



CanNorth

Canada North Environmental Services Limited Partnership

A First Nation Environmental Services Company

**NUCLEAR WASTE MANAGEMENT ORGANIZATION
ADAPTIVE PHASED MANAGEMENT PROJECT – WABIGOON LAKE
OJIBWAY NATION-IGNACE AREA
ENVIRONMENTAL MEDIA BASELINE PROGRAM – YEAR 2 BASELINE
REPORT**

Final Report

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Prepared for:

Nuclear Waste Management Organization

Project No. 3260

November 2024



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Version	Date	Description of Revision	Prepared/Revised by
Final Report Version 1.0	November 1, 2024	Initial issue	• Canada North Environmental Services • Geosyntec Consultants International Inc.

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LIST OF ACRONYMS

<u>Term</u>	<u>Description</u>
ALS	Australian Laboratory Services
AMPA	Aminomethylphosphonic Acid
AOI	Area of Interest
APHA	American Public Health Association
APM	Adaptive Phased Management
BCMOE	British Columbia Ministry of Environment
BOD	Biochemical Oxygen Demand
BTEX	Benzene, Toluene, Ethylbenzene, and Xylene
CALA	Canadian Association for Laboratory Accreditation
CCME	Canadian Council of Ministers of the Environment
COPC	Contaminants of Potential Concern
CSQG	Canadian Sediment Quality Guideline
CWQG	Canadian Water Quality Guideline
DEM	Digital Elevation Model
DGR	Deep Geological Repository
DMP	Data Management Plan
DO	Dissolved Oxygen
DOC	Dissolved Organic Carbon
ECHA	European Chemicals Agency
<i>E. Coli</i>	<i>Escherichia coli</i>
EMBP	Environmental Media Baseline Program
EQG	Environmental Quality Standards
FEQG	Federal Environmental Quality Guideline
GA	Government of Alberta
GC	Government of Canada
GPS	Global Positioning System
IA	Impact Assessment
IK	Indigenous Knowledge

KGS	KGS Group Consulting Engineers
LEL	Lowest Effect Level
LPL	Lowest Practical Level
LSA/LSA _X	Local Study Area/Local Study Area for 'X' environmental component
MECP	Ontario Ministry of the Environment, Conservation and Parks (formerly Ontario Ministry of the Environment [MOE], formerly Ontario Ministry of the Environment and Energy [MOEE])
MNO	Métis Nation of Ontario
NO ₂	Nitrite
NO ₃	Nitrate
NWMO	Nuclear Waste Management Organization
ORP	Oxidation-Reduction Potential
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PHC	Petroleum Hydrocarbon
PNEC	Probable No Effects Concentration
PQP	Project Quality Plan
PWQO	Provincial Water Quality Objective
QA/QC	Quality Assurance/Quality Control
RBCA	Atlantic Risk Based Corrective Action
RDL	Reportable Detection Limit
RSA/RSA _X	Regional Study Area/Regional Study Area for 'X' environmental component
SD	Standard Deviation
SEL	Severe Effect Level
SON	Saugeen Ojibway Nation
SQG	Sediment Quality Guideline
SSA	Site Study Area
SVOC	Semi-volatile Organic Compound

TDS	Total Dissolved Solids
TIC	Total Inorganic Carbon
TKN	Total Kjeldahl Nitrogen
TOC	Total Organic Carbon
TSS	Total Suspended Solids
U.S. EPA	United States Environmental Protection Agency
UTM	Universal Transverse Mercator
VOC	Volatile Organic Compound
WLON	Wabigoon Lake Ojibway Nation
WQG	Water Quality Guideline

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EXECUTIVE SUMMARY

The Nuclear Waste Management Organization (NWMO) has undertaken a voluntary siting process for the safe, long-term management of used nuclear fuel. Canada's plan, which follows an approach known as Adaptive Phased Management (APM), would safely contain and isolate used nuclear fuel inside a deep geological repository (DGR) in a manner that protects people and the environment for generations to come. Throughout this document, the term Project is used to refer to the DGR and associated infrastructure.

There are two remaining sites being considered as informed and willing hosts for the Project: the Wabigoon Lake Ojibway Nation (WLON)-Ignace area and the Saugeen Ojibway Nation (SON)-South Bruce area, both in Ontario. The WLON-Ignace area site, which is approximately 40 km west of Ignace in Northwestern Ontario, is the focus of this report. The nearest First Nation community to the potential site is WLON, but the area is also used by other Indigenous communities, including members of the Métis Nation of Ontario (MNO).

As part of the siting process, an Environmental Media Baseline Program (EMBP) was initiated to collect baseline environmental data for the Project. The collection of data from the WLON-Ignace area under the EMBP commenced in summer 2021. The data collected in Year 1 (2021/2022) are presented in the Year 1 baseline report. The current document presents the Year 2 (2022/2023) data, which includes surface water quality, plankton communities, sediment quality, and hydrology. Benthic invertebrate community data were also collected during Year 2 surveys; however, the results are not yet available. The Year 2 baseline data were collected by KGS Group Consulting Engineers and North/South Consultants. The objective of this report is to summarize the Year 2 data to further inform our current understanding of the area.

The northern portion of the Project area contains several small, connected ponds that collectively drain into Mennin Lake. Mennin Lake drains to the north into the Mennin River, and then northwest into the Wabigoon River. On the other side of the Project area, the Revell River flows into the Wabigoon River. This river drains northwest to Wabigoon Lake, which in turn, drains towards the Winnipeg River and the Nelson River, which outlets at Hudson Bay.

The Year 2 study area included waterbodies in the Project area and surrounding region that could potentially be impacted by the Project (ponds, Mennin Lake, Mennin River,

Revell Lake, Revell River, and Wabigoon River) along with sites that could act as reference areas during future studies.

Surface Water Quality

Limnology profiles and water quality data, including general chemistry, metals and trace elements, organic compounds, and radionuclide samples, were collected from each site in the study area.



Mennin Lake

Water clarity was moderate to low, with turbidity higher in rivers than in the lakes and ponds. Elevated turbidity in rivers is likely due to suspended solids carried in the current.

Thermal stratification of the water column was evident during the spring and summer sampling in many lakes and ponds throughout the study area.

Dissolved oxygen concentrations were suitable for aquatic life except near the bottoms of lakes and ponds where measurements were often below Water Quality Guidelines (WQG) or near anoxic. Slightly acidic pH readings were commonly found throughout the study area.

Concentrations of anions, nutrients, organics, physical properties, and radionuclides were below relevant WQGs throughout the study area. Bacteriological tests for *Escherichia coli* found some samples from the Mennin and Wabigoon rivers and the Unnamed Watercourse contained concentrations that exceeded the WQG.

Total and dissolved metals and trace elements were low and similar across the study area. There were occasional elevated concentrations of aluminum, copper, manganese, and mercury above the WQGs. All other metals and trace elements were at or near laboratory detection limits. All other parameters were low, including pesticides and herbicides. Glyphosate levels were below the WQG in all areas tested.



Wabigoon River

The detection limits of some organic compounds were higher than the respective guideline and were thus a limiting factor in data evaluation. Lower detection limits may be needed

to accurately assess concentrations of organic compounds within the study area and should be considered within the design review and update for the program.

Plankton Communities

Phytoplankton and zooplankton samples were collected seasonally in Mennin and Revell lakes alongside the water quality samples. The plankton communities in each lake varied across seasons but were dominated by similar taxa. The abundance of cyanobacteria remained well below the health guideline at both Mennin Lake and Revell Lake throughout Year 2 sampling. Phytoplankton and zooplankton communities were moderately diverse, though presented low evenness.

Sediment Quality

Sediment samples were collected in September 2022 and sites were co-located with water quality sampling where possible. Sediment particle size was variable in the study area, with silt- and clay-sized particles dominating the composition of ponds and lakes, while rivers were largely comprised of sands. The concentration of anions, nutrients, and carbon were relatively low across the study area. Concentrations of total organic carbon, total Kjeldahl nitrogen, and some metals were higher than Sediment Quality Guidelines at numerous sites indicating the study area has naturally elevated concentrations of these parameters, which is important to characterize during baseline studies.

Hydrology

It is important to understand the water levels in lakes and flows in the local rivers in the Project area and surrounding region. These will fluctuate through the seasons and reflect precipitation. In Year 2 of the monitoring program, water levels at 10 locations continued to be measured and the seasonal variation was between 0.4 m to 1.7 m, which is within the reasonable range for small lakes and streams in the area.

In Year 1 of the EMBP, bathymetric surveys were completed at 13 waterbodies in the study area to map water depths. Quality checks on the data identified gaps in the Revell Lake mapping; thus, additional data were collected in August 2023 (Year 2). Bathymetry surveys at all waterbodies proposed for the program have now been completed.

A meteorological station was installed at the beginning of Year 1 of the program to collect data to support the hydrology and other programs. Continuous soil moisture content, ambient temperature, total precipitation, snow depth, wind speed and direction, relative

humidity, atmospheric pressure, and solar radiation were recorded continuously in Year 2. These recordings will continue throughout the 3-year study period.

Next Steps

The information presented in this report represents the second year of data collected in the study area for the EMBP; however, because conditions can change from year-to-year, data collections will continue to provide an understanding of the range of conditions in the WLON-Ignace area during the baseline period. There will be additional years of data and additional components sampled as part of the EMBP (such as air quality and tissues) and these will be discussed in future reports.

LAND ACKNOWLEDGEMENT

It is acknowledged that the lands and communities discussed in this report are primarily situated on the Traditional Territory of the Anishinaabe people of Treaty 3 and the Métis Nation.

1.0 INTRODUCTION

1.1 Overview

The Nuclear Waste Management Organization (NWMO) was established in 2002 with the objective of developing and implementing a plan for the long-term management of Canada's used nuclear fuel. The process has included the adoption of Adaptive Phased Management (APM), undertaking a siting process for the Deep Geological Repository (DGR) and associated infrastructure (hereinafter referred to as the Project), and conducting preliminary studies. From an initial list of 22 potential areas, two remain in the voluntary siting process for informed and willing hosts for the Project, the Wabigoon Lake Ojibway Nation (WLON)-Ignace area in Northwestern Ontario and the Saugeen Ojibway Nation (SON)-South Bruce area in Southern Ontario. The WLON-Ignace area site, which is approximately 40 km west of Ignace, as shown on Figure 1-1, is the focus of this report. The nearest First Nation to the Northwestern Ontario area is WLON. There are also several neighbouring Indigenous communities in the area including the Métis Nation of Ontario (MNO).

The NWMO is actively engaging with local Indigenous Nations, governments, and communities throughout the site selection process to better understand the thoughts and concerns of people who wish to be engaged. From the results of the 2021 Ignace community survey, Ignace residents indicated very high interest in the environment, including water, soil, wildlife, and air (CCI Research Inc. 2021).

As part of the siting process, an Environmental Media Baseline Program (EMBP; CanNorth et al. 2020) was designed to collect baseline environmental data to be used to inform an Impact Assessment (IA) should the community remain in the process and become the single preferred site for the Project.

The collection of data from the WLON-Ignace area under the EMBP commenced in summer 2021. During Year 1 and Year 2 of the program (summer 2021 to spring 2023), data were collected to inform the surface water, hydrology, and soil components. The baseline data collection program is being managed by KGS Group Consulting Engineers

(KGS). They were responsible for program management and the hydrology component of the program. KGS was supported by North/South Consultants for the surface water quality component and ECOSTEM Ltd. for the soil component.

The objective of this report is to summarize the field surveys that were conducted and to provide a high-level summary of the Year 2 baseline data collected for the EMBP. The Year 1 baseline data are summarized in the Year 1 baseline report (CanNorth and Geosyntec 2023).

The NWMO plans to share this information with local communities to provide an update and gain input on the EMBP. It needs to be emphasized that at this time, the assessment has been conducted primarily through a Western Science approach. Rights-holders require additional discussion and input to reflect Indigenous Knowledge (IK) and a holistic view of the environment, within a harmonized approach.

1.2 Scope

The current document provides simple summary statistics for the Year 2 data collected for surface water, plankton communities, sediment quality, and hydrology. Benthic invertebrate community data were also collected during Year 2 surveys; however, the results are not yet available. Soil data were collected during Year 1 of the program and the information is presented in the Year 1 report (CanNorth and Geosyntec 2023). Noise, light, air quality, and tissues are also components of the EMBP and will be included and reviewed in a future campaign.

This report is shared with the public and rights-holders in order to present the findings thus far and to obtain feedback such as any concerns around measured concentrations, areas that should be sampled in future years, etc. Once feedback is obtained, a Program Review report will be produced, which will:

- Outline changes or updates to applicable regulations, standards, guidelines, and current and emerging best practice identified in a high-level review;
- Recommend changes to the EMBP design for future years along with explanations as to why the changes are recommended;
- Provide a rationale table illustrating changes that were considered and rationale as to why they were or were not implemented; and
- Summarize input received and provide responses.

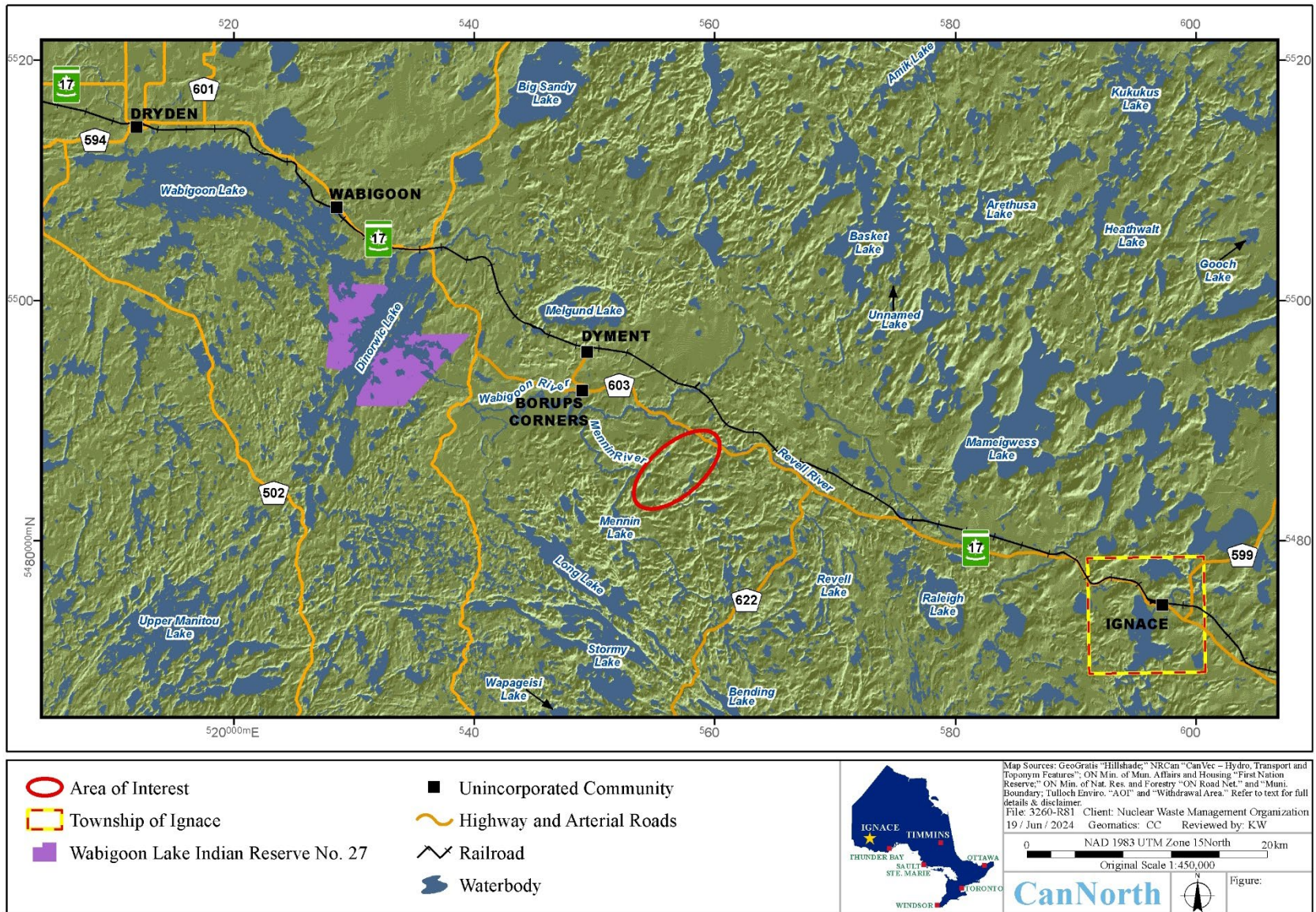


Figure 1-1 Proposed location for DGR in Wabigoon Lake Ojibway Nation-Ignace area.

2.0 ENVIRONMENTAL MEDIA BASELINE PROGRAM

A Preliminary Sample Design Feasibility Assessment report (CanNorth et al. 2019) was prepared in advance of the EMBP to develop and evaluate various design options for the program. In selecting the design options, consideration was given to input received from people who participated in 10 different community engagement workshops led by the NWMO between November 2018 and April 2019. A second set of community engagement workshops was then held in September and October 2019 to obtain community feedback on the design options (i.e., sampling locations, frequency, etc.) and seek further input and clarification on how some of the issues and concerns raised during the first round of workshops could be addressed in the EMBP.

Ultimately, all of this information was used in the final design of the EMBP, as detailed under separate cover (CanNorth et al. 2020). Annual reviews and a thorough three-year program update will be completed to modify the EMBP as needed, based on analysis of data collected each year, continued feedback from stakeholders, rights-holders, and technical experts, and data needs of other studies being completed in support of the Project.

The full EMBP is focused on select environmental components that have potential to interact with the Project and includes 1) tissues, 2) hydrology, 3) surface water parameters (water, plankton, sediment, and benthic invertebrates), 4) air quality, noise, and light, and 5) soil (soil quality and gamma radiation). Shallow groundwater (from 0 to 100 metres below ground surface [m bgs]) and subsurface soil and bedrock (between 0.3 m bgs to 100 m bgs) are also essential components when conducting site characterization of a DGR facility (CNSC 2021). Although these two components were originally part of the EMBP (CanNorth et al. 2019) and discussed with stakeholders and rights-holders at community engagement workshops in 2019, they are being implemented separately by the Geosciences group within the NWMO as part of the deep drilling program and will be reported distinctly from this report. The NWMO will remain accountable for addressing concerns raised at engagement workshops related to groundwater. Shallow groundwater will also be included in the safety case, which will include identifying three groundwater systems (shallow, intermediate, and deep).

Figure 2-1 provides a pictorial representation of the Project and how the various Project components may interact with one another and the environment. Further details on these potential interactions, as well as potential mitigation measures, is provided under separate cover (CanNorth et al. 2023).

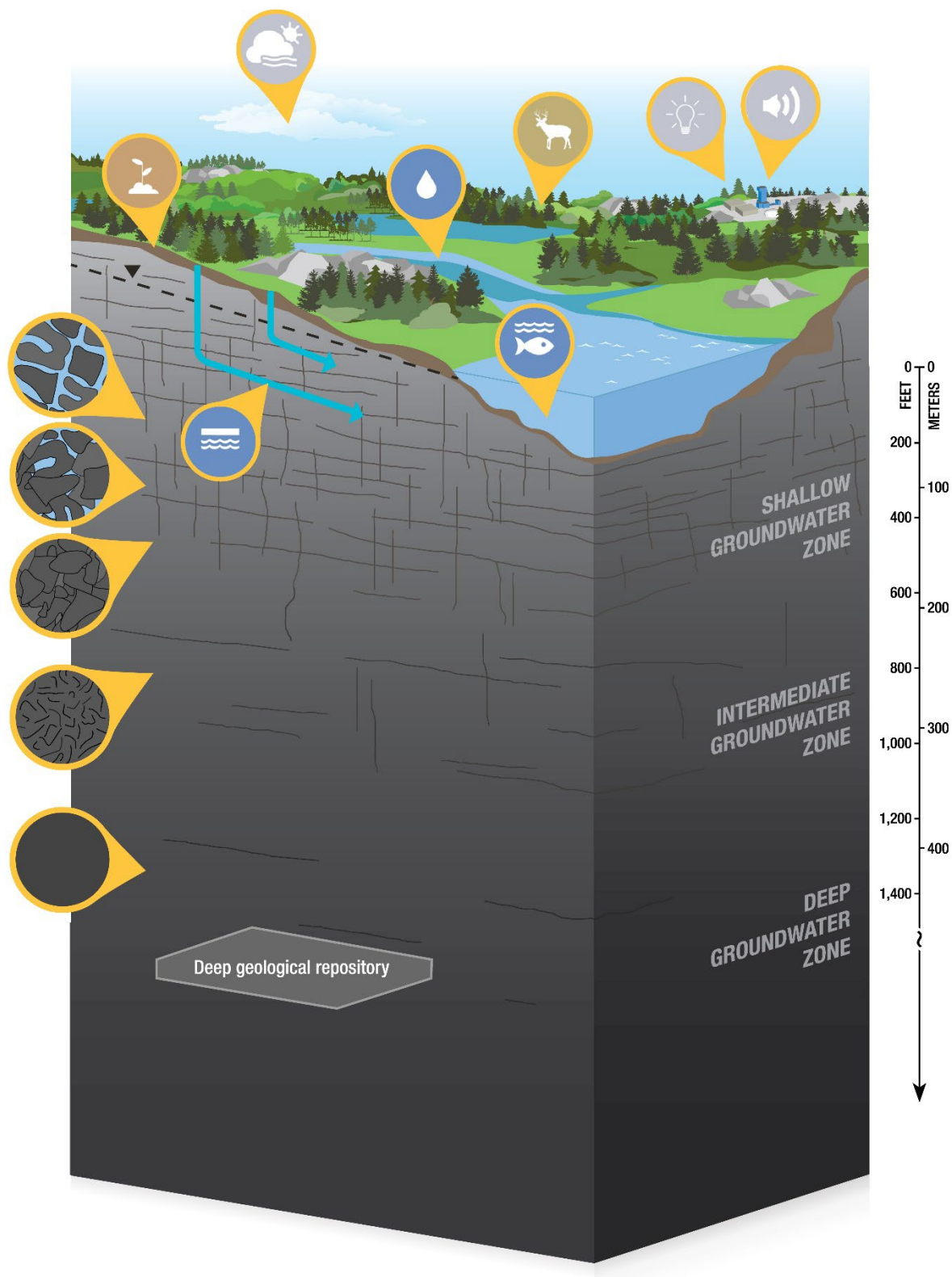


Figure 2-1 Conceptual Site Model for the biophysical environment.

Note: 1000 m reflects the extent of deep drilling being completed by the NWMO.

2.1 Schedule

Data collections and reporting for the EMBP are planning to take place for one to three years for each component. Surface water quality, hydrology, and soil were monitored through 2021/2022 as part of the Year 1 program. Surface water quality, hydrology, sediment quality, and benthic invertebrates¹ were sampled in 2022/2023 as a part of the Year 2 program. Additional components including air and tissues will commence as part of the Year 3 program in 2023/2024.

2.2 Study Area

The EMBP includes monitoring the conceptual boundary of the potential facility (called the Site Study Area [SSA]) that would be located somewhere within the Area of Interest (AOI), in environments surrounding the facility (called the Local Study Area [LSA]), and in some cases, in a larger area (called the Regional Study Area [RSA]). The proposed LSA_x and RSA_x, where 'x' is specific for each of the environmental components, differ for the components and are discussed within respective sections of this report.

In addition to examining areas in the SSA and LSA that could be subject to future Project impacts, study areas that can act as reference areas in the future were sampled in Year 1 and Year 2. Sampling reference areas will aid in determining whether changes over time can be attributed to the Project or are due to other factors such as climate change, natural variability, or other sources of non-natural origin.

2.3 Contaminants of Potential Concern

A comprehensive list of Contaminants of Potential Concern (COPC) is required for a baseline sampling program to provide a complete picture of the natural constituents in the environment; however, it is also important that the COPC list meets EMBP project objectives, is relevant to potential interactions with the environment, and is not cost prohibitive. The COPC list for Year 2 of the EMBP was identical to that of Year 1, which was developed in collaboration with the NWMO, with consideration of stakeholder and rights-holder concerns, and with consultation of external sources of information. The Preliminary Sample Design Feasibility Assessment report (CanNorth et al. 2019) provides the rationale for the selection of COPCs.

¹ Although benthic invertebrate community data were collected as part of the Year 2 program, taxonomic data were not yet available for inclusion in this report.

In general, only those contaminants with the highest potential for having interactions with the Project have been identified as COPC. There are some exceptions where a contaminant was included due to a high level of community concern, and the potential for cumulative effects. For example, the herbicide glyphosate is not expected to have any Project-environment interactions, but it may be present in environmental media being sampled as part of the EMBP due to its use by the forestry industry or in invasive vegetation management. Community engagement workshops revealed that there is a high level of concern around the use of glyphosate and its environmental fate and, thus, it has been included as a COPC for those media identified as being of highest concern by community members (e.g., surface water, berries, etc.).

Table 2-1 presents the list of COPCs selected for the environmental components monitored in 2022 and 2023, as per the EMBP design (CanNorth et al. 2020). It should be noted that not all parameters are intended to be measured in every sample. The list contains a wide suite of parameters, including metals, radionuclides, Polycyclic Aromatic Hydrocarbons (PAHs), Petroleum Hydrocarbon Compounds (PHCs), Volatile Organic Compounds (VOCs), Semi-volatile Organic Compounds (SVOCs), Polychlorinated Biphenyls (PCBs), pesticides, nutrients, and generic parameters routinely used to characterize components of the environment. The list will be re-evaluated as part of the Program Review report to ensure it remains relevant and that information is available for all COPC.

Table 2-1
COPCs selected for the EMBP by environmental component.

Group	Parameters ¹
Surface Water (LSA_{SW} and Reference Area)	
Radionuclides	Tier 1 ² : H-3, C-14, Sr-90, I-129, Cs-137 [and associated Co-60, Se-79, Ru-106], gross- α , gross- β
	Tier 2 ² : Cl-36, Co-60, Se-79, Ru-106, Np-237, Pu-238, Pu-239, Pu-240, Pu-241 Am-241, Cm-244 (<i>artificial</i>)
	Ra-226, U-238, U-234, U-235, U-238, K-40, Th-228, Th-230, Th-232 (<i>natural</i>)
Metals (Total and Dissolved)	Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Bromine, Cadmium, Calcium, Cesium, Chromium (total, trivalent, hexavalent), Cobalt, Copper, Iron, Lead, Lithium, Mercury, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Rhodium, Ruthenium, Samarium, Selenium, Sodium, Silver, Strontium, Thallium, Tin, Titanium, Uranium, Vanadium, Zinc, Zirconium
Organics	SVOCs, PAHs, PHCs, PCBs
<i>In situ</i> limnology	Dissolved Oxygen (DO), Temperature, pH, Conductivity, Redox Potential
Nutrients and General Chemistry	Alkalinity, Bicarbonate, Bromide, Calcium, Carbonate, Chloride, Cyanide, Fluoride, Hydroxide, Magnesium, pH, Potassium, Sodium, Specific Conductivity, Sulphate, Sum of Ions, Total Dissolved Solids (TDS), Total Hardness, Total Suspended Solids (TSS), Turbidity, Ammonia as Nitrogen, Nitrate (NO ₃) + Nitrite (NO ₂), NO ₃ , Total Organic Carbon (TOC), Total Inorganic Carbon (TIC), Dissolved Organic Carbon (DOC), Phosphorus, Total Kjeldahl Nitrogen (TKN), Chlorophyll α
	5-day Biological Oxygen Demand (BOD), E. coli, Total Coliforms
Herbicides and Pesticides	Glyphosate, Aminomethylphosphonic acid (AMPA), Glufosinate
Sediment	
Radionuclides	Tier 1 ² : H-3, C-14, Sr-90, I-129, Cs-137 [and associated Co-60, Se-79, Ru-106], gross- α , gross- β
	Tier 2 ² : Cl-36, Co-60, Se-79, Ru-106, Np-237, Pu-238, Pu-239, Pu-240, Pu-241 Am-241, Cm-244 (<i>artificial</i>)
	Ra-226, U-238, U-234, U-235, U-238, K-40, Th-228, Th-230, Th-232 (<i>natural</i>)
Metals	Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Bromine, Cadmium, Calcium, Cesium, Chromium (total, trivalent, hexavalent), Cobalt, Copper, Iron, Lead, Lithium, Mercury, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Rhodium, Ruthenium, Samarium, Selenium, Sodium, Silver, Strontium, Thallium, Tin, Titanium, Uranium, Vanadium, Zinc, Zirconium
Organics	SVOCs and PAHs
Nutrients and General Characterization	Moisture, TOC, Particle Size (5 fraction EEM), Ammonia as Nitrogen, NO ₃ + NO ₂ , NO ₃ , Total Phosphorus, Total Kjeldahl Nitrogen (TKN), pH
Other	None

Note: As tissues and RSA water quality were not monitored in 2021, 2022, or 2023, parameters associated with these environmental components, as well as gamma radiation to be included in a future year of the soil program, are not included.

¹ Not all parameters were measured in 2022 and 2023 as planned. This is not unexpected in a large program and will be noted in the Program Review and corrected in subsequent sampling campaigns.

² Tier 1 radionuclides are those that may be associated with releases from the Project. Tier 2 radionuclides are being measured to establish baseline concentrations.

3.0 SURFACE WATER

3.1 Sampling Overview

The Project has the potential of affecting aquatic environments through multiple pathways, such as direct pollution/exposure to a waterway, bioaccumulation through the ecosystem, or transfer to other media (i.e., interaction with sediment). The primary objectives of the surface water quality assessment program are to:

- characterize ponds, lakes, and rivers of the LSA_{sw};
- explore the variability of COPC concentrations and other endpoints to re-evaluate the sample design as needed;
- determine the baseline conditions of water quality, sediment quality, plankton community composition, and benthic invertebrate community composition prior to Project development;
- establish a long-term monitoring program to evaluate temporal changes; and
- provide necessary data to use in modeling to predict and assess Project impacts in the IA.

The surface water sampling locations were selected in consideration of potential direct Project interactions with the environment, the potential for cumulative effects, input received from stakeholders and rights-holders, and potential reference areas. During community engagement workshops conducted in Ignace, Dymont, and WLON, taking care of water and monitoring surface water were common themes expressed by stakeholders and rights-holders (CanNorth et al. 2020). Thus, beyond ensuring pertinent data are collected for scientific purposes, an additional data objective of the surface water quality program is to provide community assurance, address perceptions, and build relationships. This included incorporating a water quality monitoring program in the RSA_{sw} that will sample locations identified as important areas to monitor by stakeholders and rights-holders. Sampling within the RSA_{sw} will be implemented in a later year of the program once the final site has been selected.

The study components included in the surface water parameters component include:

- surface water quality and characterization;
- sediment quality and characterization;
- phytoplankton and zooplankton community composition and biomass; and
- benthic invertebrate community composition and biomass.

The Year 2 program included continued sampling of surface water quality and plankton communities, in addition to completing the first year of sampling for the sediment quality and benthic invertebrate community program.

3.1.1 Study Areas

The LSA_{sw} includes waterbodies with the potential of being impacted by the Project, as well as potential reference areas. Locations for water withdrawal and treated effluent release from the Project have not yet been determined; thus, assumptions were made in order to initiate data collections for the EMBP (CanNorth et al. 2020). Figure 3-1 presents the surface water quality stations sampled during the Year 2 program. This included the following waterbodies:

- Seven ponds located in the AOI (sites P1 to P7). Since it is not yet known where within the AOI the Project site may be located, it is also not known which waterbodies within that area would be most likely to be subject to potential impacts; thus, all ponds in the AOI were included in the Year 1 and Year 2 program.
- Three ponds outside of the AOI that could act as reference areas (sites RP1 to RP3) for the ponds sampled in the AOI.
- The watercourse extending from the AOI and entering Mennin Lake at the north end (site ML4).
- Three areas of Mennin Lake (sites ML1 to ML3). Potential Project interactions with Mennin Lake are currently unclear and could include water withdrawal, treated effluent release, and/or COPC contributions from the AOI in the north end of the lake where the inflow is located.
- Two areas of Revell Lake (sites RL1 and RL2), which is the proposed reference lake for Mennin Lake.
- Two areas of the Mennin River downstream of Mennin Lake (sites MR2 and MR3) and one site in the Revell River (site RR1) as these waterbodies are potential exposure locations for treated effluent release.
- One area of the Mennin River upstream of Mennin Lake (site MR1) to provide a potential future reference area for the Mennin River downstream of Mennin Lake and/or the Revell River.
- Three areas of the Wabigoon River (sites WR1, WR2, and WR3) as far-field potential future exposure (sites WR2 and WR3) and reference (site WR1) locations.

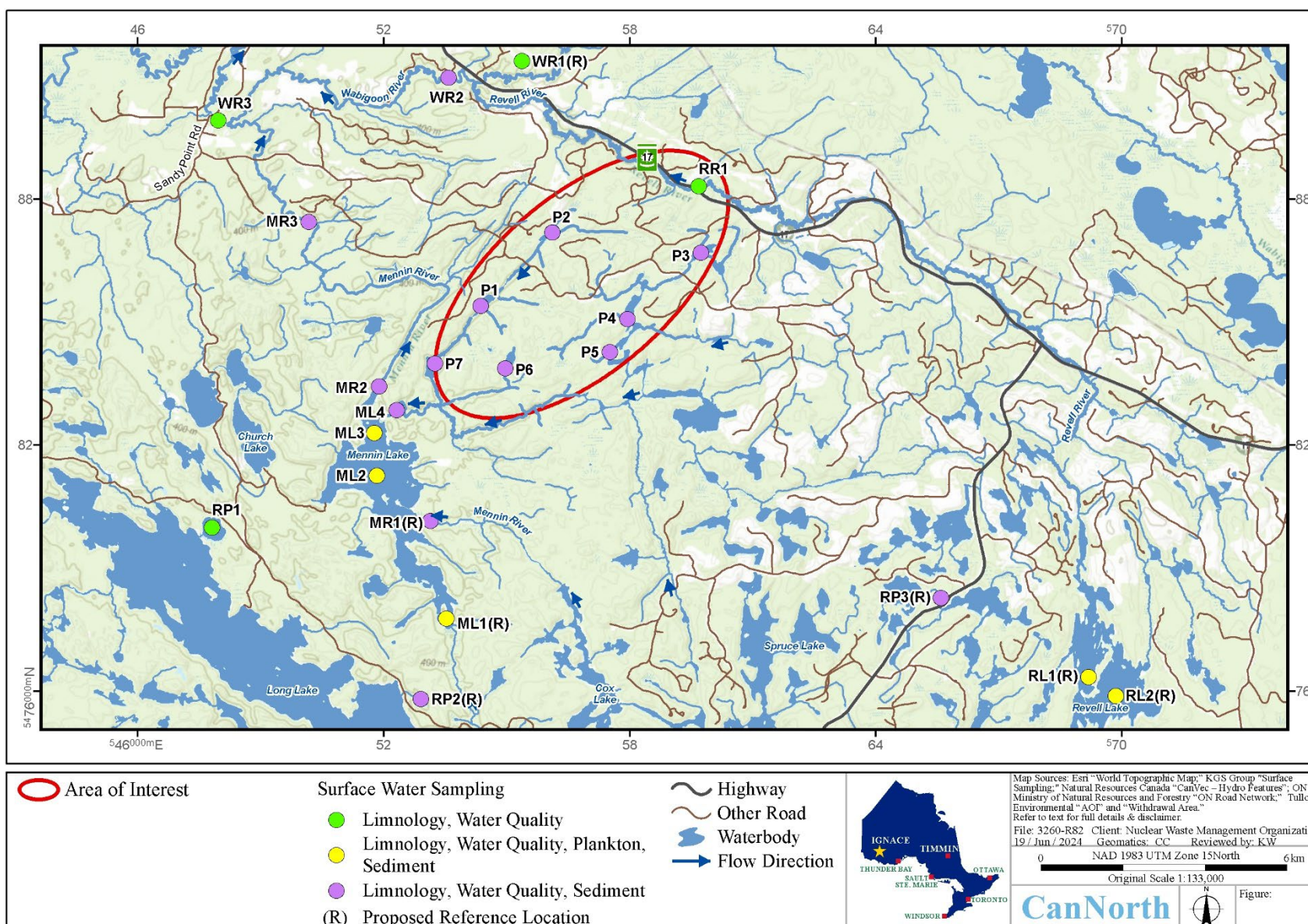


Figure 3-1 Year 2 surface water sampling locations.

3.1.2 Contaminants of Potential Concern

A large suite of COPCs were included in the Year 2 program (see Table 2-1). The specific COPC list varied across sampling locations, depending on the investigative and/or exploratory purpose of the site (as noted in Section 2.3). During development of the COPC list for the EMBP, PHCs and VOCs were identified as having potential Project interactions; however, the NWMO initiated an annual sampling program in the AOI in 2017 that includes measuring suites of these parameters in surface water, sediment, and soil. Since baseline data were already being collected for these parameters at various locations throughout the AOI and near vicinity, they were not included in the EMBP for surface water quality. In the AOI and associated reference areas, PAHs and SVOCs are included since these have not been previously measured by the NWMO and there is the potential for Project-interactions. These were only sampled within the AOI ponds and associated reference ponds as potential interactions would be near-field, such as a fuel spill, or entirely unrelated to the potential Project impacts.

3.2 Methods

3.2.1 Field Methods

Site visits were scheduled quarterly to capture the variation across seasons. Summer sampling was scheduled in July 2022, followed by fall sampling in September 2022, winter sampling in February 2023, and spring sampling in May 2023. At each station, Universal Transverse Mercator (UTM) coordinates were collected, site characterization attributes were noted, and samples were collected. Limnology profiles, water quality samples, and plankton were collected quarterly, while sediment quality and benthic invertebrate samples were collected during the fall campaign only.

In addition to site samples, duplicate samples and blank samples were collected as part of the Quality Assurance/Quality Control (QA/QC) program. Details are provided in Appendix A.

3.2.1.1 Site Characterization

General site characterization data were collected at each station to aid in planning for future field programs and to assess if historic or current impacts in the area may deem the study area not representative of baseline or reference conditions. The assessment included recording historic and current land use, describing the surrounding environment, and noting

the disturbance level (i.e., road proximity, nearby industry, etc.) and community use (i.e., cabins, fishing, drinking water).

3.2.1.2 Limnology and Water Quality

At each station, *in situ* limnology profiles and water quality samples were collected. Limnological measurements included temperature (°C), dissolved oxygen (DO; %, mg/L), pH, specific conductivity (µS/cm), oxidation-reduction potential (ORP; mV), and turbidity (NTU). Measurements were collected throughout the water column according to the depth displayed on the EXO multi-meter. The number of measurements taken were conditional on the station depth and consisted of the following criteria:

- In water less than 1 m deep: a minimum of a single near surface measurement (e.g., 0.3 m) was taken.
- In water less than 2 m deep: measurements were taken at 0.5 m intervals (e.g., near surface [0.3 m], 1.0 m, 1.5 m).
- In water greater than 2 m deep: measurements were taken at 1 m intervals (e.g., near surface [0.3 m], 1.0 m, 2.0 m).

To provide an additional measure of water transparency, measurements using a 20 cm diameter black and white Secchi disk were taken. The Secchi disk measurement is the water depth where the observer can no longer view the disk from the boat, and thus a measure of sunlight penetration. Factors which affect the amount of sunlight penetration include plankton, water colour, suspended solids, and water quality. The total water depth of each station was measured using a depth sounder.

Water chemistry samples were collected using a Kemmerer water sampler. In water depths of less than 2 m, a sample was collected from mid-depth or at least 15 cm below the surface. In water depths of more than 2 m and with a thermocline present (i.e., at least a 1°C change in temperature in 1 m of water), two discrete sample sets were collected. The first set of samples was collected closer to the surface (above the thermocline) and the second set of samples was collected closer to the bottom (below the thermocline). Composite samples were taken at stations with no thermocline and where the water depths were greater than 2 m (water was collected near surface, at mid-depth, and near bottom in the water column and mixed). Locations with less than 1.5 m water in ice-covered conditions were collected using a peristaltic pump and water was discharged from the tubing directing into the sample bottles.

To increase statistical robustness and decrease inter-waterbody variation, replicate samples were collected during Year 2 sampling events. Replicates were spaced at least 20 m apart for lakes, or three to six bankfull widths apart for rivers (Environment Canada 2012). In the lake and river sites, three replicate samples were collected per station and season. In the AOI and reference ponds, one sample was collected per station and season, due to the small size.

Water samples for dissolved metals and dissolved organic carbon were field filtered for parameters using a 0.45 µm cellulose acetate filter and syringe provided by the lab. Based on discussions with the analytical lab and the NWMO, samples for chlorophyll α were not field filtered.

Water samples were stored in coolers provided by the laboratory and were maintained at 4°C (not frozen). Samples were delivered to the laboratory daily, to meet hold times for analyses.

Invasive Species Protection

Aquatic sampling gear, personal gear, and any other gear that contacts water are potential vectors for transfer of aquatic invasive species and/or pathogens between waterbodies. To reduce the risk of field programs contributing to these transfers, all equipment was new or decontaminated prior to arriving on site. In addition, during the field program, all equipment that contacted the water was cleaned and disinfected each evening.

3.2.1.3 Plankton

Plankton sampling stations were co-located with water quality stations. Three replicate plankton samples were collected from three locations in Mennin Lake and two locations in Revell Lake in the summer and fall of 2022 and winter and spring of 2023. Plankton samples were collected from the euphotic zone (the upper layer of water that receives sunlight) and was defined as twice the Secchi disk measurement. If the water depth was less than the euphotic zone, the sampling equipment was lowered to 1 m above the bottom, as to not disturb the sediment.

The phytoplankton samples were collected via integrated tube sampler which spanned the euphotic zone. A weighted Nalgene or Tygon tubing was lowered vertically into the water column to the determined depth. The tube was crimped to seal the contents inside while the tubing was raised and discharged into a sample container. Depending on the station depth,

samples were composed of three to 10 hauls. Phytoplankton samples were preserved using 1% Lugol's solution and were stored in the dark at room temperature.

The zooplankton samples were collected using a 64 µm mesh Wisconsin net. The net was lowered to the bottom of the euphotic zone and raised vertically at a continuous rate of 0.5 m/s through the water column. At the surface, the outer sides of the net were rinsed and the bucket containing the sample was detached from the net and drained into the sample container. Each sample was a composite of between three and five hauls, depending on the station depth. Zooplankton samples were preserved with 70% ethanol and stored in the dark at room temperature.

3.2.1.4 Sediment

Sediment quality and benthic invertebrate community monitoring can provide information on habitat characteristics and COPC concentrations, in addition to food chain dynamics. Samples were collected during the fall campaign to capture benthic populations at peak biomass and at a period of low emergence. Where possible, sediment quality and benthic invertebrate sample sites were co-located with water quality sites, though depositional areas where sediments and contaminants may accumulate were targeted.

A dredge sampler (e.g., Ekman) was used to collect sediment samples. Information regarding sample characteristics were recorded and a photo was taken prior to bagging and storing the sample. The most biologically active portion of the sediment was targeted for sample collection (0 to 5 cm), though the depth of each horizon varied across sites ranging from 0 to 2 cm, 0 to 3 cm, 0 to 4 cm, or 0 to 5 cm. At lake and pond stations, three to five replicates, spaced at least 20 m apart, were collected. At river stations, three to five replicates, spaced at least three times the bankfull width, were collected.

Samples were stored in the freezer until transport to the laboratory for analysis.

3.2.2 Laboratory Analyses

3.2.2.1 Water Chemistry

Water chemistry samples were analyzed by Australian Laboratory Services (ALS) laboratories, a Canadian Association for Laboratory Accreditation (CALA) accredited lab. Information on laboratory QA/QC is provided in Appendix A.

3.2.2.2 Plankton

Plankton laboratory analyses was also completed by ALS laboratories following American Public Health Association (APHA) 10200 C, F, and I reference methods for phytoplankton and C, G, and I for zooplankton. Samples were prepared by sedimentation/settling and examined using a compound phase contrast inverted microscope or stereoscopic microscope (to aid in identification of larger crustaceans). Plankton was identified to species, where possible, and enumerated. The average biovolume and total biovolume for every genus/species was also reported.

Information on laboratory QA/QC is provided in Appendix A.

3.2.2.3 Sediment

Sediment chemistry samples were analyzed by ALS laboratories, a CALA accredited lab. Information on laboratory QA/QC is provided in Appendix A.

3.2.3 Data Analyses

3.2.3.1 Water Quality

Statistical Analyses

In order to provide a high-level characterization of the waterbodies sampled in the study area and remain consistent with Year 1 data analyses, data were grouped into categories and summary statistics were completed using the data from all seasons and stations within each category. To complete these analyses, the following categories were used:

- Mennin Lake (3 stations, 51 samples)
- Mennin River (3 stations, 30 samples)
- Revell Lake (2 stations, 39 samples)
- Revell River (1 station, 9 samples)
- AOI Ponds (7 stations, 30 samples)
- Reference Ponds (3 stations, 14 samples)
- Unnamed Watercourse (2 station, 13 samples)
- Wabigoon River (3 stations, 33 samples)

Note, sample sizes of some parameters varied from the target sample size due to errors in the chain of custody paperwork, prematurely destroyed samples, and unintended human error. To calculate summary statistics, values below method reportable detection limits

(RDLs) were set equal to the RDL. The summary statistics calculated included the sample size, mean, standard deviation, median, 5th percentile, and 95th percentile. In addition, for each parameter the units, RDL, and number of samples below the RDL ($n < \text{RDL}$) are reported.

Guideline Comparisons

The measured data are compared to Water Quality Guidelines (WQGs). The EMBP Design report (CanNorth et al. 2020) identified the following primary references for obtaining these values:

- Canadian Council of Ministers of the Environment (CCME): Canadian Water Quality Guidelines (CWQGs) for the Protection of Freshwater Aquatic Life, and for the Protection of Agriculture (Irrigation and Livestock) (CCME 2023).
- Government of Canada: Federal Environmental Quality Guidelines (FEQGs) for surface water quality (GC 2021)².
- Ontario Ministry of Environment, Conservation and Parks (MECP): Provincial Water Quality Objectives (PWQOs; MOEE 1994).
- Health Canada: Guidelines for Canadian Drinking Water Quality and Recreational Water Quality (Health Canada 2022).

Guidelines are also available from other jurisdictions, such as the British Columbia Ministry of Environment (BCMOE) approved water quality guidelines (BCMOE 2023), which can be considered on an as-needed basis. In addition, the NWMO developed interim acceptance criteria for the protection of persons and the environment from non-radiological impacts for surface water, groundwater, soil, sediment, and air (NWMO 2015, 2019). The interim acceptance criteria are primarily based on the applicable guidelines, supplemented as needed by internationally developed guidelines and literature. These acceptance criteria are being used in the NWMO postclosure safety assessment and are, therefore, also relevant as an evaluation tool.

The approach outlined below was followed to select the WQGs for the measured parameters. When guidelines were available from multiple agencies for a parameter, the following approach was taken in selecting an appropriate WQG.

² <https://www.canada.ca/en/health-canada/services/chemical-substances/fact-sheets/federal-environmental-quality-guidelines.html>

1. As specified in the EMBP, the first consideration was for all federal (CWQGs and FEQGs) and provincial (MECP) guidelines. However, within this there are some additional considerations:
 - a. For many of the metals and trace elements, the CWQGs and FEQGs are updated values compared to the MECP guidelines. Therefore, for these COPCs, the FEQG was the first priority, CWQG was the second priority, and MECP was the third priority.
 - If there was a value for dissolved, it was given preference over the guideline for total in the assessment of the data.
 - b. Other than the metals and trace elements, the most restrictive of the applicable federal and provincial guidelines was selected, except as follows.
 - The MECP PWQOs for PAHs are below the level of detection. As the basis of these values is unknown, they were not considered in the selection of the applicable guidelines.
2. If federal or provincial values were not available, as outlined in the EMBP, guidelines from the BCMOE were considered.
3. If no values were available from the first two steps then guidelines from other jurisdictions and sources were adopted including:
 - Environmental quality guidelines for Alberta surface waters (GA 2018).
 - United States Environmental Protection Agency (U.S. EPA 2022) water quality criteria for aquatic life.
 - NWMO interim acceptance criteria (NWMO 2015, 2019).
 - Suter and Tsao (1996).
 - European Union – Probable No Effects Concentration (PNEC) values from the European Chemicals Agency (ECHA)³.
4. The final consideration in selecting the WQG was to ensure that the value did not exceed drinking water or recreational use guidelines.
 - a. For drinking water guidelines, only those that are health-based were included as candidate guidelines (not operational guidelines or aesthetic objectives, with the exception of sulphate and TDS as these are based on taste).
 - b. The bacterial guidelines for drinking water not considered appropriate for application to freshwater sources.

³ <https://echa.europa.eu/information-on-chemicals>

The selected WQGs are included in Appendix B, Table 1, although WQGs were not available for every COPC.

3.2.3.2 Plankton

For each waterbody (i.e., Mennin Lake and Revell Lake), phytoplankton and zooplankton density (organisms/L) and percent taxonomic composition were reported seasonally. To provide a high-level summary of community composition replicates ($n = 3$) and waterbody stations (Mennin Lake = 3, Revell Lake = 2) were averaged.

Additional community metrics calculated included taxon richness, Simpson's diversity index, and Simpson's evenness. The biotic indices were calculated at the family level of taxonomy following Environment and Climate Change Canada recommendations for benthic invertebrates (Environment Canada 2012). Brief descriptions of these indices are provided below.

Simpson's diversity index is a measure of diversity which considers both the number of family-level taxa (richness) and the evenness of distribution of individuals among taxa in a sample (Environment Canada 2012). For each family-level taxon, this index was calculated by determining the proportion of individuals that contribute to the community total in the sample. The value of the Simpson's diversity index ranges between zero and one where the greater the value, the greater the community diversity.

Simpson's evenness is a measure of the equitability of distribution of individuals among taxa within the community. Evenness was calculated by determining the relative diversity over the total number of taxa in each sample, where relative diversity is the sum of the proportions of each taxon in the sample (Environment Canada 2012). A community in which each taxon presence is equally abundant has high evenness, while a community numerically dominated by one or few taxa has low evenness (Environment Canada 2012). As with the Simpson's diversity index, evenness ranges between zero and one.

3.2.3.3 Sediment

Statistical Analyses

The statistical analyses were performed on data grouped into categories based on stations and their potential to be categorized as exposure (i.e., downstream of treated effluent release or the AOI) or reference once the site is operational. These groupings provide a high-level characterization of the sediment quality in each area during the baseline period. The following categories were used for the analyses:

- Mennin Lake
 - Exposure (2 stations (ML2 and ML3), 10 samples)
 - Reference (1 station (ML1), 5 samples)
- Mennin River
 - Exposure (2 stations (MR2 and MR3), 10 samples)
 - Reference (1 station (MR1), 5 samples)
- Revell Lake
 - Reference (2 stations, 10 samples)
- Revell River
 - Exposure (1 station, 5 samples)
- AOI Ponds
 - Exposure (7 stations, 21 samples)
- Reference Ponds
 - Reference (3 stations, 9 samples)
- Unnamed Watercourse
 - Exposure (1 station, 5 samples)
- Wabigoon River
 - Exposure (1 station, 5 samples)

Note, sample sizes of some parameters varied from the target sample size due to sample destruction and errors to the chain of custody paperwork. To calculate summary statistics, values below RDLs were set equal to the RDL. The summary statistics calculated included the sample size, mean, standard deviation, median, 5th percentile, and 95th percentile. In addition, for each parameter the units, RDL, and number of samples below the RDL ($n < \text{RDL}$) are reported.

Guideline Comparisons

The measured data are compared to Sediment Quality Guidelines (SQGs). The EMBP Design report (CanNorth et al. 2020) identified the following primary references for obtaining these values:

- CCME: Canadian Sediment Quality Guidelines (CSQGs) for the Protection of Aquatic Life (CCME 2023).
- MECP: Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (MOE 2011).

- MECP: Guidelines for Identifying, Assessing, and Managing Contaminated Sediments in Ontario (MOE 2008).

In addition, the NWMO developed interim acceptance criteria for the protection of persons and the environment from non-radiological impacts for surface water, groundwater, soil, sediment, and air (NWMO 2015, 2019). The interim acceptance criteria are primarily based on the applicable guidelines, supplemented as needed by internationally developed guidelines and literature. These acceptance criteria are being used in the NWMO postclosure safety assessment and are, therefore, also relevant as an evaluation tool.

The approach outlined below was followed to select the SQGs for the measured parameters. When guidelines were available from multiple agencies for a parameter, the following approach was taken in selecting an appropriate SQG.

1. As mentioned in the EMBP, federal (CSQGs; CCME 2023) and provincial (MOE 2008, 2011) guidelines were considered, and the most conservative guideline was chosen.
2. If federal or provincial guidelines were not available, as outlined in the EMBP, guidelines from other jurisdictions and sources were adopted, including:
 - a. Medri, C., 2015. Non-radiological interim acceptance criteria for the protection of persons and the environment. NWMO TR-2015-03, January. (Medri 2015).
 - b. Fernandes, S., Woolhouse, K., & Thackeray, N. (2019). Supplementary non-radiological interim acceptance criteria for the protection of persons and the environment (NWMO-TR--2017-05). Canada. (NWMO 2019).
 - c. Thompson, P.A., J. Kurias and S. Mihok. 2005. Derivation and Use of Sediment Quality Guidelines for Ecological Risk Assessment of Metals and Radionuclides Released to the Environment from Uranium Mining and Milling Activities in Canada. Environmental Monitoring and Assessment. 110: 71-85. (Thompson et al. 2005).
 - d. Atlantic Risk Based Corrective Action (RBCA) – Ecological Tier 1 Environmental Quality Standards (EGQs) for Sediment (mg/kg) (Atlantic RBCA 2023).
 - e. U.S. EPA Sediment Screening Benchmarks: Region 3 Screening Benchmarks 2006. (U.S. EPA 2006).

- f. U.S. EPA Region 6. 2023. Ecological benchmark table. Austin, Texas.
<https://www.tceq.texas.gov/downloads/remediation/trrp/aquatic-life-benchmark-table.xlsx>. (U.S. EPA Region 6 2023).

The selected SQGs are included in Appendix B, Table 2 although SQGs were not available for every COPC.

3.3 Results

Year 2 site visits occurred in summer 2022 (July), fall 2022 (September), winter 2023 (February), and spring 2023 (May). Table 3-1 below presents a summary of samples collected from each site throughout the Year 2 baseline program. Tables within Appendix B present a summary of results for each site and environmental media included in the Year 2 program. In addition to the outlined COPCs in Table 3-1, a suite of rare-earth metals, including lanthanides and some transition metals, and organochlorine pesticides were analyzed. However, these parameters are not included in the planned COPC evaluation and are not discussed herein, but are presented in Appendix C, Table 1 as supporting information.

Table 3-1 Summary of the samples collected for surface water quality component during the Year 2 EMBP.

Area	Waterbody/ Watercourse	Site ID	Location Purpose	Season Sampled	Water Quality																	Sediment										
					Base Water Quality ¹	Dissolved Metals (Tier 1)		Dissolved Metals (Tier 2)		Total Metals (Tier 1)		Total Metals (Tier 2)		Radiological Parameters (Tier 1)		Radiological Parameters (Tier 2 - Artificial)	Radiological Parameters (Tier 2 - Natural)	Herbicides and Pesticides	Organochlorine Pesticides	Hydrocarbons	Volatile Organic Carbons	Polycyclic Aromatic Hydrocarbons	Semi-Volatile Organic Compounds	Polychlorinated Biphenyls	Chlorophyll <i>a</i>	Plankton Community	Base Sediment Quality ²	Total Metals	Radiological Parameters (Tier 1)		Radiological Parameters (Tier 2 - Artificial)	Radiological Parameters (Tier 2 - Natural)
LSA _{sw}	Mennin Lake	ML1	Reference	Summer	x	x		x		x		x										x	x									
				Fall	x	x		x		x		x											x	x	x	x						
				Winter	x	x	x	x	x	x		x				x	x						x	x								
				Spring	x	x		x		x	x												x	x								
		ML2	Exposure	Summer	x	x		x		x	x	x											x	x								
				Fall	x	x		x		x	x	x											x	x	x	x						
				Winter	x	x	x	x	x ³	x	x	x				x	x						x	x								
				Spring	x	x		x		x	x	x											x	x								
		ML3	Exposure	Summer	x	x		x		x		x											x	x								
				Fall	x	x		x		x		x											x	x	x	x						
				Winter	x	x	x	x	x	x		x											x	x						x		
				Spring	x	x		x		x		x											x	x								

Table 3-1 Summary of the samples collected for surface water quality component during the Year 2 EMBP. (continued)

Area	Waterbody/ Watercourse	Site ID	Location Purpose	Season Sampled	Water Quality																	Sediment												
					Base Water Quality ¹	Dissolved Metals (Tier 1)		Dissolved Metals (Tier 2)	Total Metals (Tier 1)		Total Metals (Tier 2)	Radiological Parameters (Tier 1)		Radiological Parameters (Tier 2 - Artificial)		Radiological Parameters (Tier 2 - Natural)		Herbicides and Pesticides	Organochlorine Pesticides	Hydrocarbons	Volatile Organic Carbons	Polycyclic Aromatic Hydrocarbons	Semi-Volatile Organic Compounds	Polychlorinated Biphenyls	Chlorophyll <i>a</i>	Plankton Community	Base Sediment Quality ²	Total Metals	Radiological Parameters (Tier 1)		Radiological Parameters (Tier 2 - Artificial)		Radiological Parameters (Tier 2 - Natural)	
LSAsw	Mennin River	MR1	Reference	Summer	x	x		x		x		x										x												
				Fall	x	x		x		x		x		x									x		x	x								
				Spring	x	x		x		x		x	x	x									x											
		MR2	Exposure	Summer	x	x		x		x	x	x										x												
				Fall	x	x		x		x	x	x	x									x												
				Spring	x	x		x		x	x	x	x									x												
	MR3	Exposure	Summer	x	x		x		x	x		x									x													
			Fall	x	x		x		x	x	x	x									x													
			Winter	x	x	x	x	x	x	x	x	x									x													
	Spring	x	x		x		x		x		x									x														
	Revell Lake	RL1	Reference	Summer	x	x		x		x		x										x	x											
				Fall	x	x		x		x		x		x								x	x	x										
Winter				x ⁴	x	x	x	x	x	x	x	x									x	x												
RL2		Reference	Spring	x	x		x		x		x									x	x													
			Summer	x	x		x		x		x		x								x	x												
			Fall	x	x		x		x		x		x								x	x												
Winter	x	x ⁵	x ⁶	x	x	x	x	x	x										x	x														
Spring	x	x		x		x		x		x									x	x														

Table 3-1 Summary of the samples collected for surface water quality component during the Year 2 EMBP. (continued)

Area	Waterbody/ Watercourse	Site ID	Location Purpose	Season Sampled	Water Quality														Sediment																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
					Base Water Quality ¹	Dissolved Metals (Tier 1)		Dissolved Metals (Tier 2)		Total Metals (Tier 1)		Total Metals (Tier 2)		Radiological Parameters (Tier 1)		Radiological Parameters (Tier 2 - Artificial)		Radiological Parameters (Tier 2 - Natural)		Herbicides and Pesticides	Organochlorine Pesticides		Hydrocarbons	Volatile Organic Carbons		Polycyclic Aromatic Hydrocarbons		Semi-Volatile Organic Compounds		Polychlorinated Biphenyls		Chlorophyll <i>α</i>		Plankton Community		Base Sediment Quality ²		Total Metals		Radiological Parameters (Tier 1)		Radiological Parameters (Tier 2 - Artificial)		Radiological Parameters (Tier 2 - Natural)		Polycyclic Aromatic Hydrocarbons		Semi-Volatile Organic Compounds																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
LSAsw	Revell River	RR1	Exposure	Summer	x	x		x		x	x	x									x																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					

Table 3-1 Summary of the samples collected for surface water quality component during the Year 2 EMBP. (continued)

Area	Waterbody/ Watercourse	Site ID	Location Purpose	Season Sampled	Water Quality															Sediment											
					Base Water Quality ¹	Dissolved Metals (Tier 1)		Dissolved Metals (Tier 2)	Total Metals (Tier 1)	Total Metals (Tier 2)	Radiological Parameters (Tier 1)		Radiological Parameters (Tier 2 - Artificial)		Radiological Parameters (Tier 2 - Natural)		Herbicides and Pesticides	Organochlorine Pesticides	Hydrocarbons	Volatile Organic Carbons	Polycyclic Aromatic Hydrocarbons	Semi-Volatile Organic Compounds	Polychlorinated Biphenyls	Chlorophyll α	Plankton Community	Base Sediment Quality ²	Total Metals	Radiological Parameters (Tier 1)	Radiological Parameters (Tier 2 - Artificial)	Radiological Parameters (Tier 2 - Natural)	Polycyclic Aromatic Hydrocarbons
AOI Ponds	Unnamed Waterbody 1	P1	Exposure	Summer	x	x		x		x		x	x				x	x		x			x	x	x						
				Fall	x	x		x		x		x	x						x	x		x			x	x					
				Winter	x	x		x		x		x	x						x	x		x									
				Spring	x	x		x		x		x	x						x	x ⁸		x									
	Unnamed Waterbody 2	P2	Exposure	Summer	x	x		x		x		x	x				x	x		x				x	x	x					
				Fall	x	x		x		x		x	x						x	x		x				x					
				Winter	x	x		x		x		x	x						x	x		x					x				
				Spring	x	x		x		x		x	x						x	x ⁸		x									
	Unnamed Waterbody 3	P3	Exposure	Summer	x	x		x		x	x	x	x				x	x		x					x	x	x	x			
				Fall	x	x		x		x		x	x	x	x				x	x		x					x				
				Winter	x	x		x		x		x	x	x	x				x	x		x					x				
				Spring	x	x		x		x		x	x	x	x				x	x ⁸		x									
	Unnamed Waterbody 4	P4	Exposure	Summer	x	x		x		x		x	x				x	x		x											
				Fall	x	x		x		x		x	x	x	x				x	x		x									
				Winter	x	x	x	x	x	x		x	x	x	x				x	x		x									
				Spring	x	x		x		x		x		x	x				x	x ⁸		x									

Table 3-1 Summary of the samples collected for surface water quality component during the Year 2 EMBP. (continued)

Area	Waterbody/ Watercourse	Site ID	Location Purpose	Season Sampled	Water Quality															Sediment																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
					Base Water Quality ¹		Dissolved Metals (Tier 1)		Dissolved Metals (Tier 2)		Total Metals (Tier 1)		Total Metals (Tier 2)		Radiological Parameters (Tier 1)		Radiological Parameters (Tier 2 - Artificial)		Radiological Parameters (Tier 2 - Natural)		Herbicides and Pesticides		Organochlorine Pesticides		Hydrocarbons		Volatile Organic Carbons		Polycyclic Aromatic Hydrocarbons		Semi-Volatile Organic Compounds		Polychlorinated Biphenyls		Chlorophyll α		Plankton Community		Base Sediment Quality ²		Total Metals		Radiological Parameters (Tier 1)		Radiological Parameters (Tier 2 - Artificial)		Radiological Parameters (Tier 2 - Natural)		Polycyclic Aromatic Hydrocarbons		Semi-Volatile Organic Compounds																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
AOI Ponds	Unnamed Waterbody 5	P5	Exposure	Summer	x	x		x		x		x	x					x	x		x																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										

Table 3-1 Summary of the samples collected for surface water quality component during the Year 2 EMBP. (continued)

Area	Waterbody/ Watercourse	Site ID	Location Purpose	Season Sampled	Water Quality															Sediment																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
					Base Water Quality ¹	Dissolved Metals (Tier 1)		Dissolved Metals (Tier 2)		Total Metals (Tier 1)		Total Metals (Tier 2)		Radiological Parameters (Tier 1)		Radiological Parameters (Tier 2 - Artificial)		Radiological Parameters (Tier 2 - Natural)		Herbicides and Pesticides		Organochlorine Pesticides		Hydrocarbons		Volatile Organic Carbons		Polycyclic Aromatic Hydrocarbons		Semi-Volatile Organic Compounds		Polychlorinated Biphenyls		Chlorophyll α		Plankton Community		Base Sediment Quality ²		Total Metals		Radiological Parameters (Tier 1)		Radiological Parameters (Tier 2 - Artificial)		Radiological Parameters (Tier 2 - Natural)		Polycyclic Aromatic Hydrocarbons		Semi-Volatile Organic Compounds																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
Reference Ponds	Unnamed Waterbody 8	RP1	Reference	Summer	x	x		x		x		x	x				x	x							x																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										</

Notes: LSA_{sw} – Local study area (surface water); AOI – Area of Interest; a dash indicates analyses were proposed as part of the EMPB study design, but were not analyzed due to

¹Base Water Quality includes limnology, aggregate organics, anions and nutrients, cyanides, microbiological tests, organic carbon, inorganic carbon, physical tests, and speciated metals

²Base Sediment Quality includes percent moisture, carbon content, nitrogen concentration, hexavalent chromium, and particle size

³Missing hafnium analysis

⁴Missing TSS analysis

⁵Missing dissolved zinc analysis for reps b and c

⁶Missing dissolved gold, thulium, ytterbium

⁷Missing tier 1 radiological analysis for reps a and c

⁸Missing 4-Chloroaniline analysis

3.3.1 Site Characterization

Site characterization attributes were reassessed and recorded during Year 2 surveys. All sites remained consistent with Year 1 attributes and land use (CanNorth 2023). One exception was the increase of forestry activity near Reference Pond 1 (RP1). Site characteristics are summarized in Table 3-2 below. Photographs of sites are presented in the Year 1 report (CanNorth and Geosyntec 2023).

In general, the study area is typical of a northern, forested environment with mature, undisturbed forests and few human developments. The stations sampled were described as having predominantly silt/clay/sand bottoms with a lack of rocky erosional habitat in the river areas. A separate habitat mapping study is being completed as part of the Biodiversity Impact Study.

Table 3-2 Site characterization information for surface water stations sampled during the Year 1 and Year 2 EMBP.

Waterbody/ Watercourse	Site ID	Sampling Year	Station Depth (m)	General Field Observations	Land Use Comments
Mennin Lake	ML1	2021/2022 2022/2023	1.87 ± 0.340 1.73 ± 0.205	- Soft muck and sand sediment - Shallow, vegetated area of Mennin Lake - Abundant zooplankton - Mature forest and island surrounding site	Mature undisturbed forest
	ML2	2021/2022 2022/2023	13.98 ± 0.533 13.69 ± 0.329	- Soft sand sediment - Deepest section of Mennin Lake (Information obtained from a local Indigenous Guide) - Open, unprotected area of lake	Mature undisturbed forest
	ML3	2021/2022 2022/2023	6.00 ± 0.374 5.70 ± 0.379	- Soft sand sediment - Intermediate depth in lake - Protected inlet with mature forest and wetland surrounding - Rocky outcrops with a high fish population nearby (e.g., Pike and Walleye)	Mature forest, Road 1 m away
Mennin River	MR1	2021/2022 2022/2023	0.83 ± 0.236 0.69 ± 0.173	- Soft muck, detritus, and mud sediment - Wetlands surrounding, emergent and submergent vegetation - Meandering stream with slow flow - Inlet to Mennin Lake - Birds and amphibians noted on every visit	Mature undisturbed forest
	MR2	2021/2022	1.23 ± 0.205	- Soft mud and sand sediment, with some boulder	Mature undisturbed forest
		2022/2023	0.98 ± 0.220	- Wetlands and mature forest surrounding - Outlet to Mennin Lake - Large beaver dam prevents access further downstream	

Table 3-2 Site characterization information for surface water stations sampled during the Year 1 and Year 2 EMBP. (continued)

Waterbody/ Watercourse	Site ID	Sampling Year	Station Depth (m)	General Field Observations	Land Use Comments
Mennin River	MR3	2021/2022 2022/2023	0.83 ± 0.047 1.06 ± 0.266	- Soft mud and sand sediment - Permanent flowing water - Deadfall and sandbars nearby - Overgrown forestry area 100 m away from site	100 m from historical forestry area
Revell Lake	RL1	2021/2022 2022/2023	9.27 ± 0.544 8.51 ± 0.594	- Soft mud and sand sediment - Rocky outcrops and islands of mature forest surrounding site - Some benthic vegetation	Boat docks present, forestry along access road
Revell Lake	RL2	2021/2022 2022/2023	8.13 ± 0.368 7.54 ± 0.677	- Soft mud and sand sediment - Rocky outcrops and islands of mature forest surrounding site - High zooplankton concentration in summer months	Fishing hot spot, forestry along access road
Revell River	RR1	2021/2022 2022/2023	0.90 ± 0.082 0.93 ± 0.309	- Soft mud and sand sediment, some detritus - Mature forest surrounding - Sand bars formed after high flow - 200 m upstream of highway 17	Highway bridge downstream
Unknown Watercourse 1	ML4	2021/2022 2022/2023	1.90 ± 0.141 2.06 ± 0.297	- Soft muck, detritus, and mud sediment - Wetlands surrounding, emergent and submergent vegetation - Meandering stream with slow flow - Abundant deadfall in area	Mature undisturbed forest
Wabigoon River	WR1	2021/2022 2022/2023	1.63 ± 1.255 1.70 ± 0.592	- Soft mud/silt and sand sediment - 300 m upstream of highway 17 - Thick, mature forest surrounding - Permanent flowing water - Sand bars forming during periods following high flow	Highway (200 m away), cabin close by, undisturbed forest
	WR2	2021/2022 2022/2023	1.27 ± 0.591 1.03 ± 0.156	- Soft mud/silt and sand sediment - 800 m downstream of highway 17 - Thick, mature forest surrounding - Permanent flowing water - Sand bars forming during periods following high flow	Undisturbed forest
	WR3	2021/2022 2022/2023	2.57 ± 0.478 3.04 ± 0.794	- Soft mud/silt and sand sediment - 200 m upstream of dirt road - Thick, mature forest surrounding - Permanent flowing water - Sand bars forming during periods following high flow - Waterfall 300 m downstream of site	Highway (200 m away), Fishing spots, Undisturbed forest
Unknown Waterbody 1	P1	2021/2022 2022/2023	0.85 ± 0.050 1.23 ± 0.545	- Soft muck and detritus - Surrounded by mature forest and historical logging - Wetland characteristics and rocky outcrops	Undisturbed forest
Unknown Waterbody 2	P2	2021/2022	1.57 ± 0.544	- Soft sand and mud sediment - Large bedrock outcrops surrounding pond - Mature forest and historical logging in area	Mature forest, Previous logging (50-100 m away)
		2022/2023	2.00 ± 0.300		

Table 3-2 Site characterization information for surface water stations sampled during the Year 1 and Year 2 EMBP. (continued)

Waterbody/ Watercourse	Site ID	Sampling Year	Station Depth (m)	General Field Observations	Land Use Comments
Unknown Waterbody 3	P3	2021/2022 2022/2023	3.38 ± 0.701 3.98 ± 0.192	- Soft mud sediment, some boulder and cobble - Historical logging in area - Active logging road 200 m SW of site - Ephemeral inlet - Outlet leads to wetland area with emergent vegetation	Mature undisturbed forest
Unknown Waterbody 4	P4	2021/2022 2022/2023	3.08 ± 0.614 2.98 ± 0.164	- Soft mud sediment - Rocky outcrops and mature forest surrounding site - Historical logging in area	Undisturbed forest
Unknown Waterbody 5	P5	2021/2022 2022/2023	2.65 ± 0.150 2.55 ± 0.050	- Soft mud sediment - Rocky outcrops and mature forest surrounding site - Historical logging in area	Undisturbed forest
Unknown Waterbody 6	P6	2021/2022 2022/2023	0.95 ± 0.050 0.55 ± 0.260	- Shallow, soft muck and detritus sediment - Helicopter access only - Bog wetland and mature forest surrounding site - High submergent vegetation	Undisturbed forest
Unknown Waterbody 7	P7	2021/2022 2022/2023	1.80 ± 0.900 2.68 ± 1.176	- Shallow, sand with soft muck and detritus - Helicopter access only - Hummocked wetland and mature forest surrounding - Some bedrock around the southwest side of pond	Undisturbed forest
Unknown Waterbody 8	RP1	2021/2022 2022/2023	4.30 ± 0.927 2.75 ± 0.492	- Soft mud sediment - Small minnow pond - Active logging 100 m E of site - Mature forest surrounding area - Active wildlife on nearly every visit	Recent forest clearing (100 m away), fishing spot, increased forestry observed during Year 2 visit
Unknown Waterbody 9	RP2	2021/2022 2022/2023	3.43 ± 0.287 3.50 ± 0.324	- Soft muck and detritus sediment - Rapid oxygen decrease with increased depth in water column - Mature forest surrounding pond - Two inactive beaver dams nearby	Undisturbed forest
Unknown Waterbody 10	RP3	2021/2022 2022/2023	1.20 ± 0.400 2.17 ± 0.205	- Soft mud and sand sediment - Atikokan highway 200 m E of site - Mature forest surrounding with wetland characteristics (e.g., cattails and emergent vegetation on E side of pond)	Highway nearby (50 m)

3.3.2 Surface Water Quality

The objective of the surface water quality program was to continue the collection of baseline data to gain an understanding of existing conditions in the LSA_{sw} and provide a baseline for which future conditions can be compared. Table 3-2 details the data collected at each station during each site visit. Appendix B, Table 3 presents site UTM coordinates, station depth, and the type of water sample collected. Detailed limnology and surface water quality results are provided in Appendix B, Table 4 through Table 12.

The following section provides a summary of general results, as well as stations where WQGs were exceeded. The WQGs are detailed in Appendix B, Table 1.

3.3.2.1 Limnology

Field measured limnology parameters included water clarity (measured as Secchi depth; m), turbidity (NTU), temperature (°C), DO (mg/L), specific conductivity (µS/cm), ORP (mV), and pH (pH units). Detailed measurements are presented in Appendix B, Table 4 and are summarized in Table 3-3 below. The summary table below presents average surface measurements across seasons and depth profiles, while the detailed data displays the seasonal profile measurements.

Water clarity was moderate to low in the LSA_{sw} averaging higher in the lakes (Mennin Lake = 1.5 ± 0.34 m; Revell Lake = 2.6 ± 0.47 m) compared to the ponds (AOI Ponds = 0.7 ± 0.29 m). Many of the river sampling locations had Secchi disc readings reaching the bottom of the water column, due to the shallow nature of the sampling area. Thus, for rivers, turbidity is a better measure of water clarity.

The surface turbidity of lakes and ponds within the study area was relatively stable and consistently low (<2.0 NTU). The surface turbidity of watercourses within the study area was slightly higher, ranging between 1.0 ± 0.38 NTU and 4.3 ± 3.69 NTU, and fluctuated considerably. These results indicate that rivers in the study area tend to have lower water clarity than lakes, likely due to suspended material carried in the flow. Some notable surface values were measured in Wabigoon River station 1 (15.07 NTU) and Unnamed Pond 7 (14.73 NTU). These values are considered suspect because although the probes were cleaned prior to reading, sediments may have been disturbed during sampling as the laboratory results indicate a lower turbidity.

Average (surface) temperatures were comparable between waterbodies and watercourses in the study area, ranging between 12.7 °C and 18.1°C. As shown in Appendix B, Table 4, thermal stratification events ($n = 23$) were observed in the water column of lakes and a few ponds in the study area, occurring mostly during spring and summer seasons. Rivers in the study area were well mixed and temperature fluctuated minimally with depth.

Averaged surface DO concentrations ranged from $8.3 \text{ mg/L} \pm 1.38 \text{ mg/L}$ in the AOI ponds to $9.8 \pm 2.14 \text{ mg/L}$ in Mennin Lake. All surface measurements were above the lower guideline for the protection of cold-water biota (6.0 mg/L ; MOEE 1994). Some DO measurements taken near bottom in lakes and ponds were below the WQG. Additionally, there were instances of hypoxia ($\text{DO} < 2.0 \text{ mg/L}$) or near-hypoxic conditions in some ponds and lakes close to the bottom of the water column, which occurred predominantly during summer and fall sampling.

Specific conductivity varied slightly throughout the study area. Average surface specific conductivity measurements tended to be lower in lakes and ponds, ranging from $18.5 \pm 1.08 \text{ }\mu\text{S/cm}$ to $38.7 \pm 11.61 \text{ }\mu\text{S/cm}$, compared to rivers in the study area. Revell River and Wabigoon River had somewhat higher specific conductance measurements of $77.2 \pm 4.35 \text{ }\mu\text{S/cm}$ and $56.9 \pm 10.46 \text{ }\mu\text{S/cm}$, respectively, likely due to increased sediment and ion load suspended in the flowing water.

The surface pH of waterbodies in the study area ranged from $5.7 \pm 0.36 \text{ pH units}$ in the AOI ponds to $7.1 \pm 0.52 \text{ pH units}$ in Revell Lake. The pH of watercourses in the study area ranged from 6.1 ± 0.4 in Unnamed watercourse to 6.9 ± 0.22 in Wabigoon River. There were numerous pH measurements that were slightly below the lower guideline of 6.5 throughout the study area, and a few pH measurements that were near to or above the upper guideline of 8.5 in select areas during the winter (Appendix B, Table 4). A slightly acidic surface water pH is common in the area.

Field ORP measurements in the study area varied slightly and ranged from $180.9 \pm 48.5 \text{ mV}$ in Revell River to $301.1 \pm 57.18 \text{ mV}$ in Reference Ponds. ORP measurements can provide insight into the aquatic life within a waterbody; however, ORP measurements are reflective of a combination of other species in the water (i.e., salts, metals, pH, oxygen).

Table 3-3 Summary of surface limnological measurements collected during the Year 2 EMBP.

Parameter	Mennin Lake		Mennin River		Revell Lake		Revell River		AOI Ponds		Reference Ponds		Unnamed Watercourse		Wabigoon River	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Station Depth (m)	7.2	5.10	0.9	0.26	8.1	0.71	1.1	0.29	2.3	1.14	2.9	0.65	2.1	0.27	1.9	0.81
Secchi Depth (m)	1.5	0.34	0.6	0.40	2.6	0.47	0.4	0.40	0.7	0.29	1.2	0.30	0.8	0.14	0.6	0.49
Temp. (°C)	14.1	8.12	18.1	2.75	14.5	8.19	14.9	4.56	13.9	6.85	15.3	7.26	12.7	7.91	14.5	5.35
DO (mg/L)	9.8	2.14	8.7	0.57	9.6	1.67	8.9	1.17	8.3	1.38	8.4	0.84	8.8	1.96	9.3	0.58
DO (%)	91.9	4.84	92.5	5.66	91.2	3.16	87.2	3.72	78.7	8.05	83.1	11.11	80.7	2.16	90.7	8.97
Specific Conductance (µS/cm)	22.8	1.96	21.8	1.85	18.5	1.08	77.2	4.35	19.8	3.25	38.7	11.61	24.1	4.86	56.9	10.46
pH	6.8	0.39	6.4	0.37	7.1	0.52	6.7	0.15	5.8	0.36	6.7	0.51	6.1	0.40	6.9	0.22
ORP (mV)	284.9¹	0.96	274.3²	36.94	229.6	62.60	180.9	48.50	253.4	55.94	301.1	57.18	283.6	25.21	237.3	42.01
Turbidity (NTU)	1.0	0.25	1.2	0.78	0.2	0.30	1.0	0.38	2.0	3.16	0.9	0.54	2.2	2.16	4.3	3.69

Data represent mean and standard deviation (SD) of all surface and profile measurements collected in all seasons. Detailed seasonal profile data are presented in Appendix B.

¹One value measured during winter sampling was outside the expected range and was removed from the data (934.2 mV).

²One value measured during winter sampling was outside the expected range and was removed from the data (1194.7 mV).

3.3.2.2 Anions, Nutrients, Organics, and Physical Properties

Detailed summary statistics outlining the general chemistry characteristics of the LSA_{sw} are summarized in Figure 3-2 below for select COPC and are presented in Appendix B, Table 5 through Table 12. Laboratory measures of conductivity and turbidity tended to agree with the field measured parameters. No laboratory pH data was collected during the Year 2 campaign. Of the 27 anions, nutrients, organics, and physical properties analysed to characterize the general chemistry of the LSA_{sw}, 9 have available WQGs, which are presented in Appendix B, Table 1. The WQG exceedances are summarized below in Table 3-4 and all parameters were below available WQGs.

In the Year 1 report, total phosphorus concentrations were flagged as exceeding the WQG of 0.01 mg/L throughout the study area (CanNorth and Geosyntec 2023); however, as stated in the Year 1 report, this WQG is only meant to apply to lakes naturally below this value (MOEE 1994). It is important during baseline studies to establish site-specific total phosphorus concentrations as this information can then be used to select a trigger range and establish the percent of acceptable phosphorus increase (CCME 2023). Thus, a specific total phosphorus guideline was not applied herein. Overall, the nutrient levels of the lakes in the study area are considered low or oligotrophic according to Wetzel (2001).

Table 3-4 Summary of exceedances of available guidelines for anions, nutrients, organics, and physical properties in surface water.

Parameter	Guideline ^a	Exceedance							
		Mennin Lake	Mennin River	Revell Lake	Revell River	AOI Ponds	Reference Ponds	Unnamed Watercourse	Wabigoon River
Ammonia, Total (as N)	5.855								
Chloride (Cl)	120								
Conductivity	700								
Cyanide, Total	0.005								
Fluoride (F)	0.12								
Nitrite (as N)	0.02								
Sulfate (SO ₄)	128								
Total Dissolved Solids	500								
Turbidity	50								

^aAll units in mg/L except Turbidity which is in NTU.

All summary statistics below the guideline.

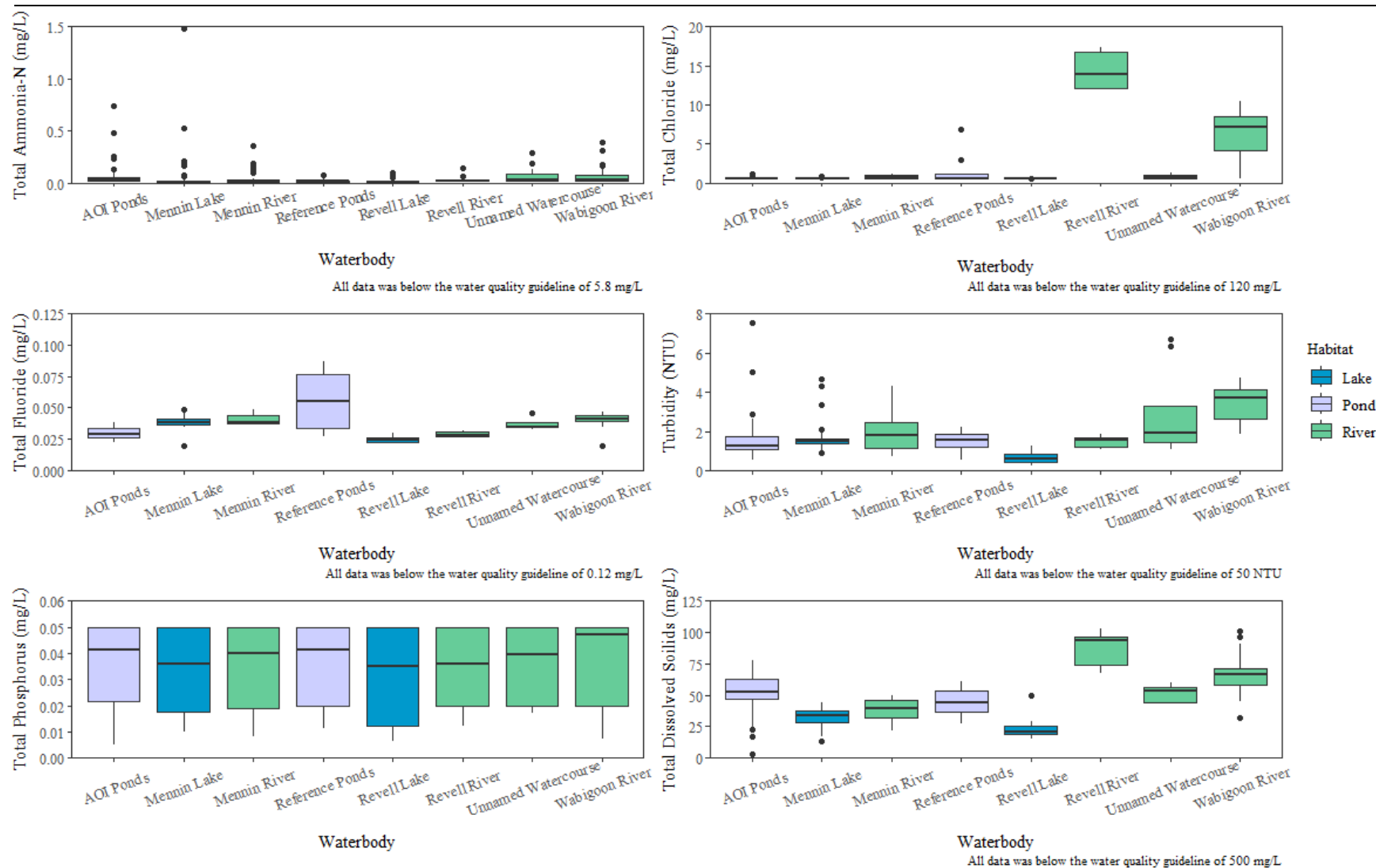


Figure 3-2 Summary of select COPCs in surface water collected during the Year 2 EMBP.

3.3.2.3 Bacteriological Tests

Bacteriological tests were completed for the bacteria *Escherichia Coli* (*E. Coli*) and total coliforms as an indicator of sanitary quality of the surface water. WQGs (Appendix B, Table 1) were only available for *E. Coli*, and exceedances are summarized in Table 3-5. The 95th percentile of samples collected at Mennin and Wabigoon rivers, and the Unnamed Watercourse exceeded the available WQG of 100 CFU/100 mL, measuring 146 CFU/100 mL, 168 CFU/100 mL, and 188 CFU/100 mL, respectively. Figure 3-3 summarizes *E. Coli* concentrations throughout the LSA_{sw}. Detailed results are presented in Appendix B, Table 5 through Table 12.

Table 3-5 Summary of exceedances of available guidelines for bacteriological tests in surface water.

Parameter	Guideline (CFU/100 mL)	Exceedance							
		Mennin Lake	Mennin River	Revell Lake	Revell River	AOI Ponds	Reference Ponds	Unnamed Watercourse	Wabigoon River
<i>Escherichia Coli</i>	100								
	All summary statistics below the guideline								
	Mean above guideline								
	95 th Percentile above guideline								
	Mean and 95 th Percentile above guideline								
	Median and 95 th Percentile above guideline								
	Mean, Median and 95 th Percentile above guideline								
	5 th Percentile, Mean, Median and 95 th Percentile above guideline								

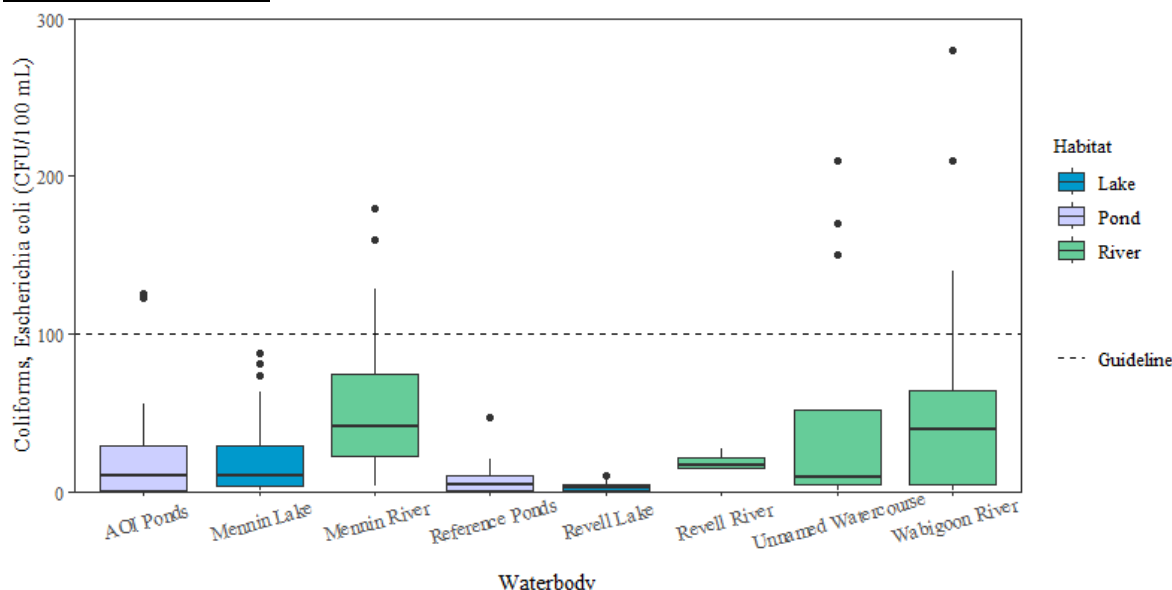


Figure 3-3 Summary of E. Coli concentration in surface water in the LSA_{sw}.

3.3.2.4 Metals and Trace Elements

Baseline concentrations of total and dissolved metals and trace elements were low and similar between waterbodies in the LSA_{sw}. Figure 3-4 summarizes select metal and trace metal concentrations within the LSA_{sw}. Detailed results are presented in Appendix B, Table 5 through Table 12.

Of the 90 total and dissolved metals assessed in the water chemistry samples, 43 have available WQGs (Appendix B, Table 1). Table 3-7 summarizes the few parameters which exceeded the WQGs in the LSA_{sw}. The 95th percentile of total aluminum concentrations from Mennin, Revell, and Wabigoon rivers exceeded the guideline of 0.32 mg/L, but the mean and median levels did not, indicating levels generally remained below the guideline. In the AOI Ponds, the mean, median, and 95th percentile exceeded the total aluminum WQG, while in the Unnamed Watercourse, the mean, median, and 5th and 9th percentiles exceeded the same WQG. This indicates that levels are above the guideline in these waterbodies relatively regularly. Total and dissolved copper concentrations were also elevated above WQGs in some samples. For total copper, the 95th percentile concentrations from Mennin Lake, the AOI Ponds, the Unnamed Watercourse, and Wabigoon River exceeded the WQG, as well as the mean and 95th percentile concentrations from Revell Lake and the Reference Ponds. Dissolved copper exceeded WQGs at every site in the LSA_{sw}. Additionally, there were a few exceedances of manganese and mercury WQGs within the study area during the Year 2 surveys (Table 3-7).

These results are consistent with the Year 1 report that also found several exceedances of the aluminum and copper WQGs in the study area (CanNorth and Geosyntec 2023). Metals and trace elements are naturally occurring in the environment and elevated levels of copper and aluminum in the area may be more an indication that these are naturally elevated in the area, rather than a result of human caused disturbance.

Table 3-6 Summary of exceedances of available guidelines for metals and trace elements in surface water.

Parameter	Guideline (mg/L)	Exceedance							
		Mennin Lake	Mennin River	Revell Lake	Revell River	AOI Ponds	Reference Ponds	Unnamed Watercourse	Wabigoon River
Total									
Aluminum, total	0.32								
Antimony, total	0.006								
Arsenic, total	0.005								
Barium, total	1								
Beryllium, total	0.011								
Bismuth, total	17.5								
Boron, total	1.5								
Cadmium, total	0.00004								
Calcium, total	1000								
Chromium III	0.0089								
Chromium VI	0.005								
Cobalt, total	0.00078								
Copper, total	0.002								
Iron, total	3.3								
Lead, total	0.001								
Lithium, total	2.5								
Magnesium, total	82								
Manganese, total	0.12								
Mercury, total	0.000026								
Molybdenum, total	0.073								
Nickel, total	0.025								
Potassium, total	53								
Rhodium, total	0.01								
Ruthenium, total	0.01								
Samarium, total	0.0082								
Selenium, total	0.001								
Silver, total	0.00025								
Sodium, total	680								
Strontium, total	7								
Tellurium, total	0.0058								
Thallium, total	0.0008								
Tin, total	0.073								
Titanium, total	0.076								
Tungsten, total	0.03								
Uranium, total	0.015								
Vanadium, total	0.12								
Zinc, total	0.02								
Zirconium, total	0.004								

Table 3-6 Summary of exceedances of available guidelines for metals and trace elements in surface water. (continued)

Parameter	Guideline (mg/L)	Exceedance							
		Mennin Lake	Mennin River	Revell Lake	Revell River	AOI Ponds	Reference Ponds	Unnamed Watercourse	Wabigoon River
Dissolved									
Copper, dissolved	0.00087								
Lead, dissolved	0.0065								
Manganese, dissolved	0.23								
Strontium, dissolved	2.5								
Zinc, dissolved	0.017								

	All summary statistics below the guideline
	Mean above guideline
	95 th Percentile above guideline
	Mean and 95 th Percentile above guideline
	Median and 95 th Percentile above guideline
	Mean, Median and 95 th Percentile above guideline
	5 th Percentile, Mean, Median and 95 th Percentile above guideline

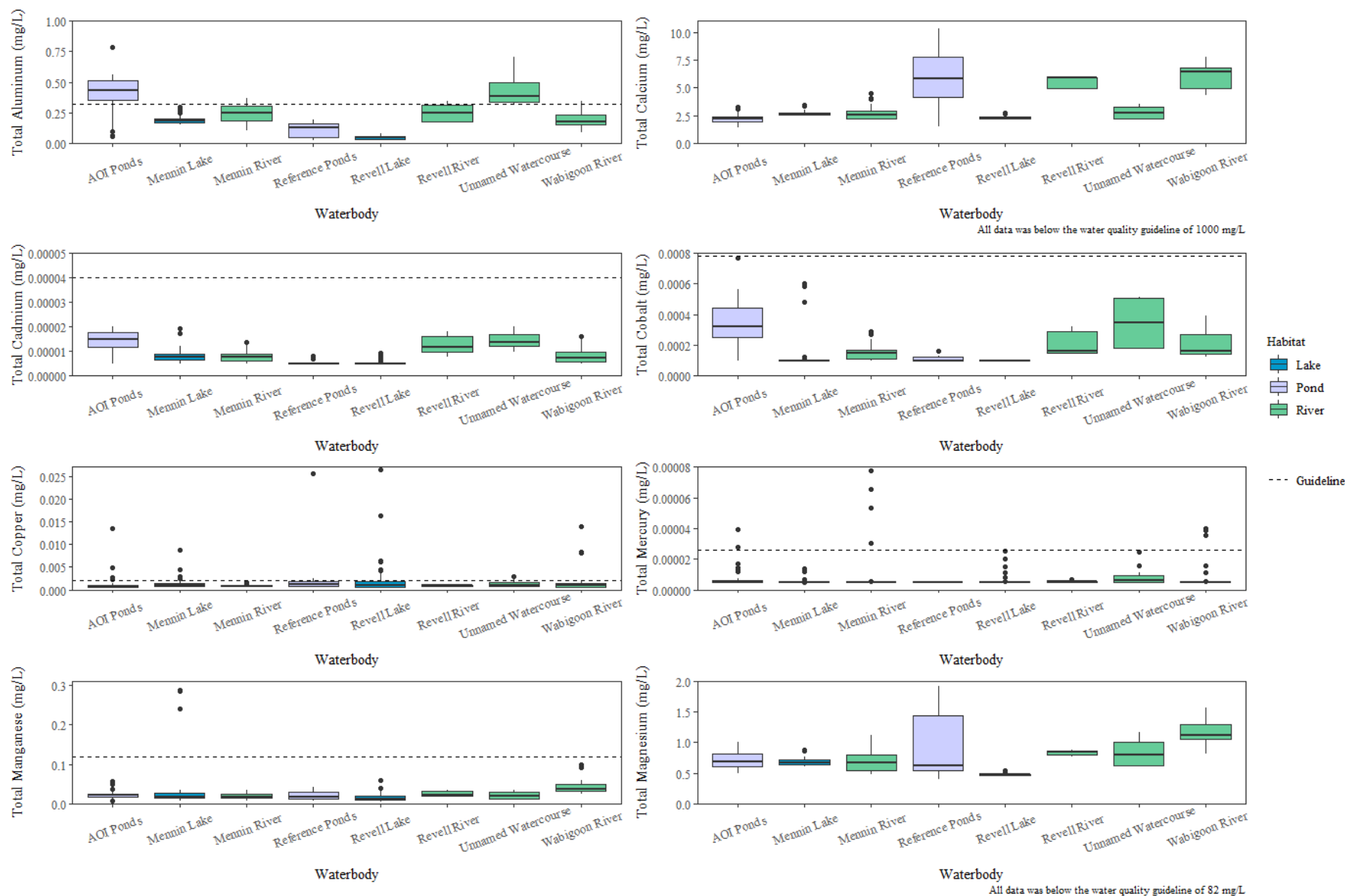


Figure 3-4 Summary of select metal COPC concentrations in surface water.

3.3.2.5 Organic Compounds

Polycyclic Aromatic Hydrocarbons (PAHs)

The class of chemicals known as PAHs occur naturally in coal, crude oil, and gasoline or produced when these products (and others) are burned. A total of 19 PAHs were assessed in the AOI Ponds and Reference Ponds and are presented in Appendix B, Table 9 and Table 10, respectively. Of the PAHs' assessed, 10 have available WQGs (Appendix B, Table 1). All values were measured at or below the RDL in both the AOI and Reference ponds. Although WQG exceedances were noted, it was due to the RDL of the analysis being higher than or equal to the available WQG for the PAHs. To more accurately determine if levels exceed guidelines during baseline conditions, lower RDLs will need to be achieved by the laboratory for anthracene and benzo(a)anthracene.

Semi-Volatile Organic Compounds (SVOCs)

The class of chemicals known as SVOCs can be found in pesticides, cleaning agents, personal care products, and additives to flooring, furniture, clothing, cookware, food packaging, and electronics (Lucattini et al. 2018). A total of 20 SVOCs were assessed in the AOI Ponds and Reference Ponds, and results are presented in Appendix B, Table 9 and Table 10, respectively. Of the SVOCs assessed, 18 have available WQGs (Appendix B, Table 1). All but two values were measured below RDLs. Some exceedances were noted due to the RDL of the analysis being higher than or equal to the available WQG. To more accurately determine if levels exceed guidelines during baseline conditions, lower RDLs will need to be achieved by the laboratory for 2,4-dichlorophenol, pentachlorophenol, and biphenyl.

Polychlorinated Biphenyls (PCBs)

The class of chemicals known as PCBs are anthropogenic compounds created for various applications, though largely based on chemical stability (i.e., dielectric fluid for industrial equipment, fire-retardant coatings, coolant, plasticizers, pesticide extenders, etc.; BC MOE 1992). PCBs are toxic to humans and the environment and are resistant to chemical degradation in the environment (BC MOE 1992). PCBs are slightly water soluble and are thus often associated with the solid fraction (i.e., particulate matter, sediment) or may vaporise into the hydrosphere (BC MOE 1992). All PCB measurements in the LSA_{sw} were below RDLs (Appendix B, Table 9 and Table 10). Five WQGs are available for PCBs (Appendix B, Table 1), all of which were lower than the RDL; therefore, lower RDLs are required to confirm exceedances of WQGs.

Petroleum Hydrocarbon Compounds (PHCs)

PHCs is a term used to describe any mixture of hydrocarbons that are found in crude oil. The total amount of hydrocarbons was measured through seven groupings, all of which were below RDLs (Appendix B, Tables 5, 6, 10, and 12) and below available guidelines (Appendix B, Table 1).

3.3.2.6 Herbicides and Pesticides

Three herbicides and pesticides were assessed in the AOI and Reference Ponds: AMPA, glufosinate, and glyphosate. All levels were below the RDL (Appendix B, Table 9 and Table 10) and below available guidelines (Appendix B, Table 1).

3.3.2.7 Radionuclides

A total of 24 naturally occurring and artificial radionuclides were assessed in the water chemistry samples from the LSA_{sw} (Appendix B, Table 5 through Table 12) of which 16 have available WQGs (Appendix B, Table 1). No radionuclide levels exceeded the available guidelines. It is noted that the Tier 2 radionuclides Pu-240 and Cm-244 were not measured.

3.3.3 Plankton

The objective of plankton sampling was to provide baseline plankton community metrics of density, richness, diversity, and biomass, and to characterize the community composition in the LSA_{sw}. Phytoplankton composition and biomass (primary production) provides an assessment of water-quality conditions and an indication of the trophic status of lakes. Zooplankton composition and biomass (secondary production) provide insight to the quality of the food chain and the energy flow through the system.

Plankton sampling was completed seasonally at three locations in Mennin Lake and two locations in Revell Lake throughout 2022 and 2023. Phytoplankton sampling was conducted in the spring, summer, fall, and winter, while zooplankton sampling was conducted in spring, summer, and fall due to restrictions with equipment during winter sampling events. Appendix B, Table 3 presents station depth and coordinates of sample locations.

Detailed phytoplankton enumeration results are presented in Appendix B, Table 13 through Table 16. Zooplankton enumeration results are detailed in Appendix B, Table 17 through

Table 20. Summaries of the phytoplankton and zooplankton community metrics and community composition are provided below.

3.3.3.1 Phytoplankton

Community Composition

Phytoplankton community composition is summarized in Figure 3-5 below. Appendix B, Table 13 and Table 15 presents enumeration results at the lowest practical level (LPL), while family-level descriptive stats are presented in Appendix B, Table 14 and Table 16.

Seasonal variability in community composition was observed across all seasons in Mennin Lake and Revell Lake; however, Chroococcaceae (cyanobacteria) and Chrysophyceae (golden algae) were the dominant taxa throughout the year.

In summer, Chroococcaceae was the dominant taxa in Mennin Lake (64.8%) and Revell Lake (84.6%), followed by unidentified Chrysophyceae comprising 18.3% and 12.0%, respectively, of the total community. As temperatures cooled into the fall, communities shifted slightly. In Mennin Lake, the community was dominated by Chroococcaceae (42.6%) and unidentified Chrysophyceae (21.2%), followed by a Fragilaraceae (11.5%) and Tabellariaceae (7.3%). Fall mixing events and increases in dissolved salts (i.e., calcium carbonate) can promote renewed phases of diatom abundance (Patrick 1977; Reynolds 2006), as seen in the rapid increase of Fragilaraceae and Tabellariaceae. In Revell Lake, unidentified Chrysophyceae (54.8%) in the fall dominated the community composition, followed by Chroococcaceae (28.0%).

A dramatic shift in community composition was observed in winter at Revell Lake. Unidentified Chrysophyceae substantially dominated the community composition, comprising 86.5% of the community. The next most abundant taxa were unidentified Cryptophyceae, which comprised 10.6% of the community. At Mennin Lake unidentified Chrysophyceae (41.1%) and Chroococcaceae (31.9%) remained the dominant taxa, followed by unidentified Cryptophyceae (13.8%) and Scenedesmaceae (7.1%). The increase in Chrysophytes and Cryptophytes may allude to their metabolic (phototrophic and heterotrophic) and motile (flagellate) strategies, enhancing their ability to survive harsh conditions, limited nutrient availability, and low-light levels (Bowling 2019; Butts and Carrick 2017; Hazukova et al. 2021).

As temperatures warmed into spring, Chyrosphyceae and Cryptophyceae remained the dominant taxa in Mennin Lake (79.5% and 6.9%, respectively) and Revell Lake (84.5% and 7.5%, respectively).

Cyanobacteria – Health Guidelines

Cyanobacteria can cause adverse health reactions; thus, Health Canada has established a guideline of 50,000 cells/mL for recreational waters (Health Canada 2022). The abundance of cyanobacteria remained well below the health guideline at both Mennin Lake and Revell Lake throughout Year 2 sampling. However, a dramatic increase in abundance was observed during summer sampling at both Mennin Lake and Revell Lake, reaching an average of 6,114 cells/mL and 11,346 cells/mL, respectively. Although cell density remained below health guidelines, it is noted that waterbodies should be monitored for summer algal blooms and the potential increase of cyanobacteria and harmful cyanotoxins.

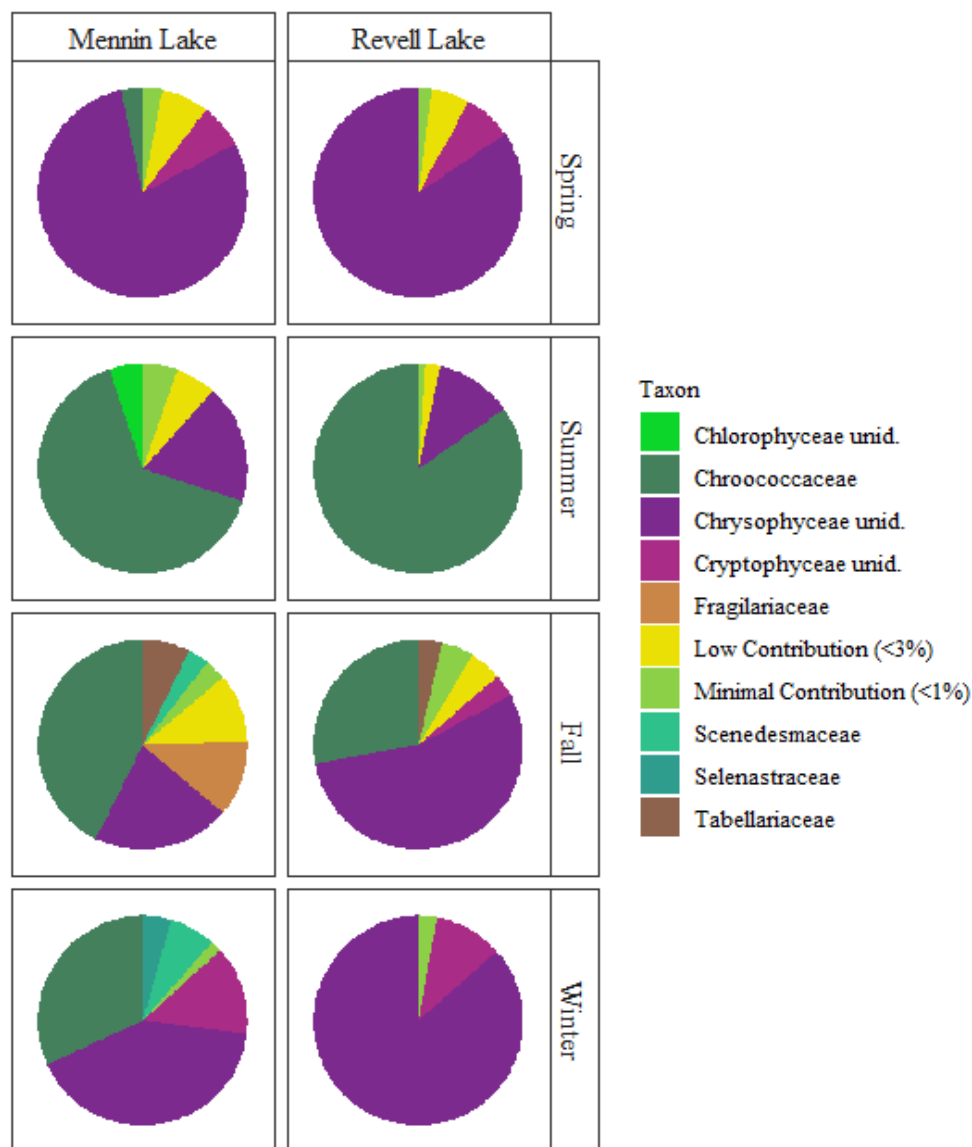


Figure 3-5 Phytoplankton percent composition in Mennin and Revell lakes, 2022/23.

Community Metrics

Community metrics are summarized in Table 3-7 below. In summer, the average density in Revell Lake reached 13,371,889 orgs/L, while the average density in Mennin Lake reached 9,396,667 orgs/L. Taxon richness was similar between the lakes in all seasons except winter where less taxa were identified in the samples from Revell Lake. Average Simpson's diversity of Mennin Lake was greater across every season when compared to Revell Lake. Average Simpson's evenness was low across seasons in both lakes, due to the high proportion of Chroococcaceae and Chrysophyceae, which made up 78.5% of the

Mennin Lake community composition and 93.1% of the Revell Lake community composition, across all seasons.

Table 3-7 Phytoplankton community metrics for Year 2 of EMBP, 2022/23.

Season	Average Density (Org/L)	Average Taxon Richness ¹	Average Simpson's Diversity ¹	Average Simpson's Evenness ¹
Mennin Lake				
Summer	9,396,667	30	0.480	0.064
Fall	3,877,222	26	0.733	0.144
Winter	277,333	11	0.700	0.303
Spring	3,422,556	21	0.281	0.066
Revell Lake				
Summer	13,371,889	27	0.253	0.050
Fall	3,154,111	25	0.590	0.098
Winter	242,000	6	0.217	0.213
Spring	1,479,667	20	0.198	0.062

¹metric was computed at the family level except for Cryptophyceae and Chrysophyceae

Non-phytoplankton were removed for analysis including: Hydrophilidae. Taxa which were also removed for analysis included: unidentified Chlorophyceae and unidentified Cyanophyceae.

3.3.3.2 Zooplankton

Community Composition

Zooplankton community composition is summarized in Figure 3-6. Appendix B, Table 17 and Table 19 present enumeration results at the LPL and a summary of family-level descriptive stats are presented in Appendix B, Table 18 and Table 20.

The zooplankton communities of Mennin Lake and Revell Lake varied slightly across seasons and were dominated by similar taxa. The community composition of Mennin Lake in summer was dominated by Vorticellidae (28.2%), Synchaetidae (19.9%), and unidentified Copepoda (14.0%). In Revell Lake, unidentified Copepoda (21.9%), Brachionidae (16.7%), Synchaetidae (14.4%), and Collothecidae (12.4%) comprised majority of the community composition.

During fall, communities shifted slightly. In Mennin Lake, the community composition was majorly comprised of Brachionidae (49.4%), Vorticellidae (16.7%), and Synchaetidae (10.9%). The community composition of Revell Lake was dominated by Brachionidae (28.6%), Conochilidae (12.9%), and Bosminidae (9.2%).

As temperatures warmed during spring conditions, communities in Mennin Lake and Revell Lake were dominated by the same taxa. Mennin Lake community composition was

comprised mostly of unidentified Copepoda (28.0%) and Synchaetidae (26.9%), followed by Brachionidae (16.2%). At Revell Lake the community composition was dominated by Synchaetidae (24.6%), followed by unidentified Copepoda (22.6%) and Brachionidae (18.2%).

Overall, the zooplankton communities in Mennin Lake and Revell Lake were largely dominated by Rotifers and Copepods. Rotifers comprised more than half of the zooplankton composition in Mennin Lake and Revell Lake. Their population stability stems from their diet, feeding on cyanobacteria and phytoplankton, in addition to their ability to lay resting eggs which may remain dormant throughout harsh conditions (i.e., winter; Kobayashi et al. 2019). Over a quarter of the population of each lake was comprised of Copepods, which also may produce resting eggs which can withstand adverse conditions. Additionally, Copepods are carnivorous, feeding on phytoplankton and small zooplankton (Kobayashi et al. 2019).

Protozoa also contributed nearly a quarter of the community composition in Mennin Lake. The success of Protozoa stems from their quick population growth by means of cell duplication, in addition to their efficiency at eating bacteria, phytoplankton, and some zooplankton, and their resilience to low-oxygen environments (Kobayashi et al. 2019), which tend to occur in summer when the water is warmer (low affinity for oxygen), has fewer mixing events, and increased microbial activity (i.e., decomposition).

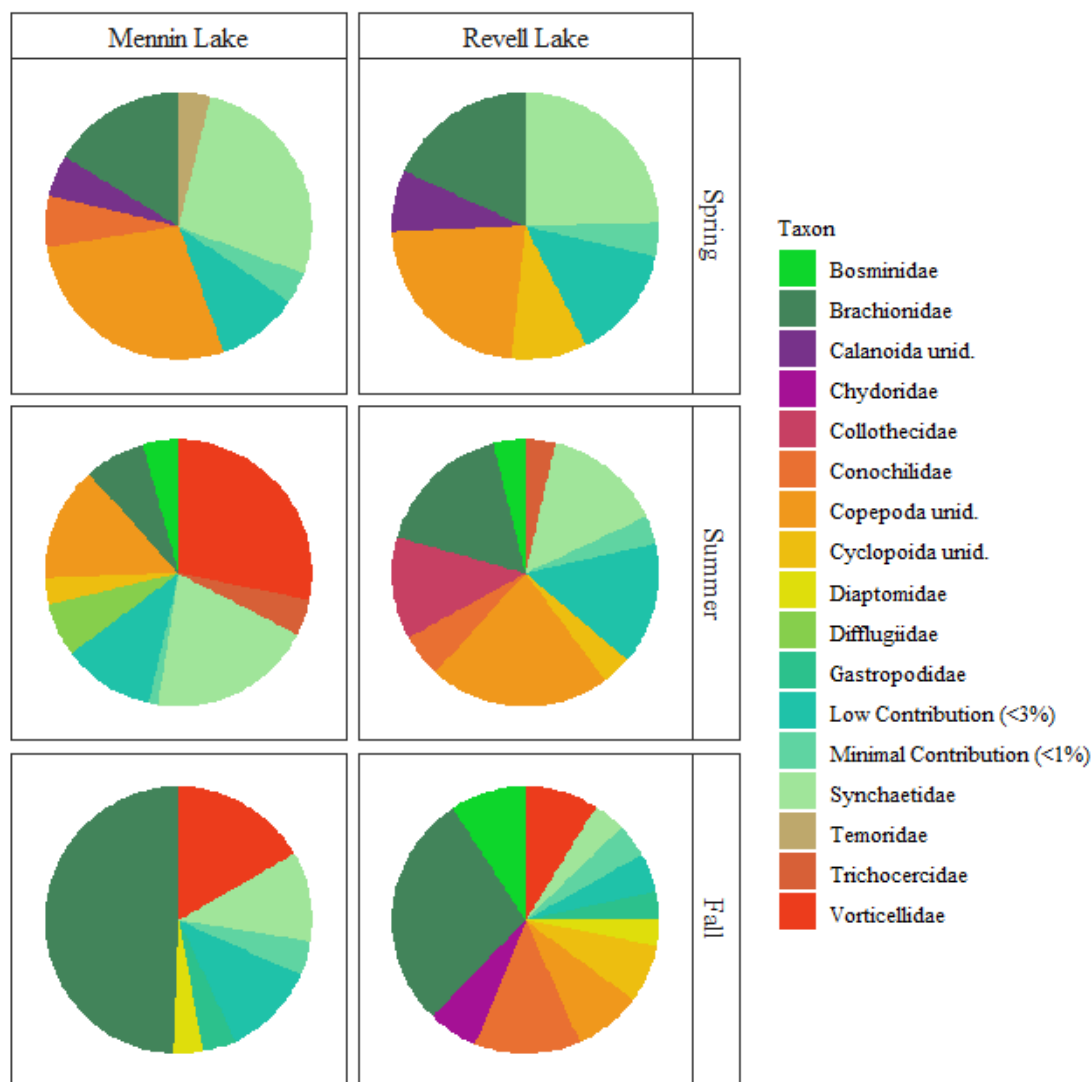


Figure 3-6 Zooplankton percent composition in Mennin and Revell lakes, 2022/23.

