
	LSM4	2-Sep-20	34.9	36.1	<0.000010	<0.000010	198	<0.00010	<0.00010	<0.00010	<0.00010
	LSM1	2-Sep-20	33.8	35.7	<0.000010	0.000017	199	<0.00010	0.00023	<0.00010	0.00011
	LSM3	2-Sep-20	34.5	37.8	<0.000010	0.000011	140	<0.00010	0.00018	<0.00010	0.00013
Dauphin River	DR-A	2-Sep-20	32.1	32.1	<0.000010	<0.000010	203	<0.00010	0.00010	<0.00010	<0.00010
	DR-B	3-Sep-20	33.1	35.8	<0.000010	0.000013	198	<0.00010	0.00020	<0.00010	0.00012
	DR-E	3-Sep-20	32.0	34.5	<0.000010	0.000036	197	<0.00010	0.00039	<0.00010	0.00017
Big Buffalo Lake	BBL	1-Sep-20	49.9	51.9	<0.000010	<0.000010	20.4	<0.00010	0.00013	<0.00010	0.00010
Buffalo Creek	BC3	1-Sep-20	43.6	45.7	<0.000010	0.000040	4.9	<0.00010	0.00175	<0.00010	0.00022
Lake Winnipeg	SB1	3-Sep-20	30.3	30.4	<0.000010	0.00009	66.2	<0.00010	0.00132	<0.00010	0.00038
	SB2	3-Sep-20	27.8	29.2	<0.000010	0.000081	31.6	<0.00010	0.00117	<0.00010	0.00035
Birch Creek drain	BCD-2018-9	13-Oct-20	76.7	71.8	<0.000010	<0.000010	20.5	<0.00010	0.00012	<0.00010	<0.00010
Birch Creek	BC-LSM	13-Oct-20	75.7	72.0	<0.000010	<0.000010	23.4	<0.00010	0.00014	<0.00010	<0.00010
Fairford River	FR1	13-Oct-20	42.7	44.9	<0.000010	0.000031	206	<0.00010	0.00049	<0.00010	0.00018
	FR2	13-Oct-20	41.9	42.3	<0.000010	0.000023	206	<0.00010	0.00036	<0.00010	0.00015

Table 8. Continued.

Waterbody	Site ID	Sampling Date	Calcium (Ca)		Cesium (Cs)		Chloride (Cl)	Chromium (Cr)		Cobalt (Co)	
			Dissolved	Total	Dissolved	Total	Dissolved	Dissolved	Total	Dissolved	Total
Lake St. Martin	BB-LSM	13-Oct-20	41.5	39.0	<0.000010	0.000012	199	<0.00010	0.00020	<0.00010	0.00011
	LSM4	14-Oct-20	37.2	39.1	<0.000010	<0.000010	202	<0.00010	<0.00010	<0.00010	<0.00010
	LSM1	14-Oct-20	37.7	42.5	<0.000010	0.000031	204	<0.00010	0.00046	<0.00010	0.00017
	LSM3	14-Oct-20	41.9	45.7	<0.000010	0.000034	163	<0.00010	0.00047	<0.00010	0.00018
Dauphin River	DR-A	14-Oct-20	37.6	39.8	<0.000010	<0.000010	202	<0.00010	0.00014	<0.00010	<0.00010
Lake Manitoba	WHB1	15-Mar-21	53.1	56.9	<0.000010	<0.000010	256	<0.00010	<0.00010	<0.00010	<0.00010
	WHB2	15-Mar-21	56.8	60.8	<0.000010	<0.000010	268	<0.00010	<0.00010	<0.00010	<0.00010
Watchorn Creek	WHC-WB [1]	15-Mar-21	-	-	-	-	-	-	-	-	-
Mercer Creek	MC-WB [1]	15-Mar-21	-	-	-	-	-	-	-	-	-
Birch Creek drain	BCD-2018-9 [1]	16-Mar-21	-	-	-	-	-	-	-	-	-
Birch Creek	BC-LSM [1]	16-Mar-21	-	-	-	-	-	-	-	-	-
Fairford River	FR1	16-Mar-21	50.6	49.6	<0.000010	<0.000010	239	<0.00010	<0.00010	<0.00010	<0.00010
	FR2	16-Mar-21	47.9	49.7	<0.000010	<0.000010	237	<0.00010	<0.00010	<0.00010	<0.00010
Lake St. Martin	BB-LSM	16-Mar-21	59.6	55.2	<0.000010	<0.000010	266	<0.00010	<0.00010	<0.00010	<0.00010
	LSM5	17-Mar-21	54.4	54.7	<0.000010	<0.000010	261	<0.00010	<0.00010	<0.00010	<0.00010
	LSM4	17-Mar-21	61.8	58.8	<0.000010	<0.000010	270	<0.00010	0.00010	<0.00010	<0.00010
	LSM1	17-Mar-21	54.7	54.7	<0.000010	0.000012	251	<0.00010	0.00022	<0.00010	<0.00010
	LSM3	17-Mar-21	96.0	92.5	<0.000010	<0.000010	393	<0.00010	0.00014	0.00010	0.00012
Dauphin River	DR-A	17-Mar-21	56.0	55.9	<0.000010	<0.000010	257	<0.00010	<0.00010	<0.00010	<0.00010
	DR-B	18-Mar-21	55.8	57.0	<0.000010	<0.000010	266	<0.00010	<0.00010	<0.00010	<0.00010
	DR-E	18-Mar-21	54.2	54.9	<0.000010	<0.000010	261	<0.00010	<0.00010	<0.00010	<0.00010
Big Buffalo Lake	BBL [1]	17-Mar-21	-	-	-	-	-	-	-	-	-
Buffalo Creek	BC3 [1]	18-Mar-21	-	-	-	-	-	-	-	-	-
Lake Winnipeg	SB1	18-Mar-21	33.5	35.7	<0.000010	0.000013	49.6	<0.00010	0.00025	<0.00010	<0.00010
Lake Winnipeg	SB2	18-Mar-21	33.4	34.9	<0.000010	0.000014	50.3	<0.00010	0.00025	<0.00010	<0.00010

Table 8. Continued.

Waterbody	Site ID	Sampling Date	Calcium (Ca)		Cesium (Cs)		Chloride (Cl)	Chromium (Cr)		Cobalt (Co)	
			Dissolved	Total	Dissolved	Total	Dissolved	Dissolved	Total	Dissolved	Total
Lake Manitoba	WHB1	17-May-21	40.7	40.7	<0.000010	<0.000010	202	<0.00010	<0.00010	<0.00010	<0.00010
	WHB2	17-May-21	41.1	41.1	<0.000010	0.000011	204	<0.00010	0.00013	<0.00010	<0.00010
Watchorn Creek	WHC-WB	17-May-21	44.0	44.9	<0.000010	0.000011	194	<0.00010	0.00015	<0.00010	0.00010
Mercer Creek	MC-WB	17-May-21	41.5	45.4	<0.000010	0.000024	204	<0.00010	0.00036	<0.00010	0.00015
Birch Creek drain	BCD-2018-9	17-May-21	52.9	54.8	<0.000010	<0.000010	10.7	<0.00010	0.00017	<0.00010	<0.00010
Birch Creek	BC-LSM	17-May-21	60.2	58.0	<0.000010	<0.000010	7.82	<0.00010	0.00022	<0.00010	0.00013
Fairford River	FR1	18-May-21	42.6	42.4	<0.000010	0.000015	215	<0.00010	0.00031	<0.00010	0.00011
	FR2	18-May-21	41.4	44.7	<0.000010	0.000024	218	<0.00010	0.00039	<0.00010	0.00015
Lake St. Martin	BB-LSM	17-May-21	31.9	32.6	<0.000010	0.000010	147	<0.00010	0.00013	<0.00010	<0.00010
	LSM5 [3]	May 2021	-	-	-	-	-	-	-	-	-
	LSM4	19-May-21	40.9	40.1	<0.000010	<0.000010	197	<0.00010	0.00014	<0.00010	<0.00010
	LSM1	19-May-21	41.2	43.6	<0.000010	0.000017	207	<0.00010	0.00027	<0.00010	0.00012
	LSM3	19-May-21	36.7	37.8	<0.000010	0.000013	126	<0.00010	0.00016	<0.00010	<0.00010
Dauphin River	DR-A	19-May-21	41.3	43.0	<0.000010	0.000031	208	<0.00010	0.00042	<0.00010	0.00017
	DR-B	18-May-21	42.4	46.2	<0.000010	0.000024	222	<0.00010	0.00036	<0.00010	0.00013
	DR-E	19-May-21	44.1	42.0	<0.000010	0.000017	221	<0.00010	0.00152	<0.00010	0.00012
Big Buffalo Lake	BBL	16-May-21	36.5	35.3	<0.000010	<0.000010	12.3	<0.00010	<0.00010	<0.00010	<0.00010
Buffalo Creek	BC3	16-May-21	38.2	37.7	<0.000010	0.000070	8.03	<0.00010	0.00131	<0.00010	0.00031
Lake Winnipeg	SB1	27-May-21	32.7	33.1	<0.000010	0.000056	54.5	<0.00010	0.00084	<0.00010	0.00024
	SB2	27-May-21	30.9	32.4	<0.000010	0.000180	49.4	<0.00010	0.00266	<0.00010	0.00075

Table 8. Continued.

Waterbody	Site ID	Sampling Date	Copper (Cu)		Fluoride (F)	Iron (Fe)		Lead (Pb)		Lithium (Li)	
			Dissolved	Total	Dissolved	Dissolved	Total	Dissolved	Total	Dissolved	Total
Analytical DL			*0.00020*	*0.00050*	*0.020*	*0.010*	*0.010*	*0.000050*	*0.000050*	*0.0010*	*0.0010*
Lake Manitoba	WHB1	1-Sep-20	0.00024	0.00050	0.152	<0.010	0.104	<0.000050	0.000205	0.0337	0.0310
	WHB2	1-Sep-20	0.00024	0.00055	0.157	<0.010	0.176	<0.000050	0.000262	0.0345	0.0315
Watchorn Creek	WHC-WB	1-Sep-20	0.00026	<0.00050	0.156	<0.010	0.090	<0.000050	0.000196	0.0348	0.0307
Mercer Creek	MC-WB	1-Sep-20	<0.00020	<0.00050	0.154	<0.010	0.062	<0.000050	0.000093	0.0333	0.0310
Birch Creek drain	BCD-2018-9	9-Sep-20	0.00023	0.00055	0.339	0.021	0.249	<0.000050	0.000152	0.0241	0.0266
Birch Creek	BC-LSM	1-Sep-20	0.00039	0.00054	0.271	0.028	0.055	<0.000050	<0.000050	0.0222	0.0194
Fairford River	FR1	1-Sep-20	0.00028	<0.00050	0.137	<0.010	0.072	<0.000050	0.000175	0.0334	0.0308
	FR2	10-Sep-20	0.00030	0.00054	0.161	<0.010	0.134	<0.000050	0.000268	0.0372	0.0399
Lake St. Martin	BB-LSM	10-Sep-20	0.00030	0.00053	0.164	<0.010	0.106	<0.000050	0.000341	0.0320	0.0362
	LSM5	2-Sep-20	0.00024	<0.00050	0.155	<0.010	0.031	<0.000050	0.000143	0.0348	0.0317
	LSM4	2-Sep-20	0.00023	<0.00050	0.152	<0.010	0.016	<0.000050	0.000107	0.0316	0.0319
	LSM1	2-Sep-20	0.00026	<0.00050	0.158	<0.010	0.082	<0.000050	0.000207	0.0336	0.0322
	LSM3	2-Sep-20	0.00033	0.00064	0.155	<0.010	0.083	<0.000050	0.000239	0.0243	0.0247
Dauphin River	DR-A	2-Sep-20	0.00023	<0.00050	0.154	<0.010	0.033	<0.000050	0.000154	0.0314	0.0284
	DR-B	3-Sep-20	0.00028	0.00137	0.157	<0.010	0.079	<0.000050	0.000202	0.0310	0.0329
	DR-E	3-Sep-20	0.00027	0.00052	0.155	<0.010	0.187	<0.000050	0.000306	0.0316	0.0319
Big Buffalo Lake	BBL	1-Sep-20	0.00034	<0.00050	0.164	<0.010	0.066	<0.000050	0.000093	0.0148	0.0159
Buffalo Creek	BC3	1-Sep-20	0.00064	0.00090	0.117	0.033	0.384	<0.000050	0.000175	0.0088	0.0097
Lake Winnipeg	SB1	3-Sep-20	0.00105	0.00209	0.116	<0.010	0.747	<0.000050	0.000450	0.0177	0.0171
	SB2	3-Sep-20	0.00117	0.00185	0.102	<0.010	0.678	<0.000050	0.000346	0.0135	0.0138
Birch Creek drain	BCD-2018-9	13-Oct-20	<0.00020	<0.00050	0.265	0.024	0.041	<0.000050	0.000076	0.0287	0.0304
Birch Creek	BC-LSM	13-Oct-20	0.00065	0.00077	0.285	0.026	0.048	<0.000050	<0.000050	0.0320	0.0298
Fairford River	FR1	13-Oct-20	0.00032	0.00069	0.133	<0.010	0.238	<0.000050	0.000356	0.0387	0.0370
	FR2	13-Oct-20	0.00027	0.00059	0.161	<0.010	0.182	<0.000050	0.000289	0.0391	0.0363

Table 8. Continued.

Waterbody	Site ID	Sampling Date	Copper (Cu)		Fluoride (F)	Iron (Fe)		Lead (Pb)		Lithium (Li)	
			Dissolved	Total	Dissolved	Dissolved	Total	Dissolved	Total	Dissolved	Total
Analytical DL			*0.00020*	*0.00050*	*0.020*	*0.010*	*0.010*	*0.000050*	*0.000050*	*0.0010*	*0.0010*
Lake St. Martin	BB-LSM	13-Oct-20	0.00031	<0.00050	0.161	<0.010	0.069	<0.000050	0.000256	0.0355	0.0330
	LSM4	14-Oct-20	0.00026	<0.00050	-	<0.010	0.032	<0.000050	0.000149	0.0309	0.0323
	LSM1	14-Oct-20	0.00032	0.00066	-	<0.010	0.206	<0.000050	0.000297	0.0316	0.0321
	LSM3	14-Oct-20	0.00044	0.00072	-	<0.010	0.236	<0.000050	0.000338	0.0270	0.0278
Dauphin River	DR-A	14-Oct-20	0.00029	<0.00050	-	<0.010	0.043	<0.000050	0.000145	0.0309	0.0326
Lake Manitoba	WHB1	15-Mar-21	0.00072	0.00098	0.190	<0.010	<0.010	<0.000050	<0.000050	0.0448	0.0458
	WHB2	15-Mar-21	0.00069	0.00090	0.208	<0.010	0.011	<0.000050	0.000053	0.0492	0.0494
Watchorn Creek	WHC-WB [1]	15-Mar-21	-	-	-	-	-	-	-	-	-
Mercer Creek	MC-WB [1]	15-Mar-21	-	-	-	-	-	-	-	-	-
Birch Creek drain	BCD-2018-9 [1]	16-Mar-21	-	-	-	-	-	-	-	-	-
Birch Creek	BC-LSM [1]	16-Mar-21	-	-	-	-	-	-	-	-	-
Fairford River	FR1	16-Mar-21	0.00045	0.00053	0.189	<0.010	0.025	<0.000050	0.000057	0.0408	0.0412
	FR2	16-Mar-21	0.00037	<0.00050	0.186	<0.010	0.015	<0.000050	0.000057	0.0390	0.0405
Lake St. Martin	BB-LSM	16-Mar-21	0.00050	0.00059	0.206	<0.010	0.014	<0.000050	<0.000050	0.0475	0.0436
	LSM5	17-Mar-21	0.00057	0.00054	0.206	<0.010	<0.010	<0.000050	<0.000050	0.0460	0.0481
	LSM4	17-Mar-21	0.00038	<0.00050	0.216	<0.010	0.013	<0.000050	0.000053	0.0509	0.0509
	LSM1	17-Mar-21	0.00063	0.00094	0.202	<0.010	0.069	<0.000050	0.000114	0.0431	0.0445
	LSM3	17-Mar-21	0.00059	0.00089	0.286	0.013	0.068	<0.000050	0.000071	0.0632	0.0695
Dauphin River	DR-A	17-Mar-21	0.00040	0.00052	0.201	<0.010	<0.010	<0.000050	<0.000050	0.0442	0.0461
	DR-B	18-Mar-21	0.00037	0.00054	0.218	<0.010	0.013	<0.000050	<0.000050	0.0468	0.0495
	DR-E	18-Mar-21	0.00048	0.00067	0.218	<0.010	0.017	<0.000050	0.000060	0.0452	0.0487
Big Buffalo Lake	BBL [1]	17-Mar-21	-	-	-	-	-	-	-	-	-
Buffalo Creek	BC3 [1]	18-Mar-21	-	-	-	-	-	-	-	-	-
Lake Winnipeg	SB1	18-Mar-21	0.00147	0.00183	0.131	<0.010	0.099	<0.000050	0.000084	0.0160	0.0175
Lake Winnipeg	SB2	18-Mar-21	0.00166	0.00189	0.130	<0.010	0.106	<0.000050	0.000080	0.0162	0.0175

Table 8. Continued.

Waterbody	Site ID	Sampling Date	Copper (Cu)		Fluoride (F)	Iron (Fe)		Lead (Pb)		Lithium (Li)	
			Dissolved	Total	Dissolved	Dissolved	Total	Dissolved	Total	Dissolved	Total
Analytical DL			*0.00020*	*0.00050*	*0.020*	*0.010*	*0.010*	*0.000050*	*0.000050*	*0.0010*	*0.0010*
Lake Manitoba	WHB1	17-May-21	0.00033	0.00051	0.149	<0.010	0.022	<0.000050	0.000058	0.0355	0.0351
	WHB2	17-May-21	0.00034	0.00053	0.151	<0.010	0.052	<0.000050	0.000079	0.0349	0.0348
Watchorn Creek	WHC-WB	17-May-21	0.00035	0.00060	0.164	<0.010	0.056	<0.000050	0.000097	0.0368	0.0368
Mercer Creek	MC-WB	17-May-21	0.00087	0.00094	0.157	<0.010	0.172	<0.000050	0.000197	0.0353	0.0366
Birch Creek drain	BCD-2018-9	17-May-21	0.00025	0.00089	0.244	0.015	0.046	<0.000050	0.000074	0.0176	0.0201
Birch Creek	BC-LSM	17-May-21	0.00070	0.00093	0.268	0.022	0.083	<0.000050	0.000063	0.0169	0.0177
Fairford River	FR1	18-May-21	0.00040	0.00064	0.156	<0.010	0.133	<0.000050	0.000107	0.0352	0.0374
	FR2	18-May-21	0.00044	0.00077	0.158	<0.010	0.187	<0.000050	0.000184	0.0364	0.038
Lake St. Martin	BB-LSM	17-May-21	0.00032	0.00052	0.127	<0.010	0.058	<0.000050	0.000114	0.0238	0.0253
	LSM5 [3]	May 2021	-	-	-	-	-	-	-	-	-
	LSM4	19-May-21	0.00048	<0.00050	0.164	<0.010	0.045	<0.000050	0.000117	0.0338	0.0330
	LSM1	19-May-21	0.00039	0.00063	0.160	<0.010	0.108	<0.000050	0.000175	0.0352	0.0355
	LSM3	19-May-21	0.00039	0.00050	0.138	<0.010	0.073	<0.000050	0.000113	0.0225	0.0222
Dauphin River	DR-A	19-May-21	0.00041	0.00077	0.169	<0.010	0.205	<0.000050	0.000261	0.0379	0.0343
	DR-B	18-May-21	0.00042	0.00073	0.170	<0.010	0.167	<0.000050	0.000169	0.0383	0.0413
	DR-E	19-May-21	0.00053	0.00096	0.169	<0.010	0.118	<0.000050	0.000154	0.0392	0.0365
Big Buffalo Lake	BBL	16-May-21	0.00021	<0.00050	0.125	<0.010	0.039	<0.000050	0.000081	0.0108	0.0116
Buffalo Creek	BC3	16-May-21	0.00080	0.00135	0.121	0.012	0.568	<0.000050	0.000282	0.0094	0.0105
Lake Winnipeg	SB1	27-May-21	0.00105	0.00175	0.108	<0.010	0.450	<0.000050	0.000243	0.0146	0.0168
	SB2	27-May-21	0.00115	0.00301	0.073	<0.010	1.51	<0.000050	0.000728	0.0138	0.0178

Table 8. Continued.

Waterbody	Site ID	Sampling Date	Magnesium (Mg)		Manganese (Mn)		Mercury (Hg)		Molybdenum (Mo)	
			Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Analytical DL			*0.0050*	*0.0050*	*0.00010*	*0.00010*	*0.0000050/ 0.00000050*	*0.0000020/ 0.0000050/ 0.00000050*	*0.000050*	*0.000050*
Lake Manitoba	WHB1	1-Sep-20	36.7	36.9	<0.00010	0.00839	<0.00000050	0.00000072	0.00212	0.00221
	WHB2	1-Sep-20	36.3	38.0	<0.00010	0.00947	<0.00000050	0.00000074	0.00221	0.00227
Watchorn Creek	WHC-WB	1-Sep-20	39.6	38.8	0.00017	0.00707	<0.00000050	0.00000061	0.00193	0.00199
Mercer Creek	MC-WB	1-Sep-20	38.5	38.9	0.00016	0.00751	<0.00000050	0.00000060	0.00217	0.00219
Birch Creek drain	BCD-2018-9	9-Sep-20	73.7	76.6	0.00046	0.264	0.00000097	0.00000166	0.000291	0.000383
Birch Creek	BC-LSM	1-Sep-20	71.8	70.5	0.00450	0.0262	<0.00000050	0.00000079	0.000530	0.00056
Fairford River	FR1	1-Sep-20	36.3	36.1	<0.00010	0.00735	<0.00000050	0.00000123	0.00204	0.00204
	FR2	10-Sep-20	37.8	39.2	<0.00010	0.0102	<0.00000050	0.00000084	0.00225	0.00229
Lake St. Martin	BB-LSM	10-Sep-20	36.4	36.7	<0.00010	0.0106	<0.00000050	0.00000077	0.00245	0.00239
	LSM5	2-Sep-20	37.1	35.5	<0.00010	0.00614	<0.00000050	0.00000066	0.00226	0.00228
	LSM4	2-Sep-20	39.2	35.0	<0.00010	0.00526	<0.00000050	0.00000057	0.00212	0.00221
	LSM1	2-Sep-20	37.1	35.8	<0.00010	0.00913	<0.00000050	0.00000080	0.00232	0.00232
	LSM3	2-Sep-20	35.9	36.4	0.00013	0.0115	<0.00000050	0.00000112	0.00184	0.00188
Dauphin River	DR-A	2-Sep-20	35.5	34.1	<0.00010	0.00797	<0.00000050	0.00000056	0.00212	0.00228
	DR-B	3-Sep-20	36.7	34.3	<0.00010	0.00939	<0.00000050	0.00000087	0.00228	0.00232
	DR-E	3-Sep-20	37.0	36.0	<0.00010	0.0133	<0.00000050	0.00000095	0.00219	0.00230
Big Buffalo Lake	BBL	1-Sep-20	37.4	38.5	0.00032	0.0154	<0.0000050	<0.0000050	0.000491	0.000512
Buffalo Creek	BC3	1-Sep-20	29.0	28.9	0.00162	0.0231	<0.0000050	<0.0000050	0.000305	0.000308
Lake Winnipeg	SB1	3-Sep-20	22.2	21.2	0.00015	0.0191	<0.00000050	0.00000105	0.00114	0.00115
	SB2	3-Sep-20	18.1	17.4	<0.00010	0.0153	<0.00000050	0.00000102	0.000881	0.000857
Birch Creek drain	BCD-2018-9	13-Oct-20	79.5	87.5	0.00449	0.00943	0.00000051	0.00000073	0.000501	0.000565
Birch Creek	BC-LSM	13-Oct-20	77.6	88.1	0.00198	0.0054	0.00000084	0.00000067	0.000671	0.000656
Fairford River	FR1	13-Oct-20	33.8	40.1	<0.00010	0.01593	<0.00000050	0.00000112	0.00224	0.00238
	FR2	13-Oct-20	32.8	39.1	0.00014	0.0121	<0.00000050	0.00000111	0.00228	0.00232

Table 8. Continued.