Community Metrics

A summary of community metrics is presented in Table 3-8 below. The average density of zooplankton in Mennin Lake, ranging from 55 org/L in spring to 163 orgs/L in summer, was substantially greater than that of Revell Lake, which ranged from 19 orgs/L in spring to 52 orgs/L in summer. Although the average density in Revell Lake was less than a third of that in Mennin Lake, the Simpson's diversity and Simpson's evenness was greater in Revell Lake, which is reflective of the high taxon richness (ranging from 19 to 21 in both lakes during all seasons). Simpson's diversity peaked during summer in both lakes, but was overall slightly higher in Revell Lake, ranging from 0.769 in spring to 0.872 in summer,

compared to Mennin Lake which ranged from 0.691 in fall to 0.808 in summer. Simpson's evenness ranged from 0.216 to 0.354 in Revell Lake and 0.154 to 0.261 in Mennin Lake.

Table 3-8 Zooplankton community metrics for Year 2 of EMBP, 2022/23.

Season	Average Density (Org/L)	Average Taxon Richness ¹	Average Simpson's Diversity ¹	Average Simpson's Evenness ¹
Mennin Lake				
Summer	163	20	0.808	0.261
Fall	103	21	0.691	0.154
Spring	55	20	0.725	0.182
Revell Lake				
Summer	52	22	0.872	0.354
Fall	36	19	0.844	0.338
Spring	19	20	0.769	0.216

¹Metric was computed at the family level, except for Cyclopoida

Non-zooplankton were removed, including unidentified Hydracarina and Chironomidae. Taxa which were also removed for analysis included: unidentified Cladocera, unidentified Calanoida, unidentified Copepoda, unidentified Ciliata, and unidentified Rotifera

3.3.4 Sediment

The objective of sediment quality and benthic invertebrate community sampling was to collect baseline data to gain an understanding of existing conditions in the LSA_{sw} and provide a baseline for which future conditions can be compared. Samples were collected during the fall campaign in September 2022. Sites were co-located with water quality sampling sites where possible.

Some equipment limitations were encountered during the sediment quality and benthic invertebrate sampling due to substrate composition. High amounts of clay and sand in the substrate prevented sample collection at Wabigoon River 1 (WR1) and Wabigoon River 3 (WR3).

Site coordinates, depth, and descriptions of each core collected are presented in Appendix B, Table 21. Sediment quality guidelines are summarized in Appendix B, Table 2 and sediment chemistry results and particle size composition are presented in Appendix B, Table 22 through Table 30. Benthic invertebrate community data were not yet available.

3.3.4.1 Anions, Nutrients, Organics, and Physical Characteristics

The concentration of anions, nutrients, and carbon were relatively low across the study area (Appendix B, Table 22 through Table 29). The Reference Ponds tended to have higher

carbon and nitrogen concentrations compared to lakes and rivers. The guidelines used to assess the general chemistry of sediment in the study area include TKN and TOC (Appendix B, Table 2). A summary of guideline exceedances is presented in Table 3-9 below. The TOC and TKN guideline exceedances were variable throughout the study area. The Lowest Effect Level (LEL) TOC guideline (1%) and TKN guideline (0.055%) were exceeded at all lake, pond, and river sites, with the exception to Revell River and Unnamed Watercourse; however, the Severe Effect Level (SEL) TOC guideline (10%) and TKN guideline (0.480%) were only exceeded at pond sites.

Because TOC and TKN are heavily influenced by local geology and topography, the selected TOC and TKN guideline may need to be re-evaluated for the study area. The LEL is defined as the level at which most organisms can tolerate the concentration, or the level at which ecotoxic effects become noticeable, whereas the SEL would have a pronounced effect on the sediment-dwelling organisms and could be detrimental to majority of the benthic species (MOEE 1993).

The Ministry recognizes the geologic diversity in Ontario and acknowledges natural sediment levels of TOC and TKN can vary considerably and may naturally exceed the LEL (BC MOE 2008; MOEE 1993). It is important to note that exceedance of an LEL is cautionary rather than indicative of hazards. The elevated TOC and TKN content in the Reference and AOI Ponds are likely due to lake morphology, such that the substantially decreased size supports wetland-like characteristics, which may include increased aquatic vegetation, microbial activity (i.e., decomposition), and planktonic activity; thus, the carbon and nitrogen content may be naturally elevated. While the LEL and SEL may be useful as an approximation for comparing carbon and nitrogen content, exploring the concentration of additional parameters should be used for determining the health of the sediment in the study area.

Table 3-9 Summary of exceedances of available guidelines for anions, nutrients, organics, and physical characteristics in sediment.

Parameter	Guideline	Exceedance									
		Mennin Lake Exposure	Mennin Lake Reference	Mennin River Exposure	Mennin River Reference	Revell Lake Exposure	Revell River Exposure	AOI Ponds Exposure	Reference Ponds Reference	Unnamed Watercourse Exposure	Wabigoon River Exposure
Total Kjeldahl Nitrogen	550 mg/kg										
Total Organic Carbon	1 %										

	All summary statistics below the guideline
	Mean above guideline
	95 th Percentile above guideline
	Mean and 95 th Percentile above guideline
	Median and 95 th Percentile above guideline
	Mean, Median and 95 th Percentile above guideline
	5 th Percentile, Mean, Median and 95 th Percentile above guideline

3.3.4.2 Metals and Trace Elements

Metal and trace element concentrations in sediments varied across the study area and habitat (lake, river, pond). Exceedances of multiple SQG (Appendix B, Table 2) suggests some metals and trace elements are naturally elevated within the study area. The concentrations of arsenic, bismuth, cobalt, lead, rhodium, ruthenium, samarium, silver, tungsten, and uranium remained below applicable guidelines in all study sites. No guidelines were exceeded in the Unnamed Watercourse, Wabigoon River, and Mennin River, with the exception of selenium. The guidelines for iron, manganese, vanadium, cadmium, and zinc were exceeded by the 95th percentile, mean, and/or the median at various sites throughout the study area. Chromium, copper, nickel, and selenium guidelines were exceeded by the 5th percentile, mean, median, and/or the 95th percentile at various sites, especially in the Mennin Lake reference area. A summary of the guideline exceedances are provided in Table 3-10 below. Detailed data is presented in Appendix B, Table 22 through Table 29.

Table 3-10 Summary of exceedances of available guidelines for metals and trace elements in sediment.

Parameter	Guideline (mg/kg)	Exceedance									
		Mennin Lake Exposure	Mennin Lake Reference	Mennin River Exposure	Mennin River Reference	Revell Lake Reference	Revell River Exposure	AOI Ponds Exposure	Reference Ponds Reference	Unnamed Watercourse Exposure	Wabigoon River Exposure
Arsenic, total	5.9										
Bismuth, total	65000										
Cadmium, total	0.6										
Chromium, total	26										
Cobalt, total	50										
Copper, total	16										
Iron, total	20000										
Lead, total	31										
Manganese, total	460										
Molybdenum, total	8.3										
Nickel, total	16										
Rhodium, total	600										
Ruthenium, total	390										
Samarium, total	2500										
Selenium, total	0.9										
Silver, total	0.5										
Tungsten, total	960										
Uranium, total	32										
Vanadium, total	27										
Zinc, total	120										

	All summary statistics below the guideline
	Mean above guideline
	95 th Percentile above guideline
	Mean and 95 th Percentile above guideline
	Median and 95 th Percentile above guideline
	Mean, Median and 95 th Percentile above guideline
	5 th Percentile, Mean, Median and 95 th Percentile above guideline

3.3.4.3 Organic Compounds

Polycyclic Aromatic Hydrocarbons (PAHs)

As discussed above, PAHs are a class of chemicals that occur naturally in coal, crude oil, and gasoline. A total of 19 PAHs were assessed in the AOI Ponds and Reference Ponds, of which 17 have available SQGs (Appendix B, Table 2). Results are presented in Appendix B, Table 26 and Table 27, respectively. All values measured were at or below the RDL in

both the AOI Ponds and Reference Ponds. Exceedances of SQGs were noted; however, the RDL was above the SQG for all compounds. To more accurately determine if levels exceed guidelines during baseline conditions, lower RDLs will need to be achieved by the laboratory. No SQGs are available for 1+2-Methylnaphthalenes or Benzo(b)fluoranthene.

Semi-Volatile Organic Compounds (SVOCs)

As discussed above, SVOCs are a class of chemicals that can be found in pesticides and a multitude of anthropogenic products. A total of 21 SVOCs were assessed in the AOI Ponds and Reference Ponds, of which 13 have available SQGs (Appendix B, Table 2). Results are presented in Appendix B, Table 26 and Table 27, respectively. All but one value were measured below RDLs. Similar to the PAHs, some exceedances were noted due to the RDL of the analysis being higher than or equal to the available SQG. To more accurately determine if levels exceed guidelines during baseline conditions, lower RDLs will need to be achieved by the laboratory.

3.3.4.4 Radionuclides

Radionuclides can occur naturally or artificially in the environment. A total of 22 naturally occurring and artificial radionuclides were assessed in the sediment chemistry samples from the LSA_{sw} of which 11 have available SQGs (Appendix B, Table 2). Results are presented in Appendix B, Table 22 through Table 29. Carbon-14, Cobalt-60, Iodine-129, Ruthenium-106, Strontium-90 and Tritium were consistently measured at or below the RDLs. Radionuclides measured above detection limits were considered within an acceptable range. All values remained below the available SQGs in all study areas.

3.3.4.5 Particle Size

Particle size and particle size composition are important attributes to consider when characterizing and investigating the quality of sediment. Particle size can influence the concentration of metals and nutrients, biogeochemical pathways, and the ecology of benthic invertebrates. The particle size composition of sites within the study area was variable and is summarized in Figure 3-7 and Appendix B, Table 30.

Silt and clay comprised the majority (>90%) of the particle size composition of the AOI Ponds, Mennin Lake (exposure and reference), Mennin River (reference), and the Reference Ponds. Mennin River (exposure) and Revell Lake (reference) were also largely comprised of silt (~60%), however, fine and coarse sand comprised >30% of the particle

size composition, with minimal clay content. Fine sand and coarse sand were the dominant particle size at Unnamed Watercourse (>60%) and Wabigoon River (>80%), followed by silt. At Revell River (exposure), coarse sand comprised over 65% of the particle size composition, with some fine sand (~30%). There are no SQGs associated with particle size content.

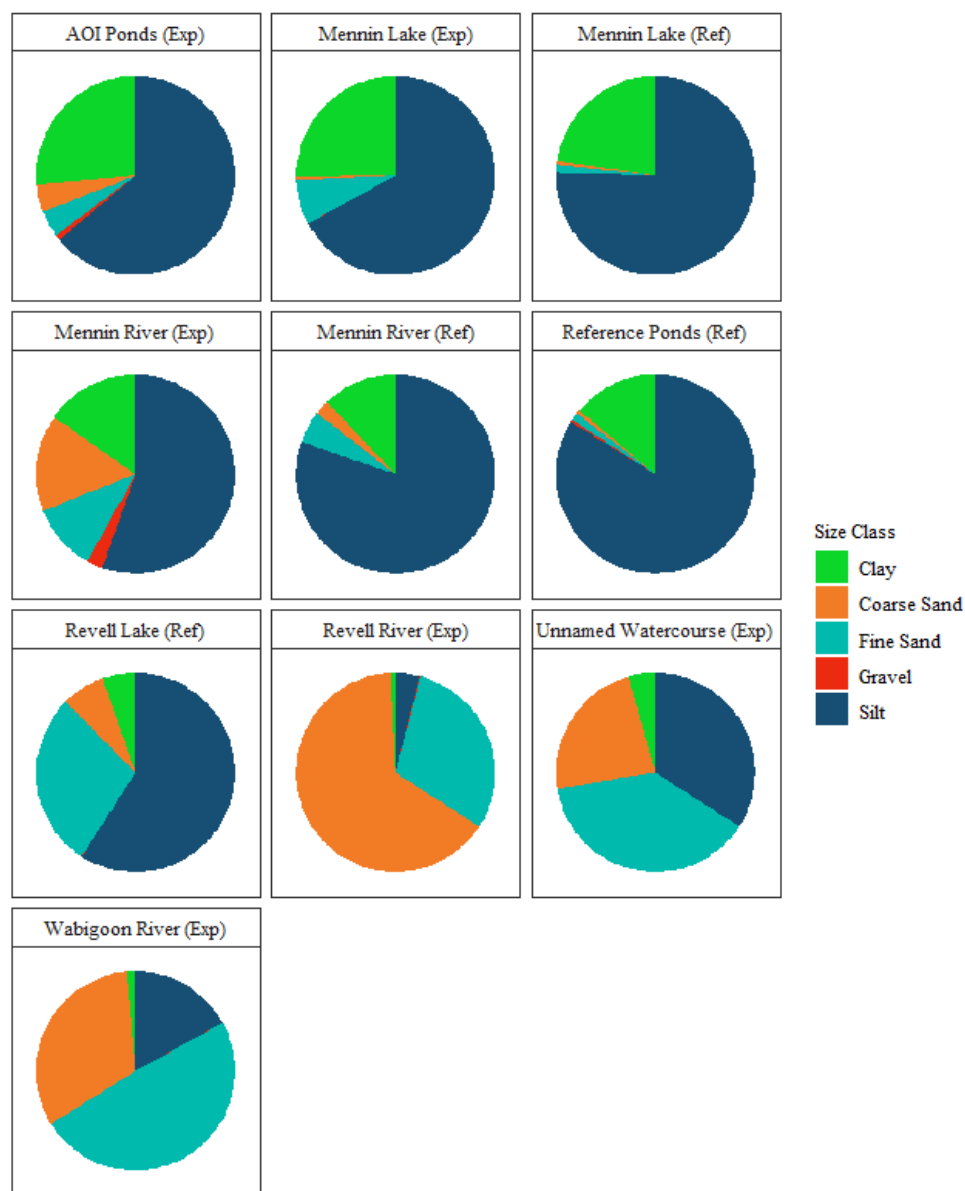


Figure 3-7 Summary of particle size composition of sediments collected during the Year 2 EMBP.

3.4 Summary

The Year 2 surface water quality program conducted in 2022 and 2023 continued the collection of baseline data for site characterization, water quality, and plankton community composition, and initiated sample collection for sediment quality and benthic invertebrate community composition.

The study area is a typical northern, forested environment with mature, undisturbed forests and few human developments nearby.

Water quality in the study area is normal and indicative of healthy ecosystems. All sites maintained a suitable amount of dissolved oxygen for aquatic life throughout most of the water column, had a slightly acidic pH, and low to moderate water clarity. Concentrations of anions, nutrients, organics, physical properties, and radionuclides were below relevant water quality guidelines throughout the study area. Bacteriological tests for *Escherichia coli* found some samples from the Mennin and Wabigoon rivers and the Unnamed Watercourse contained concentrations that exceeded the WQG. While there were few instances of water quality guideline exceedances for metals, most parameters were within an acceptable range or below RDLs. Samples analyzed for PAHs, SVOCs, PCBs, and herbicides and pesticides were below detection limits, with few exceptions.

Seasonal variability in plankton community composition was observed in Mennin Lake and Revell Lake. Chroococcaceae and Chrysophyceae tended to comprise majority of the phytoplankton community composition, while Vorticellidae, Synchaetidae, Brachionidae, and Copepods were the dominant zooplankton taxa. Phytoplankton and zooplankton communities were moderately diverse, though presented low evenness.

Sediment particle size was variable in the study area, with silt- and clay-sized particles dominating the composition of ponds and lakes, while rivers were largely comprised of sands. All samples analyzed for PAHs and SVOCs were below RDLs. Potential exceedances of radionuclide and PAH guidelines were observed; however, lower laboratory detection limits must be achieved to confirm these findings. Exceedance of SQGs for metals and TOC indicates the study area has naturally elevated concentrations of some of these parameters, which is important to characterize during baseline studies.

4.0 HYDROLOGY

4.1 Sampling Overview

The purpose of the hydrology monitoring component is to determine the existing hydrology conditions within the vicinity of the proposed Project location and to assess the potential impact posed by the development of the Project. The hydrologic conditions near the Project location will be monitored for at least three years and the data collected will be used to assess the feasibility of design, construction, and operation of the Project on the local hydrologic environment.

The AOI is bounded by Revell River to the northeast and the inlet location to Mennin Lake to the southwest. Three small streams are located within the area, running through multiple wetlands and small lakes in the southwest direction until reaching confluence before discharging into Mennin Lake. This inlet to Mennin Lake from the small streams within the study area is in close proximity to the outlet of Mennin Lake, which discharges towards the northwest into Mennin River. Figure 4-1 illustrates the locations and flow directions of the waterbodies within the study area.

Given the abundance of small streams, wetlands, and lakes near the AOI and the potential need to withdraw and discharge water during operation of the Project should this site be selected for further consideration, it is important to understand whether some of these waterbodies are intermittent, the variability of water volume available in the waterbodies, when/if any seasonal flooding may occur, and other factors that have an effect on the hydrologic conditions of the study area such as ice causing changes in the river paths, logging activities, forest fires, and man-made and animal (beaver) dams being built or altered.

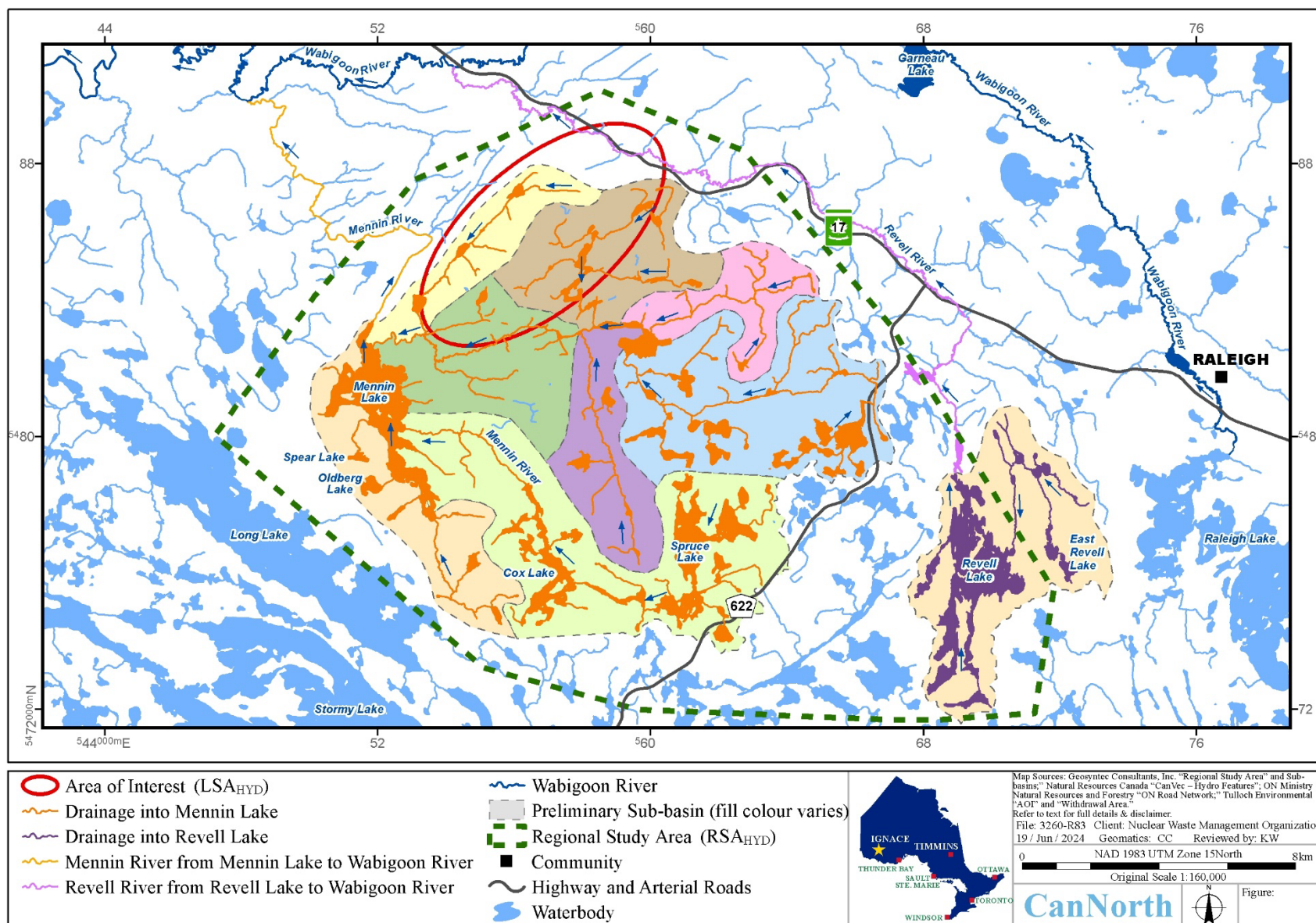


Figure 4-1 Surface waterbodies and flow directions in the study area.

During Year 2 of the program (summer 2022 to spring 2023), the monitoring instrumentation set up in Year 1 at the study area were used to continue collecting hydrologic and meteorological data. In addition, data gaps identified during review of the Year 1 data collection were addressed by resurveying or instrumentation maintenance in Year 2. Year 2 of the monitoring program consisted of the following elements.

- Continuous water level at two large lakes (Revell Lake and Mennin Lake) and eight smaller waterbodies (shown in Figure 4-2).
- Discrete flow measurements at two large rivers and five small rivers/streams (shown in Figure 4-2).
- Bathymetric re-survey of specific areas of Revell Lake (data gap identified in Year 1).
- Continuous meteorological data collection including ambient temperature, total precipitation, and snow cover.

A summary of the hydrology component of the EMBP is presented in this section.

4.1.1 Lake Water Level and Characteristics

In Year 2 of the monitoring program, level loggers that were installed at 10 locations during Year 1 in the AOI and surrounding areas were used to continuously measure the water level of waterbodies at 6-hour intervals. As shown in Figure 4-2, monitoring locations include Revell River (T15), Mennin River (T14), and eight other smaller streams, wetlands, and lakes in the study area (S01, S02, S04, S05, S09, S10, S11, S12). Barometric loggers were also installed in order to complement the level logger data and accurately determine true changes in water levels⁴. Water level measurement recording in Year 2 of the program lasted from July 2022 to June 2023 and will continue throughout the 3-year study period of this program.

The continuous water level monitoring data will be used as baseline information to understand the characteristics of the waterbodies within the study area, including the potential for increased water levels that might result in flooding, decreased water levels that might limit the ability to draw and discharge water, and changes in water quality due to changes in water level which might affect aquatic habitat.

⁴ Level loggers measure total pressure (water column equivalent plus barometric pressure). Barometric loggers are installed so that barometric pressure fluctuations can be removed from the level logger data.

4.1.2 Stream and River Flow

In Year 2 of the monitoring program, discrete flow measurements were taken using acoustic doppler velocimeters at two major rivers (Revell and Mennin rivers) and five small streams within the AOI and surrounding areas. The locations of the flow measurement locations are illustrated in Figure 4-2, labeled as large (FM14, FM15) and small (FM16 to FM20) river sites. The discrete flow measurements on the major rivers will be used to establish flow-discharge relationships for the waterways such that the continuous water level measurements can be translated to continuous flow measurements. The flow measurements at the small streams will be used to assess the range of flow present in the streams throughout the high and low flow seasons.

The flow measurements will help in assessing the feasibility of withdrawing water for supply. The measurements will also be used to evaluate the assimilative capacity of these waterbodies and establish water balance between the major rivers and Mennin Lake.

4.1.3 Bathymetry

The purpose of the bathymetric surveys is to estimate the stage-storage relationship of these waterbodies. With this information in conjunction with the lake water level data, the seasonal variability of water volume in these waterbodies can be estimated and the feasibility of withdrawing water for supply and the assimilative capacity of these waterbodies can be assessed when considering this study area for the development of the Project.

In Year 1 of the monitoring program, bathymetric surveys were completed at 13 waterbodies. The locations of these surveyed waterbodies are illustrated in Figure 4-2, including Mennin Lake (S09), Revell Lake (S10), and 11 other smaller wetlands and lakes (S01 to S08, S11 to S13). During the quality control assessment, it was determined that the high wind/waves conditions on the day of the survey for Revell Lake (July 2021 at S10) resulted in the data failing the quality control. As a result, specific areas in Revell Lake were re-surveyed in August 2023. Although the timing of the re-survey is at the beginning of Year 3 of the program, the field method and re-survey result is covered in this report. Results for the other 12 waterbodies are discussed in the Year 1 report (CanNorth and Geosyntec 2023).

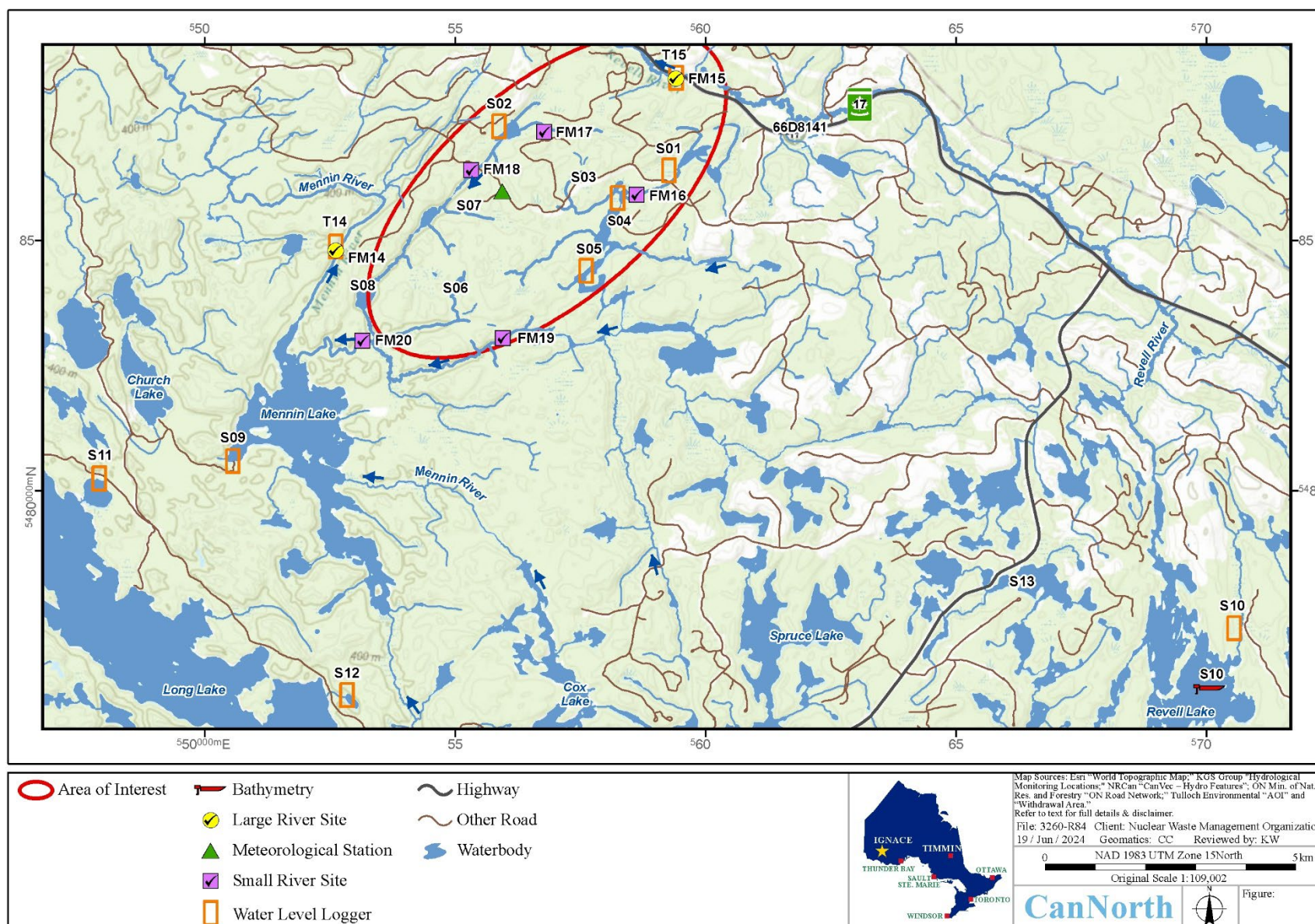


Figure 4-2 Hydrology monitoring locations in Year 2 of the EMBP.

4.1.4 Meteorology

A meteorological station was installed at the beginning of Year 1 of the program near the center of the AOI as shown on Figure 4-2 to provide supporting information for hydrology and other programs. Continuous soil moisture content, ambient temperature, total precipitation (rainfall and estimate of snowfall), snow depth, wind speed and direction, relative humidity, atmospheric pressure, and solar radiation were recorded continuously in Year 2 and these recordings will continue throughout the 3-year study period. The collected meteorological data will support not only the hydrology component of the site feasibility studies, but also the surface water, soil, and air components. For the hydrology component, the most important data collected are ambient temperature and precipitation, which will be used to assess the frequency of intense rainfall, major flooding events, drought conditions, and snow cover seasonality. The data will also be used to assess how climate change will impact the longer-term hydrologic conditions of the AOI.

4.2 Methods

4.2.1 Field Methods

4.2.1.1 Water Level

Level loggers were installed and used to collect the water level data at 6-hour intervals. The water level stations were installed by inserting the pressure transducer into a perforated plastic tubing attached to an aviation cable. The cable was then secured to a ground anchor and the pressure transducer was submerged into the waterbody at a depth that would remain underwater during normal water level fluctuations. Barometric pressure transducers were also installed. Throughout Year 2 of the monitoring period, maintenance visits were conducted to ensure that instrumentation defects, battery life, and wildlife did not affect the continuous collection of water level data.

4.2.1.2 Flow Measurements

To measure the stream flow, field staff entered the watercourses and used acoustic doppler velocimeters for smaller streams and rivers with lower flow depth (FM16 through to FM20 in Figure 4-2) and with acoustic doppler current profilers for larger streams and river with higher flow depths (FM14 and FM15 in Figure 4-2). The velocity data collected at each flow measurement location were incorporated with the water depth and the waterway cross-section information to calculate the discharge at time of measurement.

4.2.1.3 Bathymetric Survey

Bathymetric data of waterbodies in the study area were captured using a sonar attached to the side of a boat or canoe used for the survey. A survey grade Global Positioning System (GPS) tracker was used in conjunction with the sonar unit to collect the geodetic data of the lake depths at 5-meter intervals across the entire waterbody of interest.

4.2.1.4 Meteorological Station

A solar-powered Campbell Scientific datalogger with cellular communication link was deployed in Year 1 as the meteorological station for this monitoring program. In Year 2, the station continued to collect barometric pressure, air temperature, relative humidity, rain, snow depth, wind speed, wind direction, net solar radiation, and soil water content at 15-minute intervals. The data are uploaded hourly to cloud storage.

4.2.2 Data Quality Assurance & Quality Control

For each monitoring component, QA/QC measures were completed as part of the data collection effort and included calibration of survey equipment, protection of the instrument against factors that may obstruct or damage the equipment (wildlife, flooding, and winter conditions), and establishing proper vertical and horizontal datum for the data collection. Project Quality Plans (PQPs) and Data Management Plans (DMPs) were completed for the monitoring components and the work was carried out consistent with these PQPs and DMPs.

Data quality controls were also conducted throughout Year 2 of the monitoring programs. Site visits to the monitoring stations were conducted to download and assess the reliability of the data, re-calibrate the survey equipment, and perform other maintenance activities periodically. After the data from Year 2 were retrieved, the data were checked for completeness and reliability (by comparison with normal ranges expected for the AOI).

4.3 Results

The data from the Year 2 hydrology monitoring component of the EMBP are summarized in Appendix D. A brief summary is provided herein.

4.3.1 Water Level

Continuous water level monitoring was completed in Year 2. Water levels were recorded at 10 water level monitoring locations at 6-hour intervals from July 2022 to June 2023 (Year 2). Water level data at 9 of the 10 stations were retrieved in October 2023. Year 2 water level data at station S05 were not retrieved due to difficulty accessing the station. The logger at S05 was programmed to continue collecting data, which will be retrieved during Year 3 of the program. Therefore, level data from S05 were not available for analysis in this report.

No major data gaps were discovered at the nine stations from which data were retrieved. The seasonal variation in water level for all stations during Year 2 was between 0.4 m to 1.7 m, which is within the reasonable range for small lakes and streams in the area and slightly lower than the variations recorded in Year 1 of the program. The water level monitoring will continue for another year at a minimum.

4.3.2 Stream and River Flow

The discrete stream and river flow monitoring was only partially completed in Year 2, primarily due to difficulty in accessing some of the monitoring sites. Monitoring was incomplete for FM14, FM17, and FM20 (see Figure 4-2).

For the two larger rivers where the flow measurements were used to establish stage-flow relationships (FM14 and FM15 in Figure 4-2), an adequate number of measurements and a wide range of flow conditions at time of measurement are critical. Based on these two criteria, the flow measurements on the Revell River (FM15) can be preliminarily considered complete with seven measurements ranging from 0.1 m³/s to 2.6 m³/s, including three measurements taken in Year 2 of the program. However, due to a beaver dam obstructing the access road to the flow measurement location on the Mennin River (FM14), only four flow measurements have been collected since the beginning of the Year 1 monitoring program, including one measurement in June 2023 during Year 2. In addition, three out of the four measurements were collected during similar near zero flow conditions. Therefore, at least two more flow measurements are necessary to develop the stage-flow relationship for FM14.

Similar to the Mennin River, access to two of the five flow measurement locations for small streams (FM17 and FM20) was restricted and no flow measurement was taken at these two streams in Year 2. Alternative monitoring locations will be selected or alternative means

of transportation (by air or by water) will be used to fill the data gaps in Year 3 of the EMBP at these locations. Three measurements were collected at FM16, FM18 and FM19 in August 2022, November 2022, and June 2023. Therefore, monitoring at these three flow measurement locations in Year 2 is considered completed.

4.3.3 Bathymetry

The bathymetric survey results at Revell Lake (S10) from August 2023 have been digitized. While some areas remained where bottom substrate/vegetation resulted in not-applicable data, these areas were interpolated, and a complete bathymetric map was developed. Overall, the results of the bathymetric survey showed that Revell Lake (S10) has a bottom elevation of 429 meters (vertical datum: CGVD2013) and a maximum depth of 17 meters during the time of survey. By the end of Year 2 of the program, bathymetry surveys at all waterbodies proposed for the program have been completed.

4.3.4 Meteorology

A variety of meteorological parameters were monitored continuously at the meteorological station, with the most important parameters for site hydrology being ambient temperature and total precipitation. There is one 3-day gap in the data for Year 2, from February 3rd, 2023 to February 6th, 2023. Otherwise, data gaps in the Year 2 data are minimal. Due to the data gap, statistics for February 2023 such as precipitation and average temperatures are less reliable. However, the overall completeness of the Year 2 meteorological record is good.

The temperature data for Year 2 generally appear to be of good quality and show expected trends, with average monthly temperatures ranging from -12.7 °C in December to 18.8 °C in June. Average monthly daily maximum temperatures range from -9.3 °C in December to 24.9 °C in June, while average monthly daily minimum temperatures range from -18.5 °C in February to 12.8 °C in August. As noted above, the February averages are more uncertain due to the 3-day data gap. However, the lowest recorded daily minimum temperatures in Year 2 did occur in February 2023.

The snowfall data indicate a total of 286.6 cm of snow accumulation in Year 2, with measured snow occurring between October and May and the highest accumulation in November 2022, December 2022, and April 2023.

The total precipitation data appear reasonable during the summer but appear to underestimate total precipitation during the winter. For example, zero total precipitation was recorded throughout December 2022, while snow accumulation was estimated at 67.4 cm. This may indicate a general issue with accurately recording snow water equivalent during periods of heavier snow. The total precipitation recorded for Year 2 was 254.3 mm, compared with 504.6 mm at the Dryden Regional meteorological station maintained by Environment and Climate Change Canada. While the precipitation data at the AOI may be underestimated during the winter (due to the potential issue during periods of higher snowfall), the greatest difference with the Dryden Regional station during Year 2 occurred during July 2022, where 215.3 mm of precipitation were recorded at Dryden compared to 79.6 mm at the AOI. There is no indication of issues with the data at the AOI during this period; the high rainfall accumulation at Dryden during July 2022 was likely more localized. Despite being substantially less than at Dryden, July 2022 was still the month with the highest recorded precipitation at the AOI during Year 2.

4.4 Summary

In summary, the hydrology portion of the EMBP was partially completed for Year 2. Water level monitoring and bathymetry survey were completed. Stream and river flow monitoring was not completed at three stations (FM14, FM17 and FM20) due to access restrictions, which was a data gap identified in Year 1 of the program but not addressed in Year 2. Additional aerial imagery collection during winter to assess snow and ice cover, which was identified as a data gap in Year 1, was not completed in Year 2 of the program either. Corrective actions have been identified to address these gaps and will be carried out in Year 3 of the EMBP. Air temperature data from Year 2 appear of good quality; the precipitation data collected in Year 2 should be evaluated further to ensure accurate measurement during snowfall periods.

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APPENDIX A

QA/QC METHODS AND RESULTS

APPENDIX A: QA/QC METHODS AND RESULTS

INTRODUCTION

All sample collection and handling in the field adhered to applicable protocols, whenever possible. Any deviations from protocols were recorded along with the rationale for the deviation.

All chemistry and taxonomy samples were analyzed by ALS in Winnipeg. ALS is certified and accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA). As such, the ALS laboratories adhere to strict QA/QC standards and protocols. With each set of samples run, ALS tests reference materials, duplicates, and spiked samples.

METHODS

Water Quality

Some of the specific QA/QC methods employed during the water quality sampling program included:

- Regular calibration, inspection, and accuracy verifications of field meters and equipment.
- Use of gloves during sampling.
- Sampling equipment was rigorously cleaned prior to departure for the field to avoid sample contamination and equipment was triple rinsed with site water prior to use.
- The peristaltic pump was run for approximately 5 to 7 minutes so that the tubing was rinsed with approximately three times its volume; the water was then discarded prior to sampling.
- Sampling from downstream to upstream where replicates are collected.
- General measures to prevent sample contamination were adhered to (e.g., avoid contact with fuel while sampling).
- Avoiding contact with the insides of sample bottles, including lids.
- Limiting exposure of the inside of the sample bottles to the atmosphere.
- Sample bottles were filled to the top without any headspace unless specified otherwise. Some substances may volatilize and may be lost from a headspace when a bottle is opened.
- Samples for laboratory analysis were kept cool (4°C) and in the dark but not frozen.
- Samples were delivered to the laboratory daily to ensure hold times were met for all applicable parameters (shortest hold time was for *E. Coli* at 30 hours).

The following blanks and field duplicates were collected for verification of the analytical results:

- One field blank per survey was collected by bringing lab supplied deionized water into the field. Field blanks were prepared by passing deionized water through the Kemmerer and all other sample handling procedures, including filtration for the field filtered parameters and preservation. A second field blank was collected if a peristaltic pump was used and was be prepared by passing deionized water through the pump and following all other sample handling procedures.
- One filtration blank per survey was collected by running deionized water supplied by the analytical laboratory through the filtration system, putting it into sample containers and preserving the samples.
- One trip blank per survey was prepared by the analytical laboratory by filling one set of sample bottles with deionized water and adding preservatives where appropriate. The trip blanks were transported to the field site with the same handling and transport protocols, but they were not opened at any point in the field and thus were not exposed to the environment.
- Field duplicate samples were collected at a frequency of five samples per season. Duplicates were collected at the same time as the main sample and filled at the same time from the same Kemmerer.

Plankton

The following are some of the specific QA/QC methods employed during the plankton sampling program:

- All phytoplankton weighted sample tubing (Nalgene or Tygon) were triple rinsed with site water prior to sampling; and
- The fine mesh Wisconsin net was soaked in the site lake water for 2 minutes prior to use then attached to zooplankton bucket.

Sediment Quality

The following are some of the specific QA/QC methods employed during sediment sampling program:

- Samples were discarded if the sampling quality control measures were not met.
- Sampling equipment was cleaned prior to the start of sampling.
- Chain-of-custody forms were used in the transportation of samples so the samples could be tracked from the field to the laboratory.

- Field duplicate samples were taken at a frequency of approximately 10% of the samples collected to ensure that sampling and laboratory analyses produced repeatable results.

QA/QC Data Analyses

For the water and sediment samples, the Relative Percent Difference (RPD) was calculated between the test sample and the duplicate sample¹. The Data Quality Objective (DQO) for the RPDs was set at 20% for water quality (EC 2012; SEPS 1989), and 40% for sediment quality. The intent of applying this DQO was to provide a benchmark for the initial data screening process, which determined whether the results were acceptable or required further investigation. It is estimated that at concentrations near the reportable detection limit (RDL), measurement uncertainty is very high, often approaching 100% at concentrations within five times the RDL. Thus, RPDs of greater than 20% or 40% were only considered a potential issue if the test and duplicate results were both greater than five times the RDL.

Similarly, parameter concentrations in the water field and trip blank samples should be at or below the RDL as they are composed of deionized water. Thus, if parameter concentrations were greater than five times the RDL in the field and trip blank samples they were further investigated.

Plankton samples were identified to the lowest taxa possible and enumerated. Subset counts were performed regularly to confirm sorting efficiency. A different technician conducted each count independently. The DQO was set to 30% and 3 of the 5 top-ranking identified organisms must agree. Plankton taxonomy and enumeration data were also reviewed for potential data entry errors prior to analysis of community composition and metrics.

The QA/QC tables in Appendix A present the calculated RPDs, identify whether parameter concentrations are higher than five times the RDL, and flag parameters that exceed the above mentioned criteria.

RESULTS

Water Quality

Water chemistry QA/QC results from the summer and fall of 2022 and winter and spring of 2023 are presented in Appendix A, Tables 1 through 4. In a few instances, the RPDs for some parameters in some of the water samples exceeded the DQO of 20% and were five times greater than the RDL.

¹ $(RPD = ((Duplicate - Sample)/((Duplicate + Sample)/2))*100$.

Unfortunately, flagged results were not able to be re-analysed by ALS for confirmation of the original measurement. ALS includes comprehensive QC checks with every analysis to ensure high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined data quality objectives to provide confidence in the accuracy of associated test results. Additionally, analytical results for the field blank and trip blank samples were low or non-detectable and considered acceptable. Thus, these exceedances are likely related to matrix heterogeneity and measurement uncertainty and not a result of sample contamination.

Plankton

Plankton identification and enumeration QA/QC results are presented in Appendix A, Table 5. The RPD of all QA/QC recounts ranged from 0% to 18%, thus falling within the target DOQ of 30%. Additionally, the top-ranked organisms were confirmed. The high percent agreement between recounts indicates results were not affected by subsampling procedures and that they are therefore valid.

Sediment Quality

The sediment chemistry and particle size QA/QC results are presented in Appendix A, Table 6 and Table 7. In total, two analytes (calcium and clay content) exceeded the DQO while being more than 5 times greater than the RDL. Those occurred in samples collected in September 2022. Unfortunately, flagged results were not able to be re-analysed by ALS for confirmation of the original measurement. ALS includes comprehensive QC checks with every analysis to ensure high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined data quality objectives to provide confidence in the accuracy of associated test results. Overall, the number of flagged results was less than 1% of the measures taken for this survey (116 analytes x 6 pairs of samples = 696 measures). Variability between the samples and their duplicates in these two measures is likely attributable to a small amount spatial heterogeneity occurring in sediment collected. The results were therefore overall considered consistent between the samples and their duplicates, and no contamination of the samples was apparent.

LITERATURE CITED

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APPENDIX A, TABLE 1

Water chemistry QAQC results, summer 2022.

Analyte	Units	RDL	Summer 2022											
			Mennin Lake				Mennin River				UWB-03			
			ML2-A				MR2-A				P3-A			
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹
Aggregate Organics														
Biochemical Oxygen Demand	mg/L	2	2.5	<2	22.2	No	<2	<2	0.0	No	<2	<2	0.0	No
Anions and Nutrients														
Ammonia, Total (as N)	mg/L	0.01	<0.01	0.018	57.1	No	0.019	0.015	23.5	No	0.018	0.017	5.7	No
Bromide	mg/L	0.1	<0.1	<0.1	0.0	No	<0.1	<0.1	0.0	No	<0.1	<0.1	0.0	No
Chloride	mg/L	0.5	0.62	0.62	0.0	No	<0.5	<0.5	0.0	No	<0.5	<0.5	0.0	No
Fluoride	mg/L	0.02	0.038	0.038	0.0	No	0.037	0.037	0.0	No	0.024	0.025	4.1	No
Iodide	mg/L	0.2	0.96	<0.2	131.0	No	<0.2	<0.2	0.0	No	<0.2	<0.2	0.0	No
Kjeldahl nitrogen, total [TKN]	mg/L	0.2	0.32	3.94	170.0	No	0.36	0.39	8.0	No	0.4	0.41	2.5	No
Nitrate (as N)	mg/L	0.02	<0.02	<0.02	0.0	No	<0.02	0.021	4.9	No	<0.02	<0.02	0.0	No
Nitrate and Nitrite as N	mg/L	0.07	<0.07	<0.07	0.0	No	<0.07	<0.07	0.0	No	<0.07	<0.07	0.0	No
Nitrite (as N)	mg/L	0.01	<0.01	<0.01	0.0	No	<0.01	<0.01	0.0	No	<0.01	<0.01	0.0	No
Phosphorus, total	mg/L	0.003 to 0.03	0.0137	0.0098	33.2	No	0.0135	0.0141	4.3	No	<0.03	<0.03	0.0	No
Sulfate (as SO4)	mg/L	0.3	0.9	0.9	0.0	No	0.65	0.66	1.5	No	<0.3	<0.3	0.0	No
Cyanides														
Cyanide, Total	mg/L	0.002	<0.002	<0.002	0.0	No	<0.002	<0.002	0.0	No	<0.002	<0.002	0.0	No
Herbicides														
AMPA	µg/L	0.5	-	-	-	-	-	-	-	-	<0.5	<0.5	0.0	No
Hydrocarbons														
F1 (C6-C10)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
F1-BTEX	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
F2 (C10-C16)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
F3 (C16-C34)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
F4 (C34-C50)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
TEH (C10-C50)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
TEH (C16-C50)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals Dissolved														
Aluminum, dissolved	mg/L	0.001	0.147	0.146	0.7	Yes	0.258	0.263	1.9	Yes	0.312	0.308	1.3	Yes
Antimony, dissolved	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No
Arsenic, dissolved	mg/L	0.0001	0.00031	0.00034	9.2	No	0.00041	0.00039	5.0	No	0.00043	0.00043	0.0	No
Barium, dissolved	mg/L	0.0001	0.00512	0.00527	2.9	Yes	0.00604	0.00595	1.5	Yes	0.00529	0.00528	0.2	Yes
Beryllium, dissolved	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No
Bismuth, dissolved	mg/L	0.00005	<0.00005	<0.00005	0.0	No	<0.00005	<0.00005	0.0	No	<0.00005	<0.00005	0.0	No
Boron, dissolved	mg/L	0.01	<0.01	<0.01	0.0	No	<0.01	<0.01	0.0	No	<0.01	<0.01	0.0	No
Cadmium, dissolved	mg/L	0.000005	0.0000063	0.0000085	29.7	No	0.0000131	0.0000122	7.1	No	0.0000157	0.0000168	6.8	No
Calcium, dissolved	mg/L	0.05	2.58	2.63	1.9	Yes	2.35	2.33	0.9	Yes	1.85	1.88	1.6	Yes
Cerium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Cesium, dissolved	mg/L	0.00001	<0.00001	<0.00001	0.0	No	0.000012	0.000013	8.0	No	0.000017	0.000018	5.7	No
Chromium, dissolved	mg/L	0.0001	0.00032	0.00039	19.7	No	0.00048	0.00044	8.7	No	0.00049	0.00048	2.1	No
Cobalt, dissolved	mg/L	0.0001	<0.0001	<0.0001	0.0	No	0.00025	0.00026	3.9	No	0.00032	0.00033	3.1	No
Copper, dissolved	mg/L	0.0002	0.0007	0.00337	131.2	No	0.00066	0.00065	1.5	No	0.00043	0.00045	4.5	No

APPENDIX A, TABLE 1
Water chemistry QAQC results, summer 2022.

Analyte	Units	RDL	Summer 2022											
			Mennin Lake				Mennin River				UWB-03			
			ML2-A				MR2-A				P3-A			
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹
Metals Dissolved														
Dysprosium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Erbium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Europium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Gadolinium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Gold, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Hafnium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Holmium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Iridium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron, dissolved	mg/L	0.01	0.152	0.153	0.7	Yes	0.467	0.469	0.4	Yes	0.609	0.593	2.7	Yes
Lanthanum, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead, dissolved	mg/L	0.00005	0.000058	0.00006	3.4	No	0.000119	0.000117	1.7	No	0.000238	0.000233	2.1	No
Lithium, dissolved	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No
Magnesium, dissolved	mg/L	0.005	0.643	0.653	1.5	Yes	0.624	0.619	0.8	Yes	0.541	0.536	0.9	Yes
Manganese, dissolved	mg/L	0.0001	0.00257	0.00277	7.5	Yes	0.0263	0.026	1.1	Yes	0.033	0.0325	1.5	Yes
Mercury, dissolved	mg/L	0.000005	<0.000005	<0.000005	0.0	No	<0.000005	<0.000005	0.0	No	<0.000005	<0.000005	0.0	No
Molybdenum, dissolved	mg/L	0.00005	0.000292	0.000295	1.0	Yes	0.000197	0.000199	1.0	No	<0.00005	<0.00005	0.0	No
Neodymium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel, dissolved	mg/L	0.0005	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	0.0	No
Palladium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus, dissolved	mg/L	0.05	<0.05	<0.05	0.0	No	<0.05	<0.05	0.0	No	<0.05	<0.05	0.0	No
Platinum, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium, dissolved	mg/L	0.05	0.358	0.369	3.0	Yes	0.309	0.315	1.9	Yes	0.374	0.381	1.9	Yes
Praseodymium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Rhenium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Rhodium, dissolved	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No
Rubidium, dissolved	mg/L	0.0002	0.00114	0.00114	0.0	Yes	0.00108	0.00107	0.9	Yes	0.00127	0.00115	9.9	Yes
Ruthenium, dissolved	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No
Samarium, dissolved	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No
Scandium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium, dissolved	mg/L	0.00005	0.000111	0.000079	33.7	No	0.000121	0.000083	37.3	No	0.000101	0.000094	7.2	No
Silicon, dissolved	mg/L	0.05	1.6	1.58	1.3	Yes	2.03	2.01	1.0	Yes	1.71	1.72	0.6	Yes
Silver, dissolved	mg/L	0.00001	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No
Sodium, dissolved	mg/L	0.05	1.86	1.1	51.4	Yes	0.996	0.968	2.9	Yes	1.84	1.77	3.9	Yes
Strontium, dissolved	mg/L	0.0002	0.00973	0.00979	0.6	Yes	0.0101	0.00993	1.7	Yes	0.00738	0.00761	3.1	Yes
Sulfur, dissolved	mg/L	0.5	<0.5	<0.5	0.0	No	<0.5	<0.5	0.0	No	<0.5	<0.5	0.0	No
Tellurium, dissolved	mg/L	0.0002	<0.0002	<0.0002	0.0	No	<0.0002	<0.0002	0.0	No	<0.0002	<0.0002	0.0	No
Terbium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium, dissolved	mg/L	0.00001	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No
Thorium, dissolved	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No
Thulium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX A, TABLE 1

Water chemistry QAQC results, summer 2022.

Analyte	Units	RDL	Summer 2022											
			Mennin Lake				Mennin River				UWB-03			
			ML2-A				MR2-A				P3-A			
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹
Metals Dissolved														
Tin, dissolved	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No
Titanium, dissolved	mg/L	0.0003	0.0015	0.00162	7.7	No	0.00287	0.0029	1.0	Yes	0.00305	0.00273	11.1	Yes
Tungsten, dissolved	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No
Uranium, dissolved	mg/L	0.00001	0.000084	0.000086	2.4	Yes	0.000112	0.000109	2.7	Yes	0.000058	0.000057	1.7	Yes
Vanadium, dissolved	mg/L	0.0005	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	0.0	No
Ytterbium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc, dissolved	mg/L	0.001	0.0031	0.166	192.7	No	0.0021	0.002	4.9	No	0.0032	0.0061	62.4	No
Zirconium, dissolved	mg/L	0.0002	0.00024	0.00025	4.1	No	0.00029	0.00028	3.5	No	0.00025	0.00025	0.0	No
Metals Total														
Aluminum, total	mg/L	0.003	0.157	0.196	22.1	Yes	0.295	0.293	0.7	Yes	0.356	0.352	1.1	Yes
Antimony, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No
Arsenic, total	mg/L	0.0001	0.00036	0.00034	5.7	No	0.00042	0.00043	2.4	No	0.00046	0.00048	4.3	No
Barium, total	mg/L	0.0001	0.00539	0.00565	4.7	Yes	0.0064	0.00663	3.5	Yes	0.00558	0.00556	0.4	Yes
Beryllium, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No
Bismuth, total	mg/L	0.00005	<0.00005	<0.00005	0.0	No	<0.00005	<0.00005	0.0	No	<0.00005	<0.00005	0.0	No
Boron, total	mg/L	0.01	<0.01	<0.01	0.0	No	<0.01	<0.01	0.0	No	<0.01	<0.01	0.0	No
Cadmium, total	mg/L	0.000005	0.0000075	0.000009	18.2	No	0.0000136	0.0000126	7.6	No	0.0000148	0.0000157	5.9	No
Calcium, total	mg/L	0.05	2.54	2.51	1.2	Yes	2.49	2.49	0.0	Yes	1.85	1.88	1.6	Yes
Cerium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Cesium, total	mg/L	0.00001	<0.00001	0.00001	0.0	No	0.000015	0.000015	0.0	No	0.000018	0.000018	0.0	No
Chromium, total	mg/L	0.0001	0.00033	0.00043	26.3	No	0.0005	0.00056	11.3	No	0.00061	0.00059	3.3	Yes
Cobalt, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	0.00027	0.00029	7.1	No	0.00037	0.00036	2.7	No
Copper, total	mg/L	0.0005	0.00076	0.00352	129.0	No	0.00097	0.00102	5.0	No	0.00075	0.00106	34.3	No
Dysprosium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Erbium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Europium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Gadolinium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Gold, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Hafnium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Holmium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Iridium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron, total	mg/L	0.01	0.205	0.258	22.9	Yes	0.557	0.571	2.5	Yes	0.763	0.758	0.7	Yes
Lanthanum, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead, total	mg/L	0.00005	0.000066	0.000079	17.9	No	0.000156	0.000158	1.3	No	0.000279	0.000284	1.8	Yes
Lithium, total	mg/L	0.001	<0.001	<0.001	0.0	No	0.001	0.001	0.0	No	<0.001	<0.001	0.0	No
Magnesium, total	mg/L	0.005	0.663	0.663	0.0	Yes	0.625	0.636	1.7	Yes	0.563	0.56	0.5	Yes
Manganese, total	mg/L	0.0001	0.0109	0.0116	6.2	Yes	0.0302	0.031	2.6	Yes	0.0348	0.0349	0.3	Yes
Mercury, total	mg/L	0.000005	<0.000005	<0.000005	0.0	No	<0.000005	<0.000005	0.0	No	<0.000005	<0.000005	0.0	No
Molybdenum, total	mg/L	0.00005	0.000287	0.000322	11.5	Yes	0.000196	0.000208	5.9	No	<0.00005	<0.00005	0.0	No
Neodymium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX A, TABLE 1

Water chemistry QAQC results, summer 2022.

Analyte	Units	RDL	Summer 2022											
			Mennin Lake				Mennin River				UWB-03			
			ML2-A				MR2-A				P3-A			
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹
Metals Total														
Nickel, total	mg/L	0.0005	<0.0005	<0.0005	0.0	No	0.00052	0.00051	1.9	No	<0.0005	<0.0005	0.0	No
Palladium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus, total	mg/L	0.05	<0.05	<0.05	0.0	No	<0.05	<0.05	0.0	No	<0.05	<0.05	0.0	No
Platinum, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium, total	mg/L	0.05	0.363	0.375	3.3	Yes	0.311	0.312	0.3	Yes	0.38	0.383	0.8	Yes
Praseodymium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Rhenium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Rhodium, total	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No
Rubidium, total	mg/L	0.0002	0.0012	0.00118	1.7	Yes	0.00107	0.00107	0.0	Yes	0.00124	0.00126	1.6	Yes
Ruthenium, total	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No
Samarium, total	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No
Scandium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium, total	mg/L	0.00005	0.000087	0.000097	10.9	No	0.000106	0.00009	16.3	No	0.000109	0.000123	12.1	No
Silicon, total	mg/L	0.1	1.64	1.67	1.8	Yes	2.17	2.21	1.8	Yes	1.92	1.89	1.6	Yes
Silver, total	mg/L	0.00001	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No
Sodium, total	mg/L	0.05	1.06	1.06	0.0	Yes	1.06	1.07	0.9	Yes	0.928	0.896	3.5	Yes
Strontium, total	mg/L	0.0002	0.00962	0.0099	2.9	Yes	0.0102	0.0101	1.0	Yes	0.00767	0.00784	2.2	Yes
Sulfur, total	mg/L	0.5	<0.5	0.52	3.9	No	<0.5	<0.5	0.0	No	<0.5	<0.5	0.0	No
Tellurium, total	mg/L	0.0002	<0.0002	<0.0002	0.0	No	<0.0002	<0.0002	0.0	No	<0.0002	<0.0002	0.0	No
Terbium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium, total	mg/L	0.00001	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No
Thorium, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	0.00011	9.5	No	<0.0001	<0.0001	0.0	No
Thulium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No
Titanium, total	mg/L	0.0003	0.00176	0.00264	40.0	Yes	0.00381	0.00378	0.8	Yes	0.00406	0.00429	5.5	Yes
Tungsten, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No
Uranium, total	mg/L	0.00001	0.000089	0.000093	4.4	Yes	0.000121	0.000121	0.0	Yes	0.000062	0.000063	1.6	Yes
Vanadium, total	mg/L	0.0005	<0.0005	<0.0005	0.0	No	0.00066	0.0007	5.9	No	0.0006	0.00062	3.3	No
Ytterbium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc, total	mg/L	0.003	<0.003	<0.003	0.0	No	<0.003	<0.003	0.0	No	<0.003	<0.003	0.0	No
Zirconium, total	mg/L	0.0002	<0.0002	0.00025	22.2	No	0.00024	0.00026	8.0	No	0.0002	0.00021	4.9	No
Metals Speciated														
Chromium, hexavalent [Cr VI], dissolved	mg/L	0.0005	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	0.0	No	0.00056	<0.0005	11.3	No
Chromium, hexavalent [Cr VI], total	mg/L	0.0005	<0.0005	<0.0005	0.0	No	<0.0005	0.00064	24.6	No	<0.0005	<0.0005	0.0	No
Chromium, trivalent [Cr III], dissolved	mg/L	0.0005	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	0.0	No
Chromium, trivalent [Cr III], total	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No
Microbiological Tests														
Coliforms, Escherichia coli [E. coli]	CFU/100mL	1	23	1	183.3	No	6	8	28.6	Yes	>200	145	31.9	Yes
Coliforms, total	CFU/100mL	1	162	>200	21.0	Yes	>200	>200	0.0	Yes	>200	>200	0.0	Yes

APPENDIX A, TABLE 1

Water chemistry QAQC results, summer 2022.

Analyte	Units	RDL	Summer 2022											
			Mennin Lake				Mennin River				UWB-03			
			ML2-A				MR2-A				P3-A			
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹
Organic_Inorganic Carbon														
Carbon, dissolved organic [DOC]	mg/L	0.5	13.7	13	5.2	Yes	20.2	19.8	2.0	Yes	20.9	21.4	2.4	Yes
Carbon, total inorganic [TIC]	mg/L	0.5	0.51	<0.5	2.0	No	<0.5	<0.5	0.0	No	<0.5	<0.5	0.0	No
Carbon, total organic [TOC]	mg/L	0.5	13.4	13.4	0.0	Yes	21.9	22.8	4.0	Yes	20.9	20.8	0.5	Yes
Organochlorine Pesticides														
Aldrin	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlordane, cis- (alpha)	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlordane, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlordane, trans- (gamma)	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
DDD, 2,4'-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
DDD, 4,4'-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
DDD, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
DDE, 2,4'-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
DDE, 4,4'-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
DDE, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
DDT, 2,4'-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
DDT, 4,4'-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
DDT, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dieldrin	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Endosulfan, alpha-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Endosulfan, beta-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Endosulfan, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Endrin	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Heptachlor	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Heptachlor epoxide	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobenzene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobutadiene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorocyclohexane, gamma-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexachloroethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Methoxychlor	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Polychlorinated Biphenyls														
Aroclor 1016	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1221	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1232	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1242	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1248	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1254	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1260	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1262	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1268	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Polychlorinated biphenyls [PCBs], total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Pesticides														
Glufosinate	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Glyphosate	µg/L	0.2	-	-	-	-	-	-	-	-	<0.2	<0.2	0.0	No

APPENDIX A, TABLE 1

Water chemistry QAQC results, summer 2022.

Analyte	Units	RDL	Summer 2022											
			Mennin Lake				Mennin River				UWB-03			
			ML2-A				MR2-A				P3-A			
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹
Physical Tests														
Alkalinity, bicarbonate (as CaCO3)	mg/L	1.2	7.6	7.3	4.0	Yes	5.9	5.5	7.0	No	4.3	4	7.2	No
Alkalinity, carbonate (as CaCO3)	mg/L	0.6	<0.6	<0.6	0.0	No	<0.6	<0.6	0.0	No	<0.6	<0.6	0.0	No
Alkalinity, hydroxide (as CaCO3)	mg/L	0.34	<0.34	<0.34	0.0	No	<0.34	<0.34	0.0	No	<0.34	<0.34	0.0	No
Alkalinity, phenolphthalein (as CaCO3)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Total (as CaCO3)	mg/L	1	6.2	6	3.3	Yes	4.8	4.5	6.5	No	3.5	3.3	5.9	No
Conductivity	µS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	umhos/cm	1	21.4	21.4	0.0	Yes	20	20	0.0	Yes	17.5	16.5	5.9	Yes
Hardness (as CaCO3), from total Ca/Mg	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Solids, total dissolved [TDS]	mg/L	4 to 13.33	37.1	35.7	3.8	Yes	46.4	45.9	1.1	Yes	49.5	45.4	8.6	Yes
Solids, total suspended [TSS]	mg/L	3	<3	<3	0.0	No	<3	<3	0.0	No	<3	<3	0.0	No
Turbidity	NTU	0.1	1.33	1.25	6.2	Yes	1.37	1.38	0.7	Yes	1.27	1.35	6.1	Yes
Plant Pigments														
Chlorophyll a	µg/L	0.1	6.42	6.36	0.9	Yes	3.21	3.07	4.5	Yes	4.44	4.3	3.2	Yes
Polycyclic Aromatic Hydrocarbons														
1+2-Methylnaphthalenes	µg/L	0.0283	-	-	-	-	-	-	-	-	<0.028	<0.028	0.0	No
1-Methylnaphthalene	µg/L	0.02	-	-	-	-	-	-	-	-	<0.02	<0.02	0.0	No
2-Methylnaphthalene	µg/L	0.02	-	-	-	-	-	-	-	-	<0.02	<0.02	0.0	No
Acenaphthene	µg/L	0.02	-	-	-	-	-	-	-	-	<0.02	<0.02	0.0	No
Acenaphthylene	µg/L	0.02	-	-	-	-	-	-	-	-	<0.02	<0.02	0.0	No
Anthracene	µg/L	0.02	-	-	-	-	-	-	-	-	<0.02	<0.02	0.0	No
Benz(a)anthracene	µg/L	0.02	-	-	-	-	-	-	-	-	<0.02	<0.02	0.0	No
Benzo(a)pyrene	µg/L	0.01	-	-	-	-	-	-	-	-	<0.01	<0.01	0.0	No
Benzo(b&j)fluoranthene	µg/L	0.02	-	-	-	-	-	-	-	-	<0.02	<0.02	0.0	No
Benzo(g,h,i)perylene	µg/L	0.02	-	-	-	-	-	-	-	-	<0.02	<0.02	0.0	No
Benzo(k)fluoranthene	µg/L	0.02	-	-	-	-	-	-	-	-	<0.02	<0.02	0.0	No
Chrysene	µg/L	0.02	-	-	-	-	-	-	-	-	<0.02	<0.02	0.0	No
Dibenz(a,h)anthracene	µg/L	0.02	-	-	-	-	-	-	-	-	<0.02	<0.02	0.0	No
Fluoranthene	µg/L	0.02	-	-	-	-	-	-	-	-	<0.02	<0.02	0.0	No
Fluorene	µg/L	0.02	-	-	-	-	-	-	-	-	<0.02	<0.02	0.0	No
Indeno(1,2,3-c,d)pyrene	µg/L	0.02	-	-	-	-	-	-	-	-	<0.02	<0.02	0.0	No
Naphthalene	µg/L	0.05	-	-	-	-	-	-	-	-	<0.05	<0.05	0.0	No
Phenanthrene	µg/L	0.02	-	-	-	-	-	-	-	-	<0.02	<0.02	0.0	No
Pyrene	µg/L	0.02	-	-	-	-	-	-	-	-	<0.02	<0.02	0.0	No

APPENDIX A, TABLE 1

Water chemistry QAQC results, summer 2022.

Analyte	Units	RDL	Summer 2022											
			Mennin Lake				Mennin River				UWB-03			
			ML2-A				MR2-A				P3-A			
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹
Radiological Parameters														
Carbon-14	Bq/L	6.6 to 9.5	<6.6	<6.7	1.5	No	<6.7	<6.7	0.0	No	<6.6	<6.6	0.0	No
Cesium-137	Bq/L	0.25 to 0.37	<0.25	<0.32	24.6	No	<0.36	<0.36	0.0	No	<0.31	<0.33	6.3	No
Chlorine-36	Bq/L	0.18 to 0.23	<0.21	-	-	-	<0.23	-	-	-	<0.18	-	-	-
Cobalt-60	Bq/L	0.31 to 0.54	<0.31	<0.38	20.3	No	<0.46	<0.34	30.0	No	<0.4	<0.34	16.2	No
Gross Alpha	Bq/L	0.028 to 0.066	<0.058	<0.06	3.4	No	<0.066	<0.064	3.1	No	<0.052	<0.045	14.4	No
Gross Beta	Bq/L	0.039 to 0.088	<0.087	<0.086	1.2	No	<0.087	<0.088	1.1	No	<0.082	<0.085	3.6	No
Iodine-129	Bq/L	0.23 to 0.3	<0.25	<0.24	4.1	No	<0.3	<0.26	14.3	No	<0.28	<0.23	19.6	No
Neptunium-237	Bq/L	0.0011 to 0.0053	<0.0027	-	-	-	<0.0011	-	-	-	<0.0053	-	-	-
Plutonium-238	Bq/L	0.00023 to 0.001	<0.00097	-	-	-	0.00034	-	-	-	<0.001	-	-	-
Plutonium-239	Bq/L	0.00019 to 0.001	0.0003	-	-	-	<0.00062	-	-	-	<0.001	-	-	-
Potassium-40	Bq/L	5.6 to 7.8	<5.8	<6.7	14.4	No	<7.5	<6.9	8.3	No	<6.3	<5.6	11.8	No
Radium-226	Bq/L	0.0042 to 0.0076	<0.0053	<0.0056	5.5	No	<0.0064	<0.0066	3.1	No	<0.0067	<0.0076	12.6	No
Ruthenium-106	Bq/L	2.4 to 3.7	<2.4	<3	22.2	No	<3.7	<3.3	11.4	No	<3.2	<3.1	3.2	No
Selenium-79	Bq/L	1.85	<1.85	-	-	-	<1.85	-	-	-	<1.85	-	-	-
Strontium-90	Bq/L	0.014 to 0.019	<0.015	<0.016	6.5	No	<0.017	<0.016	6.1	No	<0.015	<0.019	23.5	No
Thorium-228	Bq/L	0.0033 to 0.0071	<0.0061	<0.005	19.8	No	<0.0043	<0.0039	9.8	No	<0.0046	<0.0042	9.1	No
Thorium-230	Bq/L	0.0037 to 0.0049	<0.0049	0.0057	15.1	No	<0.0037	0.0041	10.3	No	<0.0038	0.0047	21.2	No
Thorium-232	Bq/L	0.00034 to 0.0023	<0.0021	<0.002	4.9	No	0.00098	<0.0012	20.2	No	<0.0012	<0.0014	15.4	No
Tritium	Bq/L	9.2 to 14	<13	<13	0.0	No	<12	<12	0.0	No	<12	<12	0.0	No
Uranium-234	Bq/L	0.0016 to 0.0041	0.0051	<0.0032	45.8	No	0.0032	0.0047	38.0	No	0.0022	0.0038	53.3	No
Uranium-235	Bq/L	0.00074 to 0.0032	<0.00074	<0.0022	99.3	No	0.00086	<0.0032	115.3	No	<0.0017	<0.0014	19.4	No
Uranium-238	Bq/L	0.001 to 0.0039	0.0025	<0.0018	32.6	No	<0.0018	<0.0039	73.7	No	<0.0013	0.0013	0.0	No
Semi-Volatile Organic Compounds														
1,2,4-Trichlorobenzene	µg/L	0.4	-	-	-	-	-	-	-	-	<0.4	<0.4	0.0	No
2,4,5-Trichlorophenol	µg/L	0.2	-	-	-	-	-	-	-	-	<0.2	<0.2	0.0	No
2,4,6-Trichlorophenol	µg/L	0.2	-	-	-	-	-	-	-	-	<0.2	<0.2	0.0	No
2,4+2,6-Dinitrotoluene	µg/L	0.566	-	-	-	-	-	-	-	-	<0.57	<0.57	0.0	No
2,4-Dichlorophenol	µg/L	0.3	-	-	-	-	-	-	-	-	<0.3	<0.3	0.0	No
2,4-Dimethylphenol	µg/L	0.5	-	-	-	-	-	-	-	-	<0.5	<0.5	0.0	No
2,4-Dinitrophenol	µg/L	1	-	-	-	-	-	-	-	-	<1	<1	0.0	No
2,4-Dinitrotoluene	µg/L	0.4	-	-	-	-	-	-	-	-	<0.4	<0.4	0.0	No
2,6-Dinitrotoluene	µg/L	0.4	-	-	-	-	-	-	-	-	<0.4	<0.4	0.0	No
2-Chlorophenol	µg/L	0.3	-	-	-	-	-	-	-	-	<0.3	<0.3	0.0	No
4-Chloroaniline	µg/L	0.4	-	-	-	-	-	-	-	-	<0.4	<0.4	0.0	No
Biphenyl	µg/L	0.4	-	-	-	-	-	-	-	-	<0.4	<0.4	0.0	No
bis(2-Chloro-1-methylethyl) ether	µg/L	0.4	-	-	-	-	-	-	-	-	<0.4	<0.4	0.0	No
bis(2-Chloroethyl) ether	µg/L	0.4	-	-	-	-	-	-	-	-	<0.4	<0.4	0.0	No
Bis(2-ethylhexyl)phthalate	µg/L	2	-	-	-	-	-	-	-	-	<2	<2	0.0	No
Dichlorobenzidine, 3,3'-	µg/L	0.4	-	-	-	-	-	-	-	-	<0.4	<0.4	0.0	No
Diethylphthalate	µg/L	0.2	-	-	-	-	-	-	-	-	<0.2	<0.2	0.0	No
Semi-Volatile Organic Compounds														
Dimethylphthalate	µg/L	0.2	-	-	-	-	-	-	-	-	<0.2	<0.2	0.0	No
Pentachlorophenol [PCP]	µg/L	0.5	-	-	-	-	-	-	-	-	<0.5	<0.5	0.0	No
Phenol	µg/L	0.5 to 0.63	-	-	-	-	-	-	-	-	<0.5	<0.5	0.0	No

APPENDIX A, TABLE 1

Water chemistry QAQC results, summer 2022.

Analyte	Units	RDL	Summer 2022											
			Mennin Lake				Mennin River				UWB-03			
			ML2-A				MR2-A				P3-A			
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹
Volatile Organic Compounds														
Acetone	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromoform	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromomethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
BTEX, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon disulfide	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon tetrachloride	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloromethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromochloromethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromoethane, 1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorobenzene, 1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorobenzene, 1,3-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorobenzene, 1,4-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethane, 1,1-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethane, 1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethylene, 1,1-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethylene, cis+trans-1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethylene, cis-1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethylene, trans-1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloromethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloropropane, 1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloropropylene, cis+trans-1,3-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloropropylene, cis-1,3-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloropropylene, trans-1,3-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexane, n-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexanone, 2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl ethyl ketone [MEK]	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl isobutyl ketone [MIBK]	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl-tert-butyl ether [MTBE]	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX A, TABLE 1

Water chemistry QAQC results, summer 2022.

Analyte	Units	RDL	Summer 2022											
			Mennin Lake				Mennin River				UWB-03			
			ML2-A				MR2-A				P3-A			
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹
Volatile Organic Compounds														
Tetrachloroethane, 1,1,1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethane, 1,1,2,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethylene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethane, 1,1,1-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethane, 1,1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethylene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl chloride	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Xylene, m+p-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Xylene, o-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Xylenes, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Trihalomethanes [THMs], total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX A, TABLE 1

Water chemistry QAQC results, summer 2022.

Analyte	Units	RDL	Summer 2022										
			UWB-08				Revell River				Blanks		
			RP1-A				RR1-A				Filter	Field	Trip
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	FB-1A	WB-1A	WB-1B
Aggregate Organics													
Biochemical Oxygen Demand	mg/L	2	2.1	<2	4.9	No	<2	<2	0.0	No	-	<2	<2
Anions and Nutrients													
Ammonia, Total (as N)	mg/L	0.01	<0.01	0.02	66.7	No	0.015	0.031	69.6	No	-	0.026	<0.01
Bromide	mg/L	0.1	<0.1	<0.1	0.0	No	<0.1	<0.1	0.0	No	-	<0.1	<0.1
Chloride	mg/L	0.5	<0.5	<0.5	0.0	No	12	12.1	0.8	Yes	-	<0.5	<0.5
Fluoride	mg/L	0.02	0.027	0.028	3.6	No	0.031	0.032	3.2	No	-	<0.02	<0.02
Iodide	mg/L	0.2	<0.2	<0.2	0.0	No	<0.2	<0.2	0.0	No	-	<0.2	<0.2
Kjeldahl nitrogen, total [TKN]	mg/L	0.2	0.77	0.67	13.9	No	0.73	0.8	9.2	No	-	<0.2	<0.2
Nitrate (as N)	mg/L	0.02	<0.02	<0.02	0.0	No	0.032	0.034	6.1	No	-	<0.02	<0.02
Nitrate and Nitrite as N	mg/L	0.07	<0.07	<0.07	0.0	No	<0.07	<0.07	0.0	No	-	<0.07	<0.07
Nitrite (as N)	mg/L	0.01	<0.01	<0.01	0.0	No	<0.01	<0.01	0.0	No	-	<0.01	<0.01
Phosphorus, total	mg/L	0.003 to 0.03	0.033	<0.03	9.5	No	0.0223	0.0203	9.4	Yes	-	<0.003	<0.003
Sulfate (as SO4)	mg/L	0.3	0.39	0.39	0.0	No	0.79	0.87	9.6	No	-	<0.3	<0.3
Cyanides													
Cyanide, Total	mg/L	0.002	<0.002	<0.002	0.0	No	<0.002	<0.002	0.0	No	-	<0.002	<0.002
Herbicides													
AMPA	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	<0.5	<0.5
Hydrocarbons													
F1 (C6-C10)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
F1-BTEX	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
F2 (C10-C16)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
F3 (C16-C34)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
F4 (C34-C50)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
TEH (C10-C50)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
TEH (C16-C50)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
Metals Dissolved													
Aluminum, dissolved	mg/L	0.001	0.0266	0.0285	6.9	Yes	0.28	0.276	1.4	Yes	<0.001	<0.001	<0.001
Antimony, dissolved	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	<0.0001
Arsenic, dissolved	mg/L	0.0001	0.00033	0.00031	6.3	No	0.00066	0.00058	12.9	Yes	<0.0001	<0.0001	<0.0001
Barium, dissolved	mg/L	0.0001	0.00609	0.00625	2.6	Yes	0.0108	0.0107	0.9	Yes	<0.0001	<0.0001	<0.0001
Beryllium, dissolved	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	<0.0001
Bismuth, dissolved	mg/L	0.00005	<0.00005	<0.00005	0.0	No	<0.00005	<0.00005	0.0	No	<0.00005	<0.00005	<0.00005
Boron, dissolved	mg/L	0.01	<0.01	<0.01	0.0	No	<0.01	<0.01	0.0	No	<0.01	<0.01	<0.01
Cadmium, dissolved	mg/L	0.000005	<0.000005	<0.000005	0.0	No	0.0000154	0.0000169	9.3	No	<0.000005	<0.000005	<0.000005
Calcium, dissolved	mg/L	0.05	7.87	7.96	1.1	Yes	5.9	5.83	1.2	Yes	<0.05	<0.05	<0.05
Cerium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Cesium, dissolved	mg/L	0.00001	<0.00001	<0.00001	0.0	No	0.000032	0.000032	0.0	No	<0.00001	<0.00001	<0.00001
Chromium, dissolved	mg/L	0.0001	0.00018	0.00017	5.7	No	0.0006	0.00062	3.3	Yes	<0.0001	<0.0001	<0.0001
Cobalt, dissolved	mg/L	0.0001	<0.0001	<0.0001	0.0	No	0.0002	0.00021	4.9	No	<0.0001	<0.0001	<0.0001
Copper, dissolved	mg/L	0.0002	0.00048	0.00039	20.7	No	0.00098	0.001	2.0	No	<0.0002	<0.0002	<0.0002

APPENDIX A, TABLE 1

Water chemistry QAQC results, summer 2022.

Analyte	Units	RDL	Summer 2022										
			UWB-08				Revell River				Blanks		
			RP1-A				RR1-A				Filter	Field	Trip
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	FB-1A	WB-1A	WB-1B
Metals Dissolved													
Dysprosium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Erbium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Europium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Gadolinium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Gold, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Hafnium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Holmium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Iridium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Iron, dissolved	mg/L	0.01	0.114	0.115	0.9	Yes	1.11	1.06	4.6	Yes	<0.01	<0.01	<0.01
Lanthanum, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Lead, dissolved	mg/L	0.00005	<0.00005	<0.00005	0.0	No	0.000161	0.000164	1.8	No	<0.00005	<0.00005	<0.00005
Lithium, dissolved	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	<0.001	<0.001	<0.001
Magnesium, dissolved	mg/L	0.005	1.42	1.42	0.0	Yes	0.851	0.84	1.3	Yes	<0.005	<0.005	<0.005
Manganese, dissolved	mg/L	0.0001	0.00133	0.00147	10.0	Yes	0.0214	0.0211	1.4	Yes	<0.0001	<0.0001	<0.0001
Mercury, dissolved	mg/L	0.000005	<0.000005	<0.000005	0.0	No	<0.000005	<0.000005	0.0	No	<0.000005	<0.000005	<0.000005
Molybdenum, dissolved	mg/L	0.00005	0.000062	0.000054	13.8	No	0.000098	0.000108	9.7	No	<0.00005	<0.00005	<0.00005
Neodymium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Nickel, dissolved	mg/L	0.0005	<0.0005	<0.0005	0.0	No	0.00065	0.00083	24.3	No	<0.0005	<0.0005	<0.0005
Palladium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus, dissolved	mg/L	0.05	<0.05	<0.05	0.0	No	<0.05	<0.05	0.0	No	<0.05	<0.05	<0.05
Platinum, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Potassium, dissolved	mg/L	0.05	0.551	0.549	0.4	Yes	0.576	0.57	1.0	Yes	<0.05	<0.05	<0.05
Praseodymium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Rhenium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Rhodium, dissolved	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	<0.001	<0.001	<0.001
Rubidium, dissolved	mg/L	0.0002	0.00116	0.00107	8.1	Yes	0.00187	0.00194	3.7	Yes	<0.0002	<0.0002	<0.0002
Ruthenium, dissolved	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	<0.001	<0.001	<0.001
Samarium, dissolved	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	<0.001	<0.001	<0.001
Scandium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Selenium, dissolved	mg/L	0.00005	0.000101	0.000107	5.8	No	0.000165	0.000154	6.9	No	<0.00005	<0.00005	<0.00005
Silicon, dissolved	mg/L	0.05	1.51	1.52	0.7	Yes	2.93	2.97	1.4	Yes	<0.05	<0.05	<0.05
Silver, dissolved	mg/L	0.00001	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	<0.00001
Sodium, dissolved	mg/L	0.05	1.16	1.16	0.0	Yes	8.35	8.25	1.2	Yes	<0.05	<0.05	<0.05
Strontium, dissolved	mg/L	0.0002	0.015	0.0155	3.3	Yes	0.0189	0.0193	2.1	Yes	<0.0002	<0.0002	<0.0002
Sulfur, dissolved	mg/L	0.5	<0.5	<0.5	0.0	No	0.63	<0.5	23.0	No	<0.5	<0.5	<0.5
Tellurium, dissolved	mg/L	0.0002	<0.0002	<0.0002	0.0	No	<0.0002	<0.0002	0.0	No	<0.0002	<0.0002	<0.0002
Terbium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Thallium, dissolved	mg/L	0.00001	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	<0.00001
Thorium, dissolved	mg/L	0.0001	<0.0001	<0.0001	0.0	No	0.00031	0.00022	34.0	No	<0.0001	<0.0001	<0.0001
Thulium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX A, TABLE 1

Water chemistry QAQC results, summer 2022.

Analyte	Units	RDL	Summer 2022										
			UWB-08				Revell River				Blanks		
			RP1-A				RR1-A				Filter	Field	Trip
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	FB-1A	WB-1A	WB-1B
Metals Dissolved													
Tin, dissolved	mg/L	0.0001	<0.0001	0.0001	0.0	No	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	<0.0001
Titanium, dissolved	mg/L	0.0003	0.00046	0.00048	4.3	No	0.00367	0.00324	12.4	Yes	<0.0003	<0.0003	<0.0003
Tungsten, dissolved	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	<0.0001
Uranium, dissolved	mg/L	0.00001	<0.00001	<0.00001	0.0	No	0.000165	0.000169	2.4	Yes	<0.00001	<0.00001	<0.00001
Vanadium, dissolved	mg/L	0.0005	<0.0005	<0.0005	0.0	No	0.00088	0.00083	5.8	No	<0.0005	<0.0005	<0.0005
Ytterbium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Zinc, dissolved	mg/L	0.001	<0.001	0.0017	51.9	No	0.0065	0.0049	28.1	No	0.0029	<0.001	<0.001
Zirconium, dissolved	mg/L	0.0002	<0.0002	<0.0002	0.0	No	0.00036	0.00033	8.7	No	<0.0002	<0.0002	<0.0002
Metals Total													
Aluminum, total	mg/L	0.003	0.0543	0.053	2.4	Yes	0.348	0.327	6.2	Yes	-	<0.003	<0.003
Antimony, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	-	<0.0001	<0.0001
Arsenic, total	mg/L	0.0001	0.00035	0.00038	8.2	No	0.00068	0.00065	4.5	Yes	-	<0.0001	<0.0001
Barium, total	mg/L	0.0001	0.00696	0.00679	2.5	Yes	0.0117	0.0113	3.5	Yes	-	<0.0001	<0.0001
Beryllium, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	-	<0.0001	<0.0001
Bismuth, total	mg/L	0.00005	<0.00005	<0.00005	0.0	No	<0.00005	<0.00005	0.0	No	-	<0.00005	<0.00005
Boron, total	mg/L	0.01	<0.01	<0.01	0.0	No	<0.01	<0.01	0.0	No	-	<0.01	<0.01
Cadmium, total	mg/L	0.000005	<0.000005	<0.000005	0.0	No	0.0000177	0.0000165	7.0	No	-	<0.000005	<0.000005
Calcium, total	mg/L	0.05	8.07	7.8	3.4	Yes	5.88	5.88	0.0	Yes	-	<0.05	<0.05
Cerium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Cesium, total	mg/L	0.00001	<0.00001	<0.00001	0.0	No	0.000036	0.000035	2.8	No	-	<0.00001	<0.00001
Chromium, total	mg/L	0.0001	0.00019	0.00021	10.0	No	0.00074	0.0007	5.6	Yes	-	<0.0001	<0.0001
Cobalt, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	0.00032	0.00029	9.8	No	-	<0.0001	<0.0001
Copper, total	mg/L	0.0005	0.00054	<0.0005	7.7	No	0.00115	0.0011	4.4	No	-	<0.0005	<0.0005
Dysprosium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Erbium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Europium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Gadolinium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Gold, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Hafnium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Holmium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Iridium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Iron, total	mg/L	0.01	0.229	0.229	0.0	Yes	1.74	1.64	5.9	Yes	-	<0.01	<0.01
Lanthanum, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Lead, total	mg/L	0.00005	<0.00005	<0.00005	0.0	No	0.000279	0.000256	8.6	Yes	-	<0.00005	<0.00005
Lithium, total	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	-	<0.001	<0.001
Magnesium, total	mg/L	0.005	1.43	1.43	0.0	Yes	0.881	0.851	3.5	Yes	-	<0.005	<0.005
Manganese, total	mg/L	0.0001	0.0325	0.0323	0.6	Yes	0.0346	0.0306	12.3	Yes	-	0.0001	<0.0001
Mercury, total	mg/L	0.000005	<0.000005	<0.000005	0.0	No	0.0000054	0.0000071	27.2	No	-	<0.000005	<0.000005
Molybdenum, total	mg/L	0.00005	0.000061	0.000059	3.3	No	0.000129	0.000096	29.3	No	-	<0.00005	<0.00005
Neodymium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX A, TABLE 1

Water chemistry QAQC results, summer 2022.

Analyte	Units	RDL	Summer 2022										
			UWB-08				Revell River				Blanks		
			RP1-A				RR1-A				Filter	Field	Trip
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	FB-1A	WB-1A	WB-1B
Metals Total													
Nickel, total	mg/L	0.0005	<0.0005	<0.0005	0.0	No	0.00094	0.0007	29.3	No	-	<0.0005	<0.0005
Palladium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus, total	mg/L	0.05	<0.05	<0.05	0.0	No	<0.05	<0.05	0.0	No	-	<0.05	<0.05
Platinum, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Potassium, total	mg/L	0.05	0.561	0.554	1.3	Yes	0.59	0.572	3.1	Yes	-	<0.05	<0.05
Praseodymium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Rhenium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Rhodium, total	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	-	<0.001	<0.001
Rubidium, total	mg/L	0.0002	0.00112	0.00112	0.0	Yes	0.00187	0.00192	2.6	Yes	-	<0.0002	<0.0002
Ruthenium, total	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	-	<0.001	<0.001
Samarium, total	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	-	<0.001	<0.001
Scandium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Selenium, total	mg/L	0.00005	0.000089	0.000129	36.7	No	0.00021	0.0002	4.9	No	-	<0.00005	<0.00005
Silicon, total	mg/L	0.1	1.56	1.57	0.6	Yes	3.04	2.98	2.0	Yes	-	<0.1	<0.1
Silver, total	mg/L	0.00001	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No	-	<0.00001	<0.00001
Sodium, total	mg/L	0.05	1.15	1.13	1.8	Yes	8.44	8.19	3.0	Yes	-	<0.05	<0.05
Strontium, total	mg/L	0.0002	0.0152	0.0156	2.6	Yes	0.0198	0.0194	2.0	Yes	-	<0.0002	<0.0002
Sulfur, total	mg/L	0.5	<0.5	<0.5	0.0	No	<0.5	<0.5	0.0	No	-	<0.5	<0.5
Tellurium, total	mg/L	0.0002	<0.0002	<0.0002	0.0	No	<0.0002	<0.0002	0.0	No	-	<0.0002	<0.0002
Terbium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Thallium, total	mg/L	0.00001	<0.00001	<0.00001	0.0	No	0.000012	<0.00001	18.2	No	-	<0.00001	<0.00001
Thorium, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	0.00029	0.00028	3.5	No	-	<0.0001	<0.0001
Thulium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Tin, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	-	<0.0001	<0.0001
Titanium, total	mg/L	0.0003	0.00125	0.00108	14.6	No	0.00695	0.00577	18.6	Yes	-	<0.0003	<0.0003
Tungsten, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	-	<0.0001	<0.0001
Uranium, total	mg/L	0.00001	<0.00001	<0.00001	0.0	No	0.000186	0.000182	2.2	Yes	-	<0.00001	<0.00001
Vanadium, total	mg/L	0.0005	<0.0005	<0.0005	0.0	No	0.00129	0.00119	8.1	No	-	<0.0005	<0.0005
Ytterbium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Zinc, total	mg/L	0.003	<0.003	<0.003	0.0	No	0.0042	0.0052	21.3	No	-	<0.003	<0.003
Zirconium, total	mg/L	0.0002	<0.0002	<0.0002	0.0	No	0.00031	0.00029	6.7	No	-	<0.0002	<0.0002
Metals Speciated													
Chromium, hexavalent [Cr VI], dissolved	mg/L	0.0005	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	<0.0005
Chromium, hexavalent [Cr VI], total	mg/L	0.0005	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	0.0	No	-	<0.0005	<0.0005
Chromium, trivalent [Cr III], dissolved	mg/L	0.0005	<0.0005	<0.0005	0.0	No	0.0006	0.00062	3.3	No	<0.0005	<0.0005	<0.0005
Chromium, trivalent [Cr III], total	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	-	<0.001	<0.001
Microbiological Tests													
Coliforms, Escherichia coli [E. coli]	CFU/100mL	1	6	6	0.0	Yes	27	20	29.8	Yes	-	-	-
Coliforms, total	CFU/100mL	1	>200	>200	0.0	Yes	>200	>200	0.0	Yes	-	-	-

APPENDIX A, TABLE 1

Water chemistry QAQC results, summer 2022.

Analyte	Units	RDL	Summer 2022										
			UWB-08				Revell River				Blanks		
			RP1-A				RR1-A				Filter	Field	Trip
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	FB-1A	WB-1A	WB-1B
Organic_Inorganic Carbon													
Carbon, dissolved organic [DOC]	mg/L	0.5	18.7	20.5	9.2	Yes	31.5	30.8	2.2	Yes	0.92	<0.5	<0.5
Carbon, total inorganic [TIC]	mg/L	0.5	3.37	3.48	3.2	Yes	2.16	0.82	89.9	No	-	0.81	0.6
Carbon, total organic [TOC]	mg/L	0.5	19.2	23.5	20.1	Yes	31	30.8	0.6	Yes	-	<0.5	<0.5
Organochlorine Pesticides													
Aldrin	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Chlordane, cis- (alpha)	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Chlordane, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Chlordane, trans- (gamma)	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
DDD, 2,4'	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
DDD, 4,4'	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
DDD, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
DDE, 2,4'	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
DDE, 4,4'	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
DDE, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
DDT, 2,4'	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
DDT, 4,4'	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
DDT, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dieldrin	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Endosulfan, alpha-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Endosulfan, beta-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Endosulfan, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Endrin	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Heptachlor	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Heptachlor epoxide	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobenzene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobutadiene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorocyclohexane, gamma-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Hexachloroethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Methoxychlor	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Polychlorinated Biphenyls													
Aroclor 1016	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1221	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1232	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1242	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1248	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1254	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1260	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1262	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1268	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Polychlorinated biphenyls [PCBs], total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Pesticides													
Glufosinate	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Glyphosate	µg/L	0.2	<0.2	<0.2	0.0	No	-	-	-	-	-	<0.2	<0.2

APPENDIX A, TABLE 1

Water chemistry QAQC results, summer 2022.

Analyte	Units	RDL	Summer 2022										
			UWB-08				Revell River				Blanks		
			RP1-A				RR1-A				Filter	Field	Trip
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	FB-1A	WB-1A	WB-1B
Physical Tests													
Alkalinity, bicarbonate (as CaCO3)	mg/L	1.2	29.2	28.7	1.7	Yes	11.5	10.9	5.4	Yes	-	<1.2	<1.2
Alkalinity, carbonate (as CaCO3)	mg/L	0.6	<0.6	<0.6	0.0	No	<0.6	<0.6	0.0	No	-	<0.6	<0.6
Alkalinity, hydroxide (as CaCO3)	mg/L	0.34	<0.34	<0.34	0.0	No	<0.34	<0.34	0.0	No	-	<0.34	<0.34
Alkalinity, phenolphthalein (as CaCO3)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Total (as CaCO3)	mg/L	1	23.9	23.5	1.7	Yes	9.4	8.9	5.5	Yes	-	<1	<1
Conductivity	µS/cm	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	umhos/cm	1	47.9	47.8	0.2	Yes	70.8	71.2	0.6	Yes	-	2.8	<1
Hardness (as CaCO3), from total Ca/Mg	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
Solids, total dissolved [TDS]	mg/L	4 to 13.33	52.5	51.2	2.5	Yes	103	98	5.0	Yes	-	<4	<4
Solids, total suspended [TSS]	mg/L	3	3.1	3.9	22.9	No	6.3	4.7	29.1	No	-	<3	<3
Turbidity	NTU	0.1	1.92	1.99	3.6	Yes	1.69	1.81	6.9	Yes	-	<0.1	<0.1
Plant Pigments													
Chlorophyll a	µg/L	0.1	10.4	11	5.6	Yes	0.96	1.07	10.8	Yes	-	-	-
Polycyclic Aromatic Hydrocarbons													
1+2-Methylnaphthalenes	µg/L	0.0283	<0.028	<0.028	0.0	No	-	-	-	-	-	<0.028	<0.028
1-Methylnaphthalene	µg/L	0.02	<0.02	<0.02	0.0	No	-	-	-	-	-	<0.02	<0.02
2-Methylnaphthalene	µg/L	0.02	<0.02	<0.02	0.0	No	-	-	-	-	-	<0.02	<0.02
Acenaphthene	µg/L	0.02	<0.02	<0.02	0.0	No	-	-	-	-	-	<0.02	<0.02
Acenaphthylene	µg/L	0.02	<0.02	<0.02	0.0	No	-	-	-	-	-	<0.02	<0.02
Anthracene	µg/L	0.02	<0.02	<0.02	0.0	No	-	-	-	-	-	<0.02	<0.02
Benz(a)anthracene	µg/L	0.02	<0.02	<0.02	0.0	No	-	-	-	-	-	<0.02	<0.02
Benzo(a)pyrene	µg/L	0.01	<0.01	<0.01	0.0	No	-	-	-	-	-	<0.01	<0.01
Benzo(b&j)fluoranthene	µg/L	0.02	<0.02	<0.02	0.0	No	-	-	-	-	-	<0.02	<0.02
Benzo(g,h,i)perylene	µg/L	0.02	<0.02	<0.02	0.0	No	-	-	-	-	-	<0.02	<0.02
Benzo(k)fluoranthene	µg/L	0.02	<0.02	<0.02	0.0	No	-	-	-	-	-	<0.02	<0.02
Chrysene	µg/L	0.02	<0.02	<0.02	0.0	No	-	-	-	-	-	<0.02	<0.02
Dibenz(a,h)anthracene	µg/L	0.02	<0.02	<0.02	0.0	No	-	-	-	-	-	<0.02	<0.02
Fluoranthene	µg/L	0.02	<0.02	<0.02	0.0	No	-	-	-	-	-	<0.02	<0.02
Fluorene	µg/L	0.02	<0.02	<0.02	0.0	No	-	-	-	-	-	<0.02	<0.02
Indeno(1,2,3-c,d)pyrene	µg/L	0.02	<0.02	<0.02	0.0	No	-	-	-	-	-	<0.02	<0.02
Naphthalene	µg/L	0.05	<0.05	<0.05	0.0	No	-	-	-	-	-	<0.05	<0.05
Phenanthrene	µg/L	0.02	<0.02	<0.02	0.0	No	-	-	-	-	-	<0.02	<0.02
Pyrene	µg/L	0.02	<0.02	<0.02	0.0	No	-	-	-	-	-	<0.02	<0.02

APPENDIX A, TABLE 1

Water chemistry QAQC results, summer 2022.

Analyte	Units	RDL	Summer 2022										
			UWB-08				Revell River				Blanks		
			RP1-A				RR1-A				Filter	Field	Trip
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	FB-1A	WB-1A	WB-1B
Radiological Parameters													
Carbon-14	Bq/L	6.6 to 9.5	<6.6	<6.9	4.4	No	<6.7	<8.8	27.1	No	-	<8.9	<9.5
Cesium-137	Bq/L	0.25 to 0.37	<0.36	<0.36	0.0	No	<0.36	<0.37	2.7	No	-	<0.36	<0.31
Chlorine-36	Bq/L	0.18 to 0.23	-	-	-	-	<0.21	-	-	-	-	<0.21	<0.22
Cobalt-60	Bq/L	0.31 to 0.54	<0.45	<0.42	6.9	No	<0.54	<0.32	51.2	No	-	<0.38	<0.38
Gross Alpha	Bq/L	0.028 to 0.066	<0.028	<0.036	25.0	No	0.084	0.046	58.5	No	-	<0.04	<0.046
Gross Beta	Bq/L	0.039 to 0.088	<0.039	<0.041	5.0	No	0.066	0.077	15.4	No	-	<0.062	<0.067
Iodine-129	Bq/L	0.23 to 0.3	<0.27	<0.27	0.0	No	<0.24	<0.24	0.0	No	-	<0.26	0.42
Neptunium-237	Bq/L	0.0011 to 0.0053	-	-	-	-	<0.004	-	-	-	-	<0.0031	<0.0025
Plutonium-238	Bq/L	0.00023 to 0.001	-	-	-	-	<0.00067	-	-	-	-	<0.00052	<0.00075
Plutonium-239	Bq/L	0.00019 to 0.001	-	-	-	-	<0.00086	-	-	-	-	0.00021	<0.00075
Potassium-40	Bq/L	5.6 to 7.8	<6.4	<7.8	19.7	No	<7.3	<6.6	10.1	No	-	<6	<5.8
Radium-226	Bq/L	0.0042 to 0.0076	<0.0058	<0.0074	24.2	No	0.0043	<0.0056	26.3	No	-	<0.0067	<0.0052
Ruthenium-106	Bq/L	2.4 to 3.7	<3.5	<3.5	0.0	No	<3.6	<3.2	11.8	No	-	<3.3	<3.4
Selenium-79	Bq/L	1.85	-	-	-	-	<1.85	-	-	-	-	<1.85	<1.85
Strontium-90	Bq/L	0.014 to 0.019	<0.017	<0.018	5.7	No	<0.015	<0.015	0.0	No	-	<0.015	<0.014
Thorium-228	Bq/L	0.0033 to 0.0071	<0.0035	<0.0041	15.8	No	0.0079	<0.0058	30.7	No	-	<0.0071	<0.0043
Thorium-230	Bq/L	0.0037 to 0.0049	<0.0038	<0.0037	2.7	No	<0.0038	<0.0046	19.0	No	-	<0.0049	<0.0039
Thorium-232	Bq/L	0.00034 to 0.0023	<0.00034	0.00051	40.0	No	<0.0017	<0.0023	30.0	No	-	<0.0023	0.0013
Tritium	Bq/L	9.2 to 14	<14	<14	0.0	No	<9.2	<9.2	0.0	No	-	<9.2	<9.2
Uranium-234	Bq/L	0.0016 to 0.0041	<0.0031	0.0042	30.1	No	0.005	0.021	123.1	No	-	<0.0019	0.002
Uranium-235	Bq/L	0.00074 to 0.0032	0.0011	0.0027	84.2	No	<0.0018	<0.0022	20.0	No	-	<0.0016	<0.0013
Uranium-238	Bq/L	0.001 to 0.0039	<0.0027	0.0027	0.0	No	0.0042	0.016	116.8	No	-	<0.0014	0.0011
Semi-Volatile Organic Compounds													
1,2,4-Trichlorobenzene	µg/L	0.4	<0.4	<0.4	0.0	No	-	-	-	-	-	<0.4	<0.4
2,4,5-Trichlorophenol	µg/L	0.2	<0.2	<0.2	0.0	No	-	-	-	-	-	<0.2	<0.2
2,4,6-Trichlorophenol	µg/L	0.2	<0.2	<0.2	0.0	No	-	-	-	-	-	<0.2	<0.2
2,4+2,6-Dinitrotoluene	µg/L	0.566	<0.57	<0.57	0.0	No	-	-	-	-	-	<0.57	<0.57
2,4-Dichlorophenol	µg/L	0.3	<0.3	<0.3	0.0	No	-	-	-	-	-	<0.3	<0.3
2,4-Dimethylphenol	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	<0.5	<0.5
2,4-Dinitrophenol	µg/L	1	<1	<1	0.0	No	-	-	-	-	-	<1	<1
2,4-Dinitrotoluene	µg/L	0.4	<0.4	<0.4	0.0	No	-	-	-	-	-	<0.4	<0.4
2,6-Dinitrotoluene	µg/L	0.4	<0.4	<0.4	0.0	No	-	-	-	-	-	<0.4	<0.4
2-Chlorophenol	µg/L	0.3	<0.3	<0.3	0.0	No	-	-	-	-	-	<0.3	<0.3
4-Chloroaniline	µg/L	0.4	<0.4	<0.4	0.0	No	-	-	-	-	-	<0.4	<0.4
Biphenyl	µg/L	0.4	<0.4	<0.4	0.0	No	-	-	-	-	-	<0.4	<0.4
bis(2-Chloro-1-methylethyl) ether	µg/L	0.4	<0.4	<0.4	0.0	No	-	-	-	-	-	<0.4	<0.4
bis(2-Chloroethyl) ether	µg/L	0.4	<0.4	<0.4	0.0	No	-	-	-	-	-	<0.4	<0.4
Bis(2-ethylhexyl)phthalate	µg/L	2	<2	<2	0.0	No	-	-	-	-	-	<2	<2
Dichlorobenzidine, 3,3'-	µg/L	0.4	<0.4	<0.4	0.0	No	-	-	-	-	-	<0.4	<0.4
Diethylphthalate	µg/L	0.2	<0.2	<0.2	0.0	No	-	-	-	-	-	<0.2	<0.2
Semi-Volatile Organic Compounds													
Dimethylphthalate	µg/L	0.2	<0.2	<0.2	0.0	No	-	-	-	-	-	<0.2	<0.2
Pentachlorophenol [PCP]	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	<0.5	<0.5
Phenol	µg/L	0.5 to 0.63	1.49	<0.5	99.5	No	-	-	-	-	-	<0.63	<0.5

APPENDIX A, TABLE 1

Water chemistry QAQC results, summer 2022.

Analyte	Units	RDL	Summer 2022										
			UWB-08				Revell River				Blanks		
			RP1-A				RR1-A				Filter	Field	Trip
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	FB-1A	WB-1A	WB-1B
Volatile Organic Compounds													
Acetone	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Bromoform	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Bromomethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
BTEX, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Carbon disulfide	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Carbon tetrachloride	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Chloroethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Chloromethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dibromochloromethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dibromoethane, 1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorobenzene, 1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorobenzene, 1,3-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorobenzene, 1,4-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethane, 1,1-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethane, 1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethylene, 1,1-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethylene, cis+trans-1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethylene, cis-1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethylene, trans-1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichloromethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichloropropane, 1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichloropropylene, cis+trans-1,3-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichloropropylene, cis-1,3-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichloropropylene, trans-1,3-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Hexane, n-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Hexanone, 2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Methyl ethyl ketone [MEK]	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Methyl isobutyl ketone [MIBK]	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Methyl-tert-butyl ether [MTBE]	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX A, TABLE 1

Water chemistry QAQC results, summer 2022.

Analyte	Units	RDL	Summer 2022										
			UWB-08				Revell River				Blanks		
			RP1-A				RR1-A				Filter	Field	Trip
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	FB-1A	WB-1A	WB-1B
Volatile Organic Compounds													
Tetrachloroethane, 1,1,1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethane, 1,1,2,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethylene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethane, 1,1,1-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethane, 1,1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethylene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl chloride	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Xylene, m+p-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Xylene, o-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Xylenes, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Trihalomethanes [THMs], total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-

Gray cells indicate exceedances of QAQC criteria.
RDL = reportable detection limit; dash = no data.
Relative percent difference (RPD) = | ((Duplicate - Sample)/((Duplicate + Sample)/2))*100 |.
For calculation of RPDs, values <RDL were set equal to the RDL; Grayed cells indicate exceedances of data quality control limits (RPD > 20%, with both samples >5*RDL).
¹Ranking of a "yes" used only if either value is >5*RDL.

APPENDIX A, TABLE 2
Water chemistry QAQC results, fall 2022.

Analyte	Units	RDL	Fall 2022											
			Mennin Lake				Mennin River				UWB-03			
			ML2-A				MR2-A				P3-A			
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹
Aggregate Organics														
Biochemical Oxygen Demand	mg/L	2	<2	<2	0.0	No	<2	<2	0.0	No	<2	<2	0.0	No
Anions and Nutrients														
Ammonia, Total (as N)	mg/L	0.01	0.013	0.012	8.0	No	0.029	0.023	23.1	No	0.019	0.035	59.3	No
Bromide	mg/L	0.1	<0.1	<0.1	0.0	No	<0.1	<0.1	0.0	No	<0.1	<0.1	0.0	No
Chloride	mg/L	0.5	0.57	0.59	3.4	No	0.58	0.58	0.0	No	<0.5	<0.5	0.0	No
Fluoride	mg/L	0.02	0.039	0.041	5.0	No	0.038	0.039	2.6	No	0.027	0.028	3.6	No
Iodide	mg/L	0.2	<0.2	<0.2	0.0	No	<0.2	<0.2	0.0	No	<0.2	<0.2	0.0	No
Kjeldahl nitrogen, total [TKN]	mg/L	0.2	0.34	0.32	6.1	No	0.39	0.42	7.4	No	0.6	0.57	5.1	No
Nitrate (as N)	mg/L	0.02	<0.02	<0.02	0.0	No	<0.02	<0.02	0.0	No	<0.02	<0.02	0.0	No
Nitrate and Nitrite as N	mg/L	0.07	<0.07	<0.07	0.0	No	<0.07	<0.07	0.0	No	<0.07	<0.07	0.0	No
Nitrite (as N)	mg/L	0.01	<0.01	<0.01	0.0	No	<0.01	<0.01	0.0	No	<0.01	<0.01	0.0	No
Phosphorus, total	mg/L	0.003	0.0108	0.0116	7.1	No	0.0102	0.0115	12.0	No	0.0193	0.0176	9.2	Yes
Sulfate (as SO4)	mg/L	0.3	0.84	0.82	2.4	No	0.8	0.81	1.2	No	0.36	0.36	0.0	No
Cyanides														
Cyanide, Total	mg/L	0.002	<0.002	<0.002	0.0	No	<0.002	<0.002	0.0	No	<0.002	<0.002	0.0	No
Herbicides														
AMPA	µg/L	0.5	-	-	-	-	-	-	-	-	<0.5	<0.5	0.0	No
Hydrocarbons														
F1 (C6-C10)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
F1-BTEX	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
F2 (C10-C16)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
F3 (C16-C34)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
F4 (C34-C50)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
TEH (C10-C50)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
TEH (C16-C50)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals Dissolved														
Aluminum, dissolved	mg/L	0.001	0.126	0.128	1.6	Yes	0.145	0.153	5.4	Yes	0.342	0.342	0.0	Yes
Antimony, dissolved	mg/L	0.0001	<0.0001	<0.0001	0.0	No	0.00013	<0.0001	26.1	No	<0.0001	<0.0001	0.0	No
Arsenic, dissolved	mg/L	0.0001	0.00036	0.00033	8.7	No	0.00035	0.00034	2.9	No	0.00057	0.00055	3.6	Yes
Barium, dissolved	mg/L	0.0001	0.00524	0.00535	2.1	Yes	0.00576	0.00547	5.2	Yes	0.00585	0.0059	0.9	Yes
Beryllium, dissolved	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No
Bismuth, dissolved	mg/L	0.00005	<0.00005	<0.00005	0.0	No	<0.00005	<0.00005	0.0	No	<0.00005	<0.00005	0.0	No
Boron, dissolved	mg/L	0.01	<0.01	<0.01	0.0	No	<0.01	<0.01	0.0	No	<0.01	<0.01	0.0	No
Cadmium, dissolved	mg/L	0.000005	0.0000076	<0.000005	41.3	No	0.0000061	0.0000096	44.6	No	0.0000123	0.0000132	7.1	No
Calcium, dissolved	mg/L	0.05	2.58	2.63	1.9	Yes	2.67	2.71	1.5	Yes	2.46	2.56	4.0	Yes
Cerium, dissolved	µg/L		-	-	-	-	-	-	-	-	-	-	-	-
Cesium, dissolved	mg/L	0.00001	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No	0.000041	0.000031	27.8	No
Chromium, dissolved	mg/L	0.0001	0.00034	0.0003	12.5	No	0.00034	0.00036	5.7	No	0.00062	0.00058	6.7	Yes
Cobalt, dissolved	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	0.0002	0.0002	0.0	No
Copper, dissolved	mg/L	0.0002	0.00069	0.00073	5.6	No	0.00064	0.00069	7.5	No	0.00099	0.00095	4.1	No

APPENDIX A, TABLE 2
Water chemistry QAQC results, fall 2022.

Analyte	Units	RDL	Fall 2022											
			Mennin Lake				Mennin River				UWB-03			
			ML2-A				MR2-A				P3-A			
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹
Metals Dissolved														
Dysprosium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Erbium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Europium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Gadolinium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Gold, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Hafnium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Holmium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Iridium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron, dissolved	mg/L	0.01	0.24	0.241	0.4	Yes	0.302	0.307	1.6	Yes	1.04	1	3.9	Yes
Lanthanum, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead, dissolved	mg/L	0.00005	0.000061	0.000065	6.3	No	0.000061	0.000074	19.3	No	0.000234	0.000234	0.0	No
Lithium, dissolved	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No
Magnesium, dissolved	mg/L	0.005	0.689	0.684	0.7	Yes	0.655	0.68	3.7	Yes	0.715	0.736	2.9	Yes
Manganese, dissolved	mg/L	0.0001	0.00924	0.00943	2.0	Yes	0.0111	0.0112	0.9	Yes	0.0244	0.0242	0.8	Yes
Mercury, dissolved	mg/L	0.000005	<0.000005	<0.000005	0.0	No	<0.000005	<0.000005	0.0	No	<0.000005	<0.000005	0.0	No
Molybdenum, dissolved	mg/L	0.00005	0.000348	0.000335	3.8	Yes	0.000276	0.000301	8.7	Yes	<0.00005	<0.00005	0.0	No
Neodymium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel, dissolved	mg/L	0.0005	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	0.0	No	0.00053	0.00053	0.0	No
Palladium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus, dissolved	mg/L	0.05	<0.05	<0.05	0.0	No	<0.05	<0.05	0.0	No	<0.05	<0.05	0.0	No
Platinum, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium, dissolved	mg/L	0.05	0.369	0.371	0.5	Yes	0.342	0.357	4.3	Yes	0.466	0.469	0.6	Yes
Praseodymium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Rhenium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Rhodium, dissolved	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No
Rubidium, dissolved	mg/L	0.0002	0.00122	0.00127	4.0	Yes	0.00112	0.00114	1.8	Yes	0.00157	0.00142	10.0	Yes
Ruthenium, dissolved	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No
Samarium, dissolved	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No
Scandium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium, dissolved	mg/L	0.00005	0.000099	0.000092	7.3	No	0.000127	0.000077	49.0	No	0.000122	0.000099	20.8	No
Silicon, dissolved	mg/L	0.05	1.24	1.25	0.8	Yes	1.22	1.27	4.0	Yes	1.87	1.85	1.1	Yes
Silver, dissolved	mg/L	0.00001	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No
Sodium, dissolved	mg/L	0.05	1.15	1.14	0.9	Yes	1.09	1.11	1.8	Yes	1.26	1.27	0.8	Yes
Strontium, dissolved	mg/L	0.0002	0.0111	0.011	0.9	Yes	0.0106	0.0109	2.8	Yes	0.01	0.00975	2.5	Yes
Sulfur, dissolved	mg/L	0.5	<0.5	<0.5	0.0	No	<0.5	<0.5	0.0	No	<0.5	<0.5	0.0	No
Tellurium, dissolved	mg/L	0.0002	<0.0002	<0.0002	0.0	No	<0.0002	<0.0002	0.0	No	<0.0002	<0.0002	0.0	No
Terbium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium, dissolved	mg/L	0.00001	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No
Thorium, dissolved	mg/L	0.0001	<0.0001	<0.0001	0.0	No	0.00011	0.00011	0.0	No	0.00011	0.00012	8.7	No
Thulium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX A, TABLE 2
Water chemistry QAQC results, fall 2022.

Analyte	Units	RDL	Fall 2022											
			Mennin Lake				Mennin River				UWB-03			
			ML2-A				MR2-A				P3-A			
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹
Metals Dissolved														
Tin, dissolved	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No
Titanium, dissolved	mg/L	0.0003	0.00135	0.00145	7.1	No	0.00187	0.00214	13.5	Yes	0.00426	0.00515	18.9	Yes
Tungsten, dissolved	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No
Uranium, dissolved	mg/L	0.00001	0.000096	0.000101	5.1	Yes	0.000107	0.000104	2.8	Yes	0.000072	0.000075	4.1	Yes
Vanadium, dissolved	mg/L	0.0005	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	0.0	No	0.00062	0.00062	0.0	No
Ytterbium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc, dissolved	mg/L	0.001	<0.001	0.0011	9.5	No	0.0024	0.0038	45.2	No	0.0043	0.007	47.8	No
Zirconium, dissolved	mg/L	0.0002	0.00025	0.00026	3.9	No	0.0003	0.0003	0.0	No	0.00033	0.00034	3.0	No
Metals Total														
Aluminum, total	mg/L	0.003	0.193	0.18	7.0	Yes	0.209	0.227	8.3	Yes	0.351	0.354	0.9	Yes
Antimony, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No
Arsenic, total	mg/L	0.0001	0.0004	0.00038	5.1	No	0.00038	0.00039	2.6	No	0.00058	0.0006	3.4	Yes
Barium, total	mg/L	0.0001	0.00588	0.00579	1.5	Yes	0.00558	0.006	7.3	Yes	0.00572	0.00702	20.4	Yes
Beryllium, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No
Bismuth, total	mg/L	0.00005	<0.00005	<0.00005	0.0	No	<0.00005	<0.00005	0.0	No	<0.00005	<0.00005	0.0	No
Boron, total	mg/L	0.01	<0.01	<0.01	0.0	No	<0.01	<0.01	0.0	No	<0.01	<0.01	0.0	No
Cadmium, total	mg/L	0.000005	0.0000093	0.0000111	17.6	No	0.0000074	0.0000071	4.1	No	0.0000143	0.0000225	44.6	No
Calcium, total	mg/L	0.05	2.53	2.51	0.8	Yes	2.72	2.75	1.1	Yes	2.36	3.14	28.4	Yes
Cerium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Cesium, total	mg/L	0.00001	0.00001	<0.00001	0.0	No	0.000012	0.000013	8.0	No	0.000026	0.000024	8.0	No
Chromium, total	mg/L	0.0001	0.00046	0.0005	8.3	No	0.00049	0.00048	2.1	No	0.00064	0.00067	4.6	Yes
Cobalt, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	0.00011	9.5	No	0.00028	0.00028	0.0	No
Copper, total	mg/L	0.0005	0.00087	0.00142	48.0	No	0.00072	0.00074	2.7	No	0.00129	0.00087	38.9	No
Dysprosium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Erbium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Europium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Gadolinium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Gold, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Hafnium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Holmium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Iridium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron, total	mg/L	0.01	0.374	0.356	4.9	Yes	0.42	0.442	5.1	Yes	1.25	1.3	3.9	Yes
Lanthanum, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead, total	mg/L	0.00005	0.000114	0.000128	11.6	No	0.000096	0.000105	9.0	No	0.000352	0.00052	38.5	Yes
Lithium, total	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	0.0012	0.0018	40.0	No
Magnesium, total	mg/L	0.005	0.728	0.709	2.6	Yes	0.668	0.699	4.5	Yes	0.688	0.735	6.6	Yes
Manganese, total	mg/L	0.0001	0.0316	0.0304	3.9	Yes	0.0154	0.0158	2.6	Yes	0.0285	0.0295	3.4	Yes
Mercury, total	mg/L	0.000005	<0.000005	0.0000761	175.3	No	<0.000005	<0.000005	0.0	No	<0.000005	<0.000005	0.0	No
Molybdenum, total	mg/L	0.00005	0.000357	0.00036	0.8	Yes	0.000285	0.000285	0.0	Yes	<0.00005	<0.00005	0.0	No
Neodymium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX A, TABLE 2
Water chemistry QAQC results, fall 2022.