Waterbody	Site ID	Sampling Date	Magnesium (Mg)		Manganese (Mn)		Mercury (Hg)		Molybdenum (Mo)	
			Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Lake St. Martin	BB-LSM	13-Oct-20	33.4	37.2	0.00016	0.00765	<0.00000050	0.00000061	0.00251	0.00252
	LSM4	14-Oct-20	38.3	38.5	<0.00010	0.00493	<0.00000050	<0.00000050	0.00219	0.00226
	LSM1	14-Oct-20	37.8	38.9	<0.00010	0.0114	<0.00000050	0.00000118	0.00227	0.00225
	LSM3	14-Oct-20	39.2	39.5	0.00010	0.0140	<0.00000050	0.00000110	0.00211	0.00224
Dauphin River	DR-A	14-Oct-20	38.4	38.8	<0.00010	0.00513	<0.00000050	0.00000055	0.00222	0.00233
Lake Manitoba	WHB1	15-Mar-21	50.9	48.8	<0.00010	0.00215	<0.00000050	0.00000053	0.00285	0.00293
	WHB2	15-Mar-21	54.0	51.9	0.00010	0.00178	0.00000076	0.00000147	0.00320	0.00314
Watchorn Creek	WHC-WB [1]	15-Mar-21	-	-	-	-	-	-	-	-
Mercer Creek	MC-WB [1]	15-Mar-21	-	-	-	-	-	-	-	-
Birch Creek drain	BCD-2018-9 [1]	16-Mar-21	-	-	-	-	-	-	-	-
Birch Creek	BC-LSM [1]	16-Mar-21	-	-	-	-	-	-	-	-
Fairford River	FR1	16-Mar-21	49.8	46.4	<0.00010	0.00283	<0.00000050	<0.00000050	0.00275	0.00268
	FR2	16-Mar-21	49.6	46.7	0.00012	0.00323	<0.00000050	<0.00000050	0.00265	0.00273
Lake St. Martin	BB-LSM	16-Mar-21	54.8	51.5	<0.00010	0.00381	<0.00000050	0.00000070	0.00305	0.00307
	LSM5	17-Mar-21	51.9	50.8	<0.00010	0.00552	<0.00000050	<0.00000050	0.00292	0.00298
	LSM4	17-Mar-21	56.0	54.1	<0.00010	0.00650	<0.00000050	<0.00000050	0.00306	0.00303
	LSM1	17-Mar-21	51.3	50.4	<0.00010	0.0104	0.00000073	0.00000255	0.00284	0.00279
	LSM3	17-Mar-21	86.7	77.9	0.0355	0.0373	0.00000079	0.00000246	0.00333	0.00345
Dauphin River	DR-A	17-Mar-21	51.7	50.9	<0.00010	0.00544	<0.00000050	<0.00000050	0.00279	0.00293
	DR-B	18-Mar-21	50.5	50.4	<0.00010	0.00554	<0.00000050	<0.00000050	0.00278	0.00280
	DR-E	18-Mar-21	51.3	51.3	0.00010	0.00520	<0.00000050	0.00000077	0.00281	0.00284
Big Buffalo Lake	BBL [1]	17-Mar-21	-	-	-	-	-	-	-	-
Buffalo Creek	BC3 [1]	18-Mar-21	-	-	-	-	-	-	-	-
Lake Winnipeg	SB1	18-Mar-21	21.6	21.6	<0.00010	0.00142	<0.00000050	0.00000090	0.00120	0.001233
Lake Winnipeg	SB2	18-Mar-21	21.3	21.2	<0.00010	0.00157	<0.00000050	0.00000095	0.00119	0.00124

Table 8. Continued.

Waterbody	Site ID	Sampling Date	Magnesium (Mg)		Manganese (Mn)		Mercury (Hg)		Molybdenum (Mo)	
			Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Lake Manitoba	WHB1	17-May-21	39.9	39.6	<0.00010	0.00407	<0.00000050	0.00000053	0.00223	0.00224
	WHB2	17-May-21	40.7	40.6	<0.00010	0.00587	<0.00000050	0.00000056	0.00225	0.00227
Watchorn Creek	WHC-WB	17-May-21	43.7	42.5	0.00010	0.0110	<0.00000050	0.00000067	0.00221	0.00214
Mercer Creek	MC-WB	17-May-21	41.4	41.1	0.00014	0.0104	<0.00000050	<0.0000020	0.00226	0.00223
Birch Creek drain	BCD-2018-9	17-May-21	65.0	62.0	0.00032	0.0234	0.00000089	0.00000065	0.000491	0.000517
Birch Creek	BC-LSM	17-May-21	63.8	61.7	0.00066	0.0166	0.00000101	0.00000109	0.000604	0.000626
Fairford River	FR1	18-May-21	38.7	39.2	<0.00010	0.00688	<0.00000050	0.00000068	0.00213	0.00211
	FR2	18-May-21	38.9	40.4	<0.00010	0.0100	<0.00000050	0.00000081	0.00218	0.00221
Lake St. Martin	BB-LSM	17-May-21	30.4	28.8	<0.00010	0.00518	<0.00000050	0.00000055	0.00172	0.00173
	LSM5 [3]	May 2021	-	-	-	-	-	-	-	-
	LSM4	19-May-21	38.5	38.4	0.00012	0.00711	<0.00000050	<0.00000050	0.00228	0.00225
	LSM1	19-May-21	39.2	40.1	<0.00010	0.0106	<0.00000050	0.00000073	0.00236	0.00221
	LSM3	19-May-21	31.8	31.5	<0.00010	0.00634	<0.00000050	0.00000076	0.00163	0.00164
Dauphin River	DR-A	19-May-21	41.4	39.8	<0.00010	0.0122	<0.00000050	0.00000122	0.00251	0.00256
	DR-B	18-May-21	43.1	43.9	<0.00010	0.00934	<0.00000050	0.00000096	0.00232	0.00239
	DR-E	19-May-21	43.2	41.1	<0.00010	0.0102	<0.00000050	0.00000097	0.00240	0.00233
Big Buffalo Lake	BBL	16-May-21	29.4	29.0	<0.00010	0.00820	<0.00000050	0.00000092	0.000531	0.000523
Buffalo Creek	BC3	16-May-21	27.0	26.1	0.00038	0.0571	0.00000056	0.00000119	0.000417	0.000420
Lake Winnipeg	SB1	27-May-21	21.0	20.9	<0.00010	0.00806	<0.00000050	<0.0000020	0.00110	0.00110
	SB2	27-May-21	19.9	20.8	<0.00010	0.0250	<0.00000050	0.00000146	0.00102	0.000987

Table 8. Continued.

Waterbody	Site ID	Sampling Date	Nickel (Ni)		Potassium (K)		Rubidium (Rb)		Selenium (Se)	
			Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Analytical DL			*0.00050*	*0.00050*	*0.050*	*0.050*	*0.00020*	*0.00020*	*0.000050*	*0.000050*
Lake Manitoba	WHB1	1-Sep-20	<0.00050	0.00075	9.81	9.95	0.00391	0.00429	0.000094	<0.000050
	WHB2	1-Sep-20	<0.00050	0.00084	9.91	10.1	0.00404	0.00452	0.000059	<0.000050
Watchorn Creek	WHC-WB	1-Sep-20	<0.00050	0.00069	9.41	9.51	0.00381	0.00414	0.000094	0.000058
Mercer Creek	MC-WB	1-Sep-20	<0.00050	0.00065	9.98	10.0	0.00406	0.00402	0.000084	<0.000050
Birch Creek drain	BCD-2018-9	9-Sep-20	<0.00050	0.00078	7.04	6.84	0.00356	0.00360	0.000220	0.000177
Birch Creek	BC-LSM	1-Sep-20	0.00101	0.00107	10.8	10.6	0.00471	0.00480	0.000207	0.000109
Fairford River	FR1	1-Sep-20	<0.00050	0.00068	9.83	9.51	0.00389	0.00390	0.000085	<0.000050
	FR2	10-Sep-20	<0.00050	0.00078	10.5	9.86	0.00407	0.00412	0.000093	0.000085
Lake St. Martin	BB-LSM	10-Sep-20	0.00050	0.00077	9.06	9.02	0.00405	0.00394	0.000074	0.000108
	LSM5	2-Sep-20	<0.00050	0.00063	9.96	9.35	0.00428	0.00412	0.000070	0.000054
	LSM4	2-Sep-20	<0.00050	0.00053	10.8	9.35	0.00415	0.00401	0.000055	0.000095
	LSM1	2-Sep-20	<0.00050	0.00069	9.77	9.62	0.00420	0.00435	0.000076	0.000086
	LSM3	2-Sep-20	0.00050	0.00068	7.01	6.90	0.00392	0.00414	0.000111	0.000097
Dauphin River	DR-A	2-Sep-20	<0.00050	0.00066	9.26	9.28	0.00393	0.00393	0.000064	<0.000050
	DR-B	3-Sep-20	<0.00050	0.00072	9.84	9.37	0.00441	0.00432	0.000089	0.000075
	DR-E	3-Sep-20	<0.00050	0.00081	9.86	9.52	0.00422	0.00444	0.000069	0.000071
Big Buffalo Lake	BBL	1-Sep-20	<0.00050	<0.00050	3.10	3.16	0.00246	0.00260	0.000120	0.000129
Buffalo Creek	BC3	1-Sep-20	0.00060	0.00109	1.40	1.52	0.00170	0.00246	0.000091	0.000110
Lake Winnipeg	SB1	3-Sep-20	0.00070	0.00182	4.84	4.91	0.00220	0.00369	0.000126	0.000111
	SB2	3-Sep-20	0.00078	0.00177	3.95	3.86	0.00157	0.00297	0.000131	0.000121
Birch Creek drain	BCD-2018-9	13-Oct-20	<0.00050	0.00078	13.7	14.6	0.00396	0.00422	0.000136	0.000128
Birch Creek	BC-LSM	13-Oct-20	<0.00050	0.00052	14.9	14.8	0.00416	0.00434	0.000155	0.000089
Fairford River	FR1	13-Oct-20	<0.00050	0.00106	10.1	10.4	0.00406	0.00449	0.000069	0.000099
	FR2	13-Oct-20	<0.00050	0.00090	9.70	10.2	0.00428	0.00440	0.000085	0.000089

Table 8. Continued.

Waterbody	Site ID	Sampling Date	Nickel (Ni)		Potassium (K)		Rubidium (Rb)		Selenium (Se)	
			Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Lake St. Martin	BB-LSM	13-Oct-20	0.00054	0.00074	9.39	9.59	0.00413	0.00413	0.000072	0.000084
	LSM4	14-Oct-20	<0.00050	0.00059	10.3	10.1	0.00416	0.00412	0.000109	0.000081
	LSM1	14-Oct-20	0.00051	0.00094	10.1	10.1	0.00399	0.00450	0.000100	0.000100
	LSM3	14-Oct-20	0.00051	0.00097	8.29	8.24	0.00378	0.00435	0.000093	0.000102
Dauphin River	DR-A	14-Oct-20	<0.00050	0.00063	10.0	10.2	0.00412	0.00418	0.000103	0.000123
Lake Manitoba	WHB1	15-Mar-21	0.00071	0.00083	14.1	14.6	0.00543	0.00539	0.000095	0.000127
	WHB2	15-Mar-21	0.00073	0.00087	15.3	15.5	0.00593	0.00585	0.000109	0.000072
Watchorn Creek	WHC-WB [1]	15-Mar-21	-	-	-	-	-	-	-	-
Mercer Creek	MC-WB [1]	15-Mar-21	-	-	-	-	-	-	-	-
Birch Creek drain	BCD-2018-9 [1]	16-Mar-21	-	-	-	-	-	-	-	-
Birch Creek	BC-LSM [1]	16-Mar-21	-	-	-	-	-	-	-	-
Fairford River	FR1	16-Mar-21	0.00066	0.00081	12.9	12.8	0.00492	0.00490	0.000092	0.000062
	FR2	16-Mar-21	0.00065	0.00077	13.0	12.8	0.00497	0.00496	0.000107	0.000084
Lake St. Martin	BB-LSM	16-Mar-21	0.00077	0.00091	14.9	13.7	0.00542	0.00548	0.000066	0.000090
	LSM5	17-Mar-21	0.00072	0.00080	13.8	13.7	0.00526	0.00551	0.000067	0.000096
	LSM4	17-Mar-21	0.00076	0.00088	15.0	14.3	0.00568	0.00579	0.000097	0.000105
	LSM1	17-Mar-21	0.00070	0.00094	13.5	13.4	0.00488	0.00539	0.000121	0.000086
	LSM3	17-Mar-21	0.00103	0.00114	20.1	19.0	0.00741	0.00729	0.000173	0.000143
Dauphin River	DR-A	17-Mar-21	0.00070	0.00084	14.0	13.8	0.00511	0.00514	0.000087	0.000095
	DR-B	18-Mar-21	0.00069	0.00081	13.4	13.0	0.00524	0.00515	0.000105	0.000109
	DR-E	18-Mar-21	0.00069	0.00082	13.3	12.7	0.00529	0.00511	0.000085	0.000080
Big Buffalo Lake	BBL [1]	17-Mar-21	-	-	-	-	-	-	-	-
Buffalo Creek	BC3 [1]	18-Mar-21	-	-	-	-	-	-	-	-
Lake Winnipeg	SB1	18-Mar-21	0.00087	0.00109	4.8	4.71	0.00181	0.00206	0.000149	0.000124
Lake Winnipeg	SB2	18-Mar-21	0.00086	0.00113	4.72	4.60	0.00176	0.00205	0.000127	0.000123

Table 8. Continued.

Waterbody	Site ID	Sampling Date	Nickel (Ni)		Potassium (K)		Rubidium (Rb)		Selenium (Se)	
			Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Lake Manitoba	WHB1	17-May-21	0.00053	0.00070	10.6	10.1	0.00400	0.00382	0.000101	0.000097
	WHB2	17-May-21	0.00060	0.00077	11.0	10.5	0.00418	0.00393	0.000095	0.000084
Watchorn Creek	WHC-WB	17-May-21	0.00063	0.00081	11.2	10.8	0.00409	0.00406	0.000069	0.000102
Mercer Creek	MC-WB	17-May-21	0.00067	0.00106	11.0	10.3	0.00422	0.00413	0.000064	0.000084
Birch Creek drain	BCD-2018-9	17-May-21	<0.00050	0.00052	9.42	9.08	0.00313	0.00296	0.000098	0.000075
Birch Creek	BC-LSM	17-May-21	0.00061	0.00081	7.28	6.90	0.00267	0.00262	0.000108	0.000113
Fairford River	FR1	18-May-21	0.00059	0.00088	10.6	9.95	0.00399	0.00410	0.000099	0.000092
	FR2	18-May-21	0.00061	0.00098	10.6	10.4	0.00391	0.00437	0.000084	0.000106
Lake St. Martin	BB-LSM	17-May-21	<0.00050	0.00061	7.72	7.29	0.00287	0.00292	<0.000050	0.000067
	LSM5 [3]	May 2021	-	-	-	-	-	-	-	-
	LSM4	19-May-21	0.00056	0.00078	10.2	10.4	0.00386	0.00407	0.000071	<0.000050
	LSM1	19-May-21	0.00060	0.00090	10.5	10.6	0.00404	0.00430	0.000082	0.000071
	LSM3	19-May-21	<0.00050	0.00057	7.32	7.22	0.00298	0.00323	0.000069	0.000084
Dauphin River	DR-A	19-May-21	0.00060	0.00105	10.9	10.8	0.00420	0.00469	0.000082	0.000087
	DR-B	18-May-21	0.00061	0.00096	11.3	10.9	0.00433	0.00453	0.000072	0.000120
	DR-E	19-May-21	0.00065	0.00090	11.5	11.2	0.00421	0.00464	0.000091	0.000052
Big Buffalo Lake	BBL	16-May-21	<0.00050	<0.00050	3.27	3.31	0.00158	0.00163	<0.000050	0.000073
Buffalo Creek	BC3	16-May-21	0.00058	0.00132	2.86	3.02	0.00236	0.00334	0.000053	0.000065
Lake Winnipeg	SB1	27-May-21	0.00068	0.00142	4.56	4.64	0.00168	0.00276	0.000106	0.000141
	SB2	27-May-21	0.00062	0.00289	4.23	4.54	0.00159	0.00502	0.000120	0.000098

Table 8. Continued.

Waterbody	Site ID	Sampling Date	Silicon (Si)		Silver (Ag)		Sodium (Na)		Strontium (Sr)	
			Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Analytical DL			*0.050*	*0.10*	*0.000010*	*0.000010*	*0.050*	*0.050*	*0.00010*	*0.00020*
Lake Manitoba	WHB1	1-Sep-20	4.24	4.74	<0.000010	<0.000010	130	133	0.259	0.276
	WHB2	1-Sep-20	4.20	5.07	<0.000010	<0.000010	136	130	0.266	0.266
Watchorn Creek	WHC-WB	1-Sep-20	3.29	3.68	<0.000010	<0.000010	121	121	0.253	0.245
Mercer Creek	MC-WB	1-Sep-20	3.79	3.95	<0.000010	<0.000010	128	126	0.262	0.261
Birch Creek drain	BCD-2018-9	9-Sep-20	10.3	11.1	<0.000010	<0.000010	13.7	14.4	0.205	0.205
Birch Creek	BC-LSM	1-Sep-20	1.34	1.42	<0.000010	<0.000010	15.2	15.0	0.151	0.153
Fairford River	FR1	1-Sep-20	4.19	4.49	<0.000010	<0.000010	129	128	0.257	0.266
	FR2	10-Sep-20	4.15	4.83	<0.000010	<0.000010	136	144	0.275	0.273
Lake St. Martin	BB-LSM	10-Sep-20	4.32	4.75	<0.000010	<0.000010	127	134	0.253	0.249
	LSM5	2-Sep-20	4.15	4.23	<0.000010	<0.000010	134	125	0.267	0.257
	LSM4	2-Sep-20	3.87	4.06	<0.000010	<0.000010	145	127	0.254	0.254
	LSM1	2-Sep-20	4.19	4.47	<0.000010	<0.000010	131	126	0.255	0.254
	LSM3	2-Sep-20	6.21	6.55	<0.000010	<0.000010	89.3	90.2	0.196	0.203
Dauphin River	DR-A	2-Sep-20	3.92	4.10	<0.000010	<0.000010	130	130	0.235	0.242
	DR-B	3-Sep-20	4.29	4.78	<0.000010	<0.000010	130	124	0.249	0.244
	DR-E	3-Sep-20	4.38	5.50	<0.000010	<0.000010	132	126	0.235	0.242
Big Buffalo Lake	BBL	1-Sep-20	12.1	14.8	<0.000010	<0.000010	27.4	27.7	0.209	0.204
Buffalo Creek	BC3	1-Sep-20	9.39	10.6	<0.000010	<0.000010	10.1	10.2	0.114	0.108
Lake Winnipeg	SB1	3-Sep-20	3.40	4.95	<0.000010	<0.000010	44.5	44.3	0.155	0.156
	SB2	3-Sep-20	2.78	4.29	<0.000010	<0.000010	28.5	26.6	0.135	0.134
Birch Creek drain	BCD-2018-9	13-Oct-20	11.0	11.8	<0.000010	<0.000010	17.1	18.4	0.207	0.233
Birch Creek	BC-LSM	13-Oct-20	11.4	9.98	<0.000010	<0.000010	17.2	18.8	0.221	0.234
Fairford River	FR1	13-Oct-20	4.53	4.93	<0.000010	<0.000010	130	146	0.259	0.293
	FR2	13-Oct-20	4.38	4.70	<0.000010	<0.000010	128	142	0.259	0.282

Table 8. Continued.

Waterbody	Site ID	Sampling Date	Silicon (Si)		Silver (Ag)		Sodium (Na)		Strontium (Sr)	
			Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Lake St. Martin	BB-LSM	13-Oct-20	4.48	4.35	<0.000010	<0.000010	129	139	0.248	0.254
	LSM4	14-Oct-20	3.83	4.08	<0.000010	<0.000010	143	144	0.263	0.254
	LSM1	14-Oct-20	3.79	4.34	<0.000010	<0.000010	141	144	0.264	0.262
	LSM3	14-Oct-20	4.61	5.23	<0.000010	<0.000010	117	117	0.227	0.229
Dauphin River	DR-A	14-Oct-20	3.70	4.01	<0.000010	<0.000010	142	142	0.262	0.260
Lake Manitoba	WHB1	15-Mar-21	5.88	6.29	<0.000010	<0.000010	187	196	0.371	0.386
	WHB2	15-Mar-21	6.03	6.50	<0.000010	<0.000010	200	205	0.409	0.405
Watchorn Creek	WHC-WB [1]	15-Mar-21	-	-	-	-	-	-	-	-
Mercer Creek	MC-WB [1]	15-Mar-21	-	-	-	-	-	-	-	-
Birch Creek drain	BCD-2018-9 [1]	16-Mar-21	-	-	-	-	-	-	-	-
Birch Creek	BC-LSM [1]	16-Mar-21	-	-	-	-	-	-	-	-
Fairford River	FR1	16-Mar-21	5.39	5.26	<0.000010	<0.000010	182	177	0.357	0.351
	FR2	16-Mar-21	5.71	5.46	<0.000010	<0.000010	175	175	0.357	0.346
Lake St. Martin	BB-LSM	16-Mar-21	6.44	6.10	<0.000010	<0.000010	201	192	0.405	0.379
	LSM5	17-Mar-21	6.13	6.22	<0.000010	<0.000010	190	191	0.385	0.382
	LSM4	17-Mar-21	5.90	5.75	<0.000010	<0.000010	204	200	0.412	0.407
	LSM1	17-Mar-21	5.38	5.21	<0.000010	<0.000010	188	188	0.377	0.374
	LSM3	17-Mar-21	9.04	8.75	<0.000010	<0.000010	283	266	0.582	0.540
Dauphin River	DR-A	17-Mar-21	5.64	5.29	<0.000010	<0.000010	193	192	0.394	0.396
	DR-B	18-Mar-21	4.98	5.16	<0.000010	<0.000010	179	186	0.384	0.388
	DR-E	18-Mar-21	4.95	5.22	<0.000010	<0.000010	183	183	0.379	0.381
Big Buffalo Lake	BBL [1]	17-Mar-21	-	-	-	-	-	-	-	-
Buffalo Creek	BC3 [1]	18-Mar-21	-	-	-	-	-	-	-	-
Lake Winnipeg	SB1	18-Mar-21	2.47	2.83	<0.000010	<0.000010	39.7	41.0	0.173	0.174
Lake Winnipeg	SB2	18-Mar-21	2.46	2.96	<0.000010	<0.000010	39.1	40.6	0.170	0.174

Table 8. Continued.

Waterbody	Site ID	Sampling Date	Silicon (Si)		Silver (Ag)		Sodium (Na)		Strontium (Sr)	
			Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Lake Manitoba	WHB1	17-May-21	2.86	2.81	<0.000010	<0.000010	142	144	0.286	0.285
	WHB2	17-May-21	2.71	2.68	<0.000010	<0.000010	147	145	0.293	0.293
Watchorn Creek	WHC-WB	17-May-21	2.05	2.12	<0.000010	<0.000010	141	140	0.292	0.293
Mercer Creek	MC-WB	17-May-21	2.57	2.79	<0.000010	<0.000010	144	147	0.295	0.302
Birch Creek drain	BCD-2018-9	17-May-21	1.97	2.06	<0.000010	<0.000010	11.9	11.7	0.172	0.173
Birch Creek	BC-LSM	17-May-21	2.40	2.54	<0.000010	<0.000010	10.2	10.2	0.160	0.165
Fairford River	FR1	18-May-21	2.84	3.18	<0.000010	<0.000010	151	150	0.285	0.288
	FR2	18-May-21	2.47	2.85	<0.000010	<0.000010	149	153	0.285	0.296
Lake St. Martin	BB-LSM	17-May-21	1.65	1.76	<0.000010	<0.000010	104	102	0.213	0.214
	LSM5 [3]	May 2021	-	-	-	-	-	-	-	-
	LSM4	19-May-21	1.35	1.53	<0.000010	<0.000010	142	141	0.280	0.290
	LSM1	19-May-21	1.18	1.40	<0.000010	<0.000010	143	151	0.292	0.301
	LSM3	19-May-21	0.45	0.70	<0.000010	<0.000010	91.3	91.6	0.200	0.210
Dauphin River	DR-A	19-May-21	0.31	0.75	<0.000010	<0.000010	155	146	0.281	0.299
	DR-B	18-May-21	0.45	0.82	<0.000010	<0.000010	158	159	0.296	0.303
	DR-E	19-May-21	0.35	0.55	<0.000010	<0.000010	157	154	0.298	0.309
Big Buffalo Lake	BBL	16-May-21	1.88	1.89	<0.000010	<0.000010	18.9	19.0	0.130	0.128
Buffalo Creek	BC3	16-May-21	2.19	3.27	<0.000010	<0.000010	14.9	14.7	0.0977	0.102
Lake Winnipeg	SB1	27-May-21	1.97	2.80	<0.000010	<0.000010	44.3	44.8	0.157	0.165
	SB2	27-May-21	1.57	4.60	<0.000010	<0.000010	41.0	41.0	0.140	0.146

Table 8. Continued.