Analyte	Units	RDL	Fall 2022											
			Mennin Lake				Mennin River				UWB-03			
			ML2-A				MR2-A				P3-A			
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹
Metals Total														
Nickel, total	mg/L	0.0005	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	0.0	No	0.00064	0.00097	41.0	No
Palladium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus, total	mg/L	0.05	<0.05	<0.05	0.0	No	<0.05	<0.05	0.0	No	<0.05	<0.05	0.0	No
Platinum, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium, total	mg/L	0.05	0.406	0.372	8.7	Yes	0.351	0.361	2.8	Yes	0.409	0.447	8.9	Yes
Praseodymium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Rhenium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Rhodium, total	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No
Rubidium, total	mg/L	0.0002	0.00136	0.00125	8.4	Yes	0.00121	0.00136	11.7	Yes	0.00139	0.00156	11.5	Yes
Ruthenium, total	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No
Samarium, total	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No
Scandium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium, total	mg/L	0.00005	0.000119	0.000102	15.4	No	0.000128	0.000122	4.8	No	0.000136	0.000106	24.8	No
Silicon, total	mg/L	0.1	1.45	1.34	7.9	Yes	1.4	1.55	10.2	Yes	1.98	1.93	2.6	Yes
Silver, total	mg/L	0.00001	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No
Sodium, total	mg/L	0.05	1.19	1.15	3.4	Yes	1.09	1.16	6.2	Yes	1.1	1.18	7.0	Yes
Strontium, total	mg/L	0.0002	0.0113	0.0109	3.6	Yes	0.0107	0.0108	0.9	Yes	0.00926	0.00964	4.0	Yes
Sulfur, total	mg/L	0.5	0.61	<0.5	19.8	No	<0.5	<0.5	0.0	No	<0.5	<0.5	0.0	No
Tellurium, total	mg/L	0.0002	<0.0002	<0.0002	0.0	No	<0.0002	<0.0002	0.0	No	<0.0002	<0.0002	0.0	No
Terbium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium, total	mg/L	0.00001	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No	<0.00001	0.000111	166.9	No
Thorium, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	0.00011	<0.0001	9.5	No	<0.0001	<0.0001	0.0	No
Thulium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No
Titanium, total	mg/L	0.0003	0.00294	0.00247	17.4	Yes	0.00384	0.00455	16.9	Yes	0.00474	0.00488	2.9	Yes
Tungsten, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No
Uranium, total	mg/L	0.00001	0.0001	0.000101	1.0	Yes	0.000114	0.000115	0.9	Yes	0.000081	0.000103	23.9	Yes
Vanadium, total	mg/L	0.0005	<0.0005	<0.0005	0.0	No	0.00051	0.00056	9.3	No	0.00069	0.00074	7.0	No
Ytterbium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc, total	mg/L	0.003	<0.003	<0.003	0.0	No	<0.003	<0.003	0.0	No	0.0043	0.0386	159.9	No
Zirconium, total	mg/L	0.0002	0.00026	0.00021	21.3	No	0.00027	0.00024	11.8	No	0.00022	0.00025	12.8	No
Metals Speciated														
Chromium, hexavalent [Cr VI], dissolved	mg/L	0.0005	0.00129	0.001	25.3	No	<0.0005	<0.0005	0.0	No	0.00064	0.00062	3.2	No
Chromium, hexavalent [Cr VI], total	mg/L	0.0005	0.00087	0.00092	5.6	No	<0.0005	<0.0005	0.0	No	<0.0005	0.00054	7.7	No
Chromium, trivalent [Cr III], dissolved	mg/L	0.0005	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	0.0	No
Chromium, trivalent [Cr III], total	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No
Microbiological Tests														
Coliforms, Escherichia coli [E. coli]	CFU/100mL	1	3	4	28.6	No	88	40	75.0	Yes	8	21	89.7	Yes
Coliforms, total	CFU/100mL	1	103	104	1.0	Yes	>200	160	22.2	Yes	48	101	71.1	Yes

APPENDIX A, TABLE 2
Water chemistry QAQC results, fall 2022.

Analyte	Units	RDL	Fall 2022											
			Mennin Lake				Mennin River				UWB-03			
			ML2-A				MR2-A				P3-A			
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹
Organic_Inorganic Carbon														
Carbon, dissolved organic [DOC]	mg/L	0.5	11.8	12.1	2.5	Yes	15.9	14.1	12.0	Yes	22	22.4	1.8	Yes
Carbon, total inorganic [TIC]	mg/L	0.5	1.04	0.95	9.0	No	1.01	0.76	28.2	No	<0.5	<0.5	0.0	No
Carbon, total organic [TOC]	mg/L	0.5	12.3	12.5	1.6	Yes	13.8	14.7	6.3	Yes	21.5	21.2	1.4	Yes
Organochlorine Pesticides														
Aldrin	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlordane, cis- (alpha)	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlordane, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlordane, trans- (gamma)	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
DDD, 2,4'-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
DDD, 4,4'-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
DDD, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
DDE, 2,4'-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
DDE, 4,4'-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
DDE, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
DDT, 2,4'-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
DDT, 4,4'-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
DDT, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dieldrin	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Endosulfan, alpha-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Endosulfan, beta-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Endosulfan, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Endrin	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Heptachlor	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Heptachlor epoxide	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobenzene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobutadiene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorocyclohexane, gamma-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexachloroethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Methoxychlor	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX A, TABLE 2
Water chemistry QAQC results, fall 2022.

Analyte	Units	RDL	Fall 2022											
			Mennin Lake				Mennin River				UWB-03			
			ML2-A				MR2-A				P3-A			
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹
Polychlorinated Biphenyls														
Aroclor 1016	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1221	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1232	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1242	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1248	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1254	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1260	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1262	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1268	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Polychlorinated biphenyls [PCBs], total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Pesticides														
Glufosinate	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Glyphosate	µg/L	0.2	-	-	-	-	-	-	-	-	<0.2	<0.2	0.0	No
Physical Tests														
Alkalinity, bicarbonate (as CaCO3)	mg/L	1.2	7.9	7	12.1	Yes	6.6	7.2	8.7	Yes	4.9	5.2	5.9	No
Alkalinity, carbonate (as CaCO3)	mg/L	0.6	<0.6	<0.6	0.0	No	<0.6	<0.6	0.0	No	<0.6	<0.6	0.0	No
Alkalinity, hydroxide (as CaCO3)	mg/L	0.34	<0.34	<0.34	0.0	No	<0.34	<0.34	0.0	No	<0.34	<0.34	0.0	No
Alkalinity, phenolphthalein (as CaCO3)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Total (as CaCO3)	mg/L	1	6.5	5.7	13.1	Yes	5.4	5.9	8.8	Yes	4	4.3	7.2	No
Conductivity	µS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	umhos/cm	1	22.9	21.9	4.5	Yes	22.1	21.8	1.4	Yes	19.6	19.4	1.0	Yes
Hardness (as CaCO3), from total Ca/Mg	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Solids, total dissolved [TDS]	mg/L	4 to 13.33	34.1	32.8	3.9	Yes	39.9	33.5	17.4	Yes	48.1	50.2	4.3	Yes
Solids, total suspended [TSS]	mg/L	3	<3	3.3	9.5	No	<3	<3	0.0	No	<3	3.4	12.5	No
Turbidity	NTU	0.1	1.51	1.42	6.1	Yes	1.62	1.63	0.6	Yes	2.86	2.9	1.4	Yes
Plant Pigments														
Chlorophyll a	µg/L	0.1	8.36	7.79	7.1	Yes	1.62	1.64	1.2	Yes	2.43	3.02	21.7	Yes
Polycyclic Aromatic Hydrocarbons														
1+2-Methylnaphthalenes	µg/L	0.0283	-	-	-	-	-	-	-	-	<0.028	<0.028	0.0	No
1-Methylnaphthalene	µg/L	0.02	-	-	-	-	-	-	-	-	<0.02	<0.02	0.0	No
2-Methylnaphthalene	µg/L	0.02	-	-	-	-	-	-	-	-	<0.02	<0.02	0.0	No
Acenaphthene	µg/L	0.02	-	-	-	-	-	-	-	-	<0.02	<0.02	0.0	No
Acenaphthylene	µg/L	0.02	-	-	-	-	-	-	-	-	<0.02	<0.02	0.0	No
Anthracene	µg/L	0.02	-	-	-	-	-	-	-	-	<0.02	<0.02	0.0	No
Benz(a)anthracene	µg/L	0.02	-	-	-	-	-	-	-	-	<0.02	<0.02	0.0	No
Benzo(a)pyrene	µg/L	0.01	-	-	-	-	-	-	-	-	<0.01	<0.01	0.0	No
Benzo(b&j)fluoranthene	µg/L	0.02	-	-	-	-	-	-	-	-	<0.02	<0.02	0.0	No
Benzo(g,h,i)perylene	µg/L	0.02	-	-	-	-	-	-	-	-	<0.02	<0.02	0.0	No

APPENDIX A, TABLE 2
Water chemistry QAQC results, fall 2022.

Analyte	Units	RDL	Fall 2022											
			Mennin Lake				Mennin River				UWB-03			
			ML2-A				MR2-A				P3-A			
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹
Polycyclic Aromatic Hydrocarbons														
Benzo(k)fluoranthene	µg/L	0.02	-	-	-	-	-	-	-	-	<0.02	<0.02	0.0	No
Chrysene	µg/L	0.02	-	-	-	-	-	-	-	-	<0.02	<0.02	0.0	No
Dibenz(a,h)anthracene	µg/L	0.02	-	-	-	-	-	-	-	-	<0.02	<0.02	0.0	No
Fluoranthene	µg/L	0.02	-	-	-	-	-	-	-	-	<0.02	<0.02	0.0	No
Fluorene	µg/L	0.02	-	-	-	-	-	-	-	-	<0.02	<0.02	0.0	No
Indeno(1,2,3-c,d)pyrene	µg/L	0.02	-	-	-	-	-	-	-	-	<0.02	<0.02	0.0	No
Naphthalene	µg/L	0.05	-	-	-	-	-	-	-	-	<0.05	<0.05	0.0	No
Phenanthrene	µg/L	0.02	-	-	-	-	-	-	-	-	<0.02	<0.02	0.0	No
Pyrene	µg/L	0.02	-	-	-	-	-	-	-	-	<0.02	<0.02	0.0	No
Radiological Parameters														
Carbon-14	Bq/L	18.5	<18.5	<18.5	0.0	No	<18.5	<18.5	0.0	No	<18.5	<18.5	0.0	No
Cesium-137	Bq/L	0.37	<0.37	<0.37	0.0	No	<0.37	<0.37	0.0	No	<0.37	<0.37	0.0	No
Chlorine-36	Bq/L	0.37	<0.37	-	-	-	<0.37	-	-	-	0.667	-	-	-
Cobalt-60	Bq/L	0.37	<0.37	<0.37	0.0	No	<0.37	<0.37	0.0	No	<0.37	<0.37	0.0	No
Gross Alpha	Bq/L	0.111	<0.111	<0.111	0.0	No	<0.111	<0.111	0.0	No	<0.111	<0.111	0.0	No
Gross Beta	Bq/L	0.148	<0.148	<0.148	0.0	No	<0.148	<0.148	0.0	No	0.168	0.144	15.4	No
Iodine-129	Bq/L	0.37	<0.37	<0.37	0.0	No	<0.37	<0.37	0.0	No	<0.37	<0.37	0.0	No
Neptunium-237	Bq/L	0.0037	<0.0037	-	-	-	<0.0037	-	-	-	<0.0037	-	-	-
Plutonium-238	Bq/L	0.0037	<0.0037	-	-	-	<0.0037	-	-	-	<0.0037	-	-	-
Plutonium-239	Bq/L	0.0037	<0.0037	-	-	-	<0.0037	-	-	-	<0.0037	-	-	-
Potassium-40	Bq/L	7.1	<7.1	<7.1	0.0	No	<7.1	<7.1	0.0	No	<7.1	<7.1	0.0	No
Radium-226	Bq/L	0.037	<0.037	<0.037	0.0	No	<0.037	<0.037	0.0	No	0.0253	0.0163	43.3	No
Ruthenium-106	Bq/L	3	<3	<3	0.0	No	<3	<3	0.0	No	<3	<3	0.0	No
Selenium-79	Bq/L	1.85	<1.85	-	-	-	<1.85	-	-	-	<1.85	-	-	-
Strontium-90	Bq/L	0.037	<0.037	<0.037	0.0	No	<0.037	<0.037	0.0	No	<0.037	<0.037	0.0	No
Thorium-228	Bq/L	0.0074	<0.0074	0.0329	126.6	No	<0.0074	<0.0074	0.0	No	<0.0074	<0.0074	0.0	No
Thorium-230	Bq/L	0.0074	<0.0074	<0.0074	0.0	No	0.0036	<0.0074	69.1	No	<0.0074	<0.0074	0.0	No
Thorium-232	Bq/L	0.0074	<0.0074	<0.0074	0.0	No	<0.0074	<0.0074	0.0	No	<0.0074	<0.0074	0.0	No
Tritium	Bq/L	14.8	<14.8	<14.8	0.0	No	<14.8	<14.8	0.0	No	<14.8	<14.8	0.0	No
Uranium-234	Bq/L	0.0074	<0.0074	<0.0074	0.0	No	<0.0074	<0.0074	0.0	No	<0.0074	<0.0074	0.0	No
Uranium-235	Bq/L	0.0074	<0.0074	<0.0074	0.0	No	<0.0074	<0.0074	0.0	No	<0.0074	<0.0074	0.0	No
Uranium-238	Bq/L	0.0074	<0.0074	<0.0074	0.0	No	<0.0074	<0.0074	0.0	No	0.00383	0.00323	17.0	No
Semi-Volatile Organic Compounds														
1,2,4-Trichlorobenzene	µg/L	0.4	-	-	-	-	-	-	-	-	<0.4	<0.4	0.0	No
2,4,5-Trichlorophenol	µg/L	0.2	-	-	-	-	-	-	-	-	<0.2	<0.2	0.0	No
2,4,6-Trichlorophenol	µg/L	0.2	-	-	-	-	-	-	-	-	<0.2	<0.2	0.0	No
2,4+2,6-Dinitrotoluene	µg/L	0.566	-	-	-	-	-	-	-	-	<0.57	<0.57	0.0	No
2,4-Dichlorophenol	µg/L	0.3	-	-	-	-	-	-	-	-	<0.3	<0.3	0.0	No
2,4-Dimethylphenol	µg/L	0.5	-	-	-	-	-	-	-	-	<0.5	<0.5	0.0	No
2,4-Dinitrophenol	µg/L	1	-	-	-	-	-	-	-	-	<1	<1	0.0	No

APPENDIX A, TABLE 2
Water chemistry QAQC results, fall 2022.

Analyte	Units	RDL	Fall 2022											
			Mennin Lake				Mennin River				UWB-03			
			ML2-A				MR2-A				P3-A			
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹
Semi-Volatile Organic Compounds														
2,4-Dinitrotoluene	µg/L	0.4	-	-	-	-	-	-	-	-	<0.4	<0.4	0.0	No
2,6-Dinitrotoluene	µg/L	0.4	-	-	-	-	-	-	-	-	<0.4	<0.4	0.0	No
2-Chlorophenol	µg/L	0.3	-	-	-	-	-	-	-	-	<0.3	<0.3	0.0	No
4-Chloroaniline	µg/L	0.4	-	-	-	-	-	-	-	-	<0.4	<0.4	0.0	No
Biphenyl	µg/L	0.4	-	-	-	-	-	-	-	-	<0.4	<0.4	0.0	No
bis(2-Chloro-1-methylethyl) ether	µg/L	0.4	-	-	-	-	-	-	-	-	<0.4	<0.4	0.0	No
bis(2-Chloroethyl) ether	µg/L	0.4	-	-	-	-	-	-	-	-	<0.4	<0.4	0.0	No
Bis(2-ethylhexyl)phthalate	µg/L	2	-	-	-	-	-	-	-	-	<2	<2	0.0	No
Dichlorobenzidine, 3,3'-	µg/L	0.4	-	-	-	-	-	-	-	-	<0.4	<0.4	0.0	No
Diethylphthalate	µg/L	0.2	-	-	-	-	-	-	-	-	<0.2	<0.2	0.0	No
Dimethylphthalate	µg/L	0.2	-	-	-	-	-	-	-	-	<0.2	<0.2	0.0	No
Pentachlorophenol [PCP]	µg/L	0.5	-	-	-	-	-	-	-	-	<0.5	<0.5	0.0	No
Phenol	µg/L	0.5	-	-	-	-	-	-	-	-	<0.5	<0.5	0.0	No
Volatile Organic Compounds														
Acetone	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromoform	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromomethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
BTEX, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon disulfide	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon tetrachloride	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloromethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromochloromethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromoethane, 1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorobenzene, 1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorobenzene, 1,3-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorobenzene, 1,4-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethane, 1,1-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethane, 1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethylene, 1,1-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethylene, cis+trans-1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethylene, cis-1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethylene, trans-1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloromethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloropropane, 1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX A, TABLE 2
 Water chemistry QAQC results, fall 2022.

Analyte	Units	RDL	Fall 2022											
			Mennin Lake				Mennin River				UWB-03			
			ML2-A				MR2-A				P3-A			
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹
Volatile Organic Compounds														
Dichloropropylene, cis+trans-1,3-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloropropylene, cis-1,3-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloropropylene, trans-1,3-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexane, n-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexanone, 2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl ethyl ketone [MEK]	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl isobutyl ketone [MIBK]	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl-tert-butyl ether [MTBE]	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethane, 1,1,1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethane, 1,1,2,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethylene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethane, 1,1,1-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethane, 1,1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethylene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl chloride	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Xylene, m+p-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Xylene, o-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Xylenes, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Trihalomethanes [THMs], total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX A, TABLE 2

Water chemistry QAQC results, fall 2022.

Analyte	Units	RDL	Fall 2022										
			UWB-08				Revell River				Blanks		
			RP1-A				RR1-A				Filter	Field	Trip
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	FB-1A	WB-1A	WB-1B
Aggregate Organics													
Biochemical Oxygen Demand	mg/L	2	<2	<2	0.0	No	<2	<2	0.0	No	-	<2	<2
Anions and Nutrients													
Ammonia, Total (as N)	mg/L	0.01	0.04	0.038	5.1	No	0.012	0.021	54.5	No	-	<0.01	0.064
Bromide	mg/L	0.1	<0.1	<0.1	0.0	No	<0.1	<0.1	0.0	No	-	<0.1	<0.1
Chloride	mg/L	0.5	<0.5	<0.5	0.0	No	13.7	13.7	0.0	Yes	-	<0.5	<0.5
Fluoride	mg/L	0.02	0.029	0.031	6.7	No	0.028	0.028	0.0	No	-	<0.02	<0.02
Iodide	mg/L	0.2	<0.2	<0.2	0.0	No	<0.2	<0.2	0.0	No	-	<0.2	<0.2
Kjeldahl nitrogen, total [TKN]	mg/L	0.2	0.73	0.72	1.4	No	0.54	0.45	18.2	No	-	<0.2	<0.2
Nitrate (as N)	mg/L	0.02	<0.02	<0.02	0.0	No	0.043	0.048	11.0	No	-	<0.02	<0.02
Nitrate and Nitrite as N	mg/L	0.07	<0.07	<0.07	0.0	No	<0.07	<0.07	0.0	No	-	<0.07	<0.07
Nitrite (as N)	mg/L	0.01	<0.01	<0.01	0.0	No	<0.01	<0.01	0.0	No	-	<0.01	<0.01
Phosphorus, total	mg/L	0.003	0.0207	0.0224	7.9	Yes	0.012	0.0129	7.2	No	-	<0.003	<0.003
Sulfate (as SO4)	mg/L	0.3	0.36	0.36	0.0	No	1.1	1.1	0.0	No	-	<0.3	<0.3
Cyanides													
Cyanide, Total	mg/L	0.002	<0.002	<0.002	0.0	No	<0.002	<0.002	0.0	No	-	<0.002	<0.002
Herbicides													
AMPA	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	<0.5	<0.5
Hydrocarbons													
F1 (C6-C10)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
F1-BTEX	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
F2 (C10-C16)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
F3 (C16-C34)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
F4 (C34-C50)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
TEH (C10-C50)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
TEH (C16-C50)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
Metals Dissolved													
Aluminum, dissolved	mg/L	0.001	0.0218	0.0189	14.3	Yes	0.219	0.23	4.9	Yes	0.002	0.0018	<0.001
Antimony, dissolved	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	<0.0001
Arsenic, dissolved	mg/L	0.0001	0.00036	0.00032	11.8	No	0.00046	0.00049	6.3	No	<0.0001	<0.0001	<0.0001
Barium, dissolved	mg/L	0.0001	0.00687	0.00674	1.9	Yes	0.00966	0.0101	4.5	Yes	0.00033	0.00028	<0.0001
Beryllium, dissolved	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	<0.0001
Bismuth, dissolved	mg/L	0.00005	<0.00005	<0.00005	0.0	No	<0.00005	<0.00005	0.0	No	<0.00005	<0.00005	<0.00005
Boron, dissolved	mg/L	0.01	<0.01	<0.01	0.0	No	<0.01	<0.01	0.0	No	<0.01	<0.01	<0.01
Cadmium, dissolved	mg/L	0.000005	<0.000005	<0.000005	0.0	No	0.0000108	0.0000116	7.1	No	<0.000005	<0.000005	<0.000005
Calcium, dissolved	mg/L	0.05	8.18	8.03	1.9	Yes	5.77	5.81	0.7	Yes	0.061	<0.05	<0.05
Cerium, dissolved	µg/L		-	-	-	-	-	-	-	-	-	-	-
Cesium, dissolved	mg/L	0.00001	<0.00001	<0.00001	0.0	No	0.000022	0.000021	4.7	No	0.00001	<0.00001	<0.00001
Chromium, dissolved	mg/L	0.0001	0.00012	0.00014	15.4	No	0.00051	0.00049	4.0	No	<0.0001	<0.0001	<0.0001
Cobalt, dissolved	mg/L	0.0001	<0.0001	<0.0001	0.0	No	0.00013	0.00015	14.3	No	<0.0001	<0.0001	<0.0001
Copper, dissolved	mg/L	0.0002	0.00141	0.00111	23.8	Yes	0.00061	0.00066	7.9	No	0.00023	0.0004	<0.0002

APPENDIX A, TABLE 2
Water chemistry QAQC results, fall 2022.

Analyte	Units	RDL	Fall 2022										
			UWB-08				Revell River				Blanks		
			RP1-A				RR1-A				Filter	Field	Trip
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	FB-1A	WB-1A	WB-1B
Metals Dissolved													
Dysprosium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Erbium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Europium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Gadolinium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Gold, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Hafnium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Holmium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Iridium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Iron, dissolved	mg/L	0.01	0.094	0.09	4.3	Yes	0.95	0.987	3.8	Yes	<0.01	<0.01	<0.01
Lanthanum, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Lead, dissolved	mg/L	0.00005	<0.00005	<0.00005	0.0	No	0.000135	0.00014	3.6	No	<0.00005	<0.00005	<0.00005
Lithium, dissolved	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	<0.001	<0.001	<0.001
Magnesium, dissolved	mg/L	0.005	1.53	1.5	2.0	Yes	0.865	0.908	4.9	Yes	0.0093	<0.005	<0.005
Manganese, dissolved	mg/L	0.0001	0.00136	0.00114	17.6	Yes	0.0165	0.0174	5.3	Yes	0.00012	<0.0001	<0.0001
Mercury, dissolved	mg/L	0.000005	<0.000005	<0.000005	0.0	No	<0.000005	<0.000005	0.0	No	<0.000005	<0.000005	<0.000005
Molybdenum, dissolved	mg/L	0.00005	0.000118	0.000149	23.2	No	0.000051	0.000064	22.6	No	0.000198	<0.00005	<0.00005
Neodymium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Nickel, dissolved	mg/L	0.0005	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	<0.0005
Palladium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus, dissolved	mg/L	0.05	<0.05	<0.05	0.0	No	<0.05	<0.05	0.0	No	<0.05	<0.05	<0.05
Platinum, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Potassium, dissolved	mg/L	0.05	0.6	0.583	2.9	Yes	0.56	0.561	0.2	Yes	<0.05	<0.05	<0.05
Praseodymium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Rhenium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Rhodium, dissolved	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	<0.001	<0.001	<0.001
Rubidium, dissolved	mg/L	0.0002	0.00115	0.00119	3.4	Yes	0.00166	0.00175	5.3	Yes	<0.0002	<0.0002	<0.0002
Ruthenium, dissolved	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	<0.001	<0.001	<0.001
Samarium, dissolved	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	<0.001	<0.001	<0.001
Scandium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Selenium, dissolved	mg/L	0.00005	<0.00005	0.000099	65.8	No	0.000102	0.000165	47.2	No	<0.00005	<0.00005	<0.00005
Silicon, dissolved	mg/L	0.05	1.58	1.56	1.3	Yes	3.97	4.04	1.7	Yes	<0.05	<0.05	<0.05
Silver, dissolved	mg/L	0.00001	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	<0.00001
Sodium, dissolved	mg/L	0.05	1.27	1.27	0.0	Yes	9.64	9.97	3.4	Yes	0.223	0.155	<0.05
Strontium, dissolved	mg/L	0.0002	0.0162	0.0164	1.2	Yes	0.0172	0.0171	0.6	Yes	<0.0002	<0.0002	<0.0002
Sulfur, dissolved	mg/L	0.5	<0.5	<0.5	0.0	No	<0.5	0.51	2.0	No	<0.5	<0.5	<0.5
Tellurium, dissolved	mg/L	0.0002	<0.0002	<0.0002	0.0	No	<0.0002	<0.0002	0.0	No	<0.0002	<0.0002	<0.0002
Terbium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Thallium, dissolved	mg/L	0.00001	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	<0.00001
Thorium, dissolved	mg/L	0.0001	<0.0001	<0.0001	0.0	No	0.00026	0.00032	20.7	No	<0.0001	<0.0001	<0.0001
Thulium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX A, TABLE 2
Water chemistry QAQC results, fall 2022.

Analyte	Units	RDL	Fall 2022											
			UWB-08				Revell River				Blanks			
			RP1-A				RR1-A				Filter	Field	Trip	
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	FB-1A	WB-1A	WB-1B	
Metals Dissolved														
Tin, dissolved	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	0.00031	0.00028	<0.0001	
Titanium, dissolved	mg/L	0.0003	<0.0003	<0.0003	0.0	No	0.00331	0.00373	11.9	Yes	<0.0003	<0.0003	<0.0003	
Tungsten, dissolved	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	<0.0001	
Uranium, dissolved	mg/L	0.00001	<0.00001	<0.00001	0.0	No	0.000162	0.000161	0.6	Yes	<0.00001	<0.00001	<0.00001	
Vanadium, dissolved	mg/L	0.0005	<0.0005	<0.0005	0.0	No	0.00072	0.00077	6.7	No	<0.0005	<0.0005	<0.0005	
Ytterbium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	
Zinc, dissolved	mg/L	0.001	0.0013	<0.001	26.1	No	0.0025	0.0022	12.8	No	0.0013	<0.001	<0.001	
Zirconium, dissolved	mg/L	0.0002	0.00024	<0.0002	18.2	No	0.00033	0.00034	3.0	No	<0.0002	<0.0002	<0.0002	
Metals Total														
Aluminum, total	mg/L	0.003	0.0282	0.0268	5.1	Yes	0.251	0.245	2.4	Yes	-	<0.003	<0.003	
Antimony, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	-	<0.0001	<0.0001	
Arsenic, total	mg/L	0.0001	0.00038	0.00037	2.7	No	0.00049	0.00049	0.0	No	-	<0.0001	<0.0001	
Barium, total	mg/L	0.0001	0.00786	0.00781	0.6	Yes	0.01	0.0106	5.8	Yes	-	0.00028	<0.0001	
Beryllium, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	-	<0.0001	<0.0001	
Bismuth, total	mg/L	0.00005	<0.00005	<0.00005	0.0	No	<0.00005	<0.00005	0.0	No	-	<0.00005	<0.00005	
Boron, total	mg/L	0.01	<0.01	<0.01	0.0	No	<0.01	<0.01	0.0	No	-	<0.01	<0.01	
Cadmium, total	mg/L	0.000005	<0.000005	<0.000005	0.0	No	0.0000138	0.0000087	45.3	No	-	<0.000005	<0.000005	
Calcium, total	mg/L	0.05	8.67	8.73	0.7	Yes	5.93	5.93	0.0	Yes	-	<0.05	<0.05	
Cerium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	
Cesium, total	mg/L	0.00001	<0.00001	<0.00001	0.0	No	0.000024	0.000024	0.0	No	-	<0.00001	<0.00001	
Chromium, total	mg/L	0.0001	0.00018	0.00017	5.7	No	0.00055	0.00141	87.8	Yes	-	<0.0001	<0.0001	
Cobalt, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	0.00016	0.00017	6.1	No	-	<0.0001	<0.0001	
Copper, total	mg/L	0.0005	0.00077	<0.0005	42.5	No	0.0007	0.00111	45.3	No	-	<0.0005	<0.0005	
Dysprosium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	
Erbium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	
Europium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	
Gadolinium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	
Gold, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	
Hafnium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	
Holmium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	
Iridium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	
Iron, total	mg/L	0.01	0.232	0.229	1.3	Yes	1.4	1.38	1.4	Yes	-	<0.01	<0.01	
Lanthanum, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	
Lead, total	mg/L	0.00005	<0.00005	<0.00005	0.0	No	0.000223	0.000228	2.2	No	-	<0.00005	<0.00005	
Lithium, total	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	-	<0.001	<0.001	
Magnesium, total	mg/L	0.005	1.71	1.69	1.2	Yes	0.86	0.855	0.6	Yes	-	0.0052	<0.005	
Manganese, total	mg/L	0.0001	0.0343	0.0341	0.6	Yes	0.0206	0.0203	1.5	Yes	-	<0.0001	<0.0001	
Mercury, total	mg/L	0.000005	<0.000005	<0.000005	0.0	No	<0.000005	<0.000005	0.0	No	-	<0.000005	<0.000005	
Molybdenum, total	mg/L	0.00005	0.000072	0.000066	8.7	No	0.000065	0.000083	24.3	No	-	<0.00005	<0.00005	
Neodymium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	

APPENDIX A, TABLE 2

Water chemistry QAQC results, fall 2022.

Analyte	Units	RDL	Fall 2022										
			UWB-08				Revell River				Blanks		
			RP1-A				RR1-A				Filter	Field	Trip
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	FB-1A	WB-1A	WB-1B
Metals Total													
Nickel, total	mg/L	0.0005	<0.0005	<0.0005	0.0	No	<0.0005	0.00085	51.9	No	-	<0.0005	<0.0005
Palladium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus, total	mg/L	0.05	<0.05	<0.05	0.0	No	<0.05	<0.05	0.0	No	-	<0.05	<0.05
Platinum, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Potassium, total	mg/L	0.05	0.621	0.615	1.0	Yes	0.531	0.53	0.2	Yes	-	<0.05	<0.05
Praseodymium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Rhenium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Rhodium, total	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	-	<0.001	<0.001
Rubidium, total	mg/L	0.0002	0.00138	0.00126	9.1	Yes	0.00166	0.0017	2.4	Yes	-	<0.0002	<0.0002
Ruthenium, total	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	-	<0.001	<0.001
Samarium, total	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	-	<0.001	<0.001
Scandium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Selenium, total	mg/L	0.00005	0.00013	0.000112	14.9	No	0.000103	0.000146	34.5	No	-	<0.00005	<0.00005
Silicon, total	mg/L	0.1	1.75	1.8	2.8	Yes	4.21	4.08	3.1	Yes	-	<0.1	<0.1
Silver, total	mg/L	0.00001	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No	-	<0.00001	<0.00001
Sodium, total	mg/L	0.05	1.34	1.3	3.0	Yes	9.79	9.86	0.7	Yes	-	0.176	<0.05
Strontium, total	mg/L	0.0002	0.0183	0.0183	0.0	Yes	0.017	0.0171	0.6	Yes	-	<0.0002	<0.0002
Sulfur, total	mg/L	0.5	<0.5	<0.5	0.0	No	0.67	0.52	25.2	No	-	<0.5	<0.5
Tellurium, total	mg/L	0.0002	<0.0002	<0.0002	0.0	No	<0.0002	<0.0002	0.0	No	-	<0.0002	<0.0002
Terbium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Thallium, total	mg/L	0.00001	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No	-	<0.00001	<0.00001
Thorium, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	0.00023	0.00025	8.3	No	-	<0.0001	<0.0001
Thulium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Tin, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	-	0.00031	<0.0001
Titanium, total	mg/L	0.0003	0.0006	0.00045	28.6	No	0.00453	0.00448	1.1	Yes	-	<0.0003	<0.0003
Tungsten, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	-	<0.0001	<0.0001
Uranium, total	mg/L	0.00001	<0.00001	<0.00001	0.0	No	0.000169	0.000167	1.2	Yes	-	<0.00001	<0.00001
Vanadium, total	mg/L	0.0005	<0.0005	<0.0005	0.0	No	0.00105	0.00104	1.0	No	-	<0.0005	<0.0005
Ytterbium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Zinc, total	mg/L	0.003	<0.003	<0.003	0.0	No	<0.003	<0.003	0.0	No	-	<0.003	<0.003
Zirconium, total	mg/L	0.0002	0.00034	<0.0002	51.9	No	0.00027	0.00027	0.0	No	-	<0.0002	<0.0002
Metals Speciated													
Chromium, hexavalent [Cr VI], dissolved	mg/L	0.0005	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	<0.0005
Chromium, hexavalent [Cr VI], total	mg/L	0.0005	0.00065	<0.0005	26.1	No	<0.0005	<0.0005	0.0	No	-	<0.0005	<0.0005
Chromium, trivalent [Cr III], dissolved	mg/L	0.0005	<0.0005	<0.0005	0.0	No	0.00051	<0.0005	2.0	No	<0.0005	<0.0005	<0.0005
Chromium, trivalent [Cr III], total	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	0.0014	33.3	No	-	<0.001	<0.001
Microbiological Tests													
Coliforms, Escherichia coli [E. coli]	CFU/100mL	1	3	8	90.9	No	15	14	6.9	Yes	-	-	-
Coliforms, total	CFU/100mL	1	103	48	72.8	Yes	>200	>200	0.0	Yes	-	-	-

APPENDIX A, TABLE 2
Water chemistry QAQC results, fall 2022.

Analyte	Units	RDL	Fall 2022										
			UWB-08				Revell River				Blanks		
			RP1-A				RR1-A				Filter	Field	Trip
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	FB-1A	WB-1A	WB-1B
Organic_Inorganic Carbon													
Carbon, dissolved organic [DOC]	mg/L	0.5	16.4	16.6	1.2	Yes	23.8	23.2	2.6	Yes	<0.5	<0.5	<0.5
Carbon, total inorganic [TIC]	mg/L	0.5	2.92	2.92	0.0	Yes	0.76	0.88	14.6	No	-	<0.5	<0.5
Carbon, total organic [TOC]	mg/L	0.5	16.3	16	1.9	Yes	26.3	26	1.1	Yes	-	<0.5	<0.5
Organochlorine Pesticides													
Aldrin	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Chlordane, cis- (alpha)	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Chlordane, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Chlordane, trans- (gamma)	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
DDD, 2,4'-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
DDD, 4,4'-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
DDD, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
DDE, 2,4'-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
DDE, 4,4'-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
DDE, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
DDT, 2,4'-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
DDT, 4,4'-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
DDT, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dieldrin	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Endosulfan, alpha-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Endosulfan, beta-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Endosulfan, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Endrin	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Heptachlor	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Heptachlor epoxide	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobenzene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobutadiene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorocyclohexane, gamma-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Hexachloroethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Methoxychlor	µg/L	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX A, TABLE 2
Water chemistry QAQC results, fall 2022.

Analyte	Units	RDL	Fall 2022										
			UWB-08				Revell River				Blanks		
			RP1-A				RR1-A				Filter	Field	Trip
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	FB-1A	WB-1A	WB-1B
Polychlorinated Biphenyls													
Aroclor 1016	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1221	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1232	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1242	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1248	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1254	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1260	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1262	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1268	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Polychlorinated biphenyls [PCBs], total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Pesticides													
Glufosinate	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Glyphosate	µg/L	0.2	<0.2	<0.2	0.0	No	-	-	-	-	-	<0.2	<0.2
Physical Tests													
Alkalinity, bicarbonate (as CaCO3)	mg/L	1.2	28.1	28.1	0.0	Yes	10.9	10.6	2.8	Yes	-	1.2	<1.2
Alkalinity, carbonate (as CaCO3)	mg/L	0.6	<0.6	<0.6	0.0	No	<0.6	<0.6	0.0	No	-	<0.6	<0.6
Alkalinity, hydroxide (as CaCO3)	mg/L	0.34	<0.34	<0.34	0.0	No	<0.34	<0.34	0.0	No	-	<0.34	<0.34
Alkalinity, phenolphthalein (as CaCO3)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Total (as CaCO3)	mg/L	1	23	23	0.0	Yes	8.9	8.7	2.3	Yes	-	1	<1
Conductivity	µS/cm	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	umhos/cm	1	51	51	0.0	Yes	77.5	76.8	0.9	Yes	-	<1	<1
Hardness (as CaCO3), from total Ca/Mg	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
Solids, total dissolved [TDS]	mg/L	4 to 13.33	53	55.9	5.3	Yes	97	98	1.0	Yes	-	<4	<4
Solids, total suspended [TSS]	mg/L	3	<3	<3	0.0	No	3.6	<3	18.2	No	-	<3	<3
Turbidity	NTU	0.1	1.87	2.05	9.2	Yes	1.63	1.71	4.8	Yes	-	<0.1	0.16
Plant Pigments													
Chlorophyll a	µg/L	0.1	18.6	17.1	8.4	Yes	0.74	0.73	1.4	Yes	-	-	-
Polycyclic Aromatic Hydrocarbons													
1+2-Methylnaphthalenes	µg/L	0.0283	<0.028	<0.028	0.0	No	-	-	-	-	-	<0.028	<0.028
1-Methylnaphthalene	µg/L	0.02	<0.02	<0.02	0.0	No	-	-	-	-	-	<0.02	<0.02
2-Methylnaphthalene	µg/L	0.02	<0.02	<0.02	0.0	No	-	-	-	-	-	<0.02	<0.02
Acenaphthene	µg/L	0.02	<0.02	<0.02	0.0	No	-	-	-	-	-	<0.02	<0.02
Acenaphthylene	µg/L	0.02	<0.02	<0.02	0.0	No	-	-	-	-	-	<0.02	<0.02
Anthracene	µg/L	0.02	<0.02	<0.02	0.0	No	-	-	-	-	-	<0.02	<0.02
Benz(a)anthracene	µg/L	0.02	<0.02	<0.02	0.0	No	-	-	-	-	-	<0.02	<0.02
Benzo(a)pyrene	µg/L	0.01	<0.01	<0.01	0.0	No	-	-	-	-	-	<0.01	<0.01
Benzo(b&j)fluoranthene	µg/L	0.02	<0.02	<0.02	0.0	No	-	-	-	-	-	<0.02	<0.02
Benzo(g,h,i)perylene	µg/L	0.02	<0.02	<0.02	0.0	No	-	-	-	-	-	<0.02	<0.02

APPENDIX A, TABLE 2

Water chemistry QAQC results, fall 2022.

Analyte	Units	RDL	Fall 2022										
			UWB-08				Revell River				Blanks		
			RP1-A				RR1-A				Filter	Field	Trip
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	FB-1A	WB-1A	WB-1B
Polycyclic Aromatic Hydrocarbons													
Benzo(k)fluoranthene	µg/L	0.02	<0.02	<0.02	0.0	No	-	-	-	-	-	<0.02	<0.02
Chrysene	µg/L	0.02	<0.02	<0.02	0.0	No	-	-	-	-	-	<0.02	<0.02
Dibenz(a,h)anthracene	µg/L	0.02	<0.02	<0.02	0.0	No	-	-	-	-	-	<0.02	<0.02
Fluoranthene	µg/L	0.02	<0.02	<0.02	0.0	No	-	-	-	-	-	<0.02	<0.02
Fluorene	µg/L	0.02	<0.02	<0.02	0.0	No	-	-	-	-	-	<0.02	<0.02
Indeno(1,2,3-c,d)pyrene	µg/L	0.02	<0.02	<0.02	0.0	No	-	-	-	-	-	<0.02	<0.02
Naphthalene	µg/L	0.05	<0.05	<0.05	0.0	No	-	-	-	-	-	<0.05	<0.05
Phenanthrene	µg/L	0.02	<0.02	<0.02	0.0	No	-	-	-	-	-	<0.02	<0.02
Pyrene	µg/L	0.02	<0.02	<0.02	0.0	No	-	-	-	-	-	<0.02	<0.02
Radiological Parameters													
Carbon-14	Bq/L	18.5	<18.5	<18.5	0.0	No	<18.5	<18.5	0.0	No	-	<18.5	<18.5
Cesium-137	Bq/L	0.37	<0.37	<0.37	0.0	No	<0.37	<0.37	0.0	No	-	<0.37	<0.37
Chlorine-36	Bq/L	0.37	-	-	-	-	<0.37	-	-	-	-	<0.37	<0.37
Cobalt-60	Bq/L	0.37	<0.37	<0.37	0.0	No	<0.37	<0.37	0.0	No	-	<0.37	<0.37
Gross Alpha	Bq/L	0.111	<0.111	<0.111	0.0	No	0.0668	0.128	62.8	No	-	<0.111	<0.111
Gross Beta	Bq/L	0.148	0.161	0.103	43.9	No	<0.148	<0.148	0.0	No	-	<0.148	<0.148
Iodine-129	Bq/L	0.37	<0.37	<0.37	0.0	No	<0.37	<0.37	0.0	No	-	<0.37	<0.37
Neptunium-237	Bq/L	0.0037	-	-	-	-	<0.0037	-	-	-	-	<0.0037	<0.0037
Plutonium-238	Bq/L	0.0037	-	-	-	-	<0.0037	-	-	-	-	<0.0037	<0.0037
Plutonium-239	Bq/L	0.0037	-	-	-	-	<0.0037	-	-	-	-	<0.0037	<0.0037
Potassium-40	Bq/L	7.1	<7.1	<7.1	0.0	No	<7.1	<7.1	0.0	No	-	<7.1	<7.1
Radium-226	Bq/L	0.037	<0.037	<0.037	0.0	No	0.0193	<0.037	62.9	No	-	0.0156	<0.037
Ruthenium-106	Bq/L	3	<3	<3	0.0	No	<3	<3	0.0	No	-	<3	<3
Selenium-79	Bq/L	1.85	-	-	-	-	<1.85	-	-	-	-	<1.85	<1.85
Strontium-90	Bq/L	0.037	<0.037	<0.037	0.0	No	<0.037	<0.037	0.0	No	-	<0.037	<0.037
Thorium-228	Bq/L	0.0074	<0.0074	<0.0074	0.0	No	0.00931	0.0166	56.3	No	-	<0.0074	<0.0074
Thorium-230	Bq/L	0.0074	<0.0074	<0.0074	0.0	No	<0.0074	<0.0074	0.0	No	-	<0.0074	<0.0074
Thorium-232	Bq/L	0.0074	<0.0074	<0.0074	0.0	No	0.00153	0.00429	94.8	No	-	<0.0074	<0.0074
Tritium	Bq/L	14.8	<14.8	<14.8	0.0	No	<14.8	<14.8	0.0	No	-	<14.8	<14.8
Uranium-234	Bq/L	0.0074	<0.0074	<0.0074	0.0	No	<0.0074	<0.0074	0.0	No	-	<0.0074	<0.0074
Uranium-235	Bq/L	0.0074	<0.0074	<0.0074	0.0	No	<0.0074	<0.0074	0.0	No	-	<0.0074	<0.0074
Uranium-238	Bq/L	0.0074	<0.0074	<0.0074	0.0	No	<0.0074	<0.0074	0.0	No	-	<0.0074	<0.0074
Semi-Volatile Organic Compounds													
1,2,4-Trichlorobenzene	µg/L	0.4	<0.4	<0.4	0.0	No	-	-	-	-	-	<0.4	<0.4
2,4,5-Trichlorophenol	µg/L	0.2	<0.2	<0.2	0.0	No	-	-	-	-	-	<0.2	<0.2
2,4,6-Trichlorophenol	µg/L	0.2	<0.2	<0.2	0.0	No	-	-	-	-	-	<0.2	<0.2
2,4+2,6-Dinitrotoluene	µg/L	0.566	<0.57	<0.57	0.0	No	-	-	-	-	-	<0.57	<0.57
2,4-Dichlorophenol	µg/L	0.3	<0.3	<0.3	0.0	No	-	-	-	-	-	<0.3	<0.3
2,4-Dimethylphenol	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	<0.5	<0.5
2,4-Dinitrophenol	µg/L	1	<1	<1	0.0	No	-	-	-	-	-	<1	<1

APPENDIX A, TABLE 2

Water chemistry QAQC results, fall 2022.

Analyte	Units	RDL	Fall 2022										
			UWB-08				Revell River				Blanks		
			RP1-A				RR1-A				Filter	Field	Trip
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	FB-1A	WB-1A	WB-1B
Semi-Volatile Organic Compounds													
2,4-Dinitrotoluene	µg/L	0.4	<0.4	<0.4	0.0	No	-	-	-	-	-	<0.4	<0.4
2,6-Dinitrotoluene	µg/L	0.4	<0.4	<0.4	0.0	No	-	-	-	-	-	<0.4	<0.4
2-Chlorophenol	µg/L	0.3	<0.3	<0.3	0.0	No	-	-	-	-	-	<0.3	<0.3
4-Chloroaniline	µg/L	0.4	<0.4	<0.4	0.0	No	-	-	-	-	-	<0.4	<0.4
Biphenyl	µg/L	0.4	<0.4	<0.4	0.0	No	-	-	-	-	-	<0.4	<0.4
bis(2-Chloro-1-methylethyl) ether	µg/L	0.4	<0.4	<0.4	0.0	No	-	-	-	-	-	<0.4	<0.4
bis(2-Chloroethyl) ether	µg/L	0.4	<0.4	<0.4	0.0	No	-	-	-	-	-	<0.4	<0.4
Bis(2-ethylhexyl)phthalate	µg/L	2	<2	<2	0.0	No	-	-	-	-	-	<2	<2
Dichlorobenzidine, 3,3'-	µg/L	0.4	<0.4	<0.4	0.0	No	-	-	-	-	-	<0.4	<0.4
Diethylphthalate	µg/L	0.2	<0.2	<0.2	0.0	No	-	-	-	-	-	<0.2	<0.2
Dimethylphthalate	µg/L	0.2	<0.2	<0.2	0.0	No	-	-	-	-	-	<0.2	<0.2
Pentachlorophenol [PCP]	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	<0.5	<0.5
Phenol	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	<0.5	<0.5
Volatile Organic Compounds													
Acetone	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Bromoform	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Bromomethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
BTEX, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Carbon disulfide	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Carbon tetrachloride	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Chloroethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Chloromethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dibromochloromethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dibromoethane, 1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorobenzene, 1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorobenzene, 1,3-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorobenzene, 1,4-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethane, 1,1-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethane, 1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethylene, 1,1-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethylene, cis+trans-1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethylene, cis-1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethylene, trans-1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichloromethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichloropropane, 1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX A, TABLE 2

Water chemistry QAQC results, fall 2022.

Analyte	Units	RDL	Fall 2022										
			UWB-08				Revell River				Blanks		
			RP1-A				RR1-A				Filter	Field	Trip
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	FB-1A	WB-1A	WB-1B
Volatile Organic Compounds													
Dichloropropylene, cis+trans-1,3-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichloropropylene, cis-1,3-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichloropropylene, trans-1,3-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Hexane, n-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Hexanone, 2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Methyl ethyl ketone [MEK]	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Methyl isobutyl ketone [MIBK]	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Methyl-tert-butyl ether [MTBE]	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethane, 1,1,1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethane, 1,1,2,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethylene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethane, 1,1,1-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethane, 1,1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethylene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl chloride	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Xylene, m+p-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Xylene, o-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Xylenes, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Trihalomethanes [THMs], total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-

Gray cells indicate exceedances of QAQC criteria.
RDL = reportable detection limit; dash = no data.
Relative percent difference (RPD) = | ((Duplicate - Sample)/((Duplicate + Sample)/2))*100 |.
For calculation of RPDs, values <RDL were set equal to the RDL; Grayed cells indicate exceedances of data quality control limits (RPD > 20%, with both samples >5*RDL).
¹Ranking of a "yes" used only if either value is >5*RDL.

APPENDIX A, TABLE 3

Water chemistry QAQC results, winter 2023.

Analyte	Units	RDL	Winter 2023											
			Mennin Lake				Mennin River				UWB-03			
			ML2-A				MR3-A				P3-A			
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹
Aggregate Organics														
Biochemical Oxygen Demand	mg/L	2	<2	<2	0.0	No	<2	<2	0.0	No	<2	<2	0.0	No
Anions and Nutrients														
Ammonia, Total (as N)	mg/L	0.01	<0.01	0.112	167.2	No	0.19	0.171	10.5	Yes	0.046	0.099	73.1	No
Bromide	mg/L	0.1	<0.1	<0.1	0.0	No	<0.1	<0.1	0.0	No	<0.1	<0.1	0.0	No
Chloride	mg/L	0.5	0.7	0.62	12.1	No	0.97	0.96	1.0	No	0.53	0.55	3.7	No
Fluoride	mg/L	0.02	0.038	0.038	0.0	No	0.046	0.046	0.0	No	0.024	0.025	4.1	No
Iodide	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Kjeldahl nitrogen, total [TKN]	mg/L	0.15	0.31	0.5	46.9	No	0.67	0.65	3.0	No	0.58	0.66	12.9	No
Nitrate (as N)	mg/L	0.02	0.075	0.072	4.1	No	0.098	0.096	2.1	No	0.071	0.094	27.9	No
Nitrate and Nitrite as N	mg/L	0.0224	0.075	0.072	4.1	No	0.098	0.096	2.1	No	0.071	0.094	27.9	No
Nitrite (as N)	mg/L	0.01	<0.01	<0.01	0.0	No	<0.01	<0.01	0.0	No	<0.01	<0.01	0.0	No
Phosphorus, total	mg/L	0.02	<0.02	<0.02	0.0	No	<0.02	<0.02	0.0	No	<0.02	<0.02	0.0	No
Sulfate (as SO4)	mg/L	0.3	0.95	0.93	2.1	No	0.95	0.96	1.0	No	0.47	0.7	39.3	No
Cyanides														
Cyanide, Total	mg/L	0.002	<0.002	<0.002	0.0	No	<0.002	<0.002	0.0	No	<0.002	<0.002	0.0	No
Herbicides														
AMPA	µg/L	0.5	-	-	-	-	-	-	-	-	<0.5	<0.5	0.0	No
Hydrocarbons														
F1 (C6-C10)	mg/L	0.1	<0.1	<0.1	0.0	No	-	-	-	-	-	-	-	-
F1-BTEX	mg/L	0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-
F2 (C10-C16)	mg/L	0.1	<0.1	<0.1	0.0	No	-	-	-	-	-	-	-	-
F3 (C16-C34)	mg/L	0.2 to 0.25	<0.25	<0.25	0.0	No	-	-	-	-	-	-	-	-
F4 (C34-C50)	mg/L	0.2 to 0.25	<0.25	<0.25	0.0	No	-	-	-	-	-	-	-	-
TEH (C10-C50)	mg/L	0.4	<0.4	<0.4	0.0	No	-	-	-	-	-	-	-	-
TEH (C16-C50)	mg/L	0.4	<0.4	<0.4	0.0	No	-	-	-	-	-	-	-	-
Metals Dissolved														
Aluminum, dissolved	mg/L	0.001	0.144	0.139	3.5	Yes	0.207	0.213	2.9	Yes	0.316	0.318	0.6	Yes
Antimony, dissolved	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No
Arsenic, dissolved	mg/L	0.0001	0.00037	0.00038	2.7	No	0.00037	0.00037	0.0	No	0.00046	0.00049	6.3	No
Barium, dissolved	mg/L	0.0001	0.00572	0.0057	0.4	Yes	0.00704	0.00681	3.3	Yes	0.00603	0.00602	0.2	Yes
Beryllium, dissolved	mg/L	0.00002	<0.00002	<0.00002	0.0	No	<0.00002	<0.00002	0.0	No	<0.00002	<0.00002	0.0	No
Bismuth, dissolved	mg/L	0.00005	<0.00005	<0.00005	0.0	No	<0.00005	<0.00005	0.0	No	<0.00005	<0.00005	0.0	No
Boron, dissolved	mg/L	0.01	<0.01	<0.01	0.0	No	<0.01	<0.01	0.0	No	<0.01	<0.01	0.0	No
Cadmium, dissolved	mg/L	0.000005	<0.000005	<0.000005	0.0	No	0.0000084	0.0000072	15.4	No	0.0000082	0.0000102	21.7	No
Calcium, dissolved	mg/L	0.05	2.67	2.74	2.6	Yes	4.05	3.98	1.7	Yes	2.64	2.7	2.2	Yes
Cerium, dissolved	µg/L	0.005	0.674	-	-	-	1	0.973	2.7	Yes	-	-	-	-
Cesium, dissolved	mg/L	0.00001	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No	0.000011	0.00001	9.5	No
Chromium, dissolved	mg/L	0.0005	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	0.0	No	0.00057	0.00056	1.8	No
Cobalt, dissolved	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	0.00011	9.5	No	0.00012	0.00013	8.0	No
Copper, dissolved	mg/L	0.0002	0.00072	0.00204	95.7	No	0.00129	0.00055	80.4	No	0.00454	0.00115	119.2	Yes

APPENDIX A, TABLE 3
Water chemistry QAQC results, winter 2023.

Analyte	Units	RDL	Winter 2023											
			Mennin Lake				Mennin River				UWB-03			
			ML2-A				MR3-A				P3-A			
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹
Metals Dissolved														
Dysprosium, dissolved	µg/L	0.005	0.0373	-	-	-	0.0487	0.048	1.4	Yes	-	-	-	-
Erbium, dissolved	µg/L	0.005	0.0228	-	-	-	0.0274	0.0286	4.3	Yes	-	-	-	-
Europium, dissolved	µg/L	0.005	0.0124	-	-	-	0.0183	0.0165	10.3	No	-	-	-	-
Gadolinium, dissolved	µg/L	0.005	0.0507	-	-	-	0.0665	0.0742	10.9	Yes	-	-	-	-
Gold, dissolved	µg/L	0.005	<0.005	<0.005	0.0	No	<0.005	-	-	-	-	-	-	-
Hafnium, dissolved	µg/L	0.005	-	-	-	-	0.0096	0.0103	7.0	No	-	-	-	-
Holmium, dissolved	µg/L	0.005	0.007	-	-	-	0.0098	0.0092	6.3	No	-	-	-	-
Iridium, dissolved	µg/L	0.005	<0.005	<0.005	0.0	No	<0.005	<0.005	0.0	No	-	-	-	-
Iron, dissolved	mg/L	0.01	0.331	0.328	0.9	Yes	0.6	0.61	1.7	Yes	0.838	0.86	2.6	Yes
Lanthanum, dissolved	µg/L	0.005	0.42	-	-	-	0.565	-	-	-	-	-	-	-
Lead, dissolved	mg/L	0.00005	0.000076	0.00009	16.9	No	0.000144	0.000141	2.1	No	0.000265	0.000257	3.1	Yes
Lithium, dissolved	mg/L	0.001	<0.001	<0.001	0.0	No	0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No
Magnesium, dissolved	mg/L	0.005	0.711	0.706	0.7	Yes	1.1	1.11	0.9	Yes	0.754	0.74	1.9	Yes
Manganese, dissolved	mg/L	0.0001	0.00745	0.00716	4.0	Yes	0.0146	0.0148	1.4	Yes	0.0107	0.0107	0.0	Yes
Mercury, dissolved	mg/L	0.000005	0.0000054	0.000005	7.7	No	0.000015	0.000014	6.9	No	0.0000129	0.0000135	4.5	No
Molybdenum, dissolved	mg/L	0.00005	0.000566	0.000397	35.1	Yes	0.000322	0.000455	34.2	Yes	<0.00005	<0.00005	0.0	No
Neodymium, dissolved	µg/L	0.005	0.376	-	-	-	0.52	0.513	1.4	Yes	-	-	-	-
Nickel, dissolved	mg/L	0.0005	<0.0005	<0.0005	0.0	No	0.00054	<0.0005	7.7	No	0.0005	<0.0005	0.0	No
Palladium, dissolved	µg/L	0.005	<0.005	<0.005	0.0	No	<0.005	0.0053	5.8	No	-	-	-	-
Phosphorus, dissolved	mg/L	0.05	<0.05	<0.05	0.0	No	<0.05	<0.05	0.0	No	<0.05	<0.05	0.0	No
Platinum, dissolved	µg/L	0.005	<0.005	<0.005	0.0	No	<0.005	<0.005	0.0	No	-	-	-	-
Potassium, dissolved	mg/L	0.05	0.356	0.358	0.6	Yes	0.486	0.489	0.6	Yes	0.428	0.43	0.5	Yes
Praseodymium, dissolved	µg/L	0.005	0.102	-	-	-	0.136	0.135	0.7	Yes	-	-	-	-
Rhenium, dissolved	µg/L	0.005	<0.005	<0.005	0.0	No	<0.005	<0.005	0.0	No	-	-	-	-
Rhodium, dissolved	mg/L	1	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No
Rubidium, dissolved	mg/L	0.0002	0.00114	0.00115	0.9	Yes	0.00138	0.00141	2.2	Yes	0.00134	0.00143	6.5	Yes
Ruthenium, dissolved	mg/L	1	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No
Samarium, dissolved	mg/L	1	<0.001	-	-	-	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No
Scandium, dissolved	µg/L	0.005	0.057	-	-	-	0.0672	0.067	0.3	Yes	-	-	-	-
Selenium, dissolved	mg/L	0.00005	0.000102	0.000111	8.5	No	0.000108	0.000106	1.9	No	0.000099	0.00012	19.2	No
Silicon, dissolved	mg/L	0.05	1.49	1.44	3.4	Yes	2.92	2.82	3.5	Yes	2.57	2.53	1.6	Yes
Silver, dissolved	mg/L	0.00001	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No
Sodium, dissolved	mg/L	0.05	1.16	1.19	2.6	Yes	1.6	1.65	3.1	Yes	1.14	1.16	1.7	Yes
Strontium, dissolved	mg/L	0.0002	0.0112	0.0113	0.9	Yes	0.0147	0.0144	2.1	Yes	0.00949	0.00952	0.3	Yes
Sulfur, dissolved	mg/L	0.5	0.65	0.68	4.5	No	0.7	0.6	15.4	No	<0.5	<0.5	0.0	No
Tellurium, dissolved	mg/L	0.0002	<0.0002	<0.0002	0.0	No	<0.0002	<0.0002	0.0	No	<0.0002	<0.0002	0.0	No
Terbium, dissolved	µg/L	0.005	0.0067	-	-	-	0.0081	0.0082	1.2	No	-	-	-	-
Thallium, dissolved	mg/L	0.00001	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No
Thorium, dissolved	mg/L	0.0001	<0.0001	<0.0001	0.0	No	0.00012	0.00014	15.4	No	0.00013	0.00014	7.4	No
Thulium, dissolved	µg/L	0.005	<0.005	-	-	-	<0.005	-	-	-	-	-	-	-

APPENDIX A, TABLE 3
Water chemistry QAQC results, winter 2023.

Analyte	Units	RDL	Winter 2023											
			Mennin Lake				Mennin River				UWB-03			
			ML2-A				MR3-A				P3-A			
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹
Metals Dissolved														
Tin, dissolved	mg/L	0.0001	<0.0001	<0.0001	0.0	No	0.00465	0.00038	169.8	No	0.00305	0.00229	28.5	Yes
Titanium, dissolved	mg/L	0.0003	0.00198	0.00196	1.0	Yes	0.00324	0.00326	0.6	Yes	0.00369	0.00386	4.5	Yes
Tungsten, dissolved	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No
Uranium, dissolved	mg/L	0.00001	0.000101	0.000101	0.0	Yes	0.000165	0.000168	1.8	Yes	0.000086	0.000084	2.4	Yes
Vanadium, dissolved	mg/L	0.0005	<0.0005	<0.0005	0.0	No	0.00053	0.00057	7.3	No	0.00059	0.0006	1.7	No
Ytterbium, dissolved	µg/L	0.005	0.0173	-	-	-	0.024	-	-	-	-	-	-	-
Zinc, dissolved	mg/L	0.001	<0.001	0.0014	33.3	No	0.0014	0.001	33.3	No	0.0018	0.0079	125.8	No
Zirconium, dissolved	mg/L	0.0003	<0.0003	<0.0003	0.0	No	0.00042	0.00034	21.1	No	0.00033	0.00036	8.7	No
Metals Total														
Aluminum, total	mg/L	0.003	0.159	0.158	0.6	Yes	0.346	0.334	3.5	Yes	0.361	0.36	0.3	Yes
Antimony, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No
Arsenic, total	mg/L	0.0001	0.0004	0.0004	0.0	No	0.00045	0.00047	4.3	No	0.00053	0.0005	5.8	No
Barium, total	mg/L	0.0001	0.00619	0.00597	3.6	Yes	0.00818	0.00817	0.1	Yes	0.00658	0.00638	3.1	Yes
Beryllium, total	mg/L	0.00002	<0.00002	<0.00002	0.0	No	<0.00002	<0.00002	0.0	No	<0.00002	0.000022	9.5	No
Bismuth, total	mg/L	0.00005	<0.00005	<0.00005	0.0	No	<0.00005	<0.00005	0.0	No	<0.00005	<0.00005	0.0	No
Boron, total	mg/L	0.01	<0.01	<0.01	0.0	No	<0.01	<0.01	0.0	No	<0.01	<0.01	0.0	No
Cadmium, total	mg/L	0.000005	0.0000074	0.000006	20.9	No	0.0000078	0.0000092	16.5	No	0.0000088	0.0000066	28.6	No
Calcium, total	mg/L	0.05	2.94	2.86	2.8	Yes	4.09	4.02	1.7	Yes	2.77	2.85	2.8	Yes
Cerium, total	µg/L	0.005	0.734	0.743	1.2	Yes	1.23	1.28	4.0	Yes	-	-	-	-
Cesium, total	mg/L	0.00001	<0.00001	<0.00001	0.0	No	0.000022	0.000023	4.4	No	0.000014	0.000016	13.3	No
Chromium, total	mg/L	0.0005	<0.0005	<0.0005	0.0	No	0.00065	0.00063	3.1	No	0.00064	0.00064	0.0	No
Cobalt, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	0.00018	0.00017	5.7	No	0.00014	0.00014	0.0	No
Copper, total	mg/L	0.0005	0.0008	0.00186	79.7	No	0.00175	0.00086	68.2	No	0.00483	0.00115	123.1	No
Dysprosium, total	µg/L	0.005	0.0397	0.0393	1.0	Yes	0.0592	0.0598	1.0	Yes	-	-	-	-
Erbium, total	µg/L	0.005	0.0216	0.0243	11.8	No	0.0334	0.0327	2.1	Yes	-	-	-	-
Europium, total	µg/L	0.005	0.0144	0.0129	11.0	No	0.0208	0.0207	0.5	No	-	-	-	-
Gadolinium, total	µg/L	0.005	0.0557	0.0565	1.4	Yes	0.0831	0.083	0.1	Yes	-	-	-	-
Gold, total	µg/L	0.02	<0.02	<0.02	0.0	No	<0.02	<0.02	0.0	No	-	-	-	-
Hafnium, total	µg/L	0.005	0.0086	0.0081	6.0	No	0.0083	0.0077	7.5	No	-	-	-	-
Holmium, total	µg/L	0.005	0.008	0.0076	5.1	No	0.0116	0.0116	0.0	No	-	-	-	-
Iridium, total	µg/L	0.005	<0.005	<0.005	0.0	No	<0.005	<0.005	0.0	No	-	-	-	-
Iron, total	mg/L	0.01	0.41	0.418	1.9	Yes	0.822	0.817	0.6	Yes	1.06	1.03	2.9	Yes
Lanthanum, total	µg/L	0.005	0.459	0.464	1.1	Yes	0.692	-	-	-	-	-	-	-
Lead, total	mg/L	0.00005	0.000111	0.000109	1.8	No	0.000193	0.000205	6.0	No	0.000316	0.000329	4.0	Yes
Lithium, total	mg/L	0.001	<0.001	<0.001	0.0	No	0.0012	0.0012	0.0	No	<0.001	<0.001	0.0	No
Magnesium, total	mg/L	0.005	0.739	0.751	1.6	Yes	1.12	1.12	0.0	Yes	0.792	0.78	1.5	Yes
Manganese, total	mg/L	0.0001	0.0109	0.0107	1.9	Yes	0.0188	0.0184	2.2	Yes	0.0119	0.0118	0.8	Yes
Mercury, total	mg/L	0.000005	0.0000052	0.0000061	15.9	No	0.0000302	0.0000067	127.4	No	0.0000145	0.0000077	61.3	No
Molybdenum, total	mg/L	0.00005	0.000589	0.000387	41.4	Yes	0.000336	0.000462	31.6	Yes	<0.00005	<0.00005	0.0	No
Neodymium, total	µg/L	0.005	0.399	0.411	3.0	Yes	0.618	0.635	2.7	Yes	-	-	-	-

APPENDIX A, TABLE 3

Water chemistry QAQC results, winter 2023.

Analyte	Units	RDL	Winter 2023											
			Mennin Lake				Mennin River				UWB-03			
			ML2-A				MR3-A				P3-A			
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹
Metals Total														
Nickel, total	mg/L	0.0005	<0.0005	<0.0005	0.0	No	0.00071	0.0006	16.8	No	<0.0005	<0.0005	0.0	No
Palladium, total	µg/L	0.005	<0.005	<0.005	0.0	No	0.0051	<0.005	2.0	No	-	-	-	-
Phosphorus, total	mg/L	0.05	<0.05	<0.05	0.0	No	<0.05	<0.05	0.0	No	<0.05	<0.05	0.0	No
Platinum, total	µg/L	0.02	<0.02	<0.02	0.0	No	<0.02	<0.02	0.0	No	-	-	-	-
Potassium, total	mg/L	0.05	0.342	0.348	1.7	Yes	0.502	0.483	3.9	Yes	0.456	0.432	5.4	Yes
Praseodymium, total	µg/L	0.005	0.108	0.108	0.0	Yes	0.17	0.168	1.2	Yes	-	-	-	-
Rhenium, total	µg/L	0.005	<0.005	<0.005	0.0	No	<0.005	<0.005	0.0	No	-	-	-	-
Rhodium, total	mg/L	1	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No
Rubidium, total	mg/L	0.0002	0.00112	0.00118	5.2	Yes	0.00148	0.00163	9.6	Yes	0.00132	0.00137	3.7	Yes
Ruthenium, total	mg/L	1	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No
Samarium, total	mg/L	1	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No
Scandium, total	µg/L	0.005	0.0698	0.0735	5.2	Yes	0.106	0.108	1.9	Yes	-	-	-	-
Selenium, total	mg/L	0.00005	0.000109	0.000108	0.9	No	0.000096	0.000149	43.3	No	0.000147	0.000144	2.1	No
Silicon, total	mg/L	0.1	1.61	1.57	2.5	Yes	3.23	3.07	5.1	Yes	2.79	2.72	2.5	Yes
Silver, total	mg/L	0.00001	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No	0.000019	<0.00001	62.1	No
Sodium, total	mg/L	0.05	1.29	1.29	0.0	Yes	1.57	1.53	2.6	Yes	1.23	1.13	8.5	Yes
Strontium, total	mg/L	0.0002	0.0114	0.0112	1.8	Yes	0.0157	0.0151	3.9	Yes	0.0106	0.0097	8.9	Yes
Sulfur, total	mg/L	0.5	<0.5	<0.5	0.0	No	0.56	<0.5	11.3	No	<0.5	<0.5	0.0	No
Tellurium, total	mg/L	0.0002	<0.0002	<0.0002	0.0	No	<0.0002	0.00032	46.2	No	<0.0002	<0.0002	0.0	No
Terbium, total	µg/L	0.005	0.0068	0.0069	1.5	No	0.0101	0.0105	3.9	No	-	-	-	-
Thallium, total	mg/L	0.00001	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No
Thorium, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	0.00014	0.00011	24.0	No	0.00014	0.00014	0.0	No
Thulium, total	µg/L	0.005	<0.005	<0.005	0.0	No	<0.005	-	-	-	-	-	-	-
Tin, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	0.005	0.00047	165.6	No	0.00314	0.00242	25.9	Yes
Titanium, total	mg/L	0.0003	0.00232	0.00228	1.7	Yes	0.00811	0.00749	7.9	Yes	0.00484	0.00495	2.2	Yes
Tungsten, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No
Uranium, total	mg/L	0.00001	0.000103	0.000112	8.4	Yes	0.000173	0.00016	7.8	Yes	0.000087	0.000094	7.7	Yes
Vanadium, total	mg/L	0.0005	0.00065	0.00067	3.0	No	0.0009	0.00089	1.1	No	0.00079	0.00077	2.6	No
Ytterbium, total	µg/L	0.005	0.0204	0.0199	2.5	No	0.0267	-	-	-	-	-	-	-
Zinc, total	mg/L	0.003	<0.003	<0.003	0.0	No	<0.003	<0.003	0.0	No	<0.003	0.0104	110.4	No
Zirconium, total	mg/L	0.0002	0.00022	0.00022	0.0	No	0.00029	0.00025	14.8	No	0.00026	0.00026	0.0	No
Metals Speciated														
Chromium, hexavalent [Cr VI], dissolved	mg/L	0.0005	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	0.0	No	0.00063	<0.0005	23.0	No
Chromium, hexavalent [Cr VI], total	mg/L	0.0005	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	0.0	No	0.00063	<0.0005	23.0	No
Chromium, trivalent [Cr III], dissolved	mg/L	0.0005	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	0.0	No	<0.0005	0.00056	11.3	No
Chromium, trivalent [Cr III], total	mg/L	0.0005	<0.0005	<0.0005	0.0	No	0.00065	0.00063	3.1	No	<0.0005	0.00064	24.6	No
Microbiological Tests														
Coliforms, Escherichia coli [E. coli]	CFU/100mL	1	<1	<1	0.0	No	6	10	50.0	Yes	<1	<1	0.0	No
Coliforms, total	CFU/100mL	1	<1	<1	0.0	No	75	63	17.4	Yes	<1	<1	0.0	No

APPENDIX A, TABLE 3

Water chemistry QAQC results, winter 2023.

Analyte	Units	RDL	Winter 2023											
			Mennin Lake				Mennin River				UWB-03			
			ML2-A				MR3-A				P3-A			
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹
Organic_Inorganic Carbon														
Carbon, dissolved organic [DOC]	mg/L	0.5	12.5	12.9	3.1	Yes	16.3	15	8.3	Yes	22.6	21.8	3.6	Yes
Carbon, total inorganic [TIC]	mg/L	0.5	0.87	0.76	13.5	No	1.52	1.61	5.8	No	<0.5	<0.5	0.0	No
Carbon, total organic [TOC]	mg/L	0.5	11.8	11.5	2.6	Yes	15.7	15.8	0.6	Yes	22.4	19	16.4	Yes
Organochlorine Pesticides														
Aldrin	µg/L	0.008	-	-	-	-	-	-	-	-	-	-	-	-
Chlordane, cis- (alpha)	µg/L	0.008	-	-	-	-	-	-	-	-	-	-	-	-
Chlordane, total	µg/L	0.011	-	-	-	-	-	-	-	-	-	-	-	-
Chlordane, trans- (gamma)	µg/L	0.008	-	-	-	-	-	-	-	-	-	-	-	-
DDD, 2,4'-	µg/L	0.004	-	-	-	-	-	-	-	-	-	-	-	-
DDD, 4,4'-	µg/L	0.004	-	-	-	-	-	-	-	-	-	-	-	-
DDD, total	µg/L	0.006	-	-	-	-	-	-	-	-	-	-	-	-
DDE, 2,4'-	µg/L	0.004	-	-	-	-	-	-	-	-	-	-	-	-
DDE, 4,4'-	µg/L	0.004	-	-	-	-	-	-	-	-	-	-	-	-
DDE, total	µg/L	0.006	-	-	-	-	-	-	-	-	-	-	-	-
DDT, 2,4'-	µg/L	0.004	-	-	-	-	-	-	-	-	-	-	-	-
DDT, 4,4'-	µg/L	0.004 to 0.012	-	-	-	-	-	-	-	-	-	-	-	-
DDT, total	µg/L	0.006 to 0.0126	-	-	-	-	-	-	-	-	-	-	-	-
Dieldrin	µg/L	0.008 to 0.048	-	-	-	-	-	-	-	-	-	-	-	-
Endosulfan, alpha-	µg/L	0.007	-	-	-	-	-	-	-	-	-	-	-	-
Endosulfan, beta-	µg/L	0.007	-	-	-	-	-	-	-	-	-	-	-	-
Endosulfan, total	µg/L	0.01	-	-	-	-	-	-	-	-	-	-	-	-
Endrin	µg/L	0.01	-	-	-	-	-	-	-	-	-	-	-	-
Heptachlor	µg/L	0.008	-	-	-	-	-	-	-	-	-	-	-	-
Heptachlor epoxide	µg/L	0.008	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobenzene	µg/L	0.008	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobutadiene	µg/L	0.008	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorocyclohexane, gamma-	µg/L	0.008	-	-	-	-	-	-	-	-	-	-	-	-
Hexachloroethane	µg/L	0.008	-	-	-	-	-	-	-	-	-	-	-	-
Methoxychlor	µg/L	0.008	-	-	-	-	-	-	-	-	-	-	-	-
Polychlorinated Biphenyls														
Aroclor 1016	µg/L	0.02	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1221	µg/L	0.02	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1232	µg/L	0.02	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1242	µg/L	0.02	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1248	µg/L	0.02	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1254	µg/L	0.02	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1260	µg/L	0.02	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1262	µg/L	0.02	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1268	µg/L	0.02	-	-	-	-	-	-	-	-	-	-	-	-
Polychlorinated biphenyls [PCBs], total	µg/L	0.06	-	-	-	-	-	-	-	-	-	-	-	-
Pesticides														
Glufosinate	µg/L	0.5	-	-	-	-	-	-	-	-	<0.5	<0.5	0.0	No
Glyphosate	µg/L	0.2	-	-	-	-	-	-	-	-	<0.2	<0.2	0.0	No

APPENDIX A, TABLE 3

Water chemistry QAQC results, winter 2023.

Analyte	Units	RDL	Winter 2023											
			Mennin Lake				Mennin River				UWB-03			
			ML2-A				MR3-A				P3-A			
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹
Physical Tests														
Alkalinity, bicarbonate (as CaCO3)	mg/L	1	6.3	6.5	3.1	Yes	11.3	10.6	6.4	Yes	5.5	4.8	13.6	No
Alkalinity, carbonate (as CaCO3)	mg/L	1	<1	<1	0.0	No	<1	<1	0.0	No	<1	<1	0.0	No
Alkalinity, hydroxide (as CaCO3)	mg/L	1	<1	<1	0.0	No	<1	<1	0.0	No	<1	<1	0.0	No
Alkalinity, phenolphthalein (as CaCO3)	mg/L	1	<1	<1	0.0	No	<1	<1	0.0	No	<1	<1	0.0	No
Alkalinity, Total (as CaCO3)	mg/L	2	6.3	6.5	3.1	No	11.3	10.6	6.4	Yes	5.5	4.8	13.6	No
Conductivity	µS/cm	1	24.3	24.1	0.8	Yes	34	33.5	1.5	Yes	23.8	23.2	2.6	Yes
Conductivity	umhos/cm		-	-	-	-	-	-	-	-	-	-	-	-
Hardness (as CaCO3), from total Ca/Mg	mg/L	0.5	10.4	10.2	1.9	Yes	14.8	14.6	1.4	Yes	10.2	10.3	1.0	Yes
Solids, total dissolved [TDS]	mg/L	3 to 10	35.5	33.3	6.4	Yes	46.6	47.4	1.7	Yes	48.8	50	2.4	Yes
Solids, total suspended [TSS]	mg/L	3	<3	<3	0.0	No	<3	<3	0.0	No	<3	<3	0.0	No
Turbidity	NTU	0.1	1.08	1.16	7.1	Yes	3.9	3.92	0.5	Yes	1.13	1.15	1.8	Yes
Plant Pigments														
Chlorophyll a	µg/L	0.01	0.358	0.355	0.8	Yes	0.551	0.593	7.3	Yes	0.173	0.188	8.3	Yes
Polycyclic Aromatic Hydrocarbons														
1+2-Methylnaphthalenes	µg/L	0.015	-	-	-	-	-	-	-	-	<0.015	<0.015	0.0	No
1-Methylnaphthalene	µg/L	0.01	-	-	-	-	-	-	-	-	<0.01	<0.01	0.0	No
2-Methylnaphthalene	µg/L	0.01	-	-	-	-	-	-	-	-	<0.01	<0.01	0.0	No
Acenaphthene	µg/L	0.01 to 0.013	-	-	-	-	-	-	-	-	<0.01	<0.01	0.0	No
Acenaphthylene	µg/L	0.01	-	-	-	-	-	-	-	-	<0.01	<0.01	0.0	No
Anthracene	µg/L	0.01	-	-	-	-	-	-	-	-	<0.01	<0.01	0.0	No
Benz(a)anthracene	µg/L	0.01	-	-	-	-	-	-	-	-	<0.01	<0.01	0.0	No
Benzo(a)pyrene	µg/L	0.005	-	-	-	-	-	-	-	-	<0.005	<0.005	0.0	No
Benzo(b&j)fluoranthene	µg/L	0.01	-	-	-	-	-	-	-	-	<0.01	<0.01	0.0	No
Benzo(g,h,i)perylene	µg/L	0.01	-	-	-	-	-	-	-	-	<0.01	<0.01	0.0	No
Benzo(k)fluoranthene	µg/L	0.01	-	-	-	-	-	-	-	-	<0.01	<0.01	0.0	No
Chrysene	µg/L	0.01	-	-	-	-	-	-	-	-	<0.01	<0.01	0.0	No
Dibenz(a,h)anthracene	µg/L	0.005	-	-	-	-	-	-	-	-	<0.005	<0.005	0.0	No
Fluoranthene	µg/L	0.01	-	-	-	-	-	-	-	-	<0.01	<0.01	0.0	No
Fluorene	µg/L	0.01	-	-	-	-	-	-	-	-	<0.01	<0.01	0.0	No
Indeno(1,2,3-c,d)pyrene	µg/L	0.01	-	-	-	-	-	-	-	-	<0.01	<0.01	0.0	No
Naphthalene	µg/L	0.05	-	-	-	-	-	-	-	-	<0.05	<0.05	0.0	No
Phenanthrene	µg/L	0.02	-	-	-	-	-	-	-	-	<0.02	<0.02	0.0	No
Pyrene	µg/L	0.01	-	-	-	-	-	-	-	-	<0.01	<0.01	0.0	No

APPENDIX A, TABLE 3

Water chemistry QAQC results, winter 2023.

Analyte	Units	RDL	Winter 2023											
			Mennin Lake				Mennin River				UWB-03			
			ML2-A				MR3-A				P3-A			
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹
Radiological Parameters														
Carbon-14	Bq/L	18.5	<18.5	<18.5	0.0	No	<18.5	<18.5	0.0	No	<18.5	<18.5	0.0	No
Cesium-137	Bq/L	0.37	<0.37	<0.37	0.0	No	<0.37	<0.37	0.0	No	<0.37	<0.37	0.0	No
Chlorine-36	Bq/L	0.37	<0.37	-	-	-	<0.37	-	-	-	<0.37	<0.37	0.0	No
Cobalt-60	Bq/L	0.37	<0.37	<0.37	0.0	No	<0.37	<0.37	0.0	No	<0.37	<0.37	0.0	No
Gross Alpha	Bq/L	0.111	<0.111	<0.111	0.0	No	<0.111	<0.111	0.0	No	0.088	<0.111	23.1	No
Gross Beta	Bq/L	0.148	<0.148	<0.148	0.0	No	<0.148	<0.148	0.0	No	<0.148	<0.148	0.0	No
Iodine-129	Bq/L	0.37	<0.37	<0.37	0.0	No	<0.37	<0.37	0.0	No	<0.37	<0.37	0.0	No
Neptunium-237	Bq/L	0.0037	<0.0037	-	-	-	<0.0037	-	-	-	<0.0037	<0.0037	0.0	No
Plutonium-238	Bq/L	0.0037	<0.0037	-	-	-	<0.0037	-	-	-	<0.0037	<0.0037	0.0	No
Plutonium-239	Bq/L	0.0037	<0.0037	-	-	-	<0.0037	-	-	-	<0.0037	<0.0037	0.0	No
Potassium-40	Bq/L	7.1	<7.1	<7.1	0.0	No	<7.1	<7.1	0.0	No	<7.1	<7.1	0.0	No
Radium-226	Bq/L	0.037	0.0194	0.0147	27.6	No	<0.037	<0.037	0.0	No	<0.037	<0.037	0.0	No
Ruthenium-106	Bq/L	3	<3	<3	0.0	No	<3	<3	0.0	No	<3	<3	0.0	No
Selenium-79	Bq/L	1.85	<1.85	-	-	-	<1.85	-	-	-	<1.85	<1.85	0.0	No
Strontium-90	Bq/L	0.037	<0.037	<0.037	0.0	No	<0.037	<0.037	0.0	No	<0.037	<0.037	0.0	No
Thorium-228	Bq/L	0.0074	<0.0074	<0.0074	0.0	No	<0.0074	0.00291	87.1	No	<0.0074	<0.0074	0.0	No
Thorium-230	Bq/L	0.0074	<0.0074	0.00531	32.9	No	<0.0074	<0.0074	0.0	No	0.00508	0.00388	26.8	No
Thorium-232	Bq/L	0.0074	0.00397	<0.0074	60.3	No	0.00249	<0.0074	99.3	No	0.00171	<0.0074	124.9	No
Tritium	Bq/L	14.8	<14.8	<14.8	0.0	No	<14.8	<14.8	0.0	No	<14.8	<14.8	0.0	No
Uranium-234	Bq/L	0.0074	0.0313	<0.0074	123.5	No	<0.0074	<0.0074	0.0	No	<0.0074	<0.0074	0.0	No
Uranium-235	Bq/L	0.0074	0.00233	<0.0074	104.2	No	<0.0074	<0.0074	0.0	No	<0.0074	<0.0074	0.0	No
Uranium-238	Bq/L	0.0074	0.00441	0.00437	0.9	No	<0.0074	0.00312	81.4	No	<0.0074	0.00284	89.1	No
Semi-Volatile Organic Compounds														
1,2,4-Trichlorobenzene	µg/L	0.4	-	-	-	-	-	-	-	-	<0.4	<0.4	0.0	No
2,4,5-Trichlorophenol	µg/L	0.2	-	-	-	-	-	-	-	-	<0.2	<0.2	0.0	No
2,4,6-Trichlorophenol	µg/L	0.2	-	-	-	-	-	-	-	-	<0.2	<0.2	0.0	No
2,4+2,6-Dinitrotoluene	µg/L	0.6	-	-	-	-	-	-	-	-	<0.6	<0.6	0.0	No
2,4-Dichlorophenol	µg/L	0.3	-	-	-	-	-	-	-	-	<0.3	<0.3	0.0	No
2,4-Dimethylphenol	µg/L	0.5	-	-	-	-	-	-	-	-	<0.5	<0.5	0.0	No
2,4-Dinitrophenol	µg/L	1 to 2	-	-	-	-	-	-	-	-	<1	<1	0.0	No
2,4-Dinitrotoluene	µg/L	0.4	-	-	-	-	-	-	-	-	<0.4	<0.4	0.0	No
2,6-Dinitrotoluene	µg/L	0.4	-	-	-	-	-	-	-	-	<0.4	<0.4	0.0	No
2-Chlorophenol	µg/L	0.3	-	-	-	-	-	-	-	-	<0.3	<0.3	0.0	No
4-Chloroaniline	µg/L	0.4	-	-	-	-	-	-	-	-	<0.4	<0.4	0.0	No
Biphenyl	µg/L	0.4	-	-	-	-	-	-	-	-	<0.4	<0.4	0.0	No
bis(2-Chloro-1-methylethyl) ether	µg/L	0.4	-	-	-	-	-	-	-	-	<0.4	<0.4	0.0	No
bis(2-Chloroethyl) ether	µg/L	0.4	-	-	-	-	-	-	-	-	<0.4	<0.4	0.0	No
Bis(2-ethylhexyl)phthalate	µg/L	2	-	-	-	-	-	-	-	-	<2	<2	0.0	No
Dichlorobenzidine, 3,3'-	µg/L	0.4	-	-	-	-	-	-	-	-	<0.4	<0.4	0.0	No
Diethylphthalate	µg/L	0.2	-	-	-	-	-	-	-	-	<0.2	<0.2	0.0	No
Semi-Volatile Organic Compounds														
Dimethylphthalate	µg/L	0.2	-	-	-	-	-	-	-	-	<0.2	<0.2	0.0	No
Pentachlorophenol [PCP]	µg/L	0.5	-	-	-	-	-	-	-	-	<0.5	<0.5	0.0	No
Phenol	µg/L	0.5	-	-	-	-	-	-	-	-	<0.5	<0.5	0.0	No

APPENDIX A, TABLE 3
Water chemistry QAQC results, winter 2023.

Analyte	Units	RDL	Winter 2023											
			Mennin Lake				Mennin River				UWB-03			
			ML2-A				MR3-A				P3-A			
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹
Volatile Organic Compounds														
Acetone	µg/L	20	<20	<20	0.0	No	-	-	-	-	-	-	-	-
Benzene	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	-	-	-
Bromodichloromethane	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	-	-	-
Bromoform	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	-	-	-
Bromomethane	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	-	-	-
BTEX, total	µg/L	1	<1	<1	0.0	No	-	-	-	-	-	-	-	-
Carbon disulfide	µg/L	1	<1	<1	0.0	No	-	-	-	-	-	-	-	-
Carbon tetrachloride	µg/L	0.2	<0.2	<0.2	0.0	No	-	-	-	-	-	-	-	-
Chlorobenzene	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	-	-	-
Chloroethane	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	-	-	-
Chloroform	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	-	-	-
Chloromethane	µg/L	2	<2	<2	0.0	No	-	-	-	-	-	-	-	-
Dibromochloromethane	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	-	-	-
Dibromoethane, 1,2-	µg/L	0.2	<0.2	<0.2	0.0	No	-	-	-	-	-	-	-	-
Dichlorobenzene, 1,2-	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	-	-	-
Dichlorobenzene, 1,3-	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	-	-	-
Dichlorobenzene, 1,4-	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	-	-	-
Dichloroethane, 1,1-	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	-	-	-
Dichloroethane, 1,2-	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	-	-	-
Dichloroethylene, 1,1-	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	-	-	-
Dichloroethylene, cis+trans-1,2-	µg/L	0.71	<0.71	<0.71	0.0	No	-	-	-	-	-	-	-	-
Dichloroethylene, cis-1,2-	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	-	-	-
Dichloroethylene, trans-1,2-	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	-	-	-
Dichloromethane	µg/L	1	<1	<1	0.0	No	-	-	-	-	-	-	-	-
Dichloropropane, 1,2-	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	-	-	-
Dichloropropylene, cis+trans-1,3-	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	-	-	-
Dichloropropylene, cis-1,3-	µg/L	0.3	<0.3	<0.3	0.0	No	-	-	-	-	-	-	-	-
Dichloropropylene, trans-1,3-	µg/L	0.3	<0.3	<0.3	0.0	No	-	-	-	-	-	-	-	-
Ethylbenzene	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	-	-	-
Hexane, n-	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	-	-	-
Hexanone, 2-	µg/L	20	<20	<20	0.0	No	-	-	-	-	-	-	-	-
Methyl ethyl ketone [MEK]	µg/L	20	<20	<20	0.0	No	-	-	-	-	-	-	-	-
Methyl isobutyl ketone [MIBK]	µg/L	20	<20	<20	0.0	No	-	-	-	-	-	-	-	-
Methyl-tert-butyl ether [MTBE]	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	-	-	-
Styrene	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	-	-	-

APPENDIX A, TABLE 3

Water chemistry QAQC results, winter 2023.

Analyte	Units	RDL	Winter 2023											
			Mennin Lake				Mennin River				UWB-03			
			ML2-A				MR3-A				P3-A			
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹
Volatile Organic Compounds														
Tetrachloroethane, 1,1,1,2-	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	-	-	-
Tetrachloroethane, 1,1,2,2-	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	-	-	-
Tetrachloroethylene	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	-	-	-
Toluene	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	-	-	-
Trichloroethane, 1,1,1-	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	-	-	-
Trichloroethane, 1,1,2-	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	-	-	-
Trichloroethylene	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	-	-	-
Trichlorofluoromethane	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	-	-	-
Vinyl chloride	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	-	-	-
Xylene, m+p-	µg/L	0.4	<0.4	<0.4	0.0	No	-	-	-	-	-	-	-	-
Xylene, o-	µg/L	0.3	<0.3	<0.3	0.0	No	-	-	-	-	-	-	-	-
Xylenes, total	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	-	-	-
Trihalomethanes [THMs], total	µg/L	1	<1	-	-	-	-	-	-	-	-	-	-	-

APPENDIX A, TABLE 3

Water chemistry QAQC results, winter 2023.

Analyte	Units	RDL	Winter 2023								
			UWB-08				Blanks				
			RP1-A				Filter	Pump	Field 1	Field 2	Trip
			Sample	Duplicate	RPD (%)	>5*RDL ¹	FB-1A	WB-2A	WB-1A	WB-2A	WB-1B
Aggregate Organics											
Biochemical Oxygen Demand	mg/L	2	<2	<2	0.0	No	-	-	<2	<2	<2
Anions and Nutrients											
Ammonia, Total (as N)	mg/L	0.01	0.023	0.098	124.0	No	-	0.039	0.012	0.016	<0.01
Bromide	mg/L	0.1	<0.1	<0.1	0.0	No	-	<0.1	<0.1	<0.1	<0.1
Chloride	mg/L	0.5	<0.5	<0.5	0.0	No	-	<0.5	<0.5	<0.5	<0.5
Fluoride	mg/L	0.02	0.035	0.036	2.8	No	-	<0.02	<0.02	<0.02	<0.02
Iodide	mg/L	-	-	-	-	-	-	-	-	-	-
Kjeldahl nitrogen, total [TKN]	mg/L	0.15	0.74	0.81	9.0	No	-	<0.15	<0.15	<0.15	<0.15
Nitrate (as N)	mg/L	0.02	0.198	0.192	3.1	Yes	-	<0.02	<0.02	<0.02	<0.02
Nitrate and Nitrite as N	mg/L	0.0224	0.198	0.192	3.1	Yes	-	<0.0224	<0.0224	<0.0224	<0.0224
Nitrite (as N)	mg/L	0.01	<0.01	<0.01	0.0	No	-	<0.01	<0.01	<0.01	<0.01
Phosphorus, total	mg/L	0.02	<0.02	<0.02	0.0	No	<0.02	<0.02	<0.02	<0.02	<0.02
Sulfate (as SO4)	mg/L	0.3	0.98	0.58	51.3	No	-	<0.3	<0.3	<0.3	<0.3
Cyanides											
Cyanide, Total	mg/L	0.002	<0.002	<0.002	0.0	No	-	<0.002	<0.002	-	<0.002
Herbicides											
AMPA	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	<0.5	<0.5	<0.5
Hydrocarbons											
F1 (C6-C10)	mg/L	0.1	<0.1	-	-	-	-	-	-	-	-
F1-BTEX	mg/L	0.1	<0.1	-	-	-	-	-	-	-	-
F2 (C10-C16)	mg/L	0.1	<0.1	-	-	-	-	-	-	-	-
F3 (C16-C34)	mg/L	0.2 to 0.25	<0.25	-	-	-	-	-	-	-	-
F4 (C34-C50)	mg/L	0.2 to 0.25	<0.25	-	-	-	-	-	-	-	-
TEH (C10-C50)	mg/L	0.4	<0.4	-	-	-	-	-	-	-	-
TEH (C16-C50)	mg/L	0.4	<0.4	-	-	-	-	-	-	-	-
Metals Dissolved											
Aluminum, dissolved	mg/L	0.001	0.0182	0.0183	0.5	Yes	<0.001	<0.001	<0.001	<0.001	0.0014
Antimony, dissolved	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Arsenic, dissolved	mg/L	0.0001	0.00036	0.00036	0.0	No	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Barium, dissolved	mg/L	0.0001	0.00795	0.00811	2.0	Yes	0.00018	<0.0001	<0.0001	<0.0001	<0.0001
Beryllium, dissolved	mg/L	0.00002	<0.00002	<0.00002	0.0	No	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
Bismuth, dissolved	mg/L	0.00005	<0.00005	<0.00005	0.0	No	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Boron, dissolved	mg/L	0.01	<0.01	<0.01	0.0	No	<0.01	<0.01	<0.01	<0.01	<0.01
Cadmium, dissolved	mg/L	0.000005	<0.000005	<0.000005	0.0	No	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
Calcium, dissolved	mg/L	0.05	10	9.88	1.2	Yes	<0.05	<0.05	0.077	<0.05	<0.05
Cerium, dissolved	µg/L	0.005	0.0985	0.103	4.5	Yes	-	<0.005	-	-	-
Cesium, dissolved	mg/L	0.00001	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Chromium, dissolved	mg/L	0.0005	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cobalt, dissolved	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Copper, dissolved	mg/L	0.0002	<0.0002	<0.0002	0.0	No	0.00254	<0.0002	<0.0002	<0.0002	<0.0002

APPENDIX A, TABLE 3

Water chemistry QAQC results, winter 2023.

Analyte	Units	RDL	Winter 2023								
			UWB-08				Blanks				
			RP1-A				Filter	Pump	Field 1	Field 2	Trip
			Sample	Duplicate	RPD (%)	>5*RDL ¹	FB-1A	WB-2A	WB-1A	WB-2A	WB-1B
Metals Dissolved											
Dysprosium, dissolved	µg/L	0.005	0.0077	0.0093	18.8	No	-	<0.005	-	-	-
Erbium, dissolved	µg/L	0.005	0.0064	0.0056	13.3	No	-	<0.005	-	-	-
Europium, dissolved	µg/L	0.005	<0.005	<0.005	0.0	No	-	<0.005	-	-	-
Gadolinium, dissolved	µg/L	0.005	0.0111	0.0106	4.6	No	-	<0.005	-	-	-
Gold, dissolved	µg/L	0.005	<0.005	<0.005	0.0	No	-	<0.005	-	-	-
Hafnium, dissolved	µg/L	0.005	<0.005	<0.005	0.0	No	-	<0.005	-	-	-
Holmium, dissolved	µg/L	0.005	<0.005	<0.005	0.0	No	-	<0.005	-	-	-
Iridium, dissolved	µg/L	0.005	<0.005	<0.005	0.0	No	-	<0.005	-	-	-
Iron, dissolved	mg/L	0.01	0.055	0.055	0.0	Yes	<0.01	<0.01	<0.01	<0.01	<0.01
Lanthanum, dissolved	µg/L	0.005	0.0767	0.0761	0.8	Yes	-	<0.005	-	-	-
Lead, dissolved	mg/L	0.00005	<0.00005	<0.00005	0.0	No	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Lithium, dissolved	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium, dissolved	mg/L	0.005	1.83	1.88	2.7	Yes	0.0063	<0.005	0.0086	<0.005	<0.005
Manganese, dissolved	mg/L	0.0001	0.00042	0.00068	47.3	No	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury, dissolved	mg/L	0.000005	<0.000005	<0.000005	0.0	No	<0.000005	<0.000005	<0.000005	-	<0.000005
Molybdenum, dissolved	mg/L	0.00005	0.000075	0.000236	103.5	No	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Neodymium, dissolved	µg/L	0.005	0.0686	0.0672	2.1	Yes	-	<0.005	-	-	-
Nickel, dissolved	mg/L	0.0005	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Palladium, dissolved	µg/L	0.005	<0.005	<0.005	0.0	No	-	<0.005	-	-	-
Phosphorus, dissolved	mg/L	0.05	<0.05	<0.05	0.0	No	<0.05	<0.05	<0.05	<0.05	<0.05
Platinum, dissolved	µg/L	0.005	<0.005	<0.005	0.0	No	-	<0.005	-	-	-
Potassium, dissolved	mg/L	0.05	0.716	0.692	3.4	Yes	<0.05	<0.05	<0.05	<0.05	<0.05
Praseodymium, dissolved	µg/L	0.005	0.017	0.0164	3.6	No	-	<0.005	-	-	-
Rhenium, dissolved	µg/L	0.005	<0.005	<0.005	0.0	No	-	<0.005	-	-	-
Rhodium, dissolved	mg/L	1	<0.001	<0.001	0.0	No	<0.001	<0.001	<0.001	-	<0.001
Rubidium, dissolved	mg/L	0.0002	0.00151	0.00154	2.0	Yes	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Ruthenium, dissolved	mg/L	1	<0.001	<0.001	0.0	No	<0.001	<0.001	<0.001	-	<0.001
Samarium, dissolved	mg/L	1	<0.001	<0.001	0.0	No	<0.001	<0.001	<0.001	-	<0.001
Scandium, dissolved	µg/L	0.005	0.0134	0.0138	2.9	No	-	<0.005	-	-	-
Selenium, dissolved	mg/L	0.00005	0.000083	0.000096	14.5	No	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Silicon, dissolved	mg/L	0.05	1.5	1.52	1.3	Yes	<0.05	<0.05	<0.05	<0.05	<0.05
Silver, dissolved	mg/L	0.00001	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Sodium, dissolved	mg/L	0.05	1.61	1.58	1.9	Yes	0.183	<0.05	0.196	<0.05	<0.05
Strontium, dissolved	mg/L	0.0002	0.019	0.0191	0.5	Yes	<0.0002	<0.0002	0.00026	<0.0002	<0.0002
Sulfur, dissolved	mg/L	0.5	0.7	0.62	12.1	No	<0.5	<0.5	<0.5	<0.5	<0.5
Tellurium, dissolved	mg/L	0.0002	<0.0002	<0.0002	0.0	No	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Terbium, dissolved	µg/L	0.005	<0.005	<0.005	0.0	No	-	<0.005	-	-	-
Thallium, dissolved	mg/L	0.00001	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Thorium, dissolved	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Thulium, dissolved	µg/L	0.005	<0.005	<0.005	0.0	No	-	<0.005	-	-	-

APPENDIX A, TABLE 3

Water chemistry QAQC results, winter 2023.

Analyte	Units	RDL	Winter 2023								
			UWB-08				Blanks				
			RP1-A				Filter	Pump	Field 1	Field 2	Trip
			Sample	Duplicate	RPD (%)	>5*RDL ¹	FB-1A	WB-2A	WB-1A	WB-2A	WB-1B
Metals Dissolved											
Tin, dissolved	mg/L	0.0001	<0.0001	<0.0001	0.0	No	0.00027	<0.0001	<0.0001	<0.0001	<0.0001
Titanium, dissolved	mg/L	0.0003	<0.0003	<0.0003	0.0	No	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Tungsten, dissolved	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Uranium, dissolved	mg/L	0.00001	0.000011	<0.00001	9.5	No	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Vanadium, dissolved	mg/L	0.0005	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Ytterbium, dissolved	µg/L	0.005	<0.005	<0.005	0.0	No	-	<0.005	-	-	-
Zinc, dissolved	mg/L	0.001	0.0041	<0.001	121.6	No	0.0011	<0.001	<0.001	<0.001	<0.001
Zirconium, dissolved	mg/L	0.0003	<0.0003	<0.0003	0.0	No	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Metals Total											
Aluminum, total	mg/L	0.003	0.0237	0.0214	10.2	Yes	-	<0.003	<0.003	-	<0.003
Antimony, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	-	<0.0001	<0.0001	-	<0.0001
Arsenic, total	mg/L	0.0001	0.0004	0.00039	2.5	No	-	<0.0001	<0.0001	-	<0.0001
Barium, total	mg/L	0.0001	0.00853	0.00854	0.1	Yes	-	<0.0001	0.00015	-	<0.0001
Beryllium, total	mg/L	0.00002	<0.00002	<0.00002	0.0	No	-	<0.00002	<0.00002	-	<0.00002
Bismuth, total	mg/L	0.00005	<0.00005	<0.00005	0.0	No	-	<0.00005	<0.00005	-	<0.00005
Boron, total	mg/L	0.01	<0.01	<0.01	0.0	No	-	<0.01	<0.01	-	<0.01
Cadmium, total	mg/L	0.000005	<0.000005	<0.000005	0.0	No	-	<0.000005	<0.000005	-	<0.000005
Calcium, total	mg/L	0.05	10.3	10.3	0.0	Yes	-	<0.05	<0.05	-	<0.05
Cerium, total	µg/L	0.005	0.117	0.113	3.5	Yes	-	<0.005	-	-	-
Cesium, total	mg/L	0.00001	<0.00001	<0.00001	0.0	No	-	<0.00001	<0.00001	-	<0.00001
Chromium, total	mg/L	0.0005	<0.0005	<0.0005	0.0	No	-	<0.0005	<0.0005	-	<0.0005
Cobalt, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	-	<0.0001	<0.0001	-	<0.0001
Copper, total	mg/L	0.0005	0.00075	<0.0005	40.0	No	-	<0.0005	0.00082	-	<0.0005
Dysprosium, total	µg/L	0.005	0.0098	0.0092	6.3	No	-	<0.005	-	-	-
Erbium, total	µg/L	0.005	0.0061	0.0074	19.3	No	-	<0.005	-	-	-
Europium, total	µg/L	0.005	<0.005	<0.005	0.0	No	-	<0.005	-	-	-
Gadolinium, total	µg/L	0.005	0.0107	0.0127	17.1	No	-	<0.005	-	-	-
Gold, total	µg/L	0.02	<0.02	<0.02	0.0	No	-	<0.02	-	-	-
Hafnium, total	µg/L	0.005	<0.005	<0.005	0.0	No	-	<0.005	-	-	-
Holmium, total	µg/L	0.005	<0.005	<0.005	0.0	No	-	<0.005	-	-	-
Iridium, total	µg/L	0.005	<0.005	<0.005	0.0	No	-	<0.005	-	-	-
Iron, total	mg/L	0.01	0.088	0.089	1.1	Yes	-	<0.01	<0.01	-	<0.01
Lanthanum, total	µg/L	0.005	0.09	0.0857	4.9	Yes	-	<0.005	-	-	-
Lead, total	mg/L	0.00005	<0.00005	<0.00005	0.0	No	-	<0.00005	<0.00005	-	<0.00005
Lithium, total	mg/L	0.001	<0.001	<0.001	0.0	No	-	<0.001	<0.001	-	<0.001
Magnesium, total	mg/L	0.005	1.92	1.92	0.0	Yes	-	<0.005	<0.005	-	<0.005
Manganese, total	mg/L	0.0001	0.00668	0.00639	4.4	Yes	-	<0.0001	<0.0001	-	<0.0001
Mercury, total	mg/L	0.000005	<0.000005	<0.000005	0.0	No	-	<0.000005	<0.000005	-	<0.000005
Molybdenum, total	mg/L	0.00005	0.000074	0.00023	102.6	No	-	<0.00005	<0.00005	-	<0.00005
Neodymium, total	µg/L	0.005	0.0736	0.0713	3.2	Yes	-	<0.005	-	-	-

APPENDIX A, TABLE 3

Water chemistry QAQC results, winter 2023.

Analyte	Units	RDL	Winter 2023								
			UWB-08				Blanks				
			RP1-A				Filter	Pump	Field 1	Field 2	Trip
			Sample	Duplicate	RPD (%)	>5*RDL ¹	FB-1A	WB-2A	WB-1A	WB-2A	WB-1B
Metals Total											
Nickel, total	mg/L	0.0005	<0.0005	<0.0005	0.0	No	-	<0.0005	<0.0005	-	<0.0005
Palladium, total	µg/L	0.005	<0.005	<0.005	0.0	No	-	<0.005	-	-	-
Phosphorus, total	mg/L	0.05	<0.05	<0.05	0.0	No	-	<0.05	<0.05	-	<0.05
Platinum, total	µg/L	0.02	<0.02	<0.02	0.0	No	-	<0.02	-	-	-
Potassium, total	mg/L	0.05	0.689	0.662	4.0	Yes	-	<0.05	<0.05	-	<0.05
Praseodymium, total	µg/L	0.005	0.0191	0.018	5.9	No	-	<0.005	-	-	-
Rhenium, total	µg/L	0.005	<0.005	<0.005	0.0	No	-	<0.005	-	-	-
Rhodium, total	mg/L	1	<0.001	<0.001	0.0	No	-	<0.001	<0.001	-	<0.001
Rubidium, total	mg/L	0.0002	0.00137	0.00144	5.0	Yes	-	<0.0002	<0.0002	-	<0.0002
Ruthenium, total	mg/L	1	<0.001	<0.001	0.0	No	-	<0.001	<0.001	-	<0.001
Samarium, total	mg/L	1	<0.001	<0.001	0.0	No	-	<0.001	<0.001	-	<0.001
Scandium, total	µg/L	0.005	0.0154	0.0155	0.6	No	-	<0.005	-	-	-
Selenium, total	mg/L	0.00005	0.000109	0.000092	16.9	No	-	<0.00005	<0.00005	-	<0.00005
Silicon, total	mg/L	0.1	1.69	1.64	3.0	Yes	-	<0.1	<0.1	-	<0.1
Silver, total	mg/L	0.00001	<0.00001	<0.00001	0.0	No	-	<0.00001	<0.00001	-	<0.00001
Sodium, total	mg/L	0.05	1.64	1.64	0.0	Yes	-	<0.05	0.165	-	<0.05
Strontium, total	mg/L	0.0002	0.0196	0.0192	2.1	Yes	-	<0.0002	<0.0002	-	<0.0002
Sulfur, total	mg/L	0.5	0.6	0.58	3.4	No	-	<0.5	<0.5	-	<0.5
Tellurium, total	mg/L	0.0002	<0.0002	<0.0002	0.0	No	-	<0.0002	<0.0002	-	<0.0002
Terbium, total	µg/L	0.005	<0.005	<0.005	0.0	No	-	<0.005	-	-	-
Thallium, total	mg/L	0.00001	<0.00001	<0.00001	0.0	No	-	<0.00001	<0.00001	-	<0.00001
Thorium, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	-	<0.0001	<0.0001	-	<0.0001
Thulium, total	µg/L	0.005	<0.005	<0.005	0.0	No	-	<0.005	-	-	-
Tin, total	mg/L	0.0001	0.00013	<0.0001	26.1	No	-	0.0001	0.00015	-	<0.0001
Titanium, total	mg/L	0.0003	0.0003	<0.0003	0.0	No	-	<0.0003	<0.0003	-	<0.0003
Tungsten, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	-	<0.0001	<0.0001	-	<0.0001
Uranium, total	mg/L	0.00001	<0.00001	<0.00001	0.0	No	-	<0.00001	<0.00001	-	<0.00001
Vanadium, total	mg/L	0.0005	<0.0005	<0.0005	0.0	No	-	<0.0005	<0.0005	-	<0.0005
Ytterbium, total	µg/L	0.005	0.0054	0.0058	7.1	No	-	<0.005	-	-	-
Zinc, total	mg/L	0.003	0.0044	<0.003	37.8	No	-	<0.003	<0.003	-	<0.003
Zirconium, total	mg/L	0.0002	<0.0002	<0.0002	0.0	No	-	<0.0002	<0.0002	-	<0.0002
Metals Speciated											
Chromium, hexavalent [Cr VI], dissolved	mg/L	0.0005	<0.0005	<0.0005	0.0	No	<0.0005	-	0.00104	<0.0005	<0.0005
Chromium, hexavalent [Cr VI], total	mg/L	0.0005	<0.0005	<0.0005	0.0	No	-	-	0.00067	<0.0005	<0.0005
Chromium, trivalent [Cr III], dissolved	mg/L	0.0005	<0.0005	<0.0005	0.0	No	<0.0005	-	<0.0005	<0.0005	<0.0005
Chromium, trivalent [Cr III], total	mg/L	0.0005	<0.0005	<0.0005	0.0	No	-	-	<0.0005	<0.0005	<0.0005
Microbiological Tests											
Coliforms, Escherichia coli [E. coli]	CFU/100mL	1	<1	<1	0.0	No	-	-	-	-	-
Coliforms, total	CFU/100mL	1	<1	<1	0.0	No	-	-	-	-	-

APPENDIX A, TABLE 3

Water chemistry QAQC results, winter 2023.

Analyte	Units	RDL	Winter 2023								
			UWB-08				Blanks				
			RP1-A				Filter	Pump	Field 1	Field 2	Trip
			Sample	Duplicate	RPD (%)	>5*RDL ¹	FB-1A	WB-2A	WB-1A	WB-2A	WB-1B
Organic_Inorganic Carbon											
Carbon, dissolved organic [DOC]	mg/L	0.5	18.6	19.4	4.2	Yes	<0.5	<0.5	0.51	<0.5	0.77
Carbon, total inorganic [TIC]	mg/L	0.5	5.56	4.87	13.2	Yes	<0.5	<0.5	0.67	<0.5	<0.5
Carbon, total organic [TOC]	mg/L	0.5	19.5	19.3	1.0	Yes	<0.5	0.6	<0.5	0.69	<0.5
Organochlorine Pesticides											
Aldrin	µg/L	0.008	<0.008	<0.008	0.0	No	-	<0.008	-	-	-
Chlordane, cis- (alpha)	µg/L	0.008	<0.008	<0.008	0.0	No	-	<0.008	-	-	-
Chlordane, total	µg/L	0.011	<0.011	<0.011	0.0	No	-	<0.011	-	-	-
Chlordane, trans- (gamma)	µg/L	0.008	<0.008	<0.008	0.0	No	-	<0.008	-	-	-
DDD, 2,4'-	µg/L	0.004	<0.004	<0.004	0.0	No	-	<0.004	-	-	-
DDD, 4,4'-	µg/L	0.004	<0.004	<0.004	0.0	No	-	<0.004	-	-	-
DDD, total	µg/L	0.006	<0.006	<0.006	0.0	No	-	<0.006	-	-	-
DDE, 2,4'-	µg/L	0.004	<0.004	<0.004	0.0	No	-	<0.004	-	-	-
DDE, 4,4'-	µg/L	0.004	<0.004	<0.004	0.0	No	-	<0.004	-	-	-
DDE, total	µg/L	0.006	<0.006	<0.006	0.0	No	-	<0.006	-	-	-
DDT, 2,4'-	µg/L	0.004	<0.004	<0.004	0.0	No	-	<0.004	-	-	-
DDT, 4,4'-	µg/L	0.004 to 0.012	<0.012	<0.01	18.2	No	-	<0.004	-	-	-
DDT, total	µg/L	0.006 to 0.0126	<0.0126	<0.0108	15.4	No	-	<0.006	-	-	-
Dieldrin	µg/L	0.008 to 0.048	<0.008	<0.008	0.0	No	-	<0.048	-	-	-
Endosulfan, alpha-	µg/L	0.007	<0.007	<0.007	0.0	No	-	<0.007	-	-	-
Endosulfan, beta-	µg/L	0.007	<0.007	<0.007	0.0	No	-	<0.007	-	-	-
Endosulfan, total	µg/L	0.01	<0.01	<0.01	0.0	No	-	<0.01	-	-	-
Endrin	µg/L	0.01	<0.01	<0.01	0.0	No	-	<0.01	-	-	-
Heptachlor	µg/L	0.008	<0.008	<0.008	0.0	No	-	<0.008	-	-	-
Heptachlor epoxide	µg/L	0.008	<0.008	<0.008	0.0	No	-	<0.008	-	-	-
Hexachlorobenzene	µg/L	0.008	<0.008	<0.008	0.0	No	-	<0.008	-	-	-
Hexachlorobutadiene	µg/L	0.008	<0.008	<0.008	0.0	No	-	<0.008	-	-	-
Hexachlorocyclohexane, gamma-	µg/L	0.008	<0.008	<0.008	0.0	No	-	<0.008	-	-	-
Hexachloroethane	µg/L	0.008	<0.008	<0.008	0.0	No	-	<0.008	-	-	-
Methoxychlor	µg/L	0.008	<0.008	<0.008	0.0	No	-	<0.008	-	-	-
Polychlorinated Biphenyls											
Aroclor 1016	µg/L	0.02	<0.02	<0.02	0.0	No	-	<0.02	-	-	-
Aroclor 1221	µg/L	0.02	<0.02	<0.02	0.0	No	-	<0.02	-	-	-
Aroclor 1232	µg/L	0.02	<0.02	<0.02	0.0	No	-	<0.02	-	-	-
Aroclor 1242	µg/L	0.02	<0.02	<0.02	0.0	No	-	<0.02	-	-	-
Aroclor 1248	µg/L	0.02	<0.02	<0.02	0.0	No	-	<0.02	-	-	-
Aroclor 1254	µg/L	0.02	<0.02	<0.02	0.0	No	-	<0.02	-	-	-
Aroclor 1260	µg/L	0.02	<0.02	<0.02	0.0	No	-	<0.02	-	-	-
Aroclor 1262	µg/L	0.02	<0.02	<0.02	0.0	No	-	<0.02	-	-	-
Aroclor 1268	µg/L	0.02	<0.02	<0.02	0.0	No	-	<0.02	-	-	-
Polychlorinated biphenyls [PCBs], total	µg/L	0.06	<0.06	<0.06	0.0	No	-	<0.06	-	-	-
Pesticides											
Glufosinate	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	<0.5	<0.5	<0.5
Glyphosate	µg/L	0.2	<0.2	<0.2	0.0	No	-	-	<0.2	<0.2	<0.2

APPENDIX A, TABLE 3

Water chemistry QAQC results, winter 2023.