Waterbody	Site ID	Sampling Date	Sulphate (SO4)	Sulphur (S)		Tellurium (Te)		Thallium (Tl)	
			Dissolved	Dissolved	Total	Dissolved	Total	Dissolved	Total
Analytical DL			*0.30/0.60*	*0.50*	*0.50*	*0.00020*	*0.00020*	*0.000010*	*0.000010*
Lake Manitoba	WHB1	1-Sep-20	97.6	30.9	32.2	<0.00020	<0.00020	<0.000010	<0.000010
	WHB2	1-Sep-20	97.9	32.1	31.6	<0.00020	<0.00020	<0.000010	<0.000010
Watchorn Creek	WHC-WB	1-Sep-20	90.7	29.1	30.8	<0.00020	<0.00020	<0.000010	<0.000010
Mercer Creek	MC-WB	1-Sep-20	97.9	30.6	31.6	<0.00020	<0.00020	<0.000010	<0.000010
Birch Creek drain	BCD-2018-9	9-Sep-20	85.6	28.6	30.0	<0.00020	<0.00020	<0.000010	<0.000010
Birch Creek	BC-LSM	1-Sep-20	65.5	22.4	22.5	<0.00020	<0.00020	<0.000010	<0.000010
Fairford River	FR1	1-Sep-20	92.6	29.7	30.4	<0.00020	<0.00020	<0.000010	<0.000010
	FR2	10-Sep-20	93.5	29.9	32.5	<0.00020	<0.00020	<0.000010	<0.000010
Lake St. Martin	BB-LSM	10-Sep-20	82.4	28.5	29.1	<0.00020	<0.00020	<0.000010	<0.000010
	LSM5	2-Sep-20	81.7	27.2	29.6	<0.00020	<0.00020	<0.000010	<0.000010
	LSM4	2-Sep-20	82.8	27.4	29.9	<0.00020	<0.00020	<0.000010	<0.000010
	LSM1	2-Sep-20	83.3	28.1	30.3	<0.00020	<0.00020	<0.000010	<0.000010
	LSM3	2-Sep-20	56.7	19.2	20.6	<0.00020	<0.00020	<0.000010	<0.000010
Dauphin River	DR-A	2-Sep-20	85.9	27.4	27.5	<0.00020	<0.00020	<0.000010	<0.000010
	DR-B	3-Sep-20	82.8	27.3	28.9	<0.00020	<0.00020	<0.000010	<0.000010
	DR-E	3-Sep-20	82.5	28.8	29.7	<0.00020	<0.00020	<0.000010	<0.000010
Big Buffalo Lake	BBL	1-Sep-20	24.6	8.82	9.33	<0.00020	<0.00020	<0.000010	<0.000010
Buffalo Creek	BC3	1-Sep-20	12.8	4.75	5.01	<0.00020	<0.00020	<0.000010	<0.000010
Lake Winnipeg	SB1	3-Sep-20	50.3	16.2	17.3	<0.00020	<0.00020	<0.000010	0.000013
	SB2	3-Sep-20	44.8	14.9	15.5	<0.00020	<0.00020	<0.000010	0.000010
Birch Creek drain	BCD-2018-9	13-Oct-20	149	47.4	54.6	<0.00020	<0.00020	<0.000010	<0.000010
Birch Creek	BC-LSM	13-Oct-20	136	52.9	45.9	<0.00020	<0.00020	<0.000010	<0.000010
Fairford River	FR1	13-Oct-20	92.4	33.6	34.0	<0.00020	<0.00020	<0.000010	<0.000010
	FR2	13-Oct-20	92.1	32.5	33.5	<0.00020	<0.00020	<0.000010	<0.000010

Table 8. Continued.

Waterbody	Site ID	Sampling Date	Sulphate (SO4)	Sulphur (S)		Tellurium (Te)		Thallium (Tl)	
			Dissolved	Dissolved	Total	Dissolved	Total	Dissolved	Total
Lake St. Martin	BB-LSM	13-Oct-20	84.9	31.3	28.9	<0.00020	<0.00020	<0.000010	<0.000010
	LSM4	14-Oct-20	87.2	29.1	32.1	<0.00020	<0.00020	<0.000010	<0.000010
	LSM1	14-Oct-20	88.0	29.1	31.7	<0.00020	<0.00020	<0.000010	<0.000010
	LSM3	14-Oct-20	71.0	23.5	25.6	<0.00020	<0.00020	<0.000010	<0.000010
Dauphin River	DR-A	14-Oct-20	86.4	28.7	32.1	<0.00020	<0.00020	<0.000010	<0.000010
Lake Manitoba	WHB1	15-Mar-21	114	45.4	49.5	<0.00020	<0.00020	<0.000010	<0.000010
	WHB2	15-Mar-21	120	46.3	52.7	<0.00020	<0.00020	<0.000010	<0.000010
Watchorn Creek	WHC-WB [1]	15-Mar-21	-	-	-	-	-	-	-
Mercer Creek	MC-WB [1]	15-Mar-21	-	-	-	-	-	-	-
Birch Creek drain	BCD-2018-9 [1]	16-Mar-21	-	-	-	-	-	-	-
Birch Creek	BC-LSM [1]	16-Mar-21	-	-	-	-	-	-	-
Fairford River	FR1	16-Mar-21	104	41.7	42.7	<0.00020	<0.00020	<0.000010	<0.000010
	FR2	16-Mar-21	104	40.9	42.0	<0.00020	<0.00020	<0.000010	<0.000010
Lake St. Martin	BB-LSM	16-Mar-21	116	45.7	47.0	<0.00020	<0.00020	<0.000010	<0.000010
	LSM5	17-Mar-21	112	45.5	47.7	<0.00020	<0.00020	<0.000010	<0.000010
	LSM4	17-Mar-21	120	47.5	48.4	<0.00020	<0.00020	<0.000010	<0.000010
	LSM1	17-Mar-21	108	44.6	45.8	<0.00020	<0.00020	<0.000010	<0.000010
	LSM3	17-Mar-21	171	61.6	64.9	<0.00020	<0.00020	<0.000010	<0.000010
Dauphin River	DR-A	17-Mar-21	111	45.7	46.3	<0.00020	<0.00020	<0.000010	<0.000010
	DR-B	18-Mar-21	117	42.2	45.1	<0.00020	<0.00020	<0.000010	<0.000010
	DR-E	18-Mar-21	119	42.8	45.8	<0.00020	<0.00020	<0.000010	<0.000010
Big Buffalo Lake	BBL [1]	17-Mar-21	-	-	-	-	-	-	-
Buffalo Creek	BC3 [1]	18-Mar-21	-	-	-	-	-	-	-
Lake Winnipeg	SB1	18-Mar-21	54.7	19.4	20.5	<0.00020	<0.00020	<0.000010	<0.000010
Lake Winnipeg	SB2	18-Mar-21	53.7	19.8	19.6	<0.00020	<0.00020	<0.000010	<0.000010

Table 8. Continued.

Waterbody	Site ID	Sampling Date	Sulphate (SO4)	Sulphur (S)		Tellurium (Te)		Thallium (Tl)	
			Dissolved	Dissolved	Total	Dissolved	Total	Dissolved	Total
Lake Manitoba	WHB1	17-May-21	92.5	33.1	34.0	<0.00020	<0.00020	<0.000010	<0.000010
	WHB2	17-May-21	92.6	33.3	34.2	<0.00020	<0.00020	<0.000010	<0.000010
Watchorn Creek	WHC-WB	17-May-21	93.7	34.1	36.4	<0.00020	<0.00020	<0.000010	<0.000010
Mercer Creek	MC-WB	17-May-21	93.1	33.8	35.4	<0.00020	<0.00020	<0.000010	<0.000010
Birch Creek drain	BCD-2018-9	17-May-21	87.3	31.5	34.4	<0.00020	<0.00020	<0.000010	<0.000010
Birch Creek	BC-LSM	17-May-21	71.9	25.8	27.6	<0.00020	<0.00020	<0.000010	<0.000010
Fairford River	FR1	18-May-21	89.9	32.2	33.2	<0.00020	<0.00020	<0.000010	<0.000010
	FR2	18-May-21	92.5	33.7	34.1	<0.00020	<0.00020	<0.000010	<0.000010
Lake St. Martin	BB-LSM	17-May-21	65.7	23.9	25.1	<0.00020	<0.00020	<0.000010	<0.000010
	LSM5 [3]	May 2021	-	-	-	-	-	-	-
	LSM4	19-May-21	85.9	32.4	32.6	<0.00020	<0.00020	<0.000010	<0.000010
	LSM1	19-May-21	89.7	32.6	34.0	<0.00020	<0.00020	<0.000010	<0.000010
	LSM3	19-May-21	56.5	21.0	22.4	<0.00020	<0.00020	<0.000010	<0.000010
Dauphin River	DR-A	19-May-21	91.0	34.6	34.6	<0.00020	<0.00020	<0.000010	<0.000010
	DR-B	18-May-21	96.6	36.6	36.7	<0.00020	<0.00020	<0.000010	<0.000010
	DR-E	19-May-21	96.2	35.5	36.2	<0.00020	<0.00020	<0.000010	<0.000010
Big Buffalo Lake	BBL	16-May-21	31.3	11.7	12.1	<0.00020	<0.00020	<0.000010	<0.000010
Buffalo Creek	BC3	16-May-21	23.7	8.71	9.62	<0.00020	<0.00020	<0.000010	<0.000010
Lake Winnipeg	SB1	27-May-21	49.5	18.1	18.6	<0.00020	<0.00020	<0.000010	<0.000010
	SB2	27-May-21	44.5	16.3	16.3	<0.00020	<0.00020	<0.000010	0.000026

Table 8. Continued.

Waterbody	Site ID	Sampling Date	Thorium (Th)		Tin (Sn)		Titanium (Ti)		Tungsten (W)	
			Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Analytical DL			*0.00010*	*0.00010*	*0.00010*	*0.00010*	*0.00030*	*0.00030*	*0.00010*	*0.00010*
Lake Manitoba	WHB1	1-Sep-20	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00455	<0.00010	<0.00010
	WHB2	1-Sep-20	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00835	<0.00010	<0.00010
Watchorn Creek	WHC-WB	1-Sep-20	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00444	<0.00010	<0.00010
Mercer Creek	MC-WB	1-Sep-20	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00291	<0.00010	<0.00010
Birch Creek drain	BCD-2018-9	9-Sep-20	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00542	<0.00010	<0.00010
Birch Creek	BC-LSM	1-Sep-20	<0.00010	<0.00010	<0.00010	<0.00010	0.00039	0.00154	<0.00010	<0.00010
Fairford River	FR1	1-Sep-20	<0.00010	<0.00010	<0.00010	0.00012	<0.00030	0.00357	<0.00010	<0.00010
	FR2	10-Sep-20	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00530	<0.00010	<0.00010
Lake St. Martin	BB-LSM	10-Sep-20	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00463	<0.00010	<0.00010
	LSM5	2-Sep-20	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00137	<0.00010	<0.00010
	LSM4	2-Sep-20	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00048	<0.00010	<0.00010
	LSM1	2-Sep-20	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00399	<0.00010	<0.00010
	LSM3	2-Sep-20	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00393	<0.00010	<0.00010
Dauphin River	DR-A	2-Sep-20	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00168	<0.00010	<0.00010
	DR-B	3-Sep-20	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00398	<0.00010	<0.00010
	DR-E	3-Sep-20	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00939	<0.00010	<0.00010
Big Buffalo Lake	BBL	1-Sep-20	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00252	<0.00010	<0.00010
Buffalo Creek	BC3	1-Sep-20	<0.00010	<0.00010	<0.00010	<0.00010	0.00172	0.0163	<0.00010	<0.00010
Lake Winnipeg	SB1	3-Sep-20	<0.00010	0.00013	<0.00010	<0.00010	0.00087	0.0330	<0.00010	<0.00010
	SB2	3-Sep-20	<0.00010	0.00011	<0.00010	<0.00010	0.00072	0.0288	<0.00010	<0.00010
Birch Creek drain	BCD-2018-9	13-Oct-20	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00065	<0.00010	<0.00010
Birch Creek	BC-LSM	13-Oct-20	<0.00010	<0.00010	<0.00010	<0.00010	0.00031	0.00166	<0.00010	<0.00010
Fairford River	FR1	13-Oct-20	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00955	<0.00010	<0.00010
	FR2	13-Oct-20	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00730	<0.00010	<0.00010

Table 8. Continued.

Waterbody	Site ID	Sampling Date	Thorium (Th)		Tin (Sn)		Titanium (Ti)		Tungsten (W)	
			Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Lake St. Martin	BB-LSM	13-Oct-20	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00321	<0.00010	<0.00010
	LSM4	14-Oct-20	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00133	<0.00010	<0.00010
	LSM1	14-Oct-20	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00818	<0.00010	<0.00010
	LSM3	14-Oct-20	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00919	<0.00010	<0.00010
Dauphin River	DR-A	14-Oct-20	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00174	<0.00010	<0.00010
Lake Manitoba	WHB1	15-Mar-21	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	<0.00030	<0.00010	<0.00010
	WHB2	15-Mar-21	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	<0.00030	<0.00010	<0.00010
Watchorn Creek	WHC-WB [1]	15-Mar-21	-	-	-	-	-	-	-	-
Mercer Creek	MC-WB [1]	15-Mar-21	-	-	-	-	-	-	-	-
Birch Creek drain	BCD-2018-9 [1]	16-Mar-21	-	-	-	-	-	-	-	-
Birch Creek	BC-LSM [1]	16-Mar-21	-	-	-	-	-	-	-	-
Fairford River	FR1	16-Mar-21	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00090	<0.00010	<0.00010
	FR2	16-Mar-21	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00057	<0.00010	<0.00010
Lake St. Martin	BB-LSM	16-Mar-21	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00032	<0.00010	<0.00010
	LSM5	17-Mar-21	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	<0.00030	<0.00010	<0.00010
	LSM4	17-Mar-21	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00038	<0.00010	<0.00010
	LSM1	17-Mar-21	<0.00010	<0.00010	<0.00010	0.00015	<0.00030	0.00247	<0.00010	<0.00010
	LSM3	17-Mar-21	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00105	<0.00010	<0.00010
Dauphin River	DR-A	17-Mar-21	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	<0.00030	<0.00010	<0.00010
	DR-B	18-Mar-21	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00039	<0.00010	<0.00010
	DR-E	18-Mar-21	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00050	<0.00010	<0.00010
Big Buffalo Lake	BBL [1]	17-Mar-21	-	-	-	-	-	-	-	-
Buffalo Creek	BC3 [1]	18-Mar-21	-	-	-	-	-	-	-	-
Lake Winnipeg	SB1	18-Mar-21	<0.00010	<0.00010	<0.00010	<0.00010	0.00066	0.00472	<0.00010	<0.00010
Lake Winnipeg	SB2	18-Mar-21	<0.00010	<0.00010	<0.00010	<0.00010	0.00067	0.00509	<0.00010	<0.00010

Table 8. Continued.

Waterbody	Site ID	Sampling Date	Thorium (Th)		Tin (Sn)		Titanium (Ti)		Tungsten (W)	
			Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Lake Manitoba	WHB1	17-May-21	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00076	<0.00010	<0.00010
	WHB2	17-May-21	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00194	<0.00010	<0.00010
Watchorn Creek	WHC-WB	17-May-21	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00229	<0.00010	<0.00010
Mercer Creek	MC-WB	17-May-21	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00670	<0.00010	<0.00010
Birch Creek drain	BCD-2018-9	17-May-21	<0.00010	<0.00010	<0.00010	0.00015	<0.00030	0.00118	<0.00010	<0.00010
Birch Creek	BC-LSM	17-May-21	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00320	<0.00010	<0.00010
Fairford River	FR1	18-May-21	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00569	<0.00010	<0.00010
	FR2	18-May-21	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00701	<0.00010	<0.00010
Lake St. Martin	BB-LSM	17-May-21	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00229	<0.00010	<0.00010
	LSM5 [3]	May 2021	-	-	-	-	-	-	-	-
	LSM4	19-May-21	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00204	<0.00010	<0.00010
	LSM1	19-May-21	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00428	<0.00010	<0.00010
	LSM3	19-May-21	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00308	<0.00010	<0.00010
Dauphin River	DR-A	19-May-21	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00838	<0.00010	<0.00010
	DR-B	18-May-21	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00697	<0.00010	<0.00010
	DR-E	19-May-21	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00431	<0.00010	<0.00010
Big Buffalo Lake	BBL	16-May-21	<0.00010	<0.00010	<0.00010	<0.00010	<0.00030	0.00126	<0.00010	<0.00010
Buffalo Creek	BC3	16-May-21	<0.00010	0.00022	<0.00010	<0.00010	0.00095	0.0239	<0.00010	<0.00010
Lake Winnipeg	SB1	27-May-21	<0.00010	<0.00010	<0.00010	<0.00010	0.00035	0.0198	<0.00010	<0.00010
	SB2	27-May-21	<0.00010	0.00039	<0.00010	<0.00010	0.00060	0.0687	<0.00010	<0.00010

Table 8. Continued.

Waterbody	Site ID	Sampling Date	Uranium (U)		Vanadium (V)		Zinc (Zn)		Zirconium (Zr)	
			Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Analytical DL			*0.000010*	*0.000010*	*0.00050*	*0.00050*	*0.0010*	*0.0030*	*0.00020*	*0.00020*
Lake Manitoba	WHB1	1-Sep-20	0.00170	0.00159	0.00142	0.00213	<0.0010	<0.0030	<0.00020	<0.00020
	WHB2	1-Sep-20	0.00172	0.00166	0.00148	0.00226	<0.0010	<0.0030	<0.00020	0.00060
Watchorn Creek	WHC-WB	1-Sep-20	0.00160	0.00154	0.00129	0.00194	<0.0010	<0.0030	<0.00020	<0.00020
Mercer Creek	MC-WB	1-Sep-20	0.00168	0.00161	0.00126	0.00179	<0.0010	<0.0030	<0.00020	<0.00020
Birch Creek drain	BCD-2018-9	9-Sep-20	0.000532	0.00063	<0.00050	0.00076	<0.0010	<0.0030	<0.00020	<0.00020
Birch Creek	BC-LSM	1-Sep-20	0.000693	0.000691	0.00060	0.00109	<0.0010	<0.0030	0.00032	0.00028
Fairford River	FR1	1-Sep-20	0.00163	0.00157	0.00136	0.00191	<0.0010	<0.0030	<0.00020	<0.00020
	FR2	10-Sep-20	0.00147	0.00170	0.00140	0.00180	<0.0010	<0.0030	<0.00020	0.00053
Lake St. Martin	BB-LSM	10-Sep-20	0.00184	0.00180	0.00173	0.00214	<0.0010	<0.0030	<0.00020	<0.00020
	LSM5	2-Sep-20	0.00154	0.00161	0.00153	0.00202	<0.0010	<0.0030	<0.00020	<0.00020
	LSM4	2-Sep-20	0.00161	0.00165	0.00160	0.00198	<0.0010	<0.0030	<0.00020	<0.00020
	LSM1	2-Sep-20	0.00165	0.00171	0.00160	0.00217	<0.0010	<0.0030	<0.00020	<0.00020
	LSM3	2-Sep-20	0.00131	0.00138	0.00173	0.00227	<0.0010	<0.0030	<0.00020	<0.00020
Dauphin River	DR-A	2-Sep-20	0.00170	0.00161	0.00158	0.00199	<0.0010	<0.0030	<0.00020	<0.00020
	DR-B	3-Sep-20	0.00167	0.00172	0.00156	0.00219	<0.0010	<0.0030	<0.00020	<0.00020
	DR-E	3-Sep-20	0.00165	0.00173	0.00167	0.00235	<0.0010	<0.0030	<0.00020	0.00052
Big Buffalo Lake	BBL	1-Sep-20	0.000671	0.000656	0.00078	0.00126	0.0011	<0.0030	<0.00020	<0.00020
Buffalo Creek	BC3	1-Sep-20	0.000320	0.000317	0.00077	0.00170	<0.0010	<0.0030	0.00022	0.00122
Lake Winnipeg	SB1	3-Sep-20	0.000942	0.000988	0.00165	0.00342	<0.0010	0.0030	<0.00020	0.00042
	SB2	3-Sep-20	0.000826	0.000893	0.00152	0.00298	<0.0010	<0.0030	<0.00020	0.00040
Birch Creek drain	BCD-2018-9	13-Oct-20	0.00174	0.00177	<0.00050	0.00072	0.0011	<0.0030	<0.00020	<0.00020
Birch Creek	BC-LSM	13-Oct-20	0.00225	0.00211	0.00088	0.00130	<0.0010	<0.0030	<0.00020	<0.00020
Fairford River	FR1	13-Oct-20	0.00186	0.00178	0.00125	0.00220	<0.0010	<0.0030	<0.00020	<0.00020
	FR2	13-Oct-20	0.00191	0.00173	0.00129	0.00200	<0.0010	<0.0030	<0.00020	<0.00020

Table 8. Continued.

Waterbody	Site ID	Sampling Date	Uranium (U)		Vanadium (V)		Zinc (Zn)		Zirconium (Zr)	
			Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Lake St. Martin	BB-LSM	13-Oct-20	0.00201	0.00190	0.00159	0.00214	<0.0010	<0.0030	<0.00020	<0.00020
	LSM4	14-Oct-20	0.00159	0.00178	0.00143	0.00171	<0.0010	<0.0030	<0.00020	<0.00020
	LSM1	14-Oct-20	0.00165	0.00180	0.00139	0.00207	<0.0010	<0.0030	<0.00020	<0.00020
	LSM3	14-Oct-20	0.00156	0.00170	0.00131	0.00194	<0.0010	<0.0030	<0.00020	<0.00020
Dauphin River	DR-A	14-Oct-20	0.00165	0.00181	0.00141	0.00174	<0.0010	<0.0030	<0.00020	<0.00020
Lake Manitoba	WHB1	15-Mar-21	0.00215	0.00217	0.00138	0.00166	<0.0010	<0.0030	<0.00020	<0.00020
	WHB2	15-Mar-21	0.00235	0.00222	0.00159	0.00178	0.0015	0.0046	<0.00020	<0.00020
Watchorn Creek	WHC-WB [1]	15-Mar-21	-	-	-	-	-	-	-	-
Mercer Creek	MC-WB [1]	15-Mar-21	-	-	-	-	-	-	-	-
Birch Creek drain	BCD-2018-9 [1]	16-Mar-21	-	-	-	-	-	-	-	-
Birch Creek	BC-LSM [1]	16-Mar-21	-	-	-	-	-	-	-	-
Fairford River	FR1	16-Mar-21	0.00202	0.00211	0.00122	0.00139	0.0021	<0.0030	<0.00020	<0.00020
	FR2	16-Mar-21	0.00194	0.00203	0.00126	0.00141	<0.0010	<0.0030	<0.00020	<0.00020
Lake St. Martin	BB-LSM	16-Mar-21	0.00218	0.00229	0.00142	0.00152	<0.0010	<0.0030	<0.00020	<0.00020
	LSM5	17-Mar-21	0.00215	0.00227	0.00131	0.00145	<0.0010	<0.0030	<0.00020	<0.00020
	LSM4	17-Mar-21	0.00239	0.00239	0.00134	0.00146	<0.0010	0.0082	<0.00020	<0.00020
	LSM1	17-Mar-21	0.00211	0.00213	0.00122	0.00152	<0.0010	<0.0030	<0.00020	<0.00020
	LSM3	17-Mar-21	0.00308	0.00305	0.00119	0.00144	0.0013	0.0030	<0.00020	<0.00020
Dauphin River	DR-A	17-Mar-21	0.00205	0.00223	0.00122	0.00135	<0.0010	<0.0030	<0.00020	<0.00020
	DR-B	18-Mar-21	0.00220	0.00239	0.00117	0.00132	<0.0010	<0.0030	<0.00020	<0.00020
	DR-E	18-Mar-21	0.00214	0.00223	0.00117	0.00134	0.0011	<0.0030	<0.00020	<0.00020
Big Buffalo Lake	BBL [1]	17-Mar-21	-	-	-	-	-	-	-	-
Buffalo Creek	BC3 [1]	18-Mar-21	-	-	-	-	-	-	-	-
Lake Winnipeg	SB1	18-Mar-21	0.00114	0.00121	0.00143	0.00173	<0.0010	<0.0030	<0.00020	<0.00020
Lake Winnipeg	SB2	18-Mar-21	0.00113	0.00116	0.00138	0.00174	<0.0010	<0.0030	<0.00020	<0.00020

Table 8. Continued.

Waterbody	Site ID	Sampling Date	Uranium (U)		Vanadium (V)		Zinc (Zn)		Zirconium (Zr)	
			Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Lake Manitoba	WHB1	17-May-21	0.00170	0.00186	0.00097	0.00124	<0.0010	<0.0030	<0.00020	<0.00020
	WHB2	17-May-21	0.00176	0.00190	0.00102	0.00141	<0.0010	<0.0030	<0.00020	<0.00020
Watchorn Creek	WHC-WB	17-May-21	0.00190	0.00201	0.00107	0.00147	<0.0010	<0.0030	<0.00020	<0.00020
Mercer Creek	MC-WB	17-May-21	0.00178	0.00193	0.00108	0.00168	0.0014	<0.0030	<0.00020	<0.00020
Birch Creek drain	BCD-2018-9	17-May-21	0.00145	0.00158	<0.00050	0.00061	<0.0010	0.0064	<0.00020	<0.00020
Birch Creek	BC-LSM	17-May-21	0.00191	0.00207	0.00069	0.00106	<0.0010	<0.0030	<0.00020	0.00024
Fairford River	FR1	18-May-21	0.00167	0.00166	0.00091	0.00133	<0.0010	<0.0030	<0.00020	<0.00020
	FR2	18-May-21	0.00167	0.00170	0.00097	0.00157	<0.0010	<0.0030	<0.00020	<0.00020
Lake St. Martin	BB-LSM	17-May-21	0.00135	0.00143	0.00076	0.00115	<0.0010	0.0033	<0.00020	<0.00020
	LSM5 [3]	May 2021	-	-	-	-	-	-	-	-
	LSM4	19-May-21	0.00168	0.00166	0.00112	0.00145	<0.0010	<0.0030	<0.00020	<0.00020
	LSM1	19-May-21	0.00173	0.00176	0.00104	0.00150	<0.0010	<0.0030	<0.00020	<0.00020
	LSM3	19-May-21	0.00128	0.00123	0.00059	0.00095	<0.0010	<0.0030	<0.00020	<0.00020
Dauphin River	DR-A	19-May-21	0.00188	0.00189	0.00104	0.00168	<0.0010	<0.0030	<0.00020	<0.00020
	DR-B	18-May-21	0.00189	0.00195	0.00104	0.00163	<0.0010	<0.0030	<0.00020	<0.00020
	DR-E	19-May-21	0.00187	0.00176	0.00099	0.00145	<0.0010	0.0040	<0.00020	<0.00020
Big Buffalo Lake	BBL	16-May-21	0.000562	0.00061	<0.00050	0.00072	<0.0010	<0.0030	<0.00020	<0.00020
Buffalo Creek	BC3	16-May-21	0.000538	0.00059	0.00067	0.00191	<0.0010	<0.0030	<0.00020	0.00045
Lake Winnipeg	SB1	27-May-21	0.00105	0.00103	0.00099	0.00209	<0.0010	0.0041	<0.00020	0.00038
	SB2	27-May-21	0.000949	0.00101	0.00094	0.00414	<0.0010	0.0066	<0.00020	0.00117

1 - No sample collected, site was frozen to the bottom or effective depth was too shallow to collect a sample.