Analyte	Units	RDL	Winter 2023								
			UWB-08				Blanks				
			RP1-A				Filter	Pump	Field 1	Field 2	Trip
			Sample	Duplicate	RPD (%)	>5*RDL ¹	FB-1A	WB-2A	WB-1A	WB-2A	WB-1B
Physical Tests											
Alkalinity, bicarbonate (as CaCO3)	mg/L	1	28.5	28.5	0.0	Yes	-	<1	<1	<1	<1
Alkalinity, carbonate (as CaCO3)	mg/L	1	<1	<1	0.0	No	-	<1	<1	<1	<1
Alkalinity, hydroxide (as CaCO3)	mg/L	1	<1	<1	0.0	No	-	<1	<1	<1	<1
Alkalinity, phenolphthalein (as CaCO3)	mg/L	1	<1	<1	0.0	No	-	<1	<1	<1	<1
Alkalinity, Total (as CaCO3)	mg/L	2	28.5	28.5	0.0	Yes	-	<2	<2	<2	<2
Conductivity	µS/cm	1	64.5	63.1	2.2	Yes	-	<1	<1	<1	<1
Conductivity	umhos/cm		-	-	-	-	-	-	-	-	-
Hardness (as CaCO3), from total Ca/Mg	mg/L	0.5	33.6	33.6	0.0	Yes	-	<0.5	<0.5	<0.5	<0.5
Solids, total dissolved [TDS]	mg/L	3 to 10	56.2	59.5	5.7	Yes	-	<3	<3	-	<3
Solids, total suspended [TSS]	mg/L	3	<3	<3	0.0	No	-	<3	<3	<3	<3
Turbidity	NTU	0.1	1.16	0.56	69.8	Yes	-	<0.1	0.12	<0.1	<0.1
Plant Pigments											
Chlorophyll a	µg/L	0.01	1.35	1.53	12.5	Yes	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons											
1+2-Methylnaphthalenes	µg/L	0.015	<0.015	<0.015	0.0	No	-	0.061	<0.015	-	<0.015
1-Methylnaphthalene	µg/L	0.01	<0.01	<0.01	0.0	No	-	0.018	<0.01	-	<0.01
2-Methylnaphthalene	µg/L	0.01	<0.01	<0.01	0.0	No	-	0.043	<0.01	-	<0.01
Acenaphthene	µg/L	0.01 to 0.013	<0.01	<0.01	0.0	No	-	<0.013	<0.01	-	<0.01
Acenaphthylene	µg/L		<0.01	<0.01	0.0	No	-	<0.01	<0.01	-	<0.01
Anthracene	µg/L		<0.01	<0.01	0.0	No	-	<0.01	<0.01	-	<0.01
Benz(a)anthracene	µg/L		<0.01	<0.01	0.0	No	-	<0.01	<0.01	-	<0.01
Benzo(a)pyrene	µg/L	0.005	<0.005	<0.005	0.0	No	-	<0.005	<0.005	-	<0.005
Benzo(b&j)fluoranthene	µg/L	0.01	<0.01	<0.01	0.0	No	-	<0.01	<0.01	-	<0.01
Benzo(g,h,i)perylene	µg/L	0.01	<0.01	<0.01	0.0	No	-	<0.01	<0.01	-	<0.01
Benzo(k)fluoranthene	µg/L	0.01	<0.01	<0.01	0.0	No	-	<0.01	<0.01	-	<0.01
Chrysene	µg/L	0.01	<0.01	<0.01	0.0	No	-	<0.01	<0.01	-	<0.01
Dibenz(a,h)anthracene	µg/L	0.005	<0.005	<0.005	0.0	No	-	<0.005	<0.005	-	<0.005
Fluoranthene	µg/L	0.01	<0.01	<0.01	0.0	No	-	<0.01	<0.01	-	<0.01
Fluorene	µg/L	0.01	<0.01	<0.01	0.0	No	-	<0.01	<0.01	-	<0.01
Indeno(1,2,3-c,d)pyrene	µg/L	0.01	<0.01	<0.01	0.0	No	-	<0.01	<0.01	-	<0.01
Naphthalene	µg/L	0.05	<0.05	<0.05	0.0	No	-	0.098	<0.05	-	<0.05
Phenanthrene	µg/L	0.02	<0.02	<0.02	0.0	No	-	0.025	<0.02	-	<0.02
Pyrene	µg/L	0.01	<0.01	<0.01	0.0	No	-	<0.01	<0.01	-	<0.01

APPENDIX A, TABLE 3

Water chemistry QAQC results, winter 2023.

Analyte	Units	RDL	Winter 2023								
			UWB-08				Blanks				
			RP1-A				Filter	Pump	Field 1	Field 2	Trip
			Sample	Duplicate	RPD (%)	>5*RDL ¹	FB-1A	WB-2A	WB-1A	WB-2A	WB-1B
Radiological Parameters											
Carbon-14	Bq/L	18.5	<18.5	<18.5	0.0	No	-	<18.5	<18.5	<18.5	<18.5
Cesium-137	Bq/L	0.37	<0.37	<0.37	0.0	No	-	<0.37	<0.37	-	<0.37
Chlorine-36	Bq/L	0.37	-	-	-	-	-	-	<0.37	<0.37	<0.37
Cobalt-60	Bq/L	0.37	<0.37	<0.37	0.0	No	-	<0.37	<0.37	<0.37	<0.37
Gross Alpha	Bq/L	0.111	<0.111	<0.111	0.0	No	-	<0.111	<0.111	<0.111	<0.111
Gross Beta	Bq/L	0.148	<0.148	<0.148	0.0	No	-	<0.148	<0.148	<0.148	<0.148
Iodine-129	Bq/L	0.37	<0.37	<0.37	0.0	No	-	<0.37	<0.37	<0.37	<0.37
Neptunium-237	Bq/L	0.0037	-	-	-	-	-	-	<0.0037	<0.0037	<0.0037
Plutonium-238	Bq/L	0.0037	-	-	-	-	-	-	<0.0037	<0.0037	<0.0037
Plutonium-239	Bq/L	0.0037	-	-	-	-	-	-	<0.0037	<0.0037	<0.0037
Potassium-40	Bq/L	7.1	<7.1	<7.1	0.0	No	-	-	<7.1	<7.1	<7.1
Radium-226	Bq/L	0.037	<0.037	0.0144	87.9	No	-	-	<0.037	0.0194	<0.037
Ruthenium-106	Bq/L	3	<3	<3	0.0	No	-	<3	<3	<3	<3
Selenium-79	Bq/L	1.85	-	-	-	-	-	-	<1.85	<1.85	<1.85
Strontium-90	Bq/L	0.037	<0.037	<0.037	0.0	No	-	<0.037	<0.037	<0.037	<0.037
Thorium-228	Bq/L	0.0074	<0.0074	<0.0074	0.0	No	-	-	<0.0074	<0.0074	<0.0074
Thorium-230	Bq/L	0.0074	<0.0074	<0.0074	0.0	No	-	-	<0.0074	<0.0074	<0.0074
Thorium-232	Bq/L	0.0074	<0.0074	<0.0074	0.0	No	-	-	<0.0074	0.00155	<0.0074
Tritium	Bq/L	14.8	<14.8	<14.8	0.0	No	-	<14.8	<14.8	<14.8	<14.8
Uranium-234	Bq/L	0.0074	<0.0074	<0.0074	0.0	No	-	-	<0.0074	<0.0074	<0.0074
Uranium-235	Bq/L	0.0074	<0.0074	<0.0074	0.0	No	-	-	<0.0074	<0.0074	<0.0074
Uranium-238	Bq/L	0.0074	<0.0074	<0.0074	0.0	No	-	-	<0.0074	<0.0074	<0.0074
Semi-Volatile Organic Compounds											
1,2,4-Trichlorobenzene	µg/L	0.4	<0.4	<0.4	0.0	No	-	-	<0.4	<0.4	<0.4
2,4,5-Trichlorophenol	µg/L	0.2	<0.2	<0.2	0.0	No	-	-	<0.2	<0.2	<0.2
2,4,6-Trichlorophenol	µg/L	0.2	<0.2	<0.2	0.0	No	-	-	<0.2	<0.2	<0.2
2,4+2,6-Dinitrotoluene	µg/L	0.6	<0.6	<0.6	0.0	No	-	-	<0.6	<0.6	<0.6
2,4-Dichlorophenol	µg/L	0.3	<0.3	<0.3	0.0	No	-	-	<0.3	<0.3	<0.3
2,4-Dimethylphenol	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	<0.5	<0.5	<0.5
2,4-Dinitrophenol	µg/L	1 to 2	<2	<2	0.0	No	-	-	<1	<1	<1
2,4-Dinitrotoluene	µg/L	0.4	<0.4	<0.4	0.0	No	-	-	<0.4	<0.4	<0.4
2,6-Dinitrotoluene	µg/L	0.4	<0.4	<0.4	0.0	No	-	-	<0.4	<0.4	<0.4
2-Chlorophenol	µg/L	0.3	<0.3	<0.3	0.0	No	-	-	<0.3	<0.3	<0.3
4-Chloroaniline	µg/L	0.4	<0.4	<0.4	0.0	No	-	-	<0.4	<0.4	<0.4
Biphenyl	µg/L	0.4	<0.4	<0.4	0.0	No	-	-	<0.4	<0.4	<0.4
bis(2-Chloro-1-methylethyl) ether	µg/L	0.4	<0.4	<0.4	0.0	No	-	-	<0.4	<0.4	<0.4
bis(2-Chloroethyl) ether	µg/L	0.4	<0.4	<0.4	0.0	No	-	-	<0.4	<0.4	<0.4
Bis(2-ethylhexyl)phthalate	µg/L	2	<2	<2	0.0	No	-	-	<2	3.7	<2
Dichlorobenzidine, 3,3'-	µg/L	0.4	<0.4	<0.4	0.0	No	-	-	<0.4	<0.4	<0.4
Diethylphthalate	µg/L	0.2	<0.2	<0.2	0.0	No	-	-	<0.2	0.58	<0.2
Semi-Volatile Organic Compounds											
Dimethylphthalate	µg/L	0.2	<0.2	<0.2	0.0	No	-	-	<0.2	<0.2	<0.2
Pentachlorophenol [PCP]	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	<0.5	<0.5	<0.5
Phenol	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	<0.5	<0.5	<0.5

APPENDIX A, TABLE 3

Water chemistry QAQC results, winter 2023.

Analyte	Units	RDL	Winter 2023								
			UWB-08				Blanks				
			RP1-A				Filter	Pump	Field 1	Field 2	Trip
			Sample	Duplicate	RPD (%)	>5*RDL ¹	FB-1A	WB-2A	WB-1A	WB-2A	WB-1B
Volatile Organic Compounds											
Acetone	µg/L	20	<20	-	-	-	-	-	-	-	-
Benzene	µg/L	0.5	<0.5	-	-	-	-	-	-	-	-
Bromodichloromethane	µg/L	0.5	<0.5	-	-	-	-	-	-	-	-
Bromoform	µg/L	0.5	<0.5	-	-	-	-	-	-	-	-
Bromomethane	µg/L	0.5	<0.5	-	-	-	-	-	-	-	-
BTEX, total	µg/L	1	<1	-	-	-	-	-	-	-	-
Carbon disulfide	µg/L	1	<1	-	-	-	-	-	-	-	-
Carbon tetrachloride	µg/L	0.2	<0.2	-	-	-	-	-	-	-	-
Chlorobenzene	µg/L	0.5	<0.5	-	-	-	-	-	-	-	-
Chloroethane	µg/L	0.5	<0.5	-	-	-	-	-	-	-	-
Chloroform	µg/L	0.5	<0.5	-	-	-	-	-	-	-	-
Chloromethane	µg/L	2	<2	-	-	-	-	-	-	-	-
Dibromochloromethane	µg/L	0.5	<0.5	-	-	-	-	-	-	-	-
Dibromoethane, 1,2-	µg/L	0.2	<0.2	-	-	-	-	-	-	-	-
Dichlorobenzene, 1,2-	µg/L	0.5	<0.5	-	-	-	-	-	-	-	-
Dichlorobenzene, 1,3-	µg/L	0.5	<0.5	-	-	-	-	-	-	-	-
Dichlorobenzene, 1,4-	µg/L	0.5	<0.5	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	µg/L	0.5	<0.5	-	-	-	-	-	-	-	-
Dichloroethane, 1,1-	µg/L	0.5	<0.5	-	-	-	-	-	-	-	-
Dichloroethane, 1,2-	µg/L	0.5	<0.5	-	-	-	-	-	-	-	-
Dichloroethylene, 1,1-	µg/L	0.5	<0.5	-	-	-	-	-	-	-	-
Dichloroethylene, cis+trans-1,2-	µg/L	0.71	<0.71	-	-	-	-	-	-	-	-
Dichloroethylene, cis-1,2-	µg/L	0.5	<0.5	-	-	-	-	-	-	-	-
Dichloroethylene, trans-1,2-	µg/L	0.5	<0.5	-	-	-	-	-	-	-	-
Dichloromethane	µg/L	1	<1	-	-	-	-	-	-	-	-
Dichloropropane, 1,2-	µg/L	0.5	<0.5	-	-	-	-	-	-	-	-
Dichloropropylene, cis+trans-1,3-	µg/L	0.5	<0.5	-	-	-	-	-	-	-	-
Dichloropropylene, cis-1,3-	µg/L	0.3	<0.3	-	-	-	-	-	-	-	-
Dichloropropylene, trans-1,3-	µg/L	0.3	<0.3	-	-	-	-	-	-	-	-
Ethylbenzene	µg/L	0.5	<0.5	-	-	-	-	-	-	-	-
Hexane, n-	µg/L	0.5	<0.5	-	-	-	-	-	-	-	-
Hexanone, 2-	µg/L	20	<20	-	-	-	-	-	-	-	-
Methyl ethyl ketone [MEK]	µg/L	20	<20	-	-	-	-	-	-	-	-
Methyl isobutyl ketone [MIBK]	µg/L	20	<20	-	-	-	-	-	-	-	-
Methyl-tert-butyl ether [MTBE]	µg/L	0.5	<0.5	-	-	-	-	-	-	-	-
Styrene	µg/L	0.5	<0.5	-	-	-	-	-	-	-	-

APPENDIX A, TABLE 3

Water chemistry QAQC results, winter 2023.

Analyte	Units	RDL	Winter 2023								
			UWB-08				Blanks				
			RP1-A				Filter	Pump	Field 1	Field 2	Trip
			Sample	Duplicate	RPD (%)	>5*RDL ¹	FB-1A	WB-2A	WB-1A	WB-2A	WB-1B
Volatile Organic Compounds											
Tetrachloroethane, 1,1,1,2-	µg/L	0.5	<0.5	-	-	-	-	-	-	-	-
Tetrachloroethane, 1,1,2,2-	µg/L	0.5	<0.5	-	-	-	-	-	-	-	-
Tetrachloroethylene	µg/L	0.5	<0.5	-	-	-	-	-	-	-	-
Toluene	µg/L	0.5	<0.5	-	-	-	-	-	-	-	-
Trichloroethane, 1,1,1-	µg/L	0.5	<0.5	-	-	-	-	-	-	-	-
Trichloroethane, 1,1,2-	µg/L	0.5	<0.5	-	-	-	-	-	-	-	-
Trichloroethylene	µg/L	0.5	<0.5	-	-	-	-	-	-	-	-
Trichlorofluoromethane	µg/L	0.5	<0.5	-	-	-	-	-	-	-	-
Vinyl chloride	µg/L	0.5	<0.5	-	-	-	-	-	-	-	-
Xylene, m+p-	µg/L	0.4	<0.4	-	-	-	-	-	-	-	-
Xylene, o-	µg/L	0.3	<0.3	-	-	-	-	-	-	-	-
Xylenes, total	µg/L	0.5	<0.5	-	-	-	-	-	-	-	-
Trihalomethanes [THMs], total	µg/L	1	-	-	-	-	-	-	-	-	-

Gray cells indicate exceedances of QAQC criteria.
RDL = reportable detection limit; dash = no data.
Relative percent difference (RPD) = | ((Duplicate - Sample)/((Duplicate + Sample)/2))*100 |.
For calculation of RPDs, values <RDL were set equal to the RDL; Grayed cells indicate exceedances of data quality control limits (RPD > 20%, with both samples >5*RDL).
¹Ranking of a "yes" used only if either value is >5*RDL.

APPENDIX A, TABLE 4

Water chemistry QAQC results, spring 2023.

Analyte	Units	RDL	Spring 2023											
			Mennin Lake				Mennin River				UWB-03			
			ML2-A				MR2-A				P3-A			
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹
Aggregate Organics														
Biochemical Oxygen Demand	mg/L	2	<2	<2	0.0	No	<2	<2	0.0	No	<2	<2	0.0	No
Anions and Nutrients														
Ammonia, Total (as N)	mg/L	0.01 to 0.1	<0.01	0.034	109.1	No	0.142	<0.01	173.7	No	0.014	0.012	15.4	No
Bromide	mg/L	0.1	<0.1	<0.1	0.0	No	<0.1	<0.1	0.0	No	<0.1	<0.1	0.0	No
Chloride	mg/L	0.5	0.66	0.67	1.5	No	0.65	0.63	3.1	No	<0.5	<0.5	0.0	No
Fluoride	mg/L	0.02	0.036	0.036	0.0	No	0.036	0.036	0.0	No	0.023	0.022	4.4	No
Iodide	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Kjeldahl nitrogen, total [TKN]	mg/L	0.15	0.41	0.36	13.0	No	0.74	0.52	34.9	No	0.42	0.45	6.9	No
Nitrate (as N)	mg/L	0.02	0.051	0.05	2.0	No	<0.02	<0.02	0.0	No	0.034	0.04	16.2	No
Nitrate and Nitrite as N	mg/L	0.0224	0.051	0.05	2.0	No	<0.0224	<0.0224	0.0	No	0.034	0.04	16.2	No
Nitrite (as N)	mg/L	0.01	<0.01	<0.01	0.0	No	<0.01	<0.01	0.0	No	<0.01	<0.01	0.0	No
Phosphorus, total	mg/L	0.02	<0.02	<0.02	0.0	No	<0.02	<0.02	0.0	No	<0.02	<0.02	0.0	No
Sulfate (as SO4)	mg/L	0.3	1.11	0.98	12.4	No	0.9	0.89	1.1	No	0.5	0.49	2.0	No
Cyanides														
Cyanide, Total	mg/L	0.002	<0.002	<0.002	0.0	No	<0.002	<0.002	0.0	No	<0.002	<0.002	0.0	No
Herbicides														
AMPA	µg/L	0.5	-	-	-	-	-	-	-	-	<0.5	<0.5	0.0	No
Hydrocarbons														
F1 (C6-C10)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
F1-BTEX	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
F2 (C10-C16)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
F3 (C16-C34)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
F4 (C34-C50)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
TEH (C10-C50)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
TEH (C16-C50)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals Dissolved														
Aluminum, dissolved	mg/L	0.001	0.142	0.14	1.4	Yes	0.169	0.171	1.2	Yes	0.257	0.258	0.4	Yes
Antimony, dissolved	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No
Arsenic, dissolved	mg/L	0.0001	0.0003	0.00033	9.5	No	0.00033	0.00037	11.4	No	0.00035	0.00037	5.6	No
Barium, dissolved	mg/L	0.0001	0.00522	0.0053	1.5	Yes	0.00502	0.00522	3.9	Yes	0.00492	0.00501	1.8	Yes
Beryllium, dissolved	mg/L	0.00002	<0.00002	<0.00002	0.0	No	<0.00002	<0.00002	0.0	No	<0.00002	<0.00002	0.0	No
Bismuth, dissolved	mg/L	0.00005	<0.00005	<0.00005	0.0	No	<0.00005	<0.00005	0.0	No	<0.00005	<0.00005	0.0	No
Boron, dissolved	mg/L	0.01	<0.01	<0.01	0.0	No	<0.01	<0.01	0.0	No	<0.01	<0.01	0.0	No
Cadmium, dissolved	mg/L	0.000005	0.0000066	0.0000064	3.1	No	0.0000068	0.0000073	7.1	No	0.0000103	0.0000145	33.9	No
Calcium, dissolved	mg/L	0.05	2.52	2.67	5.8	Yes	2.88	2.72	5.7	Yes	2.22	2.29	3.1	Yes
Cerium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Cesium, dissolved	mg/L	0.00001	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No	0.00001	0.000011	9.5	No
Chromium, dissolved	mg/L	0.0005	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	0.0	No
Cobalt, dissolved	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	0.00018	0.0002	10.5	No
Copper, dissolved	mg/L	0.0002	0.00068	0.00084	21.1	No	0.00121	0.00171	34.2	Yes	0.00042	0.00042	0.0	No

APPENDIX A, TABLE 4

Water chemistry QAQC results, spring 2023.

Analyte	Units	RDL	Spring 2023											
			Mennin Lake				Mennin River				UWB-03			
			ML2-A				MR2-A				P3-A			
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹
Metals Dissolved														
Dysprosium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Erbium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Europium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Gadolinium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Gold, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Hafnium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Holmium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Iridium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron, dissolved	mg/L	0.01	0.276	0.289	4.6	Yes	0.289	0.292	1.0	Yes	0.565	0.556	1.6	Yes
Lanthanum, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead, dissolved	mg/L	0.00005	0.000078	0.00008	2.5	No	0.000116	0.000117	0.9	No	0.000194	0.000189	2.6	No
Lithium, dissolved	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No
Magnesium, dissolved	mg/L	0.005	0.612	0.623	1.8	Yes	0.688	0.642	6.9	Yes	0.621	0.642	3.3	Yes
Manganese, dissolved	mg/L	0.0001	0.0086	0.009	4.5	Yes	0.0094	0.00954	1.5	Yes	0.0199	0.0201	1.0	Yes
Mercury, dissolved	mg/L	0.000005	<0.000005	0.0000288	140.8	No	0.0000259	0.0000742	96.5	Yes	<0.000005	<0.000005	0.0	No
Molybdenum, dissolved	mg/L	0.00005	0.000469	0.000393	17.6	Yes	0.000228	0.000247	8.0	No	<0.00005	<0.00005	0.0	No
Neodymium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel, dissolved	mg/L	0.0005	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	0.0	No
Palladium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus, dissolved	mg/L	0.05	<0.05	<0.05	0.0	No	<0.05	<0.05	0.0	No	<0.05	<0.05	0.0	No
Platinum, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium, dissolved	mg/L	0.05	0.365	0.361	1.1	Yes	0.379	0.385	1.6	Yes	0.487	0.485	0.4	Yes
Praseodymium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Rhenium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Rhodium, dissolved	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No
Rubidium, dissolved	mg/L	0.0002	0.00104	0.00109	4.7	Yes	0.0012	0.00114	5.1	Yes	0.00147	0.00145	1.4	Yes
Ruthenium, dissolved	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No
Samarium, dissolved	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No
Scandium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium, dissolved	mg/L	0.00005	0.000101	0.000079	24.4	No	0.000088	0.00009	2.2	No	0.000059	0.000067	12.7	No
Silicon, dissolved	mg/L	0.05	1.7	1.76	3.5	Yes	1.66	1.64	1.2	Yes	2.89	2.84	1.7	Yes
Silver, dissolved	mg/L	0.00001	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No
Sodium, dissolved	mg/L	0.05	1.03	1.09	5.7	Yes	1.31	1.18	10.4	Yes	0.952	0.966	1.5	Yes
Strontium, dissolved	mg/L	0.0002	0.00971	0.00989	1.8	Yes	0.00955	0.00964	0.9	Yes	0.00767	0.00778	1.4	Yes
Sulfur, dissolved	mg/L	0.5	<0.5	<0.5	0.0	No	0.67	<0.5	29.1	No	<0.5	<0.5	0.0	No
Tellurium, dissolved	mg/L	0.0002	<0.0002	<0.0002	0.0	No	<0.0002	<0.0002	0.0	No	<0.0002	<0.0002	0.0	No
Terbium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium, dissolved	mg/L	0.00001	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No
Thorium, dissolved	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No
Thulium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX A, TABLE 4

Water chemistry QAQC results, spring 2023.

Analyte	Units	RDL	Spring 2023											
			Mennin Lake				Mennin River				UWB-03			
			ML2-A				MR2-A				P3-A			
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹
Metals Dissolved														
Tin, dissolved	mg/L	0.0001	<0.0001	0.00299	187.1	No	0.00472	0.0137	97.5	Yes	<0.0001	<0.0001	0.0	No
Titanium, dissolved	mg/L	0.0003	0.00212	0.00193	9.4	Yes	0.00231	0.00244	5.5	Yes	0.00257	0.00288	11.4	Yes
Tungsten, dissolved	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No
Uranium, dissolved	mg/L	0.00001	0.000089	0.000094	5.5	Yes	0.000107	0.000103	3.8	Yes	0.000067	0.000064	4.6	Yes
Vanadium, dissolved	mg/L	0.0005	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	0.0	No
Ytterbium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc, dissolved	mg/L	0.001	0.003	0.0058	63.6	No	0.0029	0.0109	115.9	No	0.0028	0.0031	10.2	No
Zirconium, dissolved	mg/L	0.0003	<0.0003	<0.0003	0.0	No	<0.0003	<0.0003	0.0	No	<0.0003	<0.0003	0.0	No
Metals Total														
Aluminum, total	mg/L	0.003	0.187	0.182	2.7	Yes	0.24	0.225	6.5	Yes	0.294	0.292	0.7	Yes
Antimony, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No
Arsenic, total	mg/L	0.0001	0.00038	0.00033	14.1	No	0.00037	0.00035	5.6	No	0.00039	0.00038	2.6	No
Barium, total	mg/L	0.0001	0.00578	0.00552	4.6	Yes	0.00563	0.0053	6.0	Yes	0.00521	0.00522	0.2	Yes
Beryllium, total	mg/L	0.00002	<0.00002	<0.00002	0.0	No	<0.00002	<0.00002	0.0	No	<0.00002	<0.00002	0.0	No
Bismuth, total	mg/L	0.00005	<0.00005	<0.00005	0.0	No	<0.00005	<0.00005	0.0	No	<0.00005	<0.00005	0.0	No
Boron, total	mg/L	0.01	<0.01	<0.01	0.0	No	<0.01	<0.01	0.0	No	<0.01	<0.01	0.0	No
Cadmium, total	mg/L	0.000005	0.0000076	0.0000078	2.6	No	0.000008	0.0000084	4.9	No	0.0000112	0.0000124	10.2	No
Calcium, total	mg/L	0.05	2.58	2.49	3.6	Yes	2.5	2.43	2.8	Yes	2.22	2.25	1.3	Yes
Cerium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Cesium, total	mg/L	0.00001	<0.00001	<0.00001	0.0	No	0.000013	0.000011	16.7	No	0.000015	0.000015	0.0	No
Chromium, total	mg/L	0.0005	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	0.0	No	0.00059	0.00059	0.0	No
Cobalt, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	0.00011	0.0001	9.5	No	0.00022	0.00022	0.0	No
Copper, total	mg/L	0.0005	0.00114	0.00178	43.8	No	0.00155	0.00087	56.2	No	0.00091	<0.0005	58.2	No
Dysprosium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Erbium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Europium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Gadolinium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Gold, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Hafnium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Holmium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Iridium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron, total	mg/L	0.01	0.409	0.408	0.2	Yes	0.443	0.421	5.1	Yes	0.741	0.758	2.3	Yes
Lanthanum, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead, total	mg/L	0.00005	0.000124	0.000118	5.0	No	0.000153	0.000142	7.5	No	0.000242	0.000248	2.4	No
Lithium, total	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No
Magnesium, total	mg/L	0.005	0.662	0.632	4.6	Yes	0.661	0.63	4.8	Yes	0.643	0.639	0.6	Yes
Manganese, total	mg/L	0.0001	0.0176	0.017	3.5	Yes	0.0162	0.0151	7.0	Yes	0.0216	0.0217	0.5	Yes
Mercury, total	mg/L	0.000005	<0.000005	<0.000005	0.0	No	0.0000654	<0.000005	171.6	No	<0.000005	<0.000005	0.0	No
Molybdenum, total	mg/L	0.00005	0.000304	0.000303	0.3	Yes	0.000262	0.000256	2.3	Yes	<0.00005	<0.00005	0.0	No
Neodymium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX A, TABLE 4

Water chemistry QAQC results, spring 2023.

Analyte	Units	RDL	Spring 2023											
			Mennin Lake				Mennin River				UWB-03			
			ML2-A				MR2-A				P3-A			
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹
Metals Total														
Nickel, total	mg/L	0.0005	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	0.0	No
Palladium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus, total	mg/L	0.05	<0.05	<0.05	0.0	No	<0.05	<0.05	0.0	No	<0.05	<0.05	0.0	No
Platinum, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium, total	mg/L	0.05	0.374	0.355	5.2	Yes	0.384	0.361	6.2	Yes	0.482	0.482	0.0	Yes
Praseodymium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Rhenium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Rhodium, total	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No
Rubidium, total	mg/L	0.0002	0.00113	0.00126	10.9	Yes	0.0013	0.00114	13.1	Yes	0.00135	0.00146	7.8	Yes
Ruthenium, total	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No
Samarium, total	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No
Scandium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium, total	mg/L	0.00005	0.000098	0.000096	2.1	No	0.000101	0.00008	23.2	No	0.00007	0.000095	30.3	No
Silicon, total	mg/L	0.1	1.83	1.84	0.5	Yes	1.81	1.73	4.5	Yes	2.98	2.96	0.7	Yes
Silver, total	mg/L	0.00001	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No
Sodium, total	mg/L	0.05	1.08	1.04	3.8	Yes	1.11	1.03	7.5	Yes	1.1	0.976	11.9	Yes
Strontium, total	mg/L	0.0002	0.00999	0.00982	1.7	Yes	0.00993	0.00947	4.7	Yes	0.0078	0.00777	0.4	Yes
Sulfur, total	mg/L	0.5	<0.5	<0.5	0.0	No	<0.5	<0.5	0.0	No	<0.5	<0.5	0.0	No
Tellurium, total	mg/L	0.0002	<0.0002	<0.0002	0.0	No	<0.0002	<0.0002	0.0	No	<0.0002	<0.0002	0.0	No
Terbium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium, total	mg/L	0.00001	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No
Thorium, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No
Thulium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	0.004	<0.0001	190.2	No	<0.0001	<0.0001	0.0	No
Titanium, total	mg/L	0.0003	0.00285	0.00319	11.3	Yes	0.00408	0.00405	0.7	Yes	0.00412	0.00403	2.2	Yes
Tungsten, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No
Uranium, total	mg/L	0.00001	0.000099	0.000093	6.3	Yes	0.000117	0.000108	8.0	Yes	0.000064	0.000068	6.1	Yes
Vanadium, total	mg/L	0.0005	<0.0005	<0.0005	0.0	No	0.0006	0.00055	8.7	No	0.0006	0.00061	1.7	No
Ytterbium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc, total	mg/L	0.003	0.0031	<0.003	3.3	No	<0.003	<0.003	0.0	No	0.0032	<0.003	6.5	No
Zirconium, total	mg/L	0.0002	<0.0002	<0.0002	0.0	No	<0.0002	<0.0002	0.0	No	<0.0002	<0.0002	0.0	No
Metals Speciated														
Chromium, hexavalent [Cr VI], dissolved	mg/L	0.0005	<0.0005	<0.0005	0.0	No	0.00052	0.0005	3.9	No	<0.0005	<0.0005	0.0	No
Chromium, hexavalent [Cr VI], total	mg/L	0.0005	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	0.0	No	0.00054	0.00053	1.9	No
Chromium, trivalent [Cr III], dissolved	mg/L	0.0005	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	0.0	No
Chromium, trivalent [Cr III], total	mg/L	0.0005	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	0.0	No
Microbiological Tests														
Coliforms, Escherichia coli [E. coli]	CFU/100mL	1 to 10	20	20	0.0	No	180	150	18.2	Yes	14	23	48.6	Yes
Coliforms, total	CFU/100mL	1 to 10	430	320	29.3	Yes	630	740	16.1	Yes	>200	>200	0.0	Yes

APPENDIX A, TABLE 4

Water chemistry QAQC results, spring 2023.

Analyte	Units	RDL	Spring 2023											
			Mennin Lake				Mennin River				UWB-03			
			ML2-A				MR2-A				P3-A			
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹
Organic_Inorganic Carbon														
Carbon, dissolved organic [DOC]	mg/L	0.5	12.9	12.6	2.4	Yes	13.8	14.1	2.2	Yes	20.2	19	6.1	Yes
Carbon, total inorganic [TIC]	mg/L	0.5	1	0.95	5.1	No	0.75	0.85	12.5	No	<0.5	<0.5	0.0	No
Carbon, total organic [TOC]	mg/L	0.5	12.5	12.2	2.4	Yes	12.7	13.1	3.1	Yes	17	17.9	5.2	Yes
Organochlorine Pesticides														
Aldrin	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlordane, cis- (alpha)	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlordane, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlordane, trans- (gamma)	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
DDD, 2,4'-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
DDD, 4,4'-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
DDD, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
DDE, 2,4'-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
DDE, 4,4'-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
DDE, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
DDT, 2,4'-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
DDT, 4,4'-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
DDT, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dieldrin	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Endosulfan, alpha-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Endosulfan, beta-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Endosulfan, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Endrin	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Heptachlor	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Heptachlor epoxide	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobenzene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobutadiene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorocyclohexane, gamma-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexachloroethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Methoxychlor	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Polychlorinated Biphenyls														
Aroclor 1016	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1221	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1232	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1242	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1248	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1254	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1260	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1262	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1268	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Polychlorinated biphenyls [PCBs], total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Pesticides														
Glufosinate	µg/L	0.5	-	-	-	-	-	-	-	-	<0.5	<0.5	0.0	No
Glyphosate	µg/L	0.2	-	-	-	-	-	-	-	-	<0.2	<0.2	0.0	No

APPENDIX A, TABLE 4

Water chemistry QAQC results, spring 2023.

Analyte	Units	RDL	Spring 2023											
			Mennin Lake				Mennin River				UWB-03			
			ML2-A				MR2-A				P3-A			
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹
Physical Tests														
Alkalinity, bicarbonate (as CaCO3)	mg/L	1	6.5	6.3	3.1	Yes	5.7	5.6	1.8	Yes	5.2	5	3.9	No
Alkalinity, carbonate (as CaCO3)	mg/L	1	<1	<1	0.0	No	<1	<1	0.0	No	<1	<1	0.0	No
Alkalinity, hydroxide (as CaCO3)	mg/L	1	<1	<1	0.0	No	<1	<1	0.0	No	<1	<1	0.0	No
Alkalinity, phenolphthalein (as CaCO3)	mg/L	1	<1	<1	0.0	No	<1	<1	0.0	No	<1	<1	0.0	No
Alkalinity, Total (as CaCO3)	mg/L	2	6.5	6.3	3.1	No	5.7	5.6	1.8	No	5.2	5	3.9	No
Conductivity	µS/cm	1	23.5	22.6	3.9	Yes	21.2	21.2	0.0	Yes	20.2	20.2	0.0	Yes
Conductivity	umhos/cm	-	-	-	-	-	-	-	-	-	-	-	-	-
Hardness (as CaCO3), from total Ca/Mg	mg/L	0.5	9.17	8.82	3.9	Yes	8.96	8.66	3.4	Yes	8.19	8.25	0.7	Yes
Solids, total dissolved [TDS]	mg/L	3 to 10	33.7	30.5	10.0	Yes	30.6	33.1	7.8	Yes	40.3	42.8	6.0	Yes
Solids, total suspended [TSS]	mg/L	3	<3	<3	0.0	No	3.4	3.2	6.1	No	<3	3.6	18.2	No
Turbidity	NTU	0.1	1.59	1.44	9.9	Yes	2.1	1.98	5.9	Yes	1.46	1.47	0.7	Yes
Plant Pigments														
Chlorophyll a	µg/L	0.01	5.09	4.43	13.9	Yes	6.11	6.45	5.4	Yes	4.27	4.92	14.1	Yes
Polycyclic Aromatic Hydrocarbons														
1+2-Methylnaphthalenes	µg/L	0.015	-	-	-	-	-	-	-	-	<0.015	<0.015	0.0	No
1-Methylnaphthalene	µg/L	0.01	-	-	-	-	-	-	-	-	<0.01	<0.01	0.0	No
2-Methylnaphthalene	µg/L	0.01	-	-	-	-	-	-	-	-	<0.01	<0.01	0.0	No
Acenaphthene	µg/L	0.01	-	-	-	-	-	-	-	-	<0.01	<0.01	0.0	No
Acenaphthylene	µg/L	0.01	-	-	-	-	-	-	-	-	<0.01	<0.01	0.0	No
Anthracene	µg/L	0.01	-	-	-	-	-	-	-	-	<0.01	<0.01	0.0	No
Benz(a)anthracene	µg/L	0.01	-	-	-	-	-	-	-	-	<0.01	<0.01	0.0	No
Benzo(a)pyrene	µg/L	0.005	-	-	-	-	-	-	-	-	<0.005	<0.005	0.0	No
Benzo(b&j)fluoranthene	µg/L	0.01	-	-	-	-	-	-	-	-	<0.01	<0.01	0.0	No
Benzo(g,h,i)perylene	µg/L	0.01	-	-	-	-	-	-	-	-	<0.01	<0.01	0.0	No
Benzo(k)fluoranthene	µg/L	0.01	-	-	-	-	-	-	-	-	<0.01	<0.01	0.0	No
Chrysene	µg/L	0.01	-	-	-	-	-	-	-	-	<0.01	<0.01	0.0	No
Dibenz(a,h)anthracene	µg/L	0.005	-	-	-	-	-	-	-	-	<0.005	<0.005	0.0	No
Fluoranthene	µg/L	0.01	-	-	-	-	-	-	-	-	<0.01	<0.01	0.0	No
Fluorene	µg/L	0.01	-	-	-	-	-	-	-	-	<0.01	<0.01	0.0	No
Indeno(1,2,3-c,d)pyrene	µg/L	0.01	-	-	-	-	-	-	-	-	<0.01	<0.01	0.0	No
Naphthalene	µg/L	0.05	-	-	-	-	-	-	-	-	<0.05	<0.05	0.0	No
Phenanthrene	µg/L	0.02	-	-	-	-	-	-	-	-	<0.02	<0.02	0.0	No
Pyrene	µg/L	0.01	-	-	-	-	-	-	-	-	<0.01	<0.01	0.0	No

APPENDIX A, TABLE 4

Water chemistry QAQC results, spring 2023.

Analyte	Units	RDL	Spring 2023											
			Mennin Lake				Mennin River				UWB-03			
			ML2-A				MR2-A				P3-A			
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹
Radiological Parameters														
Carbon-14	Bq/L	18.5	<18.5	<18.5	0.0	No	<18.5	<18.5	0.0	No	<18.5	<18.5	0.0	No
Cesium-137	Bq/L	0.37	<0.37	<0.37	0.0	No	<0.37	<0.37	0.0	No	<0.37	<0.37	0.0	No
Chlorine-36	Bq/L	0.37	<0.37	-	-	-	<0.37	-	-	-	<0.37	-	-	-
Cobalt-60	Bq/L	0.37	<0.37	<0.37	0.0	No	<0.37	<0.37	0.0	No	<0.37	<0.37	0.0	No
Gross Alpha	Bq/L	0.111	<0.111	<0.111	0.0	No	<0.111	0.0534	70.1	No	<0.111	<0.111	0.0	No
Gross Beta	Bq/L	0.148	<0.148	<0.148	0.0	No	<0.148	0.153	3.3	No	<0.148	<0.148	0.0	No
Iodine-129	Bq/L	0.37	<0.37	<0.37	0.0	No	<0.37	<0.37	0.0	No	<0.37	<0.37	0.0	No
Neptunium-237	Bq/L	0.0037	<0.0037	-	-	-	<0.0037	-	-	-	<0.0037	-	-	-
Plutonium-238	Bq/L	0.0037	<0.0037	-	-	-	<0.0037	-	-	-	<0.0037	-	-	-
Plutonium-239	Bq/L	0.0037	<0.0037	-	-	-	<0.0037	-	-	-	<0.0037	-	-	-
Potassium-40	Bq/L	7.1	<7.1	<7.1	0.0	No	<7.1	<7.1	0.0	No	<7.1	<7.1	0.0	No
Radium-226	Bq/L	0.037	<0.037	<0.037	0.0	No	0.0235	0.084	112.6	No	<0.037	<0.037	0.0	No
Ruthenium-106	Bq/L	3	<3	<3	0.0	No	<3	<3	0.0	No	<3	<3	0.0	No
Selenium-79	Bq/L	1.85	<1.85	-	-	-	<1.85	-	-	-	<1.85	-	-	-
Strontium-90	Bq/L	0.037	<0.037	<0.037	0.0	No	<0.037	<0.037	0.0	No	<0.037	<0.037	0.0	No
Thorium-228	Bq/L	0.0074	<0.0074	<0.0074	0.0	No	<0.0074	<0.0074	0.0	No	<0.0074	<0.0074	0.0	No
Thorium-230	Bq/L	0.0074	<0.0074	<0.0074	0.0	No	<0.0074	<0.0074	0.0	No	<0.0074	<0.0074	0.0	No
Thorium-232	Bq/L	0.0074	<0.0074	<0.0074	0.0	No	<0.0074	<0.0074	0.0	No	<0.0074	<0.0074	0.0	No
Tritium	Bq/L	14.8	<14.8	<14.8	0.0	No	<14.8	<14.8	0.0	No	<14.8	<14.8	0.0	No
Uranium-234	Bq/L	0.0074	<0.0074	<0.0074	0.0	No	0.00315	<0.0074	80.6	No	<0.0074	<0.0074	0.0	No
Uranium-235	Bq/L	0.0074	<0.0074	<0.0074	0.0	No	<0.0074	<0.0074	0.0	No	<0.0074	<0.0074	0.0	No
Uranium-238	Bq/L	0.0074	<0.0074	0.00213	110.6	No	0.00375	<0.0074	65.5	No	<0.0074	0.00229	105.5	No
Semi-Volatile Organic Compounds														
1,2,4-Trichlorobenzene	µg/L	0.4	-	-	-	-	-	-	-	-	<0.4	<0.4	0.0	No
2,4,5-Trichlorophenol	µg/L	0.2	-	-	-	-	-	-	-	-	<0.2	<0.2	0.0	No
2,4,6-Trichlorophenol	µg/L	0.2	-	-	-	-	-	-	-	-	<0.2	<0.2	0.0	No
2,4+2,6-Dinitrotoluene	µg/L	0.6	-	-	-	-	-	-	-	-	<0.6	<0.6	0.0	No
2,4-Dichlorophenol	µg/L	0.3	-	-	-	-	-	-	-	-	<0.3	<0.3	0.0	No
2,4-Dimethylphenol	µg/L	0.5	-	-	-	-	-	-	-	-	<0.5	<0.5	0.0	No
2,4-Dinitrophenol	µg/L	1 to 2	-	-	-	-	-	-	-	-	<2	<2	0.0	No
2,4-Dinitrotoluene	µg/L	0.4	-	-	-	-	-	-	-	-	<0.4	<0.4	0.0	No
2,6-Dinitrotoluene	µg/L	0.4	-	-	-	-	-	-	-	-	<0.4	<0.4	0.0	No
2-Chlorophenol	µg/L	0.3	-	-	-	-	-	-	-	-	<0.3	<0.3	0.0	No
4-Chloroaniline	µg/L	0.4	-	-	-	-	-	-	-	-	-	-	-	-
Biphenyl	µg/L	0.4	-	-	-	-	-	-	-	-	<0.4	<0.4	0.0	No
bis(2-Chloro-1-methylethyl) ether	µg/L	0.4	-	-	-	-	-	-	-	-	<0.4	<0.4	0.0	No
bis(2-Chloroethyl) ether	µg/L	0.4	-	-	-	-	-	-	-	-	<0.4	<0.4	0.0	No
Bis(2-ethylhexyl)phthalate	µg/L	2 to 3.6	-	-	-	-	-	-	-	-	<2	<2	0.0	No
Dichlorobenzidine, 3,3'-	µg/L	0.4 to 1.8	-	-	-	-	-	-	-	-	<0.4	<0.4	0.0	No
Diethylphthalate	µg/L	0.2	-	-	-	-	-	-	-	-	<0.2	<0.2	0.0	No
Semi-Volatile Organic Compounds														
Dimethylphthalate	µg/L	0.2	-	-	-	-	-	-	-	-	<0.2	<0.2	0.0	No
Pentachlorophenol [PCP]	µg/L	0.5	-	-	-	-	-	-	-	-	<0.5	<0.5	0.0	No
Phenol	µg/L	0.5	-	-	-	-	-	-	-	-	<0.5	<0.5	0.0	No

APPENDIX A, TABLE 4

Water chemistry QAQC results, spring 2023.

Analyte	Units	RDL	Spring 2023											
			Mennin Lake				Mennin River				UWB-03			
			ML2-A				MR2-A				P3-A			
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹
Volatile Organic Compounds														
Acetone	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromoform	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromomethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
BTEX, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon disulfide	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon tetrachloride	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloromethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromochloromethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromoethane, 1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorobenzene, 1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorobenzene, 1,3-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorobenzene, 1,4-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethane, 1,1-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethane, 1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethylene, 1,1-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethylene, cis+trans-1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethylene, cis-1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethylene, trans-1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloromethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloropropane, 1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloropropylene, cis+trans-1,3-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloropropylene, cis-1,3-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloropropylene, trans-1,3-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexane, n-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexanone, 2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl ethyl ketone [MEK]	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl isobutyl ketone [MIBK]	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl-tert-butyl ether [MTBE]	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX A, TABLE 4

Water chemistry QAQC results, spring 2023.

Analyte	Units	RDL	Spring 2023											
			Mennin Lake				Mennin River				UWB-03			
			ML2-A				MR2-A				P3-A			
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹
Volatile Organic Compounds														
Tetrachloroethane, 1,1,1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethane, 1,1,2,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethylene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethane, 1,1,1-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethane, 1,1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethylene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl chloride	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Xylene, m+p-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Xylene, o-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Xylenes, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Trihalomethanes [THMs], total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX A, TABLE 4

Water chemistry QAQC results, spring 2023.

Analyte	Units	RDL	Spring 2023										
			UWB-08				Revell River				Blanks		
			RP1-A				RR1-A				Filter	Field	Trip
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	FB-1A	WB-1A	WB-1B
Aggregate Organics													
Biochemical Oxygen Demand	mg/L	2	<2	<2	0.0	No	<2	<2	0.0	No	-	<2	<2
Anions and Nutrients													
Ammonia, Total (as N)	mg/L	0.01 to 0.1	0.025	0.015	50.0	No	0.066	0.983	174.8	Yes	-	0.01	0.063
Bromide	mg/L	0.1	<0.1	<0.1	0.0	No	<0.1	<0.1	0.0	No	-	<0.1	<0.1
Chloride	mg/L	0.5	<0.5	<0.5	0.0	No	17.3	16.8	2.9	Yes	-	<0.5	<0.5
Fluoride	mg/L	0.02	0.027	0.027	0.0	No	0.026	0.027	3.8	No	-	<0.02	<0.02
Iodide	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
Kjeldahl nitrogen, total [TKN]	mg/L	0.15	0.7	0.7	0.0	No	0.47	1.52	105.5	No	-	<0.15	<0.15
Nitrate (as N)	mg/L	0.02	<0.02	<0.02	0.0	No	0.066	0.053	21.8	No	-	<0.02	<0.02
Nitrate and Nitrite as N	mg/L	0.0224	<0.0224	<0.0224	0.0	No	0.066	0.053	21.8	No	-	<0.0224	<0.0224
Nitrite (as N)	mg/L	0.01	<0.01	<0.01	0.0	No	<0.01	<0.01	0.0	No	-	<0.01	<0.01
Phosphorus, total	mg/L	0.02	<0.02	<0.02	0.0	No	<0.02	<0.02	0.0	No	-	<0.02	<0.02
Sulfate (as SO4)	mg/L	0.3	0.45	0.45	0.0	No	1.47	1.46	0.7	No	-	<0.3	<0.3
Cyanides													
Cyanide, Total	mg/L	0.002	<0.002	<0.002	0.0	No	<0.002	<0.002	0.0	No	-	<0.002	<0.002
Herbicides													
AMPA	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	<0.5	<0.5
Hydrocarbons													
F1 (C6-C10)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
F1-BTEX	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
F2 (C10-C16)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
F3 (C16-C34)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
F4 (C34-C50)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
TEH (C10-C50)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
TEH (C16-C50)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
Metals Dissolved													
Aluminum, dissolved	mg/L	0.001	0.0255	0.0215	17.0	Yes	0.161	0.149	7.7	Yes	<0.001	<0.001	<0.001
Antimony, dissolved	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	<0.0001
Arsenic, dissolved	mg/L	0.0001	0.00029	0.00028	3.5	No	0.00035	0.00031	12.1	No	<0.0001	<0.0001	<0.0001
Barium, dissolved	mg/L	0.0001	0.00614	0.00548	11.4	Yes	0.00781	0.00751	3.9	Yes	<0.0001	<0.0001	<0.0001
Beryllium, dissolved	mg/L	0.00002	<0.00002	<0.00002	0.0	No	<0.00002	<0.00002	0.0	No	<0.00002	<0.00002	<0.00002
Bismuth, dissolved	mg/L	0.00005	<0.00005	<0.00005	0.0	No	<0.00005	<0.00005	0.0	No	<0.00005	<0.00005	<0.00005
Boron, dissolved	mg/L	0.01	<0.01	<0.01	0.0	No	<0.01	<0.01	0.0	No	<0.01	<0.01	<0.01
Cadmium, dissolved	mg/L	0.000005	<0.000005	<0.000005	0.0	No	0.0000071	0.00001	33.9	No	<0.000005	<0.000005	<0.000005
Calcium, dissolved	mg/L	0.05	7.68	7.83	1.9	Yes	4.9	4.67	4.8	Yes	0.06	<0.05	<0.05
Cerium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Cesium, dissolved	mg/L	0.00001	<0.00001	<0.00001	0.0	No	0.000017	0.000016	6.1	No	<0.00001	<0.00001	<0.00001
Chromium, dissolved	mg/L	0.0005	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	<0.0005
Cobalt, dissolved	mg/L	0.0001	<0.0001	<0.0001	0.0	No	0.00013	0.00012	8.0	No	<0.0001	<0.0001	<0.0001
Copper, dissolved	mg/L	0.0002	0.00032	0.00028	13.3	No	0.00069	0.00063	9.1	No	0.00136	0.00028	<0.0002

APPENDIX A, TABLE 4

Water chemistry QAQC results, spring 2023.

Analyte	Units	RDL	Spring 2023										
			UWB-08				Revell River				Blanks		
			RP1-A				RR1-A				Filter	Field	Trip
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	FB-1A	WB-1A	WB-1B
Metals Dissolved													
Dysprosium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Erbium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Europium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Gadolinium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Gold, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Hafnium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Holmium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Iridium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Iron, dissolved	mg/L	0.01	0.126	0.124	1.6	Yes	0.539	0.498	7.9	Yes	<0.01	<0.01	<0.01
Lanthanum, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Lead, dissolved	mg/L	0.00005	<0.00005	<0.00005	0.0	No	0.000088	0.000085	3.5	No	<0.00005	<0.00005	<0.00005
Lithium, dissolved	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	<0.001	<0.001	<0.001
Magnesium, dissolved	mg/L	0.005	1.39	1.4	0.7	Yes	0.769	0.749	2.6	Yes	0.0161	<0.005	<0.005
Manganese, dissolved	mg/L	0.0001	0.00095	0.00089	6.5	Yes	0.0205	0.0197	4.0	Yes	<0.0001	<0.0001	<0.0001
Mercury, dissolved	mg/L	0.000005	<0.000005	<0.000005	0.0	No	0.0000056	<0.000005	11.3	No	<0.000005	<0.000005	<0.000005
Molybdenum, dissolved	mg/L	0.00005	0.000057	0.000054	5.4	No	0.000064	0.00007	9.0	No	<0.00005	<0.00005	<0.00005
Neodymium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Nickel, dissolved	mg/L	0.0005	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	<0.0005
Palladium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus, dissolved	mg/L	0.05	<0.05	<0.05	0.0	No	<0.05	<0.05	0.0	No	<0.05	<0.05	<0.05
Platinum, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Potassium, dissolved	mg/L	0.05	0.519	0.515	0.8	Yes	0.544	0.539	0.9	Yes	<0.05	<0.05	<0.05
Praseodymium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Rhenium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Rhodium, dissolved	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	<0.001	<0.001	<0.001
Rubidium, dissolved	mg/L	0.0002	0.001	0.00103	3.0	No	0.00157	0.00153	2.6	Yes	<0.0002	<0.0002	<0.0002
Ruthenium, dissolved	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	<0.001	<0.001	<0.001
Samarium, dissolved	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	<0.001	<0.001	<0.001
Scandium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Selenium, dissolved	mg/L	0.00005	0.000064	0.000057	11.6	No	0.000079	0.000074	6.5	No	<0.00005	<0.00005	<0.00005
Silicon, dissolved	mg/L	0.05	1.19	1.23	3.3	Yes	2.49	2.48	0.4	Yes	<0.05	<0.05	<0.05
Silver, dissolved	mg/L	0.00001	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	<0.00001
Sodium, dissolved	mg/L	0.05	1.2	1.17	2.5	Yes	10	9.76	2.4	Yes	0.091	<0.05	<0.05
Strontium, dissolved	mg/L	0.0002	0.015	0.0147	2.0	Yes	0.016	0.015	6.5	Yes	<0.0002	<0.0002	<0.0002
Sulfur, dissolved	mg/L	0.5	<0.5	<0.5	0.0	No	<0.5	0.54	7.7	No	<0.5	<0.5	<0.5
Tellurium, dissolved	mg/L	0.0002	<0.0002	<0.0002	0.0	No	<0.0002	<0.0002	0.0	No	<0.0002	<0.0002	<0.0002
Terbium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Thallium, dissolved	mg/L	0.00001	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	<0.00001
Thorium, dissolved	mg/L	0.0001	<0.0001	<0.0001	0.0	No	0.00023	0.00016	35.9	No	<0.0001	<0.0001	<0.0001
Thulium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX A, TABLE 4

Water chemistry QAQC results, spring 2023.

Analyte	Units	RDL	Spring 2023										
			UWB-08				Revell River				Blanks		
			RP1-A				RR1-A				Filter	Field	Trip
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	FB-1A	WB-1A	WB-1B
Metals Dissolved													
Tin, dissolved	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	<0.0001
Titanium, dissolved	mg/L	0.0003	0.00034	0.00039	13.7	No	0.00242	0.00188	25.1	Yes	<0.0003	<0.0003	<0.0003
Tungsten, dissolved	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	<0.0001
Uranium, dissolved	mg/L	0.00001	<0.00001	<0.00001	0.0	No	0.000126	0.00012	4.9	Yes	<0.00001	<0.00001	<0.00001
Vanadium, dissolved	mg/L	0.0005	<0.0005	<0.0005	0.0	No	0.00058	0.00054	7.1	No	<0.0005	<0.0005	<0.0005
Ytterbium, dissolved	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Zinc, dissolved	mg/L	0.001	0.0015	0.0013	14.3	No	0.0016	0.0017	6.1	No	0.0025	0.0011	<0.001
Zirconium, dissolved	mg/L	0.0003	<0.0003	<0.0003	0.0	No	<0.0003	<0.0003	0.0	No	<0.0003	<0.0003	<0.0003
Metals Total													
Aluminum, total	mg/L	0.003	0.0363	0.0338	7.1	Yes	0.179	0.176	1.7	Yes	-	<0.003	-
Antimony, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	-	<0.0001	-
Arsenic, total	mg/L	0.0001	0.00031	0.00028	10.2	No	0.00036	0.00035	2.8	No	-	<0.0001	-
Barium, total	mg/L	0.0001	0.00625	0.00591	5.6	Yes	0.00812	0.00772	5.1	Yes	-	<0.0001	-
Beryllium, total	mg/L	0.00002	<0.00002	<0.00002	0.0	No	<0.00002	<0.00002	0.0	No	-	<0.00002	-
Bismuth, total	mg/L	0.00005	<0.00005	<0.00005	0.0	No	<0.00005	<0.00005	0.0	No	-	<0.00005	-
Boron, total	mg/L	0.01	<0.01	<0.01	0.0	No	<0.01	<0.01	0.0	No	-	<0.01	-
Cadmium, total	mg/L	0.000005	<0.000005	<0.000005	0.0	No	0.0000097	0.00001	3.0	No	-	<0.000005	-
Calcium, total	mg/L	0.05	7.92	7.76	2.0	Yes	4.98	4.79	3.9	Yes	-	<0.05	-
Cerium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Cesium, total	mg/L	0.00001	<0.00001	<0.00001	0.0	No	0.000018	0.000018	0.0	No	-	<0.00001	-
Chromium, total	mg/L	0.0005	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	0.0	No	-	<0.0005	-
Cobalt, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	0.00015	0.00014	6.9	No	-	<0.0001	-
Copper, total	mg/L	0.0005	0.0255	<0.0005	192.3	No	0.00102	0.00072	34.5	No	-	<0.0005	-
Dysprosium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Erbium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Europium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Gadolinium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Gold, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Hafnium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Holmium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Iridium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Iron, total	mg/L	0.01	0.209	0.208	0.5	Yes	0.712	0.685	3.9	Yes	-	<0.01	-
Lanthanum, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Lead, total	mg/L	0.00005	0.000452	<0.00005	160.2	No	0.000128	0.000123	4.0	No	-	<0.00005	-
Lithium, total	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	-	<0.001	-
Magnesium, total	mg/L	0.005	1.46	1.44	1.4	Yes	0.803	0.775	3.5	Yes	-	<0.005	-
Manganese, total	mg/L	0.0001	0.0139	0.0138	0.7	Yes	0.023	0.0226	1.8	Yes	-	<0.0001	-
Mercury, total	mg/L	0.000005	<0.000005	<0.000005	0.0	No	0.0000051	0.000006	16.2	No	-	<0.000005	-
Molybdenum, total	mg/L	0.00005	0.000063	0.000064	1.6	No	0.00007	0.000067	4.4	No	-	<0.00005	-
Neodymium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX A, TABLE 4

Water chemistry QAQC results, spring 2023.

Analyte	Units	RDL	Spring 2023										
			UWB-08				Revell River				Blanks		
			RP1-A				RR1-A				Filter	Field	Trip
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	FB-1A	WB-1A	WB-1B
Metals Total													
Nickel, total	mg/L	0.0005	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	0.0	No	-	<0.0005	-
Palladium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus, total	mg/L	0.05	<0.05	<0.05	0.0	No	<0.05	<0.05	0.0	No	-	<0.05	-
Platinum, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Potassium, total	mg/L	0.05	0.532	0.532	0.0	Yes	0.532	0.518	2.7	Yes	-	<0.05	-
Praseodymium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Rhenium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Rhodium, total	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	-	<0.001	-
Rubidium, total	mg/L	0.0002	0.00098	0.001	2.0	No	0.0016	0.00166	3.7	Yes	-	<0.0002	-
Ruthenium, total	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	-	<0.001	-
Samarium, total	mg/L	0.001	<0.001	<0.001	0.0	No	<0.001	<0.001	0.0	No	-	<0.001	-
Scandium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Selenium, total	mg/L	0.00005	0.000079	0.000083	4.9	No	0.0001	0.000099	1.0	No	-	<0.00005	-
Silicon, total	mg/L	0.1	1.25	1.25	0.0	Yes	2.7	2.59	4.2	Yes	-	<0.1	-
Silver, total	mg/L	0.00001	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No	-	<0.00001	-
Sodium, total	mg/L	0.05	1.21	1.16	4.2	Yes	10.3	9.87	4.3	Yes	-	0.101	-
Strontium, total	mg/L	0.0002	0.0152	0.0158	3.9	Yes	0.0162	0.0163	0.6	Yes	-	<0.0002	-
Sulfur, total	mg/L	0.5	<0.5	<0.5	0.0	No	0.67	0.59	12.7	No	-	<0.5	-
Tellurium, total	mg/L	0.0002	<0.0002	<0.0002	0.0	No	<0.0002	<0.0002	0.0	No	-	<0.0002	-
Terbium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Thallium, total	mg/L	0.00001	<0.00001	<0.00001	0.0	No	<0.00001	<0.00001	0.0	No	-	<0.00001	-
Thorium, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	0.0002	0.00021	4.9	No	-	<0.0001	-
Thulium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Tin, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	-	<0.0001	-
Titanium, total	mg/L	0.0003	0.00068	0.00053	24.8	No	0.00311	0.00328	5.3	Yes	-	<0.0003	-
Tungsten, total	mg/L	0.0001	<0.0001	<0.0001	0.0	No	<0.0001	<0.0001	0.0	No	-	<0.0001	-
Uranium, total	mg/L	0.00001	<0.00001	<0.00001	0.0	No	0.000136	0.000131	3.7	Yes	-	<0.00001	-
Vanadium, total	mg/L	0.0005	<0.0005	<0.0005	0.0	No	0.00072	0.00069	4.3	No	-	<0.0005	-
Ytterbium, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Zinc, total	mg/L	0.003	0.0107	<0.003	112.4	No	0.0036	<0.003	18.2	No	-	<0.003	-
Zirconium, total	mg/L	0.0002	<0.0002	<0.0002	0.0	No	<0.0002	<0.0002	0.0	No	-	<0.0002	-
Metals Speciated													
Chromium, hexavalent [Cr VI], dissolved	mg/L	0.0005	<0.0005	0.00053	5.8	No	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	-
Chromium, hexavalent [Cr VI], total	mg/L	0.0005	0.00068	<0.0005	30.5	No	<0.0005	<0.0005	0.0	No	-	<0.0005	-
Chromium, trivalent [Cr III], dissolved	mg/L	0.0005	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	-
Chromium, trivalent [Cr III], total	mg/L	0.0005	<0.0005	<0.0005	0.0	No	<0.0005	<0.0005	0.0	No	-	<0.0005	-
Microbiological Tests													
Coliforms, Escherichia coli [E. coli]	CFU/100mL	1 to 10	10	20	66.7	No	21	33	44.4	Yes	-	-	-
Coliforms, total	CFU/100mL	1 to 10	530	810	41.8	Yes	>200	>200	0.0	Yes	-	-	-

APPENDIX A, TABLE 4

Water chemistry QAQC results, spring 2023.

Analyte	Units	RDL	Spring 2023										
			UWB-08				Revell River				Blanks		
			RP1-A				RR1-A				Filter	Field	Trip
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	FB-1A	WB-1A	WB-1B
Organic_Inorganic Carbon													
Carbon, dissolved organic [DOC]	mg/L	0.5	17.1	16.6	3.0	Yes	15	15.4	2.6	Yes	0.99	<0.5	<0.5
Carbon, total inorganic [TIC]	mg/L	0.5	4.15	4.14	0.2	Yes	2.21	1.34	49.0	No	-	<0.5	<0.5
Carbon, total organic [TOC]	mg/L	0.5	17.2	17.2	0.0	Yes	15.3	15.3	0.0	Yes	-	<0.5	<0.5
Organochlorine Pesticides													
Aldrin	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Chlordane, cis- (alpha)	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Chlordane, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Chlordane, trans- (gamma)	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
DDD, 2,4'-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
DDD, 4,4'-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
DDD, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
DDE, 2,4'-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
DDE, 4,4'-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
DDE, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
DDT, 2,4'-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
DDT, 4,4'-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
DDT, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dieldrin	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Endosulfan, alpha-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Endosulfan, beta-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Endosulfan, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Endrin	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Heptachlor	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Heptachlor epoxide	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobenzene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobutadiene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorocyclohexane, gamma-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Hexachloroethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Methoxychlor	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Polychlorinated Biphenyls													
Aroclor 1016	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1221	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1232	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1242	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1248	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1254	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1260	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1262	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor 1268	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Polychlorinated biphenyls [PCBs], total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Pesticides													
Glufosinate	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	<0.5	<0.5
Glyphosate	µg/L	0.2	<0.2	<0.2	0.0	No	-	-	-	-	-	<0.2	<0.2

APPENDIX A, TABLE 4

Water chemistry QAQC results, spring 2023.

Analyte	Units	RDL	Spring 2023										
			UWB-08				Revell River				Blanks		
			RP1-A				RR1-A				Filter	Field	Trip
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	FB-1A	WB-1A	WB-1B
Physical Tests													
Alkalinity, bicarbonate (as CaCO3)	mg/L	1	23.7	23.8	0.4	Yes	9.3	9.1	2.2	Yes	-	<1	<1
Alkalinity, carbonate (as CaCO3)	mg/L	1	<1	<1	0.0	No	<1	<1	0.0	No	-	<1	<1
Alkalinity, hydroxide (as CaCO3)	mg/L	1	<1	<1	0.0	No	<1	<1	0.0	No	-	<1	<1
Alkalinity, phenolphthalein (as CaCO3)	mg/L	1	<1	<1	0.0	No	<1	<1	0.0	No	-	<1	<1
Alkalinity, Total (as CaCO3)	mg/L	2	23.7	23.8	0.4	Yes	9.3	9.1	2.2	No	-	<2	<2
Conductivity	µS/cm	1	55.5	54.9	1.1	Yes	85	82	3.6	Yes	-	<1	<1
Conductivity	umhos/cm	-	-	-	-	-	-	-	-	-	-	-	-
Hardness (as CaCO3), from total Ca/Mg	mg/L	0.5	25.8	25.3	2.0	Yes	15.7	15.2	3.2	Yes	-	<0.5	<0.5
Solids, total dissolved [TDS]	mg/L	3 to 10	61	50	19.8	No	69.4	67.1	3.4	Yes	-	<3	<3
Solids, total suspended [TSS]	mg/L	3	<3	3.2	6.5	No	<3	<3	0.0	No	-	<3	<3
Turbidity	NTU	0.1	1.4	1.4	0.0	Yes	1.22	1.1	10.3	Yes	-	<0.1	0.11
Plant Pigments													
Chlorophyll a	µg/L	0.01	4.97	4.97	0.0	Yes	1.1	1.11	0.9	Yes	-	-	-
Polycyclic Aromatic Hydrocarbons													
1+2-Methylnaphthalenes	µg/L	0.015	<0.015	<0.015	0.0	No	-	-	-	-	-	<0.015	<0.015
1-Methylnaphthalene	µg/L	0.01	<0.01	<0.01	0.0	No	-	-	-	-	-	<0.01	<0.01
2-Methylnaphthalene	µg/L	0.01	<0.01	<0.01	0.0	No	-	-	-	-	-	0.011	<0.01
Acenaphthene	µg/L	0.01	<0.01	<0.01	0.0	No	-	-	-	-	-	<0.01	<0.01
Acenaphthylene	µg/L	0.01	<0.01	<0.01	0.0	No	-	-	-	-	-	<0.01	<0.01
Anthracene	µg/L	0.01	<0.01	<0.01	0.0	No	-	-	-	-	-	<0.01	<0.01
Benz(a)anthracene	µg/L	0.01	<0.01	<0.01	0.0	No	-	-	-	-	-	<0.01	<0.01
Benzo(a)pyrene	µg/L	0.005	<0.005	<0.005	0.0	No	-	-	-	-	-	<0.005	<0.005
Benzo(b&j)fluoranthene	µg/L	0.01	<0.01	<0.01	0.0	No	-	-	-	-	-	<0.01	<0.01
Benzo(g,h,i)perylene	µg/L	0.01	<0.01	<0.01	0.0	No	-	-	-	-	-	<0.01	<0.01
Benzo(k)fluoranthene	µg/L	0.01	<0.01	<0.01	0.0	No	-	-	-	-	-	<0.01	<0.01
Chrysene	µg/L	0.01	<0.01	<0.01	0.0	No	-	-	-	-	-	<0.01	<0.01
Dibenz(a,h)anthracene	µg/L	0.005	<0.005	<0.005	0.0	No	-	-	-	-	-	<0.005	<0.005
Fluoranthene	µg/L	0.01	<0.01	<0.01	0.0	No	-	-	-	-	-	<0.01	<0.01
Fluorene	µg/L	0.01	<0.01	<0.01	0.0	No	-	-	-	-	-	<0.01	<0.01
Indeno(1,2,3-c,d)pyrene	µg/L	0.01	<0.01	<0.01	0.0	No	-	-	-	-	-	<0.01	<0.01
Naphthalene	µg/L	0.05	<0.05	<0.05	0.0	No	-	-	-	-	-	<0.05	<0.05
Phenanthrene	µg/L	0.02	<0.02	<0.02	0.0	No	-	-	-	-	-	<0.02	<0.02
Pyrene	µg/L	0.01	<0.01	<0.01	0.0	No	-	-	-	-	-	<0.01	<0.01

APPENDIX A, TABLE 4

Water chemistry QAQC results, spring 2023.

Analyte	Units	RDL	Spring 2023										
			UWB-08				Revell River				Blanks		
			RP1-A				RR1-A				Filter	Field	Trip
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	FB-1A	WB-1A	WB-1B
Radiological Parameters													
Carbon-14	Bq/L	18.5	<18.5	<18.5	0.0	No	-	<18.5	-	-	-	-	<18.5
Cesium-137	Bq/L	0.37	<0.37	<0.37	0.0	No	-	<0.37	-	-	-	-	<0.37
Chlorine-36	Bq/L	0.37	-	-	-	-	<0.37	-	-	-	-	<0.37	<0.37
Cobalt-60	Bq/L	0.37	<0.37	<0.37	0.0	No	<0.37	<0.37	0.0	No	-	<0.37	<0.37
Gross Alpha	Bq/L	0.111	<0.111	<0.111	0.0	No	-	<0.111	-	-	-	-	<0.111
Gross Beta	Bq/L	0.148	0.0945	<0.148	44.1	No	-	<0.148	-	-	-	-	<0.148
Iodine-129	Bq/L	0.37	<0.37	<0.37	0.0	No	-	<0.37	-	-	-	-	<0.37
Neptunium-237	Bq/L	0.0037	-	-	-	-	<0.0037	-	-	-	-	<0.0037	<0.0037
Plutonium-238	Bq/L	0.0037	-	-	-	-	<0.0037	-	-	-	-	<0.0037	<0.0037
Plutonium-239	Bq/L	0.0037	-	-	-	-	<0.0037	-	-	-	-	<0.0037	<0.0037
Potassium-40	Bq/L	7.1	<7.1	<7.1	0.0	No	<7.1	<7.1	0.0	No	-	<7.1	<7.1
Radium-226	Bq/L	0.037	0.135	<0.037	114.0	No	<0.037	<0.037	0.0	No	-	<0.037	0.018
Ruthenium-106	Bq/L	3	<3	<3	0.0	No	<3	<3	0.0	No	-	<3	<3
Selenium-79	Bq/L	1.85	-	-	-	-	<1.85	-	-	-	-	<1.85	<1.85
Strontium-90	Bq/L	0.037	<0.037	<0.037	0.0	No	-	<0.037	-	-	-	-	<0.037
Thorium-228	Bq/L	0.0074	<0.0074	<0.0074	0.0	No	0.00943	0.00813	14.8	No	-	<0.0074	<0.0074
Thorium-230	Bq/L	0.0074	<0.0074	<0.0074	0.0	No	0.00453	0.0035	25.7	No	-	<0.0074	<0.0074
Thorium-232	Bq/L	0.0074	<0.0074	<0.0074	0.0	No	<0.0074	<0.0074	0.0	No	-	<0.0074	<0.0074
Tritium	Bq/L	14.8	<14.8	<14.8	0.0	No	-	<14.8	-	-	-	-	<14.8
Uranium-234	Bq/L	0.0074	<0.0074	<0.0074	0.0	No	<0.0074	<0.0074	0.0	No	-	<0.0074	<0.0074
Uranium-235	Bq/L	0.0074	<0.0074	<0.0074	0.0	No	<0.0074	<0.0074	0.0	No	-	<0.0074	<0.0074
Uranium-238	Bq/L	0.0074	<0.0074	<0.0074	0.0	No	<0.0074	<0.0074	0.0	No	-	<0.0074	<0.0074
Semi-Volatile Organic Compounds													
1,2,4-Trichlorobenzene	µg/L	0.4	<0.4	<0.4	0.0	No	-	-	-	-	-	<0.4	<0.4
2,4,5-Trichlorophenol	µg/L	0.2	<0.2	<0.2	0.0	No	-	-	-	-	-	<0.2	<0.2
2,4,6-Trichlorophenol	µg/L	0.2	<0.2	<0.2	0.0	No	-	-	-	-	-	<0.2	<0.2
2,4+2,6-Dinitrotoluene	µg/L	0.6	<0.6	<0.6	0.0	No	-	-	-	-	-	<0.6	<0.6
2,4-Dichlorophenol	µg/L	0.3	<0.3	<0.3	0.0	No	-	-	-	-	-	<0.3	<0.3
2,4-Dimethylphenol	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	<0.5	<0.5
2,4-Dinitrophenol	µg/L	1 to 2	<1	<1	0.0	No	-	-	-	-	-	<1	<2
2,4-Dinitrotoluene	µg/L	0.4	<0.4	<0.4	0.0	No	-	-	-	-	-	<0.4	<0.4
2,6-Dinitrotoluene	µg/L	0.4	<0.4	<0.4	0.0	No	-	-	-	-	-	<0.4	<0.4
2-Chlorophenol	µg/L	0.3	<0.3	<0.3	0.0	No	-	-	-	-	-	<0.3	-
4-Chloroaniline	µg/L	0.4	<0.4	<0.4	0.0	No	-	-	-	-	-	<0.4	-
Biphenyl	µg/L	0.4	<0.4	<0.4	0.0	No	-	-	-	-	-	<0.4	-
bis(2-Chloro-1-methylethyl) ether	µg/L	0.4	<0.4	<0.4	0.0	No	-	-	-	-	-	<0.4	-
bis(2-Chloroethyl) ether	µg/L	0.4	<0.4	<0.4	0.0	No	-	-	-	-	-	<0.4	-
Bis(2-ethylhexyl)phthalate	µg/L	2 to 3.6	<2	<2	0.0	No	-	-	-	-	-	<3.6	-
Dichlorobenzidine, 3,3'-	µg/L	0.4 to 1.8	<0.4	<0.4	0.0	No	-	-	-	-	-	<1.8	-
Diethylphthalate	µg/L	0.2	<0.2	<0.2	0.0	No	-	-	-	-	-	<0.2	-
Semi-Volatile Organic Compounds													
Dimethylphthalate	µg/L	0.2	<0.2	<0.2	0.0	No	-	-	-	-	-	<0.2	-
Pentachlorophenol [PCP]	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	<0.5	-
Phenol	µg/L	0.5	<0.5	<0.5	0.0	No	-	-	-	-	-	0.8	-

APPENDIX A, TABLE 4

Water chemistry QAQC results, spring 2023.

Analyte	Units	RDL	Spring 2023										
			UWB-08				Revell River				Blanks		
			RP1-A				RR1-A				Filter	Field	Trip
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	FB-1A	WB-1A	WB-1B
Volatile Organic Compounds													
Acetone	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Bromoform	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Bromomethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
BTEX, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Carbon disulfide	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Carbon tetrachloride	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Chloroethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Chloromethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dibromochloromethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dibromoethane, 1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorobenzene, 1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorobenzene, 1,3-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorobenzene, 1,4-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethane, 1,1-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethane, 1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethylene, 1,1-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethylene, cis+trans-1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethylene, cis-1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethylene, trans-1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichloromethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichloropropane, 1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichloropropylene, cis+trans-1,3-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichloropropylene, cis-1,3-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dichloropropylene, trans-1,3-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Hexane, n-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Hexanone, 2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Methyl ethyl ketone [MEK]	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Methyl isobutyl ketone [MIBK]	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Methyl-tert-butyl ether [MTBE]	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX A, TABLE 4

Water chemistry QAQC results, spring 2023.

Analyte	Units	RDL	Spring 2023										
			UWB-08				Revell River				Blanks		
			RP1-A				RR1-A				Filter	Field	Trip
			Sample	Duplicate	RPD (%)	>5*RDL ¹	Sample	Duplicate	RPD (%)	>5*RDL ¹	FB-1A	WB-1A	WB-1B
Volatile Organic Compounds													
Tetrachloroethane, 1,1,1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethane, 1,1,2,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethylene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethane, 1,1,1-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethane, 1,1,2-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethylene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl chloride	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Xylene, m+p-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Xylene, o-	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Xylenes, total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Trihalomethanes [THMs], total	µg/L	-	-	-	-	-	-	-	-	-	-	-	-

Gray cells indicate exceedances of QAQC criteria.
RDL = reportable detection limit; dash = no data.
Relative percent difference (RPD) = | ((Duplicate - Sample)/((Duplicate + Sample)/2))*100 |.
For calculation of RPDs, values <RDL were set equal to the RDL; Grayed cells indicate exceedances of data quality control limits (RPD > 20%, with both samples >5*RDL).
¹Ranking of a "yes" used only if either value is >5*RDL.

APPENDIX A, TABLE 5

Plankton QAQC results, summer 2022 through spring 2023.

Date of Inter-Technician Comparison	Workorder(s) Associated with Comparison	Analyst 1 Count	Analyst 2 Count	Difference	Average	RPD (%)	Upper Limit (%)	Criteria Met (Y/N)
03-Nov-22	L2724011, L2724280	40	45	5	42.5	12	30	Yes
23-Nov-22		750	694	-56	722	8	30	Yes
28-Nov-22		9335	10861	1526	10098	15	30	Yes
05-Dec-22	L2724368, L2724369, L2724451	1107	1068	-39	1087.5	4	30	Yes
09-Dec-22		5	6	1	5.5	18	30	Yes
08-Feb-23	L2732114, L2732297,	40	45	5	42.5	12	30	Yes
09-Feb-23	L2732382, L2733118,	832	896	64	864	7	30	Yes
16-Feb-23	L2733515	863	862	-1	862.5	0.12	30	Yes
24-Jul-24	L2747393, L2747411, L2747413, L2747419, L2747473	350	359	9	354.5	3	30	Yes
03-Aug-23	L2750850, L2750881, L2750899, L2750958	3876	4438	562	4157	14	30	Yes
03-Aug-23		574780	558002	-16778	566391	3	30	Yes
01-Sep-23		287	304	17	295.5	6	30	Yes
01-Sep-23		316440	268730	-47710	292585	16	30	Yes

Relative percent difference (RPD) = $|((\text{Duplicate} - \text{Sample})/((\text{Duplicate} + \text{Sample})/2))*100|$.

APPENDIX A, TABLE 6

Sediment chemistry QAQC results, fall 2022.

Analyte	Units	DL	Mennin Lake				Mennin River				Unnamed Waterbody 3			
			ML2				MR2				P3			
			Sample	Duplicate	RDP (%)	>5*DL ¹	Sample	Duplicate	RDP (%)	>5*DL ¹	Sample	Duplicate	RDP (%)	>5*DL ¹
General Chemistry														
% Moisture	%	0.25	77.7	78.4	0.9	Yes	34.6	31.3	10.0	Yes	83	82.7	0.4	Yes
Inorganic Carbon	%	0.05	0.135	0.126	6.9	No	0.055	0.055	0.0	No	0.126	0.12	4.9	No
Inorganic Carbon (as CaCO3 Equivalent)	%	0.4	1.12	1.05	6.5	No	0.46	0.46	0.0	No	1.05	1	4.9	No
Nitrate+Nitrite-N	mg/kg	2	<2	<2	0.0	No	<2	<2	0.0	No	<2	<2	0.0	No
Nitrate-N	mg/kg	2	<2	<2	0.0	No	<2	<2	0.0	No	<2	<2	0.0	No
Nitrite-N	mg/kg	1	<1	<1	0.0	No	<1	<1	0.0	No	<1	<1	0.0	No
Total Carbon by Combustion	%	0.05	5.96	6.05	1.5	Yes	1.81	1.47	20.7	Yes	9.72	9.5	2.3	Yes
Total Kjeldahl Nitrogen	%	0.02 - 0.4	0.44	0.42	4.7	No	0.093	0.08	15.0	No	0.533	0.566	6.0	Yes
Total Nitrogen by LECO	%	0.02	0.448	0.463	3.3	Yes	0.124	0.089	32.9	No	0.702	0.684	2.6	Yes
Total Organic Carbon	%	0.05 - 0.075	5.83	5.92	1.5	Yes	1.75	1.41	21.5	Yes	9.59	9.38	2.2	Yes
Metals														
Aluminum (Al)	mg/kg	50	27900	24900	11.4	Yes	4310	4030	6.7	Yes	27000	24900	8.1	Yes
Antimony (Sb)	mg/kg	0.1	0.18	0.15	18.2	No	<0.1	<0.1	0.0	No	0.19	0.53	94.4	No
Arsenic (As)	mg/kg	0.1	3.65	3.06	17.6	Yes	0.37	0.39	5.3	No	3.74	3.39	9.8	Yes
Barium (Ba)	mg/kg	0.5	155	146	6.0	Yes	21.1	18.8	11.5	Yes	126	106	17.2	Yes
Beryllium (Be)	mg/kg	0.1	0.62	0.55	12.0	Yes	0.11	0.1	9.5	No	0.57	0.53	7.3	Yes
Bismuth (Bi)	mg/kg	0.2	0.22	0.2	9.5	No	<0.2	<0.2	0.0	No	0.21	0.2	4.9	No
Boron (B)	mg/kg	5	<5	<5	0.0	No	<5	<5	0.0	No	<5	<5	0.0	No
Cadmium (Cd)	mg/kg	0.02	0.569	0.474	18.2	Yes	0.055	0.052	5.6	No	0.725	0.648	11.2	Yes
Calcium (Ca)	mg/kg	50	5040	4380	14.0	Yes	2060	1510	30.8	Yes	10900	6250	54.2	Yes
Chromium (Cr)	mg/kg	0.5	42.8	38.5	10.6	Yes	6.87	6.36	7.7	Yes	45.4	41	10.2	Yes
Cobalt (Co)	mg/kg	0.1	21.9	19.1	13.7	Yes	2.81	2.73	2.9	Yes	16.6	15	10.1	Yes
Copper (Cu)	mg/kg	0.5	23.8	21.6	9.7	Yes	3.95	3.31	17.6	Yes	21.7	19.6	10.2	Yes
Iron (Fe)	mg/kg	50	30500	27600	10.0	Yes	4780	4800	0.4	Yes	31000	27700	11.2	Yes
Lead (Pb)	mg/kg	0.5	13.3	11.6	13.7	Yes	2.05	2.13	3.8	No	19.6	18.2	7.4	Yes
Lithium (Li)	mg/kg	2	28	25.5	9.3	Yes	6.2	6.7	7.8	No	27.2	24.5	10.4	Yes
Magnesium (Mg)	mg/kg	20	6650	5920	11.6	Yes	1490	1530	2.6	Yes	8260	7150	14.4	Yes
Manganese (Mn)	mg/kg	1	936	850	9.6	Yes	88.7	82.1	7.7	Yes	343	309	10.4	Yes
Mercury (Hg)	mg/kg	0.005	0.115	0.0995	14.5	Yes	0.0125	0.0113	10.1	No	0.107	0.109	1.9	Yes
Molybdenum (Mo)	mg/kg	0.1	2.17	1.86	15.4	Yes	0.29	0.32	9.8	No	0.56	0.43	26.3	No
Nickel (Ni)	mg/kg	0.5	29.4	26.2	11.5	Yes	5.29	5.09	3.9	Yes	31.7	29.1	8.6	Yes
Phosphorus (P)	mg/kg	50	1090	941	14.7	Yes	178	169	5.2	No	895	767	15.4	Yes
Potassium (K)	mg/kg	100	2080	1830	12.8	Yes	310	330	6.3	No	2440	2220	9.4	Yes
Rhodium (Rh)	mg/kg	0.1	<0.1	<0.1	0.0	No	<0.1	<0.1	0.0	No	<0.1	<0.1	0.0	No
Ruthenium (Ru)	mg/kg	0.1	<0.1	<0.1	0.0	No	<0.1	<0.1	0.0	No	<0.1	<0.1	0.0	No
Samarium (Sm)	mg/kg	0.1	4.62	4.32	6.7	Yes	0.85	0.78	8.6	Yes	5.08	4.56	10.8	Yes
Selenium (Se)	mg/kg	0.2	0.69	0.68	1.5	No	<0.2	<0.2	0.0	No	0.91	0.74	20.6	No
Silver (Ag)	mg/kg	0.1	0.12	0.1	18.2	No	<0.1	<0.1	0.0	No	0.1	0.1	0.0	No
Sodium (Na)	mg/kg	50	362	312	14.8	Yes	94	85	10.1	No	442	381	14.8	Yes
Strontium (Sr)	mg/kg	0.5	26.7	23.5	12.7	Yes	8.99	7.57	17.1	Yes	34	29.6	13.8	Yes
Sulfur (S)	mg/kg	1000	<1000	<1000	0.0	No	<1000	<1000	0.0	No	1400	1000	33.3	No
Thallium (Tl)	mg/kg	0.05	0.301	0.283	6.2	Yes	<0.05	<0.05	0.0	No	0.241	0.218	10.0	No
Tin (Sn)	mg/kg	2	<2	<2	0.0	No	<2	<2	0.0	No	<2	<2	0.0	No
Titanium (Ti)	mg/kg	1	735	657	11.2	Yes	278	292	4.9	Yes	937	868	7.6	Yes

APPENDIX A, TABLE 6

Sediment chemistry QAQC results, fall 2022.

Analyte	Units	DL	Mennin Lake				Mennin River				Unnamed Waterbody 3			
			ML2				MR2				P3			
			Sample	Duplicate	RDP (%)	>5*DL ¹	Sample	Duplicate	RDP (%)	>5*DL ¹	Sample	Duplicate	RDP (%)	>5*DL ¹
Metals														
Tungsten (W)	mg/kg	0.5	<0.5	<0.5	0.0	No	<0.5	<0.5	0.0	No	<0.5	<0.5	0.0	No
Uranium (U)	mg/kg	0.05	2.73	2.47	10.0	Yes	0.672	0.94	33.3	Yes	2.05	1.77	14.7	Yes
Vanadium (V)	mg/kg	0.2	52.2	46.8	10.9	Yes	8.61	8.23	4.5	Yes	51.9	47.1	9.7	Yes
Zinc (Zn)	mg/kg	2	104	94.3	9.8	Yes	14.1	14.2	0.7	Yes	134	113	17.0	Yes
Zirconium (Zr)	mg/kg	1	2.5	2.3	8.3	No	<1	<1	0.0	No	4.8	4.4	8.7	No
Metals Speciated														
Chromium, Hexavalent	mg/kg	0.2 - 2	<0.4	<0.4	0.0	No	<0.2	<0.2	0.0	No	<1	<1	0.0	No
Polycyclic Aromatic Hydrocarbon														
1+2-Methylnaphthalenes	mg/kg	0.212 - 0.424	-	-	-	-	-	-	-	-	<0.21	<0.21	0.0	No
Radiological Parameter														
Carbon-14	Bq/kg	740	<740	<740	0.0	No	<740	<740	0.0	No	<740	<740	0.0	No
Cesium-137	Bq/kg	18.5	50.8	50.8	0.0	No	8.45	7.78	8.3	No	89.5	74.4	18.4	No
Chlorine-36	Bq/kg	0	<370	-	-	-	<370	-	-	-	<370	-	-	-
Cobalt-60	Bq/kg	18.5	<18.5	<18.5	0.0	No	<18.5	<18.5	0.0	No	<18.5	<18.5	0.0	No
Gross alpha	Bq/kg	111	749	747	0.3	Yes	161	278	53.3	No	607	677	10.9	Yes
Gross beta	Bq/kg	148	990	907	8.8	Yes	437	591	30.0	No	780	742	5.0	Yes
Iodine-129	Bq/kg	370	<370	<370	0.0	No	<370	<370	0.0	No	<370	<370	0.0	No
Neptunium-237	Bq/kg	0	<3.7	-	-	-	<3.7	-	-	-	<3.7	-	-	-
Plutonium-238	Bq/kg	0	0.241	-	-	-	<1.85	-	-	-	<1.85	-	-	-
Plutonium-239	Bq/kg	0	2.1	-	-	-	<1.85	-	-	-	1.99	-	-	-
Potassium-40	Bq/kg	75	475	474	0.2	Yes	445	480	7.6	Yes	554	533	3.9	Yes
Radium-226	Bq/kg	37	48.9	63.9	26.6	No	27.9	16.3	52.5	No	37.9	23.1	48.5	No
Ruthenium-106	Bq/kg	90	<90	<90	0.0	No	<90	<90	0.0	No	<90	<90	0.0	No
Selenium-79	Bq/kg	0	<370	-	-	-	<370	-	-	-	<370	-	-	-
Strontium-90	Bq/kg	18.5	<18.5	<18.5	0.0	No	<18.5	<18.5	0.0	No	<18.5	<15.1	20.2	No
Thorium-228	Bq/kg	3.7	54	49.8	8.1	Yes	13.9	11	23.3	No	44.3	40.6	8.7	Yes
Thorium-230	Bq/kg	3.7	41.9	38	9.8	Yes	24.6	19.3	24.1	Yes	39.1	39.8	1.8	Yes
Thorium-232	Bq/kg	3.7	40.9	41.7	1.9	Yes	8.76	11.9	30.4	No	48.4	37.5	25.4	Yes
Tritium	Bq/kg	37	<37	<37	0.0	No	37	37	0.0	No	<37	<40.3	8.5	No
Uranium-234	Bq/kg	3.7	50.7	54.1	6.5	Yes	15.9	20.2	23.8	No	26.6	33.9	24.1	Yes
Uranium-235	Bq/kg	3.7	2.62	3.7	34.2	No	<3.7	<3.7	0.0	No	2.72	1.3	70.6	No
Uranium-238	Bq/kg	3.7	44.1	40.9	7.5	Yes	16.6	13.9	17.7	No	28.1	28	0.4	Yes
Semi-Volatile Organic Compounds														
1,2,4-Trichlorobenzene	mg/kg	0.25 - 0.5	-	-	-	-	-	-	-	-	<0.25	<0.25	0.0	No
1-Methylnaphthalene	mg/kg	0.15 - 0.3	-	-	-	-	-	-	-	-	<0.15	<0.15	0.0	No
2,4,5-Trichlorophenol	mg/kg	0.5 - 1	-	-	-	-	-	-	-	-	<0.5	<0.5	0.0	No
2,4,6-Tribromophenol	%	1 - 10	-	-	-	-	-	-	-	-	75.5	78.8	4.3	Yes
2,4,6-Trichlorophenol	mg/kg	0.5 - 1	-	-	-	-	-	-	-	-	<0.5	<0.5	0.0	No
2,4+2,6-Dinitrotoluene	mg/kg	0.707 - 1.41	-	-	-	-	-	-	-	-	<0.71	<0.71	0.0	No
2,4-Dichlorophenol	mg/kg	0.5 - 1	-	-	-	-	-	-	-	-	<0.5	<0.5	0.0	No
2,4-Dimethylphenol	mg/kg	0.5 - 1	-	-	-	-	-	-	-	-	<0.5	<0.5	0.0	No
2,4-Dinitrophenol	mg/kg	5 - 10	-	-	-	-	-	-	-	-	<5	<5	0.0	No
2,4-Dinitrotoluene	mg/kg	0.5 - 1	-	-	-	-	-	-	-	-	<0.5	<0.5	0.0	No
2,6-Dinitrotoluene	mg/kg	0.5 - 1	-	-	-	-	-	-	-	-	<0.5	<0.5	0.0	No

APPENDIX A, TABLE 6

Sediment chemistry QAQC results, fall 2022.

Analyte	Units	DL	Mennin Lake				Mennin River				Unnamed Waterbody 3			
			ML2				MR2				P3			
			Sample	Duplicate	RDP (%)	>5*DL ¹	Sample	Duplicate	RDP (%)	>5*DL ¹	Sample	Duplicate	RDP (%)	>5*DL ¹
Semi-Volatile Organic Compounds														
2-Chlorophenol	mg/kg	0.5 - 1	-	-	-	-	-	-	-	-	<0.5	<0.5	0.0	No
2-Methylnaphthalene	mg/kg	0.15 - 0.3	-	-	-	-	-	-	-	-	<0.15	<0.15	0.0	No
3,3-Dichlorobenzidine	mg/kg	0.5 - 1	-	-	-	-	-	-	-	-	<0.5	<0.5	0.0	No
4-Chloroaniline	mg/kg	0.5 - 1	-	-	-	-	-	-	-	-	<0.5	<0.5	0.0	No
Acenaphthene	mg/kg	0.25 - 0.5	-	-	-	-	-	-	-	-	<0.25	<0.25	0.0	No
Acenaphthylene	mg/kg	0.25 - 0.5	-	-	-	-	-	-	-	-	<0.25	<0.25	0.0	No
Anthracene	mg/kg	0.25 - 0.5	-	-	-	-	-	-	-	-	<0.25	<0.25	0.0	No
Benzo(a)anthracene	mg/kg	0.25 - 0.5	-	-	-	-	-	-	-	-	<0.25	<0.25	0.0	No
Benzo(a)pyrene	mg/kg	0.25 - 0.5	-	-	-	-	-	-	-	-	<0.25	<0.25	0.0	No
Benzo(b)fluoranthene	mg/kg	0.25 - 0.5	-	-	-	-	-	-	-	-	<0.25	<0.25	0.0	No
Benzo(ghi)perylene	mg/kg	0.25 - 0.5	-	-	-	-	-	-	-	-	<0.25	<0.25	0.0	No
Benzo(k)fluoranthene	mg/kg	0.25 - 0.5	-	-	-	-	-	-	-	-	<0.25	<0.25	0.0	No
Biphenyl	mg/kg	0.25 - 0.5	-	-	-	-	-	-	-	-	<0.25	<0.25	0.0	No
Bis(2-chloroethyl)ether	mg/kg	0.5 - 1	-	-	-	-	-	-	-	-	<0.5	<0.5	0.0	No
Bis(2-chloroisopropyl)ether	mg/kg	0.5 - 1	-	-	-	-	-	-	-	-	<0.5	<0.5	0.0	No
Bis(2-ethylhexyl)phthalate	mg/kg	0.5 - 1	-	-	-	-	-	-	-	-	<0.5	<0.5	0.0	No
Chrysene	mg/kg	0.25 - 0.5	-	-	-	-	-	-	-	-	<0.25	<0.25	0.0	No
Dibenzo(a,h)anthracene	mg/kg	0.25 - 0.5	-	-	-	-	-	-	-	-	<0.25	<0.25	0.0	No
Diethylphthalate	mg/kg	0.5 - 1	-	-	-	-	-	-	-	-	<0.5	<0.5	0.0	No
Dimethylphthalate	mg/kg	0.5 - 1	-	-	-	-	-	-	-	-	<0.5	<0.5	0.0	No
Fluoranthene	mg/kg	0.25 - 0.5	-	-	-	-	-	-	-	-	<0.25	<0.25	0.0	No
Fluorene	mg/kg	0.25 - 0.5	-	-	-	-	-	-	-	-	<0.25	<0.25	0.0	No
Indeno(1,2,3-cd)pyrene	mg/kg	0.25 - 0.5	-	-	-	-	-	-	-	-	<0.25	<0.25	0.0	No
Naphthalene	mg/kg	0.25 - 0.5	-	-	-	-	-	-	-	-	<0.25	<0.25	0.0	No
Pentachlorophenol	mg/kg	0.5 - 1	-	-	-	-	-	-	-	-	<0.5	<0.5	0.0	No
Phenanthrene	mg/kg	0.25 - 0.5	-	-	-	-	-	-	-	-	<0.25	<0.25	0.0	No
Phenol	mg/kg	0.5 - 1	-	-	-	-	-	-	-	-	<0.5	<0.5	0.0	No
Pyrene	mg/kg	0.25 - 0.5	-	-	-	-	-	-	-	-	<0.25	<0.25	0.0	No

APPENDIX A, TABLE 6

Sediment chemistry QAQC results, fall 2022.

Analyte	Units	DL	Revell Lake				Unnamed Waterbody 8				Revell River			
			RL1				RP1				RR1			
			Sample	Duplicate	RDP (%)	>5*DL ¹	Sample	Duplicate	RDP (%)	>5*DL ¹	Sample	Duplicate	RDP (%)	>5*DL ¹
General Chemistry														
% Moisture	%	0.25	53.6	57.9	7.7	Yes	89.2	90.2	1.1	Yes	20.9	20.1	3.9	Yes
Inorganic Carbon	%	0.05	0.066	0.05	27.6	No	0.225	0.208	7.9	No	<0.05	<0.05	0.0	No
Inorganic Carbon (as CaCO3 Equivalent)	%	0.4	0.55	0.4	31.6	No	1.87	1.73	7.8	No	<0.4	<0.4	0.0	No
Nitrate+Nitrite-N	mg/kg	2	<2	<2	0.0	No	<2	<2	0.0	No	<2	<2	0.0	No
Nitrate-N	mg/kg	2	<2	<2	0.0	No	<2	<2	0.0	No	<2	<2	0.0	No
Nitrite-N	mg/kg	1	<1	<1	0.0	No	<1	<1	0.0	No	<1	<1	0.0	No
Total Carbon by Combustion	%	0.05	1.6	1.6	0.0	Yes	19.2	19.9	3.6	Yes	0.13	0.08	47.6	No
Total Kjeldahl Nitrogen	%	0.02 - 0.4	0.102	0.15	38.1	No	1.47	1.31	11.5	No	<0.02	<0.02	0.0	No
Total Nitrogen by LECO	%	0.02	0.148	0.157	5.9	Yes	1.47	1.53	4.0	Yes	<0.02	<0.02	0.0	No
Total Organic Carbon	%	0.05 - 0.075	1.53	1.6	4.5	Yes	19	19.7	3.6	Yes	0.131	0.081	47.2	No
Metals														
Aluminum (Al)	mg/kg	50	5150	4930	4.4	Yes	13000	12500	3.9	Yes	3330	2130	44.0	Yes
Antimony (Sb)	mg/kg	0.1	0.15	0.13	14.3	No	0.11	0.13	16.7	No	<0.1	<0.1	0.0	No
Arsenic (As)	mg/kg	0.1	2.99	2.94	1.7	Yes	2	1.91	4.6	Yes	0.39	0.22	55.7	No
Barium (Ba)	mg/kg	0.5	30.1	28.2	6.5	Yes	92.2	91.3	1.0	Yes	12.5	6.58	62.1	Yes
Beryllium (Be)	mg/kg	0.1	0.19	0.18	5.4	No	0.32	0.3	6.5	No	<0.1	<0.1	0.0	No
Bismuth (Bi)	mg/kg	0.2	<0.2	<0.2	0.0	No	<0.2	<0.2	0.0	No	<0.2	<0.2	0.0	No
Boron (B)	mg/kg	5	<5	<5	0.0	No	<5	<5	0.0	No	<5	<5	0.0	No
Cadmium (Cd)	mg/kg	0.02	0.33	0.319	3.4	Yes	0.347	0.339	2.3	Yes	<0.02	<0.02	0.0	No
Calcium (Ca)	mg/kg	50	1460	1410	3.5	Yes	9180	9190	0.1	Yes	1280	878	37.3	Yes
Chromium (Cr)	mg/kg	0.5	7.61	7.16	6.1	Yes	25.1	23.9	4.9	Yes	8.45	3.93	73.0	Yes
Cobalt (Co)	mg/kg	0.1	5.08	4.75	6.7	Yes	7.65	7.43	2.9	Yes	1.92	1.1	54.3	Yes
Copper (Cu)	mg/kg	0.5	6.22	5.94	4.6	Yes	22.8	22.3	2.2	Yes	4.04	1.6	86.5	No
Iron (Fe)	mg/kg	50	13200	12500	5.4	Yes	14400	14100	2.1	Yes	5010	3050	48.6	Yes
Lead (Pb)	mg/kg	0.5	8.39	8.47	0.9	Yes	8.21	7.88	4.1	Yes	1.67	1.04	46.5	No
Lithium (Li)	mg/kg	2	4.5	4.3	4.5	No	11.2	11.2	0.0	Yes	5.2	4.3	18.9	No
Magnesium (Mg)	mg/kg	20	830	785	5.6	Yes	3980	3770	5.4	Yes	1570	886	55.7	Yes
Manganese (Mn)	mg/kg	1	466	428	8.5	Yes	284	283	0.4	Yes	70.4	40.1	54.8	Yes
Mercury (Hg)	mg/kg	0.005	0.0264	0.0268	1.5	Yes	0.0603	0.0688	13.2	Yes	<0.005	<0.005	0.0	No
Molybdenum (Mo)	mg/kg	0.1	0.76	0.74	2.7	Yes	1.14	1.17	2.6	Yes	<0.1	<0.1	0.0	No
Nickel (Ni)	mg/kg	0.5	5.96	5.74	3.8	Yes	21.1	20.8	1.4	Yes	4.97	2.69	59.5	Yes
Phosphorus (P)	mg/kg	50	469	419	11.3	Yes	509	511	0.4	Yes	155	84	59.4	No
Potassium (K)	mg/kg	100	370	330	11.4	No	1280	1230	4.0	Yes	360	170	71.7	No
Rhodium (Rh)	mg/kg	0.1	<0.1	<0.1	0.0	No	<0.1	<0.1	0.0	No	<0.1	<0.1	0.0	No
Ruthenium (Ru)	mg/kg	0.1	<0.1	<0.1	0.0	No	<0.1	<0.1	0.0	No	<0.1	<0.1	0.0	No
Samarium (Sm)	mg/kg	0.1	1.72	1.79	4.0	Yes	2.21	2.18	1.4	Yes	0.7	0.33	71.8	No
Selenium (Se)	mg/kg	0.2	0.37	0.37	0.0	No	1.1	1.16	5.3	Yes	<0.2	<0.2	0.0	No
Silver (Ag)	mg/kg	0.1	<0.1	<0.1	0.0	No	<0.1	<0.1	0.0	No	<0.1	<0.1	0.0	No
Sodium (Na)	mg/kg	50	93	87	6.7	No	204	190	7.1	No	133	74	57.0	No
Strontium (Sr)	mg/kg	0.5	6.77	6.57	3.0	Yes	23.4	23.3	0.4	Yes	5.96	5.08	15.9	Yes
Sulfur (S)	mg/kg	1000	<1000	<1000	0.0	No	2200	2100	4.7	No	<1000	<1000	0.0	No
Thallium (Tl)	mg/kg	0.05	0.112	0.107	4.6	No	0.137	0.137	0.0	No	<0.05	<0.05	0.0	No
Tin (Sn)	mg/kg	2	<2	<2	0.0	No	<2	<2	0.0	No	<2	<2	0.0	No
Titanium (Ti)	mg/kg	1	223	214	4.1	Yes	429	473	9.8	Yes	292	207	34.1	Yes

APPENDIX A, TABLE 6

Sediment chemistry QAQC results, fall 2022.

Analyte	Units	DL	Revell Lake				Unnamed Waterbody 8				Revell River				
			RL1				RP1				RR1				
			Sample	Duplicate	RDP (%)	>5*DL ¹	Sample	Duplicate	RDP (%)	>5*DL ¹	Sample	Duplicate	RDP (%)	>5*DL ¹	
Metals															
Tungsten (W)	mg/kg	0.5	<0.5	<0.5	0.0	No	<0.5	<0.5	0.0	No	<0.5	<0.5	0.0	No	
Uranium (U)	mg/kg	0.05	1.28	1.29	0.8	Yes	1.07	1.09	1.9	Yes	0.481	0.232	69.8	No	
Vanadium (V)	mg/kg	0.2	14.6	13.4	8.6	Yes	25.8	25.2	2.4	Yes	9.29	5.09	58.4	Yes	
Zinc (Zn)	mg/kg	2	37.7	35.6	5.7	Yes	64.7	65.2	0.8	Yes	11.4	7.3	43.9	No	
Zirconium (Zr)	mg/kg	1	<1	<1	0.0	No	7.9	7.2	9.3	Yes	3	2.4	22.2	No	
Metals Speciated															
Chromium, Hexavalent	mg/kg	0.2 - 2	<0.4	<0.4	0.0	No	<1	<2	66.7	No	<0.2	<0.2	0.0	No	
Polycyclic Aromatic Hydrocarbon															
1+2-Methylnaphthalenes	mg/kg	0.212 - 0.424	-	-	-	-	<0.32	<0.42	27.0	No	-	-	-	-	
Radiological Parameter															
Carbon-14	Bq/kg	740	<740	<740	0.0	No	<740	<740	0.0	No	<740	<740	0.0	No	
Cesium-137	Bq/kg	18.5	33.6	28.7	15.7	No	15.5	12.6	20.6	No	3.04	4.7	42.9	No	
Chlorine-36	Bq/kg	0	-	-	-	-	-	-	-	-	<370	-	-	-	
Cobalt-60	Bq/kg	18.5	<18.5	<18.5	0.0	No	<18.5	<18.5	0.0	No	<18.5	<18.5	0.0	No	
Gross alpha	Bq/kg	111	306	238	25.0	No	230	276	18.2	No	164	111	38.5	No	
Gross beta	Bq/kg	148	854	891	4.2	Yes	430	398	7.7	No	734	443	49.4	No	
Iodine-129	Bq/kg	370	<370	<370	0.0	No	<370	<370	0.0	No	<370	<370	0.0	No	
Neptunium-237	Bq/kg	0	-	-	-	-	-	-	-	-	<3.7	-	-	-	
Plutonium-238	Bq/kg	0	-	-	-	-	-	-	-	-	<1.85	-	-	-	
Plutonium-239	Bq/kg	0	-	-	-	-	-	-	-	-	<1.85	-	-	-	
Potassium-40	Bq/kg	75	635	617	2.9	Yes	394	353	11.0	No	574	586	2.1	Yes	
Radium-226	Bq/kg	37	30.3	25.4	17.6	No	24.9	13.7	58.0	No	97.6	22.2	125.9	No	
Ruthenium-106	Bq/kg	90	<90	<90	0.0	No	<90	<90	0.0	No	<90	<90	0.0	No	
Selenium-79	Bq/kg	0	-	-	-	-	-	-	-	-	<370	-	-	-	
Strontium-90	Bq/kg	18.5	<18.5	<18.5	0.0	No	<18.5	<18.5	0.0	No	<18.5	<18.5	0.0	No	
Thorium-228	Bq/kg	3.7	36.8	12.3	99.8	No	32.1	31.6	1.6	Yes	39	7.38	136.4	No	
Thorium-230	Bq/kg	3.7	32.2	15.4	70.6	No	23.4	24.9	6.2	Yes	16.7	26.7	46.1	No	
Thorium-232	Bq/kg	3.7	43.4	16.1	91.8	No	29.3	28.6	2.4	Yes	45.2	10.6	124.0	No	
Tritium	Bq/kg	37	<37	<37	0.0	No	<37	<37	0.0	No	<37	<37	0.0	No	
Uranium-234	Bq/kg	3.7	17.4	20.6	16.8	No	19.2	20.6	7.0	Yes	8.4	6.62	23.7	No	
Uranium-235	Bq/kg	3.7	1.6	3.7	79.2	No	<3.7	<3.7	0.0	No	<3.7	<3.7	0.0	No	
Uranium-238	Bq/kg	3.7	20.9	24.1	14.2	Yes	19.7	16	20.7	No	7.56	9.58	23.6	No	
Semi-Volatile Organic Compounds															
1,2,4-Trichlorobenzene	mg/kg	0.25 - 0.5	-	-	-	-	<0.38	<0.5	27.3	No	-	-	-	-	
1-Methylnaphthalene	mg/kg	0.15 - 0.3	-	-	-	-	<0.23	<0.3	26.4	No	-	-	-	-	
2,4,5-Trichlorophenol	mg/kg	0.5 - 1	-	-	-	-	<0.75	<1	28.6	No	-	-	-	-	
2,4,6-Tribromophenol	%	1 - 10	-	-	-	-	76.7	73.6	4.1	Yes	-	-	-	-	
2,4,6-Trichlorophenol	mg/kg	0.5 - 1	-	-	-	-	<0.75	<1	28.6	No	-	-	-	-	
2,4+2,6-Dinitrotoluene	mg/kg	0.707 - 1.41	-	-	-	-	<1.1	<1.4	24.0	No	-	-	-	-	
2,4-Dichlorophenol	mg/kg	0.5 - 1	-	-	-	-	<0.75	<1	28.6	No	-	-	-	-	
2,4-Dimethylphenol	mg/kg	0.5 - 1	-	-	-	-	<0.75	<1	28.6	No	-	-	-	-	
2,4-Dinitrophenol	mg/kg	5 - 10	-	-	-	-	<7.5	<10	28.6	No	-	-	-	-	
2,4-Dinitrotoluene	mg/kg	0.5 - 1	-	-	-	-	<0.75	<1	28.6	No	-	-	-	-	
2,6-Dinitrotoluene	mg/kg	0.5 - 1	-	-	-	-	<0.75	<1	28.6	No	-	-	-	-	

APPENDIX A, TABLE 6

Sediment chemistry QAQC results, fall 2022.

Analyte	Units	DL	Revell Lake				Unnamed Waterbody 8				Revell River			
			RL1				RP1				RR1			
			Sample	Duplicate	RDP (%)	>5*DL ¹	Sample	Duplicate	RDP (%)	>5*DL ¹	Sample	Duplicate	RDP (%)	>5*DL ¹
Semi-Volatile Organic Compounds														
2-Chlorophenol	mg/kg	0.5 - 1	-	-	-	-	<0.75	<1	28.6	No	-	-	-	-
2-Methylnaphthalene	mg/kg	0.15 - 0.3	-	-	-	-	<0.23	<0.3	26.4	No	-	-	-	-
3,3-Dichlorobenzidine	mg/kg	0.5 - 1	-	-	-	-	<0.75	<1	28.6	No	-	-	-	-
4-Chloroaniline	mg/kg	0.5 - 1	-	-	-	-	<0.75	<1	28.6	No	-	-	-	-
Acenaphthene	mg/kg	0.25 - 0.5	-	-	-	-	<0.38	<0.5	27.3	No	-	-	-	-
Acenaphthylene	mg/kg	0.25 - 0.5	-	-	-	-	<0.38	<0.5	27.3	No	-	-	-	-
Anthracene	mg/kg	0.25 - 0.5	-	-	-	-	<0.38	<0.5	27.3	No	-	-	-	-
Benzo(a)anthracene	mg/kg	0.25 - 0.5	-	-	-	-	<0.38	<0.5	27.3	No	-	-	-	-
Benzo(a)pyrene	mg/kg	0.25 - 0.5	-	-	-	-	<0.38	<0.5	27.3	No	-	-	-	-
Benzo(b)fluoranthene	mg/kg	0.25 - 0.5	-	-	-	-	<0.38	<0.5	27.3	No	-	-	-	-
Benzo(ghi)perylene	mg/kg	0.25 - 0.5	-	-	-	-	<0.38	<0.5	27.3	No	-	-	-	-
Benzo(k)fluoranthene	mg/kg	0.25 - 0.5	-	-	-	-	<0.38	<0.5	27.3	No	-	-	-	-
Biphenyl	mg/kg	0.25 - 0.5	-	-	-	-	<0.38	<0.5	27.3	No	-	-	-	-
Bis(2-chloroethyl)ether	mg/kg	0.5 - 1	-	-	-	-	<0.75	<1	28.6	No	-	-	-	-
Bis(2-chloroisopropyl)ether	mg/kg	0.5 - 1	-	-	-	-	<0.75	<1	28.6	No	-	-	-	-
Bis(2-ethylhexyl)phthalate	mg/kg	0.5 - 1	-	-	-	-	<0.75	<1	28.6	No	-	-	-	-
Chrysene	mg/kg	0.25 - 0.5	-	-	-	-	<0.38	<0.5	27.3	No	-	-	-	-
Dibenzo(a,h)anthracene	mg/kg	0.25 - 0.5	-	-	-	-	<0.38	<0.5	27.3	No	-	-	-	-
Diethylphthalate	mg/kg	0.5 - 1	-	-	-	-	<0.75	<1	28.6	No	-	-	-	-
Dimethylphthalate	mg/kg	0.5 - 1	-	-	-	-	<0.75	<1	28.6	No	-	-	-	-
Fluoranthene	mg/kg	0.25 - 0.5	-	-	-	-	<0.38	<0.5	27.3	No	-	-	-	-
Fluorene	mg/kg	0.25 - 0.5	-	-	-	-	<0.38	<0.5	27.3	No	-	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.25 - 0.5	-	-	-	-	<0.38	<0.5	27.3	No	-	-	-	-
Naphthalene	mg/kg	0.25 - 0.5	-	-	-	-	<0.38	<0.5	27.3	No	-	-	-	-
Pentachlorophenol	mg/kg	0.5 - 1	-	-	-	-	<0.75	<1	28.6	No	-	-	-	-
Phenanthrene	mg/kg	0.25 - 0.5	-	-	-	-	<0.38	<0.5	27.3	No	-	-	-	-
Phenol	mg/kg	0.5 - 1	-	-	-	-	<0.75	<1	28.6	No	-	-	-	-
Pyrene	mg/kg	0.25 - 0.5	-	-	-	-	<0.38	<0.5	27.3	No	-	-	-	-

Gray cells indicate exceedances of QAQC criteria.

RDL = reportable detection limit; dash = no data.

Relative percent difference (RPD) = | ((Duplicate - Sample)/((Duplicate + Sample)/2))*100 |.

For calculation of RPDs, values <DL were set equal to the DL; Grayed cells indicate exceedances of data quality control limits (RPD > 40%, with both samples >5*DL).

¹Ranking of a "yes" used only if either value is >5*DL.

APPENDIX A, TABLE 7

Sediment particle size QAQC results, fall 2022.

Class	Range	Units	DL	LSA							
				Mennin Lake				Mennin River			
				Sample	Duplicate	RPD%	>5*DL	Sample	Duplicate	RPD%	>5*DL
Clay	<0.004	Wt. %	0.01	42.51	42.08	0.3	Yes	2.41	1.71	8.5	Yes
Silt	0.063 - 0.004	Wt. %	0.01	56.8	57.22	0.2	Yes	9.62	6.85	8.4	Yes
Fine Sand	0.2 - 0.063	Wt. %	0.01	0.47	0.55	3.9	Yes	11.51	9.25	5.4	Yes
Coarse Sand	2 - 0.2	Wt. %	0.01	0.19	0.15	5.9	Yes	57.45	47.89	4.5	Yes
Gravel	> 2	Wt. %	0.01	0.02	0	50.0	No	19	34.29	14.3	Yes

Class	Range	Units	DL	LSA							
				Revell Lake				Revell River			
				Sample	Duplicate	RPD%	>5*DL	Sample	Duplicate	RPD%	>5*DL
Clay	<0.004	Wt. %	0.01	1.46	1.2	4.9	Yes	3.06	0.09	47.1	Yes
Silt	0.063 - 0.004	Wt. %	0.01	24.38	25.22	0.8	Yes	7.92	0.92	39.6	Yes
Fine Sand	0.2 - 0.063	Wt. %	0.01	54.3	53.69	0.3	Yes	27.82	16.38	12.9	Yes
Coarse Sand	2 - 0.2	Wt. %	0.01	19.86	19.86	0.0	No	60.49	80.1	7.0	Yes
Gravel	> 2	Wt. %	0.01	0	0.03	50.0	No	0.72	2.51	27.7	Yes

Class	Range	Units	DL	AOI Pond				Reference Pond			
				Unnamed Waterbody				Unnamed Waterbody			
				Sample	Duplicate	RPD%	>5*DL	Sample	Duplicate	RPD%	>5*DL
Clay	<0.004	Wt. %	0.01	34.55	34.26	0.2	Yes	6.65	8.55	6.3	Yes
Silt	0.063 - 0.004	Wt. %	0.01	63.96	64.27	0.1	Yes	91.91	90.14	0.5	Yes
Fine Sand	0.2 - 0.063	Wt. %	0.01	1.4	1.33	1.3	Yes	0.81	1.14	8.5	Yes
Coarse Sand	2 - 0.2	Wt. %	0.01	0.09	0.14	10.9	Yes	0.63	0.17	28.8	Yes
Gravel	> 2	Wt. %	0.01	0	0	-	-	0	0	-	-

Gray cells indicate exceedances of QAQC criteria.

RDL = reportable detection limit; dash = no data.

Relative percent difference (RPD) = $|((\text{Duplicate} - \text{Sample})/((\text{Duplicate} + \text{Sample})/2)) * 100|$.

For calculation of RPDs, values <DL were set equal to the DL; Grayed cells indicate exceedances of data quality control limits (RPD > 40%, with both samples >5*DL).

¹Ranking of a "yes" used only if either value is >5*DL.

APPENDIX B

DETAILED YEAR 2 SURFACE WATER, PLANKTON, AND SEDIMENT QUALITY RESULTS

APPENDIX B, TABLE 1

Water quality guidelines selected for use in the Year 2 baseline report.

Parameter	Unit	Water Quality Guideline	
		Value ¹	Source
Anions, Nutrients, and Physical Properties			
Alkalinity, bicarbonate (as CaCO3)	mg/L	NG	-
Alkalinity, carbonate (as CaCO3)	mg/L	NG	-
Alkalinity, hydroxide (as CaCO3)	mg/L	NG	-
Alkalinity, phenolphthalein (as CaCO3)	mg/L	NG	-
Alkalinity, Total (as CaCO3)	mg/L	20	BCMOE 1987
Ammonia, Total (as N)	mg/L	5.855	CCME
Biochemical Oxygen Demand	mg/L	NG	-
Bromide (Br)	mg/L	NG	-
Chloride (Cl)	mg/L	120	CCME
Conductivity	µS/cm	700	BCMOE 2023, CCME
Cyanide, Total	mg/L	0.005	PWQO
Dissolved Organic Carbon	mg/L	NG	-
Dissolved Oxygen	mg/L	< 6	PWQO
Fluoride (F)	mg/L	0.12	CCME
Hardness (as CaCO3)	mg/L	NG	-
Nitrate (as N)	mg/L	3	CCME
Nitrate and Nitrite (as N)	mg/L	NG	-
Nitrite (as N)	mg/L	0.02	CCME
pH	pH units	6.5 - 8.5	PWQO
Phosphorus, Total	mg/L	NG	-
Sulfate (as SO4)	mg/L	128	BCMOE
Total Dissolved Solids	mg/L	500	HC DWG
Total Inorganic Carbon	mg/L	NG	-
Total Kjeldahl nitrogen	mg/L	NG	-
Total Organic Carbon	mg/L	NG	-
Total Suspended Solids	mg/L	NG	-
Turbidity	NTU	50	HC Rec
Bacteriological Tests			
Coliforms, Escherichia coli [E. coli]	CFU/100 mL	100	PWQO
Coliforms, total	CFU/100 mL	NG	-
Metals and Trace Elements			
Total			
Aluminum (Al)	mg/L	0.32	GOC
Antimony (Sb)	mg/L	0.006	HC DWG
Arsenic (As)	mg/L	0.005	PWQO
Barium (Ba)	mg/L	1	BCMOE
Beryllium (Be)	mg/L	0.011	PWQO
Bismuth (Bi)	mg/L	17.5	ECHA PNEC
Boron (B)	mg/L	1.5	CCME
Cadmium (Cd)	mg/L	0.00004	CCME
Calcium (Ca)	mg/L	1000	Medri 2015 (CCME Livestock watering)
Cesium (Cs)	mg/L	NG	-
Chromium (Cr)	mg/L	NG	-
Chromium III (Cr3+)	mg/L	0.0089	CCME
Chromium VI (Cr6+)	mg/L	0.005	GOC
Cobalt (Co)	mg/L	0.00078	GOC
Copper (Cu)	mg/L	0.002	CCME
Iron (Fe)	mg/L	3.3	GOC
Lead (Pb)	mg/L	0.001	PWQO
Lithium (Li)	mg/L	2.5	Medri 2015 (CCME Irrigation)
Magnesium (Mg)	mg/L	82	Medri 2015 (Suter and Tsao 1996)
Manganese (Mn)	mg/L	0.12	HC DWG
Mercury (Hg)	mg/L	0.000026	CCME
Molybdenum (Mo)	mg/L	0.073	CCME
Nickel (Ni)	mg/L	0.025	PWQO
Potassium (K)	mg/L	53	Medri 2015 (Suter and Tsao 1996)
Rhodium (Rh)	mg/L	0.01	Fernandes et al 2019
Rubidium (Rb)	mg/L	NG	-
Ruthenium (Ru)	mg/L	0.01	Fernandes et al 2019
Samarium (Sm)	mg/L	0.0082	Medri 2015 (Sneller et al. 2000)
Selenium (Se)	mg/L	0.001	CCME
Silicon (Si)	mg/L	NG	-
Silver (Ag)	mg/L	0.00025	CCME
Sodium (Na)	mg/L	680	Suter and Tsao 1996
Strontium (Sr)	mg/L	7	HC DWG
Sulphur (S)	mg/L	NG	-
Tellurium (Te)	mg/L	0.0058	Fernandes et al 2019
Thallium (Tl)	mg/L	0.0008	CCME
Thorium (Th)	mg/L	NG	-
Tin (Sn)	mg/L	0.073	Medri 2015 (Suter and Tsao 1996)
Titanium (Ti)	mg/L	0.076	ECHA PNEC
Tungsten (W)	mg/L	0.03	PWQO
Uranium (U)	mg/L	0.015	CCME
Vanadium (V)	mg/L	0.12	GOC
Zinc (Zn)	mg/L	0.02	PWQO
Zirconium (Zr)	mg/L	0.004	PWQO
Dissolved			
Aluminum (Al)	mg/L	NG	-
Antimony (Sb)	mg/L	NG	-

APPENDIX B, TABLE 1

Water quality guidelines selected for use in the Year 2 baseline report.

Parameter	Unit	Water Quality Guideline	
		Value ¹	Source
Metals and Trace Elements			
Dissolved			
Arsenic (As)	mg/L	NG	-
Barium (Ba)	mg/L	NG	-
Beryllium (Be)	mg/L	NG	-
Bismuth (Bi)	mg/L	NG	-
Boron (B)	mg/L	NG	-
Cadmium (Cd)	mg/L	NG	-
Calcium (Ca)	mg/L	NG	-
Cesium (Cs)	mg/L	NG	-
Chromium (Cr)	mg/L	NG	-
Chromium III (Cr3+)	mg/L	NG	-
Chromium VI (Cr6+)	mg/L	NG	-
Cobalt (Co)	mg/L	NG	-
Copper (Cu)	mg/L	0.00087	GOC
Iron (Fe)	mg/L	NG	-
Lead (Pb)	mg/L	0.0065	GOC
Lithium (Li)	mg/L	NG	-
Magnesium (Mg)	mg/L	NG	-
Manganese (Mn)	mg/L	0.23	CCME
Mercury (Hg)	mg/L	NG	-
Molybdenum (Mo)	mg/L	NG	-
Nickel (Ni)	mg/L	NG	-
Potassium (K)	mg/L	NG	-
Rhodium (Rh)	mg/L	NG	-
Rubidium (Rb)	mg/L	NG	-
Ruthenium (Ru)	mg/L	NG	-
Samarium (Sm)	mg/L	NG	-
Selenium (Se)	mg/L	NG	-
Silicon (Si)	mg/L	NG	-
Silver (Ag)	mg/L	NG	-
Sodium (Na)	mg/L	NG	-
Strontium (Sr)	mg/L	2.5	GOC
Sulphur (S)	mg/L	NG	-
Tellurium (Te)	mg/L	NG	-
Thallium (Tl)	mg/L	NG	-
Thorium (Th)	mg/L	NG	-
Tin (Sn)	mg/L	NG	-
Titanium (Ti)	mg/L	NG	-
Tungsten (W)	mg/L	NG	-
Uranium (U)	mg/L	NG	-
Vanadium (V)	mg/L	NG	-
Zinc (Zn)	mg/L	0.017	CCME
Zirconium (Zr)	mg/L	NG	-
Volatile Organic Compounds			
Acetone	µg/L	1500	Suter and Tsao 1996
Benzene	µg/L	5	HC DWG
Bromodichloromethane	µg/L	200	PWQO
Bromoform	µg/L	60	PWQO
Bromomethane	µg/L	0.9	PWQO
Carbon tetrachloride	µg/L	2	HC DWG
Chlorobenzene	µg/L	1.3	CCME
Dibromochloromethane	µg/L	40	PWQO
Chloroform	µg/L	1.8	CCME
1,2-Dibromoethane	µg/L	5	PWQO
1,2-Dichlorobenzene	µg/L	0.7	CCME
1,3-Dichlorobenzene	µg/L	2.5	PWQO
1,4-Dichlorobenzene	µg/L	4	PWQO
Dichlorodifluoromethane	µg/L	NG	-
1,1-Dichloroethane	µg/L	200	PWQO
1,2-Dichloroethane	µg/L	5	HC DWG
1,1-Dichloroethylene	µg/L	14	HC DWG
cis-1,2-Dichloroethylene	µg/L	200	PWQO
trans-1,2-Dichloroethylene	µg/L	200	PWQO
Dichloromethane	µg/L	50	HC DWG
1,2-Dichloropropane	µg/L	0.7	PWQO
cis-1,3-Dichloropropylene	µg/L	NG	-
trans-1,3-Dichloropropylene	µg/L	7	PWQO
cis+trans-1,3-Dichloropropylene	µg/L	0.2	CCME
Ethylbenzene	µg/L	8	PWQO
n-Hexane	µg/L	0.58	Suter and Tsao 1996
Methyl ethyl ketone	µg/L	400	PWQO
Methyl isobutyl ketone	µg/L	NG	-
Methyl-tert-butyl ether	µg/L	200	PWQO
Styrene	µg/L	4	PWQO
1,1,1,2-Tetrachloroethane	µg/L	20	PWQO
1,1,2,2-Tetrachloroethane	µg/L	70	PWQO
Tetrachloroethylene	µg/L	10	HC DWG

APPENDIX B, TABLE 1

Water quality guidelines selected for use in the Year 2 baseline report.

Parameter	Unit	Water Quality Guideline	
		Value ¹	Source
Volatile Organic Compounds			
Toluene	µg/L	0.8	PWQO
1,1,1-Trichloroethane	µg/L	10	PWQO
1,1,2-Trichloroethane	µg/L	800	PWQO
Trichloroethylene	µg/L	5	HC DWG
Trichlorofluoromethane	µg/L	NG	-
Vinyl chloride	µg/L	2	HC DWG
o-Xylene	µg/L	40	PWQO
m+p-Xylene	µg/L	32	PWQO
Xylenes (Total)	µg/L	30	BCMOE
Trihalomethanes (Total)	µg/L	0.1	FEQG
BTEX (Total)	µg/L	NG	-
Carbon disulfide	µg/L	NG	-
Chloroethane	µg/L	NG	-
Chloromethane	µg/L	NG	-
cis+trans-1,2-Dichloroethylene	µg/L	NG	-
2-Hexanone	µg/L	NG	-
Petroleum Hydrocarbon Compounds			
F1 (C6-C10)	mg/L	0.15	Alberta (short-term)
F1-BTEX	mg/L	0.15	Alberta (short-term)
F2 (C10-C16)	mg/L	0.11	Alberta (short-term)
F3 (C16-C34)	mg/L	NG	-
F4 (C34-C50)	mg/L	NG	-
TEH (C10-C50)	mg/L	NG	-
TEH (C16-C50)	mg/L	NG	-
Polycyclic Aromatic Hydrocarbons			
Acenaphthene	µg/L	5.8	CCME
Acenaphthylene	µg/L	NG	-
Anthracene	µg/L	0.012	CCME
Benz(a)anthracene	µg/L	0.018	CCME
Benzo(a)pyrene	µg/L	0.015	CCME
Benzo(b&j)fluoranthene	µg/L	NG	-
Benzo(g,h,i)perylene	µg/L	NG	-
Benzo(k)fluoranthene	µg/L	NG	-
Chrysene	µg/L	NG	-
Dibenz(a,h)anthracene	µg/L	NG	-
Fluoranthene	µg/L	0.04	CCME
Fluorene	µg/L	3	CCME
Indeno(1,2,3-c,d)pyrene	µg/L	NG	-
1+2-Methylnaphthalenes	µg/L	NG	-
1-Methylnaphthalene	µg/L	526	Suter and Tsao 1996
2-Methylnaphthalene	µg/L	NG	-
Naphthalene	µg/L	1.1	CCME
Phenanthrene	µg/L	0.4	CCME
Pyrene	µg/L	0.025	CCME
Semi-Volatile Organic Compounds			
Biphenyl	µg/L	0.2	PWQO
4-Chloroaniline	µg/L	NG	-
Bis(2-Chloroethyl) ether	µg/L	200	PWQO
2-Chlorophenol	µg/L	7	PWQO
Dichlorobenzidine, 3,3'-	µg/L	0.6	PWQO
2,4-Dichlorophenol	µg/L	0.2	PWQO
Diethylphthalate	µg/L	210	Suter and Tsao 1996
Dimethylphthalate	µg/L	330	Suter and Tsao 1996
2,4-Dimethylphenol	µg/L	10	PWQO
2,4-Dinitrophenol	µg/L	6.2	Suter and Tsao 1996
2,4-Dinitrotoluene	µg/L	4	PWQO
2,6-Dinitrotoluene	µg/L	6	PWQO
2,4+2,6-Dinitrotoluene	µg/L	10	PWQO
Bis(2-ethylhexyl)phthalate	µg/L	3	Suter and Tsao 1996
Pentachlorophenol [PCP]	µg/L	0.5	PWQO
Phenol	µg/L	4	CCME
1,2,4-Trichlorobenzene	µg/L	0.5	PWQO
2,4,5-Trichlorophenol	µg/L	18	PWQO
2,4,6-Trichlorophenol	µg/L	5	HC DWG
Bis(2-Chloro-1-methylethyl) ether	µg/L	NG	-
Polychlorinated Biphenyls			
Aroclor 1242	µg/L	0.001	PWQO
Aroclor 1248	µg/L	0.001	PWQO
Aroclor 1254	µg/L	0.001	PWQO
Aroclor 1260	µg/L	0.001	PWQO
Polychlorinated biphenyls (Total)	µg/L	0.001	PWQO
Aroclor 1016	µg/L	NG	-
Aroclor 1221	µg/L	NG	-
Aroclor 1232	µg/L	NG	-
Aroclor 1260	µg/L	NG	-
Aroclor 1262	µg/L	NG	-
Aroclor 1268	µg/L	NG	-

APPENDIX B, TABLE 1

Water quality guidelines selected for use in the Year 2 baseline report.

Parameter	Unit	Water Quality Guideline	
		Value ¹	Source
Organichlorine Pesticides			
Aldrin	µg/L	0.001	PWQO
Hexachlorocyclohexane, gamma-	µg/L	0.01	PWQO
Chlordane, cis- (alpha)	µg/L	NG	-
Chlordane, total	µg/L	0.006	CCME
Chlordane, trans- (gamma)	µg/L	NG	-
2,4-DDD	µg/L	NG	-
4,4-DDD	µg/L	0.011	Suter and Tsao 1996
DDD (Total)	µg/L	NG	-
2,4-DDE	µg/L	NG	-
4,4-DDE	µg/L	NG	-
DDE (Total)	µg/L	NG	-
2,4-DDT	µg/L	NG	-
4,4-DDT	µg/L	NG	-
DDT (Total)	µg/L	0.013	Suter and Tsao 1996
Dieldrin	µg/L	0.001	PWQO
beta-Endosulfan	µg/L	NG	-
alpha-Endosulfan	µg/L	0.056	US EPA
Endosulfan (Total)	µg/L	0.003	PWQO
Endrin	µg/L	0.002	PWQO
Heptachlor	µg/L	0.001	PWQO
Heptachlor epoxide	µg/L	0.001	PWQO
Hexachlorobenzene	µg/L	0.0065	PWQO
Hexachlorobutadiene	µg/L	0.009	PWQO
Hexachloroethane	µg/L	1	PWQO
Methoxychlor	µg/L	0.04	PWQO
Herbicides and Pesticides			
Glyphosate	µg/L	280	HC DWG
Aminomethylphosphonic acid (AMPA)	µg/L	NG	-
Glufosinate	µg/L	NG	-
Plant Pigments			
Chlorophyll a	µg/L	NG	-
Radiological Parameters			
Tritium	Bq/L	7000	HC DWG
Radium-226	Bq/L	0.5	HC DWG
Chlorine-36	Bq/L	NG	-
Iodine-129	Bq/L	1	HC DWG
Neptunium-237	Bq/L	NG	-
Gross Alpha	Bq/L	NG	-
Gross Beta	Bq/L	NG	-
Carbon-14	Bq/L	200	HC DWG
Cobalt-60	Bq/L	40	HC DWG
Cesium-137	Bq/L	10	HC DWG
Potassium-40	Bq/L	NG	-
Plutonium-238	Bq/L	0.6	HC DWG
Plutonium-239	Bq/L	0.6	HC DWG
Ruthenium-106	Bq/L	20	HC DWG
Strontium-90	Bq/L	5	HC DWG
Thorium-228	Bq/L	2	HC DWG
Thorium-230	Bq/L	0.6	HC DWG
Thorium-232	Bq/L	0.6	HC DWG
Uranium-234	Bq/L	3	HC DWG
Uranium-235	Bq/L	3	HC DWG
Uranium-238	Bq/L	3	HC DWG
Selenium-79	Bq/L	NG	-

NG - No Guideline.

¹See Section 3.2.3.1 for the procedure for selecting the water quality guideline.

Alberta: Environmental quality guidelines for Alberta surface waters (GA 2018).

BCMOE: British Columbia Ministry of Environment approved water quality guideline (BCMOE 2023).

CCME: Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guideline (CWQG) for the Protection of Freshwater Aquatic Life, and for the Protection of Agriculture (Irrigation and Livestock) (CCME 2023).

ECHA PNEC: European Chemicals Agency (ECHA) Probable No Effects Concentrations (PNEC) (<https://echa.europa.eu/information-on-chemicals>).

FEQG: Government of Canada Federal Environmental Quality Guideline (FEQG) for surface water quality (GC 2021).

HC DWG: Health Canada: Guideline for Canadian Drinking Water Quality and Recreational Water Quality (Health Canada 2022a).

PWOQ: Ontario Ministry of Environment, Conservation and Parks (MECP) Provincial Water Quality Objective (PWQO; MOEE 1994).

NWMO: Nuclear Waste Management Organization interim acceptance criteria (NWMO 2015, 2019).

Suter and Tsao: Suter and Tsao 1996.

US EPA: United States Environmental Protection Agency water quality criteria for aquatic life (US EPA 2022).

APPENDIX B, TABLE 2

Sediment quality guidelines selected for use in the Year 2 baseline report.

Parameter	Unit	Sediment Quality Guideline	
		Value ¹	Source
Anions, Nutrients, and Physical Properties			
% Moisture	%	NG	-
Inorganic Carbon	%	NG	-
Total Organic Carbon	%	1	MOE LEL
Inorganic Carbon (as CaCO3 Equivalent)	%	NG	-
Nitrate+Nitrite-N	mg/kg	NG	-
Nitrate-N	mg/kg	NG	-
Nitrite-N	mg/kg	NG	-
Total Kjeldahl Nitrogen	%	0.055	MOE LEL
Total Nitrogen by LECO	%	NG	-
Total Carbon by Combustion	%	NG	-
Metals and Trace Elements			
Aluminum, total	mg/kg	NG	-
Antimony, total	mg/kg	3	NWMO 2015
Arsenic, total	mg/kg	5.9	CCME
Barium, total	mg/kg	NG	-
Beryllium, total	mg/kg	NG	-
Bismuth, total	mg/kg	65000	NWMO 2019
Boron, total	mg/kg	NG	-
Cadmium, total	mg/kg	0.6	MOE LEL
Calcium, total	mg/kg	NG	-
Cesium, total	mg/kg	NG	-
Chromium, total	mg/kg	26	MOE LEL
Cobalt, total	mg/kg	50	MECP
Copper, total	mg/kg	16	MOE LEL
Iron, total	mg/kg	20000	MOE LEL
Lead, total	mg/kg	31	MOE LEL
Lithium, total	mg/kg	NG	-
Magnesium, total	mg/kg	NG	-
Manganese, total	mg/kg	460	MOE LEL
Mercury, total	mg/kg	0.17	CCME
Molybdenum, total	mg/kg	8.3	NWMO 2015
Nickel, total	mg/kg	16	MOE LEL
Phosphorus, total	mg/kg	NG	-
Potassium, total	mg/kg	NG	-
Rhodium, total	mg/kg	600	NWMO 2019
Ruthenium, total	mg/kg	390	NWMO 2019
Samarium, total	mg/kg	2500	NWMO 2015
Selenium, total	mg/kg	0.9	NWMO 2015
Silver, total	mg/kg	0.5	MECP
Sodium, total	mg/kg	NG	-
Strontium, total	mg/kg	NG	-
Metals and Trace Elements			
Sulfur, total	mg/kg	NG	-
Thallium, total	mg/kg	NG	-
Tin, total	mg/kg	NG	-
Titanium, total	mg/kg	NG	-
Tungsten, total	mg/kg	960	NWMO 2019
Uranium, total	mg/kg	32	NWMO 2015
Vanadium, total	mg/kg	27	NWMO 2015
Zinc, total	mg/kg	120	MOE LEL
Zirconium, total	mg/kg	NG	-
Speciated Metals			
Chromium, Hexavalent	mg/kg	NG	-
Polycyclic Aromatic Hydrocarbons (PAHs)			
Acenaphthene	mg/kg	0.00671	CCME
Acenaphthylene	mg/kg	0.00587	CCME
Anthracene	mg/kg	0.0469	CCME
Benzo(a)anthracene	mg/kg	0.0317	CCME
Benzo(a)pyrene	mg/kg	0.0319	CCME
Benzo(b)fluoranthene	mg/kg	NG	-
Benzo(ghi)perylene	mg/kg	0.17	MOE LEL
Benzo(k)fluoranthene	mg/kg	0.24	MOE LEL
Chrysene	mg/kg	0.0571	CCME
Dibenzo(a,h)anthracene	mg/kg	0.00622	CCME
Fluoranthene	mg/kg	0.111	CCME
Fluorene	mg/kg	0.0212	CCME
Indeno(1,2,3-cd)pyrene	mg/kg	0.2	MOE LEL
1+2-Methylnaphthalenes	mg/kg	NG	-
1-Methylnaphthalene	mg/kg	0.201	Atlantic RBCA
2-Methylnaphthalene	mg/kg	0.0202	CCME

APPENDIX B, TABLE 2

Sediment quality guidelines selected for use in the Year 2 baseline report.

Parameter	Unit	Sediment Quality Guideline	
		Value ¹	Source
Polycyclic Aromatic Hydrocarbons (PAHs)			
Naphthalene	mg/kg	0.0346	CCME
Phenanthrene	mg/kg	0.0419	CCME
Pyrene	mg/kg	0.053	CCME
Semi-Volatile Organic Compounds			
Biphenyl	mg/kg	1.22	US EPA Region 3
4-Chloroaniline	mg/kg	NG	-
Bis(2-chloroethyl)ether	mg/kg	NG	-
Bis(2-chloroisopropyl)ether	mg/kg	NG	-
2-Chlorophenol	mg/kg	0.0312	US EPA Region 3
3,3-Dichlorobenzidine	mg/kg	0.127	US EPA Region 3
2,4-Dichlorophenol	mg/kg	0.117	US EPA Region 3
Diethylphthalate	mg/kg	0.603	US EPA Region 3
Dimethylphthalate	mg/kg	1.49	US EPA Region 6
Semi-Volatile Organic Compounds			
2,4-Dimethylphenol	mg/kg	0.029	US EPA Region 3
2,4-Dinitrophenol	mg/kg	NG	-
2,4-Dinitrotoluene	mg/kg	0.0416	US EPA Region 3
2,6-Dinitrotoluene	mg/kg	NG	-
2,4+2,6-Dinitrotoluene	mg/kg	NG	-
Bis(2-ethylhexyl)phthalate	mg/kg	0.18	US EPA Region 3
Pentachlorophenol	mg/kg	0.4	Atlantic RBCA
Phenol	mg/kg	0.42	US EPA Region 3
1,2,4-Trichlorobenzene	mg/kg	2.1	US EPA Region 3
2,4,5-Trichlorophenol	mg/kg	NG	-
2,4,6-Trichlorophenol	mg/kg	0.213	US EPA Region 3
2,4,6-Tribromophenol	mg/kg	NG	-
Radiological Parameters			
Carbon-14	Bq/kg	NG	-
Cesium-137	Bq/kg	100000	US EPA Region 6
Chlorine-36	Bq/kg	NG	-
Cobalt-60	Bq/kg	40000	US EPA Region 6
Gross alpha	Bq/kg	NG	-
Gross beta	Bq/kg	NG	-
Iodine-129	Bq/kg	1000000	US EPA Region 6
Neptunium-237	Bq/kg	NG	-
Plutonium-238	Bq/kg	NG	-
Plutonium-239	Bq/kg	200000	US EPA Region 6
Potassium-40	Bq/kg	NG	-
Radium-226	Bq/kg	600	Thompson et al. 2005 LEL
Ruthenium-106	Bq/kg	NG	-
Selenium-79	Bq/kg	NG	-
Strontium-90	Bq/kg	20000	US EPA Region 6
Thorium-228	Bq/kg	NG	-
Thorium-230	Bq/kg	NG	-
Thorium-232	Bq/kg	40000	US EPA Region 6
Tritium	Bq/kg	10000000	US EPA Region 6
Uranium-234	Bq/kg	20000	US EPA Region 6
Uranium-235	Bq/kg	10000	US EPA Region 6
Uranium-238	Bq/kg	70000	US EPA Region 6

NG = No Guideline

¹See Section 3.2.3.3 for the procedure for selecting the sediment quality guideline.

MOE LEL: Guidelines for Identifying, Assessing, and Managing Contaminated Sediments in Ontario (MOE 2008).

NWMO 2015: Non-radiological interim acceptance criteria for the protection of persons and the environment (Medri 2015).

CCME: Canadian Sediment Quality Guidelines (CSQGs) for the Protection of Aquatic Life (CCME 2023).

NWMO 2019: Supplementary non-radiological interim acceptance criteria for the protection of persons and the environment (Fernandes et al 2019).

MECP: Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (MECP 2023).

Atlantic RBCA: Ecological Tier 1 Environmental Quality Standards (EGQs) for Sediment (mg/kg) (RBCA 2022).

US EPA Region 3: Sediment Screening Benchmarks: Region 3 Screening Benchmarks 2006 (US EPA 2006).

US EPA Region 6: Ecological benchmark table (US EPA 2023).

Thompson et al. 2005 LEL: Derivation and Use of Sediment Quality Guidelines for Ecological Risk Assessment of Metals and Radionuclides Released to the Environment from Uranium Mining and Milling Activities in Canada (Thompson et al. 2005).

APPENDIX B, TABLE 3
Detailed information for sites sampled during the Year 2 EMBP.

Location Details	Waterbody	Station ID	Station Purpose	Site ID	Rep	Type of Samples	Station Depth (m)	UTMs (zone 15U)		Date sampled
								Easting	Northing	
LSA	Mennin Lake	MenninLake_01	Reference	ML1	A	D	2	553561	5477809	23-Jul-2022
					B	D	1.8	553528	5477760	
					C	D	1.8	553497	5477752	
					A	D	1.6	553545	5477788	11-Sep-2022
					B	D	1.8	553533	5477759	
					C	D	1.4	553494	5477749	
					A	D	1.7	553540	5477790	19-Feb-23
					B	D	1.9	553534	5477757	
					C	D	1.3	553494	5477756	
					A	D	1.8	553545	5477794	30-May-23
					B	D	2	553532	5477764	
					C	D	1.7	553496	5477746	
		MenninLake_02	Exposure	ML2	A	A/B	14	551922	5481212	22-Jul-2022
					B	A/B	13.7	551773	5481269	
					C	A/B	-	551884	5481300	
					A	A/B	13.9	551849	5481189	19-Sep-2022
					B	A/B	13.5	551768	5481267	
					C	A/B	13.1	551867	5481298	
					A	C	14.1	551845	5481193	20-Feb-23
					B	C	13.9	551770	5481265	
					C	C	13.6	551863	5481296	
					A	A/B	14.1	551858	5481206	27-May-23
					B	A/B	13.5	551769	5481261	
					C	A/B	13.2	551865	5481305	
		MenninLake_03	Exposure	ML3	A	A/B	6.3	551716	5482299	24-Jul-2022
					B	A/B	-	-	-	
					C	A/B	-	-	-	
					A	C	6	551760	5482324	14-Sep-2022
					B	C	6.3	551763	5482289	
					C	C	5.8	551803	5482273	
					A	C	5.5	551759	5482321	18-Feb-23
					B	C	5.1	551769	5482292	
					C	C	5.4	551804	5482271	
					A	A/B	5.4	551763	5482343	28-May-23
					B	A/B	5.5	551766	5482302	
					C	A/B	5.7	551808	5482284	
	Mennin River	MenninRiver_01	Reference	MR1	A	D	0.9	553109	5480165	25-Jul-2022
					B	D	0.8	553161	5480141	
					C	D	0.7	553194	5480154	
					A	D	0.8	553090	5480172	12-Sep-2022
					B	D	0.9	553137	5480149	
					C	D	0.7	553182	5480147	
					A	D	0.4	553093	5480172	30-May-23
					B	D	0.5	553134	5480139	
					C	D	0.5	553184	5480153	
		MenninRiver_02	Exposure	MR2	A	D	1.4	551915	5483472	25-Jul-2022
					B	D	1.2	551863	5483422	
					C	D	0.8	551837	5483367	
					A	D	1	551951	5483492	17-Sep-2022
					B	D	0.9	551906	5483444	
					C	D	0.9	551870	5483407	
					A	D	0.9	551918	5483465	28-May-23
					B	D	0.6	551891	5483423	
					C	D	1.1	551858	5483393	
		MenninRiver_03	Exposure	MR3	A	D	1.2	550212	5487448	27-Jul-2022
					B	D	0.9	550168	5487448	
					C	D	1.1	550144	5487463	
					A	D	0.8	550204	5487424	26-Sep-2022
					B	D	0.7	550170	5487427	
					C	D	0.9	550120	5487443	
					A	D	1.3	550200	5487426	22-Feb-23
					B	D	1.5	550170	5487427	
					C	D	1.5	550142	5487428	
					A	D	1	550206	5487429	29-May-23
					B	D	1.1	550174	5487438	
					C	D	0.7	550132	5487447	
	Revell Lake	RevellLake_01	Reference	RL1	A	A/B	9.4	569155	5476162	21-Jul-2022
					B	A/B	9.7	569152	5476296	
					C	A/B	8.2	569219	5476527	
					A	A/B	8	569138	5476227	7-Sep-2022
					B	A/B	8.3	569148	5476297	
					C	A/B	7.6	569291	5476450	
					A	C	8.4	569137	5476235	17-Feb-23
					B	C	8.6	569148	5476298	
					C	C	7.9	569288	5476538	
					A	A/B	8.6	569129	5476243	24-May-23
					B	A/B	9.1	569148	5476297	
					C	A/B	8.3	569249	5476549	
		RevellLake_02	Reference	RL2	A	A/B	8.1	569958	5475870	20-Jul-2022
					B	A/B	7.6	569891	5475928	
					C	A/B	8.6	569737	5475873	
					A	C	7.2	569852	5475868	9-Sep-2022
					B	C	6.9	569877	5475899	
					C	C	6.5	569826	5475898	
					A	C	7	569844	5475859	16-Feb-23
					B	C	6.8	569869	5475896	
					C	C	-	569825	5475892	
					A	A/B	8	569849	5475871	24-May-23
					B	A/B	7.7	569860	5475892	
					C	A/B	8.5	569804	5475918	

APPENDIX B, TABLE 3 Detailed information for sites sampled during the Year 2 EMBP.										
Location Details	Waterbody	Station ID	Station Purpose	Site ID	Rep	Type of Samples	Station Depth (m)	UTMs (zone 15U)		Date sampled
								Easting	Northing	
LSA	Revell River	RevellRiver_01	Exposure	RR1	A	D	1.1	559634	5488289	19-Jul-2022
					B	D	0.9	559690	5488302	
					C	D	0.7	559727	5488265	
					A	D	1.5	559634	5488289	24-Sep-2022
					B	D	1.1	559685	5488292	
					C	D	1.2	559709	5488298	
					A	D	0.8	559673	5488300	23-May-23
					B	D	0.7	559705	488290	
					C	D	0.4	559713	5488288	
	Unnamed Watercourse	UWC_01	Exposure	ML4	A	D	1.8	552317	5482869	25-Jul-2022
					B	D	1.8	552398	5482884	16-Sep-2022
					C	D	2	552234	5482800	
					A	D	1.9	552316	5482865	
					B	D	2.1	552397	5482885	
					C	D	1.6	552246	5482807	
					A	C	2.5	552317	5482871	18-Feb-23
					B	C	2.5	552404	5482885	
					C	C	2.4	552229	5482805	
					A	D	2	552318	5482866	28-May-23
					B	D	-	552404	5482895	
					C	D	-	552248	5482812	
	Wabigoon River	WabigoonRiver_01	Reference	WR1	A	D	1.6	554465	5490950	28-Jul-2022
					B	D	1.4	554451	5490974	
					C	D	1.8	554452	5491000	
					A	D	1.4	554473	5490934	22-Sep-2022
					B	D	0.9	554459	5490969	
					C	D	1.1	554454	5491000	
					A	C	2.7	558086	5492550	24-Feb-23
					B	C	2.4	558092	5492558	
					C	C	2.8	558138	5492590	
					A	D	1.6	554478	5490932	26-May-23
					B	D	1.2	554456	5490969	
					C	D	1.5	554455	5491002	
		WabigoonRiver_02	Exposure	WR2	A	D	1.2	553594	5491008	28-Jul-2022
					B	D	0.9	553581	5490962	25-Sep-2022
					C	D	-	553578	5490905	
					A	D	1.2	553592	5491006	
					B	D	1.2	553578	5490963	
					C	D	0.9	553577	5490903	
					A	D	1.1	553589	5490987	26-May-23
					B	D	0.9	553580	5490957	
		WabigoonRiver_03	Exposure	WR3	C	D	0.8	553581	5490899	26-Jul-2022
					A	D	1.9	547951	5489913	
					B	D	2	548022	5489882	
					C	D	1.7	548112	5489861	20-Sep-2022
					A	C	3.4	547957	5489904	
					B	C	3.6	548001	5489884	
					C	C	2.9	548056	5489886	
					A	C	4	547965	5489907	
					B	C	4.2	548008	5489895	22-Feb-23
					C	C	3.8	548066	489833	29-May-23
					A	C	3.2	547960	5489907	
					B	C	2.8	547998	5489884	
					C	C	3	548056	5489888	
AOI Pond	Unknown Waterbody 1	UWB_01	Exposure	P1	A	D	0.9	554303	5485362	28-Jul-2022
					A	D	1.7	554424	5485439	14-Sep-2022
					A	D	1.8	554427	5485424	23-Feb-23
					A	D	0.5	554303	5485372	25-May-23
	Unknown Waterbody 2	UWB_02	Exposure	P2	A	A/B	2.3	556082	5487252	28-Jul-2022
					A	D	1.7	556163	5487155	10-Sep-2022
					A	D	2.3	556031	5487161	23-Feb-23
					A	D	1.7	556147	5487164	25-May-23
	Unknown Waterbody 3	UWB_03	Exposure	P3	A	A/B	4.2	559739	5486696	27-Jul-2022
					A	A/B	3.7	559718	5486687	8-Sep-2022
					A	C	4.1	559726	5486692	14-Feb-23
					A	A/B	3.9	559731	5486685	25-May-23
	Unknown Waterbody 4	UWB_04	Exposure	P4	A	A/B	3.1	557957	5485076	29-Jul-2022
					A	C	3.1	557955	5485087	23-Sep-2022
					A	A/B	2.7	557903	5485061	15-Feb-23
					A	A/B	3	557963	5485083	26-May-23
	Unknown Waterbody 5	UWB_05	Exposure	P5	A	C	2.6	557513	5484260	29-Jul-2022
					A	C	2.5	557505	5484273	23-Sep-2022
					A	C	2.5	557502	5484276	15-Feb-23
					A	A/B	2.6	557517	5484270	26-May-23
	Unknown Waterbody 6	UWB_06	Exposure	P6	A	D	0.9	554983	5483898	24-Jul-2022
					A	D	0.7	554956	5483868	13-Sep-2022
					A	A/B	2	554931	5483905	23-Feb-2023
					A	D	0.3	554947	5483847	10-May-23
	Unknown Waterbody 7	UWB_07	Exposure	P7	A	D	0.7	553327	5484091	24-Jul-2022
					A	C	3.1	553213	5483945	13-Sep-2022
					A	C	3.1	553223	5483963	24-Feb-23
					A	A/B	3.8	553212	5483956	11-May-23
Reference Pond	Unknown Waterbody 8	UWB_08	Reference	RP1	A	C	3.4	547834	5480051	26-Jul-2022
					A	C	3	547945	5480011	18-Sep-2022
					A	C	2.5	547945	5480018	21-Feb-23
					A	A/B	2.1	547954	480013	29-May-23
	Unknown Waterbody 9	UWB_09	Reference	RP2	A	D	3	552944	5475774	23-Jul-2022
					A	C	3.6	552890	5475824	27-Sep-2022
					A	A/B	3.9	552893	5475817	26-Feb-23
					A	A/B	3.5	552882	5475844	29-May-23
	Unknown Waterbody 10	UWB_10	Reference	RP3	A	A/B	1.9	565570	5478277	27-Jul-2022
					A	C	2.4	565600	5478272	21-Sep-22
					A	C	2.2	565595	5478286	25-May-23

A dash indicates data is missing; LSA = Local Study Area (surface water); AOI Pond = ponds within the Area of Interest; D = Sample (n = 1) was collected at a discrete depth; A/B = Samples (n = 2) were collected from a discrete depth above and below the thermocline; C = three discrete depths were composited for the sample (n =1); July = Summer, Setpember = Fall, Feburary = Winter, May = Spring.

APPENDIX B, TABLE 4

Limnology results for surface water stations sampled during the Year 2 EMBP.

Location Details	Waterbody/ Watercourse	Site ID	Date	Station Depth (m)	Secchi Depth (m)	Sample Depth (m)	Temp. (°C)	DO (mg/L)	DO (%)	SPC (µS/cm)	pH (pH units)	ORP (mV)	Turb. (NTU)
LSA	Mennin Lake	ML1	23-Jul-22	2.0	1.05	0.3	23.2	7.57	88.5	22.9	6.54	320.3	0.65
						0.7	23.1	7.56	88.2	22.9	6.53	332.2	0.68
						1	23.0	7.50	87.2	22.9	6.49	343.4	0.69
						1.3	22.8	7.60	88.3	22.3	6.53	349.9	0.67
						1.5	22.7	7.72	89.5	21.9	6.59	352.1	0.67
			11-Sep-22	1.6	1.50	0.3	18.4	8.17	86.7	22.2	6.82	256.8	1.38
						0.8	17.6	7.98	83.6	22.5	6.74	261.8	1.35
						1	17.5	7.95	83.1	22.6	6.71	264.5	1.31
			19-Feb-23	1.7	-	0.8	1.3	13.00	91.7	27.0	6.67	394.7	1.01
						1	1.2	12.94	91.5	26.7	6.57	400.7	1.65
			30-May-23	1.8	1.51	0.3	13.9	9.51	92.0	22.2	6.46	277.7	1.08
						0.8	13.6	9.51	91.5	22.1	6.42	281.8	1.16
		ML2	22-Jul-22	14.0	1.98	0.3	22.8	8.35	96.9	20.8	6.49	184.1	0.73
						1	22.7	8.35	96.8	20.8	6.49	189.4	0.74
						2	22.8	8.33	96.6	20.8	6.50	192.5	0.71
						3	22.7	8.31	96.3	20.8	6.51	196.1	0.75
						4	19.9	7.23	79.6	21.4	6.12	210.6	0.89
						5	18.2	6.73	71.4	21.7	6.07	220.0	0.99
						6	16.2	6.41	56.0	22.2	6.03	223.5	1.52
						7	13.7	6.00	57.9	22.3	5.94	229.5	1.55
						8	11.6	5.82	53.8	22.3	5.86	236.0	1.73
						9	10.3	5.70	60.9	22.3	5.66	249.6	1.74
						10	8.8	5.03	42.4	22.5	5.58	255.9	1.92
						11	8.1	5.01	42.8	22.8	5.57	257.3	2.22
			19-Sep-22	13.9	1.20	0.3	17.2	8.46	87.8	22.5	6.84	262.8	1.29
						1	17.1	8.40	87.1	22.5	6.83	260.8	1.29
						2	17.0	8.35	86.5	22.5	6.81	261.7	1.35
						3	17.0	8.33	86.2	22.5	6.82	261.3	1.27
						4	17.0	8.32	86.1	22.5	6.85	260.2	1.24
						5	17.0	8.29	85.8	22.5	6.80	263.4	1.27
						6	17.0	8.29	85.7	22.5	6.82	262.8	1.22
						7	16.8	7.90	81.4	22.6	6.70	266.3	1.47
						8	15.4	2.90	29.1	24.8	6.21	280.9	2.96
						9	11.7	0.82	7.7	25.7	6.09	284.9	3.72
						10	10.2	0.33	2.9	25.9	6.04	285.2	4.71
						11	9.6	0.03	0.3	25.8	6.03	261.2	5.25
						12	9.0	-0.12	-1.0	24.4	6.03	201.0	7.13
			20-Feb-23	14.1	-	0.8	1.3	12.48	88.4	23.5	7.99	934.2	0.89
						1.8	1.8	11.70	84.2	22.4	8.12	810.0	0.89
						2.8	2.1	11.61	84.2	22.4	6.62	329.7	0.96
						3.8	2.3	11.44	83.6	22.5	6.56	332.3	1.04
						4.8	2.5	11.27	82.6	22.8	6.51	335.1	1.03
						5.8	2.8	10.83	80.0	23.0	6.47	337.4	1.05
						6.8	3.0	10.34	76.9	23.5	6.38	342.9	1.13
						7.8	3.2	10.07	75.2	23.6	6.35	345.1	1.17
						8.8	3.5	9.29	70.3	24.0	6.31	347.3	1.34
						9.8	3.6	7.94	59.9	24.4	6.20	353.5	1.69
						10.8	3.7	7.09	54.0	24.9	6.18	356.2	2.07
						11.8	3.9	5.60	43.6	25.7	6.08	360.5	2.92
						12.8	4.2	2.73	21.5	27.9	6.03	302.4	5.66
			27-May-23	14.1	1.55	0.5	14.1	9.92	96.6	21.7	6.68	256.9	0.91
						1.5	14.0	9.92	96.4	21.7	6.64	261.6	0.86
						2.5	14.0	9.92	96.3	21.7	6.62	265.0	0.89
						3.5	13.9	9.89	95.7	21.8	6.60	268.5	0.87
						4.5	12.7	9.72	91.6	21.8	6.49	275.8	0.86
						5.5	12.0	9.75	88.9	21.8	6.42	282.7	0.88
						6.5	8.4	8.69	74.0	22.5	6.15	294.4	0.95
						7.5	7.5	8.34	69.6	22.7	6.09	299.5	1.03
						8.5	6.6	8.10	66.2	22.9	6.06	302.4	1.04
						9.5	6.2	7.80	63.0	23.0	6.04	305.1	1.11
						10.5	5.9	7.59	60.8	23.2	6.02	306.9	1.18
						11.5	5.3	6.87	54.6	23.6	5.98	308.4	1.43
						12.5	5.2	6.56	51.7	23.7	6.00	233.5	1.54

APPENDIX B, TABLE 4

Limnology results for surface water stations sampled during the Year 2 EMBP.

Location Details	Waterbody/ Watercourse	Site ID	Date	Station Depth (m)	Secchi Depth (m)	Sample Depth (m)	Temp. (°C)	DO (mg/L)	DO (%)	SPC (µS/cm)	pH (pH units)	ORP (mV)	Turb. (NTU)
LSA	Mennin Lake	ML3	24-Jul-22	6.3	2.20	0.3	21.8	7.73	88.1	20.7	6.49	307.3	0.47
						1	21.8	7.71	87.9	20.7	6.48	313.5	0.47
						2	21.8	7.67	87.3	20.8	6.48	317.5	0.47
						3	20.2	6.20	68.4	21.2	6.14	334.5	0.46
						4	19.3	5.90	64.2	21.9	6.14	339.6	0.53
						5	18.3	5.60	59.5	22.1	6.10	344.0	0.67
			14-Sep-22	6.0	1.25	0.3	18.5	8.12	86.8	21.9	6.64	312.0	1.19
						1	18.6	8.12	86.8	21.9	6.63	328.3	1.15
						2	18.5	8.16	87.1	21.9	6.63	347.0	1.19
						3	18.5	8.18	87.3	21.9	6.64	358.9	1.10
						4	18.4	8.18	87.2	21.9	6.63	362.7	1.21
						5	18.4	8.14	86.6	21.9	6.58	368.2	1.07
			18-Feb-23	5.5	-	0.5	0.3	14.13	97.5	26.7	6.63	305.8	0.84
						1.5	1.3	12.56	88.5	23.7	6.56	314.1	0.93
						2.5	1.8	11.89	85.6	22.7	6.54	319.4	0.92
						3.5	2.2	11.62	84.3	22.7	6.51	323.9	0.98
						4.5	2.4	11.47	83.6	23.2	6.47	327.8	1.01
			28-May-23	5.4	1.55	0.5	16.8	9.86	101.6	21.6	6.83	255.3	1.02
						1.5	16.3	9.77	99.5	21.5	6.75	268.4	1.13
						2.5	15.7	9.88	99.4	21.7	6.76	276.2	1.01
						3.5	13.9	9.72	94.2	21.8	6.62	286.8	0.94
						4.5	12.2	9.47	88.3	21.9	6.47	296.3	0.96
	Mennin River	MR1	25-Jul-22	0.90	0.90	0.3	20.0	8.64	95.1	19.5	6.09	288.2	0 ¹
			12-Sep-22	0.80	0.80	0.5	20.0	8.60	94.7	19.5	6.09	273.4	0.03
						0.3	15.4	9.15	91.6	20.5	6.38	NC ²	0.63
			30-May-23	0.40	0.40	0.1	21.1	8.46	95.1	21.7	6.37	215.7	0.48
						0.3	21.1	8.46	95.1	21.7	6.39	221.7	0.45
		MR2	25-Jul-22	1.4	0.83	0.3	19.9	7.93	87.2	19.7	5.74	290.6	0.92
						0.5	19.9	7.83	85.8	19.7	5.81	260.4	0.87
			17-Sep-22	1.00	1.00	0.3	14.4	8.30	81.3	21.8	6.11	342.6	1.23
						0.5	14.4	8.27	81.0	21.8	6.04	353.7	1.28
			28-May-23	0.90	0.90	0.5	19.2	9.43	102.1	21.2	6.79	263.5	1.36
		MR3	27-Jul-22	1.2	1.00	0.3	19.8	8.87	97.1	22.0	6.13	292.7	2.35
						0.8	19.8	8.75	95.8	22.0	6.13	292.2	3.82
			26-Sep-22	0.80	0.80	0.3	13.3	9.70	92.7	25.6	6.95	230.9	2.50
			22-Feb-23	1.3	-	1	0.0	12.44	85.2	32.8	8.19	1194.7	3.44
			29-May-23	1.00	1.00	0.3	20.2	8.13	89.9	23.9	6.68	269.9	1.50
	Revell Lake	RL1	21-Jul-22	9.4	2.90	0.3	23.3	8.00	93.7	17.2	6.97	319.5	0 ¹
						1	23.2	7.98	93.5	17.2	6.97	324.8	0 ¹
						2	23.2	7.95	93.0	17.3	6.95	328.1	0 ¹
						3	23.2	7.92	92.5	17.3	6.91	332.9	0 ¹
						4	23.1	7.89	91.9	17.3	6.93	333.7	0 ¹
						5	18.0	6.90	73.6	17.8	6.39	361.0	0 ¹
						6	12.7	6.77	64.3	18.2	6.18	372.7	0 ¹
						7	9.3	6.80	58.8	18.4	5.74	398.8	0 ¹
						8	8.0	6.76	56.8	18.4	5.72	404.9	0 ¹
			07-Sep-22	8.0	2.86	0.3	20.0	8.63	94.9	18.1	7.40	204.1	0.55
						1	19.6	8.62	94.1	18.1	7.36	203.5	0.65
						2	19.5	8.58	93.4	18.1	7.24	207.5	0.65
						3	19.5	8.56	93.2	18.1	7.26	204.5	0.59
						4	19.4	8.53	92.9	18.1	7.25	202.9	0.60
						5	19.0	8.09	87.1	18.2	7.12	204.5	0.60
						6	17.9	7.07	74.5	18.3	6.74	213.8	0.57
						7	15.3	4.58	45.1	18.9	6.28	228.2	0.37
			17-Feb-23	8.4	-	0.7	1.7	11.69	84.1	19.5	8.43	198.1	0 ¹
						1.7	2.4	11.00	80.7	18.6	8.40	212.4	0 ¹
						2.7	2.9	10.62	78.5	18.5	8.38	229.4	0 ¹
						3.7	3.0	10.44	77.5	18.7	8.37	236.2	0 ¹
						4.7	3.1	10.37	77.2	19.2	8.32	247.5	0 ¹
						5.7	3.2	10.26	76.6	19.2	8.30	253.3	0 ¹
						6.7	3.2	10.18	76.2	19.3	8.27	256.4	0 ¹
						7.7	3.4	8.97	66.4	19.4	8.26	260.1	0 ¹
	Revell Lake	RL1	24-May-23	8.6	3.30	0.3	13.6	9.76	93.8	17.8	6.84	164.5	0.22
						1.3	13.6	9.75	93.7	17.8	6.84	164.7	0.19
						2.3	13.4	9.73	93.1	17.7	6.83	165.4	0.21
						3.3	12.5	9.56	89.8	17.8	6.65	169.2	0.19
						4.3	11.4	9.23	85.6	17.9	6.52	175.7	0.20
						5.3	9.5	8.75	76.8	18.1	6.36	188.0	0.18
						6.3	6.5	8.11	66.1	18.6	6.22	193.5	0.21
						7.3	5.5	7.78	62.1	18.9	6.18	196.7	0.24

APPENDIX B, TABLE 4

Limnology results for surface water stations sampled during the Year 2 EMBP.

Location Details	Waterbody/ Watercourse	Site ID	Date	Station Depth (m)	Secchi Depth (m)	Sample Depth (m)	Temp. (°C)	DO (mg/L)	DO (%)	SPC (µS/cm)	pH (pH units)	ORP (mV)	Turb. (NTU)					
LSA	Revell Lake	RL2	20-Jul-22	8.1	2.05	0.3	22.9	7.75	90.1	17.7	6.79	306.3	0.05					
						1	22.9	7.74	90.0	17.7	6.79	308.2	0.03					
						2	22.9	7.72	89.8	17.7	6.81	309.5	0.03					
						3	22.8	7.68	89.3	17.7	6.79	313.8	0.02					
						4	21.2	6.10	68.5	18.5	6.30	334.5	0.07					
						5	19.0	5.16	55.6	19.0	6.19	342.4	0.03					
						6	17.9	4.44	46.1	19.6	6.18	346.4	0.02					
			7	16.5	2.20	22.5	22.0	6.14	347.3	1.81								
			09-Sep-22	7.2	2.00	0.3	19.4	8.43	91.7	18.7	7.04	257.5	0.90					
						1	19.4	8.42	91.6	18.6	7.04	255.9	1.07					
						2	19.4	8.41	91.5	18.6	7.04	255.2	0.95					
						3	19.4	8.40	91.3	18.6	7.00	256.8	0.94					
						4	19.4	8.40	91.3	18.7	7.02	254.9	0.95					
						5	19.4	8.36	90.9	18.7	7.01	254.5	0.99					
						6	19.4	8.33	90.6	18.7	7.01	254.4	0.93					
			16-Feb-23	7.0	-	0.9	1.5	12.69	90.3	20.8	6.93	257.2	0 ¹					
						1.5	2.0	12.27	88.1	20.2	6.52	276.1	0 ¹					
						2.5	3.6	10.13	76.1	19.5	6.36	282.2	0 ¹					
						3.5	4.1	8.33	63.5	20.5	6.12	292.9	0 ¹					
						4.5	4.2	7.83	60.1	20.7	6.05	294.9	0 ¹					
						5.5	4.4	6.55	50.7	22.2	5.97	297.3	0 ¹					
						6.5	4.6	6.24	48.5	22.9	5.96	298.0	0 ¹					
			24-May-23	8.0	2.45	0.5	13.3	9.48	90.6	18.4	6.79	129.8	0.22					
						1.5	13.3	9.48	90.5	18.4	6.78	136.2	0.24					
						2.5	13.3	9.47	90.4	18.4	6.76	143.2	0.26					
						3.5	13.3	9.47	90.4	18.4	6.76	145.6	0.24					
						4.5	13.3	9.46	90.2	18.4	6.75	151.3	0.28					
						5.5	11.8	8.89	82.2	18.6	6.47	160.3	0.27					
						6.5	7.3	7.14	59.3	18.9	6.12	175.8	0.31					
						7.5	5.8	6.49	52.0	19.2	6.04	183.7	0.38					
						Unnamed Watercourse	RR1	19-Jul-22	1.1	- ³	0.3	21.3	7.32	82.6	71.2	6.50	229.4	1.12
											0.5	21.3	7.52	82.7	71.2	6.53	231.1	1.10
											0.7	21.3	7.31	82.5	71.2	NC ²	229.9	1.09
			24-Sep-22	1.5	- ³			0.3	11.0	10.12	91.7	79.0	6.83	132.4	1.47			
								1	11.0	10.11	91.7	79.1	6.81	125.5	1.55			
								23-May-23	0.80	0.80	0.3	12.5	9.29	87.2	81.4	6.79	NC ²	0.54
			ML4	25-Jul-22	1.8		0.90	0.3	18.3	7.45	79.1	18.9	5.60	283.0	0.37			
								0.7	18.3	7.45	79.1	18.9	5.61	294.8	0.36			
								1	18.3	7.45	79.2	18.9	5.60	296.3	0.40			
								1.3	18.3	7.45	79.2	18.9	5.61	294.4	0.41			
				16-Sep-22	1.9		0.60	0.3	12.2	8.41	78.2	25.2	6.23	248.5	5.76			
								0.8	12.2	8.34	77.7	25.2	6.22	231.7	5.74			
	1.2	12.2						8.31	77.4	25.2	6.21	228.1	5.70					
	18-Feb-23	2.5		-	0.7		0.1	12.17	83.7	31.5	6.70	319.8	2.08					
					1.5		0.1	11.99	82.1	30.9	6.38	330.7	2.07					
	28-May-23	2.0		0.90	0.3		20.4	7.36	81.6	20.7	5.99	283.0	0.57					
					0.6		19.3	7.24	78.5	20.8	6.00	274.6	0.59					
					0.9		19.2	7.19	77.8	20.8	6.06	272.0	0.60					
	Wabigoon River	WR1	28-Jul-22	1.6	- ³	0.3	18.0	8.94	94.5	46.9	7.02	164.7	3.79					
						0.7	18.0	8.93	94.4	46.9	7.03	181.5	3.75					
						1	18.0	8.93	94.4	46.9	7.00	190.4	3.72					
						1.3	18.0	8.93	94.3	46.9	7.01	197.3	3.77					
			22-Sep-22	1.4	0.85	0.3	12.8	10.03	94.8	48.1	7.22	264.9	3.47					
						0.5	12.8	10.05	95.0	48.1	7.18	274.9	3.45					
						1	12.8	10.06	95.1	48.2	7.19	277.8	3.58					
			24-Feb-23	2.7	-	0.7	0.0	9.47	65.3	79.1	6.51	264.4	3.87					
						1.3	0.0	9.33	63.9	78.1	6.26	252.3	3.71					
						1.7	0.0	9.31	63.7	78.1	6.25	252.3	3.81					
						2.2	0.0	9.28	63.5	78.1	6.25	253.9	3.75					
			26-May-23	1.6	- ³	0.3	15.4	9.26	92.7	49.5	7.03	215.4	15.07					
						0.8	15.5	9.26	92.7	49.5	7.01	215.1	14.75					
		WR2	28-Jul-22	1.2	- ³	0.4	17.9	8.79	92.6	62.7	6.91	177.3	3.80					
						0.6	17.8	8.79	92.6	62.7	6.93	185.2	3.78					
						0.9	17.9	8.79	92.6	62.7	6.91	186.1	3.89					
			25-Sep-22	1.2	- ³	0.4	12.1	10.17	94.5	64.8	6.81	257.7	2.55					
			26-May-23	1.1	0.80	0.3	16.1	9.20	93.4	66.0	7.02	203.2	1.28					
		0.8	16.1	9.20	93.5	66.0	7.00	193.6	1.34									

APPENDIX B, TABLE 4

Limnology results for surface water stations sampled during the Year 2 EMBP.

Location Details	Waterbody/ Watercourse	Site ID	Date	Station Depth (m)	Secchi Depth (m)	Sample Depth (m)	Temp. (°C)	DO (mg/L)	DO (%)	SPC (µS/cm)	pH (pH units)	ORP (mV)	Turb. (NTU)		
LSA	Wabigoon River	WR3	26-Jul-22	1.9	0.80	0.3	19.4	9.14	99.2	43.6	6.62	269.2	3.32		
						0.7	19.3	9.15	99.4	44.3	6.65	264.6	3.28		
						1	19.4	9.15	99.4	43.9	6.64	264.3	3.40		
			20-Sep-22	3.4	- ³	0.3	14.2	9.57	93.3	54.1	6.59	298.8	3.64		
						1	14.2	9.55	93.1	54.1	6.56	304.8	3.83		
						2	14.2	9.57	93.2	54.8	6.61	305.4	3.69		
			22-Feb-23	4.0	-	0.8	0.0	13.08	89.5	78.3	6.60	232.6	3.50		
						1.5	0.0	13.09	89.5	78.2	6.60	217.7	2.90		
						2.5	0.0	13.10	89.6	80.4	6.59	253.4	2.82		
						2.8	0.0	13.10	89.6	80.8	6.60	251.6	2.87		
			29-May-23	3.2	1.35	0.5	18.7	8.05	86.3	54.6	6.96	257.8	1.97		
						1	18.7	8.08	86.5	57.1	6.97	267.8	2.06		
						1.5	18.6	8.09	86.5	57.8	6.99	210.9	1.81		
						2	18.6	8.09	86.6	57.3	7.00	219.7	1.73		
AOI Pond	Unnamed Waterbody 1	P1	28-Jul-22	0.90	0.90	0.3	19.5	6.64	72.3	19.7	5.38	238.2	9.07		
						0.5	19.5	6.61	71.9	19.7	5.39	251.6	9.78		
			14-Sep-22	1.7	0.69	0.3	16.6	8.00	82.1	20.6	6.14	264.3	1.33		
						0.8	16.5	7.98	81.7	20.6	6.15	262.5	1.40		
						1.3	16.3	7.88	80.4	20.6	6.14	262.5	1.35		
			23-Feb-23	1.8	-	0.6	1.2	8.79	62.2	26.9	5.88	247.4	0.21		
						1.2	2.8	4.62	46.3	27.3	5.85	247.3	0.59		
			25-May-23	0.50	0.50	0.3	15.5	9.03	90.7	17.4	5.93	156.0	2.60		
			Unnamed Waterbody 2	P2	28-Jul-22	2.3	0.50	0.3	19.6	7.18	78.4	18.2	5.03	344.8	0.78
								0.8	19.3	6.45	70.6	18.4	5.15	341.5	0.89
	1.3	17.7						1.08	11.5	20.1	5.26	163.6	2.14		
	10-Sep-22	1.7			0.60	0.3	19.1	7.14	77.1	19.7	5.92	298.7	1.37		
						0.8	18.9	7.03	75.7	19.7	5.92	284.0	1.32		
						1	18.9	7.00	75.5	19.7	5.90	221.9	1.34		
	23-Feb-23	2.3			-	0.6	1.3	10.06	71.7	23.3	5.75	267.8	0 ¹		
						1.3	3.4	6.75	51.2	24.0	5.70	266.7	0.36		
	25-May-23	1.7	0.60	0.3	14.7	8.64	85.1	16.5	5.73	174.0	0.64				
				0.8	14.1	8.59	83.5	16.5	5.75	182.4	0.65				
	Unnamed Waterbody 3	P3	27-Jul-22	4.2	0.89	0.3	20.6	6.77	75.4	17.0	5.63	339.8	0.43		
						1	20.3	6.63	73.5	17.0	5.59	361.5	0.41		
						2	19.6	4.65	50.3	17.7	5.45	378.9	0.58		
						3	16.1	0.27	2.8	23.9	5.95	113.3	5.51		
			08-Sep-22	3.7	1.30	0.3	19.4	7.34	79.7	19.3	6.31	265.8	2.66		
						1	19.3	7.35	79.6	19.3	6.31	266.2	2.66		
						2	19.0	6.79	73.1	19.4	6.22	271.0	3.12		
			14-Feb-23	4.1	-	0.3	0.9	11.41	80.2	23.3	NC ²	127.1	1.02		
						1	3.0	10.70	79.5	21.8	NC ²	132.3	1.05		
						2	4.2	5.78	48.0	23.4	NC ²	135.7	1.58		
						3	4.5	4.72	36.6	24.9	NC ²	139.7	1.87		
			25-May-23	3.9	1.05	0.5	13.9	8.90	86.2	19.2	6.26	229.9	0.86		
						1	13.8	8.96	86.6	19.2	6.25	235.2	0.85		
						2	9.4	6.55	57.4	20.9	5.81	258.6	1.40		
						3	6.5	5.28	43.7	21.6	5.79	237.8	1.62		
			Unnamed Waterbody 4	P4	29-Jul-22	3.1	0.68	0.3	19.8	6.04	66.4	19.6	5.49	285.2	0.23
1								19.7	6.04	66.1	19.6	5.49	287.7	0.32	
2								18.8	4.56	48.3	20.1	5.30	348.6	0.44	
23-Sep-22	3.1	0.50			0.3	14.4	8.06	78.8	20.4	5.89	311.8	1.59			
					1	14.3	8.08	79.0	20.4	5.90	322.7	1.62			
					2	14.3	8.09	79.0	20.4	5.90	366.9	1.64			
15-Feb-23	2.7	-			0.3	2.3	10.93	79.5	27.1	NC ²	189.5	0.38			
					0.8	2.5	10.07	73.4	25.1	NC ²	204.4	0.38			
					1.3	3.5	7.45	56.0	25.9	NC ²	229.5	0.42			
					1.8	4.0	6.06	46.4	26.8	NC ²	235.2	0.57			
26-May-23	3.0	0.95			0.5	15.8	8.51	85.8	18.5	5.78	201.1	0.23			
					1	15.6	8.48	85.2	18.5	5.76	214.3	0.27			
			1.5	13.9	7.81	75.3	18.7	5.61	238.9	0.36					
			2	12.5	6.81	63.3	19.1	5.47	260.8	0.57					

APPENDIX B, TABLE 4

Limnology results for surface water stations sampled during the Year 2 EMBP.

Location Details	Waterbody/ Watercourse	Site ID	Date	Station Depth (m)	Secchi Depth (m)	Sample Depth (m)	Temp. (°C)	DO (mg/L)	DO (%)	SPC (µS/cm)	pH (pH units)	ORP (mV)	Turb. (NTU)
AOI Pond	Unnamed Waterbody 5	P5	29-Jul-22	2.6	0.62	0.3	20.1	6.39	70.4	19.1	5.57	269.9	0.28
						1	19.7	6.31	69.0	19.1	5.49	329.7	0.33
						2	18.9	5.68	61.3	19.4	5.35	358.0	0.64
			23-Sep-22	2.5	0.60	0.3	13.6	8.28	79.7	19.8	5.97	317.4	1.58
						1	13.6	8.24	79.3	19.8	5.99	319.3	1.57
						1.5	13.6	8.22	79.2	19.8	5.95	324.6	1.55
			15-Feb-23	2.5	-	0.3	0.8	10.33	72.6	25.9	NC ²	228.8	0.60
						0.8	2.1	9.03	65.5	24.7	NC ²	236.5	0.55
						1.3	3.6	7.25	54.7	24.3	NC ²	240.6	0.72
			26-May-23	2.6	1.05	0.3	15.9	8.43	85.3	17.9	5.74	206.1	0.23
						0.6	15.4	8.31	82.9	18.5	5.73	218.3	0.25
						0.9	12.5	6.90	65.1	18.9	5.56	252.9	0.45
						1.3	12.2	6.59	61.3	18.9	5.54	264.4	0.51
						1.6	11.6	5.94	54.4	19.1	5.49	274.3	0.65
	Unnamed Waterbody 6	P6	24-Jul-22	0.90	0.90	0.3	21.9	8.47	96.6	14.0	6.43	316.7	1.52
			13-Sep-22	0.70	0.70	0.3	19.2	8.57	92.7	14.6	6.51	221.9	5.39
			23-Feb-23	2.0	-	0.8	1.6	8.47	61.4	17.9	8.95	NC ²	0.71
						1.2	2.5	6.55	47.5	18.6	8.95	NC ²	0.69
						1.7	3.3	4.73	35.2	20.3	8.95	NC ²	4.60
	10-May-23	0.30	0.30	0.3	10.3	8.24	73.9	16.6	5.83	224.0	1.15		
	Unnamed Waterbody 7	P7	24-Jul-22	0.70	0.70	0.3	19.2	6.14	66.4	20.0	5.35	259.2	14.73
			13-Sep-22	3.1	0.60	0.3	17.6	7.28	76.2	21.3	6.18	328.5	2.11
						1	17.5	7.25	75.8	21.3	6.18	333.3	2.14
						2	17.5	7.21	75.6	21.3	6.17	343.8	2.12
			24-Feb-23	3.1	-	0.8	1.5	11.31	80.6	26.0	6.15	371.4	0.09
						1.3	2.8	9.66	71.0	25.5	6.08	365.7	0.11
						1.8	3.5	5.98	45.1	26.6	5.97	361.9	0.39
						2.3	3.7	5.48	41.4	26.8	5.96	358.7	0.48
						2.8	3.8	5.37	40.7	26.9	5.97	368.2	0.58
			10-May-23	3.8	1.15	0.3	9.3	9.17	79.8	18.9	5.42	274.7	1.49
						1	8.1	8.95	76.4	19.1	5.48	275.8	1.55
						2	6.6	8.77	71.5	19.2	5.53	266.1	1.70
						2.8	5.9	8.38	67.3	19.5	5.56	252.6	1.79
Reference Pond	Unnamed Waterbody 8	RP1	26-Jul-22	3.4	1.05	0.3	21.2	7.53	84.8	48.0	7.18	274.7	0.90
						1	21.1	7.52	84.6	48.0	7.17	278.1	1.03
						2	21.0	7.38	82.9	48.0	7.13	284.2	0.91
			18-Sep-22	3.0	1.00	0.3	16.0	8.18	83.0	50.2	7.29	231.1	1.56
						0.8	16.0	8.16	82.8	50.2	7.29	226.7	1.45
						1.5	16.0	8.13	82.4	50.3	7.27	225.2	1.50
			21-Feb-23	2.5	-	0.7	1.6	10.36	73.4	58.9	7.03	442.6	0.53
						1.2	2.7	8.16	55.4	59.5	6.88	453.3	0.56
						1.9	3.6	4.32	32.3	59.6	6.70	465.3	0.73
			29-May-23	2.1	1.65	0.5	20.4	8.96	99.4	51.6	7.47	301.9	0.31
						1	20.2	8.78	96.9	51.8	7.42	302.7	0.31
						1.5	15.3	9.94	98.0	49.9	7.28	310.2	0.56
	Unnamed Waterbody 9	RP2	23-Jul-22	3.0	1.10	0.3	22.6	8.01	92.7	29.1	6.68	281.0	1.13
						1	19.8	5.25	57.9	30.0	6.22	301.7	1.14
						2	13.8	1.20	11.8	34.2	6.06	219.2	4.30
			27-Sep-22	3.6	0.80	0.3	12.6	8.01	75.3	33.1	6.70	302.2	1.68
						1	12.5	7.92	74.4	33.0	6.68	308.8	1.67
						2	12.4	7.72	72.2	33.5	6.61	316.5	2.05
			26-Feb-23	3.9	-	2.5	12.4	7.63	71.4	33.6	6.57	325.6	1.94
						0.5	1.1	8.28	58.4	42.9	6.51	331.3	0 ¹
						1.5	3.2	2.93	22.0	40.5	6.31	327.3	0.03
			29-May-23	3.5	1.75	2.5	4.1	1.29	10.2	42.5	6.27	305.8	1.26
						0.3	21.2	8.58	96.6	31.3	6.94	262.5	0.15
						1	13.4	9.90	95.1	30.0	6.73	271.6	0.20
	Unnamed Waterbody 10	RP3	27-Jul-22	1.9	1.20	1.5	7.2	7.55	64.6	30.6	6.31	225.7	0.47
						2	5.4	2.60	21.3	36.7	6.18	188.9	0.89
			21-Sep-22	2.4	1.15	0.3	15.8	8.03	81.1	22.7	5.88	340.9	1.21
						0.8	15.8	7.98	80.4	22.6	5.70	363.8	1.16
						1.3	15.7	7.69	76.9	22.7	5.59	375.4	1.48
			25-May-23	2.2	1.45	0.5	14.2	9.16	89.3	34.5	6.15	225.9	0.98
						1	13.5	9.08	87.0	34.4	6.09	239.8	1.47
	Water Quality Guideline ⁴								> 6 ⁵	NG	700	6.5 - 8.5	NG

LSA = Local Study Area; AOI Ponds = ponds within the Area of Interest; Temp. = Temperature; DO = Dissolved Oxygen; SPC = Specific Conductivity; ORP = Oxidation-Reduction Potential; Turb. = Turbidity; NC = not collected; a dash indicates the parameter was not collected; shaded values indicate exceedance/violation of the applicable guideline, italicized values indicate the value is suspect; NG = no water quality guideline available.

¹Uncertainty pertaining to extremely low values.

²Not collected due to meter malfunction.

³Flow was too strong to collect parameter.

⁴See Appendix B, Table 1 for detailed water quality guidelines.

⁵Guideline used applies to cold water biota at a temperature of 10 - 15°C.

Secchi disk measurements were not collected during winter (February) sampling.

APPENDIX B, TABLE 5

Summary of Year 2 surface water chemistry results from Mennin Lake, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Water Quality Guideline ¹
Aggregate Organics										
Biochemical Oxygen Demand	mg/L	52	2	49	2.0	0.1	2.0	2.0	2.2	-
Anions and Nutrients										
Ammonia, Total (as N)	mg/L	51	0.01 - 0.1	21	0.066	0.218	0.010	0.013	0.195	5.86
Bromide	mg/L	51	0.1	51	<0.1	-	<0.1	<0.1	<0.1	-
Chloride	mg/L	51	0.5	1	0.64	0.09	0.52	0.62	0.81	120
Fluoride	mg/L	51	0.02	1	0.039	0.004	0.035	0.038	0.046	0.12
Iodide	mg/L	51	0.2	26	0.23	0.15	0.20	0.20	0.20	-
Kjeldahl nitrogen, total [TKN]	mg/L	51	0.15 - 0.2	0	0.43	0.26	0.28	0.36	0.67	-
Nitrate (as N)	mg/L	51	0.02	19	0.052	0.036	0.020	0.044	0.126	3
Nitrate and Nitrite as N	mg/L	51	0.0224 - 0.07	22	0.073	0.023	0.042	0.070	0.126	-
Nitrite (as N)	mg/L	51	0.01	51	<0.01	-	<0.01	<0.01	<0.01	0.02
Phosphorus, total	mg/L	51	0.003 - 0.02	24	0.016	0.004	0.011	0.017	0.020	-
Sulfate (as SO4)	mg/L	51	0.3	1	0.95	0.15	0.80	0.95	1.15	128
Cyanides										
Cyanide, Total	mg/L	50 ²	0.002	50	0.0020	-	0.0020	0.0020	0.0020	0.005
Petroleum Hydrocarbon Compounds										
F1 (C6-C10)	mg/L	6	0.1	4	0.13	0.04	0.10	0.10	0.19	0.15
F1-BTEX	mg/L	1	0.1	1	<0.1	-	<0.1	<0.1	<0.1	0.15
F2 (C10-C16)	mg/L	6	0.1	6	<0.1	-	<0.1	<0.1	<0.1	0.11
F3 (C16-C34)	mg/L	6	0.2 - 0.25	6	0.21	0.02	0.20	0.20	0.24	-
F4 (C34-C50)	mg/L	6	0.2 - 0.25	6	0.21	0.02	0.20	0.20	0.24	-
TEH (C10-C50)	mg/L	6	0.4	6	<0.4	-	<0.4	<0.4	<0.4	-
TEH (C16-C50)	mg/L	6	0.4	6	<0.4	-	<0.4	<0.4	<0.4	-
Metals Dissolved										
Aluminum, dissolved	mg/L	51	0.001	0	0.15	0.02	0.13	0.14	0.20	-
Antimony, dissolved	mg/L	51	0.0001	51	<0.0001	-	<0.0001	<0.0001	<0.0001	-
Arsenic, dissolved	mg/L	51	0.0001	0	0.00034	0.00004	0.00030	0.00034	0.00041	-
Barium, dissolved	mg/L	51	0.0001	0	0.0058	0.0006	0.0051	0.0056	0.0071	-
Beryllium, dissolved	mg/L	51	0.00002 - 0.0001	51	0.000062	0.000040	0.000020	0.000100	0.000100	-
Bismuth, dissolved	mg/L	51	0.00005	51	<0.00005	-	<0.00005	<0.00005	<0.00005	-
Boron, dissolved	mg/L	51	0.01	51	<0.01	-	<0.01	<0.01	<0.01	-
Cadmium, dissolved	mg/L	51	0.000005	6	0.0000075	0.0000031	0.0000050	0.0000066	0.0000144	-
Calcium, dissolved	mg/L	51	0.05	0	2.7	0.2	2.5	2.6	3.2	-
Cesium, dissolved	mg/L	51	0.00001	49	0.000010	-	0.000010	0.000010	0.000010	-
Chromium, dissolved	mg/L	51	0.0001 - 0.0005	21	0.00043	0.00012	0.00030	0.00041	0.00050	-
Cobalt, dissolved	mg/L	51	0.0001	48	0.00012	0.00009	0.00010	0.00010	0.00027	-
Copper, dissolved	mg/L	51	0.0002	0	0.0011	0.0011	0.0006	0.0008	0.0021	0.00087
Iron, dissolved	mg/L	51	0.01	0	0.29	0.13	0.17	0.26	0.55	-
Lead, dissolved	mg/L	51	0.00005	2	0.00013	0.00015	0.00006	0.00008	0.00030	0.0065
Lithium, dissolved	mg/L	51	0.001	51	<0.001	-	<0.001	<0.001	<0.001	-
Magnesium, dissolved	mg/L	51	0.005	0	0.67	0.06	0.61	0.66	0.78	-
Manganese, dissolved	mg/L	51	0.0001	0	0.024	0.061	0.004	0.008	0.135	0.23
Mercury, dissolved	mg/L	51	0.000005	43	0.0000059	0.0000037	0.0000050	0.0000050	0.0000091	-

APPENDIX B, TABLE 5

Summary of Year 2 surface water chemistry results from Mennin Lake, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Water Quality Guideline ¹
Metals Dissolved										
Molybdenum, dissolved	mg/L	51	0.00005	0	0.00035	0.00009	0.00026	0.00034	0.00056	-
Nickel, dissolved	mg/L	51	0.0005	49	0.00050	0.00001	0.00050	0.00050	0.00050	-
Phosphorus, dissolved	mg/L	51	0.05	51	<0.05	-	<0.05	<0.05	<0.05	-
Potassium, dissolved	mg/L	51	0.05	0	0.38	0.03	0.34	0.37	0.44	-
Rhodium, dissolved	mg/L	51	0.001	51	<0.001	-	<0.001	<0.001	<0.001	-
Rubidium, dissolved	mg/L	51	0.0002	0	0.0012	0.0001	0.0010	0.0012	0.0014	-
Ruthenium, dissolved	mg/L	51	0.001	51	<0.001	-	<0.001	<0.001	<0.001	-
Samarium, dissolved	mg/L	51	0.001	51	<0.001	-	<0.001	<0.001	<0.001	-
Selenium, dissolved	mg/L	51	0.00005	0	0.00010	0.00002	0.00007	0.00010	0.00014	-
Silicon, dissolved	mg/L	51	0.05	0	1.7	0.3	1.2	1.6	2.3	-
Silver, dissolved	mg/L	60 ³	0.000005 - 0.00001	60	0.0000093	0.0000018	0.0000050	0.0000100	0.0000100	-
Sodium, dissolved	mg/L	51	0.05	0	1.2	0.2	1.0	1.1	1.4	-
Strontium, dissolved	mg/L	51	0.0002	0	0.011	0.001	0.009	0.010	0.013	2.5
Sulfur, dissolved	mg/L	51	0.5	43	0.53	0.10	0.50	0.50	0.63	-
Tellurium, dissolved	mg/L	51	0.0002	51	<0.0002	-	<0.0002	<0.0002	<0.0002	-
Thallium, dissolved	mg/L	51	0.00001	51	<0.00001	-	<0.00001	<0.00001	<0.00001	-
Thorium, dissolved	mg/L	51	0.0001	48	0.00010	0.000001	0.00010	0.00010	0.00010	-
Tin, dissolved	mg/L	51	0.0001	48	0.00019	0.00060	0.00010	0.00010	0.00010	-
Titanium, dissolved	mg/L	51	0.0003	0	0.0018	0.0005	0.0013	0.0017	0.0031	-
Tungsten, dissolved	mg/L	51	0.0001	51	<0.0001	-	<0.0001	<0.0001	<0.0001	-
Uranium, dissolved	mg/L	51	0.00001	0	0.000094	0.000009	0.000083	0.000093	0.000113	-
Vanadium, dissolved	mg/L	51	0.0005	46	0.00050	0.00002	0.00050	0.00050	0.00054	-
Zinc, dissolved	mg/L	51	0.001	4	0.0029	0.0035	0.0010	0.0019	0.0089	0.017
Zirconium, dissolved	mg/L	51	0.0002 - 0.0003	21	0.00028	0.00003	0.00023	0.00030	0.00033	-
Metals Total										
Aluminum, total	mg/L	51	0.003	0	0.20	0.03	0.16	0.19	0.28	0.32
Antimony, total	mg/L	51	0.0001	51	<0.0001	-	<0.0001	<0.0001	<0.0001	0.006
Arsenic, total	mg/L	51	0.0001	0	0.00038	0.00005	0.00033	0.00037	0.00048	0.005
Barium, total	mg/L	51	0.0001	0	0.0062	0.0008	0.0054	0.0060	0.0078	1
Beryllium, total	mg/L	51	0.00002 - 0.0001	51	0.000062	0.000040	0.000020	0.000100	0.000100	0.011
Bismuth, total	mg/L	51	0.00005	51	<0.00005	-	<0.00005	<0.00005	<0.00005	17.5
Boron, total	mg/L	51	0.01	51	<0.01	-	<0.01	<0.01	<0.01	1.5
Cadmium, total	mg/L	51	0.000005	1	0.0000083	0.0000030	0.0000051	0.0000077	0.0000146	0.00004
Calcium, total	mg/L	51	0.05	0	2.7	0.2	2.5	2.6	3.2	1000
Cesium, total	mg/L	51	0.00001	30	0.000011	0.000001	0.000010	0.000010	0.000013	-
Chromium, total	mg/L	51	0.0001 - 0.0005	23	0.00047	0.00008	0.00034	0.00050	0.00053	-
Cobalt, total	mg/L	51	0.0001	39	0.00013	0.00011	0.00010	0.00010	0.00030	0.00078
Copper, total	mg/L	51	0.0005	0	0.0014	0.0013	0.0008	0.0011	0.0029	0.002
Iron, total	mg/L	51	0.01	0	0.42	0.22	0.25	0.38	0.83	3.3
Lead, total	mg/L	51	0.00005	0	0.00013	0.00006	0.00007	0.00011	0.00025	0.001
Lithium, total	mg/L	51	0.001	50	0.0010	0.00004	0.0010	0.0010	0.0010	2.5
Magnesium, total	mg/L	51	0.005	0	0.69	0.06	0.62	0.67	0.81	82
Manganese, total	mg/L	51	0.0001	0	0.033	0.061	0.009	0.017	0.138	0.12

APPENDIX B, TABLE 5

Summary of Year 2 surface water chemistry results from Mennin Lake, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Water Quality Guideline ¹
Metals Total										
Mercury, total	mg/L	51	0.000005	40	0.0000056	0.0000018	0.0000050	0.0000050	0.0000093	0.000026
Molybdenum, total	mg/L	51	0.00005	0	0.00035	0.00008	0.00028	0.00033	0.00056	0.073
Nickel, total	mg/L	51	0.0005	41	0.00051	0.00003	0.00050	0.00050	0.00057	0.025
Phosphorus, total	mg/L	51	0.05	51	<0.05	-	<0.05	<0.05	<0.05	-
Potassium, total	mg/L	51	0.05	0	0.38	0.03	0.35	0.37	0.44	53
Rhodium, total	mg/L	51	0.001	51	<0.001	-	<0.001	<0.001	<0.001	0.01
Rubidium, total	mg/L	51	0.0002	0	0.0012	0.0001	0.0011	0.0012	0.0014	-
Ruthenium, total	mg/L	51	0.001	51	<0.001	-	<0.001	<0.001	<0.001	0.01
Samarium, total	mg/L	51	0.001	51	<0.001	-	<0.001	<0.001	<0.001	0.0082
Selenium, total	mg/L	51	0.00005	0	0.00010	0.00002	0.00008	0.00010	0.00013	0.001
Silicon, total	mg/L	51	0.1	0	1.8	0.3	1.3	1.8	2.5	-
Silver, total	mg/L	60 ³	0.000005 - 0.00001	60	0.0000093	0.0000018	0.0000050	0.0000100	0.0000100	0.00025
Sodium, total	mg/L	51	0.05	0	1.1	0.1	1.0	1.1	1.5	680
Strontium, total	mg/L	51	0.0002	0	0.011	0.001	0.010	0.010	0.013	7
Sulfur, total	mg/L	51	0.5	46	0.51	0.04	0.50	0.50	0.51	-
Tellurium, total	mg/L	51	0.0002	51	<0.0002	-	<0.0002	<0.0002	<0.0002	0.0058
Thallium, total	mg/L	51	0.00001	50	0.000010	0.000001	0.000010	0.000010	0.000010	0.0008
Thorium, total	mg/L	51	0.0001	50	0.00010	0.000004	0.00010	0.00010	0.00010	-
Tin, total	mg/L	51	0.0001	48	0.00019	0.00061	0.00010	0.00010	0.00012	0.073
Titanium, total	mg/L	51	0.0003 - 0.0039	1	0.0030	0.0007	0.0021	0.0030	0.0046	0.076
Tungsten, total	mg/L	51	0.0001	51	<0.0001	-	<0.0001	<0.0001	<0.0001	0.03
Uranium, total	mg/L	51	0.00001	0	0.000099	0.000009	0.000089	0.000098	0.000116	0.015
Vanadium, total	mg/L	51	0.0005	33	0.00057	0.00013	0.00050	0.00050	0.00083	0.12
Zinc, total	mg/L	51	0.003	45	0.0033	0.0021	0.0030	0.0030	0.0034	0.02
Zirconium, total	mg/L	51	0.0002	17	0.00022	0.00002	0.00020	0.00022	0.00027	0.004
Microbiological Tests										
Coliforms, Escherichia coli [E. coli]	CFU/100mL	51	1 - 10	13	19	22	1	10	68	100
Coliforms, total ⁴	CFU/100mL	51	1 - 10	4	96	105	1	65	285	-
Organic and Inorganic Carbon										
Carbon, dissolved organic [DOC]	mg/L	51	0.5	0	13	1	12	13	15	-
Carbon, total inorganic [TIC]	mg/L	51	0.5	13	0.86	0.33	0.50	0.87	1.32	-
Carbon, total organic [TOC]	mg/L	51	0.5	0	13	1	11	13	15	-
Physical Tests										
Alkalinity, bicarbonate (as CaCO3)	mg/L	51	1 - 1.2	0	7.1	0.8	6.0	7.1	8.6	-
Alkalinity, carbonate (as CaCO3)	mg/L	51	0.6 - 1	51	0.79	0.20	0.60	0.60	1.00	-
Alkalinity, hydroxide (as CaCO3)	mg/L	51	0.34 - 1	51	0.65	0.33	0.34	0.34	1.00	-
Alkalinity, phenolphthalein (as CaCO3)	mg/L	24	1	24	<1	-	<1	<1	<1	-
Alkalinity, Total (as CaCO3)	mg/L	27	1	0	6.3	0.5	5.6	6.2	7.2	20
Alkalinity, total (as CaCO3)	mg/L	24	2	0	6.5	0.5	5.9	6.5	7.5	-

APPENDIX B, TABLE 5

Summary of Year 2 surface water chemistry results from Mennin Lake, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Water Quality Guideline ¹
Physical Tests										
Conductivity	µS/cm	51	1	0	23	2	21	23	27	700
Hardness (as CaCO3), from total Ca/Mg	mg/L	24	0.5	0	9.7	1.1	8.8	9.1	12.1	-
Solids, total dissolved [TDS]	mg/L	51	3 - 4	0	33	6	24	34	39	500
Solids, total suspended [TSS]	mg/L	51	3	45	3.1	0.2	3.0	3.0	3.3	-
Turbidity	NTU	51	0.1	0	1.6	0.7	1.0	1.5	2.7	50
Plant Pigments										
Chlorophyll a	µg/L	51	0.01 - 0.1	0	4.2	2.8	0.4	5.4	8.1	-
Radiological Parameters										
Carbon-14	Bq/L	51	6.5 - 18.5	51	15.4	4.87	6.7	18.5	18.5	200
Cesium-137	Bq/L	51	0.2 - 0.37	51	0.35	0.05	0.24	0.37	0.37	10
Chlorine-36	Bq/L	24	0.2 - 0.37	24	0.33	0.07	0.20	0.37	0.37	-
Cobalt-60	Bq/L	51	0.23 - 0.46	51	0.36	0.04	0.28	0.37	0.39	40
Gross Alpha	Bq/L	51	0.049 - 0.111	51	0.096	0.0245	0.051	0.111	0.111	-
Gross Beta	Bq/L	51	0.067 - 0.148	47	0.128	0.0305	0.072	0.148	0.148	-
Iodine-129	Bq/L	51	0.23 - 0.37	51	0.34	0.049	0.25	0.37	0.37	1
Neptunium-237	Bq/L	24	0.0022 - 0.0037	24	0.0034	0.0005	0.0024	0.0037	0.0037	-
Plutonium-238	Bq/L	24	0.00054 - 0.0037	24	0.0030	0.0013	0.0006	0.0037	0.0037	0.6
Plutonium-239	Bq/L	24	0.0002 - 0.0037	23	0.0029	0.0014	0.0004	0.0037	0.0037	0.6
Potassium-40	Bq/L	48	3.1 - 9	46	7.0	1.3	5.1	7.1	8.4	-
Radium-226	Bq/L	48	0.003 - 0.037	32	0.022	0.013	0.005	0.021	0.037	0.5
Ruthenium-106	Bq/L	51	2.2 - 3.8	51	3.0	0.3	2.5	3.0	3.4	20
Selenium-79	Bq/L	21	1.85	21	<1.85	-	<1.85	<1.85	<1.85	-
Strontium-90	Bq/L	51	0.014 - 0.037	51	0.031	0.010	0.015	0.037	0.037	5
Thorium-228	Bq/L	48	0.0032 - 0.0074	48	0.0067	0.0012	0.0045	0.0074	0.0074	2
Thorium-230	Bq/L	48	0.0038 - 0.0074	42	0.0061	0.0015	0.0039	0.0074	0.0074	0.6
Thorium-232	Bq/L	48	0.00036 - 0.0074	39	0.0053	0.0029	0.0008	0.0074	0.0074	0.6
Tritium	Bq/L	51	9.2 - 14.8	51	13.8	1.84	9.2	14.8	14.8	7000
Uranium-234	Bq/L	48	0.00056 - 0.0074	35	0.0067	0.0041	0.0031	0.0074	0.0074	3
Uranium-235	Bq/L	48	0.00071 - 0.0074	43	0.0052	0.0028	0.0010	0.0074	0.0074	3
Uranium-238	Bq/L	48	0.00065 - 0.0074	34	0.0053	0.0024	0.0017	0.0074	0.0074	3
Speciated Metals										
Chromium, hexavalent [Cr VI], dissolved	mg/L	51	0.0005	41	0.00057	0.00020	0.00050	0.00050	0.00106	-
Chromium, hexavalent [Cr VI], total	mg/L	51	0.0005	46	0.00055	0.00017	0.00050	0.00050	0.00094	0.005
Chromium, trivalent [Cr III], dissolved	mg/L	51	0.0005	49	0.00050	0.00002	0.00050	0.00050	0.00050	-
Chromium, trivalent [Cr III], total	mg/L	51	0.0005 - 0.001	50	0.00076	0.00025	0.00050	0.00100	0.00100	0.0089

APPENDIX B, TABLE 5

Summary of Year 2 surface water chemistry results from Mennin Lake, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Water Quality Guideline ¹
Volatile Organic Compounds										
Acetone	µg/L	6	20	6	<20	-	<20	<20	<20	1500
Benzene	µg/L	6	0.5	6	<0.5	-	<0.5	<0.5	<0.5	5
Bromodichloromethane	µg/L	6	0.5	6	<0.5	-	<0.5	<0.5	<0.5	200
Bromoform	µg/L	6	0.5	6	<0.5	-	<0.5	<0.5	<0.5	60
Bromomethane	µg/L	6	0.5	6	<0.5	-	<0.5	<0.5	<0.5	0.9
BTEX, total	µg/L	6	1	6	<1	-	<1	<1	<1	-
Carbon disulfide	µg/L	6	1	6	<1	-	<1	<1	<1	-
Carbon tetrachloride	µg/L	6	0.2	6	<0.2	-	<0.2	<0.2	<0.2	2
Chlorobenzene	µg/L	6	0.5	6	<0.5	-	<0.5	<0.5	<0.5	1.3
Chloroethane	µg/L	6	0.5	6	<0.5	-	<0.5	<0.5	<0.5	-
Chloroform	µg/L	6	0.5	6	<0.5	-	<0.5	<0.5	<0.5	1.8
Chloromethane	µg/L	6	2	6	<2	-	<2	<2	<2	-
Dibromochloromethane	µg/L	6	0.5	6	<0.5	-	<0.5	<0.5	<0.5	40
Dibromoethane, 1,2-	µg/L	6	0.2	6	<0.2	-	<0.2	<0.2	<0.2	5
Dichlorobenzene, 1,2-	µg/L	6	0.5	6	<0.5	-	<0.5	<0.5	<0.5	0.7
Dichlorobenzene, 1,3-	µg/L	6	0.5	6	<0.5	-	<0.5	<0.5	<0.5	2.5
Dichlorobenzene, 1,4-	µg/L	6	0.5	6	<0.5	-	<0.5	<0.5	<0.5	4
Dichlorodifluoromethane	µg/L	6	0.5	6	<0.5	-	<0.5	<0.5	<0.5	-
Dichloroethane, 1,1-	µg/L	6	0.5	6	<0.5	-	<0.5	<0.5	<0.5	200
Dichloroethane, 1,2-	µg/L	6	0.5	6	<0.5	-	<0.5	<0.5	<0.5	5
Dichloroethylene, 1,1-	µg/L	6	0.5	6	<0.5	-	<0.5	<0.5	<0.5	14
Dichloroethylene, cis+trans-1,2-	µg/L	6	0.71	6	<0.71	-	<0.71	<0.71	<0.71	-
Dichloroethylene, cis-1,2-	µg/L	6	0.5	6	<0.5	-	<0.5	<0.5	<0.5	200
Dichloroethylene, trans-1,2-	µg/L	6	0.5	6	<0.5	-	<0.5	<0.5	<0.5	200
Dichloromethane	µg/L	6	1	6	<1	-	<1	<1	<1	50
Dichloropropane, 1,2-	µg/L	6	0.5	6	<0.5	-	<0.5	<0.5	<0.5	0.7
Dichloropropylene, cis+trans-1,3-	µg/L	6	0.5	6	<0.5 ⁵	-	<0.5 ⁵	<0.5 ⁵	<0.5 ⁵	0.2
Dichloropropylene, cis-1,3-	µg/L	6	0.3	6	<0.3	-	<0.3	<0.3	<0.3	-
Dichloropropylene, trans-1,3-	µg/L	6	0.3	6	<0.3	-	<0.3	<0.3	<0.3	7
Ethylbenzene	µg/L	6	0.5	6	<0.5	-	<0.5	<0.5	<0.5	8
Hexane, n-	µg/L	6	0.5	6	<0.5	-	<0.5	<0.5	<0.5	0.58
Hexanone, 2-	µg/L	6	20	6	<20	-	<20	<20	<20	-
Methyl ethyl ketone [MEK]	µg/L	6	20	6	<20	-	<20	<20	<20	400
Methyl isobutyl ketone [MIBK]	µg/L	6	20	6	<20	-	<20	<20	<20	-
Methyl-tert-butyl ether [MTBE]	µg/L	6	0.5	6	<0.5	-	<0.5	<0.5	<0.5	200
Styrene	µg/L	6	0.5	6	<0.5	-	<0.5	<0.5	<0.5	4
Tetrachloroethane, 1,1,1,2-	µg/L	6	0.5	6	<0.5	-	<0.5	<0.5	<0.5	20
Tetrachloroethane, 1,1,2,2-	µg/L	6	0.5	6	<0.5	-	<0.5	<0.5	<0.5	70
Tetrachloroethylene	µg/L	6	0.5	6	<0.5	-	<0.5	<0.5	<0.5	10
Toluene	µg/L	6	0.5	6	<0.5	-	<0.5	<0.5	<0.5	0.8
Trichloroethane, 1,1,1-	µg/L	6	0.5	6	<0.5	-	<0.5	<0.5	<0.5	10
Trichloroethane, 1,1,2-	µg/L	6	0.5	6	<0.5	-	<0.5	<0.5	<0.5	800
Trichloroethylene	µg/L	6	0.5	6	<0.5	-	<0.5	<0.5	<0.5	5

APPENDIX B, TABLE 5

Summary of Year 2 surface water chemistry results from Mennin Lake, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Water Quality Guideline ¹
Volatile Organic Compounds										
Trichlorofluoromethane	µg/L	6	0.5	6	<0.5	-	<0.5	<0.5	<0.5	-
Trihalomethanes [THMs], total	µg/L	1	1	1	<1 ⁵	-	<1 ⁵	<1 ⁵	<1 ⁵	0.1
Vinyl chloride	µg/L	6	0.5	6	<0.5	-	<0.5	<0.5	<0.5	2
Xylene, m+p-	µg/L	6	0.4	6	<0.4	-	<0.4	<0.4	<0.4	32
Xylene, o-	µg/L	6	0.3	6	<0.3	-	<0.3	<0.3	<0.3	40
Xylenes, total	µg/L	6	0.5	6	<0.5	-	<0.5	<0.5	<0.5	30

Gray cells indicate guideline exceedance; n = sample size; RDL = Reportable Detection Limit; SD = Standard Deviation.

¹See Appendix B, Table 1 for detailed water quality guidelines.

²One value was outside the expected range and was excluded from analysis (0.209 mg/L)

³Parameter was analyzed at multiple detection limits.

⁴Multiple samples measured above detection range.

⁵Due to detection limits, guideline exceedance cannot be confirmed.

APPENDIX B, TABLE 6

Summary of Year 2 surface water chemistry results from Mennin River, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Water Quality Guideline ¹
Aggregate Organics										
Biochemical Oxygen Demand	mg/L	30	2	30	<2	-	<2	<2	<2	-
Anions and Nutrients										
Ammonia, Total (as N)	mg/L	30	0.01	10	0.049	0.077	0.010	0.019	0.179	5.86
Bromide	mg/L	30	0.1	30	<0.1	-	<0.1	<0.1	<0.1	-
Chloride	mg/L	30	0.5	6	0.77	0.25	0.50	0.65	1.17	120
Fluoride	mg/L	30	0.02	0	0.040	0.004	0.036	0.038	0.049	0.12
Iodide	mg/L	30	0.2	18	0.20	0.00	0.20	0.20	0.20	-
Kjeldahl nitrogen, total [TKN]	mg/L	30	0.15 - 0.2	1	0.42	0.18	0.25	0.38	0.71	-
Nitrate (as N)	mg/L	30	0.02	26	0.032	0.032	0.020	0.020	0.110	3
Nitrate and Nitrite as N	mg/L	30	0.0224 - 0.07	26	0.061	0.029	0.022	0.070	0.110	-
Nitrite (as N)	mg/L	30	0.01	30	<0.01	-	<0.01	<0.01	<0.01	0.02
Phosphorus, total	mg/L	30	0.003 - 0.03	15	0.017	0.006	0.009	0.018	0.030	-
Sulfate (as SO4)	mg/L	30	0.3	0	0.85	0.16	0.64	0.89	1.17	128
Cyanides										
Cyanide, Total	mg/L	30	0.002	30	<0.002	-	<0.002	<0.002	<0.002	0.005
Petroleum Hydrocarbon Compounds										
F1 (C6-C10)	mg/L	2	0.1	2	<0.1	-	<0.1	<0.1	<0.1	0.15
F1-BTEX	mg/L	2	0.1	2	<0.1	-	<0.1	<0.1	<0.1	0.15
F2 (C10-C16)	mg/L	2	0.1	2	<0.1	-	<0.1	<0.1	<0.1	0.11
F3 (C16-C34)	mg/L	2	0.2	2	<0.2	-	<0.2	<0.2	<0.2	-
F4 (C34-C50)	mg/L	2	0.2	2	<0.2	-	<0.2	<0.2	<0.2	-
TEH (C10-C50)	mg/L	2	0.4	2	<0.4	-	<0.4	<0.4	<0.4	-
TEH (C16-C50)	mg/L	2	0.4	2	<0.4	-	<0.4	<0.4	<0.4	-
Metals Dissolved										
Aluminum, dissolved	mg/L	30	0.001	0	0.17	0.05	0.08	0.18	0.25	-
Antimony, dissolved	mg/L	30	0.0001	29	0.00010	0.00001	0.00010	0.00010	0.00010	-
Arsenic, dissolved	mg/L	30	0.0001	0	0.00036	0.00004	0.00029	0.00036	0.00041	-
Barium, dissolved	mg/L	30	0.0001	0	0.0056	0.0006	0.0049	0.0054	0.0069	-
Beryllium, dissolved	mg/L	30	0.00002 - 0.0001	30	0.000068	0.000040	0.000020	0.000100	0.000100	-
Bismuth, dissolved	mg/L	30	0.00005	30	<0.00005	-	<0.00005	<0.00005	<0.00005	-
Boron, dissolved	mg/L	30	0.01	30	<0.01	-	<0.01	<0.01	<0.01	-
Cadmium, dissolved	mg/L	30	0.000005	4	0.0000071	0.0000020	0.0000050	0.0000067	0.0000105	-
Calcium, dissolved	mg/L	30	0.05	0	2.7	0.6	2.1	2.7	4.0	-
Cesium, dissolved	mg/L	30	0.00001	19	0.000011	0.000001	0.000010	0.000010	0.000013	-
Chromium, dissolved	mg/L	30	0.0001 - 0.0005	12	0.00042	0.00009	0.00029	0.00046	0.00050	-
Cobalt, dissolved	mg/L	30	0.0001	14	0.00012	0.00005	0.00010	0.00010	0.00025	-
Copper, dissolved	mg/L	30	0.0002	0	0.00067	0.00022	0.00042	0.00067	0.00107	0.00087
Iron, dissolved	mg/L	30	0.01	0	0.33	0.13	0.15	0.31	0.59	-
Lead, dissolved	mg/L	30	0.00005	3	0.000090	0.000031	0.000050	0.000093	0.000143	0.0065
Lithium, dissolved	mg/L	30	0.001	29	0.0010	0	0.0010	0.0010	0.0010	-
Magnesium, dissolved	mg/L	30	0.005	0	0.69	0.18	0.49	0.66	1.09	-
Manganese, dissolved	mg/L	30	0.0001	0	0.016	0.007	0.007	0.015	0.031	0.23
Mercury, dissolved	mg/L	30	0.000005	24	0.0000062	0.0000042	0.0000050	0.0000050	0.0000121	-

APPENDIX B, TABLE 6

Summary of Year 2 surface water chemistry results from Mennin River, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Water Quality Guideline ¹
Metals Dissolved										
Molybdenum, dissolved	mg/L	30	0.00005	0	0.00021	0.00007	0.00011	0.00022	0.00031	-
Nickel, dissolved	mg/L	30	0.0005	29	0.00050	0.00001	0.00050	0.00050	0.00050	-
Phosphorus, dissolved	mg/L	30	0.05	30	<0.05	-	<0.05	<0.05	<0.05	-
Potassium, dissolved	mg/L	30	0.05	0	0.34	0.06	0.26	0.34	0.48	-
Rhodium, dissolved	mg/L	30	0.001	30	<0.001	-	<0.001	<0.001	<0.001	-
Rubidium, dissolved	mg/L	30	0.0002	0	0.0011	0.0001	0.0009	0.0011	0.0014	-
Ruthenium, dissolved	mg/L	30	0.001	30	<0.001	-	<0.001	<0.001	<0.001	-
Samarium, dissolved	mg/L	30	0.001	30	<0.001	-	<0.001	<0.001	<0.001	-
Selenium, dissolved	mg/L	30	0.00005	1	0.00010	0.00002	0.00006	0.00010	0.00013	-
Silicon, dissolved	mg/L	30	0.05	0	1.7	0.5	0.8	1.7	2.9	-
Silver, dissolved	mg/L	33 ²	0.000005 - 0.00001	33	0.0000095	0.0000015	0.0000050	0.0000100	0.0000100	-
Sodium, dissolved	mg/L	30	0.05	0	1.2	0.2	1.0	1.2	1.6	-
Strontium, dissolved	mg/L	30	0.0002	0	0.011	0.001	0.009	0.010	0.015	2.5
Sulfur, dissolved	mg/L	30	0.5	26	0.53	0.09	0.50	0.50	0.74	-
Tellurium, dissolved	mg/L	30	0.0002	30	<0.0002	-	<0.0002	<0.0002	<0.0002	-
Thallium, dissolved	mg/L	30	0.00001	30	<0.00001	-	<0.00001	<0.00001	<0.00001	-
Thorium, dissolved	mg/L	30	0.0001	18	0.00011	0.00001	0.00010	0.00010	0.00012	-
Tin, dissolved	mg/L	30	0.0001	24	0.00051	0.00118	0.00010	0.00010	0.00321	-
Titanium, dissolved	mg/L	30	0.0003	0	0.0021	0.0009	0.0008	0.0024	0.0032	-
Tungsten, dissolved	mg/L	30	0.0001	30	<0.0001	-	<0.0001	<0.0001	<0.0001	-
Uranium, dissolved	mg/L	30	0.00001	0	0.00011	0.00003	0.00006	0.00011	0.00017	-
Vanadium, dissolved	mg/L	30	0.0005	21	0.00051	0.00003	0.00050	0.00050	0.00057	-
Zinc, dissolved	mg/L	30	0.001	4	0.0030	0.0020	0.0010	0.0027	0.0058	0.017
Zirconium, dissolved	mg/L	30	0.0002 - 0.0003	13	0.00029	0.00005	0.00020	0.00030	0.00035	-
Metals Total										
Aluminum, total	mg/L	30	0.003	0	0.24	0.08	0.11	0.25	0.36	0.32
Antimony, total	mg/L	30	0.0001	29	0.00010	0.000004	0.00010	0.00010	0.00010	0.006
Arsenic, total	mg/L	30	0.0001	0	0.00039	0.00004	0.00032	0.00039	0.00046	0.005
Barium, total	mg/L	30	0.0001	0	0.0061	0.0009	0.0049	0.0059	0.0079	1
Beryllium, total	mg/L	30	0.00002 - 0.0001	29	0.000068	0.000040	0.000020	0.000100	0.000100	0.011
Bismuth, total	mg/L	30	0.00005	30	<0.00005	-	<0.00005	<0.00005	<0.00005	17.5
Boron, total	mg/L	30	0.01	30	<0.01	-	<0.01	<0.01	<0.01	1.5
Cadmium, total	mg/L	30	0.000005	2	0.0000082	0.0000024	0.0000051	0.0000079	0.0000126	0.00004
Calcium, total	mg/L	30	0.05	0	2.7	0.6	2.1	2.6	4.1	1000
Cesium, total	mg/L	30	0.00001	0	0.000015	0.000004	0.000010	0.000015	0.000022	-
Chromium, total	mg/L	30	0.0001 - 0.0005	6	0.00054	0.00021	0.00031	0.00051	0.00068	-
Cobalt, total	mg/L	30	0.0001	5	0.00015	0.00006	0.00010	0.00015	0.00028	0.00078
Copper, total	mg/L	30	0.0005	5	0.00089	0.00031	0.00050	0.00089	0.00154	0.002
Iron, total	mg/L	30	0.01	0	0.47	0.19	0.22	0.45	0.79	3.3
Lead, total	mg/L	30	0.00005	0	0.00013	0.00005	0.00007	0.00015	0.00020	0.001
Lithium, total	mg/L	30	0.001	23	0.0010	0.0001	0.0010	0.0010	0.0012	2.5
Magnesium, total	mg/L	30	0.005	0	0.71	0.19	0.49	0.67	1.11	82
Manganese, total	mg/L	30	0.0001	0	0.020	0.007	0.009	0.018	0.033	0.12

APPENDIX B, TABLE 6

Summary of Year 2 surface water chemistry results from Mennin River, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Water Quality Guideline ¹
Metals Total										
Mercury, total	mg/L	30	0.000005	24	0.000012	0.000019	0.000005	0.000005	0.000060	0.000026
Molybdenum, total	mg/L	30	0.00005	0	0.00022	0.00007	0.00011	0.00024	0.00031	0.073
Nickel, total	mg/L	30	0.0005	19	0.00053	0.00006	0.00050	0.00050	0.00065	0.025
Phosphorus, total	mg/L	30	0.05	30	<0.05	-	<0.05	<0.05	<0.05	-
Potassium, total	mg/L	30	0.05	0	0.35	0.07	0.24	0.35	0.49	53
Rhodium, total	mg/L	30	0.001	30	<0.001	-	<0.001	<0.001	<0.001	0.01
Rubidium, total	mg/L	30	0.0002	0	0.0012	0.0002	0.0009	0.0012	0.0015	-
Ruthenium, total	mg/L	30	0.001	30	<0.001	-	<0.001	<0.001	<0.001	0.01
Samarium, total	mg/L	30	0.001	30	<0.001	-	<0.001	<0.001	<0.001	0.0082
Selenium, total	mg/L	30	0.00005	2	0.00010	0.00003	0.00005	0.00011	0.00014	0.001
Silicon, total	mg/L	30	0.1	0	1.9	0.6	1.0	1.9	3.1	-
Silver, total	mg/L	33 ²	0.000005 - 0.00001	33	0.0000095	0.0000015	0.0000050	0.0000100	0.0000100	0.00025
Sodium, total	mg/L	30	0.05	0	1.2	0.2	1.0	1.2	1.6	680
Strontium, total	mg/L	30	0.0002	0	0.011	0.002	0.010	0.010	0.015	7
Sulfur, total	mg/L	30	0.5	28	0.50	0.01	0.50	0.50	0.52	-
Tellurium, total	mg/L	30	0.0002	30	<0.0002	-	<0.0002	<0.0002	<0.0002	0.0058
Thallium, total	mg/L	30	0.00001	30	<0.00001	-	<0.00001	<0.00001	<0.00001	0.0008
Thorium, total	mg/L	30	0.0001	21	0.00010	0.00001	0.00010	0.00010	0.00012	-
Tin, total	mg/L	30	0.0001	21	0.00062	0.00121	0.00010	0.00010	0.00315	0.073
Titanium, total	mg/L	30	0.0003 - 0.0084	2	0.0045	0.0023	0.0014	0.0040	0.0079	0.076
Tungsten, total	mg/L	30	0.0001	30	<0.0001	-	<0.0001	<0.0001	<0.0001	0.03
Uranium, total	mg/L	30	0.00001	0	0.00011	0.00004	0.00006	0.00012	0.00017	0.015
Vanadium, total	mg/L	30	0.0005	9	0.00065	0.00014	0.00050	0.00063	0.00086	0.12
Zinc, total	mg/L	30	0.003	27	0.0034	0.0017	0.0030	0.0030	0.0042	0.02
Zirconium, total	mg/L	30	0.0002	11	0.00024	0.00004	0.00020	0.00024	0.00029	0.004
Microbiological Tests										
Coliforms, Escherichia coli [E. coli]	CFU/100mL	30	1 - 10	0	53	45	5	41	146	100
Coliforms, total ³	CFU/100mL	30	1 - 10	0	191	329	1	10	851	-
Organic and Inorganic Carbon										
Carbon, dissolved organic [DOC]	mg/L	30	0.5	0	14	5	4	14	20	-
Carbon, total inorganic [TIC]	mg/L	30	0.5	9	0.84	0.31	0.50	0.82	1.53	-
Carbon, total organic [TOC]	mg/L	30	0.5	0	15	3	10	15	22	-
Physical Tests										
Alkalinity, bicarbonate (as CaCO3)	mg/L	30	1 - 1.2	0	7.0	1.9	4.9	6.3	10.6	-
Alkalinity, carbonate (as CaCO3)	mg/L	30	0.6 - 1	30	0.76	0.20	0.60	0.60	1.00	-
Alkalinity, hydroxide (as CaCO3)	mg/L	30	0.34 - 1	30	0.60	0.33	0.34	0.34	1.00	-
Alkalinity, phenolphthalein (as CaCO3)	mg/L	12	1	12	<1	-	<1	<1	<1	-
Alkalinity, Total (as CaCO3)	mg/L	18	1	0	5.5	1.3	4.0	5.1	7.5	20
Alkalinity, total (as CaCO3)	mg/L	12	2	0	7.4	2.2	5.5	6.6	11.1	-

APPENDIX B, TABLE 6

Summary of Year 2 surface water chemistry results from Mennin River, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Water Quality Guideline ¹
Physical Tests										
Conductivity	µS/cm	30	1	0	23	4	20	22	31	700
Hardness (as CaCO3), from total Ca/Mg	mg/L	12	0.5	0	10	3	7	9	15	-
Solids, total dissolved [TDS]	mg/L	30	3 - 13	0	38	8	24	39	48	500
Solids, total suspended [TSS]	mg/L	30	3	18	3.5	0.8	3.0	3.0	5.3	-
Turbidity	NTU	30	0.1	0	1.9	1.0	0.8	1.8	4.0	50
Plant Pigments										
Chlorophyll a	µg/L	30	0.01 - 0.1	0	2.5	1.6	0.6	2.0	6.0	-
Radiological Parameters										
Carbon-14	Bq/L	30	6.7 - 18.5	30	15	5	7	19	19	200
Cesium-137	Bq/L	30	0.31 - 0.37	30	0.37	0.01	0.34	0.37	0.37	10
Chlorine-36	Bq/L	15	0.21 - 0.37	15	0.34	0.06	0.22	0.37	0.37	-
Cobalt-60	Bq/L	30	0.37 - 0.46	30	0.38	0.02	0.37	0.37	0.43	40
Gross Alpha	Bq/L	30	0.053 - 0.111	29	0.098	0.021	0.064	0.111	0.111	-
Gross Beta	Bq/L	30	0.082 - 0.148	26	0.131	0.033	0.084	0.148	0.148	-
Iodine-129	Bq/L	30	0.23 - 0.37	30	0.34	0.06	0.24	0.37	0.37	1
Neptunium-237	Bq/L	15	0.0011 - 0.0037	15	0.0034	0.0007	0.0020	0.0037	0.0037	-
Plutonium-238	Bq/L	15	0.00023 - 0.0037	14	0.0030	0.0014	0.0003	0.0037	0.0037	0.6
Plutonium-239	Bq/L	15	0.00062 - 0.0037	15	0.0031	0.0012	0.0007	0.0037	0.0037	0.6
Potassium-40	Bq/L	27	5.6 - 7.7	27	7.0	0.5	5.9	7.1	7.5	-
Radium-226	Bq/L	27	0.0051 - 0.037	19	0.024	0.014	0.006	0.028	0.037	0.5
Ruthenium-106	Bq/L	30	3 - 3.9	30	3.2	0.3	3.0	3.0	3.8	20
Selenium-79	Bq/L	15	1.85	15	<1.85	-	<1.85	<1.85	<1.85	-
Strontium-90	Bq/L	30	0.015 - 0.037	30	0.031	0.010	0.015	0.037	0.037	5
Thorium-228	Bq/L	27	0.0031 - 0.0074	26	0.0064	0.0016	0.0041	0.0074	0.0074	2
Thorium-230	Bq/L	27	0.0035 - 0.0074	20	0.0057	0.0018	0.0036	0.0072	0.0074	0.6
Thorium-232	Bq/L	27	0.0003 - 0.0074	18	0.0047	0.0030	0.0010	0.0074	0.0074	0.6
Tritium	Bq/L	30	12 - 14.8	30	14	1	12	15	15	7000
Uranium-234	Bq/L	27	0.0015 - 0.0074	16	0.0055	0.0020	0.0030	0.0065	0.0074	3
Uranium-235	Bq/L	27	0.00078 - 0.0074	25	0.0055	0.0027	0.0009	0.0074	0.0074	3
Uranium-238	Bq/L	27	0.00098 - 0.0074	19	0.0054	0.0023	0.0018	0.0074	0.0074	3
Speciated Metals										
Chromium, hexavalent [Cr VI], dissolved	mg/L	30	0.0005	24	0.00052	0.00006	0.00050	0.00050	0.00064	-
Chromium, hexavalent [Cr VI], total	mg/L	30	0.0005	23	0.00058	0.00023	0.00050	0.00050	0.00109	0.005
Chromium, trivalent [Cr III], dissolved	mg/L	30	0.0005	30	<0.0005	-	<0.0005	<0.0005	<0.0005	-
Chromium, trivalent [Cr III], total	mg/L	30	0.0005 - 0.001	26	0.00082	0.00023	0.00050	0.00100	0.00100	0.0089
Volatile Organic Compounds										
Acetone	µg/L	3	20	3	<20	-	<20	<20	<20	1500
Benzene	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	5
Bromodichloromethane	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	200
Bromoform	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	60
Bromomethane	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	0.9

APPENDIX B, TABLE 6

Summary of Year 2 surface water chemistry results from Mennin River, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Water Quality Guideline ¹
Volatile Organic Compounds										
BTEX, total	µg/L	3	1	3	<1	-	<1	<1	<1	-
Carbon disulfide	µg/L	3	1	3	<1	-	<1	<1	<1	-
Carbon tetrachloride	µg/L	3	0.2	3	<0.2	-	<0.2	<0.2	<0.2	2
Chlorobenzene	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	1.3
Chloroethane	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	-
Chloroform	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	1.8
Chloromethane	µg/L	3	2	3	<2	-	<2	<2	<2	-
Dibromochloromethane	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	40
Dibromoethane, 1,2-	µg/L	3	0.2	3	<0.2	-	<0.2	<0.2	<0.2	5
Dichlorobenzene, 1,2-	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	0.7
Dichlorobenzene, 1,3-	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	2.5
Dichlorobenzene, 1,4-	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	4
Dichlorodifluoromethane	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	-
Dichloroethane, 1,1-	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	200
Dichloroethane, 1,2-	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	5
Dichloroethylene, 1,1-	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	14
Dichloroethylene, cis+trans-1,2-	µg/L	3	0.71	3	<0.71	-	<0.71	<0.71	<0.71	-
Dichloroethylene, cis-1,2-	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	200
Dichloroethylene, trans-1,2-	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	200
Dichloromethane	µg/L	3	1	3	<1	-	<1	<1	<1	50
Dichloropropane, 1,2-	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	0.7
Dichloropropylene, cis+trans-1,3-	µg/L	3	0.5	3	<0.5 ⁴	-	<0.5 ⁴	<0.5 ⁴	<0.5 ⁴	0.2
Dichloropropylene, cis-1,3-	µg/L	3	0.3	3	<0.3	-	<0.3	<0.3	<0.3	-
Dichloropropylene, trans-1,3-	µg/L	3	0.3	3	<0.3	-	<0.3	<0.3	<0.3	7
Ethylbenzene	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	8
Hexane, n-	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	0.58
Hexanone, 2-	µg/L	3	20	3	<20	-	<20	<20	<20	-
Methyl ethyl ketone [MEK]	µg/L	3	20	3	<20	-	<20	<20	<20	400
Methyl isobutyl ketone [MIBK]	µg/L	3	20	3	<20	-	<20	<20	<20	-
Methyl-tert-butyl ether [MTBE]	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	200
Styrene	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	4
Tetrachloroethane, 1,1,1,2-	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	20
Tetrachloroethane, 1,1,2,2-	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	70
Tetrachloroethylene	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	10
Toluene	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	0.8

APPENDIX B, TABLE 6

Summary of Year 2 surface water chemistry results from Mennin River, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Water Quality Guideline ¹
Volatile Organic Compounds										
Trichloroethane, 1,1,1-	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	10
Trichloroethane, 1,1,2-	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	800
Trichloroethylene	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	5
Trichlorofluoromethane	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	-
Trihalomethanes [THMs], total	µg/L	1	1	1	<1 ⁴	-	<1 ⁴	<1 ⁴	<1 ⁴	0.1
Vinyl chloride	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	2
Xylene, m+p-	µg/L	3	0.4	3	<0.4	-	<0.4	<0.4	<0.4	32
Xylene, o-	µg/L	3	0.3	3	<0.3	-	<0.3	<0.3	<0.3	40
Xylenes, total	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	30

Gray cells indicate guideline exceedance; n = sample size; RDL = Reportable Detection Limit; SD = Standard Deviation.