2 - Site not sampled in May 2021 due to strong winds which made accessing the site unsafe.

3 - One of the replicates was considered suspect and was removed from the sample mean; see Section 3.1.2 and Appendix 2 for details.

Table 9. *In situ* survey results.

Location Description	Sampling Date	Sampling Time	Total Water Depth [1] (m)	Sample Depth [1] (m)	Temperature (°C)	pH	Dissolved Oxygen (mg/L)	Oxygen Saturation (%)	Specific Conductance (µS/cm)	Turbidity (NTU)	Comments
Reed Lake	1-Sep-20	13:36	<0.05	0.3	14.03	8.56	10.10	98.2	641	0.88	heavy vegetation
Clear Lake	1-Sep-20	10:10	<0.05	0.3	13.40	8.88	9.82	94.1	802	1.75	heavy vegetation
Water Lake	1-Sep-20	10:13	<0.05	0.3	14.01	9.68	10.40	101.4	470	1.74	heavy vegetation
Goodison Lake	1-Sep-20	10:18	0.0	-	-	-	-	-	-	-	No water
Clarks Drain	1-Sep-20	10:21	0.0	-	-	-	-	-	-	-	No water
Woodale Drain	1-Sep-20	10:22	0.0	-	-	-	-	-	-	-	No water
Creek C											
at LSMOC alignment	1-Sep-20	12:58	<0.1	0.3	13.06	7.33	6.96	66.2	319	1.19	-
upstream of LSMOC alignment	1-Sep-20	12:59	<0.1	0.3	13.17	7.04	4.15	39.5	281	1.52	-
Unnamed Creek											
at Buffalo Creek	1-Sep-20	13:09	<0.1	0.3	13.49	7.24	7.47	71.7	8.2 [2]	2.96	-
at LSMOC alignment	1-Sep-20	13:11	<0.1	0.3	13.36	7.19	6.88	65.8	367	0.15	-
Reach 1	17-Mar-21	16:30	1.0	0.3	2.56	7.49	1.81	13.7	1021	0.50	Snow 5 cm; Ice 0.85 m
				1.0	3.89	7.51	2.17	16.3	1053	0.85	
Reed Lake	16-May-21	14:06	-	surface	18.59	8.24	11.12	119.1	696	1.13	-
Clear Lake	16-May-21	14:15	-	surface	17.13	7.40	7.42	77.1	588	0.65	-
Water Lake	16-May-21	14:18	-	surface	17.70	7.67	9.83	103.5	762	25.2	-
Goodison Lake	16-May-21	14:21	-	surface	-	6.99	8.90	94.6	-	8.0	-

1 - Effective depth during ice-cover

2 - Result suspect

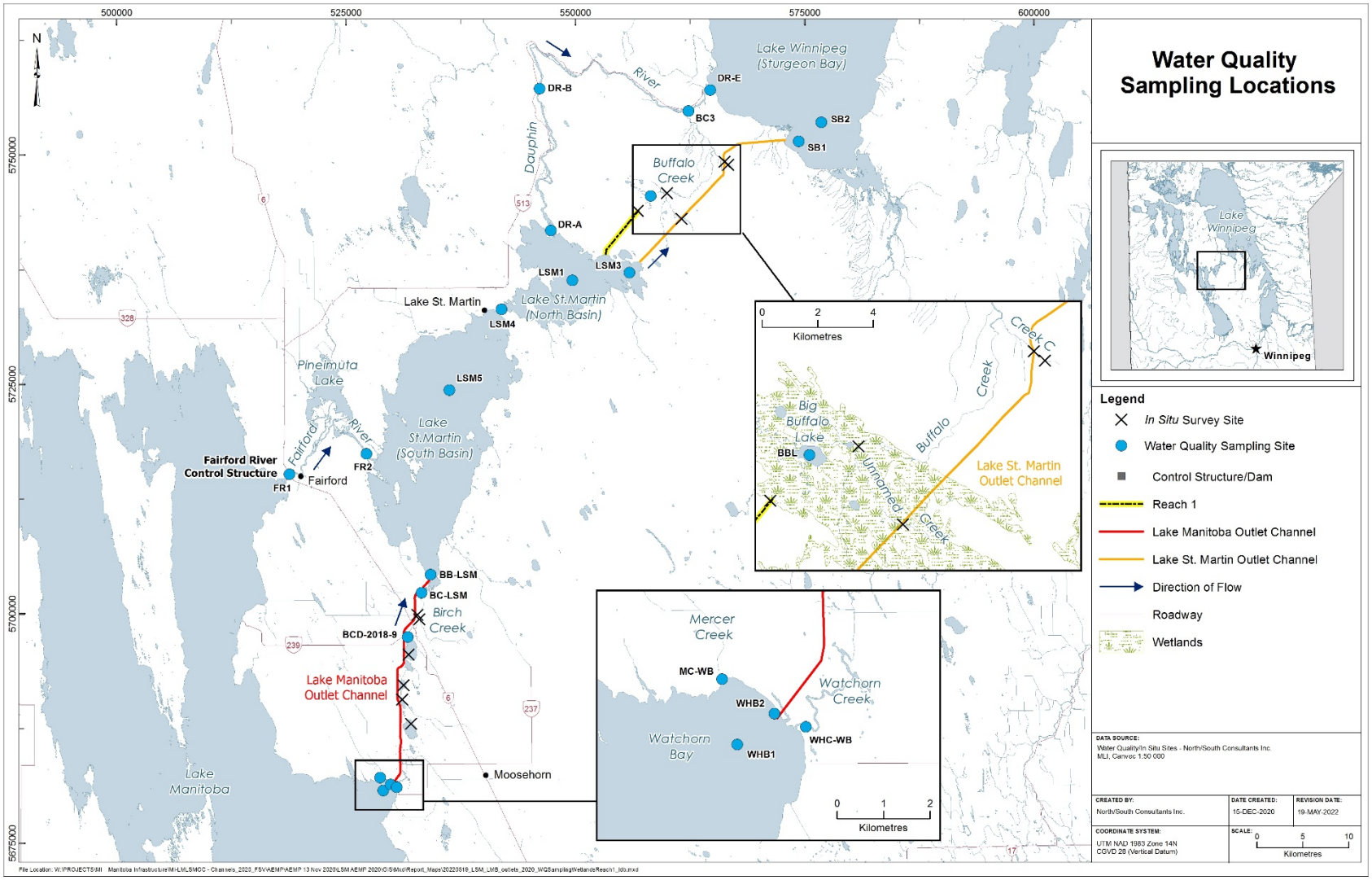

Figure 1. Water quality sampling locations.

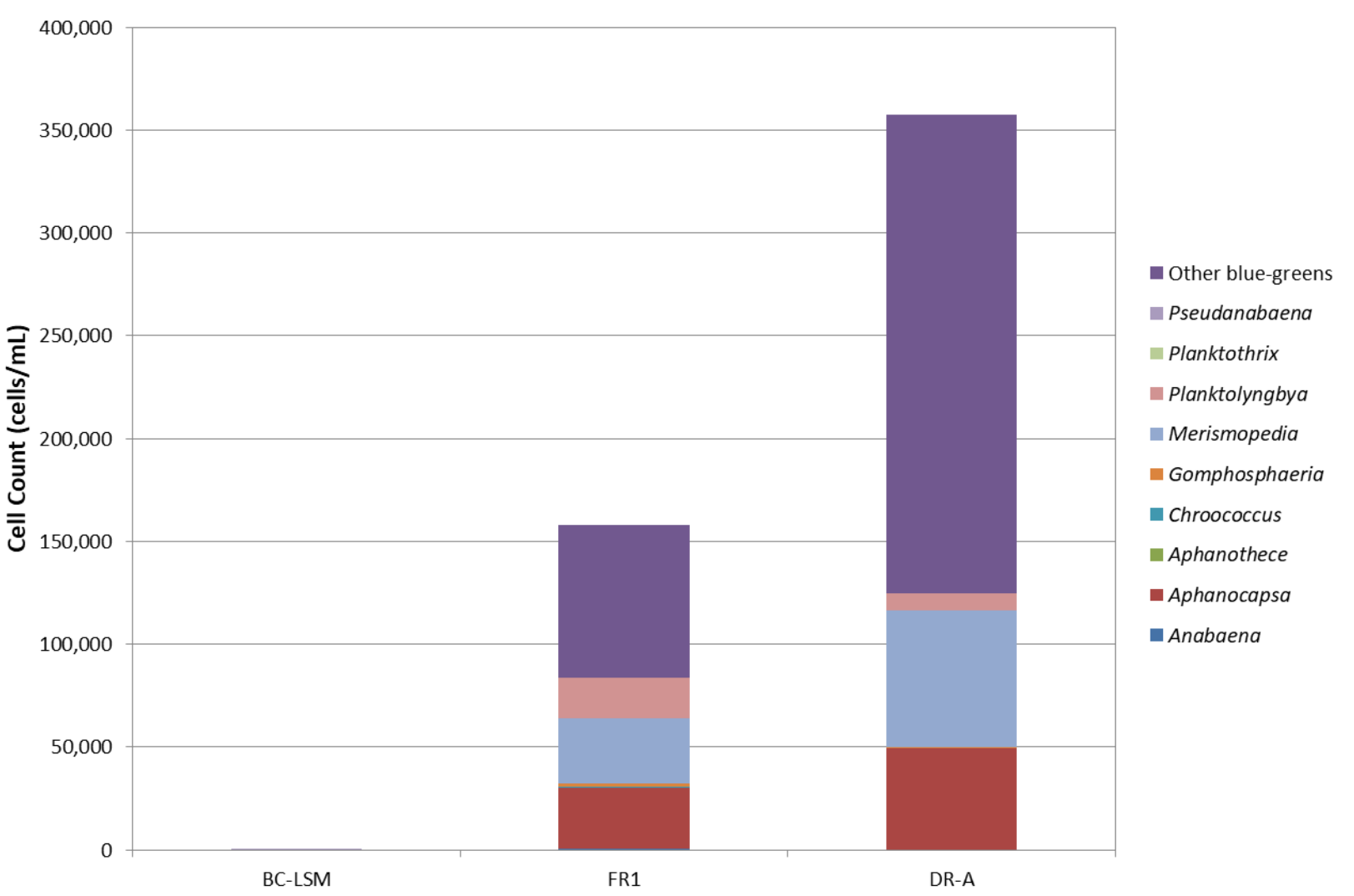

Figure 2. Abundance of blue-green algae at selected sampling sites in September 2020.

APPENDIX 1. WATER QUALITY OBJECTIVES AND GUIDELINES

WATER QUALITY OBJECTIVES AND GUIDELINES

The following is a summary of applicable water quality objectives and guidelines for evaluation of water chemistry data collected in the study area, including: the Manitoba Water Quality Standards, Objectives, and Guidelines (MWQSOG) for the protection of aquatic life (PAL; MWS 2011); and the Canadian Council of Ministers for the Environment (CCME) guidelines for the protection of freshwater aquatic life (CCME 1999, updated to 2021).

AMMONIA

Both MWQ objectives and CCME guidelines for PAL exist for ammonia; these criteria are dependent upon water temperature and pH. A representative range of Manitoba water quality objectives and CCME guidelines for ammonia appropriate for the range of pH and temperature measured in the study area (i.e., site-specific objectives) in 2020 are presented in Tables A1-1 and A1-2, respectively.

Table A1-1. Range of applicable Manitoba Water Quality Objectives for ammonia, for the protection of cool-water and cold-water aquatic life and wildlife.

Water Use	pH	Temperature (°C)	Manitoba Water Quality Objective (mg N/L) [1]		
			30-day	4-day	1-hour
Cool water aquatic life, early life stages present					
	7.49	-0.40	4.40	11.0	20.2
		20.10	3.07	7.68	20.2
	8.80	-0.40	0.66	1.65	1.84
		20.10	0.46	1.15	1.84
Cool water aquatic life, early life stages absent					
	7.49	-0.40	7.15	17.9	20.2
		20.10	3.07	7.68	20.2
	8.80	-0.40	1.07	1.84	1.84
		20.10	0.46	1.15	1.84
Cold water aquatic life, early life stages present					
	7.49	-0.40	4.40	11.0	13.5
		20.10	3.07	7.68	13.5
	8.80	-0.40	0.66	1.23	1.23
		20.10	0.46	1.15	1.23
Cold water aquatic life, early life stages absent					
	7.49	-0.40	7.15	13.5	13.5
		20.10	3.07	7.68	13.5
	8.80	-0.40	1.07	1.23	1.23
		20.10	0.46	1.15	1.23

1 - Values calculated from algorithms provided in MWS (2011) and the range of pH and water temperature measured during the study. The most stringent objective is indicated in red.

Table A1-2. CCME water quality guidelines for total ammonia for the protection of freshwater aquatic life.

Temperature (°C)	CCME water quality guideline (mg N/L) [1]				
	pH				
	7.0	7.5	8.0	8.5	9.0
0	19.0	6.02	1.92	0.616	0.206
5	12.6	3.98	1.27	0.413	0.141
10	8.47	2.68	0.855	0.282	0.100
15	5.74	1.83	0.588	0.197	0.073
20	3.96	1.27	0.410	0.141	0.055
25	2.77	0.888	0.291	0.103	0.044

1 - Guidelines presented are for the range of pH and water temperature measured in the study area in 2020. The most stringent guideline is indicated in red.

DISSOLVED OXYGEN

Manitoba objectives for dissolved oxygen (DO) are dependent upon water temperature, the presence of early life stages, and the presence of sensitive fish species (e.g., cool-water fish such as Northern Pike and Walleye or cold-water fish species such as Lake Whitefish, MWS 2011). Objectives, which are specific for early life stages and mature life stages and vary according to the averaging duration, are presented in Table A1-3. Similarly, the CCME lowest acceptable level of DO varies by warm/cold water biota and life stage, as shown in Table A1-4.

Table A1-3. Manitoba Water Quality Objectives for dissolved oxygen.

Applicable Conditions	Dissolved Oxygen Objective (mg/L)			
	Averaging Duration			
	Instantaneous Minimum	7 Day Minimum	7 Days	30 Days
Cold-Water Aquatic Life and Wildlife				
Water Temperature ≤ 5°C and Early Life Stages Present	8.0	-	9.5	-
Water Temperature > 5°C and Mature Life Stages Present	4.0	5.0	-	6.5
Cool-Water Aquatic Life and Wildlife				
Water Temperature ≤ 5°C and Mature Life Stages Present	3.0	4.0	-	5.5
Water Temperature > 5°C and Early Life Stages Present	5.0	-	6.0	-

Table A1-4. CCME lowest acceptable concentration of dissolved oxygen for the protection of freshwater aquatic life.

	Dissolved Oxygen Value (mg/L)	
	Early life stages	Other life stages
Warm water biota	6.0	5.5
Cold water biota	9.5	6.5

TOTAL SUSPENDED SOLIDS AND TURBIDITY

MWQSOG and CCME guidelines for PAL for total suspended solids (TSS) are similar and allow the following: a maximum increase of 25 mg/L from background for short term exposure (up to 24 hrs.); an average increase of 5 mg/L from background for long term exposure (i.e., 1 to 30 days); a maximum increase of 25 mg/L from background when background TSS is between 25 mg/L and 250 mg/L; and a maximum change of 10% from background when TSS greater than 250 mg/L.

There are different criteria for turbidity for the MWQSOG and CCME guidelines for PAL. The Manitoba objective for turbidity for PAL is for "equivalent induced levels of change as calculated from site-specific or regional-specific correlation between total suspended solids and turbidity" (MWS 2011). The CCME guideline is more definitive and allows for the following (CCME 1999, updated to 2021) a maximum increase of 8 NTU from background for short term exposure (up to 24 hrs.); an average increase of 2 NTU from background for long term exposure (i.e., 1 to 30 days); a maximum increase of 8 NTU from background when background TSS is between 8 NTU and 80 NTU; and a maximum change of 10% from background when background is greater than 80 NTU.

There is also a MWQSOG maximum acceptable concentration of 1.0 NTU for drinking water. However, this guideline, as with all drinking water guidelines/objectives, is to be applied to finished drinking water; and, since the majority of natural surface waters will exceed this guideline, it has not been included in this assessment.

PHOSPHORUS

MWQSOG include narrative guidelines for total phosphorus (TP) which state: "[TP] should not exceed 0.025 mg/L in any reservoir, lake, or pond, or in a tributary at the point where it enters such bodies of water. In other streams, [TP] should not exceed 0.05 mg/L" (MWS 2011).

CCME guidelines for the protection of freshwater aquatic life provide a guidance framework for the development of site-specific guidelines; this is a detailed process that requires sufficient baseline data for guideline development and is beyond the scoop of this report.

OTHER ROUTINE PARAMETERS

Table A1-5 presents water quality criteria for other routine parameters not discussed above.

METALS AND MAJOR IONS

Table A1-6 presents water quality criteria for select metals and major ions.

HYDROCARBONS

Table A1-7 presents water quality criteria for select hydrocarbons.

PESTICIDES

Table A1-8 presents water quality criteria for select pesticides.

Table A1-5. Manitoba and CCME guidelines for the protection of aquatic life for other routine parameters measured.

Parameter	Guidelines/Objectives for PAL		
	MWQSOG [1]	CCME [2]	
		Short Term	Long Term
Nitrate	2.93 mg N/L[3]	124 mg N/L	3.0 mg N/L
Nitrite	0.060 mg N/L	-	0.060 mg N/L
pH	6.5 to 9.0	-	6.5 to 9.0

1 - Manitoba Water Quality Standards, Objectives, and Guidelines (MWS 2011).

2 - CCME guidelines for the protection of freshwater aquatic life (CCME 1999, updated to 2021).

3 - The Manitoba PAL guideline for nitrate indicated in MWS (2011) was incorrectly identified as 13 mg N/L. The PAL guideline should read 2.93 mg N/L (N. Armstrong, Pers. Comm.).

Table A1-6. Manitoba and CCME guidelines for the protection of aquatic life for metals and major ions.

Parameter	Manitoba Objectives and Guidelines (mg/L)					CCME Guidelines (mg/L)		
	Tier II Objectives		Tier III Guidelines					
	Acute[1]	Chronic[2]	MWQG	Short-term	Long-term	CWQG	Short-term	Long-term
Aluminum	-	-	0.1 [3]	-	-	0.1 [3]	-	-
Arsenic, dissolved	0.34	0.15	-	-	-	-	-	-
Arsenic, total	-	-	-	-	-	0.005	-	-
Boron	-	-	-	29	1.5	-	29	1.5
Cadmium, dissolved	0.00287 to 0.0114 [4]	0.000317 to 0.000848 [4]	-	-	-	-	0.00304 to 0.00770 [4]	0.000215 to 0.000370 [4]
Chloride	-	-	-	-	-	-	640	120
Chromium (III), dissolved	0.768 to 2.46 [4]	0.0999 to 0.320 [4]	-	-	-	0.0089 [5]	-	-
Copper, dissolved	0.0189 to 0.0724 [4]	0.0122 to 0.0412 [4]	-	-	-	0.00323 to 0.004 [4*]	-	-
Fluoride	-	-	-	-	-	0.12[5]		
Iron	-	-	≤0.3	-	-	0.3	-	-
Lead, dissolved	0.0958 to 0.421 [4]	0.00373 to 0.0164 [4]	-	-	-	0.00506 to 0.007 [4*]	-	-
Manganese, dissolved	-	-	-	-	-	-	9.2 to 14.8 [6]	0.120 to 0.650 [6]
Mercury	-	-	0.000026	-	-	0.000026 [5]	-	-
Molybdenum	-	-	0.073	-	-	0.073 [5]	-	-
Nickel, dissolved	0.637 to 2.12 [4]	0.0708 to 0.236 [4]	-	-	-	0.126 to 0.150 [4*]	-	-
Selenium, total	-	-	0.001	-	-	0.001	-	-
Silver, total	-	-	0.0001	-	-	-	-	0.00025
Thallium	-	-	0.0008	-	-	0.0008	-	-
Uranium	-	-	-	0.033	0.015	-	0.033	0.015
Zinc, dissolved	0.160 to 0.533 [4]	0.161 to 0.537 [4]	-	-	-	-	0.172 to 0.334 [7]	0.0193 to 0.230 [8]

1 - 1-hour averaging objective.

2 - 4-day averaging objective.

3 - Value represents the guideline where pH > 6.5.

4 - Calculated based on the range of hardness (144-597 mg/L) observed in all samples collected.

5 - Interim guideline

6 - Calculated based on the range of hardness (144-597 mg/L) and pH (7.49-8.80) observed in all samples collected.

7 - Calculated based on the range of hardness (144-597 mg/L) and dissolved organic carbon (DOC; 7.43-34.6 mg/L) observed in all samples collected.

8 - Calculated based on the range of hardness (144-597 mg/L), DOC (7.43-34.6 mg/L) and pH (7.49-8.80) observed in all samples collected.

Table A1-7. Manitoba and CCME guidelines for the protection of aquatic life for hydrocarbons.

Parameter	Units	PAL Guideline [1]
Benzene	mg/L	0.370
Ethyl benzene	mg/L	0.090
Toluene	mg/L	0.002
Acenaphthene	mg/L	0.0058
Acridine	mg/L	0.0044
Anthracene	mg/L	0.000012
Benzo(a)anthracene	mg/L	0.000018
Benzo(a)pyrene	mg/L	0.000015
Fluoranthene	mg/L	0.00004
Fluorene	mg/L	0.003
Naphthalene	mg/L	0.0011
Phenanthrene	mg/L	0.0004
Pyrene	mg/L	0.000025
Quinoline	mg/L	0.0034

1 - MWQSOG and CCME guidelines are the same for these parameters.

Table A1-8. Manitoba and CCME guidelines for the protection of aquatic life for pesticides.

Parameter	Unit	MWQSOG			CCME Guidelines		
		MWQG	Short-term	Long-term	CWQG	Short-term	Long-term
Aldrin	µg/L	-	-	-	-	-	0.004
alpha-BHC	µg/L	0.01 [1]	-	-	-	-	0.01 [1]
beta-BHC	µg/L	0.01 [1]	-	-	-	-	0.01 [1]
gamma-hexachlorocyclohexane	µg/L	0.01 [1]	-	-	-	-	0.01 [1]
delta-BHC	µg/L	0.01 [1]	-	-	-	-	0.01 [1]
a-chlordane	µg/L	-	-	-	-	-	0.006 [2]
g-chlordane	µg/L	-	-	-	-	-	0.006 [2]
Endosulfan	µg/L	-	0.06	0.003	-	0.06	0.003
Hexachlorobutadiene	µg/L	1.3	-	-	1.3	-	-
Bromoxynil	mg/L	0.005	-	-	-	-	0.005
2,4-D	mg/L	-	-	-	-	-	0.004
Dicamba	mg/L	0.01	-	-	-	-	0.01
Dinoseb	mg/L	0.00005	-	-	-	-	0.00005
MCPA	mg/L	0.0026	-	-	-	-	0.0026
Picloram	mg/L	0.029	-	-	-	-	0.029
Atrazine	µg/L	1.8 [3]	-	-	-	-	1.8
Atrazine+N-Dealkylated Metabolites	µg/L	1.8 [3]	-	-	-	-	-
Glyphosate	µg/L	65	-	-	-	27000	800
Diclofop-methyl	mg/L	0.0061	-	-	-	-	0.0061
Triallate	mg/L	0.00024	-	-	-	-	0.00024
Trifluralin	mg/L	0.00020	-	-	-	-	0.0002

APPENDIX 2. QUALITY ASSURANCE / QUALITY CONTROL RESULTS

Table A2-1. QA/QC results for routine parameters. Percent relative standard deviation (PRSD) values greater than 18 are indicated in red bold. Results for all blanks are less than five times the analytical detection limit. Values in blue italics are considered suspect.

				Alkalinity				Nitrogen			
Waterbody	Sampling Date	Site ID	ALS ID	Total Alkalinity as $CaCO_3$ (mg/L)	Bicarbonate, HCO_3 (mg/L)	Carbonate, CO_3 (mg/L)	Hydroxide, OH (mg/L)	Total Ammonia (mg N/L)	Nitrate (mg N/L)	Nitrite (mg N/L)	Nitrate/ nitrite (mg N/L)
Analytical DL				*1.0*	*1.2*	*0.60*	*0.34*	*0.010*	*0.0050 /0.010*	*0.0010 /0.0020*	*0.0051 /0.010*
Replicates											
Mercer Creek	1-Sep-20	MC-WB	L2497954-4	188	230	<0.60	<0.34	0.030	<0.010	<0.0020	<0.010
		REP 2A	L2497954-8	189	230	<0.60	<0.34	0.031	<0.010	<0.0020	<0.010
		REP 2B	L2497954-9	192	234	<0.60	<0.34	0.031	<0.010	<0.0020	<0.010
		Mean		190	231	<0.60	<0.34	0.031	<0.010	<0.0020	<0.010
		SD		2.1	2.3	-	-	0.0006	-	-	-
		PRSD		1	1	-	-	-	-	-	-
Lake St. Martin	2-Sep-20	LSM1	L2498786-1	168	186	9.24	<0.34	<0.010	<0.010	<0.0020	<0.010
		REP-1A	L2498786-6	205	233	8.40	<0.34	<0.010	<0.010	<0.0020	<0.010
		REP-1B	L2498786-7	191	215	8.76	<0.34	<0.010	<0.010	<0.0020	<0.010
		Mean		188	211	8.80	<0.34	<0.010	<0.010	<0.0020	<0.010
		SD		18.7	23.7	0.421	-	-	-	-	-
		PRSD		10	11	5	-	-	-	-	-
Fairford River	13-Oct-20	FR1	L2516048-4	183	216	3.48	<0.34	<0.010	<0.010	<0.0020	<0.010
		REP-2A	L2516048-6	183	211	5.76	<0.34	<0.010	<0.010	<0.0020	<0.010
		REP-2B	L2516048-7	182	213	4.56	<0.34	0.010	<0.010	<0.0020	<0.010
		Mean		183	213	4.60	<0.34	<0.010	<0.010	<0.0020	<0.010
		SD		0.6	2.5	1.14	-	-	-	-	-
		PRSD		0	1	**25**	-	-	-	-	-

Table A2-1. Continued.

Waterbody	Sampling Date	Site ID	ALS ID	Alkalinity				Nitrogen			
				Total Alkalinity as $CaCO_3$ (mg/L)	Bicarbonate, HCO_3 (mg/L)	Carbonate, CO_3 (mg/L)	Hydroxide, OH (mg/L)	Total Ammonia (mg N/L)	Nitrate (mg N/L)	Nitrite (mg N/L)	Nitrate/ nitrite (mg N/L)
Lake Winnipeg	18-Mar-21	SB1	L2568772-3	138	165	1.68	<0.34	0.027	0.0236	0.0010	0.0246
		REP-1A	L2568772-5	138	164	2.16	<0.34	0.026	0.0275	<0.0010	0.0275
		REP-1B	L2568772-6	138	164	2.28	<0.34	0.026	0.0208	<0.0010	0.0208
		Mean		138	164	2.04	<0.34	0.0263	0.0240	<0.0010	0.0243
		SD		0.0	0.6	0.32	-	0.00058	0.00337	-	0.00336
		PRSD		0	0	16	-	-	-	-	14
Dauphin River	18-Mar-21	DR-B	L2568772-1	248	302	<0.60	<0.34	0.151	0.044	0.0026	0.046
		REP-2A	L2568772-7	248	295	3.60	<0.34	0.155	0.023	<0.0020	0.023
		REP-2B	L2568772-8	249	294	4.80	<0.34	0.141	0.021	<0.0020	0.021
		Mean		248	297	2.90	<0.34	0.149	0.029	<0.0020	0.030
		SD		0.6	4.36	2.33	-	0.0072	0.013	-	0.0139
		PRSD		0	1	-	-	5	-	-	-
Lake St. Martin	19-May-21	REP-2A	L2590206-6	180	207	6.12	<0.34	0.022	<0.0050	<0.0010	<0.0051
		REP-2B	L2590206-7	183	212	5.16	<0.34	0.032	<0.0050	<0.0010	<0.0051
		LSM4	L2590206-1	182	210	5.52	<0.34	0.017	<0.0050	<0.0010	<0.0051
		Mean		182	210	5.60	<0.34	0.024	<0.0050	<0.0010	<0.0051
		SD		1.5	2.5	0.485	-	0.0076	-	-	-
		PRSD		1	1	9	-	-	-	-	-
Fairford River	18-May-21	REP-1A	L2590207-4	181	207	6.96	<0.34	0.041	<0.010	<0.0020	<0.010
		REP-1B	L2590207-5	183	210	6.12	<0.34	0.038	<0.010	<0.0020	<0.010
		FR2	L2590207-2	182	208	6.72	<0.34	0.041	<0.010	<0.0020	<0.010
		Mean		182	208	6.60	<0.34	0.040	<0.010	<0.0020	<0.010
		SD		1.0	1.5	0.433	-	0.0017	-	-	-
		PRSD		1	1	7	-	-	-	-	-

Table A2-1. Continued.

Waterbody	Sampling Date	Site ID	ALS ID	Alkalinity				Nitrogen			
				Total Alkalinity as $CaCO_3$ (mg/L)	Bicarbonate, HCO_3 (mg/L)	Carbonate, CO_3 (mg/L)	Hydroxide, OH (mg/L)	Total Ammonia (mg N/L)	Nitrate (mg N/L)	Nitrite (mg N/L)	Nitrate/ nitrite (mg N/L)
Blanks											
Field Blanks	2-Sep-20	WB-1A	L2498786-5	<1.0	<1.2	<0.60	<0.34	<0.010	<0.0050	<0.0010	<0.0051
	3-Sep-20	WB-2A	L2498784-6	<1.0	<1.2	<0.60	<0.34	<0.010	<0.0050	<0.0010	<0.0051
	13-Oct-20	WB-2A	L2516048-8	1.6	2.0	<0.60	<0.34	<0.010	<0.0050	<0.0010	<0.0051
	15-Mar-21	WB-1A	L2567238-3	<1.0	<1.2	<0.60	<0.34	0.021	<0.0050	<0.0010	<0.0051
	18-Mar-21	WB-2A	L2568772-9	<1.0	<1.2	<0.60	<0.34	0.012	<0.0050	<0.0010	<0.0051
	18-May-21	WB-1A	L2590207-6	1.2	1.5	<0.60	<0.34	0.05	<0.0050	<0.0010	<0.0051
	19-May-21	WB-2A	L2590206-8	<1.0	<1.2	<0.60	<0.34	<0.010	<0.0050	<0.0010	<0.0051
Trip Blanks	2-Sep-20	WB-1B	L2498784-8	<1.0	<1.2	<0.60	<0.34	<0.010	<0.0050	<0.0010	<0.0051
	3-Sep-20	WB-2B	L2498784-7	<1.0	<1.2	<0.60	<0.34	<0.010	<0.0050	<0.0010	<0.0051
	13-Oct-20	WB-2B	L2516048-9	<1.0	<1.2	<0.60	<0.34	<0.010	<0.0050	<0.0010	<0.0051
	15-Mar-21	WB-1B	L2567238-4	<1.0	<1.2	<0.60	<0.34	<0.010	<0.0050	<0.0010	<0.0051
	18-Mar-21	WB-2B	L2568772-10	<1.0	<1.2	<0.60	<0.34	<0.010	<0.0050	<0.0010	<0.0051
	18-May-21	WB-1B	L2590207-7	1.0	1.2	<0.60	<0.34	<0.010	<0.0050	<0.0010	<0.0051
	19-May-21	WB-2B	L2590206-9	1.1	1.3	<0.60	<0.34	0.021	<0.0050	<0.0010	<0.0051

Table A2-1. Continued.

Waterbody	Sampling Date	Site ID			Phosphorus			Carbon			
			Total Kjeldahl Nitrogen (mg/L)	Total Nitrogen (mg/L)	Dissolved Phosphorus (mg/L)	Total Particulate Phosphorus (mg/L)	Total Phosphorus (mg/L)	Total Inorganic Carbon (mg/L)	Total Organic Carbon (mg/L)	Dissolved Organic Carbon (mg/L)	Total Carbon (mg/L)
Analytical DL			*0.20*	*0.20*	*0.0010 /0.0030*	*0.0028 /0.0042*	*0.0010 /0.0030*	*0.50*	*0.50*	*0.50*	*1.0*
Replicates											
Mercer Creek	1-Sep-20	MC-WB	1.18	1.18	0.0117	0.0264	0.0382	40.5	13.3	13.1	53.8
		REP 2A	1.13	1.13	0.0126	0.0267	0.0393	41.2	13.6	13.4	54.8
		REP 2B	1.13	1.13	0.0127	0.0254	0.0382	42.0	13.9	13.4	55.9
		Mean	1.15	1.15	0.0123	0.0262	0.0386	41.2	13.6	13.3	54.8
		SD	0.029	0.029	0.00055	0.00068	0.00064	0.75	0.30	0.17	1.05
		PRSD	3	3	4	3	2	2	2	1	2
Lake St. Martin	2-Sep-20	LSM1	1.30	1.30	0.0086	0.0162	0.0247	34.1	13.4	13.1	47.5
		REP-1A	1.29	1.29	0.0073	0.0181	0.0254	34.1	13.5	12.8	47.6
		REP-1B	1.27	1.27	0.0098	0.0163	0.0260	34.9	12.9	13.4	47.8
		Mean	1.29	1.29	0.0086	0.0169	0.0254	34.4	13.3	13.1	47.6
		SD	0.015	0.015	0.00125	0.00107	0.00065	0.46	0.32	0.30	0.15
		PRSD	1	1	15	-	3	1	2	2	0
Fairford River	13-Oct-20	FR1	1.41	1.41	0.0061	0.0314	0.0375	34.2	12.8	11.9	47.0
		REP-2A	1.17	1.17	0.0059	0.0274	0.0333	34.7	12.3	12.2	47.0
		REP-2B	1.59	1.59	0.0064	0.0284	0.0348	34.3	12.2	11.5	46.4
		Mean	1.39	1.39	0.0061	0.0291	0.0352	34.4	12.4	11.9	46.8
		SD	0.211	0.211	0.00025	0.00208	0.00213	0.26	0.32	0.35	0.35
		PRSD	15	15	4	7	6	1	3	3	1

Table A2-1. Continued.

Waterbody	Sampling Date	Site ID			Phosphorus			Carbon			
			Total Kjeldahl Nitrogen (mg/L)	Total Nitrogen (mg/L)	Dissolved Phosphorus (mg/L)	Total Particulate Phosphorus (mg/L)	Total Phosphorus (mg/L)	Total Inorganic Carbon (mg/L)	Total Organic Carbon (mg/L)	Dissolved Organic Carbon (mg/L)	Total Carbon (mg/L)
Lake Winnipeg	18-Mar-21	SB1	0.58	0.60	0.0183	0.0122	0.0305	31.6	9.4	9.30	41.1
		REP-1A	0.50	0.53	0.0180	0.0144	0.0324	30.6	9.34	9.22	39.9
		REP-1B	0.58	0.60	0.0202	0.0125	0.0326	31.6	9.15	9.27	40.8
		Mean	0.55	0.58	0.0188	0.0130	0.0318	31.3	9.31	9.26	40.6
		SD	0.046	0.040	0.00119	0.00119	0.00116	0.58	0.15	0.040	0.62
		PRSD	-	7	6	-	4	2	2	0	2
Dauphin River	18-Mar-21	DR-B	1.37	1.42	0.0105	0.0077	0.0182	59.0	15.9	15.8	74.9
		REP-2A	1.31	1.33	0.0105	0.0075	0.0180	54.2	16.2	15.8	70.5
		REP-2B	1.38	1.40	0.0123	0.0093	0.0215	57.7	15.8	16.0	73.5
		Mean	1.35	1.38	0.0111	0.0082	0.0199	57.0	16.0	15.9	73.0
		SD	0.038	0.047	0.00104	0.00099	0.00233	2.5	0.21	0.12	2.25
		PRSD	3	3	-	-	12	4	1	1	3
Lake St. Martin	19-May-21	REP-2A	1.23	1.23	0.008	0.0230	0.0305	37.0	14.4	14.0	51.3
		REP-2B	1.31	1.31	0.012	0.0160	0.0284	36.9	15.0	13.8	51.8
		LSM4	1.29	1.29	0.008	0.0185	0.0263	36.6	14.2	14.3	50.8
		Mean	1.28	1.28	0.009	0.0192	0.0284	36.8	14.5	14.0	51.3
		SD	0.042	0.042	0.0027	0.00355	0.00210	0.21	0.42	0.25	0.50
		PRSD	3	3	-	-	7	1	3	2	1
Fairford River	18-May-21	REP-1A	1.26	1.26	0.011	0.0253	0.0358	36.4	14.1	13.5	50.5
		REP-1B	1.29	1.29	0.006	0.0286	0.0350	36.5	14.0	13.6	50.4
		FR2	1.24	1.24	0.012	0.0190	0.0314	36.5	15.3	13.1	51.8
		Mean	1.26	1.26	0.010	0.0243	0.0341	36.5	14.5	13.4	50.9
		SD	0.025	0.025	0.00302	0.00488	0.00234	0.06	0.72	0.26	0.78
		PRSD	2	2	-	-	7	0	5	2	2

Table A2-1. Continued.

Waterbody	Sampling Date	Site ID			Phosphorus			Carbon			
			Total Kjeldahl Nitrogen (mg/L)	Total Nitrogen (mg/L)	Dissolved Phosphorus (mg/L)	Total Particulate Phosphorus (mg/L)	Total Phosphorus (mg/L)	Total Inorganic Carbon (mg/L)	Total Organic Carbon (mg/L)	Dissolved Organic Carbon (mg/L)	Total Carbon (mg/L)
Blanks											
Field Blanks	2-Sep-20	WB-1A	<0.20	<0.20	<0.0010	<0.0028	<0.0010	1.31	<0.50	<0.50	1.3
	3-Sep-20	WB-2A	<0.20	<0.20	<0.0010	<0.0028	<0.0010	0.64	<0.50	<0.50	<1.0
	13-Oct-20	WB-2A	<0.20	<0.20	<0.0010	<0.0028	<0.0010	0.66	<0.50	<0.50	<1.0
	15-Mar-21	WB-1A	<0.20	<0.20	<0.0010	<0.0028	<0.0010	<0.50	<0.50	<0.50	<1.0
	18-Mar-21	WB-2A	<0.20	<0.20	<0.0010	<0.0028	<0.0010	<0.50	<0.50	<0.50	<1.0
	18-May-21	WB-1A	<0.20	<0.20	<0.0010	<0.0028	<0.0010	<0.50	<0.50	<0.50	<1.0
	19-May-21	WB-2A	<0.20	<0.20	<0.0010	<0.0028	<0.0010	<0.50	<0.50	<0.50	<1.0
Trip Blanks	2-Sep-20	WB-1B	<0.20	<0.20	<0.0010	<0.0028	<0.0010	<0.50	<0.50	<0.50	<1.0
	3-Sep-20	WB-2B	<0.20	<0.20	<0.0010	<0.0028	<0.0010	<0.50	<0.50	<0.50	<1.0
	13-Oct-20	WB-2B	<0.20	<0.20	<0.0010	<0.0028	<0.0010	<0.50	<0.50	<0.50	<1.0
	15-Mar-21	WB-1B	<0.20	<0.20	<0.0010	<0.0028	<0.0010	<0.50	<0.50	<0.50	<1.0
	18-Mar-21	WB-2B	<0.20	<0.20	<0.0010	<0.0028	<0.0010	<0.50	<0.50	<0.50	<1.0
	18-May-21	WB-1B	<0.20	<0.20	<0.0010	<0.0028	<0.0010	<0.50	<0.50	<0.50	<1.0
	19-May-21	WB-2B	<0.20	<0.20	<0.0010	<0.0028	<0.0010	<0.50	<0.50	<0.50	<1.0

Table A2-1. Continued.

Waterbody	Sampling Date	Site ID	Routine Chemistry				Water Clarity			Algal Pigments	
			Laboratory pH (pH units)	Laboratory Conductivity (µmhos/cm)	Total Dissolved Solids (mg/L)	Hardness, as $CaCO_3$ (mg/L)	Total Suspended Solids (mg/L)	Turbidity (NTU)	True Colour (CU)	Chlorophyll a (µg/L)	Phaeophytin a (µg/L)
Analytical DL			*0.10*	*1*	*4.0/20*	*0.2*	*1.0*	*0.1*	*5.0*	*0.10*	*0.10*
Replicates											
Mercer Creek	1-Sep-20	MC-WB	8.06	1090	628	255	8.5	6.57	15.9	6.77	4.54
		REP 2A	8.07	1090	636	250	8.8	6.06	17.8	7.40	4.84
		REP 2B	8.03	1090	632	263	6.4	4.57	18.7	6.78	4.82
		Mean	8.05	1090	632	256	7.9	5.73	17.5	6.98	4.73
		SD	0.021	0.0	4.0	6.6	1.31	1.04	1.43	0.361	0.168
		PRSD	0	0	1	3	17	18	-	5	4
Lake St. Martin	2-Sep-20	LSM1	8.53	1050	618	234	17.8	11.7	5.0	8.00	2.09
		REP-1A	8.55	1040	597	237	16.6	11.5	6.5	7.39	1.82
		REP-1B	8.54	1050	620	241	17.5	11.4	5.8	7.97	2.38
		Mean	8.54	1047	612	237	17.3	11.5	5.8	7.79	2.10
		SD	0.010	5.8	12.7	3.5	0.62	0.15	0.75	0.344	0.280
		PRSD	0	1	2	1	4	1	-	4	13
Fairford River	13-Oct-20	FR1	8.30	1150	626	252	42.0	30.9	5.7	10.9	2.48
		REP-2A	8.35	1150	620	243	44.3	33.8	7.1	11.2	2.63
		REP-2B	8.34	1140	622	242	42.6	32.4	6.9	10.5	2.47
		Mean	8.33	1147	623	246	43.0	32.4	6.6	10.9	2.53
		SD	0.026	5.8	3.1	5.5	1.19	1.45	0.76	0.35	0.090
		PRSD	0	1	0	2	3	4	-	3	4

Table A2-1. Continued.

Waterbody	Sampling Date	Site ID	Routine Chemistry				Water Clarity			Algal Pigments	
			Laboratory pH (pH units)	Laboratory Conductivity (µmhos/cm)	Total Dissolved Solids (mg/L)	Hardness, as $CaCO_3$ (mg/L)	Total Suspended Solids (mg/L)	Turbidity (NTU)	True Colour (CU)	Chlorophyll a (µg/L)	Phaeophytin a (µg/L)
Lake Winnipeg	18-Mar-21	SB1	8.23	531	309	173	<1.0	4.72	7.3	9.25	2.48
		REP-1A	8.29	527	290	171	1.3	4.81	7.4	9.73	2.72
		REP-1B	8.30	532	291	174	1.4	4.61	8.1	9.53	2.67
		Mean	8.27	530	297	173	1.1	4.71	7.6	9.50	2.62
		SD	0.038	2.6	10.7	1.5	0.49	0.100	0.44	0.241	0.127
		PRSD	0	0	4	1	-	2	6	3	5
Dauphin River	18-Mar-21	DR-B	8.27	1540	851	351	1.6	1.33	<5.0	1.70	1.42
		REP-2A	8.30	1530	841	345	1.9	1.27	<5.0	1.77	1.51
		REP-2B	8.33	1530	808	346	2.2	1.29	<5.0	1.93	1.50
		Mean	8.30	1533	833	347	1.9	1.30	<5.0	1.80	1.48
		SD	0.030	5.8	22.5	3.2	0.3	0.03	-	0.118	0.049
		PRSD	0	0	3	1	16	2	-	7	3
Lake St. Martin	19-May-21	REP-2A	8.38	1120	587	260	8.4	4.95	<5.0	12.0	7.17
		REP-2B	8.38	1120	613	258	7.3	5.46	5.2	12.5	6.86
		LSM4	8.36	1120	559	263	7.9	5.08	6.2	5.96	3.44
		Mean	8.37	1120	586	260	7.9	5.16	<5.0	10.2	5.82
		SD	0.012	0.0	27.0	2.5	0.55	0.265	1.9	3.64	2.07
		PRSD	0	0	5	1	7	5	-	**36**	**36**
Fairford River	18-May-21	REP-1A	8.40	1170	662	263	15.5	10.7	<5.0	9.08	4.11
		REP-1B	8.38	1180	640	262	***83.6***	***36.2***	<5.0	***13.4***	***6.78***
		FR2	8.40	1160	640	263	16.8	8.08	<5.0	8.81	4.17
		Mean	8.39	1170	647	263	38.6	18.3	<5.0	10.4	5.02
		SD	0.012	10.0	12.7	0.6	38.9	15.5	-	2.58	1.52
		PRSD	0	1	2	0	**101**	**85**	-	**25**	**30**

Table A2-1. Continued.

Waterbody	Sampling Date	Site ID	Routine Chemistry				Water Clarity			Algal Pigments	
			Laboratory pH (pH units)	Laboratory Conductivity (µmhos/cm)	Total Dissolved Solids (mg/L)	Hardness, as $CaCO_3$ (mg/L)	Total Suspended Solids (mg/L)	Turbidity (NTU)	True Colour (CU)	Chlorophyll a (µg/L)	Phaeophytin a (µg/L)
Blanks											
Field Blanks	2-Sep-20	WB-1A	5.38	1.2	<4.0	<0.20	<1.0	<0.10	<5.0	<0.10	<0.10
	3-Sep-20	WB-2A	5.53	<1.0	<4.0	<0.20	<1.0	<0.10	<5.0	<0.10	<0.10
	13-Oct-20	WB-2A	6.06	3.3	<4.0	<0.20	<1.0	0.22	<5.0	<0.10	<0.10
	15-Mar-21	WB-1A	5.71	<1.0	4.1	<0.20	<1.0	<0.10	<5.0	<0.10	<0.10
	18-Mar-21	WB-2A	5.75	<1.0	<4.0	<0.20	<1.0	<0.10	<5.0	<0.10	<0.10
	18-May-21	WB-1A	5.65	<1.0	<4.0	<0.20	<1.0	<0.10	<5.0	<0.10	<0.10
	19-May-21	WB-2A	5.58	<1.0	<4.0	<0.20	<1.0	<0.10	<5.0	<0.10	<0.10
Trip Blanks	2-Sep-20	WB-1B	5.45	<1.0	<4.0	<0.20	<1.0	<0.10	<5.0	<0.10	0.20
	3-Sep-20	WB-2B	5.45	<1.0	<4.0	<0.20	<1.0	<0.10	<5.0	<0.10	0.11
	13-Oct-20	WB-2B	5.85	1.2	<4.0	<0.20	<1.0	<0.10	<5.0	<0.10	<0.10
	15-Mar-21	WB-1B	5.67	<1.0	<4.0	<0.20	<1.0	<0.10	<5.0	<0.10	<0.10
	18-Mar-21	WB-2B	5.65	<1.0	<4.0	<0.20	<1.0	<0.10	<5.0	<0.10	<0.10
	18-May-21	WB-1B	5.45	<1.0	<4.0	<0.20	<1.0	<0.10	<5.0	<0.10	<0.10
	19-May-21	WB-2B	5.44	<1.0	<4.0	<0.20	<1.0	<0.10	<5.0	<0.10	<0.10

Table A2-2. QA/QC results for metals and major ions (mg/L). Percent relative standard deviation (PRSD) values greater than 18 are indicated in red bold. Results for all blanks are less than five times the analytical detection limit.

Waterbody	Sampling Date	Site ID	ALS ID	Aluminum (Al)		Antimony (Sb)		Arsenic (As)		Barium (Ba)	
				Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Analytical DL				*0.0010*	*0.0030*	*0.00010*	*0.00010*	*0.00010*	*0.00010*	*0.00010*	*0.00010*
Replicates											
Mercer Creek	1-Sep-20	MC-WB	L2497954-4	0.0037	0.0804	0.00015	0.00016	0.00215	0.00215	0.0442	0.0449
		REP 2A	L2497954-8	0.0050	0.0727	0.00021	0.00018	0.00215	0.00213	0.0452	0.0455
		REP 2B	L2497954-9	0.0032	0.0526	0.00017	0.00018	0.00209	0.00215	0.0461	0.0454
		Mean		0.0040	0.0686	0.00018	0.00017	0.00213	0.00214	0.0452	0.0453
		SD		0.00093	0.0144	0.000031	0.000012	0.000035	0.000012	0.00095	0.00032
		PRSD		-	**21**	-	-	2	1	2	1
Lake St. Martin	2-Sep-20	LSM1	L2498786-1	0.0038	0.0947	0.00016	0.00018	0.00226	0.00225	0.0383	0.0411
		REP-1A	L2498786-6	0.0040	0.0941	0.00016	0.00018	0.00230	0.00222	0.0377	0.0402
		REP-1B	L2498786-7	0.0045	0.0982	0.00017	0.00025	0.00235	0.00231	0.0378	0.0408
		Mean		0.0041	0.0957	0.00016	0.00020	0.00230	0.00226	0.0379	0.0407
		SD		0.00036	0.00221	0.000006	0.000040	0.000045	0.000046	0.00032	0.00046
		PRSD		-	2	-	-	2	2	1	1
Fairford River	13-Oct-20	FR1	L2516048-4	0.0086	0.220	0.00019	0.00021	0.00206	0.00213	0.0442	0.0475
		REP-2A	L2516048-6	0.0143	0.220	0.00019	0.00020	0.00205	0.00220	0.0450	0.0471
		REP-2B	L2516048-7	0.0155	0.206	0.00019	0.00020	0.00208	0.00219	0.0450	0.0479
		Mean		0.0128	0.215	0.00019	0.00020	0.00206	0.00217	0.0447	0.0475
		SD		0.00369	0.00808	0.000000	0.000006	0.000015	0.000038	0.00046	0.00040
		PRSD		**29**	4	-	-	1	2	1	1

Table A2-2. Continued.