¹See Appendix B, Table 3 for detailed water qualtiy guidelines.

²Parameter was anlayzed at multiple detection limits.

³Multiple samples measured above detection range.

⁴Due to detection limits, guideline exceedance cannot be confirmed.

APPENDIX B, TABLE 7

Summary of Year 2 surface water chemistry results from Revell Lake, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Water Quality Guideline ¹
Aggregate Organics										
Biochemical Oxygen Demand	mg/L	39	2	39	<2	-	<2	<2	<2	-
Anions and Nutrients										
Ammonia, Total (as N)	mg/L	39	0.01	18	0.022	0.020	0.010	0.013	0.062	5.86
Bromide	mg/L	39	0.1	39	<0.1	-	<0.1	<0.1	<0.1	-
Chloride	mg/L	39	0.5	37	0.50	0.02	0.50	0.50	0.50	120
Fluoride	mg/L	39	0.02	0	0.024	0.002	0.022	0.024	0.026	0.12
Iodide	mg/L	39	0.2	21	0.20	0.00	0.20	0.20	0.20	-
Kjeldahl nitrogen, total [TKN]	mg/L	39	0.15 - 0.2	0	0.34	0.11	0.24	0.32	0.60	-
Nitrate (as N)	mg/L	39	0.02	18	0.047	0.029	0.020	0.040	0.085	3
Nitrate and Nitrite as N	mg/L	39	0.0224 - 0.07	20	0.071	0.011	0.055	0.070	0.085	-
Nitrite (as N)	mg/L	39	0.01	39	<0.01	-	<0.01	<0.01	<0.01	0.02
Phosphorus, total	mg/L	39	0.003 - 0.02	17	0.014	0.006	0.007	0.012	0.020	-
Sulfate (as SO4)	mg/L	39	0.3	0	1.1	0.7	0.8	1.0	1.7	128
Cyanides										
Cyanide, Total	mg/L	39	0.002	39	<0.002	-	<0.002	<0.002	<0.002	0.005
Metals Dissolved										
Aluminum, dissolved	mg/L	39	0.001	0	0.040	0.014	0.022	0.040	0.061	-
Antimony, dissolved	mg/L	39	0.0001	39	<0.0001	-	<0.0001	<0.0001	<0.0001	-
Arsenic, dissolved	mg/L	39	0.0001	0	0.00024	0.00003	0.00021	0.00024	0.00028	-
Barium, dissolved	mg/L	39	0.0001	0	0.0044	0.0004	0.0036	0.0046	0.0049	-
Beryllium, dissolved	mg/L	39	0.00002 - 0.0001	39	0.000063	0.000040	0.000020	0.000100	0.000100	-
Bismuth, dissolved	mg/L	39	0.00005	39	<0.00005	-	<0.00005	<0.00005	<0.00005	-
Boron, dissolved	mg/L	39	0.01	39	<0.01	-	<0.01	<0.01	<0.01	-
Cadmium, dissolved	mg/L	37	0.000005	34	0.0000052	0.0000008	0.0000050	0.0000050	0.0000062	-
Calcium, dissolved	mg/L	39	0.05	0	2.3	0.2	2.1	2.3	2.7	-
Cesium, dissolved	mg/L	39	0.00001	13	0.000013	0.000004	0.000010	0.000012	0.000017	-
Chromium, dissolved	mg/L	39	0.0001 - 0.0005	19	0.00031	0.00018	0.00011	0.00019	0.00050	-
Cobalt, dissolved	mg/L	39	0.0001	39	<0.0001	-	<0.0001	<0.0001	<0.0001	-
Copper, dissolved	mg/L	39	0.0002	0	0.0021	0.0054	0.0004	0.0005	0.0086	0.00087
Iron, dissolved	mg/L	39	0.01	0	0.11	0.05	0.04	0.12	0.17	-
Lead, dissolved	mg/L	39	0.00005	28	0.00010	0.00022	0.00005	0.00005	0.00016	0.0065
Lithium, dissolved	mg/L	39	0.001	39	<0.001	-	<0.001	<0.001	<0.001	-
Magnesium, dissolved	mg/L	39	0.005	0	0.47	0.02	0.45	0.47	0.53	-
Manganese, dissolved	mg/L	39	0.0001	0	0.0065	0.0108	0.0007	0.0036	0.0306	0.23
Mercury, dissolved	mg/L	39	0.000005	33	0.0000055	0.0000019	0.0000050	0.0000050	0.0000075	-
Molybdenum, dissolved	mg/L	39	0.00005	30	0.000062	0.000036	0.000050	0.000050	0.000121	-
Nickel, dissolved	mg/L	39	0.0005	37	0.00051	0.00005	0.00050	0.00050	0.00051	-
Phosphorus, dissolved	mg/L	39	0.05	39	<0.05	-	<0.05	<0.05	<0.05	-
Potassium, dissolved	mg/L	39	0.05	0	0.41	0.02	0.38	0.40	0.45	-
Rhodium, dissolved	mg/L	39	0.001	39	<0.001	-	<0.001	<0.001	<0.001	-
Rubidium, dissolved	mg/L	39	0.0002	0	0.0012	0.0001	0.0011	0.0012	0.0013	-
Ruthenium, dissolved	mg/L	39	0.001	39	<0.001	-	<0.001	<0.001	<0.001	-
Samarium, dissolved	mg/L	39	0.001	39	<0.001	-	<0.001	<0.001	<0.001	-

APPENDIX B, TABLE 7

Summary of Year 2 surface water chemistry results from Revell Lake, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Water Quality Guideline ¹
Metals Dissolved										
Selenium, dissolved	mg/L	39	0.00005	2	0.000075	0.000016	0.000054	0.000072	0.000103	-
Silicon, dissolved	mg/L	39	0.05	0	0.99	0.19	0.68	0.98	1.26	-
Silver, dissolved	mg/L	44 ²	0.000005 - 0.00001	44	0.0000094	0.0000016	0.0000050	0.0000100	0.0000100	-
Sodium, dissolved	mg/L	39	0.05	0	0.72	0.10	0.64	0.69	0.91	-
Strontium, dissolved	mg/L	39	0.0002	0	0.0082	0.0006	0.0075	0.0081	0.0094	2.5
Sulfur, dissolved	mg/L	39	0.5	36	0.51	0.03	0.50	0.50	0.56	-
Tellurium, dissolved	mg/L	39	0.0002	39	<0.0002	-	<0.0002	<0.0002	<0.0002	-
Thallium, dissolved	mg/L	39	0.00001	39	<0.00001	-	<0.00001	<0.00001	<0.00001	-
Thorium, dissolved	mg/L	39	0.0001	39	<0.0001	-	<0.0001	<0.0001	<0.0001	-
Tin, dissolved	mg/L	39	0.0001	36	0.00029	0.00116	0.00010	0.00010	0.00011	-
Titanium, dissolved	mg/L	39	0.0003	28	0.00034	0.00007	0.00030	0.00030	0.00047	-
Tungsten, dissolved	mg/L	39	0.0001	39	<0.0001	-	<0.0001	<0.0001	<0.0001	-
Uranium, dissolved	mg/L	39	0.00001	0	0.000036	0.000003	0.000032	0.000037	0.000040	-
Vanadium, dissolved	mg/L	39	0.0005	39	<0.0005	-	<0.0005	<0.0005	<0.0005	-
Zinc, dissolved	mg/L	37	0.001	11	0.0027	0.0034	0.0010	0.0013	0.0092	0.017
Zirconium, dissolved	mg/L	39	0.0002 - 0.0003	39	0.00025	0.00005	0.00020	0.00020	0.00030	-
Metals Total										
Aluminum, total	mg/L	39	0.003 - 0.015	0	0.049	0.014	0.029	0.049	0.070	0.32
Antimony, total	mg/L	39	0.0001	39	<0.0001	-	<0.0001	<0.0001	<0.0001	0.006
Arsenic, total	mg/L	39	0.0001	0	0.00026	0.00003	0.00022	0.00025	0.00032	0.005
Barium, total	mg/L	39	0.0001	0	0.0046	0.0004	0.0039	0.0046	0.0051	1
Beryllium, total	mg/L	39	0.00002 - 0.0001	39	0.000063	0.000040	0.000020	0.000100	0.000100	0.011
Bismuth, total	mg/L	39	0.00005	39	<0.00005	-	<0.00005	<0.00005	<0.00005	17.5
Boron, total	mg/L	39	0.01	39	<0.01	-	<0.01	<0.01	<0.01	1.5
Cadmium, total	mg/L	39	0.000005	26	0.0000056	0.0000012	0.0000050	0.0000050	0.0000090	0.00004
Calcium, total	mg/L	39	0.05	0	2.3	0.1	2.2	2.3	2.6	1000
Cesium, total	mg/L	39	0.00001	9	0.000013	0.000003	0.000010	0.000012	0.000018	-
Chromium, total	mg/L	39	0.0001 - 0.0005	18	0.00040	0.00044	0.00012	0.00048	0.00050	-
Cobalt, total	mg/L	39	0.0001	39	<0.0001	-	<0.0001	<0.0001	<0.0001	0.00078
Copper, total	mg/L	39	0.0005	8	0.0026	0.0048	0.0005	0.0010	0.0074	0.002
Iron, total	mg/L	39	0.01 - 0.05	0	0.17	0.06	0.07	0.20	0.25	3.3
Lead, total	mg/L	39	0.00005	30	0.000059	0.000025	0.000050	0.000050	0.000085	0.001
Lithium, total	mg/L	39	0.001	39	<0.001	-	<0.001	<0.001	<0.001	2.5
Magnesium, total	mg/L	39	0.005	0	0.48	0.02	0.46	0.48	0.52	82
Manganese, total	mg/L	39	0.0001	0	0.017	0.011	0.006	0.012	0.039	0.12
Mercury, total	mg/L	39	0.000005	32	0.0000066	0.0000044	0.0000050	0.0000050	0.0000153	0.000026
Molybdenum, total	mg/L	39	0.00005	32	0.000052	0.000009	0.000050	0.000050	0.000058	0.073
Nickel, total	mg/L	39	0.0005	38	0.00052	0.00014	0.00050	0.00050	0.00050	0.025
Phosphorus, total	mg/L	39	0.05	39	<0.05	-	<0.05	<0.05	<0.05	-
Potassium, total	mg/L	39	0.05	0	0.40	0.02	0.36	0.39	0.44	53
Rhodium, total	mg/L	39	0.001	39	<0.001	-	<0.001	<0.001	<0.001	0.01
Rubidium, total	mg/L	39	0.0002	0	0.0012	0.0001	0.0011	0.0012	0.0013	-
Ruthenium, total	mg/L	39	0.001	39	<0.001	-	<0.001	<0.001	<0.001	0.01

APPENDIX B, TABLE 7

Summary of Year 2 surface water chemistry results from Revell Lake, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Water Quality Guideline ¹
Metals Total										
Samarium, total	mg/L	39	0.001	39	<0.001	-	<0.001	<0.001	<0.001	0.0082
Selenium, total	mg/L	39	0.00005	0	0.000086	0.000017	0.000064	0.000084	0.000108	0.001
Silicon, total	mg/L	39	0.1	0	1.0	0.2	0.7	1.0	1.3	-
Silver, total	mg/L	44 ²	0.000005 - 0.00001	44	0.0000094	0.0000016	0.0000050	0.0000100	0.0000100	0.00025
Sodium, total	mg/L	39	0.05	0	0.71	0.09	0.64	0.67	0.94	680
Strontium, total	mg/L	39	0.0002	0	0.0083	0.0006	0.0076	0.0081	0.0095	7
Sulfur, total	mg/L	39	0.5	39	<0.5	-	<0.5	<0.5	<0.5	-
Tellurium, total	mg/L	39	0.0002	38	0.00020	0.00001	0.00020	0.00020	0.00020	0.0058
Thallium, total	mg/L	39	0.00001	39	<0.00001	-	<0.00001	<0.00001	<0.00001	0.0008
Thorium, total	mg/L	39	0.0001	39	<0.0001	-	<0.0001	<0.0001	<0.0001	-
Tin, total	mg/L	39	0.0001	33	0.00029	0.00116	0.00010	0.00010	0.00012	0.073
Titanium, total	mg/L	39	0.0003 - 0.0006	20	0.00042	0.00015	0.00030	0.00035	0.00065	0.076
Tungsten, total	mg/L	39	0.0001	39	<0.0001	-	<0.0001	<0.0001	<0.0001	0.03
Uranium, total	mg/L	39	0.00001	0	0.000038	0.000003	0.000033	0.000038	0.000041	0.015
Vanadium, total	mg/L	39	0.0005	39	<0.0005	-	<0.0005	<0.0005	<0.0005	0.12
Zinc, total	mg/L	39	0.003	36	0.0030	0.0002	0.0030	0.0030	0.0031	0.02
Zirconium, total	mg/L	39	0.0002	39	<0.0002	-	<0.0002	<0.0002	<0.0002	0.004
Microbiological Tests										
Coliforms, Escherichia coli [E. coli]	CFU/100mL	39	1	10	3.1	2.3	1.0	2.0	7.1	100
Coliforms, total	CFU/100mL	39	1	5	48	48	1	27	130	-
Organic and Inorganic Carbon										
Carbon, dissolved organic [DOC]	mg/L	39	0.5	0	9.4	2.4	7.8	8.8	12.7	-
Carbon, total inorganic [TIC]	mg/L	39	0.5	5	0.91	0.27	0.50	0.94	1.35	-
Carbon, total organic [TOC]	mg/L	39	0.5	0	8.7	1.2	7.4	8.5	11.3	-
Physical Tests										
Alkalinity, bicarbonate (as CaCO3)	mg/L	39	1 - 1.2	0	6.6	0.9	5.5	6.7	7.9	-
Alkalinity, carbonate (as CaCO3)	mg/L	39	0.6 - 1	39	0.78	0.20	0.60	0.60	1.00	-
Alkalinity, hydroxide (as CaCO3)	mg/L	39	0.34 - 1	39	0.64	0.33	0.34	0.34	1.00	-
Alkalinity, phenolphthalein (as CaCO3)	mg/L	18	1	18	<1	-	<1	<1	<1	-
Alkalinity, total (as CaCO3)	mg/L	18	2	0	5.9	0.8	4.6	6.0	6.6	-
Alkalinity, Total (as CaCO3)	mg/L	21	1	0	6.0	0.3	5.5	5.9	6.5	20
Conductivity	µS/cm	39	1	0	19	2	18	19	23	700
Hardness (as CaCO3), from total Ca/Mg	mg/L	18	0.5	0	7.8	0.5	7.3	7.7	8.8	-
Solids, total dissolved [TDS]	mg/L	39	3 - 4	0	23	6	16	21	29	500
Solids, total suspended [TSS]	mg/L	38	3	38	<3	-	<3	<3	<3	-
Turbidity	NTU	39	0.1	0	0.65	0.27	0.28	0.62	1.22	50
Plant Pigments										
Chlorophyll a	µg/L	39	0.01 - 0.1	0	2.6	1.4	0.2	3.0	4.5	-

APPENDIX B, TABLE 7

Summary of Year 2 surface water chemistry results from Revell Lake, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Water Quality Guideline ¹
Radiological Parameters										
Carbon-14	Bq/L	39	6.5 - 18.5	39	15	5	7	19	19	200
Cesium-137	Bq/L	39	0.21 - 0.37	39	0.35	0.05	0.22	0.37	0.37	10
Cobalt-60	Bq/L	39	0.23 - 0.47	39	0.36	0.04	0.26	0.37	0.42	40
Gross Alpha	Bq/L	39	0.038 - 0.111	37	0.092	0.027	0.043	0.111	0.111	-
Gross Beta	Bq/L	39	0.060 - 0.148	35	0.127	0.032	0.065	0.148	0.148	-
Iodine-129	Bq/L	39	0.23 - 0.37	39	0.33	0.06	0.24	0.37	0.37	1
Potassium-40	Bq/L	39	4.7 - 7.6	38	6.7	0.9	4.7	7.1	7.1	-
Radium-226	Bq/L	39	0.0037 - 0.037	29	0.024	0.014	0.005	0.030	0.037	0.5
Ruthenium-106	Bq/L	39	2 - 3.4	39	2.9	0.3	2.2	3.0	3.3	20
Strontium-90	Bq/L	39	0.013 - 0.037	39	0.030	0.011	0.014	0.037	0.037	5
Thorium-228	Bq/L	39	0.004 - 0.0074	39	0.0066	0.0013	0.0041	0.0074	0.0074	2
Thorium-230	Bq/L	39	0.0038 - 0.0074	28	0.0063	0.0015	0.0039	0.0074	0.0074	0.6
Thorium-232	Bq/L	39	0.00093 - 0.0074	39	0.0056	0.0028	0.0010	0.0074	0.0074	0.6
Tritium	Bq/L	39	12 - 14.8	39	14	1	12	15	15	7000
Uranium-234	Bq/L	39	0.0019 - 0.0074	33	0.0060	0.0021	0.0025	0.0074	0.0074	3
Uranium-235	Bq/L	39	0.0011 - 0.0074	37	0.0056	0.0027	0.0011	0.0074	0.0074	3
Uranium-238	Bq/L	39	0.00093 - 0.0074	35	0.0056	0.0024	0.0019	0.0074	0.0074	3
Speciated Metals										
Chromium, hexavalent [Cr VI], dissolved	mg/L	39	0.0005	34	0.00059	0.00035	0.00050	0.00050	0.00114	-
Chromium, hexavalent [Cr VI], total	mg/L	39	0.0005	38	0.00052	0.00014	0.00050	0.00050	0.00050	0.005
Chromium, trivalent [Cr III], dissolved	mg/L	39	0.0005	39	<0.0005	-	<0.0005	<0.0005	<0.0005	-
Chromium, trivalent [Cr III], total	mg/L	39	0.0005 - 0.001	38	0.00082	0.00042	0.00050	0.00100	0.00100	0.0089

Gray cells indicate guideline exceedance; n = sample size; RDL = Reportable Detection Limit; SD = Standard Deviation.

¹See Appendix B, Table 3 for detailed water qualtiy guidelines.

²Parameter was anlayzed at multiple detection limits.

APPENDIX B, TABLE 8

Summary of Year 2 surface water chemistry results from Revell River, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Water Quality Guideline ¹
Aggregate Organics										
Biochemical Oxygen Demand	mg/L	9	2	7	2.0	0.1	2.0	2.0	2.2	-
Anions and Nutrients										
Ammonia, Total (as N)	mg/L	9	0.01	0	0.038	0.042	0.013	0.018	0.111	5.86
Bromide	mg/L	9	0.1	9	<0.1	-	<0.1	<0.1	<0.1	-
Chloride	mg/L	9	0.5	0	14	2	12	14	17	120
Fluoride	mg/L	9	0.02	0	0.029	0.002	0.026	0.028	0.032	0.12
Iodide	mg/L	9	0.2	6	0.20	0.00	0.20	0.20	0.20	-
Kjeldahl nitrogen, total [TKN]	mg/L	9	0.15 - 0.2	0	0.61	0.13	0.47	0.54	0.76	-
Nitrate (as N)	mg/L	9	0.02	0	0.048	0.017	0.032	0.044	0.076	3
Nitrate and Nitrite as N	mg/L	9	0.0224 - 0.07	6	0.069	0.007	0.059	0.070	0.077	-
Nitrite (as N)	mg/L	9	0.01	9	<0.01	-	<0.01	<0.01	<0.01	0.02
Phosphorus, total	mg/L	9	0.003 - 0.02	3	0.019	0.004	0.013	0.020	0.022	-
Sulfate (as SO4)	mg/L	9	0.3	0	1.1	0.3	0.8	1.1	1.6	128
Cyanides										
Cyanide, Total	mg/L	9	0.002	9	<0.002	-	<0.002	<0.002	<0.002	0.005
Metals Dissolved										
Aluminum, dissolved	mg/L	9	0.001	0	0.22	0.05	0.16	0.22	0.28	-
Antimony, dissolved	mg/L	9	0.0001	9	<0.0001	-	<0.0001	<0.0001	<0.0001	-
Arsenic, dissolved	mg/L	9	0.0001	0	0.00048	0.00013	0.00033	0.00046	0.00065	-
Barium, dissolved	mg/L	9	0.0001	0	0.0094	0.0013	0.0078	0.0097	0.0109	-
Beryllium, dissolved	mg/L	9	0.00002 - 0.0001	9	0.000073	0.000040	0.000020	0.000100	0.000100	-
Bismuth, dissolved	mg/L	9	0.00005	9	<0.00005	-	<0.00005	<0.00005	<0.00005	-
Boron, dissolved	mg/L	9	0.01	9	<0.01	-	<0.01	<0.01	<0.01	-
Cadmium, dissolved	mg/L	9	0.000005	0	0.000012	0.000003	0.000008	0.000011	0.000016	-
Calcium, dissolved	mg/L	9	0.05	0	5.5	0.5	4.8	5.8	6.0	-
Cesium, dissolved	mg/L	9	0.00001	0	0.000024	0.000007	0.000017	0.000022	0.000033	-
Chromium, dissolved	mg/L	9	0.0001 - 0.0005	3	0.00055	0.00009	0.00046	0.00050	0.00070	-
Cobalt, dissolved	mg/L	9	0.0001	0	0.00015	0.00004	0.00012	0.00013	0.00021	-
Copper, dissolved	mg/L	9	0.0002	0	0.00079	0.00020	0.00059	0.00070	0.00108	0.00087
Iron, dissolved	mg/L	9	0.01	0	0.86	0.25	0.54	0.95	1.10	-
Lead, dissolved	mg/L	9	0.00005	0	0.00013	0.00004	0.00009	0.00014	0.00018	0.0065
Lithium, dissolved	mg/L	9	0.001	9	<0.001	-	<0.001	<0.001	<0.001	-
Magnesium, dissolved	mg/L	9	0.005	0	0.82	0.04	0.77	0.84	0.86	-
Manganese, dissolved	mg/L	9	0.0001	0	0.020	0.002	0.016	0.021	0.021	0.23
Mercury, dissolved	mg/L	9	0.000005	6	0.0000051	0.0000002	0.0000050	0.0000050	0.0000054	-
Molybdenum, dissolved	mg/L	9	0.00005	0	0.00010	0.00009	0.00005	0.00006	0.00024	-
Nickel, dissolved	mg/L	9	0.0005	5	0.00057	0.00011	0.00050	0.00050	0.00075	-
Phosphorus, dissolved	mg/L	9	0.05	9	<0.05	-	<0.05	<0.05	<0.05	-
Potassium, dissolved	mg/L	9	0.05	0	0.56	0.03	0.54	0.56	0.61	-
Rhodium, dissolved	mg/L	9	0.001	9	<0.001	-	<0.001	<0.001	<0.001	-
Rubidium, dissolved	mg/L	9	0.0002	0	0.0017	0.0001	0.0015	0.0016	0.0019	-
Ruthenium, dissolved	mg/L	9	0.001	9	<0.001	-	<0.001	<0.001	<0.001	-
Samarium, dissolved	mg/L	9	0.001	9	<0.001	-	<0.001	<0.001	<0.001	-

APPENDIX B, TABLE 8

Summary of Year 2 surface water chemistry results from Revell River, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Water Quality Guideline ¹
Metals Dissolved										
Selenium, dissolved	mg/L	9	0.00005	0	0.00012	0.00003	0.00008	0.00012	0.00016	-
Silicon, dissolved	mg/L	9	0.05	0	3.1	0.7	2.5	2.9	4.0	-
Silver, dissolved	mg/L	9	0.00001	9	<0.00001	-	<0.00001	<0.00001	<0.00001	-
Sodium, dissolved	mg/L	9	0.05	0	9.3	0.7	8.3	9.6	10.0	-
Strontium, dissolved	mg/L	9	0.0002	0	0.017	0.001	0.016	0.017	0.019	2.5
Sulfur, dissolved	mg/L	9	0.5	4	0.60	0.14	0.50	0.55	0.84	-
Tellurium, dissolved	mg/L	9	0.0002	9	<0.0002	-	<0.0002	<0.0002	<0.0002	-
Thallium, dissolved	mg/L	9	0.00001	9	<0.00001	-	<0.00001	<0.00001	<0.00001	-
Thorium, dissolved	mg/L	9	0.0001	0	0.00031	0.00008	0.00024	0.00030	0.00044	-
Tin, dissolved	mg/L	9	0.0001	7	0.00011	0.00002	0.00010	0.00010	0.00014	-
Titanium, dissolved	mg/L	9	0.0003	0	0.0032	0.0006	0.0024	0.0033	0.0038	-
Tungsten, dissolved	mg/L	9	0.0001	9	<0.0001	-	<0.0001	<0.0001	<0.0001	-
Uranium, dissolved	mg/L	9	0.00001	0	0.00015	0.00002	0.00013	0.00016	0.00017	-
Vanadium, dissolved	mg/L	9	0.0005	0	0.00072	0.00012	0.00057	0.00072	0.00087	-
Zinc, dissolved	mg/L	9	0.001	0	0.0055	0.0043	0.0020	0.0033	0.0125	0.017
Zirconium, dissolved	mg/L	9	0.0002 - 0.0003	2	0.00035	0.00004	0.00030	0.00036	0.00041	-
Metals Total										
Aluminum, total	mg/L	9	0.003	0	0.25	0.07	0.17	0.25	0.34	0.32
Antimony, total	mg/L	9	0.0001	9	<0.0001	-	<0.0001	<0.0001	<0.0001	0.006
Arsenic, total	mg/L	9	0.0001	0	0.00051	0.00013	0.00035	0.00050	0.00068	0.005
Barium, total	mg/L	9	0.0001	0	0.0098	0.0017	0.0075	0.0101	0.0117	1
Beryllium, total	mg/L	9	0.00002 - 0.0001	9	0.000073	0.000040	0.000020	0.000100	0.000100	0.011
Bismuth, total	mg/L	9	0.00005	9	<0.00005	-	<0.00005	<0.00005	<0.00005	17.5
Boron, total	mg/L	9	0.01	9	<0.01	-	<0.01	<0.01	<0.01	1.5
Cadmium, total	mg/L	9	0.000005	0	0.000013	0.000004	0.000008	0.000012	0.000018	0.00004
Calcium, total	mg/L	9	0.05	0	5.6	0.5	4.9	5.9	6.0	1000
Cesium, total	mg/L	9	0.00001	0	0.000027	0.000008	0.000018	0.000024	0.000038	-
Chromium, total	mg/L	9	0.0001 - 0.0005	3	0.00060	0.00009	0.00050	0.00060	0.00073	-
Cobalt, total	mg/L	9	0.0001	0	0.00020	0.00007	0.00014	0.00016	0.00031	0.00078
Copper, total	mg/L	9	0.0005	0	0.00093	0.00018	0.00069	0.00096	0.00114	0.002
Iron, total	mg/L	9	0.01	0	1.3	0.4	0.7	1.4	1.7	3.3
Lead, total	mg/L	9	0.00005	0	0.00020	0.00007	0.00012	0.00022	0.00027	0.001
Lithium, total	mg/L	9	0.001	9	<0.001	-	<0.001	<0.001	<0.001	2.5
Magnesium, total	mg/L	9	0.005	0	0.84	0.04	0.78	0.85	0.88	82
Manganese, total	mg/L	9	0.0001	0	0.025	0.006	0.021	0.023	0.034	0.12
Mercury, total	mg/L	9	0.000005	3	0.0000055	0.0000007	0.0000050	0.0000052	0.0000066	0.000026
Molybdenum, total	mg/L	9	0.00005	0	0.000083	0.000024	0.000065	0.000070	0.000121	0.073
Nickel, total	mg/L	9	0.0005	6	0.00060	0.00017	0.00050	0.00050	0.00089	0.025
Phosphorus, total	mg/L	9	0.05	9	<0.05	-	<0.05	<0.05	<0.05	-
Potassium, total	mg/L	9	0.05	0	0.54	0.03	0.51	0.53	0.58	53
Rhodium, total	mg/L	9	0.001	9	<0.001	-	<0.001	<0.001	<0.001	0.01
Rubidium, total	mg/L	9	0.0002	0	0.0017	0.0001	0.0015	0.0016	0.0019	-
Ruthenium, total	mg/L	9	0.001	9	<0.001	-	<0.001	<0.001	<0.001	0.01

APPENDIX B, TABLE 8

Summary of Year 2 surface water chemistry results from Revell River, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Water Quality Guideline ¹
Metals Total										
Samarium, total	mg/L	9	0.001	9	<0.001	-	<0.001	<0.001	<0.001	0.0082
Selenium, total	mg/L	9	0.00005	0	0.00013	0.00004	0.00009	0.00011	0.00020	0.001
Silicon, total	mg/L	9	0.1	0	3.3	0.7	2.5	3.0	4.2	-
Silver, total	mg/L	9	0.00001	9	<0.00001	-	<0.00001	<0.00001	<0.00001	0.00025
Sodium, total	mg/L	9	0.05	0	9.5	0.8	8.4	9.8	10.2	680
Strontium, total	mg/L	9	0.0002	0	0.018	0.002	0.016	0.017	0.020	7
Sulfur, total	mg/L	9	0.5	4	0.58	0.08	0.50	0.57	0.67	-
Tellurium, total	mg/L	9	0.0002	9	<0.0002	-	<0.0002	<0.0002	<0.0002	0.0058
Thallium, total	mg/L	9	0.00001	6	0.000010	0.000001	0.000010	0.000010	0.000012	0.0008
Thorium, total	mg/L	9	0.0001	0	0.00025	0.00003	0.00021	0.00025	0.00029	-
Tin, total	mg/L	9	0.0001	9	<0.0001	-	<0.0001	<0.0001	<0.0001	0.073
Titanium, total	mg/L	9	0.0003	0	0.0047	0.0015	0.0029	0.0045	0.0068	0.076
Tungsten, total	mg/L	9	0.0001	9	<0.0001	-	<0.0001	<0.0001	<0.0001	0.03
Uranium, total	mg/L	9	0.00001	0	0.00016	0.00002	0.00013	0.00017	0.00019	0.015
Vanadium, total	mg/L	9	0.0005	0	0.0010	0.0003	0.0007	0.0011	0.0013	0.12
Zinc, total	mg/L	9	0.003	4	0.0037	0.0009	0.0030	0.0034	0.0051	0.02
Zirconium, total	mg/L	9	0.0002	2	0.00025	0.00004	0.00020	0.00026	0.00030	0.004
Microbiological Tests										
Coliforms, Escherichia coli [E. coli]	CFU/100mL	9	1	0	19	5	14	17	27	100
Coliforms, total ²	CFU/100mL	9	1	0	1.0	-	1.0	1.0	1.0	-
Organic and Inorganic Carbon										
Carbon, dissolved organic [DOC]	mg/L	9	0.5	0	24	7	15	24	32	-
Carbon, total inorganic [TIC]	mg/L	9	0.5	0	1.6	0.7	0.8	1.4	2.6	-
Carbon, total organic [TOC]	mg/L	9	0.5	0	24	7	15	26	31	-
Physical Tests										
Alkalinity, bicarbonate (as CaCO3)	mg/L	9	1 - 1.2	0	11	1	10	11	11	-
Alkalinity, carbonate (as CaCO3)	mg/L	9	0.6 - 1	9	0.73	0.20	0.60	0.60	1.00	-
Alkalinity, hydroxide (as CaCO3)	mg/L	9	0.34 - 1	9	0.56	0.33	0.34	0.34	1.00	-
Alkalinity, phenolphthalein (as CaCO3)	mg/L	3	1	3	<1	-	<1	<1	<1	-
Alkalinity, Total (as CaCO3)	mg/L	6	1	0	8.9	0.3	8.7	8.9	9.3	20
Alkalinity, total (as CaCO3)	mg/L	3	2	0	10.0	0.6	9.4	10.3	10.3	-
Conductivity	µS/cm	9	1	0	77	5	71	78	84	700
Hardness (as CaCO3), from total Ca/Mg	mg/L	3	0.5	0	16	-	15	16	16	-
Solids, total dissolved [TDS]	mg/L	9	10 - 13	0	88	14	68	94	101	500
Solids, total suspended [TSS]	mg/L	9	3	4	4.0	1.3	3.0	3.4	6.0	-
Turbidity	NTU	9	0.1	0	1.5	0.3	1.1	1.5	1.8	50
Plant Pigments										
Chlorophyll a	µg/L	9	0.01 - 0.1	0	0.95	0.17	0.74	1.01	1.14	-

APPENDIX B, TABLE 8

Summary of Year 2 surface water chemistry results from Revell River, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Water Quality Guideline ¹
Radiological Parameters										
Carbon-14	Bq/L	7	6.7 - 18.5	7	14	6	7	19	19	200
Cesium-137	Bq/L	7	0.35 - 0.37	7	0.36	0.01	0.35	0.37	0.37	10
Chlorine-36	Bq/L	9	0.2 - 0.37	9	0.32	0.08	0.20	0.37	0.37	-
Cobalt-60	Bq/L	9	0.36 - 0.54	9	0.39	0.06	0.36	0.37	0.48	40
Gross Alpha	Bq/L	7	0.039 - 0.111	1	0.098	0.038	0.067	0.086	0.157	-
Gross Beta	Bq/L	3	0.063 - 0.148	4	0.116	0.041	0.067	0.148	0.148	-
Iodine-129	Bq/L	7	0.24 - 0.37	7	0.33	0.05	0.25	0.37	0.37	1
Neptunium-237	Bq/L	9	0.0016 - 0.004	9	0.0034	0.0007	0.0022	0.0037	0.0039	-
Plutonium-238	Bq/L	9	0.00019 - 0.0037	9	0.0027	0.0016	0.0004	0.0037	0.0037	0.6
Plutonium-239	Bq/L	9	0.00023 - 0.0037	9	0.0027	0.0015	0.0005	0.0037	0.0037	0.6
Potassium-40	Bq/L	9	6.2 - 7.3	9	7.0	0.3	6.6	7.1	7.2	-
Radium-226	Bq/L	9	0.0042 - 0.037	4	0.018	0.013	0.005	0.016	0.037	0.5
Ruthenium-106	Bq/L	9	2.9 - 3.6	9	3.1	0.2	2.9	3.0	3.4	20
Selenium-79	Bq/L	9	1.85	9	<1.85	-	<1.85	<1.85	<1.85	-
Strontium-90	Bq/L	7	0.014 - 0.037	6	0.027	0.012	0.014	0.037	0.037	5
Thorium-228	Bq/L	9	0.0033 - 0.0074	1	0.0091	0.0017	0.0075	0.0093	0.0117	2
Thorium-230	Bq/L	9	0.0038 - 0.0074	6	0.0054	0.0016	0.0034	0.0051	0.0074	0.6
Thorium-232	Bq/L	9	0.0017 - 0.0074	6	0.0039	0.0026	0.0016	0.0024	0.0074	0.6
Tritium	Bq/L	7	9.2 - 14.8	7	12	3	9	15	15	7000
Uranium-234	Bq/L	9	0.0014 - 0.0074	6	0.0063	0.0018	0.0034	0.0074	0.0074	3
Uranium-235	Bq/L	9	0.00059 - 0.0074	7	0.0053	0.0031	0.0009	0.0074	0.0074	3
Uranium-238	Bq/L	9	0.0005 - 0.0074	5	0.0056	0.0023	0.0020	0.0074	0.0074	3
Speciated Metals										
Chromium, hexavalent [Cr VI], dissolved	mg/L	9	0.0005	9	<0.0005	-	<0.0005	<0.0005	<0.0005	-
Chromium, hexavalent [Cr VI], total	mg/L	9	0.0005	9	<0.0005	-	<0.0005	<0.0005	<0.0005	0.005
Chromium, trivalent [Cr III], dissolved	mg/L	9	0.0005	5	0.00055	0.00009	0.00050	0.00050	0.00070	-
Chromium, trivalent [Cr III], total	mg/L	9	0.0005 - 0.001	9	0.00083	0.00025	0.00050	0.00100	0.00100	0.0089

Gray cells indicate guideline exceedance; n = sample size; RDL = Reportable Detection Limit; SD = Standard Deviation.

¹See Appendix B, Table 3 for detailed water quality guidelines.

²Multiple samples measured above detection.

APPENDIX B, TABLE 9

Summary of Year 2 surface water chemistry results from the AOI ponds, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Water Quality Guideline ¹
Aggregate Organics										
Biochemical Oxygen Demand	mg/L	38	2	38	<2	-	<2	<2	<2	-
Anions and Nutrients										
Ammonia, Total (as N)	mg/L	38	0.01 - 0.1	3	0.075	0.143	0.010	0.026	0.294	5.86
Bromide	mg/L	38	0.1	38	<0.1	-	<0.1	<0.1	<0.1	-
Chloride	mg/L	38	0.5	22	0.59	0.16	0.50	0.50	0.95	120
Fluoride	mg/L	38	0.02	0	0.030	0.005	0.023	0.029	0.037	0.12
Iodide	mg/L	38	0.2	18	0.20	-	0.20	0.20	0.20	-
Kjeldahl nitrogen, total [TKN]	mg/L	38	0.15 - 0.2	0	0.59	0.18	0.33	0.58	0.91	-
Nitrate (as N)	mg/L	38	0.02	20	0.044	0.031	0.020	0.020	0.098	3
Nitrate and Nitrite as N	mg/L	38	0.0224 - 0.07	20	0.068	0.020	0.026	0.070	0.098	-
Nitrite (as N)	mg/L	38	0.01	38	<0.01	-	<0.01	<0.01	<0.01	0.02
Phosphorus, total	mg/L	38	0.003 - 0.03	18	0.022	0.007	0.009	0.021	0.030	-
Sulfate (as SO4)	mg/L	38	0.3	5	0.54	0.24	0.30	0.48	0.91	128
Cyanides										
Cyanide, Total	mg/L	38	0.002	38	<0.002	-	<0.002	<0.002	<0.002	0.005
Herbicides										
AMPA	µg/L	38	0.5 - 0.55	38	0.50	0.01	0.50	0.50	0.50	-
Metals Dissolved										
Aluminum, dissolved	mg/L	38	0.001	0	0.37	0.15	0.05	0.39	0.52	-
Antimony, dissolved	mg/L	38	0.0001	36	0.00010	0.00001	0.00010	0.00010	0.00011	-
Arsenic, dissolved	mg/L	38	0.0001	0	0.00048	0.00012	0.00032	0.00048	0.00065	-
Barium, dissolved	mg/L	38	0.0001	0	0.0059	0.0011	0.0042	0.0058	0.0075	-
Beryllium, dissolved	mg/L	38	0.00002 - 0.0001	34	0.000058	0.000040	0.000020	0.000023	0.000100	-
Bismuth, dissolved	mg/L	38	0.00005	38	<0.00005	-	<0.00005	<0.00005	<0.00005	-
Boron, dissolved	mg/L	38	0.01	38	<0.01	-	<0.01	<0.01	<0.01	-
Cadmium, dissolved	mg/L	38	0.000005	3	0.000013	0.000004	0.000005	0.000014	0.000019	-
Calcium, dissolved	mg/L	38	0.05	0	2.2	0.4	1.5	2.2	3.1	-
Cesium, dissolved	mg/L	38	0.00001	7	0.000015	0.000006	0.000010	0.000013	0.000023	-
Chromium, dissolved	mg/L	38	0.0001 - 0.0005	5	0.00064	0.00018	0.00042	0.00061	0.00085	-
Cobalt, dissolved	mg/L	38	0.0001	5	0.00032	0.00015	0.00010	0.00030	0.00056	-
Copper, dissolved	mg/L	38	0.0002	1	0.0013	0.0021	0.0003	0.0007	0.0046	0.00087
Iron, dissolved	mg/L	38	0.01	0	0.79	0.30	0.32	0.84	1.23	-
Lead, dissolved	mg/L	38	0.00005	2	0.00026	0.00010	0.00005	0.00026	0.00043	0.0065
Lithium, dissolved	mg/L	38	0.001	18	0.0011	0.0001	0.0010	0.0010	0.0012	-
Magnesium, dissolved	mg/L	38	0.005	0	0.72	0.14	0.52	0.70	0.97	-
Manganese, dissolved	mg/L	38	0.0001	0	0.022	0.012	0.004	0.020	0.048	0.23
Mercury, dissolved	mg/L	38	0.000005	23	0.0000066	0.0000036	0.0000050	0.0000050	0.0000160	-
Molybdenum, dissolved	mg/L	38	0.00005	24	0.000083	0.000091	0.000050	0.000050	0.000177	-

APPENDIX B, TABLE 9

Summary of Year 2 surface water chemistry results from the AOI ponds, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Water Quality Guideline ¹
Metals Dissolved										
Nickel, dissolved	mg/L	38	0.0005	12	0.00062	0.00014	0.00050	0.00056	0.00086	-
Phosphorus, dissolved	mg/L	38	0.05	38	<0.05	-	<0.05	<0.05	<0.05	-
Potassium, dissolved	mg/L	38	0.05	0	0.37	0.11	0.20	0.38	0.49	-
Rhodium, dissolved	mg/L	38	0.001	38	<0.001	-	<0.001	<0.001	<0.001	-
Rubidium, dissolved	mg/L	38	0.0002	0	0.0012	0.0003	0.0008	0.0013	0.0016	-
Ruthenium, dissolved	mg/L	38	0.001	38	<0.001	-	<0.001	<0.001	<0.001	-
Samarium, dissolved	mg/L	38	0.001	38	<0.001	-	<0.001	<0.001	<0.001	-
Selenium, dissolved	mg/L	38	0.00005	0	0.00011	0.00004	0.00006	0.00011	0.00017	-
Silicon, dissolved	mg/L	38	0.05	0	2.8	1.0	0.9	2.9	4.2	-
Silver, dissolved	mg/L	41 ²	0.000005 - 0.00001	41	0.0000096	0.0000013	0.0000050	0.0000100	0.0000100	-
Sodium, dissolved	mg/L	38	0.05	0	1.1	0.3	0.8	1.1	1.6	-
Strontium, dissolved	mg/L	38	0.0002	0	0.0098	0.0019	0.0075	0.0095	0.0135	2.5
Sulfur, dissolved	mg/L	38	0.5	35	0.51	0.03	0.50	0.50	0.58	-
Tellurium, dissolved	mg/L	38	0.0002	38	<0.0002	-	<0.0002	<0.0002	<0.0002	-
Thallium, dissolved	mg/L	38	0.00001	37	0.000010	0.000001	0.000010	0.000010	0.000010	-
Thorium, dissolved	mg/L	38	0.0001	14	0.00013	0.00004	0.00010	0.00011	0.00020	-
Tin, dissolved	mg/L	38	0.0001	29	0.00043	0.00082	0.00010	0.00010	0.00237	-
Titanium, dissolved	mg/L	38	0.0003	0	0.0047	0.0023	0.0004	0.0046	0.0073	-
Tungsten, dissolved	mg/L	38	0.0001	38	<0.0001	-	<0.0001	<0.0001	<0.0001	-
Uranium, dissolved	mg/L	38	0.00001	0	0.000065	0.000028	0.000027	0.000062	0.000116	-
Vanadium, dissolved	mg/L	38	0.0005	7	0.00075	0.00020	0.00050	0.00073	0.00107	-
Zinc, dissolved	mg/L	38	0.001	2	0.0039	0.0022	0.0015	0.0032	0.0085	0.017
Zirconium, dissolved	mg/L	38	0.0002 - 0.0003	11	0.00035	0.00008	0.00024	0.00034	0.00051	-
Metals Total										
Aluminum, total	mg/L	38	0.003	0	0.41	0.16	0.07	0.44	0.56	0.32
Antimony, total	mg/L	38	0.0001	38	<0.0001	-	<0.0001	<0.0001	<0.0001	0.006
Arsenic, total	mg/L	38	0.0001	0	0.00051	0.00011	0.00035	0.00054	0.00066	0.005
Barium, total	mg/L	38	0.0001	0	0.0062	0.0012	0.0043	0.0060	0.0079	1
Beryllium, total	mg/L	38	0.00002 - 0.0001	34	0.000058	0.000040	0.000020	0.000023	0.000100	0.011
Bismuth, total	mg/L	38	0.00005	38	<0.00005	-	<0.00005	<0.00005	<0.00005	17.5
Boron, total	mg/L	38	0.01	38	<0.01	-	<0.01	<0.01	<0.01	1.5
Cadmium, total	mg/L	38	0.000005	1	0.000014	0.000004	0.000005	0.000015	0.000019	0.00004
Calcium, total	mg/L	38	0.05	0	2.2	0.5	1.6	2.2	3.1	1000
Cesium, total	mg/L	38	0.00001	3	0.000017	0.000005	0.000010	0.000015	0.000026	-
Chromium, total	mg/L	38	0.0001 - 0.0005	3	0.00072	0.00020	0.00046	0.00071	0.00093	-
Cobalt, total	mg/L	38	0.0001	5	0.00034	0.00015	0.00010	0.00032	0.00056	0.00078
Copper, total	mg/L	38	0.0005	5	0.0014	0.0022	0.0005	0.0008	0.0030	0.002

APPENDIX B, TABLE 9

Summary of Year 2 surface water chemistry results from the AOI ponds, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Water Quality Guideline ¹
Metals Total										
Iron, total	mg/L	38	0.01	0	0.95	0.33	0.39	0.97	1.42	3.3
Lead, total	mg/L	38	0.00005	0	0.00030	0.00012	0.00007	0.00033	0.00052	0.001
Lithium, total	mg/L	38	0.001	17	0.0011	0.0002	0.0010	0.0011	0.0014	2.5
Magnesium, total	mg/L	38	0.005	0	0.72	0.14	0.54	0.68	0.99	82
Manganese, total	mg/L	38	0.0001	0	0.024	0.010	0.012	0.022	0.039	0.12
Mercury, total	mg/L	38	0.000005	22	0.000008	0.000007	0.000005	0.000005	0.000019	0.000026
Molybdenum, total	mg/L	38	0.00005	27	0.000075	0.000097	0.000050	0.000050	0.000166	0.073
Nickel, total	mg/L	38	0.0005	12	0.00067	0.00017	0.00050	0.00064	0.00092	0.025
Phosphorus, total	mg/L	38	0.05	38	<0.05	-	<0.05	<0.05	<0.05	-
Potassium, total	mg/L	38	0.05	0	0.36	0.11	0.20	0.38	0.48	53
Rhodium, total	mg/L	38	0.001	38	<0.001	-	<0.001	<0.001	<0.001	0.01
Rubidium, total	mg/L	38	0.0002	0	0.0012	0.0003	0.0008	0.0013	0.0015	-
Ruthenium, total	mg/L	38	0.001	38	<0.001	-	<0.001	<0.001	<0.001	0.01
Samarium, total	mg/L	38	0.001	38	<0.001	-	<0.001	<0.001	<0.001	0.0082
Selenium, total	mg/L	38	0.00005	1	0.00011	0.00003	0.00007	0.00011	0.00016	0.001
Silicon, total	mg/L	38	0.1	0	2.9	1.1	0.9	3.1	4.3	-
Silver, total	mg/L	41 ²	0.000005 - 0.00001	40	0.0000099	0.0000020	0.0000050	0.0000100	0.0000100	0.00025
Sodium, total	mg/L	38	0.05	0	1.1	0.2	0.8	1.1	1.4	680
Strontium, total	mg/L	38	0.0002	0	0.0099	0.0019	0.0077	0.0096	0.0136	7
Sulfur, total	mg/L	38	0.5	36	0.51	0.02	0.50	0.50	0.51	-
Tellurium, total	mg/L	38	0.0002	38	<0.0002	-	<0.0002	<0.0002	<0.0002	0.0058
Thallium, total	mg/L	38	0.00001	37	0.000010	0.000001	0.000010	0.000010	0.000010	0.0008
Thorium, total	mg/L	38	0.0001	16	0.00012	0.00003	0.00010	0.00011	0.00018	-
Tin, total	mg/L	38	0.0001	30	0.00048	0.00090	0.00010	0.00010	0.00301	0.073
Titanium, total	mg/L	38	0.0003	0	0.0057	0.0027	0.0007	0.0059	0.0082	0.076
Tungsten, total	mg/L	38	0.0001	38	<0.0001	-	<0.0001	<0.0001	<0.0001	0.03
Uranium, total	mg/L	38	0.00001	0	0.000070	0.000030	0.000031	0.000069	0.000129	0.015
Vanadium, total	mg/L	38	0.0005	5	0.00090	0.00027	0.00050	0.00086	0.00134	0.12
Zinc, total	mg/L	38	0.003	18	0.0037	0.0013	0.0030	0.0031	0.0057	0.02
Zirconium, total	mg/L	38	0.0002	12	0.00026	0.00006	0.00020	0.00026	0.00035	0.004
Microbiological Tests										
Coliforms, Escherichia coli [E. coli] ³	CFU/100mL	38	1	9	21	30	1	10	65	100
Coliforms, total ³	CFU/100mL	38	1	5	32	53	1	1	149	-
Organic and Inorganic Carbon										
Carbon, dissolved organic [DOC]	mg/L	38	0.5 - 5	0	22	9	10	21	29	-
Carbon, total inorganic [TIC]	mg/L	38	0.5	30	0.76	0.76	0.50	0.50	2.76	-
Carbon, total organic [TOC]	mg/L	38	0.5	0	22	6	10	22	30	-

APPENDIX B, TABLE 9

Summary of Year 2 surface water chemistry results from the AOI ponds, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Water Quality Guideline ¹
Polychlorinated Biphenyls										
Aroclor 1016	µg/L	7	0.02	3	0.020	0	0.020	0.020	0.020	-
Aroclor 1221	µg/L	7	0.02	3	0.020	0	0.020	0.020	0.020	-
Aroclor 1232	µg/L	7	0.02	3	0.020	0	0.020	0.020	0.020	-
Aroclor 1242	µg/L	7	0.02	3	0.020 ³	0	0.020 ³	0.020 ³	0.020 ³	0.001
Aroclor 1248	µg/L	7	0.02	3	0.020 ³	0	0.020 ³	0.020 ³	0.020 ³	0.001
Aroclor 1254	µg/L	7	0.02	3	0.020 ³	0	0.020 ³	0.020 ³	0.020 ³	0.001
Aroclor 1260	µg/L	7	0.02	3	0.020 ³	0	0.020 ³	0.020 ³	0.020 ³	0.001
Aroclor 1260	µg/L	7	0.02	3	0.020	0	0.020	0.020	0.020	-
Aroclor 1262	µg/L	7	0.02	3	0.020	0	0.020	0.020	0.020	-
Aroclor 1268	µg/L	7	0.02	3	0.020	0	0.020	0.020	0.020	-
Polychlorinated biphenyls [PCBs], total	µg/L	7	0.06	3	0.060 ³	0	0.060 ³	0.060 ³	0.060 ³	0.000001
Pesticides										
Glufosinate	µg/L	20	0.5	20	<0.5	-	<0.5	<0.5	<0.5	-
Glyphosate	µg/L	38	0.2	38	<0.2	-	<0.2	<0.2	<0.2	280
Physical Tests										
Alkalinity, bicarbonate (as CaCO3)	mg/L	38	1 - 1.2	0	4.5	1.4	2.2	4.8	6.4	-
Alkalinity, carbonate (as CaCO3)	mg/L	38	0.6 - 1	38	0.81	0.20	0.60	1.00	1.00	-
Alkalinity, hydroxide (as CaCO3)	mg/L	38	0.34 - 1	38	0.69	0.33	0.34	1.00	1.00	-
Alkalinity, phenolphthalein (as CaCO3)	mg/L	20	1	20	<1	-	<1	<1	<1	-
Alkalinity, Total (as CaCO3)	mg/L	18	1	0	3.4	1.2	1.8	3.5	5.1	20
Alkalinity, total (as CaCO3)	mg/L	20	2	0	4.7	1.4	2.6	5.1	6.7	-
Conductivity	µS/cm	38	1	0	20	3	17	20	26	700
Hardness (as CaCO3), from total Ca/Mg	mg/L	20	0.5	0	8.7	2.0	6.7	7.6	11.8	-
Solids, total dissolved [TDS]	mg/L	38	3 - 13	1	52	16	22	53	70	500
Solids, total suspended [TSS]	mg/L	38	3	30	3.5	2.1	3.0	3.0	4.5	-
Turbidity	NTU	38	0.1	0	1.6	1.3	0.7	1.3	3.2	50
Plant Pigments										
Chlorophyll a	µg/L	38	0.01 - 0.1	0	2.6	2.0	0.2	2.4	6.1	-
Polycyclic Aromatic Hydrocarbons										
1+2-Methylnaphthalenes	µg/L	35	0.015 - 0.028	35	0.022	0.007	0.015	0.028	0.028	-
1-Methylnaphthalene	µg/L	35	0.01 - 0.02	35	0.015	0.005	0.010	0.020	0.020	526
2-Methylnaphthalene	µg/L	35	0.01 - 0.02	35	0.015	0.005	0.010	0.020	0.020	-
Acenaphthene	µg/L	35	0.01 - 0.02	35	0.015	0.005	0.010	0.020	0.020	5.8
Acenaphthylene	µg/L	35	0.01 - 0.02	35	0.015	0.005	0.010	0.020	0.020	-
Anthracene	µg/L	35	0.01 - 0.02	35	0.015 ³	0.005	0.010	0.02 ³	0.02 ³	0.012
Benz(a)anthracene	µg/L	35	0.01 - 0.02	35	0.015	0.005	0.010	0.02 ³	0.02 ³	0.018
Benzo(a)pyrene	µg/L	35	0.005 - 0.01	35	0.0076	0.0025	0.0050	0.0100	0.0100	0.015
Benzo(b&j)fluoranthene	µg/L	35	0.01 - 0.02	35	0.015	0.005	0.010	0.020	0.020	-
Benzo(g,h,i)perylene	µg/L	35	0.01 - 0.02	35	0.015	0.005	0.010	0.020	0.020	-
Benzo(k)fluoranthene	µg/L	35	0.01 - 0.02	35	0.015	0.005	0.010	0.020	0.020	-

APPENDIX B, TABLE 9

Summary of Year 2 surface water chemistry results from the AOI ponds, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Water Quality Guideline ¹
Polycyclic Aromatic Hydrocarbons										
Chrysene	µg/L	35	0.01 - 0.02	35	0.015	0.005	0.010	0.020	0.020	-
Dibenz(a,h)anthracene	µg/L	35	0.005 - 0.02	35	0.013	0.008	0.005	0.020	0.020	-
Fluoranthene	µg/L	35	0.01 - 0.02	35	0.015	0.005	0.010	0.020	0.020	0.04
Fluorene	µg/L	35	0.01 - 0.02	35	0.015	0.005	0.010	0.020	0.020	3
Indeno(1,2,3-c,d)pyrene	µg/L	35	0.01 - 0.02	35	0.015	0.005	0.010	0.020	0.020	-
Naphthalene	µg/L	35	0.05	35	<0.05	-	<0.05	<0.05	<0.05	1.1
Phenanthrene	µg/L	35	0.02	35	<0.02	-	<0.02	<0.02	<0.02	0.4
Pyrene	µg/L	35	0.01 - 0.02	35	0.015	0.005	0.010	0.020	0.020	0.025
Radiological Parameters										
Carbon-14	Bq/L	38	6.6 - 18.5	38	16	5	7	19	19	200
Cesium-137	Bq/L	38	0.23 - 0.37	38	0.36	0.03	0.31	0.37	0.37	10
Chlorine-36	Bq/L	7	0.18 - 0.37	5	0.42	0.22	0.19	0.37	0.73	-
Cobalt-60	Bq/L	38	0.29 - 0.47	38	0.38	0.03	0.37	0.37	0.42	40
Gross Alpha	Bq/L	38	0.027 - 0.111	34	0.094	0.029	0.041	0.111	0.111	-
Gross Beta	Bq/L	38	0.053 - 0.148	33	0.126	0.036	0.060	0.148	0.148	-
Iodine-129	Bq/L	38	0.24 - 0.37	38	0.34	0.05	0.26	0.37	0.37	1
Neptunium-237	Bq/L	7	0.0031 - 0.0053	7	0.0038	0.0007	0.0033	0.0037	0.0048	-
Plutonium-238	Bq/L	7	0.00076 - 0.0037	7	0.0029	0.0014	0.0008	0.0037	0.0037	0.6
Plutonium-239	Bq/L	7	0.00076 - 0.0037	7	0.0029	0.0014	0.0008	0.0037	0.0037	0.6
Potassium-40	Bq/L	38	5.3 - 7.9	38	6.9	0.6	5.5	7.1	7.1	-
Radium-226	Bq/L	38	0.0045 - 0.037	28	0.025	0.013	0.006	0.027	0.037	0.5
Ruthenium-106	Bq/L	38	2.4 - 4.1	38	3.1	0.2	3.0	3.0	3.4	20
Selenium-79	Bq/L	6	1.85	6	<1.85	-	<1.85	<1.85	<1.85	-
Strontium-90	Bq/L	38	0.014 - 0.037	38	0.031	0.010	0.015	0.037	0.037	5
Thorium-228	Bq/L	38	0.0036 - 0.0074	33	0.0065	0.0020	0.0036	0.0074	0.0074	2
Thorium-230	Bq/L	38	0.0038 - 0.0074	24	0.0060	0.0020	0.0038	0.0057	0.0086	0.6
Thorium-232	Bq/L	38	0.00035 - 0.0074	27	0.0048	0.0029	0.0010	0.0074	0.0074	0.6
Tritium	Bq/L	38	9.2 - 14.8	38	14	1	12	15	15	7000
Uranium-234	Bq/L	38	0.0016 - 0.0074	29	0.0061	0.0021	0.0022	0.0074	0.0074	3
Uranium-235	Bq/L	38	0.00077 - 0.0074	35	0.0058	0.0025	0.0012	0.0074	0.0074	3
Uranium-238	Bq/L	38	0.0013 - 0.0074	27	0.0053	0.0024	0.0014	0.0074	0.0074	3
Semi-Volatile Organic Compounds										
1,2,4-Trichlorobenzene	µg/L	35	0.4 - 0.8	35	0.41	0.07	0.40	0.40	0.40	0.5
2,4,5-Trichlorophenol	µg/L	35	0.2 - 0.4	35	0.21	0.03	0.20	0.20	0.20	18
2,4,6-Trichlorophenol	µg/L	35	0.2 - 0.4	35	0.21	0.03	0.20	0.20	0.20	5
2,4+2,6-Dinitrotoluene	µg/L	35	0.57 - 1.1	35	0.60	0.09	0.57	0.60	0.60	10
2,4-Dichlorophenol	µg/L	35	0.3 - 0.6	35	0.31 ⁴	0.05	0.30 ⁴	0.30 ⁴	0.30 ⁴	0.2
2,4-Dimethylphenol	µg/L	35	0.5 - 1	35	0.51	0.08	0.50	0.50	0.50	10
2,4-Dinitrophenol	µg/L	35	1 - 2	35	1.5	0.5	1.0	1.0	2.0	6.2
2,4-Dinitrotoluene	µg/L	35	0.4 - 0.8	35	0.41	0.07	0.40	0.40	0.40	4
2,6-Dinitrotoluene	µg/L	35	0.4 - 0.8	35	0.41	0.07	0.40	0.40	0.40	6

APPENDIX B, TABLE 9

Summary of Year 2 surface water chemistry results from the AOI ponds, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Water Quality Guideline ¹
Semi-Volatile Organic Compounds										
2-Chlorophenol	µg/L	35	0.3 - 0.6	35	0.31	0.05	0.30	0.30	0.30	7
4-Chloroaniline	µg/L	29	0.4 - 0.8	29	0.41	0.07	0.40	0.40	0.40	-
Biphenyl	µg/L	35	0.4 - 0.8	35	0.41 ⁴	0.07	0.40 ⁴	0.40 ⁴	0.40 ⁴	0.2
bis(2-Chloro-1-methylethyl) ether	µg/L	35	0.4 - 0.8	35	0.41	0.07	0.40	0.40	0.40	-
bis(2-Chloroethyl) ether	µg/L	35	0.4 - 0.8	35	0.41	0.07	0.40	0.40	0.40	200
Bis(2-ethylhexyl)phthalate	µg/L	35	2 - 4	35	2.1	0.3	2.0	2.0	2.0	3
Dichlorobenzidine, 3,3'-	µg/L	35	0.4 - 0.8	35	0.41	0.07	0.40	0.40	0.40	0.6
Diethylphthalate	µg/L	35	0.2 - 0.4	35	0.21	0.03	0.20	0.20	0.20	210
Dimethylphthalate	µg/L	35	0.2 - 0.4	35	0.21	0.03	0.20	0.20	0.20	330
Pentachlorophenol [PCP]	µg/L	35	0.5 - 1	35	0.51 ⁴	0.08	0.50	0.50	0.50	0.5
Phenol	µg/L	35	0.5 - 5	33	1.4	5.4	0.5	0.5	0.5	4
Speciated Metals										
Chromium, hexavalent [Cr VI], dissolved	mg/L	38	0.0005	28	0.00053	0.00005	0.00050	0.00050	0.00064	-
Chromium, hexavalent [Cr VI], total	mg/L	38	0.0005	21	0.00056	0.00012	0.00050	0.00050	0.00080	0.005
Chromium, trivalent [Cr III], dissolved	mg/L	38	0.0005	18	0.00060	0.00014	0.00050	0.00051	0.00085	-
Chromium, trivalent [Cr III], total	mg/L	38	0.0005 - 0.001	31	0.00077	0.00023	0.00050	0.00080	0.00100	0.0089

Gray cells indicate guideline exceedance; n = sample size; RDL = Reportable Detection Limit; SD = Standard Deviation.

¹See Appendix B, Table 3 for detailed water quality guidelines.

²Parameter was analyzed at multiple detection limits.

³Multiple samples measured above detection range.

⁴Due to detection limits, guideline exceedance cannot be confirmed.

APPENDIX B, TABLE 10

Summary of Year 2 surface water chemistry results from the reference ponds, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Water Quality Guideline ¹
Aggregate Organics										
Biochemical Oxygen Demand	mg/L	16	2	15	2.0	0.03	2.0	2.0	2.0	-
Anions and Nutrients										
Ammonia, Total (as N)	mg/L	16	0.01	3	0.023	0.016	0.010	0.018	0.048	5.86
Bromide	mg/L	16	0.1	16	<0.1	-	<0.1	<0.1	<0.1	-
Chloride	mg/L	16	0.5	12	1.4	1.8	0.5	0.5	3.9	120
Fluoride	mg/L	16	0.02	0	0.055	0.022	0.027	0.055	0.086	0.12
Iodide	mg/L	16	0.2	8	0.20	0.00	0.20	0.20	0.20	-
Kjeldahl nitrogen, total [TKN]	mg/L	16	0.15 - 0.2	0	0.60	0.12	0.42	0.62	0.75	-
Nitrate (as N)	mg/L	16	0.02	12	0.12	0.21	0.02	0.02	0.48	3
Nitrate and Nitrite as N	mg/L	16	0.0224 - 0.07	12	0.14	0.20	0.02	0.07	0.48	-
Nitrite (as N)	mg/L	16	0.01	16	<0.01	-	<0.01	<0.01	<0.01	0.02
Phosphorus, total	mg/L	16	0.003 - 0.03	7	0.021	0.006	0.012	0.020	0.031	-
Sulfate (as SO4)	mg/L	16	0.3	0	0.87	0.48	0.35	0.91	1.57	128
Cyanides										
Cyanide, Total	mg/L	16	0.002	15	0.0020	0.0001	0.0020	0.0020	0.0021	0.005
Herbicides										
AMPA	µg/L	16	0.5 - 1	16	0.53	0.13	0.50	0.50	0.63	-
Metals Dissolved										
Aluminum, dissolved	mg/L	16	0.001	0	0.093	0.052	0.021	0.110	0.156	-
Antimony, dissolved	mg/L	16	0.0001	15	0.00010	0.00001	0.00010	0.00010	0.00011	-
Arsenic, dissolved	mg/L	16	0.0001	0	0.00036	0.00008	-	0.00035	0.00050	-
Barium, dissolved	mg/L	16	0.0001	0	0.0064	0.0009	0.0051	0.0061	0.0078	-
Beryllium, dissolved	mg/L	16	0.00002 - 0.0001	16	0.000060	0.000041	0.000020	0.000060	0.000100	-
Bismuth, dissolved	mg/L	16	0.00005	16	<0.00005	-	<0.00005	<0.00005	<0.00005	-
Boron, dissolved	mg/L	16	0.01	16	<0.01	-	<0.01	<0.01	<0.01	-
Cadmium, dissolved	mg/L	16	0.000005	13	0.0000053	0.0000008	0.0000050	0.0000050	0.0000069	-
Calcium, dissolved	mg/L	16	0.05	0	5.6	2.7	1.5	5.8	8.6	-
Cesium, dissolved	mg/L	16	0.00001	5	0.000020	0.000010	0.000010	0.000021	0.000038	-
Chromium, dissolved	mg/L	16	0.0001 - 0.0005	8	0.00038	0.00015	0.00016	0.00048	0.00050	-
Cobalt, dissolved	mg/L	16	0.0001	14	0.00010	0.000003	0.00010	0.00010	0.00011	-
Copper, dissolved	mg/L	16	0.0002	1	0.00081	0.00044	0.00028	0.00095	0.00139	0.00087
Iron, dissolved	mg/L	16	0.01	0	0.14	0.06	0.07	0.12	0.25	-
Lead, dissolved	mg/L	16	0.00005	11	0.000071	0.000040	0.000050	0.000050	0.000146	0.0065
Lithium, dissolved	mg/L	16	0.001	16	<0.001	-	<0.001	<0.001	<0.001	-
Magnesium, dissolved	mg/L	16	0.005	0	0.86	0.48	0.41	0.61	1.61	-
Manganese, dissolved	mg/L	16	0.0001	0	0.0092	0.0101	0.0008	0.0034	0.0282	0.23
Mercury, dissolved	mg/L	16	0.000005	15	0.0000050	0.00000005	0.0000050	0.0000050	0.0000051	-
Molybdenum, dissolved	mg/L	16	0.00005	4	0.00052	0.00054	0.00005	0.00010	0.00119	-
Nickel, dissolved	mg/L	16	0.0005	9	0.00075	0.00042	0.00050	0.00050	0.00131	-
Phosphorus, dissolved	mg/L	16	0.05	16	<0.05	-	<0.05	<0.05	<0.05	-
Potassium, dissolved	mg/L	16	0.05	0	0.42	0.13	0.25	0.37	0.63	-
Rhodium, dissolved	mg/L	16	0.001	16	<0.001	-	<0.001	<0.001	<0.001	-
Rubidium, dissolved	mg/L	16	0.0002	0	0.0013	0.0002	0.0010	0.0012	0.0016	-

APPENDIX B, TABLE 10

Summary of Year 2 surface water chemistry results from the reference ponds, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Water Quality Guideline ¹
Metals Dissolved										
Ruthenium, dissolved	mg/L	16	0.001	16	<0.001	-	<0.001	<0.001	<0.001	-
Samarium, dissolved	mg/L	16	0.001	16	<0.001	-	<0.001	<0.001	<0.001	-
Selenium, dissolved	mg/L	16	0.00005	1	0.000096	0.000029	0.000054	0.000090	0.000143	-
Silicon, dissolved	mg/L	16	0.05	0	1.5	0.6	0.7	1.5	2.2	-
Silver, dissolved	mg/L	17 ²	0.000005 - 0.00001	17	0.0000097	0.0000012	0.0000090	0.0000100	0.0000100	-
Sodium, dissolved	mg/L	16	0.05	0	1.5	1.0	0.7	1.2	3.2	-
Strontium, dissolved	mg/L	16	0.0002	0	0.013	0.003	0.009	0.014	0.018	2.5
Sulfur, dissolved	mg/L	16	0.5	10	0.56	0.09	0.50	0.50	0.73	-
Tellurium, dissolved	mg/L	16	0.0002	16	<0.0002	-	<0.0002	<0.0002	<0.0002	-
Thallium, dissolved	mg/L	16	0.00001	16	<0.00001	-	<0.00001	<0.00001	<0.00001	-
Thorium, dissolved	mg/L	16	0.0001	16	<0.0001	-	<0.0001	<0.0001	<0.0001	-
Tin, dissolved	mg/L	16	0.0001	15	0.00010	-	0.00010	0.00010	0.00010	-
Titanium, dissolved	mg/L	16	0.0003	2	0.00080	0.00047	0.00030	0.00069	0.00154	-
Tungsten, dissolved	mg/L	16	0.0001	16	<0.0001	-	<0.0001	<0.0001	<0.0001	-
Uranium, dissolved	mg/L	16	0.00001	4	0.000030	0.000016	0.000010	0.000032	0.000054	-
Vanadium, dissolved	mg/L	16	0.0005	16	<0.0005	-	<0.0005	<0.0005	<0.0005	-
Zinc, dissolved	mg/L	16	0.001	2	0.0022	0.0009	0.0010	0.0020	0.0037	0.017
Zirconium, dissolved	mg/L	16	0.0002 - 0.0003	11	0.00027	0.00004	0.00020	0.00030	0.00030	-
Metals Total										
Aluminum, total	mg/L	16	0.003	0	0.11	0.06	0.03	0.13	0.19	0.32
Antimony, total	mg/L	16	0.0001	14	0.00011	0.00005	0.00010	0.00010	0.00017	0.006
Arsenic, total	mg/L	16	0.0001	0	0.00039	0.00009	0.00031	0.00036	0.00057	0.005
Barium, total	mg/L	16	0.0001	0	0.0067	0.0009	0.0055	0.0066	0.0080	1
Beryllium, total	mg/L	16	0.00002 - 0.0001	16	0.000060	0.000041	0.000020	0.000060	0.000100	0.011
Bismuth, total	mg/L	16	0.00005	16	<0.00005	-	<0.00005	<0.00005	<0.00005	17.5
Boron, total	mg/L	16	0.01	16	<0.01	-	<0.01	<0.01	<0.01	1.5
Cadmium, total	mg/L	16	0.000005	11	0.0000056	0.0000011	0.0000050	0.0000050	0.0000081	0.00004
Calcium, total	mg/L	16	0.05	0	5.7	2.8	1.6	5.8	9.1	1000
Cesium, total	mg/L	16	0.00001	5	0.000022	0.000009	0.000010	0.000024	0.000035	-
Chromium, total	mg/L	16	0.0001 - 0.0005	8	0.00041	0.00012	0.00019	0.00048	0.00050	-
Cobalt, total	mg/L	16	0.0001	11	0.00011	0.00002	0.00010	0.00010	0.00014	0.00078
Copper, total	mg/L	16	0.0005	2	0.0028	0.0061	0.0005	0.0012	0.0083	0.002
Iron, total	mg/L	16	0.01	0	0.22	0.07	0.12	0.22	0.34	3.3
Lead, total	mg/L	16	0.00005	8	0.00011	0.00012	0.00005	0.00005	0.00038	0.001
Lithium, total	mg/L	16	0.001	16	<0.001	-	<0.001	<0.001	<0.001	2.5
Magnesium, total	mg/L	16	0.005	0	0.89	0.51	0.43	0.63	1.76	82
Manganese, total	mg/L	16	0.0001	0	0.020	0.011	0.008	0.016	0.036	0.12
Mercury, total	mg/L	16	0.000005	16	<0.000005	-	<0.000005	<0.000005	<0.000005	0.000026
Molybdenum, total	mg/L	16	0.00005	4	0.00054	0.00057	0.00005	0.00007	0.00124	0.073
Nickel, total	mg/L	16	0.0005	9	0.00069	0.00024	0.00050	0.00050	0.00105	0.025
Phosphorus, total	mg/L	16	0.05	16	<0.05	-	<0.05	<0.05	<0.05	-
Potassium, total	mg/L	16	0.05	0	0.42	0.13	0.26	0.37	0.64	53
Rhodium, total	mg/L	16	0.001	16	<0.001	-	<0.001	<0.001	<0.001	0.01

APPENDIX B, TABLE 10

Summary of Year 2 surface water chemistry results from the reference ponds, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Water Quality Guideline ¹
Metals Total										
Rubidium, total	mg/L	16	0.0002	0	0.0013	0.0002	0.0010	0.0014	0.0017	-
Ruthenium, total	mg/L	16	0.001	16	<0.001	-	<0.001	<0.001	<0.001	0.01
Samarium, total	mg/L	16	0.001	16	<0.001	-	<0.001	<0.001	<0.001	0.0082
Selenium, total	mg/L	16	0.00005	0	0.000100	0.000019	0.000076	0.000097	0.000129	0.001
Silicon, total	mg/L	16	0.1	0	1.7	0.6	0.9	1.7	2.4	-
Silver, total	mg/L	17 ²	0.000005 - 0.00001	17	0.0000097	0.0000012	0.0000090	0.0000100	0.0000100	0.00025
Sodium, total	mg/L	16	0.05	0	1.5	1.0	0.7	1.1	3.1	680
Strontium, total	mg/L	16	0.0002	0	0.014	0.004	0.009	0.013	0.019	7
Sulfur, total	mg/L	16	0.5	10	0.56	0.10	0.50	0.50	0.78	-
Tellurium, total	mg/L	16	0.0002	16	<0.0002	-	<0.0002	<0.0002	<0.0002	0.0058
Thallium, total	mg/L	16	0.00001	16	<0.00001	-	<0.00001	<0.00001	<0.00001	0.0008
Thorium, total	mg/L	16	0.0001	16	<0.0001	-	<0.0001	<0.0001	<0.0001	-
Tin, total	mg/L	16	0.0001	14	0.00010	0.00001	0.00010	0.00010	0.00012	0.073
Titanium, total	mg/L	16	0.0003	0	0.0013	0.0007	0.0005	0.0014	0.0023	0.076
Tungsten, total	mg/L	16	0.0001	16	<0.0001	-	<0.0001	<0.0001	<0.0001	0.03
Uranium, total	mg/L	16	0.00001	5	0.000032	0.000018	0.000010	0.000034	0.000061	0.015
Vanadium, total	mg/L	16	0.0005	16	<0.0005	-	<0.0005	<0.0005	<0.0005	0.12
Zinc, total	mg/L	16	0.003	11	0.0039	0.0020	0.0030	0.0030	0.0064	0.02
Zirconium, total	mg/L	16	0.0002	8	0.00023	0.00004	0.00020	0.00021	0.00028	0.004
Microbiological Tests										
Coliforms, Escherichia coli [E. coli]	CFU/100mL	16	1 - 10	3	8.6	11.7	1.0	4.5	26.8	100
Coliforms, total ³	CFU/100mL	16	1 - 10	1	120	246	1	4	618	-
Organic and Inorganic Carbon										
Carbon, dissolved organic [DOC]	mg/L	16	0.5	0	17	3	13	17	22	-
Carbon, total inorganic [TIC]	mg/L	16	0.5	3	2.2	1.5	0.5	2.1	4.6	-
Carbon, total organic [TOC]	mg/L	16	0.5	0	17	3	12	17	19	-
Polychlorinated Biphenyls										
Aroclor 1016	µg/L	3	0.02	3	<0.02	-	<0.02	<0.02	<0.02	-
Aroclor 1221	µg/L	3	0.02	3	<0.02	-	<0.02	<0.02	<0.02	-
Aroclor 1232	µg/L	3	0.02	3	<0.02	-	<0.02	<0.02	<0.02	-
Aroclor 1242	µg/L	3	0.02	3	<0.02 ⁴	-	<0.02 ⁴	<0.02 ⁴	<0.02 ⁴	0.001
Aroclor 1248	µg/L	3	0.02	3	<0.02 ⁴	-	<0.02 ⁴	<0.02 ⁴	<0.02 ⁴	0.001
Aroclor 1254	µg/L	3	0.02	3	<0.02 ⁴	-	<0.02 ⁴	<0.02 ⁴	<0.02 ⁴	0.001
Aroclor 1260	µg/L	3	0.02	3	<0.02 ⁴	-	<0.02 ⁴	<0.02 ⁴	<0.02 ⁴	0.001
Aroclor 1260	µg/L	3	0.02	3	<0.02	-	<0.02	<0.02	<0.02	-
Aroclor 1262	µg/L	3	0.02	3	<0.02	-	<0.02	<0.02	<0.02	-
Aroclor 1268	µg/L	3	0.02	3	<0.02	-	<0.02	<0.02	<0.02	-
Polychlorinated biphenyls [PCBs], total	µg/L	3	0.06	3	<0.06 ⁴	-	<0.06 ⁴	<0.06 ⁴	<0.06 ⁴	0.000001
Pesticides										
Glufosinate	µg/L	8	0.5	8	<0.5	-	<0.5	<0.5	<0.5	-
Glyphosate	µg/L	16	0.2 - 1	16	0.25	0.20	0.20	0.20	0.40	280

APPENDIX B, TABLE 10

Summary of Year 2 surface water chemistry results from the reference ponds, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Water Quality Guideline ¹
Physical Tests										
Alkalinity, bicarbonate (as CaCO3)	mg/L	16	1 - 1.2	0	16	9	3	15	29	-
Alkalinity, carbonate (as CaCO3)	mg/L	16	0.6 - 1	16	0.80	0.21	0.60	0.80	1.00	-
Alkalinity, hydroxide (as CaCO3)	mg/L	16	0.34 - 1	16	0.67	0.34	0.34	0.67	1.00	-
Alkalinity, phenolphthalein (as CaCO3)	mg/L	8	1	8	<1	-	<1	<1	<1	-
Alkalinity, Total (as CaCO3)	mg/L	8	1	0	11	9	3	10	24	20
Alkalinity, total (as CaCO3)	mg/L	8	2	0	18	6	11	17	27	-
Conductivity	µS/cm	16	1	1	38	16	18	37	58	700
Hardness (as CaCO3), from total Ca/Mg	mg/L	8	0.5	0	20	9	9	21	31	-
Solids, total dissolved [TDS]	mg/L	16	3 - 10	0	45	10	33	44	57	500
Solids, total suspended [TSS]	mg/L	16	3	14	3.0	0.1	3.0	3.0	3.1	-
Turbidity	NTU	16	0.1	0	1.5	0.5	0.6	1.5	2.1	50
Plant Pigments										
Chlorophyll a	µg/L	16	0.01 - 0.1	0	5.7	4.3	1.3	4.6	12.5	-
Petroleum Hydrocarbon Compounds										
F1 (C6-C10)	mg/L	1	0.1	1	<0.1	-	<0.1	<0.1	<0.1	0.15
F1-BTEX	mg/L	1	0.1	1	<0.1	-	<0.1	<0.1	<0.1	0.15
F2 (C10-C16)	mg/L	1	0.1	1	<0.1	-	<0.1	<0.1	<0.1	0.11
F3 (C16-C34)	mg/L	1	0.2	1	<0.2	-	<0.2	<0.2	<0.2	-
F4 (C34-C50)	mg/L	1	0.2	1	<0.2	-	<0.2	<0.2	<0.2	-
TEH (C10-C50)	mg/L	1	0.4	1	<0.4	-	<0.4	<0.4	<0.4	-
TEH (C16-C50)	mg/L	1	0.4	1	<0.4	-	<0.4	<0.4	<0.4	-
Polycyclic Aromatic Hydrocarbons										
1+2-Methylnaphthalenes	µg/L	16	0.015 - 0.028	16	0.022	0.007	0.015	0.022	0.028	-
1-Methylnaphthalene	µg/L	16	0.01 - 0.02	16	0.015	0.005	0.010	0.015	0.020	526
2-Methylnaphthalene	µg/L	16	0.01 - 0.02	16	0.015	0.005	0.010	0.015	0.020	-
Acenaphthene	µg/L	16	0.01 - 0.02	16	0.015	0.005	0.010	0.015	0.020	5.8
Acenaphthylene	µg/L	16	0.01 - 0.02	16	0.015	0.005	0.010	0.015	0.020	-
Anthracene	µg/L	16	0.01 - 0.02	16	0.015 ⁴	0.005	0.010	0.015 ⁴	0.015 ⁴	0.012
Benz(a)anthracene	µg/L	16	0.01 - 0.02	16	0.015	0.005	0.010	0.015	0.015 ⁴	0.018
Benzo(a)pyrene	µg/L	16	0.005 - 0.01	16	0.0075	0.0026	0.0050	0.0075	0.0100	0.015
Benzo(b&j)fluoranthene	µg/L	16	0.01 - 0.02	16	0.015	0.005	0.010	0.015	0.020	-
Benzo(g,h,i)perylene	µg/L	16	0.01 - 0.02	16	0.015	0.005	0.010	0.015	0.020	-
Benzo(k)fluoranthene	µg/L	16	0.01 - 0.02	16	0.015	0.005	0.010	0.015	0.020	-
Chrysene	µg/L	16	0.01 - 0.02	16	0.015	0.005	0.010	0.015	0.020	-
Dibenz(a,h)anthracene	µg/L	16	0.005 - 0.02	16	0.013	0.008	0.005	0.013	0.020	-
Fluoranthene	µg/L	16	0.01 - 0.02	16	0.015	0.005	0.010	0.015	0.020	0.04
Fluorene	µg/L	16	0.01 - 0.02	16	0.015	0.005	0.010	0.015	0.020	3
Indeno(1,2,3-c,d)pyrene	µg/L	16	0.01 - 0.02	16	0.015	0.005	0.010	0.015	0.020	-
Naphthalene	µg/L	16	0.05	16	<0.05	-	<0.05	<0.05	<0.05	1.1
Phenanthrene	µg/L	16	0.02	16	<0.02	-	<0.02	<0.02	<0.02	0.4
Pyrene	µg/L	16	0.01 - 0.02	16	0.015	0.005	0.010	0.015	0.020	0.025

APPENDIX B, TABLE 10

Summary of Year 2 surface water chemistry results from the reference ponds, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Water Quality Guideline ¹
Radiological Parameters										
Carbon-14	Bq/L	16	6.6 - 18.5	16	15	5	7	19	19	200
Cesium-137	Bq/L	16	0.28 - 0.37	16	0.36	0.02	0.33	0.37	0.37	10
Cobalt-60	Bq/L	16	0.27 - 0.45	16	0.38	0.04	0.34	0.37	0.45	40
Gross Alpha	Bq/L	16	0.028 - 0.111	16	0.095	0.027	0.049	0.111	0.111	-
Gross Beta	Bq/L	16	0.039 - 0.148	14	0.123	0.037	0.071	0.148	0.148	-
Iodine-129	Bq/L	16	0.23 - 0.37	16	0.34	0.05	0.26	0.37	0.37	1
Potassium-40	Bq/L	16	5.8 - 7.6	15	6.8	0.7	5.5	7.1	7.2	-
Radium-226	Bq/L	16	0.0043 - 0.037	10	0.031	0.035	0.005	0.018	0.101	0.5
Ruthenium-106	Bq/L	16	2.6 - 3.6	16	3.1	0.3	2.9	3.0	3.5	20
Strontium-90	Bq/L	16	0.014 - 0.037	16	0.030	0.010	0.015	0.037	0.037	5
Thorium-228	Bq/L	16	0.0035 - 0.0074	16	0.0064	0.0016	0.0039	0.0074	0.0074	2
Thorium-230	Bq/L	16	0.0038 - 0.0074	15	0.0061	0.0017	0.0038	0.0074	0.0074	0.6
Thorium-232	Bq/L	16	0.00034 - 0.0074	14	0.0052	0.0030	0.0008	0.0074	0.0074	0.6
Tritium	Bq/L	16	12 - 14.8	16	14	1	12	15	15	7000
Uranium-234	Bq/L	16	0.0024 - 0.0074	12	0.0060	0.0020	0.0028	0.0074	0.0074	3
Uranium-235	Bq/L	16	0.001 - 0.0074	14	0.0054	0.0027	0.0012	0.0074	0.0074	3
Uranium-238	Bq/L	16	0.0024 - 0.0074	14	0.0056	0.0025	0.0023	0.0074	0.0074	3
Semi-Volatile Organic Compounds										
1,2,4-Trichlorobenzene	µg/L	16	0.4 - 0.8	16	0.43	0.10	0.40	0.40	0.50	0.5
2,4,5-Trichlorophenol	µg/L	16	0.2 - 0.4	16	0.21	0.05	0.20	0.20	0.25	18
2,4,6-Trichlorophenol	µg/L	16	0.2 - 0.4	16	0.21	0.05	0.20	0.20	0.25	5
2,4+2,6-Dinitrotoluene	µg/L	16	0.57 - 1.1	16	0.62	0.13	0.57	0.60	0.73	10
2,4-Dichlorophenol	µg/L	16	0.3 - 0.6	16	0.32	0.08	0.30	0.30	0.38	0.2
2,4-Dimethylphenol	µg/L	16	0.5 - 1	16	0.53	0.13	0.50	0.50	0.63	10
2,4-Dinitrophenol	µg/L	16	1 - 2	16	1.2	0.4	1.0	1.0	2.0	6.2
2,4-Dinitrotoluene	µg/L	16	0.4 - 0.8	16	0.43	0.10	0.40	0.40	0.50	4
2,6-Dinitrotoluene	µg/L	16	0.4 - 0.8	16	0.43	0.10	0.40	0.40	0.50	6
2-Chlorophenol	µg/L	16	0.3 - 0.6	16	0.32	0.08	0.30	0.30	0.38	7
4-Chloroaniline	µg/L	15	0.4 - 0.8	15	0.43	0.10	0.40	0.40	0.52	-
Biphenyl	µg/L	16	0.4 - 0.8	16	0.43	0.10	0.40	0.40	0.50	0.2
bis(2-Chloro-1-methylethyl) ether	µg/L	16	0.4 - 0.8	16	0.43	0.10	0.40	0.40	0.50	-
bis(2-Chloroethyl) ether	µg/L	16	0.4 - 0.8	16	0.43	0.10	0.40	0.40	0.50	200
Bis(2-ethylhexyl)phthalate	µg/L	16	2 - 4	16	2.1	0.5	2.0	2.0	2.5	3
Dichlorobenzidine, 3,3'-	µg/L	16	0.4 - 0.8	16	0.43	0.10	0.40	0.40	0.50	0.6
Diethylphthalate	µg/L	16	0.2 - 0.4	16	0.21	0.05	0.20	0.20	0.25	210
Dimethylphthalate	µg/L	16	0.2 - 0.4	16	0.21	0.05	0.20	0.20	0.25	330
Pentachlorophenol [PCP]	µg/L	16	0.5 - 1	16	0.53 ⁴	0.13	0.50	0.50	0.63 ⁴	0.5
Phenol	µg/L	16	0.5 - 1	12	0.74	0.44	0.50	0.50	1.62	4

APPENDIX B, TABLE 10

Summary of Year 2 surface water chemistry results from the reference ponds, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Water Quality Guideline ¹
Speciated Metals										
Chromium, hexavalent [Cr VI], dissolved	mg/L	16	0.0005	12	0.00053	0.00009	0.00050	0.00050	0.00063	-
Chromium, hexavalent [Cr VI], total	mg/L	16	0.0005	10	0.00058	0.00011	0.00050	0.00050	0.00077	0.005
Chromium, trivalent [Cr III], dissolved	mg/L	16	0.0005	16	<0.0005	-	<0.0005	<0.0005	<0.0005	-
Chromium, trivalent [Cr III], total	mg/L	16	0.0005 - 0.001	16	0.00075	0.00026	0.00050	0.00075	0.00100	0.0089
Volatile Organic Compounds										
Acetone	µg/L	1	20	1	<20	-	<20	<20	<20	1500
Benzene	µg/L	1	0.5	1	<0.5	-	<0.5	<0.5	<0.5	5
Bromodichloromethane	µg/L	1	0.5	1	<0.5	-	<0.5	<0.5	<0.5	200
Bromoform	µg/L	1	0.5	1	<0.5	-	<0.5	<0.5	<0.5	60
Bromomethane	µg/L	1	0.5	1	<0.5	-	<0.5	<0.5	<0.5	0.9
BTEX, total	µg/L	1	1	1	<1	-	<1	<1	<1	-
Carbon disulfide	µg/L	1	1	1	<1	-	<1	<1	<1	-
Carbon tetrachloride	µg/L	1	0.2	1	<0.2	-	<0.2	<0.2	<0.2	2
Chlorobenzene	µg/L	1	0.5	1	<0.5	-	<0.5	<0.5	<0.5	1.3
Chloroethane	µg/L	1	0.5	1	<0.5	-	<0.5	<0.5	<0.5	-
Chloroform	µg/L	1	0.5	1	<0.5	-	<0.5	<0.5	<0.5	1.8
Chloromethane	µg/L	1	2	1	<2	-	<2	<2	<2	-
Dibromochloromethane	µg/L	1	0.5	1	<0.5	-	<0.5	<0.5	<0.5	40
Dibromoethane, 1,2-	µg/L	1	0.2	1	<0.2	-	<0.2	<0.2	<0.2	5
Dichlorobenzene, 1,2-	µg/L	1	0.5	1	<0.5	-	<0.5	<0.5	<0.5	0.7
Dichlorobenzene, 1,3-	µg/L	1	0.5	1	<0.5	-	<0.5	<0.5	<0.5	2.5
Dichlorobenzene, 1,4-	µg/L	1	0.5	1	<0.5	-	<0.5	<0.5	<0.5	4
Dichlorodifluoromethane	µg/L	1	0.5	1	<0.5	-	<0.5	<0.5	<0.5	-
Dichloroethane, 1,1-	µg/L	1	0.5	1	<0.5	-	<0.5	<0.5	<0.5	200
Dichloroethane, 1,2-	µg/L	1	0.5	1	<0.5	-	<0.5	<0.5	<0.5	5
Dichloroethylene, 1,1-	µg/L	1	0.5	1	<0.5	-	<0.5	<0.5	<0.5	14
Dichloroethylene, cis+trans-1,2-	µg/L	1	0.71	1	<0.71	-	<0.71	<0.71	<0.71	-
Dichloroethylene, cis-1,2-	µg/L	1	0.5	1	<0.5	-	<0.5	<0.5	<0.5	200
Dichloroethylene, trans-1,2-	µg/L	1	0.5	1	<0.5	-	<0.5	<0.5	<0.5	200
Dichloromethane	µg/L	1	1	1	<1	-	<1	<1	<1	50
Dichloropropane, 1,2-	µg/L	1	0.5	1	<0.5	-	<0.5	<0.5	<0.5	0.7
Dichloropropylene, cis+trans-1,3-	µg/L	1	0.5	1	<0.5 ⁴	-	<0.5 ⁴	<0.5 ⁴	<0.5 ⁴	0.2
Dichloropropylene, cis-1,3-	µg/L	1	0.3	1	<0.3	-	<0.3	<0.3	<0.3	-
Dichloropropylene, trans-1,3-	µg/L	1	0.3	1	<0.3	-	<0.3	<0.3	<0.3	7
Ethylbenzene	µg/L	1	0.5	1	<0.5	-	<0.5	<0.5	<0.5	8
Hexane, n-	µg/L	1	0.5	1	<0.5	-	<0.5	<0.5	<0.5	0.58
Hexanone, 2-	µg/L	1	20	1	<20	-	<20	<20	<20	-
Methyl ethyl ketone [MEK]	µg/L	1	20	1	<20	-	<20	<20	<20	400
Methyl isobutyl ketone [MIBK]	µg/L	1	20	1	<20	-	<20	<20	<20	-
Methyl-tert-butyl ether [MTBE]	µg/L	1	0.5	1	<0.5	-	<0.5	<0.5	<0.5	200
Styrene	µg/L	1	0.5	1	<0.5	-	<0.5	<0.5	<0.5	4
Tetrachloroethane, 1,1,1,2-	µg/L	1	0.5	1	<0.5	-	<0.5	<0.5	<0.5	20
Tetrachloroethane, 1,1,2,2-	µg/L	1	0.5	1	<0.5	-	<0.5	<0.5	<0.5	70

APPENDIX B, TABLE 10

Summary of Year 2 surface water chemistry results from the reference ponds, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Water Quality Guideline ¹
Volatile Organic Compounds										
Tetrachloroethylene	µg/L	1	0.5	1	<0.5	-	<0.5	<0.5	<0.5	10
Toluene	µg/L	1	0.5	1	<0.5	-	<0.5	<0.5	<0.5	0.8
Trichloroethane, 1,1,1-	µg/L	1	0.5	1	<0.5	-	<0.5	<0.5	<0.5	10
Trichloroethane, 1,1,2-	µg/L	1	0.5	1	<0.5	-	<0.5	<0.5	<0.5	800
Trichloroethylene	µg/L	1	0.5	1	<0.5	-	<0.5	<0.5	<0.5	5
Trichlorofluoromethane	µg/L	1	0.5	1	<0.5	-	<0.5	<0.5	<0.5	-
Vinyl chloride	µg/L	1	0.5	1	<0.5	-	<0.5	<0.5	<0.5	2
Xylene, m+p-	µg/L	1	0.4	1	<0.4	-	<0.4	<0.4	<0.4	32
Xylene, o-	µg/L	1	0.3	1	<0.3	-	<0.3	<0.3	<0.3	40
Xylenes, total	µg/L	1	0.5	1	<0.5	-	<0.5	<0.5	<0.5	30

Gray cells indicate guideline exceedance; n = sample size; RDL = Reportable Detection Limit; SD = Standard Deviation.

¹See Appendix B, Table 3 for detailed water quality guidelines.

²Parameter was analyzed at multiple detection limits.

³Multiple samples measured above detection range.

⁴Due to detection limits, guideline exceedance cannot be confirmed.

APPENDIX B, TABLE 11

Summary of Year 2 surface water chemistry results from Mennin Lake Inflow (Unnamed Watercourse), summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Water Quality Guideline ¹
Aggregate Organics										
Biochemical Oxygen Demand	mg/L	12	2	12	<2	-	<2	<2	<2	-
Anions and Nutrients										
Ammonia, Total (as N)	mg/L	12	0.01	3	0.071	0.089	0.010	0.027	0.235	5.86
Bromide	mg/L	12	0.1	12	<0.1	-	<0.1	<0.1	<0.1	-
Chloride	mg/L	12	0.5	3	0.81	0.30	0.50	0.74	1.27	120
Fluoride	mg/L	12	0.02	0	0.038	0.005	0.034	0.035	0.046	0.12
Iodide	mg/L	12	0.2	6	0.20	0.00	0.20	0.20	0.20	-
Kjeldahl nitrogen, total [TKN]	mg/L	12	0.15 - 0.2	0	0.61	0.10	0.48	0.62	0.78	-
Nitrate (as N)	mg/L	12	0.02	4	0.096	0.082	0.020	0.069	0.208	3
Nitrate and Nitrite as N	mg/L	12	0.0224 - 0.07	4	0.11	0.07	0.03	0.09	0.21	-
Nitrite (as N)	mg/L	12	0.01	12	<0.01	-	<0.01	<0.01	<0.01	0.02
Phosphorus, total	mg/L	12	0.003 - 0.02	5	0.022	0.004	0.018	0.020	0.029	-
Sulfate (as SO4)	mg/L	12	0.3	0	0.63	0.17	0.40	0.66	0.81	128
Cyanides										
Cyanide, Total	mg/L	12	0.002	10	0.0022	0.0004	0.0020	0.0020	0.0029	0.005
Metals Dissolved										
Aluminum, dissolved	mg/L	12	0.001	0	0.33	0.06	0.27	0.31	0.40	-
Antimony, dissolved	mg/L	12	0.0001	12	<0.0001	-	<0.0001	<0.0001	<0.0001	-
Arsenic, dissolved	mg/L	12	0.0001	0	0.00044	0.00005	0.00039	0.00043	0.00051	-
Barium, dissolved	mg/L	12	0.0001	0	0.0062	0.0007	0.0050	0.0066	0.0068	-
Beryllium, dissolved	mg/L	12	0.00002 - 0.0001	12	0.000060	0.000042	0.000020	0.000060	0.000100	-
Bismuth, dissolved	mg/L	12	0.00005	12	<0.00005	-	<0.00005	<0.00005	<0.00005	-
Boron, dissolved	mg/L	12	0.01	12	<0.01	-	<0.01	<0.01	<0.01	-
Cadmium, dissolved	mg/L	12	0.000005	0	0.000012	0.000004	0.000008	0.000011	0.000019	-
Calcium, dissolved	mg/L	12	0.05	0	2.7	0.5	2.2	2.7	3.4	-
Cesium, dissolved	mg/L	12	0.00001	0	0.000017	0.000003	0.000013	0.000017	0.000020	-
Chromium, dissolved	mg/L	12	0.0001 - 0.0005	2	0.00059	0.00008	0.00050	0.00058	0.00072	-
Cobalt, dissolved	mg/L	12	0.0001	0	0.00028	0.00014	0.00014	0.00026	0.00048	-
Copper, dissolved	mg/L	12	0.0002	0	0.00091	0.00023	0.00072	0.00083	0.00132	0.00087
Iron, dissolved	mg/L	12	0.01	0	0.73	0.19	0.42	0.82	0.89	-
Lead, dissolved	mg/L	12	0.00005	0	0.00024	0.00013	0.00015	0.00021	0.00043	0.0065
Lithium, dissolved	mg/L	12	0.001	6	0.0011	0.0001	0.0010	0.0010	0.0013	-
Magnesium, dissolved	mg/L	12	0.005	0	0.79	0.17	0.62	0.79	0.97	-
Manganese, dissolved	mg/L	12	0.0001	0	0.020	0.010	0.010	0.018	0.035	0.23
Mercury, dissolved	mg/L	12	0.000005	8	0.0000060	0.0000024	0.0000050	0.0000050	0.0000097	-
Molybdenum, dissolved	mg/L	12	0.00005	0	0.00011	0.00002	0.00009	0.00011	0.00013	-
Nickel, dissolved	mg/L	12	0.0005	6	0.00058	0.00010	0.00050	0.00054	0.00072	-
Phosphorus, dissolved	mg/L	12	0.05	12	<0.05	-	<0.05	<0.05	<0.05	-
Potassium, dissolved	mg/L	12	0.05	0	0.40	0.08	0.27	0.43	0.47	-
Rhodium, dissolved	mg/L	12	0.001	12	<0.001	-	<0.001	<0.001	<0.001	-
Rubidium, dissolved	mg/L	12	0.0002	0	0.0013	0.0002	0.0010	0.0013	0.0014	-
Ruthenium, dissolved	mg/L	12	0.001	12	<0.001	-	<0.001	<0.001	<0.001	-
Samarium, dissolved	mg/L	12	0.001	12	<0.001	-	<0.001	<0.001	<0.001	-

APPENDIX B, TABLE 11

Summary of Year 2 surface water chemistry results from Mennin Lake Inflow (Unnamed Watercourse), summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Water Quality Guideline ¹
Metals Dissolved										
Selenium, dissolved	mg/L	12	0.00005	0	0.00012	0.00002	0.00010	0.00012	0.00014	-
Silicon, dissolved	mg/L	12	0.05	0	3.1	0.9	2.0	3.0	4.1	-
Silver, dissolved	mg/L	15 ²	0.000005 - 0.00001	15	0.0000090	0.0000021	0.0000050	0.0000100	0.0000100	-
Sodium, dissolved	mg/L	12	0.05	0	1.3	0.3	1.0	1.2	1.7	-
Strontium, dissolved	mg/L	12	0.0002	0	0.012	0.002	0.009	0.012	0.015	2.5
Sulfur, dissolved	mg/L	12	0.5	12	<0.5	-	<0.5	<0.5	<0.5	-
Tellurium, dissolved	mg/L	12	0.0002	12	<0.0002	-	<0.0002	<0.0002	<0.0002	-
Thallium, dissolved	mg/L	12	0.00001	12	<0.00001	-	<0.00001	<0.00001	<0.00001	-
Thorium, dissolved	mg/L	12	0.0001	0	0.00015	0.00002	0.00013	0.00016	0.00018	-
Tin, dissolved	mg/L	12	0.0001	10	0.00051	0.00123	0.00010	0.00010	0.00237	-
Titanium, dissolved	mg/L	12	0.0003	0	0.0046	0.0006	0.0037	0.0046	0.0053	-
Tungsten, dissolved	mg/L	12	0.0001	12	<0.0001	-	<0.0001	<0.0001	<0.0001	-
Uranium, dissolved	mg/L	12	0.00001	0	0.00015	0.00002	0.00014	0.00015	0.00018	-
Vanadium, dissolved	mg/L	12	0.0005	0	0.00076	0.00004	0.00070	0.00077	0.00081	-
Zinc, dissolved	mg/L	12	0.001	0	0.0041	0.0020	0.0028	0.0032	0.0080	0.017
Zirconium, dissolved	mg/L	12	0.0002 - 0.0003	0	0.00036	0.00005	0.00031	0.00035	0.00045	-
Metals Total										
Aluminum, total	mg/L	12	0.003	0	0.45	0.15	0.33	0.39	0.70	0.32
Antimony, total	mg/L	12	0.0001	12	<0.0001	-	<0.0001	<0.0001	<0.0001	0.006
Arsenic, total	mg/L	12	0.0001	0	0.00048	0.00007	0.00038	0.00048	0.00056	0.005
Barium, total	mg/L	12	0.0001	0	0.0070	0.0013	0.0052	0.0070	0.0089	1
Beryllium, total	mg/L	12	0.00002 - 0.0001	12	0.000060	0.000042	0.000020	0.000060	0.000100	0.011
Bismuth, total	mg/L	12	0.00005	12	<0.00005	-	<0.00005	<0.00005	<0.00005	17.5
Boron, total	mg/L	12	0.01	12	<0.01	-	<0.01	<0.01	<0.01	1.5
Cadmium, total	mg/L	12	0.000005	0	0.000014	0.000003	0.000010	0.000013	0.000019	0.00004
Calcium, total	mg/L	12	0.05	0	2.8	0.6	2.2	2.8	3.6	1000
Cesium, total	mg/L	12	0.00001	0	0.000026	0.000009	0.000019	0.000022	0.000041	-
Chromium, total	mg/L	12	0.0001 - 0.0005	0	0.00083	0.00032	0.00060	0.00070	0.00138	-
Cobalt, total	mg/L	12	0.0001	0	0.00034	0.00017	0.00018	0.00035	0.00051	0.00078
Copper, total	mg/L	12	0.0005	0	0.0014	0.0007	0.0008	0.0010	0.0027	0.002
Iron, total	mg/L	12	0.01	0	0.97	0.29	0.53	1.02	1.31	3.3
Lead, total	mg/L	12	0.00005	0	0.00027	0.00007	0.00019	0.00025	0.00038	0.001
Lithium, total	mg/L	12	0.001	3	0.0012	0.0003	0.0010	0.0011	0.0017	2.5
Magnesium, total	mg/L	12	0.005	0	0.84	0.23	0.61	0.81	1.15	82
Manganese, total	mg/L	12	0.0001	0	0.022	0.011	0.011	0.021	0.035	0.12
Mercury, total	mg/L	12	0.000005	5	0.0000088	0.0000060	0.0000050	0.0000060	0.0000199	0.000026
Molybdenum, total	mg/L	12	0.00005	0	0.00012	0.00002	0.00010	0.00011	0.00014	0.073
Nickel, total	mg/L	12	0.0005	3	0.00068	0.00023	0.00050	0.00058	0.00107	0.025
Phosphorus, total	mg/L	12	0.05	12	<0.05	-	<0.05	<0.05	<0.05	-
Potassium, total	mg/L	12	0.05	0	0.41	0.09	0.27	0.45	0.49	53
Rhodium, total	mg/L	12	0.001	12	<0.001	-	<0.001	<0.001	<0.001	0.01
Rubidium, total	mg/L	12	0.0002	0	0.0014	0.0003	0.0010	0.0014	0.0018	-
Ruthenium, total	mg/L	12	0.001	12	<0.001	-	<0.001	<0.001	<0.001	0.01

APPENDIX B, TABLE 11

Summary of Year 2 surface water chemistry results from Mennin Lake Inflow (Unnamed Watercourse), summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Water Quality Guideline ¹
Metals Total										
Samarium, total	mg/L	12	0.001	12	<0.001	-	<0.001	<0.001	<0.001	0.0082
Selenium, total	mg/L	12	0.00005	0	0.00012	0.00002	0.00009	0.00012	0.00014	0.001
Silicon, total	mg/L	12	0.1	0	3.3	0.9	2.1	3.4	4.3	-
Silver, total	mg/L	15 ²	0.000005 - 0.00001	15	0.0000090	0.0000021	0.0000050	0.0000100	0.0000100	0.00025
Sodium, total	mg/L	12	0.05	0	1.3	0.3	0.9	1.3	1.8	680
Strontium, total	mg/L	12	0.0002	0	0.012	0.003	0.010	0.012	0.015	7
Sulfur, total	mg/L	12	0.5	12	<0.5	-	<0.5	<0.5	<0.5	-
Tellurium, total	mg/L	12	0.0002	12	<0.0002	-	<0.0002	<0.0002	<0.0002	0.0058
Thallium, total	mg/L	12	0.00001	9	0.000010	0.0000004	0.000010	0.000010	0.000011	0.0008
Thorium, total	mg/L	12	0.0001	0	0.00014	0.00002	0.00011	0.00015	0.00016	-
Tin, total	mg/L	12	0.0001	9	0.00053	0.00128	0.00010	0.00010	0.00251	0.073
Titanium, total	mg/L	12	0.0003	0	0.0086	0.0048	0.0054	0.0063	0.0166	0.076
Tungsten, total	mg/L	12	0.0001	12	<0.0001	-	<0.0001	<0.0001	<0.0001	0.03
Uranium, total	mg/L	12	0.00001	0	0.00017	0.00002	0.00015	0.00017	0.00019	0.015
Vanadium, total	mg/L	12	0.0005	0	0.0011	0.0002	0.0009	0.0010	0.0014	0.12
Zinc, total	mg/L	12	0.003	9	0.0033	0.0006	0.0030	0.0030	0.0044	0.02
Zirconium, total	mg/L	12	0.0002	0	0.00028	0.00005	0.00020	0.00029	0.00035	0.004
Microbiological Tests										
Coliforms, Escherichia coli [E. coli] ³	CFU/100mL	12	1 - 10	0	50	78	1	9	188	100
Coliforms, total ³	CFU/100mL	12	1 - 10	0	18	26	1	6	66	-
Organic and Inorganic Carbon										
Carbon, dissolved organic [DOC]	mg/L	12	0.5 - 5	0	31	37	17	19	82	-
Carbon, total inorganic [TIC]	mg/L	12	0.5	6	0.68	0.22	0.50	0.59	1.04	-
Carbon, total organic [TOC]	mg/L	12	0.5 - 5	0	20	4	17	18	26	-
Physical Tests										
Alkalinity, bicarbonate (as CaCO3)	mg/L	12	1 - 1.2	0	6.2	2.0	4.0	6.3	8.2	-
Alkalinity, carbonate (as CaCO3)	mg/L	12	0.6 - 1	12	0.80	0.21	0.60	0.80	1.00	-
Alkalinity, hydroxide (as CaCO3)	mg/L	12	0.34 - 1	12	0.67	0.34	0.34	0.67	1.00	-
Alkalinity, phenolphthalein (as CaCO3)	mg/L	6	1	6	<1	-	<1	<1	<1	-
Alkalinity, Total (as CaCO3)	mg/L	6	1	0	4.9	1.7	3.2	5.0	6.6	20
Alkalinity, total (as CaCO3)	mg/L	6	2	0	6.3	2.0	4.3	6.5	8.2	-
Conductivity	µS/cm	12	1	0	24	5	19	23	31	700
Hardness (as CaCO3), from total Ca/Mg	mg/L	6	0.5	0	10	3	8	10	13	-
Solids, total dissolved [TDS]	mg/L	12	3 - 4	0	52	6	43	53	59	500
Solids, total suspended [TSS]	mg/L	12	3	9	3.2	0.4	3.0	3.0	4.0	-
Turbidity	NTU	12	0.1	0	2.9	2.2	1.1	1.9	6.5	50
Plant Pigments										
Chlorophyll a	µg/L	12	0.01 - 0.1	0	1.3	0.5	0.5	1.4	1.8	-

APPENDIX B, TABLE 11

Summary of Year 2 surface water chemistry results from Mennin Lake Inflow (Unnamed Watercourse), summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Water Quality Guideline ¹
Radiological Parameters										
Carbon-14	Bq/L	12	6.5 - 18.5	12	16	5	7	19	19	200
Cesium-137	Bq/L	12	0.34 - 0.37	12	0.37	0.01	0.35	0.37	0.37	10
Cobalt-60	Bq/L	12	0.31 - 0.37	12	0.37	0.02	0.34	0.37	0.37	40
Gross Alpha	Bq/L	12	0.054 - 0.111	12	0.098	0.024	0.056	0.111	0.111	-
Gross Beta	Bq/L	12	0.083 - 0.148	10	0.144	0.066	0.085	0.148	0.232	-
Iodine-129	Bq/L	12	0.26 - 0.37	12	0.35	0.04	0.28	0.37	0.37	1
Potassium-40	Bq/L	12	5.4 - 7.2	12	6.8	0.6	5.5	7.1	7.1	-
Radium-226	Bq/L	12	0.0025 - 0.037	6	0.021	0.013	0.004	0.019	0.037	0.5
Ruthenium-106	Bq/L	12	3 - 3.6	12	3.1	0.2	3.0	3.0	3.5	20
Strontium-90	Bq/L	12	0.015 - 0.037	12	0.032	0.010	0.016	0.037	0.037	5
Thorium-228	Bq/L	12	0.0037 - 0.0074	11	0.0063	0.0016	0.0038	0.0074	0.0074	2
Thorium-230	Bq/L	12	0.0037 - 0.0074	7	0.0066	0.0016	0.0042	0.0074	0.0082	0.6
Thorium-232	Bq/L	12	0.00093 - 0.0074	9	0.0056	0.0028	0.0012	0.0074	0.0074	0.6
Tritium	Bq/L	12	12 - 14.8	12	14	1	12	15	15	7000
Uranium-234	Bq/L	12	0.0034 - 0.0074	9	0.0060	0.0018	0.0034	0.0074	0.0074	3
Uranium-235	Bq/L	12	0.0014 - 0.0074	10	0.0052	0.0028	0.0013	0.0074	0.0074	3
Uranium-238	Bq/L	12	0.0022 - 0.0074	9	0.0058	0.0021	0.0024	0.0074	0.0074	3
Speciated Metals										
Chromium, hexavalent [Cr VI], dissolved	mg/L	12	0.0005	8	0.00053	0.00005	0.00050	0.00050	0.00062	-
Chromium, hexavalent [Cr VI], total	mg/L	12	0.0005	9	0.00051	0.00003	0.00050	0.00050	0.00057	0.005
Chromium, trivalent [Cr III], dissolved	mg/L	12	0.0005	4	0.00058	0.00008	0.00050	0.00056	0.00072	-
Chromium, trivalent [Cr III], total	mg/L	12	0.0005 - 0.001	5	0.00085	0.00026	0.00050	0.00087	0.00120	0.0089

Gray cells indicate guideline exceedance; n = sample size; RDL = Reportable Detection Limit; SD = Standard Deviation.

¹See Appendix B, Table 3 for detailed water qualtiy guidelines.

²Parameter was anlayzed at multiple detection limits.

³Multiple samples measured above detection range.