Waterbody	Sampling Date	Site ID	ALS ID	Aluminum (Al)		Antimony (Sb)		Arsenic (As)		Barium (Ba)	
				Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Analytical DL				*0.0010*	*0.0030*	*0.00010*	*0.00010*	*0.00010*	*0.00010*	*0.00010*	*0.00010*
Lake Winnipeg	18-Mar-21	SB1	L2568772-3	0.0362	0.224	0.00016	0.00023	0.00192	0.00188	0.0422	0.0446
		REP-1A	L2568772-5	0.0345	0.219	0.00015	0.00050	0.00184	0.00187	0.0421	0.0441
		REP-1B	L2568772-6	0.0379	0.209	0.00023	0.00053	0.00181	0.00188	0.0426	0.0440
		Mean		0.0362	0.217	0.00018	0.00042	0.00186	0.00188	0.0423	0.0442
		SD		0.00170	0.0076	0.000044	0.000165	0.000057	0.000006	0.000265	0.00032
		PRSD		5	4	-	-	3	0	1	1
Dauphin River	18-Mar-21	DR-B	L2568772-1	0.0021	0.0115	0.00024	0.00028	0.00261	0.00244	0.0568	0.0579
		REP-2A	L2568772-7	0.0013	0.0117	0.00026	0.00026	0.00238	0.00240	0.0575	0.0568
		REP-2B	L2568772-8	<0.0010	0.0121	0.00022	0.00027	0.00241	0.00245	0.0582	0.0575
		Mean		0.0013	0.0118	0.00024	0.00027	0.00247	0.00243	0.0575	0.0574
		SD		0.00080	0.00031	0.000020	0.000010	0.000125	0.000026	0.000700	0.00056
		PRSD		-	3	-	4	5	1	1	1
Lake St. Martin	19-May-21	REP-2A	L2590206-6	0.0033	0.057	0.00017	0.0002	0.00204	0.0020	0.0424	0.044
		REP-2B	L2590206-7	0.0030	0.061	0.00017	0.0002	0.00208	0.0020	0.0426	0.045
		LSM4	L2590206-1	0.0033	0.068	0.00020	0.0002	0.00208	0.0021	0.0427	0.045
		Mean		0.0032	0.062	0.0002	0.0002	0.00207	0.0020	0.0426	0.045
		SD		0.00017	0.0054	0.00002	0.00001	0.000023	0.00004	0.00015	0.0004
		PRSD		-	9	-	6	1	2	0	1
Fairford River	18-May-21	REP-1A	L2590207-4	0.0025	0.179	0.00017	0.00020	0.00187	0.0019	0.0411	0.045
		REP-1B	L2590207-5	0.0024	0.179	0.00017	0.00019	0.00195	0.0020	0.0413	0.046
		FR2	L2590207-2	0.0022	0.134	0.00017	0.00019	0.00198	0.0020	0.0415	0.044
		Mean		0.0024	0.164	0.00017	0.00019	0.00193	0.0020	0.0413	0.045
		SD		0.00015	0.0260	0.000000	0.000006	0.000057	0.00004	0.00020	0.0007
		PRSD		-	16	-	3	3	2	0	2

Table A2-2. Continued.

Waterbody	Sampling Date	Site ID	ALS ID	Aluminum (Al)		Antimony (Sb)		Arsenic (As)		Barium (Ba)	
				Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Analytical DL				*0.0010*	*0.0030*	*0.00010*	*0.00010*	*0.00010*	*0.00010*	*0.00010*	*0.00010*
Blanks											
Field Blanks	2-Sep-20	WB-1A	L2498786-5	<0.0010	<0.0030	<0.00010	<0.00010	<0.00010	0.00011	<0.00010	<0.00010
	3-Sep-20	WB-2A	L2498784-6	<0.0010	<0.0030	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	13-Oct-20	WB-2A	L2516048-8	<0.0010	<0.0030	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	15-Mar-21	WB-1A	L2567238-3	<0.0010	<0.0030	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	18-Mar-21	WB-2A	L2568772-9	<0.0010	<0.0030	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	18-May-21	WB-1A	L2590207-6	<0.0010	<0.0030	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	19-May-21	WB-2A	L2590206-8	<0.0010	<0.0030	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Trip Blanks	2-Sep-20	WB-1B	L2498784-8	<0.0010	<0.0030	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	3-Sep-20	WB-2B	L2498784-7	<0.0010	<0.0030	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	2-Sep-20	WB-1B	L2498784-8	<0.0010	<0.0030	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	13-Oct-20	WB-2B	L2516048-9	<0.0010	<0.0030	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	15-Mar-21	WB-1B	L2567238-4	<0.0010	<0.0030	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	18-Mar-21	WB-2B	L2568772-10	<0.0010	<0.0030	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	18-May-21	WB-1B	L2590207-7	<0.0010	<0.0030	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	19-May-21	WB-2B	L2590206-9	<0.0010	<0.0030	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

Table A2-2. Continued.

Waterbody	Sampling Date	Site ID	Beryllium (Be)		Bismuth (Bi)		Boron (B)		Cadmium (Cd)	
			Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Analytical DL			*0.00010*	*0.00010*	*0.000050*	*0.000050*	*0.010*	*0.010*	*0.0000050*	*0.0000050*
Replicates										
Mercer Creek	1-Sep-20	MC-WB	<0.00010	<0.00010	<0.000050	<0.000050	0.096	0.085	<0.0000050	<0.0000050
		REP 2A	<0.00010	<0.00010	<0.000050	<0.000050	0.090	0.080	<0.0000050	<0.0000050
		REP 2B	<0.00010	<0.00010	<0.000050	<0.000050	0.091	0.084	<0.0000050	<0.0000050
		Mean	<0.00010	<0.00010	<0.000050	<0.000050	0.092	0.083	<0.0000050	<0.0000050
		SD	-	-	-	-	0.0032	0.0026	-	-
		PRSD	-	-	-	-	3	3	-	-
Lake St. Martin	2-Sep-20	LSM1	<0.00010	<0.00010	<0.000050	<0.000050	0.088	0.089	<0.0000050	<0.0000050
		REP-1A	<0.00010	<0.00010	<0.000050	<0.000050	0.094	0.085	<0.0000050	<0.0000050
		REP-1B	<0.00010	<0.00010	<0.000050	<0.000050	0.094	0.091	<0.0000050	<0.0000050
		Mean	<0.00010	<0.00010	<0.000050	<0.000050	0.092	0.088	<0.0000050	<0.0000050
		SD	-	-	-	-	0.0035	0.0031	-	-
		PRSD	-	-	-	-	4	3	-	-
Fairford River	13-Oct-20	FR1	<0.00010	<0.00010	<0.000050	<0.000050	0.113	0.110	<0.0000050	0.0000090
		REP-2A	<0.00010	<0.00010	<0.000050	<0.000050	0.112	0.110	<0.0000050	0.0000058
		REP-2B	<0.00010	<0.00010	<0.000050	<0.000050	0.111	0.113	<0.0000050	0.0000105
		Mean	<0.00010	<0.00010	<0.000050	<0.000050	0.112	0.111	<0.0000050	0.0000084
		SD	-	-	-	-	0.0010	0.0017	-	0.00000240
		PRSD	-	-	-	-	1	2	-	-

Table A2-2. Continued.

Waterbody	Sampling Date	Site ID	Beryllium (Be)		Bismuth (Bi)		Boron (B)		Cadmium (Cd)	
			Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Analytical DL			*0.00010*	*0.00010*	*0.000050*	*0.000050*	*0.010*	*0.010*	*0.0000050*	*0.0000050*
Lake Winnipeg	18-Mar-21	SB1	<0.00010	<0.00010	<0.000050	<0.000050	0.045	0.049	<0.0000050	0.0000066
		REP-1A	<0.00010	<0.00010	<0.000050	<0.000050	0.044	0.046	<0.0000050	<0.0000050
		REP-1B	<0.00010	<0.00010	<0.000050	<0.000050	0.048	0.046	0.0000073	0.0000079
		Mean	<0.00010	<0.00010	<0.000050	<0.000050	0.0457	0.047	<0.0000050	0.0000057
		SD	-	-	-	-	0.0021	0.0017	-	0.0000028
		PRSD	-	-	-	-	5	4	-	-
Dauphin River	18-Mar-21	DR-B	<0.00010	<0.00010	<0.000050	<0.000050	0.135	0.142	<0.0000050	0.0000056
		REP-2A	<0.00010	<0.00010	<0.000050	<0.000050	0.155	0.145	0.0000057	<0.0000050
		REP-2B	<0.00010	<0.00010	<0.000050	<0.000050	0.158	0.144	<0.0000050	<0.0000050
		Mean	<0.00010	<0.00010	<0.000050	<0.000050	0.149	0.144	<0.0000050	<0.0000050
		SD	-	-	-	-	0.0125	0.0015	-	-
		PRSD	-	-	-	-	8	1	-	-
Lake St. Martin	19-May-21	REP-2A	<0.00010	<0.00010	<0.000050	<0.000050	0.106	0.099	<0.0000050	<0.0000050
		REP-2B	<0.00010	<0.00010	<0.000050	<0.000050	0.105	0.098	<0.0000050	<0.0000050
		LSM4	<0.00010	<0.00010	<0.000050	<0.000050	0.103	0.100	<0.0000050	0.0000063
		Mean	<0.00010	<0.00010	<0.000050	<0.000050	0.105	0.099	<0.0000050	<0.0000050
		SD	-	-	-	-	0.0015	0.0010	-	-
		PRSD	-	-	-	-	1	1	-	-
Fairford River	18-May-21	REP-1A	<0.00010	<0.00010	<0.000050	<0.000050	0.112	0.111	<0.0000050	0.0000074
		REP-1B	<0.00010	<0.00010	<0.000050	<0.000050	0.109	0.113	<0.0000050	0.0000063
		FR2	<0.00010	<0.00010	<0.000050	<0.000050	0.108	0.113	<0.0000050	0.0000062
		Mean	<0.00010	<0.00010	<0.000050	<0.000050	0.110	0.112	<0.0000050	0.0000066
		SD	-	-	-	-	0.0021	0.0012	-	0.0000007
		PRSD	-	-	-	-	2	1	-	10

Table A2-2. Continued.

Waterbody	Sampling Date	Site ID	Beryllium (Be)		Bismuth (Bi)		Boron (B)		Cadmium (Cd)	
			Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Analytical DL			*0.00010*	*0.00010*	*0.000050*	*0.000050*	*0.010*	*0.010*	*0.0000050*	*0.0000050*
Blanks										
Field Blanks	2-Sep-20	WB-1A	<0.00010	<0.00010	<0.000050	<0.000050	<0.010	<0.010	<0.0000050	<0.0000050
	3-Sep-20	WB-2A	<0.00010	<0.00010	<0.000050	<0.000050	<0.010	<0.010	<0.0000050	<0.0000050
	13-Oct-20	WB-2A	<0.00010	<0.00010	<0.000050	<0.000050	<0.010	<0.010	<0.0000050	<0.0000050
	15-Mar-21	WB-1A	<0.00010	<0.00010	<0.000050	<0.000050	<0.010	<0.010	<0.0000050	<0.0000050
	18-Mar-21	WB-2A	<0.00010	<0.00010	<0.000050	<0.000050	<0.010	0.011	<0.0000050	<0.0000050
	18-May-21	WB-1A	<0.00010	<0.00010	<0.000050	<0.000050	<0.010	<0.010	<0.0000050	<0.0000050
	19-May-21	WB-2A	<0.00010	<0.00010	<0.000050	<0.000050	<0.010	<0.010	<0.0000050	<0.0000050
Trip Blanks	2-Sep-20	WB-1B	<0.00010	<0.00010	<0.000050	<0.000050	<0.010	<0.010	<0.0000050	<0.0000050
	3-Sep-20	WB-2B	<0.00010	<0.00010	<0.000050	<0.000050	<0.010	<0.010	<0.0000050	<0.0000050
	2-Sep-20	WB-1B	<0.00010	<0.00010	<0.000050	<0.000050	<0.010	<0.010	<0.0000050	<0.0000050
	13-Oct-20	WB-2B	<0.00010	<0.00010	<0.000050	<0.000050	<0.010	<0.010	<0.0000050	<0.0000050
	15-Mar-21	WB-1B	<0.00010	<0.00010	<0.000050	<0.000050	<0.010	<0.010	<0.0000050	<0.0000050
	18-Mar-21	WB-2B	<0.00010	<0.00010	<0.000050	<0.000050	<0.010	<0.010	<0.0000050	<0.0000050
	18-May-21	WB-1B	<0.00010	<0.00010	<0.000050	<0.000050	<0.010	<0.010	<0.0000050	<0.0000050
	19-May-21	WB-2B	<0.00010	<0.00010	<0.000050	<0.000050	<0.010	<0.010	<0.0000050	<0.0000050

Table A2-2. Continued.

Waterbody	Sampling Date	Site ID	Calcium (Ca)		Cesium (Cs)		Chloride (Cl)	Chromium (Cr)		Cobalt (Co)	
			Dissolved	Total	Dissolved	Total	Dissolved	Dissolved	Total	Dissolved	Total
Analytical DL			*0.05*	*0.050*	*0.000010*	*0.000010*	*0.10/0.20*	*0.00010*	*0.00010*	*0.00010*	*0.00010*
Replicates											
Mercer Creek	1-Sep-20	MC-WB	38.9	39.3	<0.000010	<0.000010	200	<0.00010	0.00021	<0.00010	<0.00010
		REP 2A	37.9	39.0	<0.000010	<0.000010	201	<0.00010	0.00018	<0.00010	<0.00010
		REP 2B	40.1	40.2	<0.000010	<0.000010	199	<0.00010	0.00014	<0.00010	<0.00010
		Mean	39.0	39.5	<0.000010	<0.000010	200	<0.00010	0.00018	<0.00010	<0.00010
		SD	1.10	0.62	-	-	1.0	-	0.000035	-	-
		PRSD	3	2	-	-	1	-	-	-	-
Lake St. Martin	2-Sep-20	LSM1	33.8	36.4	<0.000010	0.000010	198	<0.00010	0.00025	<0.00010	0.00012
		REP-1A	33.9	35.5	<0.000010	0.000012	200	<0.00010	0.00020	<0.00010	0.00010
		REP-1B	33.7	35.1	<0.000010	0.000028	200	<0.00010	0.00025	<0.00010	0.00012
		Mean	33.8	35.7	<0.000010	0.000017	199	<0.00010	0.00023	<0.00010	0.00011
		SD	0.10	0.67	-	0.0000099	1.2	-	0.000029	-	0.000012
		PRSD	0	2	-	-	1	-	-	-	-
Fairford River	13-Oct-20	FR1	44.3	44.8	<0.000010	0.000033	205	<0.00010	0.00053	<0.00010	0.00018
		REP-2A	42.4	44.2	<0.000010	0.000030	206	<0.00010	0.00049	<0.00010	0.00018
		REP-2B	41.4	45.7	<0.000010	0.000029	206	<0.00010	0.00046	<0.00010	0.00018
		Mean	42.7	44.9	<0.000010	0.000031	206	<0.00010	0.00049	<0.00010	0.00018
		SD	1.47	0.75	-	0.0000021	0.6	-	0.000035	-	0.000000
		PRSD	3	2	-	-	0	-	-	-	-

Table A2-2. Continued.

Waterbody	Sampling Date	Site ID	Calcium (Ca)		Cesium (Cs)		Chloride (Cl)	Chromium (Cr)		Cobalt (Co)	
			Dissolved	Total	Dissolved	Total	Dissolved	Dissolved	Total	Dissolved	Total
Analytical DL			*0.05*	*0.050*	*0.000010*	*0.000010*	*0.10/0.20*	*0.00010*	*0.00010*	*0.00010*	*0.00010*
Lake Winnipeg	18-Mar-21	SB1	33.4	36.4	<0.000010	0.000012	49.9	<0.00010	0.00025	<0.00010	<0.00010
		REP-1A	32.7	35.7	<0.000010	0.000013	47.6	<0.00010	0.00026	<0.00010	<0.00010
		REP-1B	34.3	35.0	<0.000010	0.000013	51.4	<0.00010	0.00023	<0.00010	<0.00010
		Mean	33.5	35.7	<0.000010	0.000013	49.6	<0.00010	0.00025	<0.00010	<0.00010
		SD	0.80	0.70	-	0.0000006	1.91	-	0.000015	-	-
		PRSD	2	2	-	-	4	-	6	-	-
Dauphin River	18-Mar-21	DR-B	55.8	56.9	<0.000010	<0.000010	265	<0.00010	<0.00010	<0.00010	<0.00010
		REP-2A	55.4	57.7	<0.000010	<0.000010	267	<0.00010	<0.00010	<0.00010	<0.00010
		REP-2B	56.3	56.5	<0.000010	<0.000010	267	<0.00010	<0.00010	<0.00010	<0.00010
		Mean	55.8	57.0	<0.000010	<0.000010	266	<0.00010	<0.00010	<0.00010	<0.00010
		SD	0.45	0.61	-	-	1.15	-	-	-	-
		PRSD	1	1	-	-	0.4	-	-	-	-
Lake St. Martin	19-May-21	REP-2A	40.7	40.0	<0.000010	<0.000010	195	<0.00010	0.00010	<0.00010	<0.00010
		REP-2B	40.6	39.7	<0.000010	<0.000010	201	<0.00010	0.00013	<0.00010	<0.00010
		LSM4	41.5	40.6	<0.000010	<0.000010	196	<0.00010	0.00018	<0.00010	<0.00010
		Mean	40.9	40.1	<0.000010	<0.000010	197	<0.00010	0.00014	<0.00010	<0.00010
		SD	0.49	0.46	-	-	3.2	-	0.000040	-	-
		PRSD	1	1	-	-	2	-	-	-	-
Fairford River	18-May-21	REP-1A	41.5	45.0	<0.000010	0.000028	219	<0.00010	0.00045	<0.00010	0.00016
		REP-1B	40.4	45.1	<0.000010	0.000028	221	<0.00010	0.00044	<0.00010	0.00015
		FR2	41.2	44.4	<0.000010	0.000020	217	<0.00010	0.00033	<0.00010	0.00013
		Mean	41.0	44.8	<0.000010	0.000025	219	<0.00010	0.00041	<0.00010	0.00015
		SD	0.57	0.38	-	0.0000046	2.0	-	0.000067	-	0.0000153
		PRSD	1	1	-	-	1	-	-	-	-

Table A2-2. Continued.

Waterbody	Sampling Date	Site ID	Calcium (Ca)		Cesium (Cs)		Chloride (Cl)	Chromium (Cr)		Cobalt (Co)	
			Dissolved	Total	Dissolved	Total	Dissolved	Dissolved	Total	Dissolved	Total
Analytical DL			*0.05*	*0.050*	*0.000010*	*0.000010*	*0.10/0.20*	*0.00010*	*0.00010*	*0.00010*	*0.00010*
Blanks											
Field Blanks	2-Sep-20	WB-1A	<0.050	0.066	<0.000010	<0.000010	<0.10	<0.00010	<0.00010	<0.00010	<0.00010
	3-Sep-20	WB-2A	<0.050	<0.050	<0.000010	<0.000010	<0.10	<0.00010	<0.00010	<0.00010	<0.00010
	13-Oct-20	WB-2A	<0.050	<0.050	<0.000010	<0.000010	<0.10	<0.00010	<0.00010	<0.00010	<0.00010
	15-Mar-21	WB-1A	<0.050	<0.050	<0.000010	<0.000010	<0.10	<0.00010	<0.00010	<0.00010	<0.00010
	18-Mar-21	WB-2A	<0.050	<0.050	<0.000010	<0.000010	<0.10	<0.00010	<0.00010	<0.00010	<0.00010
	18-May-21	WB-1A	<0.050	<0.050	<0.000010	<0.000010	<0.10	<0.00010	<0.00010	<0.00010	<0.00010
	19-May-21	WB-2A	<0.050	<0.050	<0.000010	<0.000010	<0.10	<0.00010	<0.00010	<0.00010	<0.00010
Trip Blanks	2-Sep-20	WB-1B	<0.050	<0.050	<0.000010	<0.000010	<0.10	<0.00010	0.00014	<0.00010	<0.00010
	3-Sep-20	WB-2B	<0.050	<0.050	<0.000010	<0.000010	<0.10	<0.00010	<0.00010	<0.00010	<0.00010
	2-Sep-20	WB-1B	<0.050	<0.050	<0.000010	<0.000010	<0.10	<0.00010	0.00014	<0.00010	<0.00010
	13-Oct-20	WB-2B	<0.050	<0.050	<0.000010	<0.000010	<0.10	<0.00010	<0.00010	<0.00010	<0.00010
	15-Mar-21	WB-1B	<0.050	<0.050	<0.000010	<0.000010	0.14	<0.00010	<0.00010	<0.00010	<0.00010
	18-Mar-21	WB-2B	<0.050	<0.050	<0.000010	<0.000010	<0.10	<0.00010	<0.00010	<0.00010	<0.00010
	18-May-21	WB-1B	<0.050	<0.050	<0.000010	<0.000010	<0.10	<0.00010	<0.00010	<0.00010	<0.00010
	19-May-21	WB-2B	<0.050	<0.050	<0.000010	<0.000010	<0.10	<0.00010	<0.00010	<0.00010	<0.00010

Table A2-2. Continued.

Waterbody	Sampling Date	Site ID	Copper (Cu)		Fluoride (F)	Iron (Fe)		Lead (Pb)		Lithium (Li)	
			Dissolved	Total	Dissolved	Dissolved	Total	Dissolved	Total	Dissolved	Total
Analytical DL			*0.00020*	*0.00050*		*0.010*	*0.010*	*0.000050*	*0.000050*	*0.0010*	*0.0010*
Replicates											
Mercer Creek	1-Sep-20	MC-WB	0.00020	<0.00050	0.154	<0.010	0.068	<0.000050	0.000101	0.0351	0.0309
		REP 2A	0.00021	<0.00050	0.155	<0.010	0.070	<0.000050	0.000094	0.0322	0.0308
		REP 2B	<0.00020	<0.00050	0.152	<0.010	0.047	<0.000050	0.000083	0.0326	0.0314
		Mean	<0.00020	<0.00050	0.154	<0.010	0.062	<0.000050	0.000093	0.0333	0.0310
		SD	0.000007	-	0.0015	-	0.0127	-	0.0000091	0.00157	0.00032
		PRSD	-	-	1	-	-	-	10	5	1
Lake St. Martin	2-Sep-20	LSM1	0.00026	<0.00050	0.156	<0.010	0.082	<0.000050	0.000201	0.0322	0.0325
		REP-1A	0.00026	<0.00050	0.160	<0.010	0.079	<0.000050	0.000198	0.0343	0.0312
		REP-1B	0.00026	<0.00050	0.158	<0.010	0.085	<0.000050	0.000223	0.0344	0.0328
		Mean	0.00026	<0.00050	0.158	<0.010	0.082	<0.000050	0.000207	0.0336	0.0322
		SD	0.000000	-	0.0020	-	0.0030	-	0.0000137	0.00124	0.00085
		PRSD	-	-	1	-	4	-	7	4	3
Fairford River	13-Oct-20	FR1	0.00032	0.00071	0.159	<0.010	0.246	<0.000050	0.000364	0.0387	0.0364
		REP-2A	0.00031	0.00067	0.160	<0.010	0.235	<0.000050	0.000348	0.0390	0.0368
		REP-2B	0.00033	0.00069	0.080	<0.010	0.232	<0.000050	0.000356	0.0383	0.0379
		Mean	0.00032	0.00069	0.133	<0.010	0.238	<0.000050	0.000356	0.0387	0.0370
		SD	0.000010	0.000020	0.046	-	0.0074	-	0.0000080	0.00035	0.00078
		PRSD	-	-	-	-	3	-	2	1	2

Table A2-2. Continued.

Waterbody	Sampling Date	Site ID	Copper (Cu)		Fluoride (F)	Iron (Fe)		Lead (Pb)		Lithium (Li)	
			Dissolved	Total	Dissolved	Dissolved	Total	Dissolved	Total	Dissolved	Total
Analytical DL			*0.00020*	*0.00050*	*0.020*	*0.010*	*0.010*	*0.000050*	*0.000050*	*0.0010*	*0.0010*
Lake Winnipeg	18-Mar-21	SB1	0.00147	0.00193	0.132	<0.010	0.098	<0.000050	0.000077	0.016	0.0181
		REP-1A	0.00137	0.00177	0.132	<0.010	0.101	<0.000050	0.000078	0.0156	0.0172
		REP-1B	0.00156	0.00179	0.129	<0.010	0.098	<0.000050	0.000096	0.0165	0.0172
		Mean	0.00147	0.00183	0.131	<0.010	0.099	<0.000050	0.000084	0.0160	0.0175
		SD	0.000095	0.000087	0.0017	-	0.0017	-	0.0000107	0.00045	0.00052
		PRSD	6	-	1	-	2	-	-	3	3
Dauphin River	18-Mar-21	DR-B	0.00038	0.00057	0.218	<0.010	0.013	<0.000050	<0.000050	0.0454	0.0481
		REP-2A	0.00036	0.00080	0.224	<0.010	0.013	<0.000050	0.000054	0.0465	0.0509
		REP-2B	0.00037	<0.00050	0.212	<0.010	0.013	<0.000050	<0.000050	0.0485	0.0495
		Mean	0.00037	0.00054	0.218	<0.010	0.013	<0.000050	<0.000050	0.0468	0.0495
		SD	0.000010	0.000276	0.0060	-	0.000	-	-	0.00157	0.00140
		PRSD	-	-	3	-	-	-	-	3	3
Lake St. Martin	19-May-21	REP-2A	0.00032	<0.00050	0.162	<0.010	0.043	<0.000050	0.000110	0.0341	0.0333
		REP-2B	0.00033	<0.00050	0.166	<0.010	0.047	<0.000050	0.000119	0.0339	0.0318
		LSM4	0.00079	0.00072	0.163	<0.010	0.046	<0.000050	0.000122	0.0333	0.0340
		Mean	0.00048	<0.00050	0.164	<0.010	0.045	<0.000050	0.000117	0.0338	0.0330
		SD	0.000269	-	0.0021	-	0.0021	-	0.000006	0.00042	0.00112
		PRSD	-	-	1	-	-	-	5	1	3
Fairford River	18-May-21	REP-1A	0.00050	0.00086	0.156	<0.010	0.215	<0.000050	0.000198	0.0365	0.0381
		REP-1B	0.00040	0.00073	0.154	<0.010	0.220	<0.000050	0.000248	0.0358	0.0389
		FR2	0.00037	0.00067	0.160	<0.010	0.159	<0.000050	0.000169	0.0363	0.0378
		Mean	0.00042	0.00075	0.157	<0.010	0.198	<0.000050	0.000205	0.0362	0.0383
		SD	0.000068	0.00010	0.0031	-	0.0339	-	0.0000400	0.00036	0.00057
		PRSD	-	13	2	-	17	-	-	1	1

Table A2-2. Continued.

Waterbody	Sampling Date	Site ID	Copper (Cu)		Fluoride (F)	Iron (Fe)		Lead (Pb)		Lithium (Li)	
			Dissolved	Total	Dissolved	Dissolved	Total	Dissolved	Total	Dissolved	Total
Analytical DL			*0.00020*	*0.00050*		*0.010*	*0.010*	*0.000050*	*0.000050*	*0.0010*	*0.0010*
Blanks											
Field Blanks	2-Sep-20	WB-1A	<0.00020	<0.00050	<0.020	<0.010	<0.010	<0.000050	<0.000050	<0.0010	<0.0010
	3-Sep-20	WB-2A	<0.00020	<0.00050	<0.020	<0.010	<0.010	<0.000050	<0.000050	<0.0010	<0.0010
	13-Oct-20	WB-2A	<0.00020	<0.00050	<0.020	<0.010	<0.010	<0.000050	<0.000050	<0.0010	<0.0010
	15-Mar-21	WB-1A	<0.00020	<0.00050	<0.020	<0.010	<0.010	<0.000050	<0.000050	<0.0010	<0.0010
	18-Mar-21	WB-2A	<0.00020	<0.00050	<0.020	<0.010	<0.010	<0.000050	<0.000050	<0.0010	<0.0010
	18-May-21	WB-1A	<0.00020	<0.00050	<0.020	<0.010	<0.010	<0.000050	<0.000050	<0.0010	<0.0010
	19-May-21	WB-2A	<0.00020	<0.00050	<0.020	<0.010	<0.010	<0.000050	<0.000050	<0.0010	<0.0010
Trip Blanks	2-Sep-20	WB-1B	<0.00020	<0.00050	<0.020	<0.010	<0.010	<0.000050	<0.000050	<0.0010	<0.0010
	3-Sep-20	WB-2B	<0.00020	<0.00050	<0.020	<0.010	<0.010	<0.000050	<0.000050	<0.0010	<0.0010
	2-Sep-20	WB-1B	<0.00020	<0.00050	<0.020	<0.010	<0.010	<0.000050	<0.000050	<0.0010	<0.0010
	13-Oct-20	WB-2B	<0.00020	<0.00050	<0.020	<0.010	<0.010	<0.000050	<0.000050	<0.0010	<0.0010
	15-Mar-21	WB-1B	<0.00020	<0.00050	<0.020	<0.010	<0.010	<0.000050	<0.000050	<0.0010	<0.0010
	18-Mar-21	WB-2B	<0.00020	<0.00050	<0.020	<0.010	<0.010	<0.000050	<0.000050	<0.0010	<0.0010
	18-May-21	WB-1B	<0.00020	<0.00050	<0.020	<0.010	<0.010	<0.000050	<0.000050	<0.0010	<0.0010
	19-May-21	WB-2B	<0.00020	<0.00050	<0.020	<0.010	<0.010	<0.000050	<0.000050	<0.0010	<0.0010

Table A2-2. Continued.

Waterbody	Sampling Date	Site ID	Magnesium (Mg)		Manganese (Mn)		Mercury (Hg)		Molybdenum (Mo)	
			Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Analytical DL			*0.0050*	*0.0050*	*0.00010*	*0.00010*	*0.0000005*	*0.0000005*	*0.000050*	*0.000050*
Replicates										
Mercer Creek	1-Sep-20	MC-WB	38.3	38.9	0.00038	0.00759	<0.00000050	0.00000056	0.00218	0.00219
		REP 2A	37.8	38.8	<0.00010	0.00769	<0.00000050	0.00000060	0.00223	0.00219
		REP 2B	39.5	39.0	<0.00010	0.00726	<0.00000050	0.00000064	0.00210	0.00219
		Mean	38.5	38.9	0.00016	0.00751	<0.00000050	0.00000060	0.00217	0.00219
		SD	0.9	0.10	-	0.000225	-	0.00000004	0.000066	0.000000
		PRSD	2	0	-	3	-	-	3	0
Lake St. Martin	2-Sep-20	LSM1	36.4	36.3	<0.00010	0.00915	<0.00000050	0.00000081	0.00232	0.00229
		REP-1A	37.0	34.5	<0.00010	0.00891	<0.00000050	0.00000078	0.00234	0.00228
		REP-1B	38.0	36.7	<0.00010	0.00933	<0.00000050	0.00000082	0.00231	0.00238
		Mean	37.1	35.8	<0.00010	0.00913	<0.00000050	0.00000080	0.00232	0.00232
		SD	0.8	1.17	-	0.000211	-	0.00000002	0.000015	0.000055
		PRSD	2	3	-	2	-	-	1	2
Fairford River	13-Oct-20	FR1	34.4	39.8	0.00013	0.0161	<0.00000050	0.00000105	0.00228	0.00241
		REP-2A	33.3	40.4	0.00011	0.0156	<0.00000050	0.00000114	0.00221	0.00233
		REP-2B	33.6	40.2	<0.00010	0.0161	<0.00000050	0.00000116	0.00222	0.00240
		Mean	33.8	40.1	<0.00010	0.0159	<0.00000050	0.00000112	0.00224	0.00238
		SD	0.6	0.31	0.000042	0.00029	-	0.00000006	0.000038	0.000044
		PRSD	2	1	-	2	-	-	2	2

Table A2-2. Continued.

Waterbody	Sampling Date	Site ID	Magnesium (Mg)		Manganese (Mn)		Mercury (Hg)		Molybdenum (Mo)	
			Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Analytical DL			*0.0050*	*0.0050*	*0.00010*	*0.00010*	*0.0000005*	*0.0000005*	*0.000050*	*0.000050*
Lake Winnipeg	18-Mar-21	SB1	21.8	22.3	<0.00010	0.00142	<0.00000050	0.00000066	0.00121	0.00123
		REP-1A	21.6	21.5	<0.00010	0.00137	<0.00000050	0.00000072	0.00118	0.00123
		REP-1B	21.5	21	<0.00010	0.00146	<0.00000050	0.00000132	0.00122	0.00124
		Mean	21.6	21.6	<0.00010	0.00142	<0.00000050	0.00000090	0.00120	0.00123
		SD	0.15	0.66	-	0.000045	-	0.000000365	0.000021	0.000006
		PRSD	1	3	-	3	-	-	2	0
Dauphin River	18-Mar-21	DR-B	51.5	51.3	0.00010	0.00558	<0.00000050	<0.00000050	0.00275	0.00285
		REP-2A	50.2	49.8	0.00013	0.00556	<0.00000050	<0.00000050	0.00280	0.00277
		REP-2B	49.8	50.2	<0.00010	0.00547	<0.00000050	<0.00000050	0.00280	0.00279
		Mean	50.5	50.4	<0.00010	0.00554	<0.00000050	<0.00000050	0.00278	0.00280
		SD	0.89	0.78	-	0.000059	-	-	0.000029	0.000042
		PRSD	2	2	-	1	-	-	1	1
Lake St. Martin	19-May-21	REP-2A	38.6	38.1	0.00015	0.00694	<0.00000050	0.00000057	0.00231	0.00223
		REP-2B	38.1	38.2	0.00011	0.00735	<0.00000050	<0.00000050	0.00227	0.00225
		LSM4	38.7	38.9	0.00011	0.00705	<0.00000050	0.00000063	0.00227	0.00228
		Mean	38.5	38.4	0.00012	0.00711	<0.00000050	<0.00000050	0.00228	0.00225
		SD	0.32	0.44	0.000023	0.000212	-	0.000000204	0.000023	0.000025
		PRSD	1	1	-	3	-	-	1	1
Fairford River	18-May-21	REP-1A	38.7	40.5	<0.00010	0.0110	0.00000067	0.00000080	0.00217	0.00220
		REP-1B	39.1	41.0	0.00011	0.0108	<0.00000050	0.00000076	0.0022	0.00226
		FR2	39.0	40.2	<0.00010	0.0089	<0.00000050	0.00000082	0.00218	0.00222
		Mean	38.9	40.6	<0.00010	0.0102	<0.00000050	0.00000079	0.00218	0.00223
		SD	0.21	0.40	-	0.00115	-	0.000000031	0.000015	0.000031
		PRSD	1	1	-	11	-	-	1	1

Table A2-2. Continued.

Waterbody	Sampling Date	Site ID	Magnesium (Mg)		Manganese (Mn)		Mercury (Hg)		Molybdenum (Mo)	
			Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Analytical DL			*0.0050*	*0.0050*	*0.00010*	*0.00010*	*0.0000005*	*0.0000005*	*0.000050*	*0.000050*
Blanks										
Field Blanks	2-Sep-20	WB-1A	<0.0050	<0.0050	<0.00010	<0.00010	<0.0000005	<0.00000050	<0.000050	<0.000050
	3-Sep-20	WB-2A	<0.0050	<0.0050	<0.00010	<0.00010	<0.0000005	<0.00000050	<0.000050	<0.000050
	13-Oct-20	WB-2A	<0.0050	<0.0050	<0.00010	<0.00010	<0.0000005	<0.00000050	<0.000050	<0.000050
	15-Mar-21	WB-1A	<0.0050	0.0064	<0.00010	<0.00010	<0.0000005	<0.00000050	<0.000050	<0.000050
	18-Mar-21	WB-2A	<0.0050	0.0085	<0.00010	<0.00010	<0.0000005	<0.00000050	<0.000050	<0.000050
	18-May-21	WB-1A	<0.0050	<0.0050	<0.00010	<0.00010	<0.0000005	<0.00000050	<0.000050	<0.000050
	19-May-21	WB-2A	<0.0050	<0.0050	<0.00010	<0.00010	<0.0000005	<0.00000050	<0.000050	<0.000050
Trip Blanks	2-Sep-20	WB-1B	<0.0050	<0.0050	<0.00010	<0.00010	<0.0000005	<0.00000050	<0.000050	<0.000050
	3-Sep-20	WB-2B	<0.0050	0.0051	<0.00010	<0.00010	<0.0000005	<0.00000050	<0.000050	<0.000050
	2-Sep-20	WB-1B	<0.0050	<0.0050	<0.00010	<0.00010	<0.0000005	<0.00000050	<0.000050	<0.000050
	13-Oct-20	WB-2B	<0.0050	<0.0050	<0.00010	<0.00010	<0.0000005	<0.00000050	<0.000050	<0.000050
	15-Mar-21	WB-1B	<0.0050	<0.0050	<0.00010	<0.00010	<0.0000005	<0.00000050	<0.000050	<0.000050
	18-Mar-21	WB-2B	<0.0050	<0.0050	<0.00010	<0.00010	<0.0000005	<0.00000050	<0.000050	<0.000050
	18-May-21	WB-1B	<0.0050	0.0057	<0.00010	<0.00010	<0.0000005	<0.00000050	<0.000050	<0.000050
	19-May-21	WB-2B	<0.0050	<0.0050	<0.00010	<0.00010	<0.0000005	<0.00000050	<0.000050	<0.000050

Table A2-2. Continued.

Waterbody	Sampling Date	Site ID	Nickel (Ni)		Potassium (K)		Rubidium (Rb)		Selenium (Se)	
			Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Analytical DL			*0.00050*	*0.00050*	*0.050*	*0.050*	*0.00020*	*0.00020*	*0.000050*	*0.000050*
Replicates										
Mercer Creek	1-Sep-20	MC-WB	<0.00050	0.00069	9.90	9.89	0.00403	0.00401	0.000078	<0.000050
		REP 2A	0.00052	0.00063	10.1	10.1	0.00403	0.00406	0.000105	<0.000050
		REP 2B	0.00052	0.00063	9.94	10.0	0.00411	0.00399	0.000069	<0.000050
		Mean	<0.00050	0.00065	9.98	10.0	0.00406	0.00402	0.000084	<0.000050
		SD	0.000156	0.000035	0.106	0.11	0.000046	0.000036	0.0000187	-
		PRSD	-	-	1	1	1	1	-	-
Lake St. Martin	2-Sep-20	LSM1	<0.00050	0.00071	9.45	9.45	0.00427	0.00440	0.000076	0.000076
		REP-1A	<0.00050	0.00065	9.87	9.62	0.00410	0.00427	0.000073	0.000080
		REP-1B	<0.00050	0.00072	10.0	9.79	0.00423	0.00438	0.000079	0.000102
		Mean	<0.00050	0.00069	9.77	9.6	0.00420	0.00435	0.000076	0.000086
		SD	-	0.000038	0.287	0.17	0.000089	0.000070	0.0000030	0.0000140
		PRSD	-	-	3	2	2	2	-	-
Fairford River	13-Oct-20	FR1	0.00053	0.00109	10.4	10.3	0.00409	0.00451	0.000092	0.000101
		REP-2A	0.00051	0.00104	9.63	10.4	0.00402	0.00448	0.000058	0.000109
		REP-2B	<0.00050	0.00104	10.2	10.6	0.00406	0.00448	0.000056	0.000086
		Mean	<0.00050	0.00106	10.1	10.4	0.00406	0.00449	0.000069	0.000099
		SD	0.000156	0.000029	0.40	0.15	0.000035	0.000017	0.0000202	0.0000117
		PRSD	-	-	4	1	1	0	-	-

Table A2-2. Continued.

Waterbody	Sampling Date	Site ID	Nickel (Ni)		Potassium (K)		Rubidium (Rb)		Selenium (Se)	
			Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Analytical DL			*0.00050*	*0.00050*	*0.050*	*0.050*	*0.00020*	*0.00020*	*0.000050*	*0.000050*
Lake Winnipeg	18-Mar-21	SB1	0.00088	0.00114	4.8	4.83	0.00185	0.00214	0.000143	0.000135
		REP-1A	0.00085	0.00109	4.8	4.65	0.00174	0.00207	0.000162	0.000147
		REP-1B	0.00088	0.00105	4.9	4.66	0.00183	0.00196	0.000141	0.000091
		Mean	0.00087	0.00109	4.8	4.71	0.00181	0.00206	0.000149	0.000124
		SD	0.000017	0.000045	0.07	0.101	0.000059	0.0000907	0.0000116	0.0000295
		PRSD	2	4	1	2	3	4	-	-
Dauphin River	18-Mar-21	DR-B	0.00071	0.00081	13.2	13.1	0.00514	0.00510	0.000081	0.000097
		REP-2A	0.00070	0.00077	13.5	12.9	0.00525	0.00523	0.000154	0.000129
		REP-2B	0.00067	0.00085	13.6	13.0	0.00532	0.00512	0.000080	0.000101
		Mean	0.00069	0.00081	13.4	13.0	0.00524	0.00515	0.000105	0.000109
		SD	0.000021	0.000040	0.21	0.10	0.000091	0.000070	0.0000424	0.0000174
		PRSD	3	5	2	1	2	1	-	-
Lake St. Martin	19-May-21	REP-2A	0.00057	0.00072	10.3	10.3	0.00379	0.00392	0.000071	0.000054
		REP-2B	0.00054	0.00086	10.3	10.5	0.00387	0.00418	0.000061	0.000068
		LSM4	0.00058	0.00076	10.1	10.3	0.00391	0.00411	0.000081	<0.000050
		Mean	0.00056	0.00078	10.2	10.4	0.00386	0.00407	0.000071	<0.000050
		SD	0.000021	0.000072	0.12	0.12	0.000061	0.000135	0.0000100	-
		PRSD	4	9	1	1	2	3	-	-
Fairford River	18-May-21	REP-1A	0.00060	0.00102	10.5	10.3	0.0039	0.00446	0.000077	0.000094
		REP-1B	0.00063	0.00100	10.5	10.4	0.00395	0.00445	0.000079	0.000100
		FR2	0.00062	0.00094	10.7	10.4	0.00391	0.00427	0.000091	0.000118
		Mean	0.00062	0.00099	10.6	10.4	0.00392	0.00439	0.000082	0.000104
		SD	0.000015	0.000042	0.12	0.06	0.000026	0.000107	0.0000076	0.0000125
		PRSD	2	4	1	1	1	2	-	-

Table A2-2. Continued.

Waterbody	Sampling Date	Site ID	Nickel (Ni)		Potassium (K)		Rubidium (Rb)		Selenium (Se)	
			Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Analytical DL			*0.00050*	*0.00050*	*0.050*	*0.050*	*0.00020*	*0.00020*	*0.000050*	*0.000050*
Blanks										
Field Blanks	2-Sep-20	WB-1A	<0.00050	<0.00050	<0.050	<0.050	<0.00020	<0.00020	<0.000050	<0.000050
	3-Sep-20	WB-2A	<0.00050	<0.00050	<0.050	<0.050	<0.00020	<0.00020	<0.000050	<0.000050
	13-Oct-20	WB-2A	<0.00050	<0.00050	<0.050	<0.050	<0.00020	<0.00020	<0.000050	<0.000050
	15-Mar-21	WB-1A	<0.00050	<0.00050	<0.050	<0.050	<0.00020	<0.00020	<0.000050	<0.000050
	18-Mar-21	WB-2A	<0.00050	<0.00050	<0.050	<0.050	<0.00020	<0.00020	<0.000050	<0.000050
	18-May-21	WB-1A	<0.00050	<0.00050	<0.050	<0.050	<0.00020	<0.00020	<0.000050	<0.000050
	19-May-21	WB-2A	<0.00050	<0.00050	<0.050	<0.050	<0.00020	<0.00020	<0.000050	<0.000050
Trip Blanks	2-Sep-20	WB-1B	<0.00050	<0.00050	<0.050	<0.050	<0.00020	<0.00020	<0.000050	<0.000050
	3-Sep-20	WB-2B	<0.00050	<0.00050	<0.050	<0.050	<0.00020	<0.00020	<0.000050	<0.000050
	2-Sep-20	WB-1B	<0.00050	<0.00050	<0.050	<0.050	<0.00020	<0.00020	<0.000050	<0.000050
	13-Oct-20	WB-2B	<0.00050	<0.00050	<0.050	<0.050	<0.00020	<0.00020	<0.000050	<0.000050
	15-Mar-21	WB-1B	<0.00050	<0.00050	<0.050	<0.050	<0.00020	<0.00020	<0.000050	<0.000050
	18-Mar-21	WB-2B	<0.00050	<0.00050	<0.050	<0.050	<0.00020	<0.00020	<0.000050	<0.000050
	18-May-21	WB-1B	<0.00050	<0.00050	<0.050	<0.050	<0.00020	<0.00020	<0.000050	<0.000050
	19-May-21	WB-2B	<0.00050	<0.00050	<0.050	<0.050	<0.00020	<0.00020	<0.000050	<0.000050

Table A2-2. Continued.

Waterbody	Sampling Date	Site ID	Silicon (Si)		Silver (Ag)		Sodium (Na)		Strontium (Sr)		Sulphate (SO4)
			Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved
Analytical DL			*0.050*	*0.10*	*0.000010*	*0.000010*	*0.050*	*0.050*	*0.00010*	*0.00020*	*0.30/0.60*
Replicates											
Mercer Creek	1-Sep-20	MC-WB	3.88	4.04	<0.000010	<0.000010	133	127	0.257	0.257	97.5
		REP 2A	3.80	4.01	<0.000010	<0.000010	126	124	0.270	0.267	98.6
		REP 2B	3.70	3.80	<0.000010	<0.000010	126	127	0.258	0.258	97.6
		Mean	3.79	3.95	<0.000010	<0.000010	128	126	0.262	0.261	97.9
		SD	0.090	0.131	-	-	4.0	1.7	0.0072	0.0055	0.61
		PRSD	2	3	-	-	3	1	3	2	1
Lake St. Martin	2-Sep-20	LSM1	4.11	4.52	<0.000010	<0.000010	129	126	0.259	0.251	83.3
		REP-1A	4.26	4.36	<0.000010	<0.000010	131	125	0.252	0.255	83.3
		REP-1B	4.21	4.52	<0.000010	<0.000010	134	128	0.253	0.257	83.2
		Mean	4.19	4.47	<0.000010	<0.000010	131	126	0.255	0.254	83.3
		SD	0.076	0.092	-	-	2.5	1.5	0.0038	0.0031	0.06
		PRSD	2	2	-	-	2	1	1	1	0
Fairford River	13-Oct-20	FR1	4.55	4.90	<0.000010	<0.000010	133	141	0.265	0.296	92.1
		REP-2A	4.47	4.96	<0.000010	<0.000010	129	147	0.256	0.287	92.7
		REP-2B	4.58	4.93	<0.000010	<0.000010	128	149	0.255	0.295	92.5
		Mean	4.53	4.93	<0.000010	<0.000010	130	146	0.259	0.293	92.4
		SD	0.057	0.030	-	-	2.6	4.2	0.0055	0.0049	0.31
		PRSD	1	1	-	-	2	3	2	2	0

Table A2-2. Continued.

Waterbody	Sampling Date	Site ID	Silicon (Si)		Silver (Ag)		Sodium (Na)		Strontium (Sr)		Sulphate (SO4)
			Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved
Analytical DL			*0.050*	*0.10*	*0.000010*	*0.000010*	*0.050*	*0.050*	*0.00010*	*0.00020*	*0.30/0.60*
Lake Winnipeg	18-Mar-21	SB1	2.56	2.84	<0.000010	<0.000010	40.3	41.7	0.174	0.173	55.5
		REP-1A	2.47	2.78	<0.000010	<0.000010	39.6	40.8	0.172	0.173	55.1
		REP-1B	2.39	2.86	<0.000010	<0.000010	39.1	40.4	0.172	0.177	53.5
		Mean	2.47	2.83	<0.000010	<0.000010	39.7	41.0	0.173	0.174	54.7
		SD	0.085	0.042	-	-	0.60	0.67	0.0012	0.0023	1.06
		PRSD	3	1	-	-	2	2	1	1	2
Dauphin River	18-Mar-21	DR-B	5.15	5.20	<0.000010	<0.000010	186	187	0.379	0.397	119
		REP-2A	4.83	5.09	<0.000010	<0.000010	174	185	0.390	0.382	118
		REP-2B	4.95	5.20	<0.000010	<0.000010	177	185	0.383	0.384	115
		Mean	4.98	5.16	<0.000010	<0.000010	179	186	0.384	0.388	117
		SD	0.162	0.064	-	-	6.2	1.2	0.0056	0.0081	2.1
		PRSD	3	1	-	-	3	1	1	2	2
Lake St. Martin	19-May-21	REP-2A	1.37	1.49	<0.000010	<0.000010	142	142	0.278	0.285	85.2
		REP-2B	1.36	1.58	<0.000010	<0.000010	142	140	0.281	0.292	87.5
		LSM4	1.33	1.52	<0.000010	<0.000010	141	140	0.282	0.292	85.1
		Mean	1.35	1.53	<0.000010	<0.000010	142	141	0.280	0.290	85.9
		SD	0.021	0.046	-	-	0.6	1.2	0.0021	0.0040	1.36
		PRSD	2	3	-	-	0	1	1	1	2
Fairford River	18-May-21	REP-1A	2.51	2.90	<0.000010	<0.000010	149	153	0.279	0.294	92.8
		REP-1B	2.47	2.98	<0.000010	<0.000010	148	153	0.284	0.300	93.4
		FR2	2.43	2.80	<0.000010	<0.000010	148	153	0.291	0.298	92.1
		Mean	2.47	2.89	<0.000010	<0.000010	148	153	0.285	0.297	92.8
		SD	0.040	0.090	-	-	0.6	0.0	0.0060	0.0031	0.65
		PRSD	2	3	-	-	0	0	2	1	1

Table A2-2. Continued.

Waterbody	Sampling Date	Site ID	Silicon (Si)		Silver (Ag)		Sodium (Na)		Strontium (Sr)		Sulphate (SO4)
			Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved
Analytical DL			*0.050*	*0.10*	*0.000010*	*0.000010*	*0.050*	*0.050*	*0.00010*	*0.00020*	*0.30/0.60*
Blanks											
Field Blanks	2-Sep-20	WB-1A	<0.050	<0.10	<0.000010	<0.000010	<0.050	<0.050	0.00027	0.00037	<0.30
	3-Sep-20	WB-2A	<0.050	<0.10	<0.000010	<0.000010	<0.050	<0.050	0.00015	<0.00020	<0.30
	13-Oct-20	WB-2A	<0.050	<0.10	<0.000010	<0.000010	<0.050	<0.050	<0.00010	<0.00020	<0.30
	15-Mar-21	WB-1A	0.083	<0.10	<0.000010	<0.000010	<0.050	<0.050	<0.00010	<0.00020	<0.30
	18-Mar-21	WB-2A	0.087	0.13	<0.000010	<0.000010	<0.050	<0.050	<0.00010	<0.00020	<0.30
	18-May-21	WB-1A	<0.050	<0.10	<0.000010	<0.000010	<0.050	<0.050	<0.00010	<0.00020	<0.30
	19-May-21	WB-2A	<0.050	<0.10	<0.000010	<0.000010	<0.050	<0.050	<0.00010	<0.00020	<0.30
Trip Blanks	2-Sep-20	WB-1B	<0.050	<0.10	<0.000010	<0.000010	<0.050	<0.050	<0.00010	<0.00020	<0.30
	3-Sep-20	WB-2B	<0.050	<0.10	<0.000010	<0.000010	<0.050	<0.050	<0.00010	<0.00020	<0.30
	2-Sep-20	WB-1B	<0.050	<0.10	<0.000010	<0.000010	<0.050	<0.050	<0.00010	<0.00020	<0.30
	13-Oct-20	WB-2B	<0.050	<0.10	<0.000010	<0.000010	<0.050	<0.050	<0.00010	<0.00020	<0.30
	15-Mar-21	WB-1B	0.086	0.11	<0.000010	<0.000010	<0.050	<0.050	<0.00010	<0.00020	<0.30
	18-Mar-21	WB-2B	0.078	0.13	<0.000010	<0.000010	<0.050	<0.050	<0.00010	<0.00020	<0.30
	18-May-21	WB-1B	<0.050	<0.10	<0.000010	<0.000010	0.143	0.208	<0.00010	<0.00020	<0.30
	19-May-21	WB-2B	<0.050	<0.10	<0.000010	<0.000010	<0.050	<0.050	<0.00010	<0.00020	<0.30

Table A2-2. Continued.