APPENDIX B, TABLE 12

Summary of Year 2 surface water chemistry results from Wabigoon River, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Water Quality Guideline ¹
Aggregate Organics										
Biochemical Oxygen Demand	mg/L	33	2	32	2.0	-	2.0	2.0	2.0	-
Anions and Nutrients										
Ammonia, Total (as N)	mg/L	33	0.01	2	0.065	0.089	0.011	0.026	0.228	5.86
Bromide	mg/L	33	0.1	33	<0.1	-	<0.1	<0.1	<0.1	-
Chloride	mg/L	33	0.5	1	6.5	2.5	3.4	7.2	10.4	120
Fluoride	mg/L	33	0.02	1	0.041	0.005	0.036	0.041	0.047	0.12
Iodide	mg/L	33	0.2	18	0.20	0.00	0.20	0.20	0.20	-
Kjeldahl nitrogen, total [TKN]	mg/L	33	0.15 - 0.2	0	0.52	0.12	0.36	0.50	0.70	-
Nitrate (as N)	mg/L	33	0.02	5	0.036	0.025	0.020	0.027	0.095	3
Nitrate and Nitrite as N	mg/L	33	0.0224 - 0.07	23	0.061	0.024	0.022	0.070	0.095	-
Nitrite (as N)	mg/L	33	0.01	33	<0.01	-	<0.01	<0.01	<0.01	0.02
Phosphorus, total	mg/L	33	0.003 - 0.03	19	0.019	0.007	0.011	0.020	0.030	-
Sulfate (as SO4)	mg/L	33	0.3	1	0.87	0.28	0.50	0.85	1.22	128
Cyanides										
Cyanide, Total	mg/L	33	0.002	33	<0.002	-	<0.002	<0.002	<0.002	0.005
Petroleum Hydrocarbon Compounds										
F1 (C6-C10)	mg/L	3	0.1	3	<0.1	-	<0.1	<0.1	<0.1	0.15
F1-BTEX	mg/L	3	0.1	3	<0.1	-	<0.1	<0.1	<0.1	0.15
F2 (C10-C16)	mg/L	3	0.1	3	<0.1	-	<0.1	<0.1	<0.1	0.11
F3 (C16-C34)	mg/L	3	0.2	3	<0.2	-	<0.2	<0.2	<0.2	-
F4 (C34-C50)	mg/L	3	0.2	3	<0.2	-	<0.2	<0.2	<0.2	-
TEH (C10-C50)	mg/L	3	0.4	3	<0.4	-	<0.4	<0.4	<0.4	-
TEH (C16-C50)	mg/L	3	0.4	3	<0.4	-	<0.4	<0.4	<0.4	-
Metals Dissolved										
Aluminum, dissolved	mg/L	33	0.001	0	0.12	0.04	0.07	0.11	0.20	-
Antimony, dissolved	mg/L	33	0.0001	31	0.00010	0.00002	0.00010	0.00010	0.00011	-
Arsenic, dissolved	mg/L	33	0.0001	0	0.00044	0.00015	0.00027	0.00041	0.00070	-
Barium, dissolved	mg/L	33	0.0001	0	0.0071	0.0014	0.0051	0.0072	0.0086	-
Beryllium, dissolved	mg/L	33	0.00002 - 0.0001	33	0.000064	0.000040	0.000020	0.000100	0.000100	-
Bismuth, dissolved	mg/L	33	0.00005	33	<0.00005	-	<0.00005	<0.00005	<0.00005	-
Boron, dissolved	mg/L	33	0.01	33	<0.01	-	<0.01	<0.01	<0.01	-
Cadmium, dissolved	mg/L	33	0.000005	15	0.0000065	0.0000020	0.0000050	0.0000058	0.0000106	-
Calcium, dissolved	mg/L	33	0.05	0	6.0	1.1	4.5	6.2	7.6	-
Cesium, dissolved	mg/L	33	0.00001	0	0.000019	0.000005	0.000013	0.000018	0.000027	-
Chromium, dissolved	mg/L	33	0.0001 - 0.0005	14	0.00049	0.00005	0.00040	0.00050	0.00057	-
Cobalt, dissolved	mg/L	33	0.0001	11	0.00015	0.00007	0.00010	0.00011	0.00032	-
Copper, dissolved	mg/L	33	0.0002	1	0.00065	0.00026	0.00033	0.00063	0.00117	0.00087
Iron, dissolved	mg/L	33	0.01	0	1.2	0.6	0.5	1.1	2.4	-
Lead, dissolved	mg/L	33	0.00005	0	0.00015	0.00010	0.00009	0.00011	0.00031	0.0065
Lithium, dissolved	mg/L	33	0.001	30	0.0010	0.00003	0.0010	0.0010	0.0010	-
Magnesium, dissolved	mg/L	33	0.005	0	1.1	0.2	0.8	1.1	1.5	-
Manganese, dissolved	mg/L	33	0.0001	0	0.035	0.018	0.021	0.026	0.082	0.23
Mercury, dissolved	mg/L	33	0.000005	30	0.0000070	0.0000069	0.0000050	0.0000050	0.0000195	-

APPENDIX B, TABLE 12

Summary of Year 2 surface water chemistry results from Wabigoon River, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Water Quality Guideline ¹
Metals Dissolved										
Molybdenum, dissolved	mg/L	33	0.00005	0	0.00014	0.00006	0.00008	0.00013	0.00026	-
Nickel, dissolved	mg/L	33	0.0005	28	0.00052	0.00005	0.00050	0.00050	0.00064	-
Phosphorus, dissolved	mg/L	33	0.05	33	<0.05	-	<0.05	<0.05	<0.05	-
Potassium, dissolved	mg/L	33	0.05	0	0.52	0.11	0.42	0.49	0.75	-
Rhodium, dissolved	mg/L	33	0.001	33	<0.001	-	<0.001	<0.001	<0.001	-
Rubidium, dissolved	mg/L	33	0.0002	0	0.0015	0.0002	0.0013	0.0015	0.0018	-
Ruthenium, dissolved	mg/L	33	0.001	33	<0.001	-	<0.001	<0.001	<0.001	-
Samarium, dissolved	mg/L	33	0.001	33	<0.001	-	<0.001	<0.001	<0.001	-
Selenium, dissolved	mg/L	33	0.00005	0	0.000096	0.000033	0.000056	0.000090	0.000158	-
Silicon, dissolved	mg/L	33	0.05	0	3.6	0.9	2.3	3.6	5.1	-
Silver, dissolved	mg/L	36 ²	0.000005 - 0.00001	36	0.0000096	0.0000014	0.0000050	0.0000100	0.0000100	-
Sodium, dissolved	mg/L	33	0.05	0	5.2	1.9	2.9	5.1	7.0	-
Strontium, dissolved	mg/L	33	0.0002	0	0.018	0.003	0.014	0.018	0.023	2.5
Sulfur, dissolved	mg/L	33	0.5	25	0.55	0.11	0.50	0.50	0.77	-
Tellurium, dissolved	mg/L	33	0.0002	33	<0.0002	-	<0.0002	<0.0002	<0.0002	-
Thallium, dissolved	mg/L	33	0.00001	33	<0.00001	-	<0.00001	<0.00001	<0.00001	-
Thorium, dissolved	mg/L	33	0.0001	0	0.00023	0.00005	0.00016	0.00023	0.00030	-
Tin, dissolved	mg/L	33	0.0001	25	0.00029	0.00046	0.00010	0.00010	0.00108	-
Titanium, dissolved	mg/L	33	0.0003	0	0.0021	0.0005	0.0014	0.0022	0.0029	-
Tungsten, dissolved	mg/L	33	0.0001	33	<0.0001	-	<0.0001	<0.0001	<0.0001	-
Uranium, dissolved	mg/L	33	0.00001	0	0.00020	0.00003	0.00015	0.00020	0.00025	-
Vanadium, dissolved	mg/L	33	0.0005	0	0.00071	0.00008	0.00061	0.00070	0.00085	-
Zinc, dissolved	mg/L	33	0.001	2	0.0035	0.0027	0.0010	0.0026	0.0098	0.017
Zirconium, dissolved	mg/L	33	0.0002 - 0.0003	7	0.00032	0.00003	0.00030	0.00031	0.00036	-
Metals Total										
Aluminum, total	mg/L	33	0.003	0	0.20	0.07	0.10	0.18	0.33	0.32
Antimony, total	mg/L	33	0.0001	33	<0.0001	-	<0.0001	<0.0001	<0.0001	0.006
Arsenic, total	mg/L	33	0.0001	0	0.00048	0.00015	0.00031	0.00046	0.00073	0.005
Barium, total	mg/L	33	0.0001	0	0.0077	0.0012	0.0056	0.0078	0.0093	1
Beryllium, total	mg/L	33	0.00002 - 0.0001	33	0.000064	0.000040	0.000020	0.000100	0.000100	0.011
Bismuth, total	mg/L	33	0.00005	33	<0.00005	-	<0.00005	<0.00005	<0.00005	17.5
Boron, total	mg/L	33	0.01	33	<0.01	-	<0.01	<0.01	<0.01	1.5
Cadmium, total	mg/L	33	0.000005	4	0.0000083	0.0000033	0.0000050	0.0000071	0.0000153	0.00004
Calcium, total	mg/L	33	0.05	0	6.1	1.1	4.5	6.4	7.7	1000
Cesium, total	mg/L	33	0.00001	0	0.000025	0.000004	0.000021	0.000024	0.000032	-
Chromium, total	mg/L	33	0.0001 - 0.0005	6	0.00056	0.00010	0.00050	0.00052	0.00073	-
Cobalt, total	mg/L	33	0.0001	0	0.00020	0.00008	0.00012	0.00016	0.00038	0.00078
Copper, total	mg/L	33	0.0005	0	0.0018	0.0028	0.0006	0.0009	0.0082	0.002
Iron, total	mg/L	33	0.01	0	1.7	0.7	0.8	1.8	3.1	3.3
Lead, total	mg/L	33	0.00005	0	0.00020	0.00005	0.00013	0.00021	0.00026	0.001
Lithium, total	mg/L	33	0.001	23	0.0010	0.0001	0.0010	0.0010	0.0012	2.5
Magnesium, total	mg/L	33	0.005	0	1.1	0.2	0.8	1.1	1.5	82
Manganese, total	mg/L	33	0.0001	0	0.043	0.019	0.024	0.037	0.093	0.12

APPENDIX B, TABLE 12

Summary of Year 2 surface water chemistry results from Wabigoon River, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Water Quality Guideline ¹
Metals Total										
Mercury, total	mg/L	33	0.000005	27	0.0000085	0.0000097	0.0000050	0.0000050	0.0000365	0.000026
Molybdenum, total	mg/L	33	0.00005	0	0.00013	0.00005	0.00009	0.00012	0.00020	0.073
Nickel, total	mg/L	33	0.0005	23	0.00053	0.00006	0.00050	0.00050	0.00066	0.025
Phosphorus, total	mg/L	33	0.05	33	<0.05	-	<0.05	<0.05	<0.05	-
Potassium, total	mg/L	33	0.05	0	0.51	0.10	0.41	0.49	0.72	53
Rhodium, total	mg/L	33	0.001	33	<0.001	-	<0.001	<0.001	<0.001	0.01
Rubidium, total	mg/L	33	0.0002	0	0.0016	0.0001	0.0014	0.0016	0.0018	-
Ruthenium, total	mg/L	33	0.001	33	<0.001	-	<0.001	<0.001	<0.001	0.01
Samarium, total	mg/L	33	0.001	33	<0.001	-	<0.001	<0.001	<0.001	0.0082
Selenium, total	mg/L	33	0.00005	0	0.00010	0.00003	0.00006	0.00009	0.00016	0.001
Silicon, total	mg/L	33	0.1	0	3.7	0.9	2.5	3.6	5.2	-
Silver, total	mg/L	36 ²	0.000005 - 0.00001	36	0.0000096	0.0000014	0.0000050	0.0000100	0.0000100	0.00025
Sodium, total	mg/L	33	0.05	0	4.9	1.3	2.9	4.9	6.6	680
Strontium, total	mg/L	33	0.0002	0	0.018	0.003	0.014	0.018	0.024	7
Sulfur, total	mg/L	33	0.5	30	0.51	0.03	0.50	0.50	0.51	-
Tellurium, total	mg/L	33	0.0002	33	<0.0002	-	<0.0002	<0.0002	<0.0002	0.0058
Thallium, total	mg/L	33	0.00001	33	<0.00001	-	<0.00001	<0.00001	<0.00001	0.0008
Thorium, total	mg/L	33	0.0001	0	0.00025	0.00005	0.00019	0.00025	0.00037	-
Tin, total	mg/L	33	0.0001	27	0.00028	0.00047	0.00010	0.00010	0.00145	0.073
Titanium, total	mg/L	33	0.0003	0	0.0050	0.0017	0.0025	0.0045	0.0079	0.076
Tungsten, total	mg/L	33	0.0001	33	<0.0001	-	<0.0001	<0.0001	<0.0001	0.03
Uranium, total	mg/L	33	0.00001	0	0.00022	0.00003	0.00016	0.00022	0.00027	0.015
Vanadium, total	mg/L	33	0.0005	0	0.0011	0.0001	0.0009	0.0012	0.0013	0.12
Zinc, total	mg/L	33	0.003	29	0.0034	0.0012	0.0030	0.0030	0.0056	0.02
Zirconium, total	mg/L	33	0.0002	0	0.00025	0.00004	0.00021	0.00025	0.00030	0.004
Microbiological Tests										
Coliforms, Escherichia coli [E. coli] ³	CFU/100mL	33	1 - 10	2	51	60	1	39	168	100
Coliforms, total ³	CFU/100mL	33	1 - 10	0	69	214	1	1	392	-
Organic and Inorganic Carbon										
Carbon, dissolved organic [DOC]	mg/L	33	0.5 - 5	0	21	22	10	16	25	-
Carbon, total inorganic [TIC]	mg/L	33	0.5	1	2.3	1.1	1.1	1.9	4.6	-
Carbon, total organic [TOC]	mg/L	33	0.5	0	17	5	10	16	25	-
Physical Tests										
Alkalinity, bicarbonate (as CaCO3)	mg/L	33	1 - 1.2	0	17	5	11	16	28	-
Alkalinity, carbonate (as CaCO3)	mg/L	33	0.6 - 1	33	0.78	0.20	0.60	0.60	1.00	-
Alkalinity, hydroxide (as CaCO3)	mg/L	33	0.34 - 1	33	0.64	0.33	0.34	0.34	1.00	-
Alkalinity, phenolphthalein (as CaCO3)	mg/L	15	1	15	<1	-	<1	<1	<1	-
Alkalinity, Total (as CaCO3)	mg/L	18	1	0	13	2	10	14	15	20
Alkalinity, total (as CaCO3)	mg/L	15	2	0	17	7	11	13	28	-
Conductivity	µS/cm	33	1	0	60	12	45	59	82	700

APPENDIX B, TABLE 12

Summary of Year 2 surface water chemistry results from Wabigoon River, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Water Quality Guideline ¹
Physical Tests										
Hardness (as CaCO3), from total Ca/Mg	mg/L	15	0.5	0	19	5	14	16	25	-
Solids, total dissolved [TDS]	mg/L	33	3 - 13	0	66	15	48	67	93	500
Solids, total suspended [TSS]	mg/L	33	3	9	4.6	1.7	3.0	4.2	7.5	-
Turbidity	NTU	33	0.1	0	3.4	0.9	1.9	3.7	4.6	50
Plant Pigments										
Chlorophyll a	µg/L	33	0.01 - 0.1	0	1.2	0.4	0.3	1.4	1.6	-
Radiological Parameters										
Carbon-14	Bq/L	33	6.7 - 18.5	33	15	5	7	19	19	200
Cesium-137	Bq/L	33	0.28 - 0.37	33	0.36	0.02	0.31	0.37	0.37	10
Cobalt-60	Bq/L	33	0.3 - 0.42	33	0.37	0.02	0.35	0.37	0.41	40
Gross Alpha	Bq/L	33	0.024 - 0.111	20	0.104	0.045	0.047	0.111	0.189	-
Gross Beta	Bq/L	33	0.036 - 0.148	23	0.121	0.036	0.068	0.148	0.148	-
Iodine-129	Bq/L	33	0.23 - 0.37	33	0.34	0.05	0.24	0.37	0.37	1
Potassium-40	Bq/L	33	4.7 - 9.1	32	6.8	1.0	5.1	7.1	7.1	-
Radium-226	Bq/L	33	0.0051 - 0.037	22	0.086	0.262	0.006	0.029	0.303	0.5
Ruthenium-106	Bq/L	33	2.4 - 3.9	33	3.1	0.3	2.8	3.0	3.6	20
Strontium-90	Bq/L	33	0.013 - 0.037	30	0.031	0.010	0.015	0.037	0.037	5
Thorium-228	Bq/L	33	0.0035 - 0.0074	1	0.013	0.007	0.005	0.011	0.027	2
Thorium-230	Bq/L	33	0.0037 - 0.0074	15	0.0059	0.0016	0.0034	0.0063	0.0076	0.6
Thorium-232	Bq/L	33	0.00099 - 0.0074	13	0.0040	0.0023	0.0016	0.0031	0.0074	0.6
Tritium	Bq/L	33	13 - 14.8	33	14	1	13	15	15	7000
Uranium-234	Bq/L	33	0.001 - 0.0074	19	0.0064	0.0015	0.0037	0.0074	0.0074	3
Uranium-235	Bq/L	33	0.0011 - 0.0074	29	0.0054	0.0026	0.0012	0.0074	0.0074	3
Uranium-238	Bq/L	33	0.001 - 0.0074	11	0.0051	0.0021	0.0022	0.0045	0.0080	3
Speciated Metals										
Chromium, hexavalent [Cr VI], dissolved	mg/L	33	0.0005	32	0.00050	0.00001	0.00050	0.00050	0.00050	-
Chromium, hexavalent [Cr VI], total	mg/L	33	0.0005	28	0.00055	0.00014	0.00050	0.00050	0.00091	0.005
Chromium, trivalent [Cr III], dissolved	mg/L	33	0.0005	26	0.00051	0.00002	0.00050	0.00050	0.00057	-
Chromium, trivalent [Cr III], total	mg/L	33	0.0005 - 0.001	26	0.00078	0.00025	0.00050	0.00100	0.00100	0.0089
Volatile Organic Compounds										
Acetone	µg/L	3	20	3	<20	-	<20	<20	<20	1500
Benzene	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	5
Bromodichloromethane	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	200
Bromoform	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	60
Bromomethane	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	0.9
BTEX, total	µg/L	3	1	3	<1	-	<1	<1	<1	-
Carbon disulfide	µg/L	3	1	3	<1	-	<1	<1	<1	-
Carbon tetrachloride	µg/L	3	0.2	3	<0.2	-	<0.2	<0.2	<0.2	2
Chlorobenzene	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	1.3
Chloroethane	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	-
Chloroform	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	1.8

APPENDIX B, TABLE 12

Summary of Year 2 surface water chemistry results from Wabigoon River, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Water Quality Guideline ¹
Volatile Organic Compounds										
Chloromethane	µg/L	3	2	3	<2	-	<2	<2	<2	-
Dibromochloromethane	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	40
Dibromoethane, 1,2-	µg/L	3	0.2	3	<0.2	-	<0.2	<0.2	<0.2	5
Dichlorobenzene, 1,2-	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	0.7
Dichlorobenzene, 1,3-	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	2.5
Dichlorobenzene, 1,4-	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	4
Dichlorodifluoromethane	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	-
Dichloroethane, 1,1-	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	200
Dichloroethane, 1,2-	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	5
Dichloroethylene, 1,1-	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	14
Dichloroethylene, cis+trans-1,2-	µg/L	3	0.71	3	<0.71	-	<0.71	<0.71	<0.71	-
Dichloroethylene, cis-1,2-	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	200
Dichloroethylene, trans-1,2-	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	200
Dichloromethane	µg/L	3	1	3	<1	-	<1	<1	<1	50
Dichloropropane, 1,2-	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	0.7
Dichloropropylene, cis+trans-1,3-	µg/L	3	0.5	3	<0.5 ⁴	-	<0.5 ⁴	<0.5 ⁴	<0.5 ⁴	0.2
Dichloropropylene, cis-1,3-	µg/L	3	0.3	3	<0.3	-	<0.3	<0.3	<0.3	-
Dichloropropylene, trans-1,3-	µg/L	3	0.3	3	<0.3	-	<0.3	<0.3	<0.3	7
Ethylbenzene	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	8
Hexane, n-	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	0.58
Hexanone, 2-	µg/L	3	20	3	<20	-	<20	<20	<20	-
Methyl ethyl ketone [MEK]	µg/L	3	20	3	<20	-	<20	<20	<20	400
Methyl isobutyl ketone [MIBK]	µg/L	3	20	3	<20	-	<20	<20	<20	-
Methyl-tert-butyl ether [MTBE]	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	200
Styrene	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	4
Tetrachloroethane, 1,1,1,2-	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	20
Tetrachloroethane, 1,1,2,2-	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	70
Tetrachloroethylene	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	10
Toluene	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	0.8
Trichloroethane, 1,1,1-	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	10
Trichloroethane, 1,1,2-	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	800
Trichloroethylene	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	5
Trichlorofluoromethane	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	-
Vinyl chloride	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	2
Xylene, m+p-	µg/L	3	0.4	3	<0.4	-	<0.4	<0.4	<0.4	32
Xylene, o-	µg/L	3	0.3	3	<0.3	-	<0.3	<0.3	<0.3	40
Xylenes, total	µg/L	3	0.5	3	<0.5	-	<0.5	<0.5	<0.5	30

Gray cells indicate guideline exceedance; n = sample size; RDL = Reportable Detection Limit; SD = Standard Deviation.

¹See Appendix B, Table 3 for detailed water quality guidelines.

²Parameter was analyzed at multiple detection limits.

³Multiple samples measured above detection range.

⁴Due to detection limits, guideline exceedance cannot be confirmed.

APPENDIX B, TABLE 13

Seasonal phytoplankton enumeration and percent composition results from Mennin Lake at the lowest practical taxonomic level, 2023.

Taxon	Mennin Lake								Total (Orgs/L)	%
	Summer (n=9)		Fall (n=9)		Winter (n=9)		Spring (n=9)			
	Orgs/L	%	Orgs/L	%	Orgs/L	%	Orgs/L	%		
Cyanobacteria										
Cyanophyceae										
Chroococcales										
Chroococcaceae										
Aphanocapsa	13000	0.14	10000	0.26	14778	5.33	21444	0.63	59222	0.35
Aphanothece	34444	0.37	38000	0.98					72444	0.43
Chroococcus	13111	0.14	45667	1.18					58778	0.35
Gomphosphaeria	4556	0.05	2778	0.07					7333	0.04
Merismopedia	6024778	64.12	1555556	40.12	73556	26.52	91556	2.68	7745444	45.63
Rhabdoderma	5000	0.05							5000	0.03
Leptolyngbyales										
Leptolyngbyaceae										
Planktolyngbya	667	0.007	1111	0.03			111	0.003	1889	0.01
Cyanophyceae unid.			1111	0.03					1111	0.007
Nodosilineales										
Cymatolegaceae										
Cyanodictyon	15889	0.17	10556	0.27					26444	0.16
Nostocales										
Nostocaceae										
Anabaena	1444	0.02	444	0.01					1889	0.01
Aphanizomenon	222	0.002							222	0.001
Pseudanabaena	1667	0.02	778	0.02					2444	0.01
Synechococcales										
Coelosphaeriaceae										
Woronichinia	111	0.001	667	0.02					778	0.005
Euglenophycota										
Euglenophyceae										
Euglenales										
Euglenaceae										
Euglena			111	0.003			111	0.003	222	0.001
Phacus	111	0.001							111	0.001
Trachelomonas			2111	0.05					2111	0.01
Chromista										
Bacillariophyceae										
Achnanthales										
Achnanthaceae										
Achnanthes							556	0.02	556	0.003
Bacillariales										
Bacillariaceae										
Nitzschia	20222	0.22			333	0.12			20556	0.12
Eunotiales										
Eunotiaceae										
Eunotia	222	0.002							222	0.001
Fragilariales										
Fragilariaceae										
Asterionella										
formosa	15778	0.17	12222	0.32			4000	0.12	32000	0.19
Diatoma	50111	0.53	429444	11.08			1333	0.04	480889	2.83
Fragilaria					444	0.16			444	0.003
Synedra	3000	0.03	2444	0.06	444	0.16	26333	0.77	32222	0.19
Melosirales										
Melosiraceae										
Melosira	61889	0.66	73667	1.90	556	0.20	2111	0.06	138222	0.81
Naviculales										
Diploneidaceae										
Diploneis	111	0.001							111	0.001
Naviculaceae										
Navicula			222	0.006			1111	0.03	1333	0.008
Pinnulariaceae										
Pinnularia	556	0.006							556	0.003
Rhizosoleniales										
Rhizosoleniaceae										
Rhizosolenia	87333	0.93	35444	0.91			1222	0.04	124000	0.73
Surirellales										
Surirellaceae										
Surirella	222	0.002							222	0.001
Tabellariales										
Tabellariaceae										
Tabellaria	64556	0.69	282000	7.27			21111	0.62	367667	2.17
Thalassiosirales										
Stephanodiscaceae										
Cyclotella	36000	0.38	52778	1.36			8111	0.24	96889	0.57

APPENDIX B, TABLE 13

Seasonal phytoplankton enumeration and percent composition results from Mennin Lake at the lowest practical taxonomic level, 2023.

Taxon	Mennin Lake								Total (Orgs/L)	%
	Summer (n=9)		Fall (n=9)		Winter (n=9)		Spring (n=9)			
	Orgs/L	%	Orgs/L	%	Orgs/L	%	Orgs/L	%		
Chrysophyceae										
Chrysosphaerales										
Stichogloeaceae										
Stichogloea										
Chrysophyceae unid.	1721667	18.32	824889	21.28	114000	41.11	2719778	79.47	5380333	31.70
Ochromonadales										
Dinobryaceae										
Dinobryon										
bavaricum	154556	1.64	16111	0.42			85000	2.48	255667	1.51
Dinobryon unid.	2222	0.02	23444	0.60	222	0.08	10889	0.32	36778	0.22
Synuraceae										
Chrysosphaerella										
longispina	111	0.001	1111	0.03					1222	0.007
Mallomonas	23000	0.24	12222	0.32			58222	1.70	93444	0.55
Synura	112222	1.19	21444	0.55	556	0.20	2222	0.06	136444	0.80
Cryptophyceae										
Cryptomonadales										
Cryptomonadaceae										
Cryptomonas	22333	0.24	43556	1.12	1000	0.36	57444	1.68	124333	0.73
Cryptophyceae unid.	143556	1.53	91778	2.37	38222	13.78	236556	6.91	510111	3.01
Dinophyceae										
Gonyaulacales										
Ceratiaceae										
Ceratium										
hirundinella	111	0.001	222	0.006					333	0.002
Gymnodiniales										
Gymnodiniaceae										
Gymnodinium	3889	0.04					556	0.02	4444	0.03
Peridinales										
Peridiniaceae										
Peridinium	2333	0.02	778	0.02			333	0.01	3444	0.02
Plante/Chlorophyta										
Chlorophyceae										
Chlamydomonadales										
Chlorococcaceae										
Tetraedron										
minimum	10556	0.11					1111	0.03	11667	0.07
Tetraedron unid.			3333	0.09					3333	0.02
Dictyosphaeriaceae										
Dictyosphaerium			1222	0.03					1222	0.007
Chlorellales										
Oocystaceae										
Oocystis	2778	0.03	6111	0.16					8889	0.05
Planktosphaeria					333	0.12			333	0.002
Desmidiiales										
Closteriaceae										
Closterium							111	0.003	111	0.001
Desmidiaceae										
Cosmarium	1667	0.02	111	0.003			889	0.03	2667	0.02
Spondylosium			667	0.02					667	0.004
Staurastrum			333	0.009					333	0.002
Staurodesmus	111	0.001	2333	0.06					2444	0.01
Klebsormidiales										
Elakatotrichaceae										
Elakatothrix	22889	0.24	20889	0.54	556	0.20	1889	0.06	46222	0.27
Chlorophyceae unid.	484000	5.15	71444	1.84			8889	0.26	564333	3.32
Sphaeropleales										
Hydrodictyaceae										
Pediastrum										
tetras	4667	0.05	2000	0.05			111	0.003	6778	0.04
Scenedesmaceae										
Coelastrum	111	0.001					556	0.02	667	0.004
Crucigenia										
quadrata	4444	0.05	15333	0.40			4444	0.13	24222	0.14
tetrapedia	29444	0.31	99667	2.57	19778	7.13	13222	0.39	162111	0.96
Crucigenia unid.	14000	0.15	11778	0.30					25778	0.15
Scenedesmus	20667	0.22					4333	0.13	25000	0.15
Selenastraceae										
Ankistrodesmus	129111	1.37	42111	1.09	12111	4.37	36889	1.08	220222	1.30
Kirchneriella			889	0.02					889	0.005
Monoraphidium	1667	0.02							1667	0.01
Quadrigula	26778	0.28	3111	0.08					29889	0.18

APPENDIX B, TABLE 13

Seasonal phytoplankton enumeration and percent composition results from Mennin Lake at the lowest practical taxonomic level, 2023.

Taxon	Mennin Lake								Total (Orgs/L)	%
	Summer (n=9)		Fall (n=9)		Winter (n=9)		Spring (n=9)			
	Orgs/L	%	Orgs/L	%	Orgs/L	%	Orgs/L	%		
Trebouxiales										
Botryococcaceae										
Botryococcus	556	0.006	667	0.02	444	0.16			1667	0.01
Ulotrichales										
Ulotrichaceae										
Planctonema										
lauterbornii	2222	0.02	2556	0.07					4778	0.03
Grand Total	9396667	100.00	3877222	100.00	277333	100.00	3422556	100.00	16973778	100.00

n = number of samples; Orgs/L = number of organisms per Liter; % = percent composition.

APPENDIX B, TABLE 14

Seasonal phytoplankton descriptive statistics from Mennin Lake at the family level, 2023.

Taxon	Mennin Lake																			
	Summer (n=9)					Fall (n=9)					Winter (n=9)					Spring (n=9)				
	Average Total Count	Standard Deviation	Standard Error	Min	Max	Average Total Count	Standard Deviation	Standard Error	Min	Max	Average Total Count	Standard Deviation	Standard Error	Min	Max	Average Total Count	Standard Deviation	Standard Error	Min	Max
Chroococcaceae	6094889	2453904.7	1416762.6	4556	6024778	1652000	685122.2	395555.5	2778	1555556	88333	41562.2	23995.9	14778	73556	113000	49576.0	28622.7	21444	91556
Leptolyngbyaceae	667	-	-	667	667	1111	-	-	1111	1111						111	-	-	111	111
Cyanophyceae unid. (Class)						1111	-	-	1111	1111										
Cymatolegaceae	15889	-	-	15889	15889	10556	-	-	10556	10556										
Nostocaceae	3333	777.8	449.1	222	1667	1222	235.7	136.1	444	778										
Coelosphaeriaceae	111	-	-	111	111	667	-	-	667	667										
Euglenaceae	111	-	-	111	111	2222	1414.2	816.5	111	2111						111	-	-	111	111
Achnanthaceae																556	-	-	556	556
Bacillariaceae	20222	-	-	20222	20222						333	-	-	333	333					
Eunotiaceae	222	-	-	222	222															
Fragilariaceae	68889	24363.6	14066.3	3000	50111	444111	243755.0	140732.0	2444	429444	889			444	444	31667	13728.9	7926.4	1333	26333
Melosiraceae	61889	-	-	61889	61889	73667	-	-	73667	73667	556	-	-	556	556	2111	-	-	2111	2111
Diploneidaceae	111	-	-	111	111															
Naviculaceae						222	-	-	222	222						1111	-	-	1111	1111
Pinnulariaceae	556	-	-	556	556															
Rhizosoleniaceae	87333	-	-	87333	87333	35444	-	-	35444	35444						1222	-	-	1222	1222
Surirellaceae	222	-	-	222	222															
Tabellariaceae	64556	-	-	64556	64556	282000	-	-	282000	282000						21111	-	-	21111	21111
Stephanodiscaceae	36000	-	-	36000	36000	52778	-	-	52778	52778						8111	-	-	8111	8111
Chlorococcaceae	10556	-	-	10556	10556	3333	-	-	3333	3333						1111	-	-	1111	1111
Dictyosphaeriaceae						1222	-	-	1222	1222										
Oocystaceae	2778	-	-	2778	2778	6111	-	-	6111	6111	333	-	-	333	333					
Closteriaceae																111	-	-	111	111
Desmidiaceae	1778	1099.9	635.1	111	1667	3444	1007.7	581.8	111	2333						889	-	-	889	889
Elakatotrichaceae	22889	-	-	22889	22889	20889	-	-	20889	20889	556	-	-	556	556	1889	-	-	1889	1889
Chlorophyceae unid. (Class)	484000	-	-	484000	484000	71444	-	-	71444	71444						8889	-	-	8889	8889
Hydrodictyaceae	4667	-	-	4667	4667	2000	-	-	2000	2000						111	-	-	111	111
Scenedesmaceae	68667	11904.1	6872.8	111	29444	126778	49748.0	28722.0	11778	99667	19778	-	-	19778	19778	22556	5369.0	3099.8	556	13222
Selenastraceae	157556	67509.0	38976.3	1667	129111	46111	23184.8	13385.8	889	42111	12111	-	-	12111	12111	36889	-	-	36889	36889
Botryococcaceae	556	-	-	556	556	667	-	-	667	667	444	-	-	444	444					
Ulotrichaceae	2222	-	-	2222	2222	2556	-	-	2556	2556										
Chrysophyceae unid. (Class)	1721667	-	-	1721667	1721667	824889	-	-	824889	824889	114000	-	-	114000	114000	2719778	-	-	2719778	2719778
Dinobryaceae	156778	107715.9	62189.8	2222	154556	39556	5185.4	2993.8	16111	23444	222	-	-	222	222	95889	52404.5	30255.7	10889	85000
Synuraceae	135333	59236.0	34199.9	111	112222	34778	10181.3	5878.2	1111	21444	556	-	-	556	556	60444	39598.0	22861.9	2222	58222
Cryptomonadaceae	22333	-	-	22333	22333	43556	-	-	43556	43556	1000	-	-	1000	1000	57444	-	-	57444	57444
Cryptophyceae unid. (Class)	143556	-	-	143556	143556	91778	-	-	91778	91778	38222	-	-	38222	38222	236556	-	-	236556	236556
Ceratiaceae	111	-	-	111	111	222	-	-	222	222										
Gymnodiniaceae	3889	-	-	3889	3889											556	-	-	556	556
Peridiniaceae	2333	-	-	2333	2333	778	-	-	778	778						333	-	-	333	333

Min = minimum; Max = maximum.
All taxon presented at the family level, except Cyanophyceae unid., Chlorophyceae unid., Chrysophyceae unid., and Cryptophyceae unid.

APPENDIX B, TABLE 15

Seasonal phytoplankton enumeration and percent composition results from Revell Lake at the lowest practical taxonomic level, 2023.

Taxon	Revell Lake								Total (Orgs/L)	%
	Summer (n=6)		Fall (n=6)		Winter (n=6)		Spring (n=6)			
	Orgs/L	%	Orgs/L	%	Orgs/L	%	Orgs/L	%		
Cyanobacteria										
Cyanophyceae										
Chroococcales										
Chroococcaceae										
Aphanocapsa	22778	0.17	25778	0.82	556	0.23	5556	0.38	54667	0.30
Aphanothece	11556	0.09	10889	0.35					22444	0.12
Chroococcus	66333	0.50	5444	0.17					71778	0.39
Gomphosphaeria	8889	0.07	6222	0.20			778	0.05	15889	0.09
Merismopedia	11154444	83.42	797889	25.30					11952333	65.50
Rhabdoderma	56667	0.42	35444	1.12					92111	0.50
Leptolyngbyales										
Leptolyngbyaceae										
Planktolyngbya	111	0.001	2222	0.07					2333	0.01
Cyanophyceae unid.										
Nodosilineales										
Cymatolegaceae										
Cyanodictyon	24333	0.18	25000	0.79			556	0.04	49889	0.27
Nostocales										
Nostocaceae										
Anabaena	222	0.002	3667	0.12			111	0.01	4000	0.02
Pseudanabaena	778	0.006					111	0.01	889	0.005
Oscillatoriaceae										
Phormidium	111	0.001							111	0.001
Euglenophycota										
Euglenophyceae										
Euglenales										
Euglenaceae										
Trachelomonas	556	0.004	111	0.004					667	0.004
Chromista										
Bacillariophyceae										
Achnanthales										
Achnanthaceae										
Achnanthes							556	0.04	556	0.003
Bacillariales										
Bacillariaceae										
Nitzschia	556	0.004			111	0.05	556	0.04	1222	0.007
Fragilariales										
Fragilariaceae										
Asterionella										
formosa	13778	0.10	8000	0.25	1667	0.69	2222	0.15	25667	0.14
Fragilaria	2000	0.01							2000	0.01
Synedra	1778	0.01	10556	0.33			1889	0.13	14222	0.08
Melosirales										
Melosiraceae										
Melosira	556	0.004	7667	0.24					8222	0.05
Naviculales										
Naviculaceae										
Navicula	222	0.002							222	0.001
Rhizosoleniales										
Rhizosoleniaceae										
Rhizosolenia	111	0.001	58333	1.85					58444	0.32
Surirellales										
Surirellaceae										
Surirella	111	0.001					111	0.01	222	0.001
Tabellariales										
Tabellariaceae										
Tabellaria	5000	0.04	116111	3.68			1556	0.11	122667	0.67
Thalassiophysales										
Catenulaceae										
Amphora	1111	0.008							1111	0.006
Thalassiosirales										
Stephanodiscaceae										
Cyclotella	9111	0.07	7333	0.23			556	0.04	17000	0.09
Chrysophyceae										
Chrysosphaerales										
Stichogloeaceae										
Stichogloea							222	0.02	222	0.001
Chrysophyceae unid.	1598889	11.96	1730000	54.85	209444	86.55	1250667	84.52	4789000	26.24

APPENDIX B, TABLE 15

Seasonal phytoplankton enumeration and percent composition results from Revell Lake at the lowest practical taxonomic level, 2023.

Taxon	Revell Lake								Total (Orgs/L)	%
	Summer (n=6)		Fall (n=6)		Winter (n=6)		Spring (n=6)			
	Orgs/L	%	Orgs/L	%	Orgs/L	%	Orgs/L	%		
Ochromonadales										
Dinobryaceae										
Dinobryon										
bavaricum	667	0.005	3111	0.10			27333	1.85	31111	0.17
Dinobryon unid.	5556	0.04	5222	0.17	778	0.32	2778	0.19	14333	0.08
Synuraceae										
Chrysosphaerella										
longispina	2000	0.01	13667	0.43					15667	0.09
Mallomonas	6667	0.05	2778	0.09	667	0.28	25667	1.73	35778	0.20
Synura	9444	0.07	13444	0.43	111	0.05	2222	0.15	25222	0.14
Cryptophyceae										
Cryptomonadales										
Cryptomonadaceae										
Cryptomonas	15333	0.11	12000	0.38	333	0.14	29889	2.02	57556	0.32
Cryptophyceae unid.	165111	1.23	112889	3.58	25667	10.61	111000	7.50	414667	2.27
Dinophyceae										
Gonyaulacales										
Ceratiaceae										
Ceratium										
hirundinella			111	0.004					111	0.001
Gymnodiniales										
Gymnodiniaceae										
Gymnodinium	1667	0.01	1111	0.04					2778	0.02
Peridinales										
Peridiniaceae										
Peridinium	1778	0.01	2111	0.07			333	0.02	4222	0.02
Plante/Chlorophyta										
Chlorophyceae										
Chlamydomonadales										
Chlorococcaceae										
Tetraedron										
minimum	3333	0.02	556	0.02			2778	0.19	6667	0.04
Tetraedron unid.			2222	0.07					2222	0.01
Dictyosphaeriaceae										
Dictyosphaerium			1667	0.05					1667	0.01
Chlorellales										
Oocystaceae										
Oocystis	1667	0.01	111	0.004					1778	0.01
Planktosphaeria							333	0.02	333	0.002
Desmidiiales										
Desmidiaceae										
Cosmarium	778	0.006	1000	0.03					1778	0.01
Euastrum	333	0.002							333	0.002
Spondylosium	222	0.002	444	0.01					667	0.004
Staurastrum	1000	0.007	333	0.01					1333	0.007
Staurodesmus	444	0.003	1111	0.04			111	0.01	1667	0.01
Klebsormidiales										
Elakatotrichaceae										
Elakatothrix	11556	0.09	52222	1.66			556	0.04	64333	0.35
Chlorophyceae unid.	140667	1.05	52333	1.66	1667	0.69	9444	0.64	204111	1.12
Sphaeropleales										
Hydrodictyaceae										
Pediastrum										
tetras	6000	0.04	556	0.02			222	0.02	6778	0.04
Neochloridaceae										
Golenkinia			556	0.02					556	0.003
Scenedesmaceae										
Crucigenia										
quadrata			10889	0.35					10889	0.06
tetrapedia	4333	0.03							4333	0.02
Crucigenia unid.										
Scenedesmus	8667	0.06	8889	0.28					17556	0.10
Selenastraceae										
Ankistrodesmus							556	0.04	556	0.003
Monoraphidium	556	0.004	2778	0.09			667	0.05	4000	0.02
Quadrigula	4000	0.03							4000	0.02

APPENDIX B, TABLE 15

Seasonal phytoplankton enumeration and percent composition results from Revell Lake at the lowest practical taxonomic level, 2023.

Taxon	Revell Lake								Total (Orgs/L)	%
	Summer (n=6)		Fall (n=6)		Winter (n=6)		Spring (n=6)			
	Orgs/L	%	Orgs/L	%	Orgs/L	%	Orgs/L	%		
Trebouxiales										
Botryococcaceae										
Botryococcus	111	0.001	1333	0.04	1000	0.41	222	0.02	2667	0.01
Zygnematales										
Zygnemataceae										
Mougeotia							111	0.01	111	0.001
Grand Total	13371889	100.00	3154111	100.00	242000	100.00	1479667	100.00	18247667	100.00

n = number of samples; Orgs/L = number of organisms per Liter; % = percent composition.

APPENDIX B, TABLE 16

Seasonal phytoplankton descriptive statistics from Revell Lake at the family level, 2023.

Taxon	Revell Lake																			
	Summer (n=6)					Fall (n=6)					Winter (n=6)					Spring (n=6)				
	Average Total Count	Standard Deviation	Standard Error	Min	Max	Average Total Count	Standard Deviation	Standard Error	Min	Max	Average Total Count	Standard Deviation	Standard Error	Min	Max	Average Total Count	Standard Deviation	Standard Error	Min	Max
Chroococcaceae	11320667	4540272.9	2621327.8	8889	11154444	881667	319117.0	184242.3	5444	797889	556	-	-	556	556	6333	3378.4	1950.5	778	5556
Leptolyngbyaceae	111	-	-	111	111	2222	-	-	2222	2222										
Cymatolegaceae	24333	-	-	24333	24333	25000	-	-	25000	25000						556	-	-	556	556
Nostocaceae	1000	392.8	226.8	222	778	3667	-	-	3667	3667						222			111	111
Oscillatoriaceae	111	-	-	111	111															
Euglenaceae	556	-	-	556	556	111	-	-	111	111										
Achnanthaceae																556	-	-	556	556
Bacillariaceae	556	-	-	556	556						111	-	-	111	111	556	-	-	556	556
Fragilariaceae	17556	6865.0	3963.5	1778	13778	18556	1807.1	1043.3	8000	10556	1667	-	-	1667	1667	4111	235.7	136.1	1889	2222
Melosiraceae	556	-	-	556	556	7667	-	-	7667	7667										
Naviculaceae	222	-	-	222	222															
Rhizosoleniaceae	111	-	-	111	111	58333	-	-	58333	58333										
Surirellaceae	111	-	-	111	111											111	-	-	111	111
Tabellariaceae	5000	-	-	5000	5000	116111	-	-	116111	116111						1556	-	-	1556	1556
Catenulaceae	1111	-	-	1111	1111															
Stephanodiscaceae	9111	-	-	9111	9111	7333	-	-	7333	7333						556	-	-	556	556
Chlorococcaceae	3333	-	-	3333	3333	2778	1178.5	680.4	556	2222						2778	-	-	2778	2778
Dictyosphaeriaceae						1667	-	-	1667	1667										
Oocystaceae	1667	-	-	1667	1667	111	-	-	111	111						333	-	-	333	333
Desmidiaceae	2778	323.9	187.0	222	1000	2889	390.2	225.3	333	1111						111	-	-	111	111
Elakatotrichaceae	11556	-	-	11556	11556	52222	-	-	52222	52222						556	-	-	556	556
Chlorophyceae unid. (Class)	140667	-	-	140667	140667	52333	-	-	52333	52333	1667	-	-	1667	1667	9444	-	-	9444	9444
Hydrodictyaceae	6000	-	-	6000	6000	556	-	-	556	556						222	-	-	222	222
Neochloridaceae						556	-	-	556	556										
Scenedesmaceae	13000	3064.1	1769.1	4333	8667	19778	1414.2	816.5	8889	10889										
Selenastraceae	4556	2435.6	1406.2	556	4000	2778	-	-	2778	2778						1222	78.6	45.4	556	667
Botryococcaceae	111	-	-	111	111	1333	-	-	1333	1333	1000	-	-	1000	1000	222	-	-	222	222
Zygnemataceae																111	-	-	111	111
Stichogloeaceae																222	-	-	222	222
Chrysophyceae unid. (Class)	1598889	-	-	1598889	1598889	1730000	-	-	1730000	1730000	209444	-	-	209444	209444	1250667	-	-	1250667	1250667
Dinobryaceae	6222	3457.0	1995.9	667	5556	8333	1492.8	861.9	3111	5222	778	-	-	778	778	30111	17363.4	10024.8	2778	27333
Synuraceae	18111	3761.9	2172.0	2000	9444	29889	6223.5	3593.2	2778	13667	778	392.8	226.8	111	667	27889	16577.7	9571.2	2222	25667
Cryptomonadaceae	15333	-	-	15333	15333	12000	-	-	12000	12000	333	-	-	333	333	29889	-	-	29889	29889
Cryptophyceae unid. (Class)	165111	-	-	165111	165111	112889	-	-	112889	112889	25667	-	-	25667	25667	111000	-	-	111000	111000
Ceratiaceae						111	-	-	111	111										
Gymnodiniaceae	1667	-	-	1667	1667	1111	-	-	1111	1111										
Peridiniaceae	1778	-	-	1778	1778	2111	-	-	2111	2111						333	-	-	333	333

Min = minimum; Max = maximum.
All taxon presented at the family level, except Chlorophyceae unid., Chrysophyceae unid., and Cryptophyceae unid.

APPENDIX B, TABLE 17

Seasonal zooplankton enumeration and percent composition results from Mennin Lake at the lowest practical taxonomic level, 2023.

Taxon	Mennin Lake						Total (Orgs/L)	%
	Summer (n=9)		Fall (n=9)		Spring (n=9)			
	Orgs/L	%	Orgs/L	%	Orgs/L	%		
Arthropoda								
Insecta								
Diptera								
Chaoboridae								
Chaoborus	0.06	0.036					0.06	0.018
Crustacea								
Branchiopoda								
Cladocera								
Bosminidae								
Bosmina	7.09	4.3	2.07	2.0	0.22	0.4	9.38	2.9
Chydoridae								
Chydorus			0.18	0.2			0.18	0.055
Daphniidae								
Ceriodaphnia	0.03	0.017					0.03	0.009
Daphnia	0.48	0.3	0.34	0.3	0.02	0.028	0.83	0.3
Holopediidae								
Holopedium	0.31	0.2	0.12	0.1			0.44	0.1
Leptodoridae								
Leptodora								
kindtii	0.01	0.008	0.01	0.007			0.02	0.007
Sididae								
Diaphanosoma	3.37	2.1	0.50	0.5	0.05	0.1	3.92	1.2
Cladocera unid.					0.00	0.001	0.00	0.000
Copepoda								
Calanoida								
Diaptomidae								
Leptodiaptomus	2.67	1.6	2.42	2.3	0.13	0.2	5.22	1.6
Skistodiaptomus	0.18	0.1	1.30	1.3	0.02	0.039	1.50	0.5
Diaptomidae unid.	2.88	1.8	0.25	0.2	0.48	0.9	3.61	1.1
Temoridae								
Epischura	0.04	0.025			2.13	3.8	2.17	0.7
Calanoida unid.	2.66	1.6			2.83	5.1	5.49	1.7
Cyclopoida								
Cyclopidae								
Mesocyclops	0.05	0.033			0.05	0.1	0.11	0.033
Microcyclops					0.09	0.2	0.09	0.029
Cyclopoida unid.	5.21	3.2	2.63	2.5	1.46	2.6	9.30	2.9
Copepoda unid.	22.90	14.0	2.72	2.6	15.51	28.0	41.13	12.7
Protozoa								
Ciliata								
Peritrichida								
Epistylidae								
Epistylis					0.29	0.5	0.29	0.1
Vorticellidae								
Vorticella	46.26	28.2	17.27	16.7	1.33	2.4	64.86	20.1
Spirotrichida								
Codonellidae								
Codonella			0.03	0.027	0.02	0.029	0.04	0.013
Tintinnidiidae								
Tintinnidium			0.02	0.017			0.02	0.006
Ciliata unid.	0.38	0.2	0.16	0.2	1.29	2.3	1.83	0.6
Lobosa								
Arcellinida								
Diffugiidae								
Diffugia	10.54	6.4	2.69	2.6	0.09	0.2	13.32	4.1

APPENDIX B, TABLE 17

Seasonal zooplankton enumeration and percent composition results from Mennin Lake at the lowest practical taxonomic level, 2023.

Taxon	Mennin Lake						Total (Orgs/L)	%
	Summer (n=9)		Fall (n=9)		Spring (n=9)			
	Orgs/L	%	Orgs/L	%	Orgs/L	%		
Rotifera								
Monogononta								
Collothecaceae								
Collothecidae								
Collotheca	0.15	0.089	1.02	1.0			1.17	0.4
Flosculariaceae								
Conochilidae								
Conochilus	4.09	2.5	1.61	1.6	3.46	6.2	9.16	2.8
Filiniidae								
Filinia					0.01	0.013	0.01	0.002
Ploima								
Asplanchnidae								
Asplanchna	0.20	0.1	0.53	0.5	0.11	0.2	0.83	0.3
Brachionidae								
Kellicottia								
longispina	6.39	3.9	1.15	1.1	7.99	14.4	15.52	4.8
Keratella								
hiemalis								
Keratella unid.	5.60	3.4	50.00	48.3	1.02	1.8	56.61	17.5
Gastropodidae								
Gastropus	2.42	1.5	4.12	4.0	0.40	0.7	6.94	2.1
Lecanidae								
Monostyla			0.06	0.058	0.05	0.086	0.11	0.033
Synchaetidae								
Ploesoma	3.21	2.0	0.40	0.4	0.13	0.2	3.74	1.2
Polyarthra	29.39	17.9	10.85	10.5	14.79	26.7	55.03	17.0
Trichocercidae								
Trichocerca	7.11	4.3	0.49	0.5	0.07	0.1	7.66	2.4
Rotifera unid.	0.14	0.086	0.57	0.6	1.46	2.6	2.17	0.7
Grand Total	163.80	100.0	103.50	100.0	55.49	100.0	322.79	100.0

n = number of samples; Orgs/L = number of organisms per Liter; % = percent composition.

APPENDIX B, TABLE 18

Seasonal zooplankton descriptive statistics from Mennin Lake at the family level, 2023.

Taxon	Mennin Lake														
	Summer (n=9)					Fall (n=9)					Spring (n=9)				
	Average Total Count	Standard Deviation	Standard Error	Min	Max	Average Total Count	Standard Deviation	Standard Error	Min	Max	Average Total Count	Standard Deviation	Standard Error	Min	Max
Bosminidae	7.09	-	-	7.09	7.09	2.07	-	-	2.07	2.07	0.22	-	-	0.22	0.22
Chydoridae						0.18	-	-	0.18	0.18					
Cladocera unid. (Order)											0.00	-	-	0.00	0.00
Daphniidae	0.51	0.32	0.18	0.03	0.48	0.34	-	-	0.34	0.34	0.02	-	-	0.02	0.02
Holopediidae	0.31	-	-	0.31	0.31	0.12	-	-	0.12	0.12					
Leptodoridae	0.01	-	-	0.01	0.01	0.01	-	-	0.01	0.01					
Sididae	3.37	-	-	3.37	3.37	0.50	-	-	0.50	0.50	0.05	-	-	0.05	0.05
Ciliata unid.	0.38	-	-	0.38	0.38	0.16	-	-	0.16	0.16	1.29	-	-	1.29	1.29
Epistylidae											0.29	-	-	0.29	0.29
Vorticellidae	46.26	-	-	46.26	46.26	17.27	-	-	17.27	17.27	1.33	-	-	1.33	1.33
Codonellidae						0.03	-	-	0.03	0.03	0.02	-	-	0.02	0.02
Tintinnidiidae						0.02	-	-	0.02	0.02					
Calanoida unid. (Order)	2.66	-	-	2.66	2.66						2.83	-	-	2.83	2.83
Diaptomidae	2.85	1.76	1.02	0.18	2.67	3.72	0.79	0.46	1.30	2.42	0.15	0.08	0.04	0.02	0.13
Diaptomidae unid.	2.88	1.97	1.14	0.05	2.84	0.25	0.04	0.02	0.10	0.15	0.48	-	-	0.48	0.48
Temoridae	0.04	-	-	0.04	0.04						2.13	-	-	2.13	2.13
Cyclopidae	0.05	-	-	0.05	0.05						0.15	0.03	0.02	0.05	0.09
Cyclopoida unid. (Order)	5.21	3.25	1.88	0.30	4.90	2.63	-	-	2.63	2.63	1.46	0.82	0.47	0.15	1.31
Copepoda unid. (Class)	22.90	-	-	22.90	22.90	2.72	-	-	2.72	2.72	15.51	-	-	15.51	15.51
Chaoboridae	0.06	-	-	0.06	0.06										
Diffugiidae	10.54	-	-	10.54	10.54	2.69	-	-	2.69	2.69	0.09	-	-	0.09	0.09
Collothecidae	0.15	-	-	0.15	0.15	1.02	-	-	1.02	1.02					
Conochilidae	4.09	-	-	4.09	4.09	1.61	-	-	1.61	1.61	3.46	-	-	3.46	3.46
Filiniidae											0.01	-	-	0.01	0.01
Asplanchnidae	0.20	-	-	0.20	0.20	0.53	-	-	0.53	0.53	0.11	-	-	0.11	0.11
Brachionidae	11.98	0.56	0.32	5.60	6.39	51.14	34.54	19.94	1.15	50.00	9.00	4.93	2.85	1.02	7.99
Euchlanidae															
Gastropodidae	2.42	-	-	2.42	2.42	4.12	-	-	4.12	4.12	0.40	-	-	0.40	0.40
Lecanidae						0.06	-	-	0.06	0.06	0.05	-	-	0.05	0.05
Synchaetidae	32.60	18.51	10.69	3.21	29.39	11.25	7.39	4.26	0.40	10.85	14.93	10.37	5.99	0.13	14.79
Trichocercidae	7.11	-	-	7.11	7.11	0.49	-	-	0.49	0.49	0.07	-	-	0.07	0.07
Rotifera unid. (Phylum)	0.14	-	-	0.14	0.14	0.57	-	-	0.57	0.57	1.46	-	-	1.46	1.46

Min = minimum; Max = maximum.

All taxon presented at the family level, except Cladocera unid., Calanoida unid., Cyclopoida unid., Copepoda unid., and Rotifera unid.

APPENDIX B, TABLE 19

Seasonal zooplankton enumeration and percent composition results from Revell Lake at the lowest practical taxonomic level, 2023.

Taxon	Revell Lake						Total (Orgs/L)	%
	Summer (n=6)		Fall (n=6)		Spring (n=6)			
	Orgs/L	%	Orgs/L	%	Orgs/L	%		
Arthropoda								
Insecta								
Diptera								
Chaoboridae								
Chaoborus	0.05	0.090			0.01	0.036	0.05	0.050
Crustacea								
Branchiopoda								
Cladocera								
Bosminidae								
Bosmina	2.04	3.9	3.31	9.2	0.11	0.6	5.45	5.1
Chydoridae								
Chydorus	0.02	0.036	2.16	6.0	0.01	0.048	2.19	2.0
Daphniidae								
Daphnia	0.15	0.3	0.02	0.051	0.17	0.9	0.34	0.3
Holopediidae								
Holopedium	1.36	2.6	0.30	0.8	0.18	1.0	1.84	1.7
Leptodoridae								
Leptodora								
kindtii	0.01	0.015					0.01	0.007
Sididae								
Diaphanosoma	1.35	2.6	0.86	2.4	0.05	0.3	2.26	2.1
Copepoda								
Calanoida								
Diaptomidae								
Leptodiaptomus	1.45	2.8	1.13	3.1	0.47	2.5	3.06	2.8
Skistodiaptomus					0.09	0.5	0.09	0.082
Diaptomidae unid.					0.50	2.6	0.50	0.5
Temoridae								
Epischura	0.01	0.015					0.01	0.007
Calanoida unid.	0.36	0.7	0.02	0.052	1.43	7.5	1.82	1.7
Cyclopoida								
Cyclopidae								
Mesocyclops	0.13	0.3	0.09	0.2	0.18	1.0	0.40	0.4
Microcyclops					0.01	0.048	0.01	0.008
Cyclopoida unid.	1.88	3.6	2.52	7.0	1.75	9.2	6.15	5.7
Copepoda unid.	11.46	21.9	2.97	8.2	4.30	22.6	18.73	17.5
Protozoa								
Ciliata								
Peritrichida								
Epistylidae								
Epistylis	0.91	1.7	0.17	0.5			1.08	1.0
Vorticellidae								
Vorticella	0.33	0.6	3.19	8.9	0.47	2.5	3.99	3.7
Spirotrichida								
Tintinnidiidae								
Tintinnidium			0.02	0.052			0.02	0.018
Ciliata unid.	0.10	0.2	0.16	0.4	0.07	0.4	0.32	0.3
Lobosa								
Arcellinida								
Diffugiidae								
Diffugia	1.33	2.5	0.26	0.7			1.59	1.5
Rotifera								
Monogononta								
Collothecaceae								
Collothecidae								
Collotheca	6.47	12.4	0.18	0.5			6.64	6.2
Flosculariaceae								
Conochilidae								
Conochilus	2.73	5.2	4.64	12.9	0.53	2.8	7.90	7.4
Filiniidae								
Filinia	0.02	0.030			0.04	0.2	0.06	0.052
Ploima								
Asplanchnidae								
Asplanchna	0.18	0.3	0.47	1.3	0.00	0.018	0.65	0.6
Brachionidae								
Kellicottia								
longispina	2.19	4.2	0.18	0.5	3.24	17.0	5.61	5.2
Keratella								
hiemalis					0.01	0.054	0.01	0.010
Keratella unid.	6.54	12.5	10.14	28.1	0.21	1.1	16.88	15.7

APPENDIX B, TABLE 19

Seasonal zooplankton enumeration and percent composition results from Revell Lake at the lowest practical taxonomic level, 2023.

Taxon	Revell Lake						Total (Orgs/L)	%
	Summer (n=6)		Fall (n=6)		Spring (n=6)			
	Orgs/L	%	Orgs/L	%	Orgs/L	%		
Euchlanidae								
Beauchampiella					0.00	0.018	0.00	0.003
Gastropodidae								
Gastropus	1.29	2.5	1.23	3.4	0.09	0.5	2.61	2.4
Lecanidae								
Monostyla					0.03	0.1	0.03	0.025
Synchaetidae								
Ploesoma	0.83	1.6	0.21	0.6	0.01	0.036	1.05	1.0
Polyarthra	6.68	12.8	1.20	3.3	4.68	24.6	12.56	11.7
Trichocercidae								
Trichocerca	1.87	3.6	0.38	1.1	0.01	0.048	2.27	2.1
Rotifera unid.	0.47	0.9	0.25	0.7	0.38	2.0	1.10	1.0
Grand Total	52.20	100.0	36.06	100.0	19.02	100.0	107.28	100.0

n = number of samples; Orgs/L = number of organisms per Liter; % = percent composition.

APPENDIX B, TABLE 20

Seasonal zooplankton descriptive statistics from Revell Lake at the family level, 2023.

Taxon	Revell Lake														
	Summer (n=6)					Fall (n=6)					Spring (n=6)				
	Average Total Count	Standard Deviation	Standard Error	Min	Max	Average Total Count	Standard Deviation	Standard Error	Min	Max	Average Total Count	Standard Deviation	Standard Error	Min	Max
Bosminidae	2.04	-	-	2.04	2.04	3.31	-	-	3.31	3.31	0.11	-	-	0.11	0.11
Chydoridae	0.02	-	-	0.02	0.02	2.16	-	-	2.16	2.16	0.01	-	-	0.01	0.01
Daphniidae	0.15	-	-	0.15	0.15	0.02	-	-	0.02	0.02	0.17	-	-	0.17	0.17
Holopediidae	1.36	-	-	1.36	1.36	0.30	-	-	0.30	0.30	0.18	-	-	0.18	0.18
Leptodoridae	0.01	-	-	0.01	0.01										
Sididae	1.35	-	-	1.35	1.35	0.86	-	-	0.86	0.86	0.05	-	-	0.05	0.05
Ciliata unid.	0.10	-	-	0.10	0.10	0.16	-	-	0.16	0.16	0.07	-	-	0.07	0.07
Epistylidae	0.91	-	-	0.91	0.91	0.17	-	-	0.17	0.17					
Vorticellidae	0.33	-	-	0.33	0.33	3.19	-	-	3.19	3.19	0.47	-	-	0.47	0.47
Tintinnidiidae						0.02	-	-	0.02	0.02					
Calanoida unid. (Order)	0.36	-	-	0.36	0.36	0.02	-	-	0.02	0.02	1.43	-	-	1.43	1.43
Diaptomidae	1.45	-	-	1.45	1.45	1.13	-	-	1.13	1.13	0.56	0.27	0.16	0.09	0.47
Diaptomidae unid.											0.50	-	-	0.50	0.50
Temoridae	0.01	-	-	0.01	0.01										
Cyclopidae	0.13	-	-	0.13	0.13	0.09	-	-	0.09	0.09	0.19	0.12	0.07	0.01	0.18
Cyclopoida unid. (Order)	1.88	0.83	0.48	0.35	1.53	2.52	1.59	0.92	0.14	2.39	1.75	1.13	0.65	0.08	1.67
Copepoda unid. (Class)	11.46	-	-	11.46	11.46	2.97	-	-	2.97	2.97	4.30	-	-	4.30	4.30
Chaoboridae	0.05	-	-	0.05	0.05						0.01	-	-	0.01	0.01
Diffugiidae	1.33	-	-	1.33	1.33	0.26	-	-	0.26	0.26					
Collothecidae	6.47	-	-	6.47	6.47	0.18	-	-	0.18	0.18					
Conochilidae	2.73	-	-	2.73	2.73	4.64	-	-	4.64	4.64	0.53	-	-	0.53	0.53
Filiniidae	0.02	-	-	0.02	0.02						0.04	-	-	0.04	0.04
Asplanchnidae	0.18	-	-	0.18	0.18	0.47	-	-	0.47	0.47	0.00	-	-	0.00	0.00
Brachionidae	8.73	3.07	1.77	2.19	6.54	10.32	7.04	4.07	0.18	10.14	3.46	1.81	1.04	0.01	3.24
Euchlanidae											0.00	-	-	0.00	0.00
Gastropodidae	1.29	-	-	1.29	1.29	1.23	-	-	1.23	1.23	0.09	-	-	0.09	0.09
Lecanidae											0.03	-	-	0.03	0.03
Synchaetidae	7.52	4.14	2.39	0.83	6.68	1.42	0.70	0.41	0.21	1.20	4.68	3.30	1.91	0.01	4.68
Trichocercidae	1.87	-	-	1.87	1.87	0.38	-	-	0.38	0.38	0.01	-	-	0.01	0.01
Rotifera unid. (Phylum)	0.47	-	-	0.47	0.47	0.25	-	-	0.25	0.25	0.38	-	-	0.38	0.38

Min = minimum; Max = maximum.

All taxon presented at the family level, except Calanoida unid., Cyclopoida unid., Copepoda unid., and Rotifera unid.

APPENDIX B, TABLE 21
Sediment core log, September 2022.

Waterbody/ Watercourse	Site ID	Rep	QAQC	Date and Time	Station Depth (m)	UTM Zone	UTM Easting	UTM Northing	Grabs per Sample	Penetration Depth (cm)	Horizon	Colour	Consistency	Organics	Odour	Non-sediment material removed	Comments
Mennin Lake	ML1	A	-	2022-09-11 15:15	1.6	15U	553454	5477788	2	5	0-4cm	Dark Brown	Medium	Sparse	Mild earthy	-	-
		B	-	2022-09-11 16:50	1.7	15U	553533	5477759	2	5	0-4cm	Dark Brown	Medium	Moderate	Mild earthy	Fishing line	-
		C	-	2022-09-11 17:45	1.6	15U	553514	5477756	2	5	0-4cm	Dark Brown	Medium	Sparse	Mild sulfur; Mild earthy	-	-
		D	-	2022-09-12 14:45	1.6	15U	553540	5477726	2	5	0-4cm	Dark Brown	Firm	Sparse	Mild earthy	-	-
		E	-	2022-09-12 15:50	1.1	15U	553545	5477682	2	5	0-4cm	Dark Brown	Firm	Sparse	Mild sulfur; Mild earthy	-	-
	ML2	A	Sample	2022-09-22 15:15	7.8	15U	552326	5481348	3	6	0-4cm	Medium Brown	Medium	Absent	Mild Sulfur	-	-
		A	DUP	2022-09-22 16:07	7.8	15U	552326	5481348	3	10	0-5cm	Medium Brown	Medium	Absent	Mild Sulfur	-	-
		B	-	2022-09-22 16:53	7.4	15U	552306	5481294	2	6	0-4cm	Reddish Brown surface w medium Brown profile	Medium	Absent	Mild Sulfur	-	-
		C	-	2022-09-22 17:38	7.6	15U	552330	5481279	2	9.5	0-5cm	Reddish Brown	Medium	Absent	Mild Sulfur	Brittle tubular macrophyte	-
		D	-	2022-09-22 18:00	7.5	15U	552285	5481272	2	6	0-4cm	Reddish Brown	Medium	Absent	Mild Sulfur	-	-
		E	-	2022-09-22 18:48	7.9	15U	552253	5481246	2	6.5	0-5cm	Reddish Brown	Medium	Absent	Mild Sulfur	-	-
	ML3	A	-	2022-09-16 16:00	5.6	15U	551760	5482224	3	6.5	0-5cm	Greyish Brown	Medium	Sparse	Slightly earthy	-	-
		B	-	2022-09-16 17:10	5.5	15U	551763	5482289	3	6.5	0-5cm	Greyish Brown w a small bit of Brown on the surface	Medium	Sparse	Slightly earthy	-	-
		C	-	2022-09-16 18:00	5.4	15U	551803	5482273	3	6	0-5cm	Greyish Brown	Medium	Sparse	Slightly earthy	-	-
		D	-	2022-09-17 15:30	5.3	15U	551832	5482261	3	6	0-5cm	Greyish Brown	Medium	Sparse	Slightly earthy	-	-
		E	-	2022-09-17 16:06	5.3	15U	551846	5482250	3	6	0-5cm	Greyish Brown	Medium	Sparse	Slightly earthy	-	-
Mennin River	MR1	A	-	2022-09-13 16:00	0.9	15U	553090	5480172	4	5	0-3cm	Dark Brown	Firm	Dense	Earthy	Grasses and other macrophytes	Grabs contained a lot of deep rooted grass, requiring more grabs to acquire sufficient substrate quantities.
		B	-	2022-09-13 17:15	0.8	15U	553137	5480149	3	10	0-5cm	Dark Brown	Firm	Dense	Earthy	Grasses and other macrophytes	
		C	-	2022-09-13 18:30	1.3	15U	553182	5480147	3	8	0-5cm	Dark Brown	Medium	Dense	Earthy	Grasses and other macrophytes	
		D	-	2022-09-14 15:00	0.9	15U	552966	5480208	3	5	0-4cm	Dark Brown	Medium	Dense	Earthy	Earthy	
		E	-	2022-09-14 17:01	1.1	15U	552932	5480242	2	13	0-5cm	Dark Brown	Medium	Dense	Earthy	-	

APPENDIX B, TABLE 21
Sediment core log, September 2022.

Waterbody/ Watercourse	Site ID	Rep	QAQC	Date and Time	Station Depth (m)	UTM Zone	UTM Easting	UTM Northing	Grabs per Sample	Penetration Depth (cm)	Horizon	Colour	Consistency	Organics	Odour	Non-sediment material removed	Comments
Mennin River	MR2	A	Sample	2022-09-18 15:00	1.2	15U	551918	5483482	15	2.5	0-2cm	Reddish Brown	Firm	Moderate	Mild earthy	Beaver scat, clam, macrophytes, roots & woody debris	Used both Ekman & Ponar as sediment was extremely difficult to grab. New beaver dam restricted access. Teams had to stop nearer to the mouth of the lake.
		A	DUP	2022-09-18 17:00	1.2	15U	551918	5483482	10	2.5	0-2cm	Reddish Brown	Firm	Moderate	Mild earthy	Beaver scat and woody debris	
		B	-	2022-09-20 15:30	1.5	15U	551906	5483444	20	2.5	0-2cm	Brownish Grey	Medium	Moderate	Earthy, slightly sulfur	Beaver scat, clam, macrophytes, roots & woody debris	
		C	-	2022-09-20 17:05	1.1	15U	551862	5483411	7	6	0-4cm	Reddish Brown	Medium	Moderate	Earthy	Woody debris and macrophytes	Used both Ekman & Ponar as sediment was extremely difficult to grab. New beaver dam restricted access. Teams had to stop nearer to the mouth of the lake. Moved further into the mouth of the lake because of substrate.
		D	-	2022-09-21 16:13	1.2	15U	551802	5483323	4	6.5	0-5cm	Dark Brown	Medium	Moderate	Earthy	Woody Debris and macrophytes	
		E	-	2022-09-21 17:10	1.1	15U	551865	5483383	5	6	0-5cm	Dark Brown	Medium	Moderate	Earthy	Assorted macrophytes	New beaver dam restricted access. Teams had to stop nearer to the mouth of the lake. Moved further into the mouth of the lake because of substrate.
	MR3	A	-	2022-09-26 16:40	0.8	15U	550204	5487424	5	6	0-4cm	Greyish Brown	Medium	Dense	Mild earthy	Large woody debris	Rapids, dams, & distance from highway 17 preventing sampling from a boat. Therefore, teams shore sampled. Waded in the stream & dropped ekman to sample. Steep banks causing safety concerns resulted in samples being collected close to shore.
		B	-	2022-09-26 17:00	0.8	15U	550170	5487427	4	6	0-4cm	Greyish Brown	Medium	Moderate	Earthy	Grasses and macrophytes, large woody debris	
		C	-	2022-09-26 17:30	0.9	15U	550120	5487443	4	6	0-4cm	Greyish Brown	Medium	Moderate	Earthy	Grasses and macrophytes, large woody debris	
		D	-	2022-09-26 17:50	0.5	15U	550142	5487428	4	5	0-3cm	Greyish Brown	Medium	Moderate	Earthy	Macrophyte roots and woody debris	
		E	-	2022-09-26 18:35	0.7	15U	550137	5487462	3	9	0-5cm	Greyish Brown	Medium	Moderate	Earthy	Macrophytes - burreed	
Revell Lake	RL1	A	Sample	2022-09-08 14:15	7.2	15U	569145	5476276	5	6	0-5cm	Reddish Brown	Medium	Absent	Musty/Earthy	-	Red organic layer present
		A	DUP	2022-09-08 14:45	7.2	15U	569145	5476276	5	7	0-5cm	Reddish Brown	Medium	Sparse	Musty/Earthy	-	Red Organic Layer
		B	-	2022-09-08 15:30	7.9	15U	569152	5476294	3	6	0-5cm	Reddish Brown w silver sand mixed in	Medium	Absent	Musty/ Earthy minimal smell	-	Red organic top layer
		C	-	2022-09-08 16:00	8.2	15U	569255	5476453	2	6	0-5cm	Reddish Brown surface w Brown silty clay	Medium	Absent	Musty/Earthy	-	Red organic top layer
		D	-	2022-09-08 17:00	7.2	15U	569276	5476512	4	6	0-5cm	Reddish Brown surface w Brown silt-clay profile	Medium	Absent	Musty/Earthy	-	Red organic top layer
		E	-	2022-09-09 15:00	7.3	15U	569196	5476139	2	4.5	0-2cm	Reddish Brown top layer w dark Brown & Grey profile	Medium	Sparse	Musty/Earthy	-	Red organic top layer.

APPENDIX B, TABLE 21
Sediment core log, September 2022.

Waterbody/ Watercourse	Site ID	Rep	QAQC	Date and Time	Station Depth (m)	UTM Zone	UTM Easting	UTM Northing	Grabs per Sample	Penetration Depth (cm)	Horizon	Colour	Consistency	Organics	Odour	Non-sediment material removed	Comments
Revell Lake	RL2	A	-	2022-09-09 18:05	7.9	15U	569936	5475908	1	8	0-5cm	Dark Brown/Grey/Green	Medium	Absent	Faint earthy smell	-	-
		B	-	2022-09-09 19:02	7.2	15U	569964	5475954	1	7	0-5cm	Dark Brown/Grey/Green	Medium	Absent	Faint earthy smell	-	-
		C	-	2022-09-10 14:30	7.3	15U	569943	5475997	1	8	0-5cm	Dark Brown/Grey/Green	Medium	Absent	Faint earthy smell	-	-
		D	-	2022-09-10 15:30	6.8	15U	570006	5475937	1	8	0-5cm	Dark Brown/Grey/Green	Medium	Absent	Faint earthy smell	-	-
		E	-	2022-09-10 16:45	6.4	15U	570055	5475925	2	6	0-5cm	Dark Brown/Grey/Green w a thin reddish surface layer	Medium	Absent	Faint earthy smell	-	-
Revell River	RR1	A	Sample	2022-09-24 17:45	1.5	15U	559625	5488291	20	3	0-2cm	Light Brown sand	Loose	Sparse	Earthy	Woody debris and pinecones	RR1-A & RR1-A-DUP were the only sites accessible by boat - Rapids & deadfall prevented all other replicates from being sampled by boat. The benthic substrate was primarily composed of sand, requiring 20 or more grabs to fulfill the quantities required. Teams switched between an Ekman & Ponar grab sampler in efforts to make less grabs.
		A	DUP	2022-09-24 18:55	1.5	15U	559625	5488291	18	3	0-2cm	Light Brown sand	Loose	Sparse	Earthy	Woody debris and Pinecones	
		B	-	2022-09-25 14:00	0.9	15U	559675	5488291	10	3	0-2cm	Light Brown sand	Loose	Sparse	Earthy	-	Rapids & deadfall prevented sampling from a boat. Therefore, teams shore sampled. Members had to wade into the stream & drop an Ekman or Ponar grab sampler to collect samples. Steep banks causing safety concerns resulted in samples being collected close to shore. The benthic substrate was primarily composed of sand, requiring 10 or more grabs to fulfill the quantities required. Teams switched between an Ekman & Ponar grab sampler in efforts to make less grabs.
		C	-	2022-09-25 15:00	0.5	15U	559704	5488291	15	5	0-3cm	Light Brown sand	Loose	Sparse	Earthy	-	
		D	-	2022-09-25 15:30	0.5	15U	559716	5488291	15	4	0-2cm	Light Brown sand	Loose	Sparse	Earthy	-	
		E	-	2022-09-25 16:30	0.5	15U	559717	5488270	13	3	0-2cm	Light Brown sand	Loose	Sparse	Earthy	Woody debris and vegetation	
Unnamed Waterbody	P1	A	-	2022-09-14 17:25	1.7	15U	554424	5485439	2	6.5	0-5cm	Brown	Firm	Sparse	Earthy	Organics	-
		B	-	2022-09-14 18:25	1.7	15U	554488	5485494	2	8.5	0-5cm	Brown	Firm	Sparse	Earthy	Organics	-
		C	-	2022-09-14 7:25	1.9	15U	554454	5485374	2	8	0-5cm	Brown	Firm	Sparse	Earthy	Organics	-
	P2	A	-	2022-09-10 18:00	1.9	15U	556129	5487159	2	6	0-5cm	Dark Brown	Firm	Absent	Earthy	-	No organics
		B	-	2022-09-10 19:00	2.4	15U	556074	5487170	2	7.5	0-5cm	Dark Brown	Firm	Absent	Strong sulphur	-	-
		C	-	2022-09-10 8:00	2.7	15U	556006	5487141	2	9.5	0-5cm	Dark Brown	Firm	Absent	Strong sulphur	-	-

APPENDIX B, TABLE 21
Sediment core log, September 2022.

Waterbody/ Watercourse	Site ID	Rep	QAQC	Date and Time	Station Depth (m)	UTM Zone	UTM Easting	UTM Northing	Grabs per Sample	Penetration Depth (cm)	Horizon	Colour	Consistency	Organics	Odour	Non-sediment material removed	Comments
Unnamed Waterbody	P3	A	Sample	2022-09-12 14:15	3.5	15U	559723	5486693	2	7	0-5cm	Brown w Grey tinge	Medium	Absent	Earthy	-	-
		A	DUP	2022-09-12 15:00	3.5	15U	559723	5486693	2	8	0-5cm	Brown w Grey tinge	Medium	Absent	Earthy	-	-
		B	-	2022-09-12 16:45	3.9	15U	559775	5486775	2	6	0-5cm	Brown w Grey tinge	Medium	Absent	Earthy	-	-
		C	-	2022-09-12 17:50	4.1	15U	559868	5486794	2	7	0-5cm	Brown w Grey tinge	Medium	Absent	Earthy	-	-
	P4	A	-	2022-09-23 16:00	3.1	15U	557955	5485087	2	9	0-5cm	Medium Brown	Medium	Absent	Mild Sulfur	-	-
		B	-	2022-09-23 16:20	3.4	15U	557962	5485122	2	7	0-5cm	Medium Brown	Medium	Absent	Mild Sulfur	-	-
		C	-	2022-09-22 16:40	3.6	15U	557979	5485152	2	9	0-5cm	Medium Brown	Medium	Absent	Mild Sulfur	-	-
	P5	A	-	2022-09-23 17:10	2.5	15U	557505	5484272	2	7	0-5cm	Medium Brown	Medium	Sparse	None	-	-
		B	-	2022-09-23 17:15	2.5	15U	557527	5484258	2	11	0-5cm	Medium Brown	Firm	Absent	None	-	-
		C	-	2022-09-23 18:50	2.5	15U	557523	5484231	2	8	0-5cm	Medium Brown	Medium	Absent	None	-	-
	P6	A	-	2022-09-13 18:00	0.7	15U	554976	5483896	3	7	0-5cm	Reddish Brown	Medium	Moderate	Mild Sulfur	Grasses, roots	-
		B	-	2022-09-13 18:30	0.6	15U	554963	5483892	1	6	0-5cm	Reddish Brown	Medium	Sparse	Mild Sulfur	-	-
		C	-	2022-09-13 19:05	0.8	15U	554954	5483867	2	6.5	0-5cm	Reddish Brown	Medium	Dense	Mild Sulfur	Mild roots, grasses	-
	P7	A	-	2022-09-13 16:00	3.1	15U	553213	5483945	2	6	0-5cm	Brown	Firm	Sparse	Earthy	Organics	-
		B	-	2022-09-13 16:40	2.2	15U	553302	5483977	3	5.5	0-3cm	Brown	Firm	Sparse	Organics	Organics	-
		C	-	2022-09-13 17:00	2.9	15U	553233	5484065	2	5	0-3cm	Brown - Neutral	Firm	Sparse	Earthy	Organics	-
Unnamed Waterbody	RP1	A	Sample	2022-09-18 17:30	3	15U	547945	5480011	1	8	0-5cm	Greenish Brown	Medium	Sparse	Earthy, slightly sulfur	-	-
		A	DUP	2022-09-18 17:50	3	15U	547945	5480011	1	9	0-5cm	Greenish Brown	Medium	Sparse	Earthy, slightly sulfur	-	-
		B	-	2022-09-18 18:20	3.4	15U	547909	5480001	1	6.5	0-5cm	Greenish Brown	Medium	Sparse	Earthy, slightly sulfur	-	-
		C	-	2022-09-18 18:45	2.5	15U	547904	5480095	1	10	0-5cm	Greenish Brown	Medium	Sparse	Earthy	-	-

APPENDIX B, TABLE 21

Sediment core log, September 2022.

Waterbody/ Watercourse	Site ID	Rep	QAQC	Date and Time	Station Depth (m)	UTM Zone	UTM Easting	UTM Northing	Grabs per Sample	Penetration Depth (cm)	Horizon	Colour	Consistency	Organics	Odour	Non-sediment material removed	Comments
Unnamed Waterbody	RP2	A	-	2022-09-27 16:00	3.6	15U	552890	5475824	1	9	0-5cm	Dark Brown	Loose	Absent	Sulfur	-	-
		B	-	2022-09-27 17:00	4.3	15U	552928	5475796	1	8.5	0-5cm	Dark Brown	Loose	Absent	Strong sulphur	-	-
		C	-	2022-09-27 18:00	3.8	15U	553006	5475702	1	8	0-5cm	Dark Brown	Loose	Absent	Strong sulphur	-	-
	RP3	A	-	2022-09-19 14:00	2.4	15U	565600	5478272	2	8	0-5cm	Dark Brown sludge	Medium	Absent	Sulfur	-	-
		B	-	2022-09-19 15:00	2.3	15U	565612	5478235	2	9	0-5cm	Dark Brown sludge	Medium	Absent	Sulfur	-	-
		C	-	2022-09-19 16:00	2.3	15U	565623	5478215	2	9	0-5cm	Dark Brown sludge	Medium	Absent	Sulfur	-	-
Unnamed Watercourse	ML4	A	-	2022-09-17 15:40	2	15U	552308	5482867	4	4	0-2cm	Reddish Brown	Firm	Absent	Earthy, slightly sulfur	3% Roots	-
		B	-	2022-09-17 17:00	2.3	15U	552395	5482876	4	7	0-5cm	Greyish Brown	Firm	Moderate	Earthy, slightly sulfur	5% Roots	-
		C	-	2022-09-18 16:15	2.1	15U	552235	5482810	3	6	0-4cm	Reddish Brown	Firm	Sparse	Mild earthy	10% woody debris	Grab was sandy in the middle & clay/mud on the sides. Middle substrate percentage listed, outer substrate percentage was 10% sand, 45% silt, & 45% clay.
		D	-	2022-09-18 17:30	1.9	15U	552166	5482753	5	4.5	0-2cm	Reddish Brown	Firm	Sparse	Mild earthy	10% woody debris	-
		E	-	2022-09-18 18:30	1.8	15U	552080	5482733	5	4	0-2cm	Reddish Brown	Firm	Moderate	Mild earthy	10% woody debris and plants	-
Wabigoon River	WR1	A	-	2022-09-22 15:03	1.4	15U	554473	5490934	0	0	0-cm	Reddish Brown	Medium	Absent	Mild Sulfur	-	WR1 substrate was composed of sand & woody debris. Attempted using Ponar & Ekman, sampled from the middle of the river to the shoreline & upstream & downstream, but were unsuccessful in collecting a single grab. Site was deemed unsampleable for benthics & sediment.
	WR2	A	-	2022-09-25 14:30	1.1	15U	553598	5491007	6	3.5	0-2cm	Reddish Brown	Medium	Moderate	Earthy	Woody debris, grassy vegetation, snails	Rapids, dams, & deadfall prevented sampling from a boat. Therefore, teams shore sampled. Waded in the stream & dropped an Ekman to sample. Steep banks causing safety concerns resulted in samples being collected close to shore.
		B	-	2022-09-25 16:02	0.7	15U	553591	5490966	3	3	0-2cm	Light Brown	Loose	Absent	Earthy	-	
		C	-	2022-09-25 16:40	1	15U	553583	5490912	2	4	0-2cm	Light Brown	Loose	Sparse	Earthy	Woody debris	
		D	-	2022-09-25 15:22	0.8	15U	553610	5490987	3	5	0-2cm	Greyish Brown	Medium	Sparse	Earthy	Woody debris	
		E	-	2022-09-25 18:00	0.7	15U	553591	5490863	4	4	0-2cm	Greyish Brown	Medium	Sparse	Earthy	Coarse woody debris	
	WR3	C	-	2022-09-20 15:26	2.4	15U	547957	5489904	0	0	0-cm	Light Brown	Firm	Absent	Earthy	-	WR3 substrate was composed of hard clay and sand. Attempted using Ponar and Ekman,sampled throughout the river, but were unsuccessful in collecting a single grab due to hard clay/sand substrate. This site was deemed unsampleable.

APPENDIX B, TABLE 22

Summary of Year 2 sediment chemistry results from the exposure and reference areas of Mennin Lake, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Sediment Quality Guideline ¹
Exposure										
General Chemistry										
% Moisture	%	10	0.25	0	64.0	14.5	47.7	66.0	78.3	-
Inorganic Carbon	%	10	0.05	0	0.098	0.031	0.063	0.096	0.134	-
Inorganic Carbon (as CaCO3 Equiv.)	%	10	0.4	0	0.817	0.255	0.534	0.800	1.12	-
Nitrate+Nitrite-N	mg/kg	10	2	10	<2	-	<2	2.0	<2	-
Nitrate-N	mg/kg	10	2	10	<2	-	<2	2.0	<2	-
Nitrite-N	mg/kg	10	1	10	<1	-	<1	1.0	<1	-
Total Carbon by Combustion	%	10	0.05	0	4.37	1.61	2.60	4.40	6.07	-
Total Kjeldahl Nitrogen	%	10	0.06 - 0.1	0	0.291	0.147	0.138	0.289	0.440	0.055
Total Nitrogen by LECO	%	10	0.02	0	0.339	0.114	0.206	0.342	0.468	-
Total Organic Carbon	%	10	0.05	0	4.27	1.58	2.53	4.31	5.95	1
Metals										
Aluminum, total	mg/kg	10	50	0	19082	8644	9641	19400	27955	-
Antimony, total	mg/kg	10	0.1	1	0.165	0.060	0.100	0.155	0.251	3
Arsenic, total	mg/kg	10	0.1	0	2.63	1.39	1.21	2.58	4.25	5.9
Barium, total	mg/kg	10	0.5	0	107	55.0	49.0	105	168	-
Beryllium, total	mg/kg	10	0.1	0	0.408	0.214	0.178	0.410	0.626	-
Bismuth, total	mg/kg	10	0.2	5	0.219	0.022	0.200	0.210	0.250	65000
Boron, total	mg/kg	10	5	10	<5	-	<5	5.0	<5	-
Cadmium, total	mg/kg	10	0.02	0	0.438	0.177	0.246	0.438	0.626	0.6
Calcium, total	mg/kg	10	50	0	4005	937	2675	4225	4982	-
Cesium, total	mg/kg	10	0.1	0	1.6	0.7	0.8	1.6	2.3	-
Chromium, total	mg/kg	10	0.5	0	30.2	12.3	16.4	31.0	43.1	26
Cobalt, total	mg/kg	10	0.1	0	14.6	7.50	6.78	14.6	22.5	50
Copper, total	mg/kg	10	0.5	0	16.3	7.84	8.05	16.5	24.3	16
Iron, total	mg/kg	10	50	0	21092	10464	9891	21250	31935	20000
Lead, total	mg/kg	10	0.5	0	11.1	4.72	5.99	10.7	17.6	31
Lithium, total	mg/kg	10	2	0	20.0	7.78	11.3	20.4	28.0	-
Magnesium, total	mg/kg	10	20	0	4872	1841	2787	5000	6777	-
Manganese, total	mg/kg	10	1	0	656	358	299	614	1130	460
Mercury	mg/kg	10	0.005	0	0.082	0.044	0.037	0.080	0.133	-
Molybdenum, total	mg/kg	10	0.1	0	1.54	0.794	0.678	1.57	2.42	8.3
Nickel, total	mg/kg	10	0.5	0	20.5	9.08	10.8	20.8	29.8	16
Phosphorus, total	mg/kg	10	50	0	732	334	387	732	1086	-
Potassium, total	mg/kg	10	100	0	1400	690	643	1435	2076	-
Rhodium, total	mg/kg	10	0.1	10	<0.1	-	<0.1	0.1	<0.1	600
Ruthenium, total	mg/kg	10	0.1	10	<0.1	-	<0.1	0.1	<0.1	390
Samarium, total	mg/kg	10	0.1	0	3.34	1.30	1.92	3.36	4.70	2500

APPENDIX B, TABLE 22

Summary of Year 2 sediment chemistry results from the exposure and reference areas of Mennin Lake, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Sediment Quality Guideline ¹
Exposure										
Metals										
Selenium, total	mg/kg	10	0.2	0	0.544	0.232	0.283	0.535	0.823	0.9
Silver, total	mg/kg	10	0.1	5	0.110	0.011	0.100	0.110	0.120	0.5
Sodium, total	mg/kg	10	50	0	284	75.3	183	298	362	-
Strontium, total	mg/kg	10	0.5	0	21.4	5.61	13.5	22.9	27.3	-
Sulfur, total	mg/kg	10	1000	10	<1000	-	<1000	1000	<1000	-
Thallium, total	mg/kg	10	0.05	0	0.208	0.100	0.104	0.205	0.321	-
Tin, total	mg/kg	10	2	10	<2	-	<2	2.0	<2	-
Titanium, total	mg/kg	10	1	0	668	95.0	516	713	754	-
Tungsten, total	mg/kg	10	0.5	10	<0.5	-	<0.5	0.5	<0.5	960
Uranium, total	mg/kg	10	0.05	0	2.01	0.716	1.19	2.04	2.78	32
Vanadium, total	mg/kg	10	0.2	0	37.0	15.3	20.0	37.2	53.2	27
Zinc, total	mg/kg	10	2	0	74.5	33.2	39.4	74.8	108	120
Zirconium, total	mg/kg	10	1	2	1.77	0.730	1.00	1.80	2.50	-
Radiological Parameters										
Carbon-14	Bq/kg	5	740	5	<740	-	<740	740	<740	-
Cesium-137	Bq/kg	5	18.5	1	23.1	4.99	18.7	22.7	29.7	100000
Cobalt-60	Bq/kg	5	18.5	5	<18.5	-	<18.5	18.5	<18.5	40000
Gross alpha	Bq/kg	5	111	0	388	89.2	287	378	494	-
Gross beta	Bq/kg	5	148	0	683	130	506	758	779	-
Iodine-129	Bq/kg	5	370	5	<370	-	<370	370	<370	1000000
Potassium-40	Bq/kg	5	75	0	526	23.8	494	531	548	-
Radium-226	Bq/kg	5	37	5	<37	-	<37	37	<37	600
Ruthenium-106	Bq/kg	5	90	5	<90	-	<90	90.0	<90	-
Strontium-90	Bq/kg	5	18.5	5	<18.5	-	<18.5	18.5	<18.5	20000
Thorium-228	Bq/kg	5	3.7	1	20.0	9.91	6.54	24.0	27.4	-
Thorium-230	Bq/kg	5	3.7	0	24.6	2.70	21.2	25.2	27.2	-
Thorium-232	Bq/kg	5	3.7	0	21.9	2.73	19.3	20.5	25.2	40000
Tritium	Bq/kg	5	37	5	<37	-	<37	37	<37	10000000

APPENDIX B, TABLE 22

Summary of Year 2 sediment chemistry results from the exposure and reference areas of Mennin Lake, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Sediment Quality Guideline ¹
Exposure										
Radiological Parameters										
Uranium-234	Bq/kg	5	3.7	0	27.8	5.50	23.2	26.9	35.1	20000
Uranium-235	Bq/kg	5	3.7	5	<3.7	-	<3.7	3.7	<3.7	10000
Uranium-238	Bq/kg	5	3.7	0	26.2	3.38	22.6	26.4	29.8	70000
Speciated Metals										
Chromium, hexavalent [Cr VI], total	mg/kg	10	0.2 - 0.4	10	0.340	0.097	0.200	0.400	0.400	-
Reference										
General Chemistry										
% Moisture	%	5	0.25	0	68.9	3.07	66.0	68.0	72.7	-
Inorganic Carbon	%	5	0.05	0	0.136	0.007	0.127	0.139	0.141	-
Inorganic Carbon (as CaCO3 Equiv.)	%	5	0.4	0	1.13	0.054	1.06	1.16	1.18	-
Nitrate+Nitrite-N	mg/kg	5	2	5	<2	-	<2	2.0	<2	-
Nitrate-N	mg/kg	5	2	5	<2	-	<2	2.0	<2	-
Nitrite-N	mg/kg	5	1	5	<1	-	<1	1.0	<1	-
Total Carbon by Combustion	%	5	0.05	0	12.5	0.907	11.4	12.7	13.5	-
General Chemistry										
Total Kjeldahl Nitrogen	%	5	0.08 - 0.16	0	0.710	0.041	0.655	0.721	0.746	550
Total Nitrogen by LECO	%	5	0.02	0	0.886	0.049	0.829	0.884	0.938	-
Total Organic Carbon	%	5	0.05	0	12.4	0.907	11.3	12.6	13.4	1
Metals										
Aluminum, total	mg/kg	5	50	0	16460	422	15960	16600	16920	-
Antimony, total	mg/kg	5	0.1	0	0.134	0.005	0.130	0.130	0.140	3
Arsenic, total	mg/kg	5	0.1	0	2.84	0.0945	2.72	2.83	2.92	5.9
Barium, total	mg/kg	5	0.5	0	98.6	3.34	94.4	99.6	102	-
Beryllium, total	mg/kg	5	0.1	0	0.368	0.015	0.352	0.370	0.386	-
Bismuth, total	mg/kg	5	0.2	5	<0.2	-	<0.2	0.2	<0.2	65000
Boron, total	mg/kg	5	5	5	<5	-	<5	5.00	<5	-
Cadmium, total	mg/kg	5	0.02	0	0.594	0.033	0.551	0.596	0.626	0.6
Calcium, total	mg/kg	5	50	0	5552	306	5214	5470	5874	-
Cesium, total	mg/kg	5	0.1	0	1.4	0.0	1.4	1.5	1.5	-
Chromium, total	mg/kg	5	0.5	0	28.5	0.594	28.0	28.3	29.3	26
Cobalt, total	mg/kg	5	0.1	0	8.54	0.293	8.18	8.52	8.82	50
Copper, total	mg/kg	5	0.5	0	23.5	1.15	22.1	24.1	24.5	16
Iron, total	mg/kg	5	50	0	15080	545	14400	15200	15640	20000
Lead, total	mg/kg	5	0.5	0	9.75	0.672	8.90	9.86	10.4	31
Lithium, total	mg/kg	5	2	0	15.6	0.497	15.1	15.6	16.2	-
Magnesium, total	mg/kg	5	20	0	4152	110	4010	4200	4252	-
Manganese, total	mg/kg	5	1	0	365	45.7	319	352	422	460
Mercury	mg/kg	5	0.005	0	0.106	0.003	0.103	0.104	0.110	-
Molybdenum, total	mg/kg	5	0.1	0	3.47	0.0688	3.41	3.45	3.56	8.3
Nickel, total	mg/kg	5	0.5	0	21.3	0.527	20.7	21.4	21.9	16

APPENDIX B, TABLE 22

Summary of Year 2 sediment chemistry results from the exposure and reference areas of Mennin Lake, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Sediment Quality Guideline ¹
Reference										
Metals										
Phosphorus, total	mg/kg	5	50	0	535	31.4	503	533	574	-
Potassium, total	mg/kg	5	100	0	1252	33.5	1220	1260	1292	-
Rhodium, total	mg/kg	5	0.1	5	<0.1	-	<0.1	0.1	<0.1	600
Ruthenium, total	mg/kg	5	0.1	5	<0.1	-	<0.1	0.1	<0.1	390
Samarium, total	mg/kg	5	0.1	0	3.93	0.138	3.76	3.97	4.06	2500
Selenium, total	mg/kg	5	0.2	0	1.11	0.087	1.03	1.08	1.22	0.9
Silver, total	mg/kg	5	0.1	5	<0.1	-	<0.1	0.1	<0.1	0.5
Sodium, total	mg/kg	5	50	0	244	5.10	239	241	250	-
Strontium, total	mg/kg	5	0.5	0	25.6	1.17	24.1	25.9	26.8	-
Sulfur, total	mg/kg	5	1000	0	2060	167	1840	2100	2200	-
Thallium, total	mg/kg	5	0.05	0	0.162	0.006	0.156	0.161	0.168	-
Tin, total	mg/kg	5	2	5	<2	-	<2	2.0	<2	-
Titanium, total	mg/kg	5	1	0	602	19.6	576	608	619	-
Tungsten, total	mg/kg	5	0.5	5	<0.5	-	<0.5	0.5	<0.5	960
Uranium, total	mg/kg	5	0.05	0	2.92	0.158	2.75	2.89	3.11	32
Vanadium, total	mg/kg	5	0.2	0	27.4	0.532	26.9	27.2	28.1	27
Zinc, total	mg/kg	5	2	0	68.6	1.75	66.7	68.9	70.7	120
Zirconium, total	mg/kg	5	1	0	2.64	0.167	2.50	2.60	2.86	-
Radiological Parameters										
Carbon-14	Bq/kg	10	740	10	<740	-	<740	740	<740	-
Cesium-137	Bq/kg	10	18.5	0	54.3	15.0	38.7	49.3	78.1	100000
Chlorine-36	Bq/kg	5	370	5	<370	-	<370	370	<370	-
Cobalt-60	Bq/kg	10	18.5	10	<18.5	-	<18.5	18.5	<18.5	40000
Gross alpha	Bq/kg	10	111	0	589	173	363	628	786	-
Gross beta	Bq/kg	10	148	0	819	187	578	870	1018	-
Iodine-129	Bq/kg	10	370	10	<370	-	<370	370	<370	1000000
Neptunium-237	Bq/kg	5	3.7	5	<3.7	-	<3.7	3.7	<3.7	-
Plutonium-238	Bq/kg	5	1.85	4	<1.85	0.000	<1.85	1.85	<1.85	-
Plutonium-239	Bq/kg	5	1.85	0	2.47	0.514	1.90	2.42	3.00	200000
Potassium-40	Bq/kg	10	75	0	447	36.0	394	455	492	-
Radium-226	Bq/kg	10	37	0	51.4	17.8	37.0	46.6	80.3	600
Ruthenium-106	Bq/kg	10	90	10	<90	-	<90	90.0	<90	-
Selenium-79	Bq/kg	5	370	5	<370	-	<370	370	<370	-
Strontium-90	Bq/kg	10	18.5	10	<18.5	-	<18.5	18.5	<18.5	20000
Thorium-228	Bq/kg	10	3.7	0	44.0	6.89	35.1	42.7	54.4	-
Thorium-230	Bq/kg	10	3.7	0	41.8	2.98	37.1	42.5	45.3	-
Thorium-232	Bq/kg	10	3.7	0	39.6	4.63	32.4	40.5	44.6	40000

APPENDIX B, TABLE 22

Summary of Year 2 sediment chemistry results from the exposure and reference areas of Mennin Lake, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Sediment Quality Guideline ¹
Reference										
Radiological Parameters										
Tritium	Bq/kg	10	37	9	<37	0.00	<37	37	<37	10000000
Uranium-234	Bq/kg	10	3.7	0	49.7	4.44	44.9	48.5	56.8	20000
Uranium-235	Bq/kg	10	3.7	1	3.76	0.154	3.70	3.70	4.01	10000
Uranium-238	Bq/kg	10	3.7	0	44.8	4.28	40.5	43.7	52.0	70000
Speciated Metals										
Chromium, hexavalent [Cr VI], total	mg/kg	5	0.4	5	<0.4	-	<0.4	0.4	<0.4	-

Gray cells indicate guideline exceedance; n = sample size; RDL = Reportable Detection Limit; SD = Standard Deviation.

¹See Appendix B, Table 21 for detailed sediment quality guidelines.

APPENDIX B, TABLE 23

Summary of Year 2 sediment chemistry results from the exposure and reference areas of Mennin River, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Sediment Quality Guideline ¹
Exposure										
General Chemistry										
% Moisture	%	10	0.25	0	59.4	11.5	39.9	60.8	71.9	-
Inorganic Carbon	%	10	0.05	0	0.092	0.024	0.063	0.094	0.130	-
Inorganic Carbon (as CaCO3 Equiv.)	%	10	0.4	0	0.769	0.198	0.523	0.775	1.08	-
Nitrate+Nitrite-N	mg/kg	10	2	10	<2	-	<2	2.0	<2	-
Nitrate-N	mg/kg	10	2	10	<2	-	<2	2.0	<2	-
Nitrite-N	mg/kg	10	1	10	<1	-	<1	1.0	<1	-
Total Carbon by Combustion	%	10	0.05	0	6.15	-	2.15	6.07	10.5	-
Total Kjeldahl Nitrogen	%	10	0.02 - 0.2	0	0.294	0.144	0.102	0.316	0.489	0.055
Total Nitrogen by LECO	%	10	0.02	0	0.344	0.173	0.125	0.366	0.597	-
Total Organic Carbon	%	10	0.05	0	6.06	3.00	2.09	5.98	10.4	1
Metals										
Aluminum, total	mg/kg	10	50	0	12947	4084	6358	13200	17370	-
Antimony, total	mg/kg	10	0.1	9	0.101	0.003	0.100	0.100	0.106	3
Arsenic, total	mg/kg	10	0.1	0	1.56	0.563	0.735	1.61	2.25	5.9
Barium, total	mg/kg	10	0.5	0	75.6	27.4	33.2	74.0	107	-
Beryllium, total	mg/kg	10	0.1	0	0.311	0.105	0.160	0.310	0.455	-
Bismuth, total	mg/kg	10	0.2	10	<0.2	-	<0.2	0.2	<0.2	65000
Boron, total	mg/kg	10	5	10	<5	-	<5	5.0	<5	-
Cadmium, total	mg/kg	10	0.02	0	0.251	0.120	0.083	0.236	0.419	0.6
Calcium, total	mg/kg	10	50	0	4744	1206	2663	5025	5772	-
Cesium, total	mg/kg	10	0.1	0	1.1	0.4	0.5	1.1	1.6	-
Chromium, total	mg/kg	10	0.5	0	25.0	9.52	10.8	25.2	36.8	26
Cobalt, total	mg/kg	10	0.1	0	9.05	3.59	4.20	8.01	13.8	50
Copper, total	mg/kg	10	0.5	0	15.2	5.75	6.81	16.7	22.3	16
Iron, total	mg/kg	10	50	0	15003	6004	6702	14650	22820	20000
Lead, total	mg/kg	10	0.5	0	7.03	2.17	3.33	7.46	9.25	31
Lithium, total	mg/kg	10	2	0	14.2	4.49	7.51	14.4	19.4	-
Magnesium, total	mg/kg	10	20	0	4374	1745	1967	4455	6694	-
Manganese, total	mg/kg	10	1	0	384	235	146	318	753	460
Mercury	mg/kg	10	0.005	0	0.045	0.017	0.018	0.043	0.064	-
Molybdenum, total	mg/kg	10	0.1	0	0.955	1.12	0.295	0.615	2.69	8.3
Nickel, total	mg/kg	10	0.5	0	16.6	6.10	7.77	15.7	25.0	16
Phosphorus, total	mg/kg	10	50	0	372	88.5	225	391	478	-
Potassium, total	mg/kg	10	100	0	1141	514	468	1040	1827	-
Rhodium, total	mg/kg	10	0.1	10	<0.1	-	<0.1	0.1	<0.1	600
Ruthenium, total	mg/kg	10	0.1	10	<0.1	-	<0.1	0.1	<0.1	390
Samarium, total	mg/kg	10	0.1	0	2.88	0.883	1.46	3.04	3.78	2500

APPENDIX B, TABLE 23

Summary of Year 2 sediment chemistry results from the exposure and reference areas of Mennin River, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Sediment Quality Guideline ¹
Exposure										
Metals										
Selenium, total	mg/kg	10	0.2	2	0.401	0.197	0.200	0.390	0.718	0.9
Silver, total	mg/kg	10	0.1	10	<0.1	-	<0.1	0.1	<0.1	0.5
Sodium, total	mg/kg	10	50	0	270	90.7	136	283	359	-
Strontium, total	mg/kg	10	0.5	0	25.0	7.10	13.0	27.6	31.0	-
Sulfur, total	mg/kg	10	1000	7	1080	193	1000	1000	1420	-
Thallium, total	mg/kg	10	0.05	1	0.137	0.046	0.070	0.129	0.190	-
Tin, total	mg/kg	10	2	10	<2	-	<2	2.0	<2	-
Titanium, total	mg/kg	10	1	0	744	265	378	736	1077	-
Tungsten, total	mg/kg	10	0.5	10	<0.5	-	<0.5	0.5	<0.5	960
Uranium, total	mg/kg	10	0.05	0	2.27	0.969	1.13	2.17	3.82	32
Vanadium, total	mg/kg	10	0.2	0	29.0	10.9	13.3	29.5	42.8	27
Zinc, total	mg/kg	10	2	0	71.2	93.4	21.6	42.3	211	120
Zirconium, total	mg/kg	10	1	1	3.88	2.12	1.32	3.50	6.95	-
Radiological Parameters										
Carbon-14	Bq/kg	9	740	9	<740	-	<740	740	<740	-
Cesium-137	Bq/kg	9	18.5	0	25.4	7.9	18.50	23.1	36.9	100000
Chlorine-36	Bq/kg	5	370	5	<370	-	<370	370	<370	-
Cobalt-60	Bq/kg	9	18.5	9	<18.5	-	<18.5	18.5	<18.5	40000
Gross alpha	Bq/kg	9	111	0	445	166	216	447	662	-
Gross beta	Bq/kg	9	148	0	737	175	496	781	945	-
Iodine-129	Bq/kg	9	370	9	<370	-	<370	370	<370	1000000
Neptunium-237	Bq/kg	5	3.7	5	<3.7	-	<3.7	3.7	<3.7	-
Plutonium-238	Bq/kg	5	1.85	5	<1.85	-	<1.85	1.85	<1.85	-
Plutonium-239	Bq/kg	5	1.85	5	<1.85	-	<1.85	1.85	<1.85	200000
Potassium-40	Bq/kg	9	75	0	493	77.5	397	479	604	-
Radium-226	Bq/kg	9	37	0	40.6	5.7	37.0	37.0	49.4	600
Ruthenium-106	Bq/kg	9	90	9	<90	-	<90	90.0	<90	-
Selenium-79	Bq/kg	5	370	5	<370	-	<370	370	<370	-
Strontium-90	Bq/kg	9	18.5	9	<18.5	-	<18.5	18.5	<18.5	20000
Thorium-228	Bq/kg	9	3.7	0	28.9	9.38	16.4	28.5	41.3	-
Thorium-230	Bq/kg	9	3.7	0	28.9	5.06	22.8	27.1	35.4	-
Thorium-232	Bq/kg	9	3.7	0	27.8	11.7	13.3	26.7	45.0	40000
Tritium	Bq/kg	9	37	8	37.0	-	37.0	37.0	37.0	10000000

APPENDIX B, TABLE 23

Summary of Year 2 sediment chemistry results from the exposure and reference areas of Mennin River, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Sediment Quality Guideline ¹
Exposure										
Radiological Parameters										
Uranium-234	Bq/kg	9	3.7	0	41.1	17.2	21.8	35.9	68.3	20000
Uranium-235	Bq/kg	9	3.7	3	3.75	0.14	3.70	3.70	3.96	10000
Uranium-238	Bq/kg	9	3.7	0	34.2	14.0	19.2	30.0	57.4	70000
Speciated Metals										
Chromium, hexavalent [Cr VI], total	mg/kg	10	0.2 - 0.4	10	0.360	0.084	0.200	0.400	0.400	-
Reference										
General Chemistry										
% Moisture	%	5	0.25	0	72.3	1.88	70.5	71.6	74.5	-
Inorganic Carbon	%	5	0.05	0	0.100	0.017	0.090	0.094	0.123	-
Inorganic Carbon (as CaCO3 Equiv.)	%	5	0.4	0	0.832	0.140	0.746	0.780	1.02	-
Nitrate+Nitrite-N	mg/kg	5	2 - 4	5	2.80	1.10	2.00	2.00	4.00	-
Nitrate-N	mg/kg	5	2 - 4	5	2.80	1.10	2.00	2.00	4.00	-
Nitrite-N	mg/kg	5	1 - 2	5	1.40	0.548	1.00	1.00	2.00	-
Total Carbon by Combustion	%	5	0.05	0	10.5	1.84	8.50	10.8	12.7	-
Total Kjeldahl Nitrogen	%	5	0.1 - 0.2	0	0.574	0.102	0.482	0.560	0.706	550
Total Nitrogen by LECO	%	5	0.02	0	0.662	0.104	0.571	0.636	0.800	-
Total Organic Carbon	%	5	0.05	0	10.4	1.83	8.41	10.7	12.6	1
Metals										
Aluminum, total	mg/kg	5	50	0	13540	647	12840	13700	14280	-
Antimony, total	mg/kg	5	0.1	5	<0.1	-	<0.1	0.1	<0.1	3
Arsenic, total	mg/kg	5	0.1	0	1.49	0.136	1.32	1.50	1.63	5.9
Barium, total	mg/kg	5	0.5	0	76.7	4.51	71.7	76.8	81.8	-
Beryllium, total	mg/kg	5	0.1	0	0.282	0.019	0.262	0.280	0.306	-
Bismuth, total	mg/kg	5	0.2	5	<0.2	-	<0.2	0.2	<0.2	65000
Boron, total	mg/kg	5	5	5	<5	-	<5	5.0	<5	-
Cadmium, total	mg/kg	5	0.02	0	0.435	0.117	0.278	0.469	0.538	0.6
Calcium, total	mg/kg	5	50	0	4182	998	3548	3680	5562	-
Cesium, total	mg/kg	5	0.1	0	1.2	0.03	1.1	1.2	1.2	-
Chromium, total	mg/kg	5	0.5	0	21.0	1.31	19.6	21.2	22.3	26
Cobalt, total	mg/kg	5	0.1	0	8.30	1.32	6.51	8.70	9.10	50
Copper, total	mg/kg	5	0.5	0	13.0	1.05	11.9	13.0	14.2	16
Iron, total	mg/kg	5	50	0	11020	766	10220	10700	11920	20000
Lead, total	mg/kg	5	0.5	0	9.03	2.06	6.22	10.10	10.5	31
Lithium, total	mg/kg	5	2	0	14.0	0.864	13.1	13.9	14.9	-
Magnesium, total	mg/kg	5	20	0	3024	212	2778	3020	3248	-
Manganese, total	mg/kg	5	1	0	312	84.0	198	329	372	460
Mercury	mg/kg	5	0.005	0	0.068	0.015	0.048	0.072	0.080	-
Molybdenum, total	mg/kg	5	0.1	0	1.33	0.352	1.04	1.21	1.80	8.3
Nickel, total	mg/kg	5	0.5	0	13.4	0.577	12.7	13.6	13.9	16

APPENDIX B, TABLE 23

Summary of Year 2 sediment chemistry results from the exposure and reference areas of Mennin River, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Sediment Quality Guideline ¹
Reference										
Metals										
Phosphorus, total	mg/kg	5	50	0	389	15.8	368	394	401	-
Potassium, total	mg/kg	5	100	0	784	72.7	730	740	878	-
Rhodium, total	mg/kg	5	0.1	5	<0.1	-	<0.1	0.1	<0.1	600
Ruthenium, total	mg/kg	5	0.1	5	<0.1	-	<0.1	0.1	<0.1	390
Samarium, total	mg/kg	5	0.1	0	2.57	0.182	2.41	2.50	2.81	2500
Selenium, total	mg/kg	5	0.2	0	0.874	0.052	0.814	0.890	0.926	0.9
Silver, total	mg/kg	5	0.1	5	<0.1	-	<0.1	0.1	<0.1	0.5
Sodium, total	mg/kg	5	50	0	162	15.1	150	154	182	-
Strontium, total	mg/kg	5	0.5	0	24.1	9.01	19.1	20.2	36.3	-
Sulfur, total	mg/kg	5	1000	0	1380	83.7	1300	1400	1480	-
Thallium, total	mg/kg	5	0.05	0	0.110	0.012	0.095	0.112	0.123	-
Tin, total	mg/kg	5	2	5	<2	-	<2	2.0	<2	-
Titanium, total	mg/kg	5	1	0	460	36.8	418	479	493	-
Tungsten, total	mg/kg	5	0.5	5	<0.5	-	<0.5	0.5	<0.5	960
Uranium, total	mg/kg	5	0.05	0	3.00	0.522	2.46	3.08	3.51	32
Vanadium, total	mg/kg	5	0.2	0	21.0	1.18	19.7	21.4	22.2	27
Zinc, total	mg/kg	5	2	0	44.9	7.86	34.1	47.3	50.1	120
Zirconium, total	mg/kg	5	1	0	1.96	0.924	1.42	1.60	3.22	-
Radiological Parameters										
Carbon-14	Bq/kg	5	740	5	<740	-	<740	740	<740	-
Cesium-137	Bq/kg	5	18.5	0	55.0	19.7	28.2	61.2	68.8	100000
Cobalt-60	Bq/kg	5	18.5	5	<18.5	-	<18.5	18.5	<18.5	40000
Gross alpha	Bq/kg	5	111	0	528	42.8	482	542	574	-
Gross beta	Bq/kg	5	148	0	750	155	542	776	870	-
Iodine-129	Bq/kg	5	370	5	<370	-	<370	370	<370	1000000
Potassium-40	Bq/kg	5	75	0	431	52.8	372	431	495	-
Radium-226	Bq/kg	5	37	0	38.9	4.3	37.0	37.0	44.8	600
Ruthenium-106	Bq/kg	5	90	5	<90	-	<90	90.0	<90	-
Strontium-90	Bq/kg	5	18.5	5	<18.5	-	<18.5	18.5	<18.5	20000
Thorium-228	Bq/kg	5	3.7	0	29.1	4.80	24.1	28.3	35.2	-
Thorium-230	Bq/kg	5	3.7	0	31.5	4.39	28.2	29.9	37.4	-
Thorium-232	Bq/kg	5	3.7	0	28.3	4.62	23.4	27.1	33.7	40000

APPENDIX B, TABLE 23

Summary of Year 2 sediment chemistry results from the exposure and reference areas of Mennin River, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Sediment Quality Guideline ¹
Reference										
Radiological Parameters										
Tritium	Bq/kg	5	37	5	<37	-	<37	37	<37	10000000
Uranium-234	Bq/kg	5	3.7	0	51.4	9.01	41.5	53.5	60.1	20000
Uranium-235	Bq/kg	5	3.7	0	<3.7	0.000	<3.7	3.7	<3.7	10000
Uranium-238	Bq/kg	5	3.7	0	44.5	10.4	32.6	43.4	56.3	70000
Speciated Metals										
Chromium, hexavalent [Cr VI], total	mg/kg	5	0.4	5	<0.4	-	<0.4	0.4	<0.4	-

Gray cells indicate guideline exceedance; n = sample size; RDL = Reportable Detection Limit; SD = Standard Deviation.

¹See Appendix B, Table 21 for detailed sediment qualtiy guidelines.