Waterbody	Sampling Date	Site ID	Sulphur (S)		Tellurium (Te)		Thallium (Tl)		Thorium (Th)	
			Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Analytical DL			*0.50*	*0.50*	*0.00020*	*0.00020*	*0.000010*	*0.000010*	*0.00010*	*0.00010*
Replicates										
Mercer Creek	1-Sep-20	MC-WB	31.7	31.6	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010
		REP 2A	30.3	31.6	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010
		REP 2B	29.7	31.6	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010
		Mean	30.6	31.6	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010
		SD	1.03	0.00	-	-	-	-	-	-
		PRSD	3	0	-	-	-	-	-	-
Lake St. Martin	2-Sep-20	LSM1	27.4	31.0	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010
		REP-1A	28.5	30.1	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010
		REP-1B	28.4	29.7	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010
		Mean	28.1	30.3	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010
		SD	0.61	0.67	-	-	-	-	-	-
		PRSD	2	2	-	-	-	-	-	-
Fairford River	13-Oct-20	FR1	33.3	33.7	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010
		REP-2A	34.0	33.8	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010
		REP-2B	33.4	34.5	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010
		Mean	33.6	34.0	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010
		SD	0.38	0.44	-	-	-	-	-	-
		PRSD	1	1	-	-	-	-	-	-

Table A2-2. Continued.

Waterbody	Sampling Date	Site ID	Sulphur (S)		Tellurium (Te)		Thallium (Tl)		Thorium (Th)	
			Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Analytical DL			*0.50*	*0.50*	*0.00020*	*0.00020*	*0.000010*	*0.000010*	*0.00010*	*0.00010*
Lake Winnipeg	18-Mar-21	SB1	20.1	20.7	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010
		REP-1A	19.6	20.3	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010
		REP-1B	18.4	20.6	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010
		Mean	19.4	20.5	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010
		SD	0.87	0.21	-	-	-	-	-	-
		PRSD	5	1	-	-	-	-	-	-
Dauphin River	18-Mar-21	DR-B	44.5	45	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010
		REP-2A	40.5	44.6	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010
		REP-2B	41.5	45.6	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010
		Mean	42.2	45.1	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010
		SD	2.08	0.50	-	-	-	-	-	-
		PRSD	5	1	-	-	-	-	-	-
Lake St. Martin	19-May-21	REP-2A	32.8	32.2	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010
		REP-2B	32.5	32.9	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010
		LSM4	31.9	32.8	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010
		Mean	32.4	32.6	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010
		SD	0.46	0.38	-	-	-	-	-	-
		PRSD	1	1	-	-	-	-	-	-
Fairford River	18-May-21	REP-1A	33.9	33.7	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010
		REP-1B	33.4	34.3	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010
		FR2	33.4	34.5	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010
		Mean	33.6	34.2	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010
		SD	0.29	0.42	-	-	-	-	-	-
		PRSD	1	1	-	-	-	-	-	-

Table A2-2. Continued.

Waterbody	Sampling Date	Site ID	Sulphur (S)		Tellurium (Te)		Thallium (Tl)		Thorium (Th)	
			Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Analytical DL			*0.50*	*0.50*	*0.00020*	*0.00020*	*0.000010*	*0.000010*	*0.00010*	*0.00010*
Blanks										
Field Blanks	2-Sep-20	WB-1A	<0.50	<0.50	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010
	3-Sep-20	WB-2A	<0.50	<0.50	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010
	13-Oct-20	WB-2A	<0.50	<0.50	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010
	15-Mar-21	WB-1A	<0.50	<0.50	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010
	18-Mar-21	WB-2A	<0.50	<0.50	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010
	18-May-21	WB-1A	<0.50	<0.50	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010
	19-May-21	WB-2A	<0.50	<0.50	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010
Trip Blanks	2-Sep-20	WB-1B	<0.50	<0.50	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010
	3-Sep-20	WB-2B	<0.50	<0.50	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010
	2-Sep-20	WB-1B	<0.50	<0.50	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010
	13-Oct-20	WB-2B	<0.50	0.68	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010
	15-Mar-21	WB-1B	<0.50	<0.50	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010
	18-Mar-21	WB-2B	<0.50	<0.50	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010
	18-May-21	WB-1B	<0.50	<0.50	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010
	19-May-21	WB-2B	<0.50	<0.50	<0.00020	<0.00020	<0.000010	<0.000010	<0.00010	<0.00010

Table A2-2. Continued.

Waterbody	Sampling Date	Site ID	Tin (Sn)		Titanium (Ti)		Tungsten (W)		Uranium (U)	
			Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Analytical DL			*0.00010*	*0.00010*	*0.00030*	*0.00030*	*0.00010*	*0.00010*	*0.000010*	*0.000010*
Replicates										
Mercer Creek	1-Sep-20	MC-WB	<0.00010	<0.00010	<0.00030	0.00354	<0.00010	<0.00010	0.00167	0.00160
		REP 2A	<0.00010	<0.00010	<0.00030	0.00306	<0.00010	<0.00010	0.00168	0.00160
		REP 2B	<0.00010	<0.00010	<0.00030	0.00214	<0.00010	<0.00010	0.00170	0.00162
		Mean	<0.00010	<0.00010	<0.00030	0.00291	<0.00010	<0.00010	0.00168	0.00161
		SD	-	-	-	0.000711	-	-	0.000015	0.000012
		PRSD	-	-	-	**24**	-	-	1	1
Lake St. Martin	2-Sep-20	LSM1	<0.00010	<0.00010	<0.00030	0.00373	<0.00010	<0.00010	0.00168	0.00171
		REP-1A	<0.00010	<0.00010	<0.00030	0.00386	<0.00010	<0.00010	0.00163	0.00169
		REP-1B	<0.00010	<0.00010	<0.00030	0.00437	<0.00010	<0.00010	0.00163	0.00173
		Mean	<0.00010	<0.00010	<0.00030	0.00399	<0.00010	<0.00010	0.00165	0.00171
		SD	-	-	-	0.000338	-	-	0.000029	0.000020
		PRSD	-	-	-	8	-	-	2	1
Fairford River	13-Oct-20	FR1	<0.00010	<0.00010	<0.00030	0.00988	<0.00010	<0.00010	0.00185	0.00178
		REP-2A	<0.00010	<0.00010	<0.00030	0.00968	<0.00010	<0.00010	0.00189	0.00178
		REP-2B	<0.00010	<0.00010	<0.00030	0.00910	<0.00010	<0.00010	0.00184	0.00178
		Mean	<0.00010	<0.00010	<0.00030	0.00955	<0.00010	<0.00010	0.00186	0.00178
		SD	-	-	-	0.000405	-	-	0.000026	0.000000
		PRSD	-	-	-	4	-	-	1	0

Table A2-2. Continued.

Waterbody	Sampling Date	Site ID	Tin (Sn)		Titanium (Ti)		Tungsten (W)		Uranium (U)	
			Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Analytical DL			*0.00010*	*0.00010*	*0.00030*	*0.00030*	*0.00010*	*0.00010*	*0.000010*	*0.000010*
Lake Winnipeg	18-Mar-21	SB1	<0.00010	<0.00010	0.00066	0.00466	<0.00010	<0.00010	0.00115	0.00119
		REP-1A	<0.00010	<0.00010	0.00059	0.00476	<0.00010	<0.00010	0.00110	0.00125
		REP-1B	<0.00010	<0.00010	0.00072	0.00475	<0.00010	<0.00010	0.00118	0.00119
		Mean	<0.00010	<0.00010	0.00066	0.00472	<0.00010	<0.00010	0.00114	0.00121
		SD	-	-	0.000065	0.000055	-	-	0.000040	0.000035
		PRSD	-	-	-	1	-	-	4	3
Dauphin River	18-Mar-21	DR-B	<0.00010	0.00013	<0.00030	0.00037	<0.00010	<0.00010	0.00218	0.00235
		REP-2A	<0.00010	<0.00010	<0.00030	0.00042	<0.00010	<0.00010	0.00221	0.00243
		REP-2B	<0.00010	<0.00010	<0.00030	0.00039	<0.00010	<0.00010	0.00220	0.00240
		Mean	<0.00010	<0.00010	<0.00030	0.00039	<0.00010	<0.00010	0.00220	0.00239
		SD	-	-	-	0.000025	-	-	0.000015	0.000040
		PRSD	-	-	-	6	-	-	1	2
Lake St. Martin	19-May-21	REP-2A	<0.00010	<0.00010	<0.00030	0.00178	<0.00010	<0.00010	0.0017	0.00163
		REP-2B	<0.00010	<0.00010	<0.00030	0.00204	<0.00010	<0.00010	0.00168	0.00168
		LSM4	<0.00010	<0.00010	<0.00030	0.00230	<0.00010	<0.00010	0.00166	0.00168
		Mean	<0.00010	<0.00010	<0.00030	0.00204	<0.00010	<0.00010	0.00168	0.00166
		SD	-	-	-	0.000260	-	-	0.00002	0.000029
		PRSD	-	-	-	13	-	-	1	2
Fairford River	18-May-21	REP-1A	<0.00010	<0.00010	<0.00030	0.00798	<0.00010	<0.00010	0.00166	0.00169
		REP-1B	<0.00010	<0.00010	<0.00030	0.00856	<0.00010	<0.00010	0.00167	0.00174
		FR2	<0.00010	<0.00010	<0.00030	0.00604	<0.00010	<0.00010	0.00168	0.00171
		Mean	<0.00010	<0.00010	<0.00030	0.00753	<0.00010	<0.00010	0.00167	0.00171
		SD	-	-	-	0.00132	-	-	0.00001	0.000025
		PRSD	-	-	-	18	-	-	1	1

Table A2-2. Continued.

Waterbody	Sampling Date	Site ID	Tin (Sn)		Titanium (Ti)		Tungsten (W)		Uranium (U)	
			Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Analytical DL			*0.00010*	*0.00010*	*0.00030*	*0.00030*	*0.00010*	*0.00010*	*0.000010*	*0.000010*
Blanks										
Field Blanks	2-Sep-20	WB-1A	<0.00010	<0.00010	<0.00030	<0.00030	<0.00010	<0.00010	<0.000010	<0.000010
	3-Sep-20	WB-2A	<0.00010	<0.00010	<0.00030	<0.00030	<0.00010	<0.00010	<0.000010	<0.000010
	13-Oct-20	WB-2A	<0.00010	<0.00010	<0.00030	<0.00030	<0.00010	<0.00010	<0.000010	<0.000010
	15-Mar-21	WB-1A	<0.00010	<0.00010	<0.00030	<0.00030	<0.00010	<0.00010	<0.000010	<0.000010
	18-Mar-21	WB-2A	<0.00010	<0.00010	<0.00030	<0.00030	<0.00010	<0.00010	<0.000010	<0.000010
	18-May-21	WB-1A	<0.00010	<0.00010	<0.00030	<0.00030	<0.00010	<0.00010	<0.000010	<0.000010
	19-May-21	WB-2A	<0.00010	<0.00010	<0.00030	<0.00030	<0.00010	<0.00010	<0.000010	<0.000010
Trip Blanks	2-Sep-20	WB-1B	<0.00010	<0.00010	<0.00030	<0.00030	<0.00010	<0.00010	<0.000010	<0.000010
	3-Sep-20	WB-2B	<0.00010	<0.00010	<0.00030	<0.00030	<0.00010	<0.00010	<0.000010	<0.000010
	2-Sep-20	WB-1B	<0.00010	<0.00010	<0.00030	<0.00030	<0.00010	<0.00010	<0.000010	<0.000010
	13-Oct-20	WB-2B	<0.00010	<0.00010	<0.00030	<0.00030	<0.00010	<0.00010	<0.000010	<0.000010
	15-Mar-21	WB-1B	<0.00010	<0.00010	<0.00030	<0.00030	<0.00010	<0.00010	<0.000010	<0.000010
	18-Mar-21	WB-2B	<0.00010	<0.00010	<0.00030	<0.00030	<0.00010	<0.00010	<0.000010	<0.000010
	18-May-21	WB-1B	<0.00010	<0.00010	<0.00030	<0.00030	<0.00010	<0.00010	<0.000010	<0.000010
	19-May-21	WB-2B	<0.00010	<0.00010	<0.00030	<0.00030	<0.00010	<0.00010	<0.000010	<0.000010

Table A2-2. Continued.

Waterbody	Sampling Date	Site ID	Vanadium (V)		Zinc (Zn)		Zirconium (Zr)	
			Dissolved	Total	Dissolved	Total	Dissolved	Total
Analytical DL			*0.00050*	*0.00050*	*0.0010*	*0.0030*	*0.00020*	*0.00020*
Replicates								
Mercer Creek	1-Sep-20	MC-WB	0.00130	0.00186	<0.0010	<0.0030	<0.00020	<0.00020
		REP 2A	0.00125	0.00179	<0.0010	<0.0030	<0.00020	<0.00020
		REP 2B	0.00123	0.00173	<0.0010	<0.0030	<0.00020	<0.00020
		Mean	0.00126	0.00179	<0.0010	<0.0030	<0.00020	<0.00020
		SD	0.000036	0.000065	-	-	-	-
		PRSD	-	-	-	-	-	-
Lake St. Martin	2-Sep-20	LSM1	0.00156	0.00217	<0.0010	<0.0030	<0.00020	<0.00020
		REP-1A	0.00161	0.00209	<0.0010	<0.0030	<0.00020	<0.00020
		REP-1B	0.00163	0.00225	<0.0010	<0.0030	<0.00020	<0.00020
		Mean	0.00160	0.00217	<0.0010	<0.0030	<0.00020	<0.00020
		SD	0.000036	0.000080	-	-	-	-
		PRSD	-	-	-	-	-	-
Fairford River	13-Oct-20	FR1	0.00126	0.00222	<0.0010	<0.0030	<0.00020	<0.00020
		REP-2A	0.00123	0.00222	<0.0010	<0.0030	<0.00020	<0.00020
		REP-2B	0.00125	0.00215	<0.0010	<0.0030	<0.00020	<0.00020
		Mean	0.00125	0.00220	<0.0010	<0.0030	<0.00020	<0.00020
		SD	0.000015	0.000040	-	-	-	-
		PRSD	-	-	-	-	-	-

Table A2-2. Continued.

Waterbody	Sampling Date	Site ID	Vanadium (V)		Zinc (Zn)		Zirconium (Zr)	
			Dissolved	Total	Dissolved	Total	Dissolved	Total
Analytical DL			*0.00050*	*0.00050*	*0.0010*	*0.0030*	*0.00020*	*0.00020*
Lake Winnipeg	18-Mar-21	SB1	0.00145	0.00176	<0.0010	<0.0030	<0.00020	<0.00020
		REP-1A	0.00143	0.00175	<0.0010	<0.0030	<0.00020	<0.00020
		REP-1B	0.00142	0.00168	<0.0010	<0.0030	<0.00020	<0.00020
		Mean	0.00143	0.00173	<0.0010	<0.0030	<0.00020	<0.00020
		SD	0.000015	0.000044	-	-	-	-
		PRSD	1	3	-	-	-	-
Dauphin River	18-Mar-21	DR-B	0.0012	0.00129	<0.0010	<0.0030	<0.00020	<0.00020
		REP-2A	0.00115	0.00131	<0.0010	<0.0030	<0.00020	<0.00020
		REP-2B	0.00115	0.00135	<0.0010	<0.0030	<0.00020	0.00026
		Mean	0.00117	0.00132	<0.0010	<0.0030	<0.00020	<0.00020
		SD	0.000029	0.000031	-	-	-	-
		PRSD	2	2	-	-	-	-
Lake St. Martin	19-May-21	REP-2A	0.0011	0.00144	<0.0010	<0.0030	<0.00020	<0.00020
		REP-2B	0.00113	0.00146	<0.0010	<0.0030	<0.00020	<0.00020
		LSM4	0.00112	0.00145	<0.0010	<0.0030	<0.00020	<0.00020
		Mean	0.00112	0.00145	<0.0010	<0.0030	<0.00020	<0.00020
		SD	0.00002	0.000010	-	-	-	-
		PRSD	1	1	-	-	-	-
Fairford River	18-May-21	REP-1A	0.00098	0.00163	<0.0010	<0.0030	<0.00020	<0.00020
		REP-1B	0.00096	0.00164	<0.0010	<0.0030	<0.00020	0.00024
		FR2	0.00095	0.00150	<0.0010	<0.0030	<0.00020	<0.00020
		Mean	0.00096	0.00159	<0.0010	<0.0030	<0.00020	<0.00020
		SD	0.00002	0.000078	-	-	-	-
		PRSD	2	5	-	-	-	-

Table A2-2. Continued.

Waterbody	Sampling Date	Site ID	Vanadium (V)		Zinc (Zn)		Zirconium (Zr)	
			Dissolved	Total	Dissolved	Total	Dissolved	Total
Analytical DL			*0.00050*	*0.00050*	*0.0010*	*0.0030*	*0.00020*	*0.00020*
Blanks								
Field Blanks	2-Sep-20	WB-1A	<0.00050	0.00051	<0.0010	<0.0030	<0.00020	<0.00020
	3-Sep-20	WB-2A	<0.00050	<0.00050	<0.0010	<0.0030	<0.00020	<0.00020
	13-Oct-20	WB-2A	<0.00050	<0.00050	<0.0010	<0.0030	<0.00020	<0.00020
	15-Mar-21	WB-1A	<0.00050	<0.00050	<0.0010	<0.0030	<0.00020	<0.00020
	18-Mar-21	WB-2A	<0.00050	<0.00050	<0.0010	<0.0030	<0.00020	<0.00020
	18-May-21	WB-1A	<0.00050	<0.00050	<0.0010	<0.0030	<0.00020	<0.00020
	19-May-21	WB-2A	<0.00050	<0.00050	<0.0010	<0.0030	<0.00020	<0.00020
Trip Blanks	2-Sep-20	WB-1B	<0.00050	<0.00050	<0.0010	<0.0030	<0.00020	<0.00020
	3-Sep-20	WB-2B	<0.00050	<0.00050	<0.0010	<0.0030	<0.00020	<0.00020
	2-Sep-20	WB-1B	<0.00050	<0.00050	<0.0010	<0.0030	<0.00020	<0.00020
	13-Oct-20	WB-2B	<0.00050	<0.00050	<0.0010	<0.0030	<0.00020	<0.00020
	15-Mar-21	WB-1B	<0.00050	<0.00050	<0.0010	<0.0030	<0.00020	<0.00020
	18-Mar-21	WB-2B	<0.00050	<0.00050	<0.0010	<0.0030	<0.00020	<0.00020
	18-May-21	WB-1B	<0.00050	<0.00050	<0.0010	<0.0030	<0.00020	<0.00020
	19-May-21	WB-2B	<0.00050	<0.00050	<0.0010	<0.0030	<0.00020	<0.00020

APPENDIX 3. RESULTS FOR ADDITIONAL PARAMETERS

Table A3-1. Laboratory results for additional parameters measured at selected sites in September 2020.

Parameter	Units	DL	BC-LSM L2497954-5 1-Sep-20	FR1 L2497954-6 1-Sep-20	DR-A L2497954-7 2-Sep-20
Escherichia Coli	MPN/100mL	1	9	308	2
Microcystin	µg/L	0.20	<0.20	<0.20	<0.20
Cyanobacteria cell count					
Anabaena (Cyanophyceae)	cells/mL	1	-	372	60
Aphanocapsa (Cyanophyceae)	cells/mL	1	-	29700	49500
Aphanothece (Cyanophyceae)	cells/mL	1	-	310	-
Chroococcus (Cyanophyceae)	cells/mL	1	-	336	64
Gomphosphaeria (Cyanophyceae)	cells/mL	1	-	1550	550
Merismopedia (Cyanophyceae)	cells/mL	1	-	31700	66500
Planktolyngbya (Cyanophyceae)	cells/mL	1	160	19800	7920
Planktothrix (Cyanophyceae)	cells/mL	1	30	-	60
Pseudanabaena (Cyanophyceae)	cells/mL	1	220	-	-
Other blue-greens	cells/mL	1	-	74300	233000
Total cyanobacterial cell count	cells/mL	1	410	158000	358000
Hydrocarbons					
Benzene	mg/L	0.00050	<0.00050	<0.00050	<0.00050
Ethyl benzene	mg/L	0.00050	<0.00050	<0.00050	<0.00050
Toluene	mg/L	0.0010	<0.0010	<0.0010	<0.0010
o-Xylene	mg/L	0.00050	<0.00050	<0.00050	<0.00050
m+p-Xylenes	mg/L	0.00040	<0.00040	<0.00040	<0.00040
Xylenes (Total)	mg/L	0.00064	<0.00064	<0.00064	<0.00064
F1 (C6-C10)	mg/L	0.10	<0.10	<0.10	<0.10
F1-BTEX	mg/L	0.10	<0.10	<0.10	<0.10
F2-Naphth	mg/L	0.10	<0.10	<0.10	<0.10
F2 (C10-C16)	mg/L	0.10	<0.10	<0.10	<0.10
F3-PAH	mg/L	0.25	<0.25	<0.25	<0.25
F3 (C16-C34)	mg/L	0.25	<0.25	<0.25	<0.25
F4 (C34-C50)	mg/L	0.25	<0.25	<0.25	<0.25
Total Hydrocarbons (C6-C50)	mg/L	0.38	<0.38	<0.38	<0.38
Acenaphthene	mg/L	0.000020	0.000034	<0.000020	<0.000020
Acenaphthylene	mg/L	0.000020	<0.000020	<0.000020	<0.000020
Acridine	mg/L	0.000020	<0.000020	<0.000020	<0.000020
Anthracene	mg/L	0.000010	<0.000010	<0.000010	<0.000010
Benzo(a)anthracene	mg/L	0.000010	<0.000010	<0.000010	<0.000010
Benzo(a)pyrene	mg/L	0.0000050	<0.0000050	<0.0000050	<0.0000050
Benzo(b&j)fluoranthene	mg/L	0.000010	<0.000010	<0.000010	<0.000010
Benzo(g,h,i)perylene	mg/L	0.000020	<0.000020	<0.000020	<0.000020
Benzo(k)fluoranthene	mg/L	0.000010	<0.000010	<0.000010	<0.000010

Table A3-1. continued.

Parameter	Units	DL	BC-LSM L2497954-5 1-Sep-20	FR1 L2497954-6 1-Sep-20	DR-A L2497954-7 2-Sep-20
Chrysene	mg/L	0.000020	<0.000020	<0.000020	<0.000020
Dibenzo(a,h)anthracene	mg/L	0.0000050	<0.0000050	<0.0000050	<0.0000050
Fluoranthene	mg/L	0.000020	<0.000020	<0.000020	<0.000020
Fluorene	mg/L	0.000020	<0.000020	<0.000020	<0.000020
Indeno(1,2,3-cd)pyrene	mg/L	0.000010	<0.000010	<0.000010	<0.000010
1-Methyl Naphthalene	mg/L	0.000020	<0.000020	<0.000020	<0.000020
2-Methyl Naphthalene	mg/L	0.000020	<0.000020	<0.000020	<0.000020
Naphthalene	mg/L	0.000050	<0.000050	<0.000050	<0.000050
Phenanthrene	mg/L	0.000050	<0.000050	<0.000050	<0.000050
Pyrene	mg/L	0.000010	<0.000010	<0.000010	<0.000010
Quinoline	mg/L	0.000020	<0.000020	<0.000020	<0.000020
B(a)P Total Potency Equivalent	mg/L	0.000030	<0.000030	<0.000030	<0.000030
Pesticides					
Aldrin	µg/L	0.0080	<0.0080	<0.0080	<0.0080
alpha-BHC	µg/L	0.0080	<0.0080	<0.0080	<0.0080
beta-BHC	µg/L	0.0080	<0.0080	<0.0080	<0.0080
gamma-hexachlorocyclohexane	µg/L	0.0080	<0.0080	<0.0080	<0.0080
delta-BHC	µg/L	0.0080	<0.0080	<0.0080	<0.0080
a-chlordane	µg/L	0.0080	<0.0080	<0.0080	<0.0080
g-chlordane	µg/L	0.0080	<0.0080	<0.0080	<0.0080
o,p-DDD	µg/L	0.0040	<0.0040	<0.0040	<0.0040
pp-DDD	µg/L	0.0040	<0.0040	<0.0040	<0.0040
o,p-DDE	µg/L	0.0040	<0.0040	<0.0040	<0.0040
pp-DDE	µg/L	0.0040	<0.0040	<0.0040	<0.0040
op-DDT	µg/L	0.0040	<0.0040	<0.0040	<0.0040
pp-DDT	µg/L	0.0040	<0.0040	<0.0040	<0.0040
Dieldrin	µg/L	0.0080	<0.0080	<0.0080	<0.0080
Endosulfan I	µg/L	0.0070	<0.0070	<0.0070	<0.0070
Endosulfan II	µg/L	0.0070	<0.0070	<0.0070	<0.0070
Diclofop-methyl	mg/L	0.00010	<0.00010	<0.00010	<0.00010
Triallate	mg/L	0.00010	<0.00010	<0.00010	<0.00010
Trifluralin	mg/L	0.00010	<0.00010	<0.00010	<0.00010