²Sample from MR3 (Rep B) was destroyed/lost en route to lab.

APPENDIX B, TABLE 24

Summary of Year 2 sediment chemistry results from Revell Lake, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Sediment Quality Guideline ¹
General Chemistry										
% Moisture	%	10	0.25	0	66.3	13.4	49.0	70.2	81.7	-
Inorganic Carbon	%	10	0.05	2	0.077	0.019	0.050	0.082	0.102	-
Inorganic Carbon (as CaCO3 Equiv.)	%	10	0.4	2	0.637	0.168	0.400	0.685	0.852	-
Nitrate+Nitrite-N	mg/kg	10	2	10	<2	-	<2	2.0	<2	-
Nitrate-N	mg/kg	10	2	10	<2	-	<2	2.0	<2	-
Nitrite-N	mg/kg	10	1	10	<1	-	<1	1.0	<1	-
Total Carbon by Combustion	%	10	0.05	0	4.37	2.54	1.22	5.61	6.74	-
Total Kjeldahl Nitrogen	%	10	0.06 - 0.08	0	0.293	0.166	0.096	0.384	0.464	0.055
Total Nitrogen by LECO	%	10	0.02	0	0.368	0.208	0.114	0.470	0.574	-
Total Organic Carbon	%	10	0.05 - 0.075	0	4.30	2.51	1.19	5.53	6.65	1
Metals										
Aluminum, total	mg/kg	10	50	0	10840	5404	4243	13300	16255	-
Antimony, total	mg/kg	10	0.1	2	0.187	0.070	0.100	0.200	0.286	3
Arsenic, total	mg/kg	10	0.1	0	3.62	1.38	1.63	4.08	5.27	5.9
Barium, total	mg/kg	10	0.5	0	56.2	27.8	21.5	69.3	88.3	-
Beryllium, total	mg/kg	10	0.1	0	0.351	0.161	0.145	0.420	0.531	-
Bismuth, total	mg/kg	10	0.2	9	0.201	0.003	0.200	0.200	0.206	65000
Boron, total	mg/kg	10	5	10	<5	-	<5	5.0	<5	-
Cadmium, total	mg/kg	10	0.02	0	0.504	0.218	0.218	0.592	0.753	0.6
Calcium, total	mg/kg	10	50	0	2225	762	1273	2510	3051	-
Cesium, total	mg/kg	10	0.1	0	0.8	0.4	0.3	1.0	1.1	-
Chromium, total	mg/kg	10	0.5	0	13.5	5.78	6.40	16.1	19.1	26
Cobalt, total	mg/kg	10	0.1	0	6.59	2.57	3.10	7.06	10.1	50
Copper, total	mg/kg	10	0.5	0	12.2	6.06	4.59	14.8	18.9	16
Iron, total	mg/kg	10	50	0	21915	10300	9006	26300	34790	20000
Lead, total	mg/kg	10	0.5	0	12.2	5.12	5.51	13.6	18.1	31
Lithium, total	mg/kg	10	2	0	5.54	1.60	3.13	6.30	7.19	-
Magnesium, total	mg/kg	10	20	0	1249	461	645	1500	1696	-
Manganese, total	mg/kg	10	1	0	401	185	220	341	723	460
Mercury	mg/kg	10	0.005	0	0.059	0.031	0.021	0.073	0.091	-
Molybdenum, total	mg/kg	10	0.1	0	1.11	0.506	0.502	1.22	1.84	8.3
Nickel, total	mg/kg	10	0.5	0	10.2	4.29	4.60	12.4	14.4	16
Phosphorus, total	mg/kg	10	50	0	800	321	396	966	1136	-
Potassium, total	mg/kg	10	100	0	515	187	254	610	703	-
Rhodium, total	mg/kg	10	0.1	10	<0.1	-	<0.1	0.1	<0.1	600
Ruthenium, total	mg/kg	10	0.1	10	<0.1	-	<0.1	0.1	<0.1	390
Samarium, total	mg/kg	10	0.1	0	3.79	1.88	1.48	4.69	5.62	2500
Selenium, total	mg/kg	10	0.2	0	0.755	0.391	0.263	0.965	1.16	0.9
Silver, total	mg/kg	10	0.1	10	<0.1	-	<0.1	0.1	<0.1	0.5
Sodium, total	mg/kg	10	50	0	119	29.2	80.7	135	149	-

APPENDIX B, TABLE 24

Summary of Year 2 sediment chemistry results from Revell Lake, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Sediment Quality Guideline ¹
Metals										
Strontium, total	mg/kg	10	0.5	0	9.86	3.46	5.40	11.6	13.4	-
Sulfur, total	mg/kg	10	1000	5	1150	246	1000	1050	1610	-
Thallium, total	mg/kg	10	0.05	0	0.135	0.046	0.073	0.135	0.204	-
Tin, total	mg/kg	10	2	10	<2	-	<2	2.0	<2	-
Titanium, total	mg/kg	10	1	0	254	44.6	206	246	314	-
Tungsten, total	mg/kg	10	0.5	10	<0.5	-	<0.5	0.5	<0.5	960
Uranium, total	mg/kg	10	0.05	0	2.29	1.01	1.04	2.63	3.56	32
Vanadium, total	mg/kg	10	0.2	0	24.1	10.1	11.4	29.0	35.3	27
Zinc, total	mg/kg	10	2	0	66.1	29.7	28.1	80.8	95.5	120
Zirconium, total	mg/kg	10	1	10	<1	-	<1	1.0	<1	-
Radiological Parameters										
Carbon-14	Bq/kg	10	740	10	<740	-	<740	740	<740	-
Cesium-137	Bq/kg	10	18.5	0	53.3	22.0	23.3	63.2	77.5	100000
Cobalt-60	Bq/kg	10	18.5	10	<18.5	-	<18.5	18.5	<18.5	40000
Gross alpha	Bq/kg	10	111	0	583	308	204	638	979	-
Gross beta	Bq/kg	10	148	0	953	127	814	932	1122	-
Iodine-129	Bq/kg	10	370	10	<370	-	<370	370	<370	1000000
Potassium-40	Bq/kg	10	75	0	517	116	395	464	664	-
Radium-226	Bq/kg	10	37	0	39.4	6.2	37.0	37.0	49.7	600
Ruthenium-106	Bq/kg	10	90	10	<90	-	<90	90.0	<90	-
Strontium-90	Bq/kg	10	18.5	10	<18.5	-	<18.5	18.5	<18.5	20000
Thorium-228	Bq/kg	10	3.7	0	43.8	16.6	17.3	51.0	58.7	-
Thorium-230	Bq/kg	10	3.7	0	50.9	19.3	26.2	50.7	78.5	-
Thorium-232	Bq/kg	10	3.7	0	41.5	15.0	18.4	44.8	56.6	40000
Tritium	Bq/kg	10	37	10	<37	-	<37	37	<37	10000000
Uranium-234	Bq/kg	10	3.7	0	34.9	14.3	16.0	38.5	52.7	20000
Uranium-235	Bq/kg	10	3.7	0	3.96	0.56	3.70	3.70	5.03	10000
Uranium-238	Bq/kg	10	3.7	0	35.1	12.7	17.9	38.2	50.0	70000
Speciated Metals										
Chromium, hexavalent [Cr VI], total	mg/kg	10	0.2 - 1	9	0.505	0.265	0.318	0.400	1.000	-

Gray cells indicate guideline exceedance; n = sample size; RDL = Reportable Detection Limit; SD = Standard Deviation.

¹See Appendix B, Table 21 for detailed sediment quality guidelines.

APPENDIX B, TABLE 25

Summary of Year 2 sediment chemistry results from Revell River, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Sediment Quality Guideline ¹
General Chemistry										
% Moisture	%	5	0.25	0	21.6	1.28	20.1	21.4	22.9	-
Inorganic Carbon	%	5	0.05	5	<0.05	-	<0.05	0.05	<0.05	-
Inorganic Carbon (as CaCO3 Equiv.)	%	5	0.4	5	<0.4	-	<0.4	0.4	<0.4	-
Nitrate+Nitrite-N	mg/kg	5	2	5	<2	-	<2	2.0	<2	-
Nitrate-N	mg/kg	5	2	5	<2	-	<2	2.0	<2	-
Nitrite-N	mg/kg	5	1	5	<1	-	<1	1.0	<1	-
Total Carbon by Combustion	%	5	0.05	0	0.152	0.065	0.082	0.130	0.230	-
Total Kjeldahl Nitrogen	%	5	0.02	4	0.020	0.0004	0.020	0.020	0.021	0.055
Total Nitrogen by LECO	%	5	0.02	5	<0.02	-	<0.02	0.02	<0.02	-
Total Organic Carbon	%	5	0.075	1	0.154	0.064	0.086	0.132	0.233	1
Metals										
Aluminum, total	mg/kg	5	50	0	2406	594	1830	2290	3178	-
Antimony, total	mg/kg	5	0.1	5	<0.1	-	<0.1	0.1	<0.1	3
Arsenic, total	mg/kg	5	0.1	0	0.288	0.090	0.210	0.250	0.388	5.9
Barium, total	mg/kg	5	0.5	0	8.31	2.71	6.16	7.17	11.9	-
Beryllium, total	mg/kg	5	0.1	5	<0.1	-	<0.1	0.1	<0.1	-
Bismuth, total	mg/kg	5	0.2	5	<0.2	-	<0.2	0.2	<0.2	65000
Boron, total	mg/kg	5	5	5	<5	-	<5	5.0	<5	-
Cadmium, total	mg/kg	5	0.02	5	<0.02	-	<0.02	0.02	<0.02	0.6
Calcium, total	mg/kg	5	50	0	908	215	752	862	1198	-
Cesium, total	mg/kg	5	0.1	0	0.3	0.0	0.2	0.3	0.3	-
Chromium, total	mg/kg	5	0.5	0	4.37	2.29	3.05	3.43	7.49	26
Cobalt, total	mg/kg	5	0.1	0	1.26	0.388	0.974	1.08	1.79	50
Copper, total	mg/kg	5	0.5	0	2.01	1.15	1.30	1.54	3.59	16
Iron, total	mg/kg	5	50	0	3600	955	2736	3270	4830	20000
Lead, total	mg/kg	5	0.5	0	1.29	0.283	1.02	1.22	1.63	31
Lithium, total	mg/kg	5	2	0	4.68	0.589	4.12	4.50	5.36	-
Magnesium, total	mg/kg	5	20	0	984	343	719	877	1452	-
Manganese, total	mg/kg	5	1	0	47.2	13.5	36.9	43.1	65.7	460
Mercury	mg/kg	5	0.005	5	<0.005	-	<0.005	0.005	<0.005	-
Molybdenum, total	mg/kg	5	0.1	4	0.102	0.004	0.100	0.100	0.108	8.3
Nickel, total	mg/kg	5	0.5	0	3.03	1.11	2.27	2.57	4.56	16
Phosphorus, total	mg/kg	5	50	0	105	30.6	80.4	97.0	146	-
Potassium, total	mg/kg	5	100	0	196	94.5	132	160	326	-
Rhodium, total	mg/kg	5	0.1	5	<0.1	-	<0.1	0.1	<0.1	600
Ruthenium, total	mg/kg	5	0.1	5	<0.1	-	<0.1	0.1	<0.1	390
Samarium, total	mg/kg	5	0.1	0	0.456	0.145	0.334	0.410	0.652	2500
Selenium, total	mg/kg	5	0.2	5	<0.2	-	<0.2	0.2	<0.2	0.9
Silver, total	mg/kg	5	0.1	5	<0.1	-	<0.1	0.1	<0.1	0.5
Sodium, total	mg/kg	5	50	0	85.6	28.0	62.4	77.0	123	-

APPENDIX B, TABLE 25

Summary of Year 2 sediment chemistry results from Revell River, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Sediment Quality Guideline ¹
Metals										
Strontium, total	mg/kg	5	0.5	0	4.50	0.886	3.88	4.06	5.71	-
Sulfur, total	mg/kg	5	1000	5	<1000	-	<1000	1000	<1000	-
Thallium, total	mg/kg	5	0.05	5	<0.05	-	<0.05	0.05	<0.05	-
Tin, total	mg/kg	5	2	5	<2	-	<2	2.0	<2	-
Titanium, total	mg/kg	5	1	0	219	47.4	173	204	281	-
Tungsten, total	mg/kg	5	0.5	5	<0.5	-	<0.5	0.5	<0.5	960
Uranium, total	mg/kg	5	0.05	0	0.299	0.106	0.227	0.259	0.445	32
Vanadium, total	mg/kg	5	0.2	0	6.06	1.94	4.48	5.24	8.69	27
Zinc, total	mg/kg	5	2	0	8.60	2.32	6.52	7.40	11.3	120
Zirconium, total	mg/kg	5	1	0	2.04	0.650	1.42	2.00	2.86	-
Radiological Parameters										
Carbon-14	Bq/kg	5	740	5	<740	-	<740	740	<740	-
Cesium-137	Bq/kg	5	18.5	5	<18.5	0.00	<18.5	18.50	<18.5	100000
Chlorine-36	Bq/kg	5	370	5	<370	-	<370	370	<370	-
Cobalt-60	Bq/kg	5	18.5	5	<18.5	-	<18.5	18.5	<18.5	40000
Gross alpha	Bq/kg	5	111	2	133	22.9	111	134	160	-
Gross beta	Bq/kg	5	148	0	555	151	363	604	709	-
Iodine-129	Bq/kg	5	370	5	<370	-	<370	370	<370	1000000
Neptunium-237	Bq/kg	5	3.7	5	<3.7	-	<3.7	3.7	<3.7	-
Plutonium-238	Bq/kg	5	1.85	5	<1.85	-	<1.85	1.85	<1.85	-
Plutonium-239	Bq/kg	5	1.85	5	<1.85	-	<1.85	1.85	<1.85	200000
Potassium-40	Bq/kg	5	75	0	576	43.5	523	574	622	-
Radium-226	Bq/kg	5	37	4	49.1	27.1	37.0	37.0	85.5	600
Ruthenium-106	Bq/kg	5	90	5	<90	-	<90	90.0	<90	-
Selenium-79	Bq/kg	5	370	5	<370	-	<370	370	<370	-
Strontium-90	Bq/kg	5	18.5	5	<18.5	-	<18.5	18.5	<18.5	20000
Thorium-228	Bq/kg	5	3.7	0	15.9	13.0	8.57	10.8	33.5	-
Thorium-230	Bq/kg	5	3.7	0	14.6	3.26	10.3	16.7	17.0	-
Thorium-232	Bq/kg	5	3.7	0	16.4	16.1	7.94	9.54	38.4	40000
Tritium	Bq/kg	5	37	5	<37	-	<37	37	<37	10000000
Uranium-234	Bq/kg	5	3.7	0	7.96	2.75	5.41	7.13	11.6	20000
Uranium-235	Bq/kg	5	3.7	5	<3.7	-	<3.7	3.7	<3.7	10000
Uranium-238	Bq/kg	5	3.7	0	8.17	2.49	6.05	7.56	11.50	70000
Speciated Metals										
Chromium, hexavalent [Cr VI], total	mg/kg	5	0.2	5	<0.2	-	<0.2	0.2	<0.2	-

Gray cells indicate guideline exceedance; n = sample size; RDL = Reportable Detection Limit; SD = Standard Deviation.

¹See Appendix B, Table 21 for detailed sediment quality guidelines.

APPENDIX B, TABLE 26

Summary of Year 2 sediment chemistry results from the AOI ponds, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Sediment Quality Guideline ¹
General Chemistry										
% Moisture	%	21	0.25	0	79.0	5.12	71.3	79.0	86.0	-
Inorganic Carbon	%	21	0.05	0	0.121	0.023	0.081	0.124	0.155	-
Inorganic Carbon (as CaCO3 Equivalent)	%	21	0.4	0	1.010	0.189	0.670	1.030	1.29	-
Nitrate+Nitrite-N	mg/kg	21	2 - 4	20	2.14	0.478	2.00	2.00	3.00	-
Nitrate-N	mg/kg	21	2 - 4	20	2.14	0.478	2.00	2.00	3.00	-
Nitrite-N	mg/kg	21	1 - 2	21	1.05	0.218	1.00	1.00	1.00	-
Total Carbon by Combustion	%	21	0.05	0	8.71	1.40	5.97	9.04	10.1	-
Total Kjeldahl Nitrogen	%	21	0.06 - 0.1	0	0.526	0.107	0.304	0.550	0.660	0.055
Total Nitrogen by LECO	%	21	0.02	0	0.652	0.119	0.403	0.644	0.842	-
Total Organic Carbon	%	21	0.05	0	8.59	1.38	5.89	8.93	10.0	1
Metals										
Aluminum, total	mg/kg	21	50	0	20712	6206	6540	23000	26100	-
Antimony, total	mg/kg	21	0.1	1	0.180	0.100	0.100	0.160	0.370	3
Arsenic, total	mg/kg	21	0.1	0	3.39	3.34	1.80	2.86	4.00	5.9
Barium, total	mg/kg	21	0.5	0	100	21.3	51.3	106	126	-
Beryllium, total	mg/kg	21	0.1	0	0.448	0.113	0.250	0.460	0.570	-
Bismuth, total	mg/kg	21	0.2	19	0.202	0.007	0.200	0.200	0.210	65000
Boron, total	mg/kg	21	5	21	<5	0	<5	5.0	<5	-
Cadmium, total	mg/kg	21	0.02	0	0.467	0.147	0.304	0.439	0.725	0.6
Calcium, total	mg/kg	21	50	0	4681	2029	2210	4750	8140	-
Cesium, total	mg/kg	21	0.1	0	1.8	0.6	0.5	1.9	2.5	-
Chromium, total	mg/kg	21	0.5	0	32.5	10.9	9.43	37.3	42.8	26
Cobalt, total	mg/kg	21	0.1	0	10.1	3.49	3.59	11.0	14.5	50
Copper, total	mg/kg	21	0.5	0	16.5	4.48	7.47	17.9	21.0	16
Iron, total	mg/kg	21	50	0	21482	10580	7440	21400	31000	20000
Lead, total	mg/kg	21	0.5	0	13.7	4.53	7.88	13.4	20.5	31
Lithium, total	mg/kg	21	2	0	20.2	6.43	8.20	22.6	27.2	-
Magnesium, total	mg/kg	21	20	0	5500	2228	1310	6350	7630	-
Manganese, total	mg/kg	21	1	0	342	635	109	226	343	460
Mercury	mg/kg	21	0.005	0	0.106	0.032	0.049	0.104	0.150	-
Molybdenum, total	mg/kg	21	0.1	0	0.451	0.162	0.260	0.450	0.590	8.3
Nickel, total	mg/kg	21	0.5	0	23.7	7.88	6.74	27.2	31.5	16
Phosphorus, total	mg/kg	21	50	0	828	241	329	895	1040	-
Potassium, total	mg/kg	21	100	0	1581	678	350	1820	2300	-
Rhodium, total	mg/kg	21	0.1	21	<0.1	0	<0.1	0.1	<0.1	600
Ruthenium, total	mg/kg	21	0.1	21	<0.1	0	<0.1	0.1	<0.1	390
Samarium, total	mg/kg	21	0.1	0	3.25	0.918	1.78	3.62	4.38	2500
Selenium, total	mg/kg	21	0.2	0	0.656	0.173	0.460	0.650	0.91	0.9
Silver, total	mg/kg	21	0.1	14	0.101	0.003	0.100	0.100	0.110	0.5
Sodium, total	mg/kg	21	50	0	270	112	76.0	313	407	-

APPENDIX B, TABLE 26

Summary of Year 2 sediment chemistry results from the AOI ponds, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Sediment Quality Guideline ¹
Metals										
Strontium, total	mg/kg	21	0.5	0	25.1	6.61	13.4	26.5	32.7	-
Sulfur, total	mg/kg	21	1000	10	1095	128	1000	1000	1300	-
Thallium, total	mg/kg	21	0.05	1	0.168	0.050	0.081	0.177	0.241	-
Tin, total	mg/kg	21	2	21	<2	0	<2	2.0	<2	-
Titanium, total	mg/kg	21	1	0	596	223	208	682	866	-
Tungsten, total	mg/kg	21	0.5	21	<0.5	0	<0.5	0.5	<0.5	960
Uranium, total	mg/kg	21	0.05	0	1.49	0.365	0.97	1.44	2.05	32
Vanadium, total	mg/kg	21	0.2	0	35.6	10.9	14.2	38.6	49.0	27
Zinc, total	mg/kg	21	2	0	83.6	27.1	34.5	91.4	116	120
Zirconium, total	mg/kg	21	1	4	2.49	1.17	1.00	2.40	4.80	-
PAH										
1+2-Methylnaphthalenes	mg/kg	21	0.127 - 0.318	21	0.176	0.064	0.127	0.127	0.318	-
1-Methylnaphthalene	mg/kg	21	0.09 - 0.225	21	0.124	0.046	0.090	0.090	0.225 ²	0.201
2-Methylnaphthalene	mg/kg	21	0.09 - 0.225	21	0.124 ²	0.046	0.09 ²	0.09 ²	0.225 ²	0.0202
Acenaphthene	mg/kg	21	0.15 - 0.375	21	0.207 ²	0.076	0.150 ²	0.150 ²	0.375 ²	0.00671
Acenaphthylene	mg/kg	21	0.15 - 0.375	21	0.207 ²	0.076	0.150 ²	0.150 ²	0.375 ²	0.00587
Anthracene	mg/kg	21	0.15 - 0.375	21	0.207 ²	0.076	0.150 ²	0.150 ²	0.375 ²	0.0469
Benzo(a)anthracene	mg/kg	21	0.15 - 0.375	21	0.207 ²	0.076	0.150 ²	0.150 ²	0.375 ²	0.0317
Benzo(a)pyrene	mg/kg	21	0.15 - 0.375	21	0.207 ²	0.076	0.150 ²	0.150 ²	0.375 ²	0.0319
Benzo(b)fluoranthene	mg/kg	21	0.15 - 0.375	21	0.207	0.076	0.150	0.150	0.375 ²	-
Benzo(ghi)perylene	mg/kg	21	0.15 - 0.375	21	0.207 ²	0.076	0.150	0.150	0.375 ²	0.17
Benzo(k)fluoranthene	mg/kg	21	0.15 - 0.375	21	0.207	0.076	0.150	0.150	0.375 ²	0.24
Chrysene	mg/kg	21	0.15 - 0.375	21	0.207 ²	0.076	0.150 ²	0.150 ²	0.375 ²	0.0571
Dibenzo(a,h)anthracene	mg/kg	21	0.15 - 0.375	21	0.207 ²	0.076	0.150 ²	0.150 ²	0.375 ²	0.00622
Fluoranthene	mg/kg	21	0.15 - 0.375	21	0.207 ²	0.076	0.150 ²	0.150 ²	0.375 ²	0.111
Fluorene	mg/kg	21	0.15 - 0.375	21	0.207 ²	0.076	0.150 ²	0.150 ²	0.375 ²	0.0212
Indeno(1,2,3-cd)pyrene	mg/kg	21	0.15 - 0.375	21	0.207	0.076	0.150	0.150	0.375 ²	0.2
Naphthalene	mg/kg	21	0.15 - 0.375	21	0.207 ²	0.076	0.150 ²	0.150 ²	0.375 ²	0.0346
Phenanthrene	mg/kg	21	0.15 - 0.375	21	0.207 ²	0.076	0.150 ²	0.150 ²	0.375 ²	0.0419
Pyrene	mg/kg	21	0.15 - 0.375	21	0.207 ²	0.076	0.150 ²	0.150 ²	0.375 ²	0.053
Radiological Parameters										
Carbon-14	Bq/kg	21	740	21	<740	0	<740	740	<740	-
Cesium-137	Bq/kg	21	18.5	1	53.5	27.5	21.3	41.4	89.5	100000
Chlorine-36	Bq/kg	3	370	3	<370	0	<370	370	<370	-
Cobalt-60	Bq/kg	21	18.5	21	<18.5	0	<18.5	18.5	<18.5	40000
Gross alpha	Bq/kg	21	111	0	491	139	250	497	681	-
Gross beta	Bq/kg	21	148	0	687	145	488	678	948	-
Iodine-129	Bq/kg	21	370	21	<370	0	<370	370	<370	1000000
Neptunium-237	Bq/kg	3	3.7	3	<3.7	0	<3.7	3.7	<3.7	-
Plutonium-238	Bq/kg	3	1.85	3	<1.85	0	<1.85	1.85	<1.85	-
Plutonium-239	Bq/kg	3	1.85	1	2.41	0.85	1.86	1.99	3.25	200000

APPENDIX B, TABLE 26

Summary of Year 2 sediment chemistry results from the AOI ponds, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Sediment Quality Guideline ¹
Radiological Parameters										
Potassium-40	Bq/kg	21	75	0	433	85.9	280	449	541	-
Radium-226	Bq/kg	21	37	10	40.7	4.87	37.0	37.9	51.3	600
Ruthenium-106	Bq/kg	21	90	21	<90	0	<90	90	<90	-
Selenium-79	Bq/kg	3	370	3	<370	0	<370	370	<370	-
Strontium-90	Bq/kg	21	18.5	21	<18.5	0.00	<18.5	18.5	<18.5	20000
Thorium-228	Bq/kg	21	3.7	0	36.3	12.5	17.4	37.9	50.2	-
Thorium-230	Bq/kg	21	3.7	0	32.3	7.91	22.4	30.6	43.8	-
Thorium-232	Bq/kg	21	3.7	0	29.9	9.05	18.0	27.9	43.0	40000
Tritium	Bq/kg	21	37	20	37.6	2.84	37.0	37.0	37.0	10000000
Uranium-234	Bq/kg	21	3.7	0	27.7	7.14	21.2	25.3	35.0	20000
Uranium-235	Bq/kg	21	3.7	20	3.71	0.044	3.70	3.70	3.70	10000
Uranium-238	Bq/kg	21	3.7	0	25.9	5.20	19.3	25.4	30.9	70000
Speciated Metals										
Chromium, hexavalent [Cr VI], total	mg/kg	21	0.4 - 1	21	0.686	0.307	0.400	0.400	1.00	-
SVOC										
1,2,4-Trichlorobenzene	mg/kg	21	0.15 - 0.25	21	0.207	0.076	0.150	0.150	0.375	2.1
2,4,5-Trichlorophenol	mg/kg	21	0.3 - 0.5	21	0.414	0.152	0.300	0.300	0.750	-
2,4,6-Tribromophenol	%	21	1 - 5	0	76.1	9.52	61.1	75.1	93.8	-
2,4,6-Trichlorophenol	mg/kg	21	0.3 - 0.5	21	0.414 ²	0.152	0.300 ²	0.300 ²	0.750 ²	0.213
2,4+2,6-Dinitrotoluene	mg/kg	21	0.424 - 0.707	21	0.586	0.215	0.424	0.424	1.060	-
2,4-Dichlorophenol	mg/kg	21	0.3 - 0.5	21	0.414 ²	0.152	0.300 ²	0.300 ²	0.750 ²	0.117
2,4-Dimethylphenol	mg/kg	21	0.3 - 0.5	21	0.414 ²	0.152	0.300 ²	0.300 ²	0.750 ²	0.029
2,4-Dinitrophenol	mg/kg	21	3 - 5	21	4.14	1.52	3.00	3.00	7.50	-
2,4-Dinitrotoluene	mg/kg	21	0.3 - 0.5	21	0.414 ²	0.152	0.300 ²	0.300 ²	0.750 ²	0.0416
2,6-Dinitrotoluene	mg/kg	21	0.3 - 0.5	21	0.414	0.152	0.300	0.300	0.750	-
2-Chlorophenol	mg/kg	21	0.3 - 0.5	21	0.414 ²	0.152	0.300 ²	0.300 ²	0.750 ²	0.0312
3,3-Dichlorobenzidine	mg/kg	21	0.3 - 0.5	21	0.414 ²	0.152	0.300 ²	0.300 ²	0.750 ²	0.127
4-Chloroaniline	mg/kg	21	0.3 - 0.5	21	0.414	0.152	0.300	0.300	0.750	-
Biphenyl	mg/kg	21	0.15 - 0.25	21	0.207	0.076	0.150	0.150	0.375	1.22
Bis(2-chloroethyl)ether	mg/kg	21	0.3 - 0.5	21	0.414	0.152	0.300	0.300	0.750	-
Bis(2-chloroisopropyl)ether	mg/kg	21	0.3 - 0.5	21	0.414	0.152	0.300	0.300	0.750	-
Bis(2-ethylhexyl)phthalate	mg/kg	21	0.3 - 0.5	21	0.414 ²	0.152	0.300 ²	0.300 ²	0.750 ²	0.18
Diethylphthalate	mg/kg	21	0.3 - 0.5	21	0.414	0.152	0.300	0.300	0.750	0.603
Dimethylphthalate	mg/kg	21	0.3 - 0.5	21	0.414	0.152	0.300	0.300	0.750	1.49
Pentachlorophenol	mg/kg	21	0.3 - 0.5	20	0.424 ²	0.151	0.300	0.500	0.750 ²	0.4
Phenol	mg/kg	21	0.3 - 0.5	21	0.414	0.152	0.300	0.300 ²	0.750 ²	0.42

Gray cells indicate guideline exceedance; n = sample size; RDL = Reportable Detection Limit; SD = Standard Deviation.

¹See Appendix B, Table 21 for detailed sediment qualtiy guidelines.

²Due to detection limits, guideline exceedance cannot be confirmed.

APPENDIX B, TABLE 27

Summary of Year 2 sediment chemistry results from the Reference ponds, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Sediment Quality Guideline ¹
General Chemistry										
% Moisture	%	9	0.25	0	85.7	4.90	79.8	84.1	92.1	-
Inorganic Carbon	%	9	0.05	0	0.208	0.079	0.108	0.225	0.303	-
Inorganic Carbon (as CaCO3 Equiv.)	%	9	0.4	0	1.74	0.655	0.904	1.87	2.52	-
Nitrate+Nitrite-N	mg/kg	9	2 - 4	9	2.22	0.667	2.00	2.00	3.20	-
Nitrate-N	mg/kg	9	2 - 4	9	2.22	0.667	2.00	2.00	3.20	-
Nitrite-N	mg/kg	9	1 - 2	9	1.11	0.333	1.00	1.00	1.60	-
Total Carbon by Combustion	%	9	0.05	0	18.0	3.07	14.2	18.6	22.1	-
Total Kjeldahl Nitrogen	%	9	0.1 - 0.4	0	1.11	0.406	0.590	1.28	1.61	0.055
Total Nitrogen by LECO	%	9	0.02	0	1.36	0.283	0.981	1.44	1.72	-
Total Organic Carbon	%	9	0.05	0	17.8	3.00	14.1	18.3	21.9	1
Metals										
Aluminum, total	mg/kg	9	50	0	14641	4168	9734	14900	19600	-
Antimony, total	mg/kg	9	0.1	2	0.164	0.084	0.100	0.110	0.290	3
Arsenic, total	mg/kg	9	0.1	0	2.68	1.21	1.50	2.00	4.30	5.9
Barium, total	mg/kg	9	0.5	0	97.9	19.7	74.6	94.6	121	-
Beryllium, total	mg/kg	9	0.1	0	0.343	0.121	0.190	0.360	0.466	-
Bismuth, total	mg/kg	9	0.2	6	0.446	0.369	0.200	0.200	0.960	65000
Boron, total	mg/kg	9	5	9	<5	-	<5	5.0	<5	-
Cadmium, total	mg/kg	9	0.02	0	0.557	0.175	0.311	0.658	0.703	0.6
Calcium, total	mg/kg	9	50	0	7312	3357	2824	9180	10324	-
Cesium, total	mg/kg	9	0.1	0	1.6	0.7	1.0	1.1	2.7	-
Chromium, total	mg/kg	9	0.5	0	23.1	9.22	11.5	25.1	33.8	26
Cobalt, total	mg/kg	9	0.1	0	8.64	4.51	3.27	8.12	13.5	50
Copper, total	mg/kg	9	0.5	0	31.5	20.3	9.64	29.1	58.6	16
Iron, total	mg/kg	9	50	0	13434	6383	5414	14600	20460	20000
Lead, total	mg/kg	9	0.5	0	12.6	6.89	6.32	9.17	23.6	31
Lithium, total	mg/kg	9	2	0	11.6	4.23	6.74	12.3	17.3	-
Magnesium, total	mg/kg	9	20	0	3679	2095	1344	3980	6510	-
Manganese, total	mg/kg	9	1	0	223	120	69.2	284	347	460
Mercury	mg/kg	9	0.005	0	0.098	0.045	0.060	0.075	0.161	-
Molybdenum, total	mg/kg	9	0.1	0	7.43	9.93	0.27	1.64	22.5	8.3
Nickel, total	mg/kg	9	0.5	0	23.7	9.07	12.8	24.0	34.0	16
Phosphorus, total	mg/kg	9	50	0	662	263	432	509	1054	-
Potassium, total	mg/kg	9	100	0	1159	634	478	1280	2048	-
Rhodium, total	mg/kg	9	0.1	9	<0.1	-	<0.1	0.1	<0.1	600
Ruthenium, total	mg/kg	9	0.1	9	<0.1	-	<0.1	0.1	<0.1	390
Samarium, total	mg/kg	9	0.1	0	3.01	0.495	2.27	3.01	3.64	2500
Selenium, total	mg/kg	9	0.2	0	1.17	0.076	1.05	1.19	1.25	0.9
Silver, total	mg/kg	9	0.1	4	0.148	0.069	0.100	0.100	0.246	0.5
Sodium, total	mg/kg	9	50	0	200	79.7	131	195	324	-
Strontium, total	mg/kg	9	0.5	0	25.9	4.97	20.3	23.8	32.0	-
Sulfur, total	mg/kg	9	1000	0	3978	2584	1940	2700	7820	-
Thallium, total	mg/kg	9	0.05	0	0.171	0.097	0.067	0.137	0.297	-
Tin, total	mg/kg	9	2	9	<2	-	<2	2.00	<2	-

APPENDIX B, TABLE 27

Summary of Year 2 sediment chemistry results from the Reference ponds, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Sediment Quality Guideline ¹
Metals										
Titanium, total	mg/kg	9	1	0	368	172	187	398	616	-
Tungsten, total	mg/kg	9	0.5	9	<0.5	-	<0.5	0.5	<0.5	960
Uranium, total	mg/kg	9	0.05	0	1.53	0.473	1.06	1.38	2.19	32
Vanadium, total	mg/kg	9	0.2	0	26.1	12.5	10.3	29.6	38.5	27
Zinc, total	mg/kg	9	2	0	70.4	19.0	48.6	66.2	94.1	120
Zirconium, total	mg/kg	9	1	3	4.48	4.34	1.00	3.20	11.6	-
PAH										
1+2-Methylnaphthalenes	mg/kg	9	0.127 - 0.424	9	0.273	0.104	0.161	0.212	0.424	-
1-Methylnaphthalene	mg/kg	9	0.09 - 0.3	9	0.193	0.073	0.114	0.150	0.300 ²	0.201
2-Methylnaphthalene	mg/kg	9	0.09 - 0.3	9	0.193 ²	0.073	0.114 ²	0.150 ²	0.300 ²	0.0202
Acenaphthene	mg/kg	9	0.15 - 0.5	9	0.322 ²	0.122	0.190 ²	0.250 ²	0.500 ²	0.00671
Acenaphthylene	mg/kg	9	0.15 - 0.5	9	0.322 ²	0.122	0.190 ²	0.250 ²	0.500 ²	0.00587
Anthracene	mg/kg	9	0.15 - 0.5	9	0.322 ²	0.122	0.190 ²	0.250 ²	0.500 ²	0.0469
Benzo(a)anthracene	mg/kg	9	0.15 - 0.5	9	0.322 ²	0.122	0.190 ²	0.250 ²	0.500 ²	0.0317
Benzo(a)pyrene	mg/kg	9	0.15 - 0.5	9	0.322 ²	0.122	0.190 ²	0.250 ²	0.500 ²	0.0319
Benzo(b)fluoranthene	mg/kg	9	0.15 - 0.5	9	0.322	0.122	0.190	0.250	0.500	-
Benzo(ghi)perylene	mg/kg	9	0.15 - 0.5	9	0.322 ²	0.122	0.190 ²	0.250 ²	0.500 ²	0.17
Benzo(k)fluoranthene	mg/kg	9	0.15 - 0.5	9	0.322 ²	0.122	0.190	0.250 ²	0.500 ²	0.24
Chrysene	mg/kg	9	0.15 - 0.5	9	0.322 ²	0.122	0.190 ²	0.250 ²	0.500 ²	0.0571
Dibenzo(a,h)anthracene	mg/kg	9	0.15 - 0.5	9	0.322 ²	0.122	0.190 ²	0.250 ²	0.500 ²	0.00622
Fluoranthene	mg/kg	9	0.15 - 0.5	9	0.322 ²	0.122	0.190 ²	0.250 ²	0.500 ²	0.111
Fluorene	mg/kg	9	0.15 - 0.5	9	0.322 ²	0.122	0.190 ²	0.250 ²	0.500 ²	0.0212
Indeno(1,2,3-cd)pyrene	mg/kg	9	0.15 - 0.5	9	0.322 ²	0.122	0.190	0.250 ²	0.500 ²	0.2
Naphthalene	mg/kg	9	0.15 - 0.5	9	0.322 ²	0.122	0.190 ²	0.250 ²	0.500 ²	0.0346
Phenanthrene	mg/kg	9	0.15 - 0.5	9	0.322 ²	0.122	0.190 ²	0.250 ²	0.500 ²	0.0419
Pyrene	mg/kg	9	0.15 - 0.5	9	0.322 ²	0.122	0.190 ²	0.250 ²	0.500 ²	0.053
Radiological Parameters										
Carbon-14	Bq/kg	9	740	9	<740	-	<740	740	<740	-
Cesium-137	Bq/kg	9	18.5	3	45.2	20.9	18.5	54.3	68.2	100000
Cobalt-60	Bq/kg	9	18.5	9	<18.5	-	<18.5	18.5	<18.5	40000
Gross alpha	Bq/kg	9	111	0	339	60.6	244	345	416	-
Gross beta	Bq/kg	9	148	0	486	82.8	370	494	594	-
Iodine-129	Bq/kg	9	370	9	<370	-	<370	370	<370	1000000
Potassium-40	Bq/kg	9	75	0	318	95.8	215	317	470	-
Radium-226	Bq/kg	9	37	6	39.4	4.7	37.0	37.0	47.9	600
Ruthenium-106	Bq/kg	9	90	9	<90	-	<90	90.0	<90	-
Strontium-90	Bq/kg	9	18.5	9	<18.5	-	<18.5	18.5	<18.5	20000
Thorium-228	Bq/kg	9	3.7	0	33.5	6.42	26.2	32.1	42.8	-
Thorium-230	Bq/kg	9	3.7	0	46.1	52.7	22.6	30.1	127	-
Thorium-232	Bq/kg	9	3.7	0	29.7	4.52	25.4	28.5	37.1	40000
Tritium	Bq/kg	9	37	8	39.1	6.23	37.0	37.0	48.2	10000000

APPENDIX B, TABLE 27

Summary of Year 2 sediment chemistry results from the Reference ponds, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Sediment Quality Guideline ¹
Radiological Parameters										
Uranium-234	Bq/kg	9	3.7	0	27.6	8.90	17.6	26.3	40.2	20000
Uranium-235	Bq/kg	9	3.7	8	3.75	0.150	3.70	3.70	3.97	10000
Uranium-238	Bq/kg	9	3.7	0	27.7	9.28	17.4	24.4	42.5	70000
Speciated Metals										
Chromium, Hexavalent	mg/kg	9	0.4 - 2	9	1.16	0.517	0.640	1.00	2.00	-
SVOC										
1,2,4-Trichlorobenzene	mg/kg	9	0.15 - 0.5	9	0.322	0.122	0.190	0.250	0.500	2.1
2,4,5-Trichlorophenol	mg/kg	9	0.3 - 1	9	0.644	0.244	0.380	0.500	1.00	-
2,4,6-Tribromophenol	%	9	3 - 10	0	85.9	12.4	74.2	78.3	103	-
2,4,6-Trichlorophenol	mg/kg	9	0.3 - 1	9	0.644 ²	0.244	0.380 ²	0.500 ²	1.00 ²	0.213
2,4+2,6-Dinitrotoluene	mg/kg	9	0.424 - 1.41	9	0.910	0.344	0.537	0.707	1.41	-
2,4-Dichlorophenol	mg/kg	9	0.3 - 1	9	0.644 ²	0.244	0.380 ²	0.500 ²	1.00 ²	0.117
2,4-Dimethylphenol	mg/kg	9	0.3 - 1	9	0.644 ²	0.244	0.380 ²	0.500 ²	1.00 ²	0.029
2,4-Dinitrophenol	mg/kg	9	3 - 10	9	6.44	2.44	3.80	5.00	10.0	-
2,4-Dinitrotoluene	mg/kg	9	0.3 - 1	9	0.644 ²	0.244	0.380 ²	0.500 ²	1.00 ²	0.0416
2,6-Dinitrotoluene	mg/kg	9	0.3 - 1	9	0.644	0.244	0.380	0.500	1.00	-
2-Chlorophenol	mg/kg	9	0.3 - 1	9	0.644 ²	0.244	0.380 ²	0.500 ²	1.00 ²	0.0312
3,3-Dichlorobenzidine	mg/kg	9	0.3 - 1	9	0.644 ²	0.244	0.380 ²	0.500 ²	1.00 ²	0.127
4-Chloroaniline	mg/kg	9	0.3 - 1	9	0.644	0.244	0.380	0.500	1.00	-
Biphenyl	mg/kg	9	0.15 - 0.5	9	0.322	0.122	0.190	0.250	0.500	1.22
Bis(2-chloroethyl)ether	mg/kg	9	0.3 - 1	9	0.644	0.244	0.380	0.500	1.00	-
Bis(2-chloroisopropyl)ether	mg/kg	9	0.3 - 1	9	0.644	0.244	0.380	0.500	1.00	-
Bis(2-ethylhexyl)phthalate	mg/kg	9	0.3 - 1	9	0.644 ²	0.244	0.380 ²	0.500 ²	1.00 ²	0.18
Diethylphthalate	mg/kg	9	0.3 - 1	9	0.644 ²	0.244	0.380	0.500	1.00 ²	0.603
Dimethylphthalate	mg/kg	9	0.3 - 1	9	0.644	0.244	0.380	0.500	1.00	1.49
Pentachlorophenol	mg/kg	9	0.3 - 1	9	0.644 ²	0.244	0.380	0.500 ²	1.00 ²	0.4
Phenol	mg/kg	9	0.3 - 1	9	0.644 ²	0.244	0.380	0.500 ²	1.00 ²	0.42

Gray cells indicate guideline exceedance; n = sample size; RDL = Reportable Detection Limit; SD = Standard Deviation.

¹See Appendix B, Table 21 for detailed sediment quality guidelines.

²Due to detection limits, guideline exceedance cannot be confirmed.

APPENDIX B, TABLE 28

Summary of Year 2 sediment chemistry results from the Mennin Lake inflow (Unnamed Watercourse) in the LSA, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Sediment Quality Guideline ¹
General Chemistry										
% Moisture	%	5	0.25	0	37.5	6.45	32.9	34.0	46.2	-
Inorganic Carbon	%	5	0.05	5	<0.05	-	<0.05	0.05	<0.05	-
Inorganic Carbon (as CaCO3 Equiv.)	%	5	0.4	5	<0.4	-	<0.4	0.4	<0.4	-
Nitrate+Nitrite-N	mg/kg	5	2	5	<2	-	<2	2.0	<2	-
Nitrate-N	mg/kg	5	2	5	<2	-	<2	2.0	<2	-
Nitrite-N	mg/kg	5	1	5	<1	-	<1	1.0	<1	-
Total Carbon by Combustion	%	5	0.05	0	1.92	1.20	1.06	1.33	3.55	-
Total Kjeldahl Nitrogen	%	5	0.06 - 0.08	0	0.137	0.026	0.103	0.149	0.159	0.055
Total Nitrogen by LECO	%	5	0.02	0	0.128	0.065	0.083	0.094	0.216	-
Total Organic Carbon	%	5	0.075	0	1.92	1.20	1.06	1.33	3.55	1
Metals										
Aluminum, total	mg/kg	5	50	0	5604	1123	4640	5160	7096	-
Antimony, total	mg/kg	5	0.1	5	<0.1	-	<0.1	0.1	<0.1	3
Arsenic, total	mg/kg	5	0.1	0	0.528	0.134	0.412	0.490	0.702	5.9
Barium, total	mg/kg	5	0.5	0	23.2	5.23	18.2	22.3	30.0	-
Beryllium, total	mg/kg	5	0.1	3	0.110	0.017	0.100	0.100	0.134	-
Bismuth, total	mg/kg	5	0.2	5	<0.2	-	<0.2	0.2	<0.2	65000
Boron, total	mg/kg	5	5	5	<5	-	<5	5.0	<5	-
Cadmium, total	mg/kg	5	0.02	0	0.066	0.024	0.044	0.058	0.097	0.6
Calcium, total	mg/kg	5	50	0	1732	279	1478	1740	2090	-
Cesium, total	mg/kg	5	0.1	0	0.5	0.1	0.4	0.6	0.7	-
Chromium, total	mg/kg	5	0.5	0	9.55	1.89	7.85	9.00	12.0	26
Cobalt, total	mg/kg	5	0.1	0	3.56	0.785	2.76	3.43	4.55	50
Copper, total	mg/kg	5	0.5	0	4.12	1.18	3.07	3.82	5.69	16
Iron, total	mg/kg	5	50	0	6016	1107	4962	5890	7448	20000
Lead, total	mg/kg	5	0.5	0	3.53	0.826	2.79	3.18	4.62	31
Lithium, total	mg/kg	5	2	0	8.20	1.27	6.76	8.10	9.72	-
Magnesium, total	mg/kg	5	20	0	1752	288	1436	1760	2100	-
Manganese, total	mg/kg	5	1	0	95.8	19.4	76.9	94.9	121	460
Mercury	mg/kg	5	0.005	0	0.019	0.006	0.013	0.017	0.027	-
Molybdenum, total	mg/kg	5	0.1	1	0.142	0.054	0.102	0.110	0.216	8.3
Nickel, total	mg/kg	5	0.5	0	5.96	1.15	4.87	5.81	7.46	16
Phosphorus, total	mg/kg	5	50	0	190	34.1	154	190	230	-
Potassium, total	mg/kg	5	100	0	374	70.9	296	370	448	-
Rhodium, total	mg/kg	5	0.1	5	<0.1	-	<0.1	0.1	<0.1	600
Ruthenium, total	mg/kg	5	0.1	5	<0.1	-	<0.1	0.1	<0.1	390
Samarium, total	mg/kg	5	0.1	0	1.13	0.189	0.960	1.08	1.38	2500
Selenium, total	mg/kg	5	0.2	4	0.2	0	0.2	0.2	0.2	0.9
Silver, total	mg/kg	5	0.1	5	<0.1	-	<0.1	0.1	<0.1	0.5
Sodium, total	mg/kg	5	50	0	110	13.3	97.8	109	128	-
Strontium, total	mg/kg	5	0.5	0	9.05	1.43	7.66	9.07	10.9	-
Sulfur, total	mg/kg	5	1000	5	<1000	-	<1000	1000	<1000	-
Thallium, total	mg/kg	5	0.05	3	0.054	0.008	0.050	0.050	0.065	-
Tin, total	mg/kg	5	2	5	<2	-	<2	2.0	<2	-

APPENDIX B, TABLE 28

Summary of Year 2 sediment chemistry results from the Mennin Lake inflow (Unnamed Watercourse) in the LSA, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Sediment Quality Guideline ¹
Metals										
Titanium, total	mg/kg	5	1	0	369	39.0	339	362	422	-
Tungsten, total	mg/kg	5	0.5	5	<0.5	-	<0.5	0.5	<0.5	960
Uranium, total	mg/kg	5	0.05	0	0.740	0.226	0.555	0.686	1.04	32
Vanadium, total	mg/kg	5	0.2	0	11.0	2.38	8.94	10.5	14.2	27
Zinc, total	mg/kg	5	2	0	17.8	3.89	14.1	16.3	22.8	120
Zirconium, total	mg/kg	5	1	3	1.10	0.173	1.00	1.00	1.34	-
Radiological Parameters										
Carbon-14	Bq/kg	5	740	5	<740	-	<740	740	<740	-
Cesium-137	Bq/kg	5	18.5	4	18.5	0.09	18.5	18.5	18.7	100000
Cobalt-60	Bq/kg	5	18.5	5	<18.5	-	<18.5	18.5	<18.5	40000
Gross alpha	Bq/kg	5	111	0	207	52.1	150	203	270	-
Gross beta	Bq/kg	5	148	0	597	67.9	527	611	678	-
Iodine-129	Bq/kg	5	370	5	<370	-	<370	370	<370	1000000
Potassium-40	Bq/kg	5	75	0	515	16.7	494	522	532	-
Radium-226	Bq/kg	5	37	5	<37	-	<37	37	<37	600
Ruthenium-106	Bq/kg	5	90	5	<90	0	<90	90	<90	-
Strontium-90	Bq/kg	5	18.5	5	<18.5	-	<18.5	18.5	<18.5	20000
Thorium-228	Bq/kg	5	3.7	0	14.6	4.04	9.72	14.9	18.9	-
Thorium-230	Bq/kg	5	3.7	0	18.5	2.94	14.5	19.7	20.9	-
Thorium-232	Bq/kg	5	3.7	0	14.8	1.82	12.6	14.5	16.6	40000
Tritium	Bq/kg	5	37	5	<37	-	<37	37	<37	10000000
Uranium-234	Bq/kg	5	3.7	0	14.9	5.38	9.02	14.3	21.5	20000
Uranium-235	Bq/kg	5	3.7	5	<3.7	-	<3.7	3.7	<3.7	10000
Uranium-238	Bq/kg	5	3.7	0	13.8	3.61	10.5	12.5	17.8	70000
Speciated Metals										
Chromium, hexavalent [Cr VI], total	mg/kg	5	0.2	5	<0.2	0	<0.2	0.2	<0.2	-

Gray cells indicate guideline exceedance; n = sample size; RDL = Reportable Detection Limit; SD = Standard Deviation.

¹See Appendix B, Table 21 for detailed sediment quality guidelines.

APPENDIX B, TABLE 29

Summary of Year 2 sediment chemistry results from Wabigoon River, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Sediment Quality Guideline ¹
General Chemistry										
% Moisture	%	5	0.25	0	24.8	3.52	22.4	23.6	29.6	-
Inorganic Carbon	%	5	0.05	5	<0.05	-	<0.05	0.05	<0.05	-
Inorganic Carbon (as CaCO3 Equiv.)	%	5	0.4	5	<0.4	-	<0.4	0.4	<0.4	-
Nitrate+Nitrite-N	mg/kg	5	2	5	<2	-	<2	2.0	<2	-
Nitrate-N	mg/kg	5	2	5	<2	-	<2	2.0	<2	-
Nitrite-N	mg/kg	5	1	5	<1	-	<1	1.0	<1	-
Total Carbon by Combustion	%	5	0.05	0	0.480	0.422	0.200	0.340	1.058	-
Total Kjeldahl Nitrogen	%	5	0.02	2	0.033	0.014	0.020	0.029	0.048	0.055
Total Nitrogen by LECO	%	5	0.02	0	0.032	0.020	0.021	0.024	0.059	-
Total Organic Carbon	%	5	0.075	0	0.480	0.422	0.201	0.342	1.057	1
Metals										
Aluminum, total	mg/kg	5	50	0	3332	786	2690	3240	4380	-
Antimony, total	mg/kg	5	0.1	5	<0.1	-	<0.1	0.1	<0.1	3
Arsenic, total	mg/kg	5	0.1	0	0.444	0.172	0.290	0.360	0.658	5.9
Barium, total	mg/kg	5	0.5	0	14.6	5.37	10.1	12.8	21.7	-
Beryllium, total	mg/kg	5	0.1	5	<0.1	-	<0.1	0.1	<0.1	-
Bismuth, total	mg/kg	5	0.2	5	<0.2	-	<0.2	0.2	<0.2	65000
Boron, total	mg/kg	5	5	5	<5	-	<5	5.0	<5	-
Cadmium, total	mg/kg	5	0.02	2	0.033	0.019	0.020	0.022	0.059	0.6
Calcium, total	mg/kg	5	50	0	1442	441	1132	1190	2040	-
Cseium, total	mg/kg	5	0.1	0	0.4	0.1	0.3	0.4	0.6	-
Chromium, total	mg/kg	5	0.5	0	5.64	1.58	4.43	5.25	7.78	26
Cobalt, total	mg/kg	5	0.1	0	1.82	0.525	1.29	1.67	2.47	50
Copper, total	mg/kg	5	0.5	0	2.96	1.31	2.03	2.46	4.76	16
Iron, total	mg/kg	5	50	0	4668	1127	3478	4540	6036	20000
Lead, total	mg/kg	5	0.5	0	1.86	0.568	1.34	1.63	2.61	31
Lithium, total	mg/kg	5	2	0	6.64	1.53	4.96	7.00	8.44	-
Magnesium, total	mg/kg	5	20	0	1246	309	966	1200	1650	-
Manganese, total	mg/kg	5	1	0	84.6	45.8	45.9	58.1	135	460
Mercury	mg/kg	5	0.005	3	0.0061	0.0023	0.0050	0.0050	0.0092	-
Molybdenum, total	mg/kg	5	0.1	4	0.104	0.009	0.100	0.100	0.116	8.3
Nickel, total	mg/kg	5	0.5	0	3.83	0.911	3.03	3.70	5.03	16
Phosphorus, total	mg/kg	5	50	0	125	25.7	104	115	160	-
Potassium, total	mg/kg	5	100	0	254	86.2	176	230	368	-
Rhodium, total	mg/kg	5	0.1	5	<0.1	-	<0.1	0.1	<0.1	600
Ruthenium, total	mg/kg	5	0.1	5	<0.1	-	<0.1	0.1	<0.1	390
Samarium, total	mg/kg	5	0.1	0	0.884	0.316	0.654	0.680	1.3	2500
Selenium, total	mg/kg	5	0.2	5	<0.2	-	<0.2	0.2	<0.2	0.9
Silver, total	mg/kg	5	0.1	5	<0.1	-	<0.1	0.1	<0.1	0.5
Sodium, total	mg/kg	5	50	0	107	21.1	91.8	99.0	136	-

APPENDIX B, TABLE 29

Summary of Year 2 sediment chemistry results from Wabigoon River, summer 2022 to spring 2023.

Parameter	Units	n	RDL	n<RDL	Mean	SD	5th Percentile	Median	95th Percentile	Sediment Quality Guideline ¹
Metals										
Strontium, total	mg/kg	5	0.5	0	6.87	0.960	6.11	6.40	8.15	-
Sulfur, total	mg/kg	5	1000	5	<1000	-	<1000	1000	<1000	-
Thallium, total	mg/kg	5	0.05	4	0.051	0.002	0.050	0.050	0.053	-
Tin, total	mg/kg	5	2	5	<2	-	<2	2.0	<2	-
Titanium, total	mg/kg	5	1	0	345	74.7	278	337	444	-
Tungsten, total	mg/kg	5	0.5	5	<0.5	-	<0.5	0.5	<0.5	960
Uranium, total	mg/kg	5	0.05	0	0.571	0.220	0.353	0.540	0.838	32
Vanadium, total	mg/kg	5	0.2	0	8.44	2.32	6.67	7.85	11.6	27
Zinc, total	mg/kg	5	2	0	14.2	4.14	9.62	14.2	19.0	120
Zirconium, total	mg/kg	5	1	0	1.62	0.295	1.26	1.60	1.90	-
Radiological Parameters										
Carbon-14	Bq/kg	5	740	5	<740	-	<740	740	<740	-
Cesium-137	Bq/kg	5	18.5	5	<18.5	-	<18.5	18.5	<18.5	100000
Cobalt-60	Bq/kg	5	18.5	5	<18.5	-	<18.5	18.5	<18.5	40000
Gross alpha	Bq/kg	5	111	0	168	33.7	144	147	213	-
Gross beta	Bq/kg	5	148	0	558	63.1	495	572	632	-
Iodine-129	Bq/kg	5	370	5	<370	-	<370	370	<370	1000000
Potassium-40	Bq/kg	5	75	0	575	42.4	524	578	621	-
Radium-226	Bq/kg	5	37	4	37.9	1.92	37.0	37.0	40.4	600
Ruthenium-106	Bq/kg	5	90	5	<90	-	<90	90.0	<90	-
Strontium-90	Bq/kg	5	18.5	5	<18.5	-	<18.5	18.5	<18.5	20000
Thorium-228	Bq/kg	5	3.7	0	17.8	3.60	13.5	17.3	21.8	-
Thorium-230	Bq/kg	5	3.7	0	22.4	8.59	14.0	22.4	33.4	-
Thorium-232	Bq/kg	5	3.7	0	16.0	3.26	12.8	15.1	20.1	40000
Tritium	Bq/kg	5	37	5	<37	-	<37	37	<37	10000000
Uranium-234	Bq/kg	5	3.7	0	11.1	1.59	9.5	11.6	13.0	20000
Uranium-235	Bq/kg	5	3.7	5	<3.7	-	<3.7	3.7	<3.7	10000
Uranium-238	Bq/kg	5	3.7	0	12.9	1.86	11.0	12.3	15.2	70000
Speciated Metals										
Chromium, hexavalent [Cr VI], total	mg/kg	5	0.2	5	<0.2	-	<0.2	0.2	<0.2	-

Gray cells indicate guideline exceedance; n = sample size; RDL = Reportable Detection Limit; SD = Standard Deviation.

¹See Appendix B, Table 21 for detailed sediment quality guidelines.

APPENDIX B, TABLE 30

Summary of Year 2 particle size composition of sediment collected in the study area, summer 2022 to spring 2023.

Class	Size Range (mm)	AOI Pond					LSA				
		Unnamed Waterbody					Unnamed Waterbody				
		Exposure					Reference				
		n	Average (wt. %)	SD (wt. %)	Min (wt. %)	Max (wt. %)	n	Average (wt. %)	SD (wt. %)	Min (wt. %)	Max (wt. %)
Clay	<0.004	21	26.5	10.83	2.7	38.8	9	13.9	5.19	6.7	22.5
Silt	0.063 - 0.004	21	63.9	11.38	30.7	73.4	9	83.8	4.50	77.2	91.9
Fine Sand	0.2 - 0.063	21	4.3	7.89	0.1	29.8	9	1.3	1.65	0.1	4.3
Coarse Sand	2 - 0.2	21	4.4	11.01	0.03	36.7	9	0.7	0.66	0.1	1.8
Gravel	> 2	21	0.9	2.73	0.0	11.3	9	0.4	1.09	0.0	3.3

Class	Size Range (mm)	LSA									
		Mennin Lake									
		Exposure					Reference				
		n	Average (wt. %)	SD (wt. %)	Min (wt. %)	Max (wt. %)	n	Average (wt. %)	SD (wt. %)	Min (wt. %)	Max (wt. %)
Clay	<0.004	10	25.2	15.64	8.2	42.5	5	22.7	1.88	20.4	24.9
Silt	0.063 - 0.004	10	67.1	8.29	56.8	77.5	5	75.4	1.83	73.2	78.3
Fine Sand	0.2 - 0.063	10	7.1	7.25	0.4	18.3	5	1.3	1.07	0.4	3.1
Coarse Sand	2 - 0.2	10	0.6	0.59	0.04	1.7	5	0.6	0.24	0.2	0.9
Gravel	> 2	10	0.004	0.0084	0.0	0.02	5	0.0	0.0	0.0	0.0

Class	Size Range (mm)	LSA									
		Mennin River									
		Exposure					Reference				
		n	Average (wt. %)	SD (wt. %)	Min (wt. %)	Max (wt. %)	n	Average (wt. %)	SD (wt. %)	Min (wt. %)	Max (wt. %)
Clay	<0.004	5	9.8	4.73	2.4	13.3	10	16.4	5.60	10.0	25.7
Silt	0.063 - 0.004	5	45.7	25.50	9.6	80.8	10	72.7	10.89	51.1	84.0
Fine Sand	0.2 - 0.063	5	13.8	8.23	3.2	25.6	10	6.6	2.95	1.3	10.3
Coarse Sand	2 - 0.2	5	25.8	20.02	3.1	57.5	10	4.1	4.38	0.3	14.5
Gravel	> 2	5	4.8	8.19	0.0	19.0	10	0.3	0.47	0.0	1.5

Class	Size Range (mm)	LSA									
		Revell Lake					Revell River				
		Reference					Exposure				
		n	Average (wt. %)	SD (wt. %)	Min (wt. %)	Max (wt. %)	n	Average (wt. %)	SD (wt. %)	Min (wt. %)	Max (wt. %)
Clay	<0.004	10	5.4	3.78	0.9	9.5	5	0.8	1.28	0.1	3.1
Silt	0.063 - 0.004	10	59.1	26.52	24.4	84.0	5	3.9	2.93	0.6	7.9
Fine Sand	0.2 - 0.063	10	28.5	21.79	7.1	56.9	5	30.0	18.54	9.5	58.0
Coarse Sand	2 - 0.2	10	7.0	8.73	0.3	20.8	5	65.2	20.58	36.5	89.8
Gravel	> 2	10	0.002	0.0042	0.0	0.01	5	0.2	0.32	0.0	0.7

Class	Size Range (mm)	LSA									
		Unnamed Watercourse					Wabigoon River				
		Exposure					Exposure				
		n	Average (wt. %)	SD (wt. %)	Min (wt. %)	Max (wt. %)	n	Average (wt. %)	SD (wt. %)	Min (wt. %)	Max (wt. %)
Clay	<0.004	5	4.4	1.11	2.9	5.9	5	1.3	0.65	0.8	2.4
Silt	0.063 - 0.004	5	34.1	12.27	20.9	48.8	5	17.0	8.70	9.6	31.1
Fine Sand	0.2 - 0.063	5	38.2	7.59	29.3	47.3	5	49.1	6.62	43.2	59.0
Coarse Sand	2 - 0.2	5	23.4	13.86	10.1	45.6	5	32.6	13.67	13.7	45.3
Gravel	> 2	5	0.004	0.0055	0.0	0.01	5	0.02	0.035	0.0	0.1

AOI Pond = ponds within the Area of Interest; LSA = Local Study Area; n = sample size; SD = Standard Deviation.

APPENDIX C

DETAILED SECONDARY PARAMETERS RESULTS

LIST OF TABLES

Table 1	Summary of Year 2 secondary surface water chemistry results, winter 2023.
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APPENDIX C, TABLE 1

Summary of Year 2 secondary surface water chemistry results, winter 2023.

Area	Waterbody	Station(s)	Class	Parameter	Units	n	RDL	n<RDL	Mean	SD	5 th Percentile	Median	95 th Percentile
LSA	Mennin Lake	ML1, ML2, ML3	Metals Dissolved	Cerium, dissolved	µg/L	9	0.005	0	0.70	0.063	0.63	0.67	0.78
				Dysprosium, dissolved	µg/L	9	0.005	0	0.04	0.004	0.03	0.04	0.04
				Erbium, dissolved	µg/L	9	0.005	0	0.02	0.002	0.02	0.02	0.02
				Europium, dissolved	µg/L	9	0.005	0	0.01	0.001	0.01	0.01	0.02
				Gadolinium, dissolved	µg/L	9	0.005	0	0.05	0.006	0.05	0.05	0.06
				Gold, dissolved	µg/L	9	0.005	9	<0.005	-	<0.005	0.01	<0.005
				Hafnium, dissolved	µg/L	4 ¹	0.005	0	0.01	0.003	0.01	0.01	0.01
				Holmium, dissolved	µg/L	9	0.005	0	0.01	0.001	0.01	0.01	0.01
				Iridium, dissolved	µg/L	9	0.005	9	<0.005	-	<0.005	0.01	<0.005
				Lanthanum, dissolved	µg/L	9	0.005	0	0.44	0.039	0.40	0.42	0.49
				Neodymium, dissolved	µg/L	9	0.005	0	0.39	0.045	0.34	0.38	0.45
				Palladium, dissolved	µg/L	9	0.005	8	0.01	0.0001	0.01	0.01	0.01
				Platinum, dissolved	µg/L	9	0.005	9	<0.005	-	<0.005	0.01	<0.005
				Praseodymium, dissolved	µg/L	9	0.005	0	0.10	0.012	0.09	0.10	0.12
				Rhenium, dissolved	µg/L	9	0.005	9	<0.005	0	<0.005	0.01	<0.005
				Scandium, dissolved	µg/L	9	0.005	0	0.06	0.014	0.04	0.06	0.08
				Terbium, dissolved	µg/L	9	0.005	0	0.01	0.001	0.01	0.01	0.01
				Thulium, dissolved	µg/L	9	0.005	9	<0.005	-	<0.005	0.01	<0.005
				Ytterbium, dissolved	µg/L	9	0.005	0	0.02	0.002	0.02	0.02	0.02
			Metals Total	Cerium, total	µg/L	9	0.005	0	0.76	0.055	0.69	0.74	0.84
				Dysprosium, total	µg/L	9	0.005	0	0.04	0.003	0.04	0.04	0.05
				Erbium, total	µg/L	9	0.005	0	0.02	0.002	0.02	0.02	0.03
				Europium, total	µg/L	9	0.005	0	0.01	0.001	0.01	0.01	0.02
				Gadolinium, total	µg/L	9	0.005	0	0.06	0.006	0.05	0.06	0.07
				Gold, total	µg/L	9	0.02	9	<0.02	-	<0.02	0.02	<0.02
				Hafnium, total	µg/L	9	0.005	0	0.01	0.001	0.01	0.01	0.01
				Holmium, total	µg/L	9	0.005	0	0.01	0.001	0.01	0.01	0.01
				Iridium, total	µg/L	9	0.005	9	<0.005	-	<0.005	0.01	<0.005
				Lanthanum, total	µg/L	9	0.005	0	0.47	0.034	0.43	0.46	0.52
				Neodymium, total	µg/L	9	0.005	0	0.41	0.033	0.38	0.40	0.46
				Palladium, total	µg/L	9	0.005	8	0.01	0.000	0.01	0.01	0.01
				Platinum, total	µg/L	9	0.02	9	<0.02	-	<0.02	0.02	<0.02
				Praseodymium, total	µg/L	9	0.005	0	0.11	0.009	0.10	0.11	0.12
				Rhenium, total	µg/L	9	0.005	9	<0.005	-	<0.005	0.01	<0.005
				Scandium, total	µg/L	9	0.005	0	0.07	0.006	0.07	0.07	0.08
				Terbium, total	µg/L	9	0.005	0	0.01	0.001	0.01	0.01	0.01
				Thulium, total	µg/L	9	0.005	9	<0.005	-	<0.005	0.01	<0.005
				Ytterbium, total	µg/L	9	0.005	0	0.02	0.002	0.02	0.02	0.02
	Mennin River	MR3	Metals Dissolved	Cerium, dissolved	µg/L	3	0.005	0	1.02	0.021	1.00	1.01	1.04
				Dysprosium, dissolved	µg/L	3	0.005	0	0.05	0.001	0.05	0.05	0.05
				Erbium, dissolved	µg/L	3	0.005	0	0.03	0.0004	0.03	0.03	0.03
				Europium, dissolved	µg/L	3	0.005	0	0.02	0.001	0.02	0.02	0.02
				Gadolinium, dissolved	µg/L	3	0.005	0	0.07	0.001	0.07	0.07	0.07
				Gold, dissolved	µg/L	3	0.005	3	<0.005	-	<0.005	0.01	<0.005
				Hafnium, dissolved	µg/L	3	0.005	0	0.01	0.001	0.01	0.01	0.01

APPENDIX C, TABLE 1

Summary of Year 2 secondary surface water chemistry results, winter 2023.

Area	Waterbody	Station(s)	Class	Parameter	Units	n	RDL	n<RDL	Mean	SD	5 th Percentile	Median	95 th Percentile
LSA	Mennin River	MR3	Metals Dissolved	Holmium, dissolved	µg/L	3	0.005	0	0.01	0.0003	0.01	0.01	0.01
				Iridium, dissolved	µg/L	3	0.005	3	<0.005	-	<0.005	0.01	<0.005
				Lanthanum, dissolved	µg/L	3	0.005	0	0.57	0.012	0.57	0.57	0.59
				Neodymium, dissolved	µg/L	3	0.005	0	0.53	0.006	0.52	0.53	0.53
				Palladium, dissolved	µg/L	3	0.005	2	0.01	0.0001	0.01	0.01	0.01
				Platinum, dissolved	µg/L	3	0.005	3	<0.005	-	<0.005	0.01	<0.005
				Praseodymium, dissolved	µg/L	3	0.005	0	0.14	0.003	0.14	0.14	0.14
				Rhenium, dissolved	µg/L	3	0.005	3	<0.005	-	<0.005	0.01	<0.005
				Scandium, dissolved	µg/L	3	0.005	0	0.07	0.002	0.06	0.06	0.07
				Terbium, dissolved	µg/L	3	0.005	0	0.01	0.001	0.01	0.01	0.01
				Thulium, dissolved	µg/L	3	0.005	3	<0.005	-	<0.005	0.01	<0.005
				Ytterbium, dissolved	µg/L	3	0.005	0	0.02	0.0002	0.02	0.02	0.02
			Metals Total	Cerium, total	µg/L	3	0.005	0	1.24	0.006	1.23	1.24	1.24
				Dysprosium, total	µg/L	3	0.005	0	0.06	0.001	0.06	0.06	0.06
				Erbium, total	µg/L	3	0.005	0	0.03	0.001	0.03	0.03	0.03
				Europium, total	µg/L	3	0.005	0	0.02	0.001	0.02	0.02	0.02
				Gadolinium, total	µg/L	3	0.005	0	0.08	0.0002	0.08	0.08	0.08
				Gold, total	µg/L	3	0.02	3	<0.02	-	<0.02	0.02	<0.02
				Hafnium, total	µg/L	3	0.005	0	0.01	0.0002	0.01	0.01	0.01
				Holmium, total	µg/L	3	0.005	0	0.01	0.0003	0.01	0.01	0.01
				Iridium, total	µg/L	3	0.005	3	<0.005	-	<0.005	0.01	<0.005
				Lanthanum, total	µg/L	3	0.005	0	0.69	0.007	0.69	0.69	0.70
				Neodymium, total	µg/L	3	0.005	0	0.63	0.013	0.62	0.62	0.64
				Palladium, total	µg/L	3	0.005	0	0.01	0.0004	0.01	0.01	0.01
				Platinum, total	µg/L	3	0.02	3	<0.02	-	<0.02	0.02	<0.02
				Praseodymium, total	µg/L	3	0.005	0	0.17	0.004	0.17	0.17	0.17
				Rhenium, total	µg/L	3	0.005	3	<0.005	-	<0.005	0.01	<0.005
				Scandium, total	µg/L	3	0.005	0	0.11	0.001	0.11	0.11	0.11
				Terbium, total	µg/L	3	0.005	0	0.01	0.0001	0.01	0.01	0.01
				Thulium, total	µg/L	3	0.005	3	<0.005	-	<0.005	0.01	<0.005
				Ytterbium, total	µg/L	3	0.005	0	0.03	0.001	0.03	0.03	0.03
	Revell Lake	RL1, RL2	Metals Dissolved	Cerium, dissolved	µg/L	6	0.005	0	0.16	0.024	0.14	0.16	0.19
				Dysprosium, dissolved	µg/L	6	0.005	0	0.01	0.001	0.01	0.01	0.01
				Erbium, dissolved	µg/L	6	0.005	1	0.01	0.001	0.01	0.01	0.01
				Europium, dissolved	µg/L	6	0.005	6	<0.005	-	<0.005	0.01	<0.005
				Gadolinium, dissolved	µg/L	6	0.005	0	0.02	0.002	0.01	0.02	0.02
				Gold, dissolved	µg/L	5 ²	0.005	5	<0.005	-	<0.005	0.01	<0.005
				Hafnium, dissolved	µg/L	6	0.005	6	<0.005	-	<0.005	0.01	<0.005
				Holmium, dissolved	µg/L	6	0.005	6	<0.005	-	<0.005	0.01	<0.005
				Iridium, dissolved	µg/L	6	0.005	6	<0.005	-	<0.005	0.01	<0.005
				Lanthanum, dissolved	µg/L	6	0.005	0	0.13	0.015	0.12	0.13	0.15
				Neodymium, dissolved	µg/L	6	0.005	0	0.11	0.014	0.10	0.11	0.13
				Palladium, dissolved	µg/L	6	0.005	6	<0.005	-	<0.005	0.01	<0.005
				Platinum, dissolved	µg/L	6	0.005	6	<0.005	-	<0.005	0.01	<0.005
				Praseodymium, dissolved	µg/L	6	0.005	0	0.03	0.004	0.03	0.03	0.03
				Rhenium, dissolved	µg/L	6	0.005	6	<0.005	-	<0.005	0.01	<0.005
				Scandium, dissolved	µg/L	6	0.005	0	0.02	0.004	0.01	0.01	0.02
				Terbium, dissolved	µg/L	6	0.005	6	<0.005	-	<0.005	0.01	<0.005
				Thulium, dissolved	µg/L	5 ²	0.005	5	<0.005	-	<0.005	0.01	<0.005
				Ytterbium, dissolved	µg/L	5 ²	0.005	4	0.01	0	0.01	0.01	0.01

APPENDIX C, TABLE 1

Summary of Year 2 secondary surface water chemistry results, winter 2023.

Area	Waterbody	Station(s)	Class	Parameter	Units	n	RDL	n<RDL	Mean	SD	5 th Percentile	Median	95 th Percentile
LSA	Revell Lake	RL1, RL2	Metals Total	Cerium, total	µg/L	6	0.005	0	0.17	0.023	0.15	0.17	0.20
				Dysprosium, total	µg/L	6	0.005	0	0.01	0.002	0.01	0.01	0.01
				Erbium, total	µg/L	6	0.005	0	0.01	0.001	0.01	0.01	0.01
				Europium, total	µg/L	6	0.005	6	<0.005	-	<0.005	0.01	<0.005
				Gadolinium, total	µg/L	6	0.005	0	0.02	0.002	0.01	0.02	0.02
				Gold, total	µg/L	6	0.02	6	<0.02	-	<0.02	0.02	<0.02
				Hafnium, total	µg/L	6	0.005	5	0.01	0.002	0.01	0.01	0.01
				Holmium, total	µg/L	6	0.005	6	<0.005	-	<0.005	0.01	<0.005
				Iridium, total	µg/L	6	0.005	6	<0.005	-	<0.005	0.01	<0.005
				Lanthanum, total	µg/L	6	0.005	0	0.14	0.016	0.12	0.14	0.16
				Neodymium, total	µg/L	6	0.005	0	0.12	0.012	0.11	0.12	0.13
				Palladium, total	µg/L	6	0.005	6	<0.005	-	<0.005	0.01	<0.005
				Platinum, total	µg/L	6	0.02	6	<0.02	-	<0.02	0.02	<0.02
				Praseodymium, total	µg/L	6	0.005	0	0.03	0.003	0.03	0.03	0.04
				Rhenium, total	µg/L	6	0.005	6	<0.005	-	<0.005	0.01	<0.005
				Scandium, total	µg/L	6	0.005	0	0.02	0.002	0.02	0.02	0.02
				Terbium, total	µg/L	6	0.005	6	<0.005	-	<0.005	0.01	<0.005
				Thulium, total	µg/L	5 ²	0.005	5	<0.005	-	<0.005	0.01	<0.005
				Ytterbium, total	µg/L	5 ²	0.005	2	0.01	0.0003	0.01	0.01	0.01
LSA	Unnamed Watercourse	ML4	Metals Dissolved	Cerium, dissolved	µg/L	3	0.005	0	1.24	0.012	1.23	1.25	1.25
				Dysprosium, dissolved	µg/L	3	0.005	0	0.06	0.001	0.06	0.06	0.06
				Erbium, dissolved	µg/L	3	0.005	0	0.03	0.001	0.03	0.03	0.03
				Europium, dissolved	µg/L	3	0.005	0	0.02	0.001	0.02	0.02	0.02
				Gadolinium, dissolved	µg/L	3	0.005	0	0.08	0.002	0.08	0.09	0.09
				Gold, dissolved	µg/L	3	0.005	3	<0.005	-	<0.005	0.01	<0.005
				Hafnium, dissolved	µg/L	3	0.005	0	0.01	0.001	0.01	0.01	0.01
				Holmium, dissolved	µg/L	3	0.005	0	0.01	0.001	0.01	0.01	0.01
				Iridium, dissolved	µg/L	3	0.005	3	<0.005	-	<0.005	0.01	<0.005
				Lanthanum, dissolved	µg/L	3	0.005	0	0.69	0.010	0.68	0.69	0.69
				Neodymium, dissolved	µg/L	3	0.005	0	0.63	0.005	0.63	0.63	0.64
				Palladium, dissolved	µg/L	3	0.005	0	0.01	0.001	0.01	0.01	0.01
				Platinum, dissolved	µg/L	3	0.005	3	<0.005	-	<0.005	0.01	<0.005
				Praseodymium, dissolved	µg/L	3	0.005	0	0.17	0.003	0.17	0.17	0.17
				Rhenium, dissolved	µg/L	3	0.005	3	<0.005	-	<0.005	0.01	<0.005
				Scandium, dissolved	µg/L	3	0.005	0	0.06	0.002	0.06	0.07	0.07
				Terbium, dissolved	µg/L	3	0.005	0	0.01	0.0002	0.01	0.01	0.01
				Thulium, dissolved	µg/L	3	0.005	3	<0.005	-	<0.005	0.01	<0.005
				Ytterbium, dissolved	µg/L	3	0.005	0	0.03	0.001	0.03	0.03	0.03
			Metals Total	Cerium, total	µg/L	3	0.005	0	1.43	0.026	1.41	1.42	1.46
				Dysprosium, total	µg/L	3	0.005	0	0.07	0.002	0.06	0.06	0.07
				Erbium, total	µg/L	3	0.005	0	0.04	0.001	0.03	0.04	0.04
				Europium, total	µg/L	3	0.005	0	0.02	0.001	0.02	0.02	0.02
				Gadolinium, total	µg/L	3	0.005	0	0.10	0.005	0.09	0.09	0.10
				Gold, total	µg/L	3	0.02	3	<0.02	-	<0.02	0.02	<0.02
				Hafnium, total	µg/L	3	0.005	0	0.01	0.001	0.01	0.01	0.01
				Holmium, total	µg/L	3	0.005	0	0.01	0.0004	0.01	0.01	0.01
				Iridium, total	µg/L	3	0.005	3	<0.005	-	<0.005	0.01	<0.005
				Lanthanum, total	µg/L	3	0.005	0	0.78	0.023	0.76	0.77	0.80
				Neodymium, total	µg/L	3	0.005	0	0.72	0.013	0.71	0.71	0.73
				Palladium, total	µg/L	3	0.005	1	0.01	0.001	0.01	0.01	0.01

APPENDIX C, TABLE 1

Summary of Year 2 secondary surface water chemistry results, winter 2023.

Area	Waterbody	Station(s)	Class	Parameter	Units	n	RDL	n<RDL	Mean	SD	5 th Percentile	Median	95 th Percentile
LSA	Unnamed Watercourse	ML4	Metals Total	Platinum, total	µg/L	3	0.02	3	<0.02	-	<0.02	0.02	<0.02
				Praseodymium, total	µg/L	3	0.005	0	0.19	0.003	0.19	0.19	0.19
				Rhenium, total	µg/L	3	0.005	3	<0.005	-	<0.005	0.01	<0.005
				Scandium, total	µg/L	3	0.005	0	0.10	0.002	0.10	0.10	0.10
				Terbium, total	µg/L	3	0.005	0	0.01	0.0002	0.01	0.01	0.01
				Thulium, total	µg/L	3	0.005	3	<0.005	-	<0.005	0.01	<0.005
				Ytterbium, total	µg/L	3	0.005	0	0.03	0.002	0.03	0.03	0.03
	Wabigoon River	WR3	Metals Dissolved	Cerium, dissolved	µg/L	3	0.005	0	1.70	0.066	1.65	1.69	1.76
				Dysprosium, dissolved	µg/L	3	0.005	0	0.06	0.003	0.06	0.06	0.06
				Erbium, dissolved	µg/L	3	0.005	0	0.03	0.001	0.03	0.03	0.03
				Europium, dissolved	µg/L	3	0.005	0	0.02	0.002	0.02	0.02	0.02
				Gadolinium, dissolved	µg/L	3	0.005	0	0.10	0.004	0.09	0.10	0.10
				Gold, dissolved	µg/L	3	0.005	3	<0.005	-	<0.005	0.01	<0.005
				Hafnium, dissolved	µg/L	3	0.005	0	0.01	0.0009	0.01	0.01	0.01
				Holmium, dissolved	µg/L	3	0.005	0	0.01	0.0001	0.01	0.01	0.01
				Iridium, dissolved	µg/L	3	0.005	3	<0.005	-	<0.005	0.01	<0.005
				Lanthanum, dissolved	µg/L	3	0.005	0	0.98	0.043	0.94	0.97	1.02
				Neodymium, dissolved	µg/L	3	0.005	0	0.84	0.034	0.81	0.85	0.87
				Palladium, dissolved	µg/L	3	0.005	1	0.01	0.002	0.01	0.01	0.01
				Platinum, dissolved	µg/L	3	0.005	3	<0.005	-	<0.005	0.01	<0.005
				Praseodymium, dissolved	µg/L	3	0.005	0	0.23	0.011	0.22	0.23	0.24
				Rhenium, dissolved	µg/L	3	0.005	3	<0.005	-	<0.005	0.01	<0.005
				Scandium, dissolved	µg/L	3	0.005	0	0.06	0.002	0.06	0.06	0.06
				Terbium, dissolved	µg/L	3	0.005	0	0.01	0.0004	0.01	0.01	0.01
				Thulium, dissolved	µg/L	3	0.005	3	<0.005	-	<0.005	0.01	<0.005
				Ytterbium, dissolved	µg/L	3	0.005	0	0.03	0.001	0.02	0.03	0.03
			Metals Total	Cerium, total	µg/L	3	0.005	0	2.03	0.042	1.99	2.04	2.06
				Dysprosium, total	µg/L	3	0.005	0	0.07	0.001	0.07	0.07	0.07
				Erbium, total	µg/L	3	0.005	0	0.04	0.001	0.04	0.04	0.04
				Europium, total	µg/L	3	0.005	0	0.03	0.001	0.03	0.03	0.03
				Gadolinium, total	µg/L	3	0.005	0	0.12	0.006	0.11	0.12	0.12
				Gold, total	µg/L	3	0.02	3	<0.02	-	<0.02	0.02	<0.02
				Hafnium, total	µg/L	3	0.005	0	0.01	0.0004	0.01	0.01	0.01
				Holmium, total	µg/L	3	0.005	0	0.01	0.0004	0.01	0.01	0.01
				Iridium, total	µg/L	3	0.005	3	<0.005	-	<0.005	0.01	<0.005
				Lanthanum, total	µg/L	3	0.005	0	1.15	0.025	1.13	1.15	1.18
				Neodymium, total	µg/L	3	0.005	0	1.00	0.015	0.99	1.01	1.01
				Palladium, total	µg/L	3	0.005	0	0.01	0.001	0.01	0.01	0.01
				Platinum, total	µg/L	3	0.02	3	<0.02	-	<0.02	0.02	<0.02
				Praseodymium, total	µg/L	3	0.005	0	0.27	0.004	0.27	0.27	0.27
				Rhenium, total	µg/L	3	0.005	3	<0.005	-	<0.005	0.01	<0.005
				Scandium, total	µg/L	3	0.005	0	0.09	0.003	0.08	0.08	0.09
				Terbium, total	µg/L	3	0.005	0	0.01	0.0003	0.01	0.01	0.01
				Thulium, total	µg/L	3	0.005	3	<0.005	-	<0.005	0.01	<0.005
				Ytterbium, total	µg/L	3	0.005	0	0.03	0.002	0.03	0.03	0.03

APPENDIX C, TABLE 1

Summary of Year 2 secondary surface water chemistry results, winter 2023.

Area	Waterbody	Station(s)	Class	Parameter	Units	n	RDL	n<RDL	Mean	SD	5 th Percentile	Median	95 th Percentile
AOI Pond	Unnamed Waterbody	P4 ³ , P5	Metals Dissolved	Cerium, dissolved	µg/L	3	0.005	0	1.49	0.006	1.48	1.49	1.49
				Dysprosium, dissolved	µg/L	3	0.005	0	0.07	0.003	0.07	0.07	0.07
				Erbium, dissolved	µg/L	3	0.005	0	0.04	0.002	0.04	0.04	0.04
				Europium, dissolved	µg/L	3	0.005	0	0.03	0.001	0.02	0.03	0.03
				Gadolinium, dissolved	µg/L	3	0.005	0	0.10	0.002	0.10	0.10	0.10
				Gold, dissolved	µg/L	3	0.005	3	<0.005	-	<0.005	0.01	<0.005
				Hafnium, dissolved	µg/L	3	0.005	0	0.01	0.001	0.01	0.01	0.02
				Holmium, dissolved	µg/L	3	0.005	0	0.01	0.0004	0.01	0.01	0.01
				Iridium, dissolved	µg/L	3	0.005	3	<0.005	-	<0.005	0.01	<0.005
				Lanthanum, dissolved	µg/L	3	0.005	0	0.76	0.015	0.75	0.75	0.77
				Neodymium, dissolved	µg/L	3	0.005	0	0.70	0.016	0.69	0.70	0.72
				Palladium, dissolved	µg/L	3	0.005	1	0.01	0.001	0.01	0.01	0.01
				Platinum, dissolved	µg/L	3	0.005	3	<0.005	-	<0.005	0.01	<0.005
				Praseodymium, dissolved	µg/L	3	0.005	0	0.19	0.005	0.18	0.19	0.19
				Rhenium, dissolved	µg/L	3	0.005	3	<0.005	-	<0.005	0.01	<0.005
				Scandium, dissolved	µg/L	3	0.005	0	0.08	0.003	0.08	0.08	0.08
				Terbium, dissolved	µg/L	3	0.005	0	0.01	0.001	0.01	0.01	0.01
				Thulium, dissolved	µg/L	3	0.005	1	0.01	0.0002	0.01	0.01	0.01
				Ytterbium, dissolved	µg/L	3	0.005	0	0.03	0.0003	0.03	0.03	0.03
			Metals Total	Cerium, total	µg/L	3	0.005	0	1.60	0.040	1.57	1.61	1.64
				Dysprosium, total	µg/L	3	0.005	0	0.08	0.005	0.07	0.08	0.08
				Erbium, total	µg/L	3	0.005	0	0.04	0.001	0.04	0.04	0.05
				Europium, total	µg/L	3	0.005	0	0.03	0.001	0.03	0.03	0.03
				Gadolinium, total	µg/L	3	0.005	0	0.11	0.005	0.10	0.10	0.11
				Gold, total	µg/L	3	0.02	3	<0.02	-	<0.02	0.02	<0.02
				Hafnium, total	µg/L	3	0.005	0	0.01	0.0005	0.01	0.01	0.01
				Holmium, total	µg/L	3	0.005	0	0.02	0.0009	0.01	0.01	0.02
				Iridium, total	µg/L	3	0.005	3	<0.005	-	<0.005	0.01	<0.005
				Lanthanum, total	µg/L	3	0.005	0	0.80	0.020	0.78	0.80	0.81
				Neodymium, total	µg/L	3	0.005	0	0.76	0.011	0.75	0.77	0.77
				Palladium, total	µg/L	3	0.005	0	0.01	0.0006	0.01	0.01	0.01
				Platinum, total	µg/L	3	0.02	3	<0.02	-	<0.02	0.02	<0.02
				Praseodymium, total	µg/L	3	0.005	0	0.20	0.005	0.20	0.20	0.21
				Rhenium, total	µg/L	3	0.005	3	<0.005	-	<0.005	0.01	<0.005
				Scandium, total	µg/L	3	0.005	0	0.13	0.006	0.12	0.13	0.13
				Terbium, total	µg/L	3	0.005	0	0.01	0.001	0.01	0.01	0.01
				Thulium, total	µg/L	3	0.005	0	0.01	0.0003	0.01	0.01	0.01
				Ytterbium, total	µg/L	3	0.005	0	0.04	0.001	0.04	0.04	0.04

APPENDIX C, TABLE 1

Summary of Year 2 secondary surface water chemistry results, winter 2023.

Area	Waterbody	Station(s)	Class	Parameter	Units	n	RDL	n<RDL	Mean	SD	5 th Percentile	Median	95 th Percentile
Reference Pond	Unnamed Waterbody	RP1	Metals Dissolved	Cerium, dissolved	µg/L	1	0.005	0	0.10	NA	0.10	0.10	0.10
				Dysprosium, dissolved	µg/L	1	0.005	0	0.01	NA	0.01	0.01	0.01
				Erbium, dissolved	µg/L	1	0.005	0	0.01	NA	0.01	0.01	0.01
				Europium, dissolved	µg/L	1	0.005	1	<0.005	NA	<0.005	0.01	<0.005
				Gadolinium, dissolved	µg/L	1	0.005	0	0.01	NA	0.01	0.01	0.01
				Gold, dissolved	µg/L	1	0.005	1	<0.005	NA	<0.005	0.01	<0.005
				Hafnium, dissolved	µg/L	1	0.005	1	<0.005	NA	<0.005	0.01	<0.005
				Holmium, dissolved	µg/L	1	0.005	1	<0.005	NA	<0.005	0.01	<0.005
				Iridium, dissolved	µg/L	1	0.005	1	<0.005	NA	<0.005	0.01	<0.005
				Lanthanum, dissolved	µg/L	1	0.005	0	0.08	NA	0.08	0.08	0.08
				Neodymium, dissolved	µg/L	1	0.005	0	0.07	NA	0.07	0.07	0.07
				Palladium, dissolved	µg/L	1	0.005	1	<0.005	NA	<0.005	0.01	<0.005
				Platinum, dissolved	µg/L	1	0.005	1	<0.005	NA	<0.005	0.01	<0.005
				Praseodymium, dissolved	µg/L	1	0.005	0	0.02	NA	0.02	0.02	0.02
				Rhenium, dissolved	µg/L	1	0.005	1	<0.005	NA	<0.005	0.01	<0.005
				Scandium, dissolved	µg/L	1	0.005	0	0.01	NA	0.01	0.01	0.01
				Terbium, dissolved	µg/L	1	0.005	1	<0.005	NA	<0.005	0.01	<0.005
				Thulium, dissolved	µg/L	1	0.005	1	<0.005	NA	<0.005	0.01	<0.005
				Ytterbium, dissolved	µg/L	1	0.005	1	<0.005	NA	<0.005	0.01	<0.005
			Metals Total	Cerium, total	µg/L	1	0.005	0	0.12	NA	0.12	0.12	0.12
				Dysprosium, total	µg/L	1	0.005	0	0.01	NA	0.01	0.01	0.01
				Erbium, total	µg/L	1	0.005	0	0.01	NA	0.01	0.01	0.01
				Europium, total	µg/L	1	0.005	1	<0.005	NA	<0.005	0.01	<0.005
				Gadolinium, total	µg/L	1	0.005	0	0.01	NA	0.01	0.01	0.01
				Gold, total	µg/L	1	0.02	1	<0.02	NA	<0.02	0.02	<0.02
				Hafnium, total	µg/L	1	0.005	1	<0.005	NA	<0.005	0.01	<0.005
				Holmium, total	µg/L	1	0.005	1	<0.005	NA	<0.005	0.01	<0.005
				Iridium, total	µg/L	1	0.005	1	<0.005	NA	<0.005	0.01	<0.005
				Lanthanum, total	µg/L	1	0.005	0	0.09	NA	0.09	0.09	0.09
				Neodymium, total	µg/L	1	0.005	0	0.07	NA	0.07	0.07	0.07
				Palladium, total	µg/L	1	0.005	1	<0.005	NA	<0.005	0.01	<0.005
				Platinum, total	µg/L	1	0.02	1	<0.02	NA	<0.02	0.02	<0.02
				Praseodymium, total	µg/L	1	0.005	0	0.02	NA	0.02	0.02	0.02
				Rhenium, total	µg/L	1	0.005	1	<0.005	NA	<0.005	0.01	<0.005
				Scandium, total	µg/L	1	0.005	0	0.02	NA	0.02	0.02	0.02
				Terbium, total	µg/L	1	0.005	1	<0.005	NA	<0.005	0.01	<0.005
				Thulium, total	µg/L	1	0.005	1	<0.005	NA	<0.005	0.01	<0.005
				Ytterbium, total	µg/L	1	0.005	0	0.01	NA	0.01	0.01	0.01

APPENDIX C, TABLE 1

Summary of Year 2 secondary surface water chemistry results, winter 2023.

Area	Waterbody	Station(s)	Class	Parameter	Units	n	RDL	n<RDL	Mean	SD	5 th Percentile	Median	95 th Percentile
Reference Pond	Unnamed Waterbody	RP1	Organochlorine Pesticides	Aldrin	µg/L	1	0.008	1	<0.008	NA	<0.008	0.01	<0.008
				Chlordane, cis- (alpha)	µg/L	1	0.008	1	<0.008	NA	<0.008	0.01	<0.008
				Chlordane, total	µg/L	1	0.011	1	<0.011	NA	<0.011	0.01	<0.011
				Chlordane, trans- (gamma)	µg/L	1	0.008	1	<0.008	NA	<0.008	0.01	<0.008
				DDD, 2,4'-	µg/L	1	0.004	1	<0.004	NA	<0.004	0.004	<0.004
				DDD, 4,4'-	µg/L	1	0.004	1	<0.004	NA	<0.004	0.004	<0.004
				DDD, total	µg/L	1	0.006	1	<0.006	NA	<0.006	0.01	<0.006
				DDE, 2,4'-	µg/L	1	0.004	1	<0.004	NA	<0.004	0.004	<0.004
				DDE, 4,4'-	µg/L	1	0.004	1	<0.004	NA	<0.004	0.004	<0.004
				DDE, total	µg/L	1	0.006	1	<0.006	NA	<0.006	0.01	<0.006
				DDT, 2,4'-	µg/L	1	0.004	1	<0.004	NA	<0.004	0.004	<0.004
				DDT, 4,4'-	µg/L	1	0.012	1	<0.012	NA	<0.012	0.01	<0.012
				DDT, total	µg/L	1	0.0126	1	<0.0126	NA	<0.0126	0.01	<0.0126
				Dieldrin	µg/L	1	0.008	1	<0.008	NA	<0.008	0.01	<0.008
				Endosulfan, alpha-	µg/L	1	0.007	1	<0.007	NA	<0.007	0.01	<0.007
				Endosulfan, beta-	µg/L	1	0.007	1	<0.007	NA	<0.007	0.01	<0.007
				Endosulfan, total	µg/L	1	0.01	1	<0.01	NA	<0.01	0.01	<0.01
				Endrin	µg/L	1	0.01	1	<0.01	NA	<0.01	0.01	<0.01
				Heptachlor	µg/L	1	0.008	1	<0.008	NA	<0.008	0.01	<0.008
				Heptachlor epoxide	µg/L	1	0.008	1	<0.008	NA	<0.008	0.01	<0.008
				Hexachlorobenzene	µg/L	1	0.008	1	<0.008	NA	<0.008	0.01	<0.008
				Hexachlorobutadiene	µg/L	1	0.008	1	<0.008	NA	<0.008	0.01	<0.008
				Hexachlorocyclohexane, gamma-	µg/L	1	0.008	1	<0.008	NA	<0.008	0.01	<0.008
				Hexachloroethane	µg/L	1	0.008	1	<0.008	NA	<0.008	0.01	<0.008
				Methoxychlor	µg/L	1	0.008	1	<0.008	NA	<0.008	0.01	<0.008

n = sample size; RDL = Reportable Detection Limit; SD = Standard Deviation; LSA = Local Study Area (surface water); AOI = ponds within the Area of Interest; NA = not applicable

Three replicate samples were collected from each station, with the exception of P4

¹Missing analysis for ML1-B, ML1-C, ML2-A, ML2-B, ML2-C

²Missing analysis for RL2-B

³Two samples were collected at site; one above and one below the thermocline

APPENDIX D

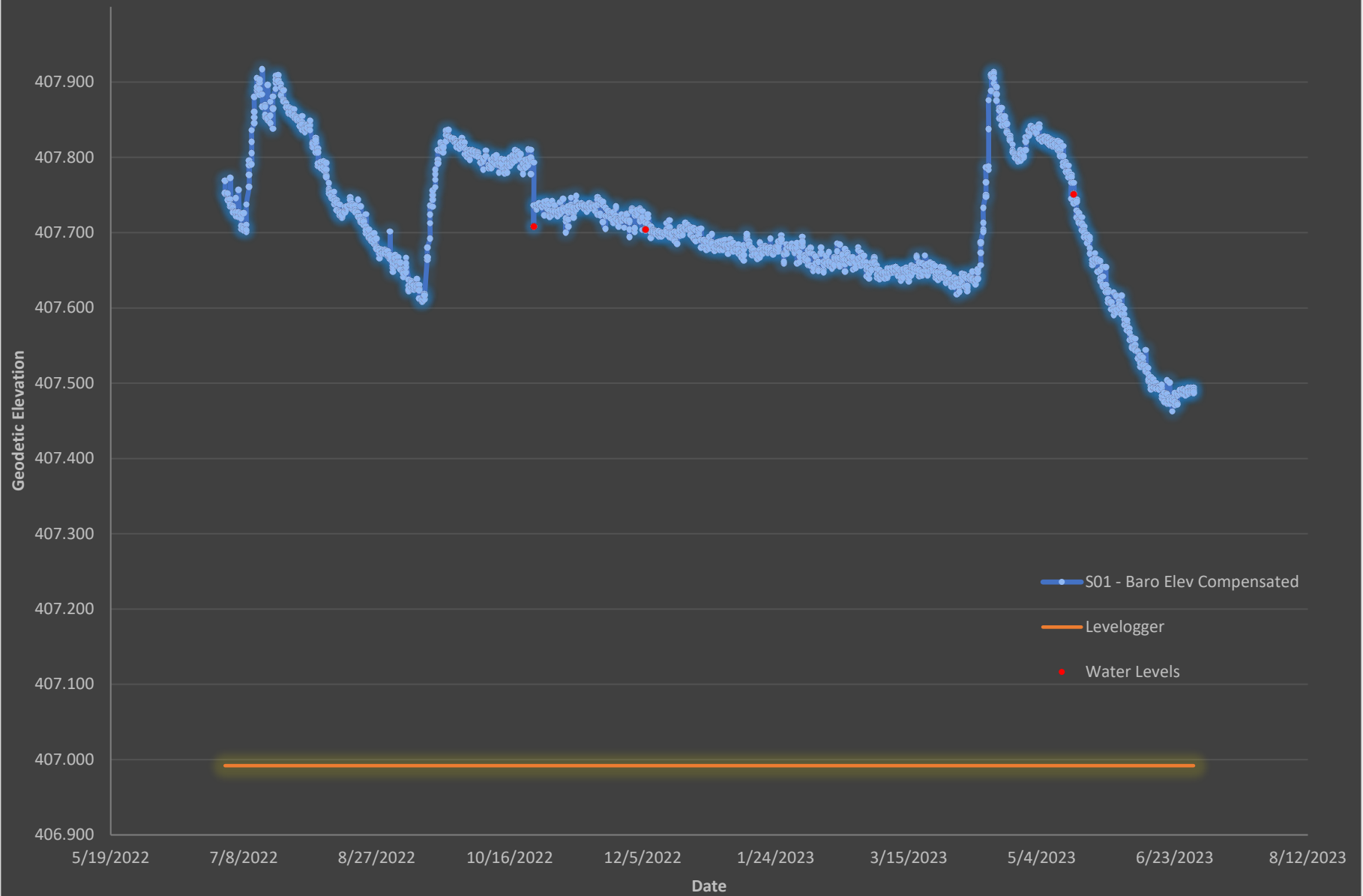
DATA FROM HYDROLOGY PROGRAM

APPENDIX D

HYDROLOGY DATA

APPENDIX D1
Water Level Logger Data

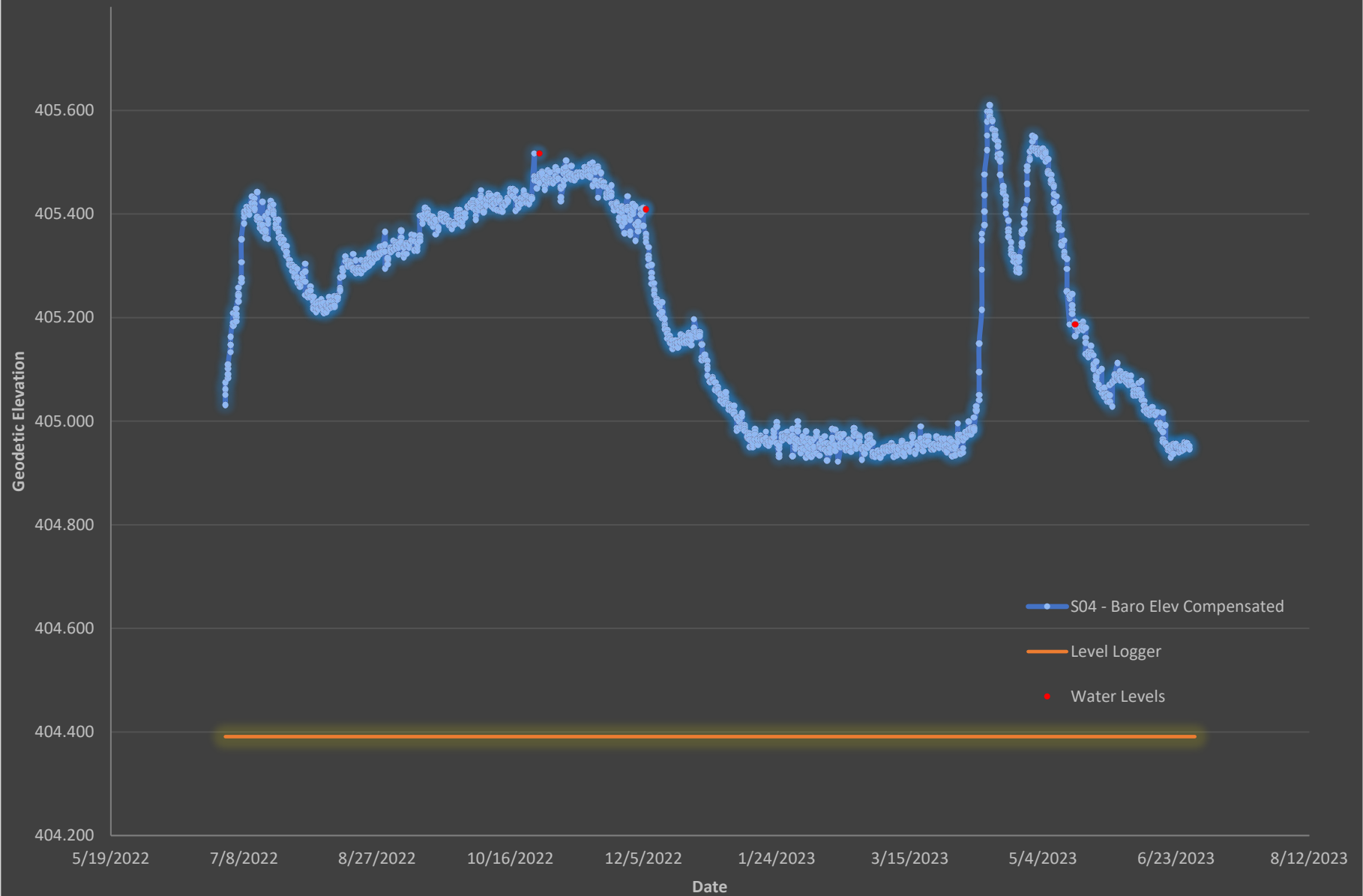
S01 Water Elevations



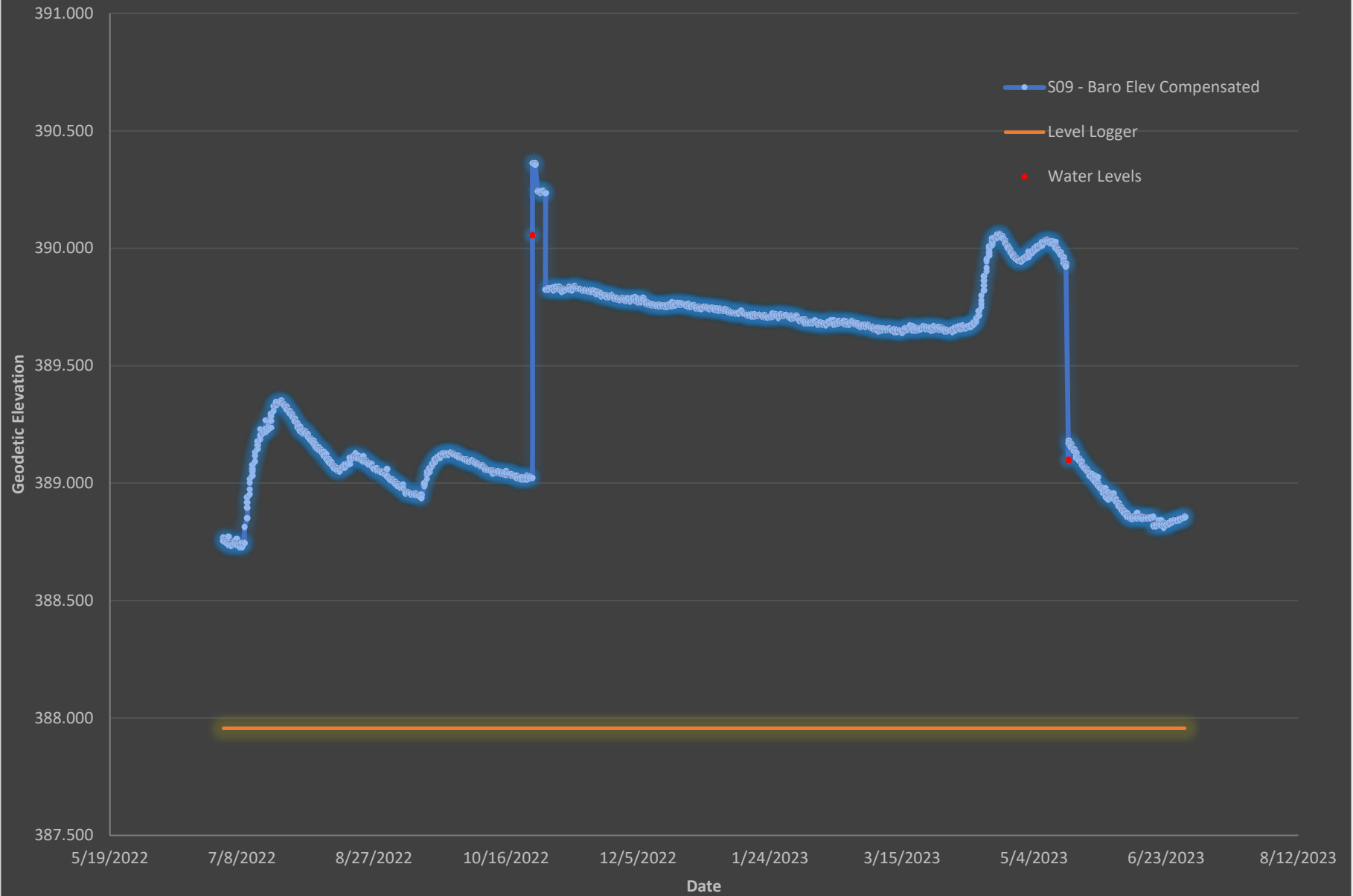
S02 Water Elevations



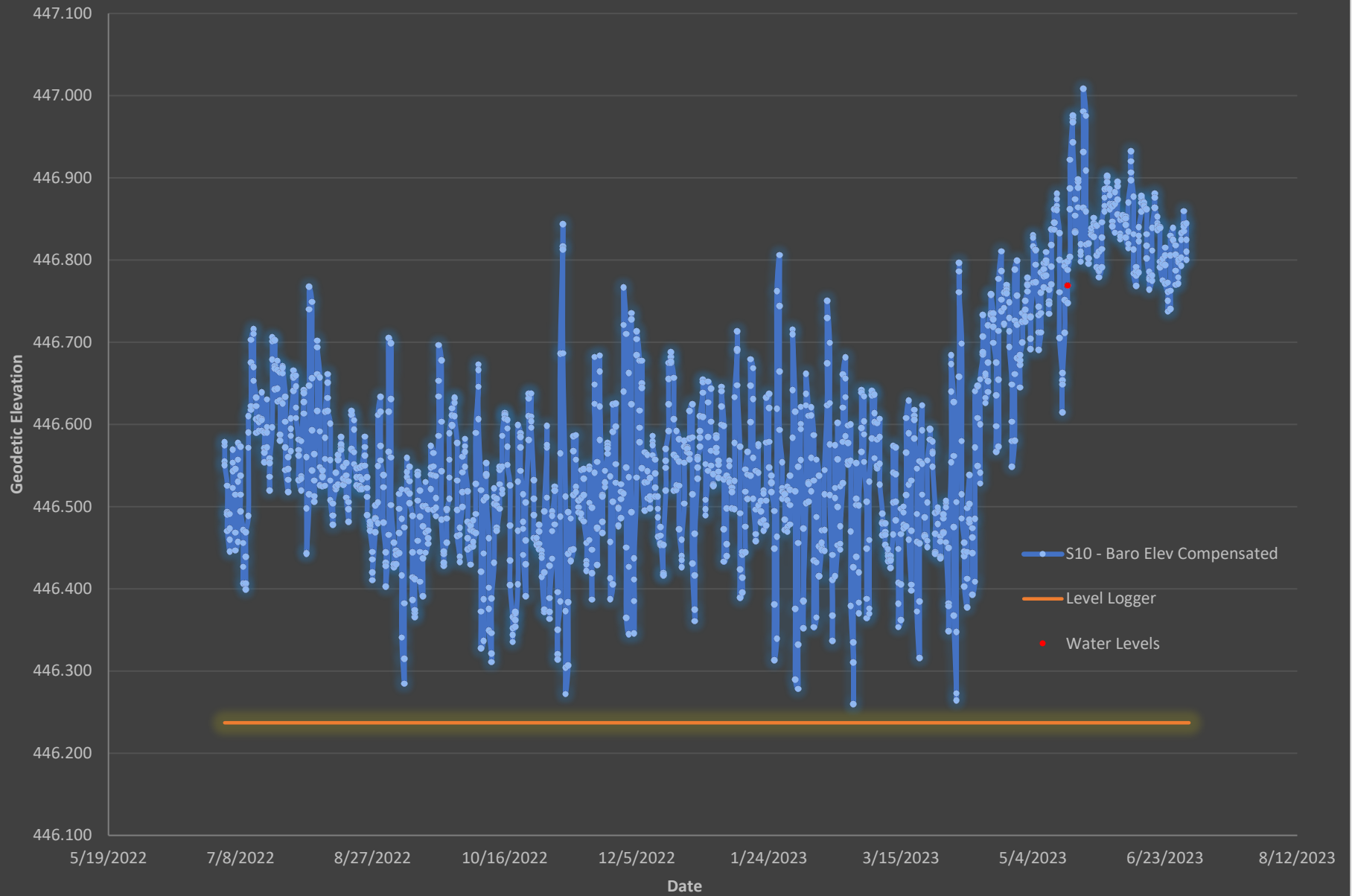
S04 Water Elevations



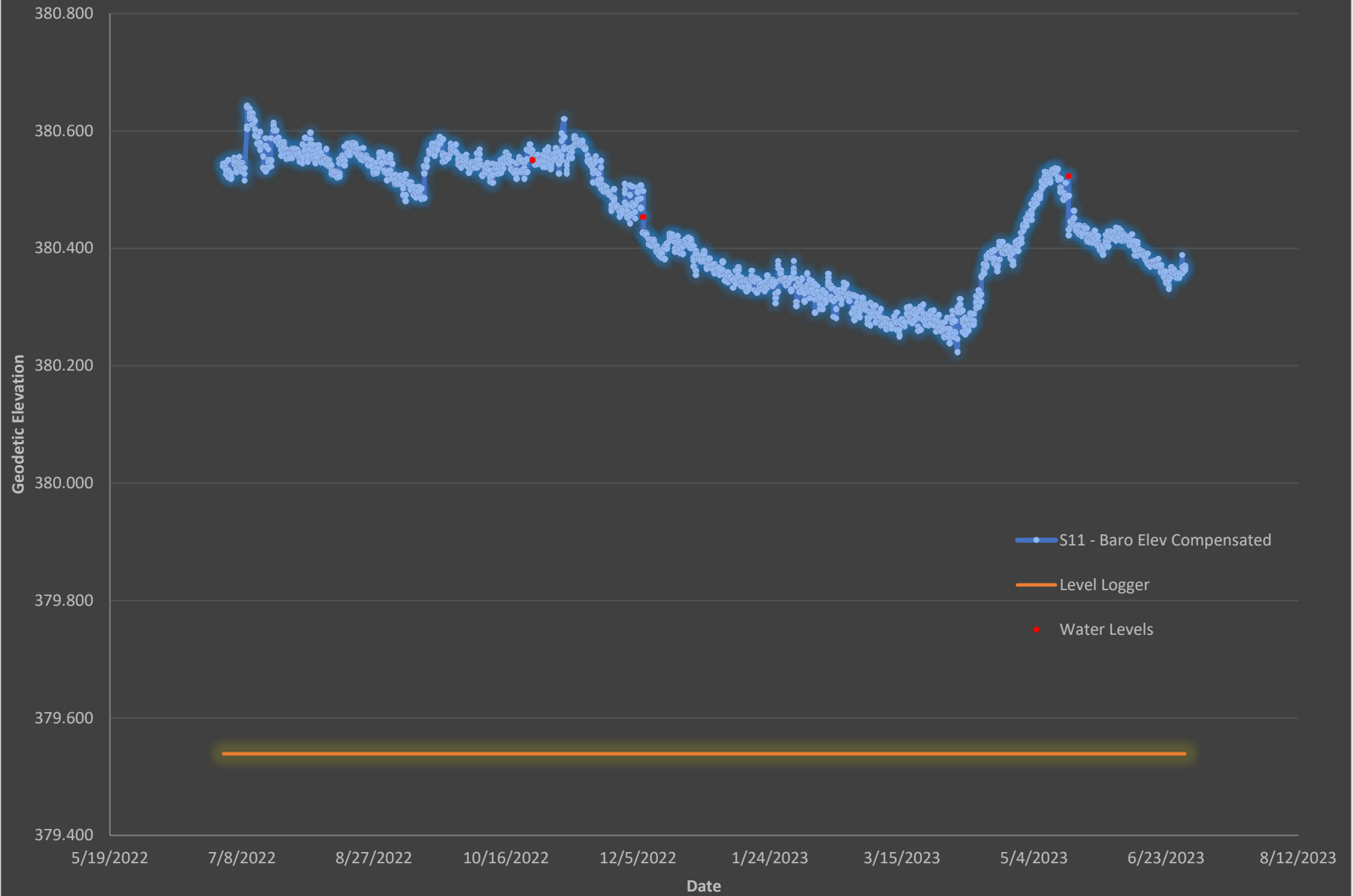
S09 Water Elevations



S10 Water Elevations



S11 Water Elevations



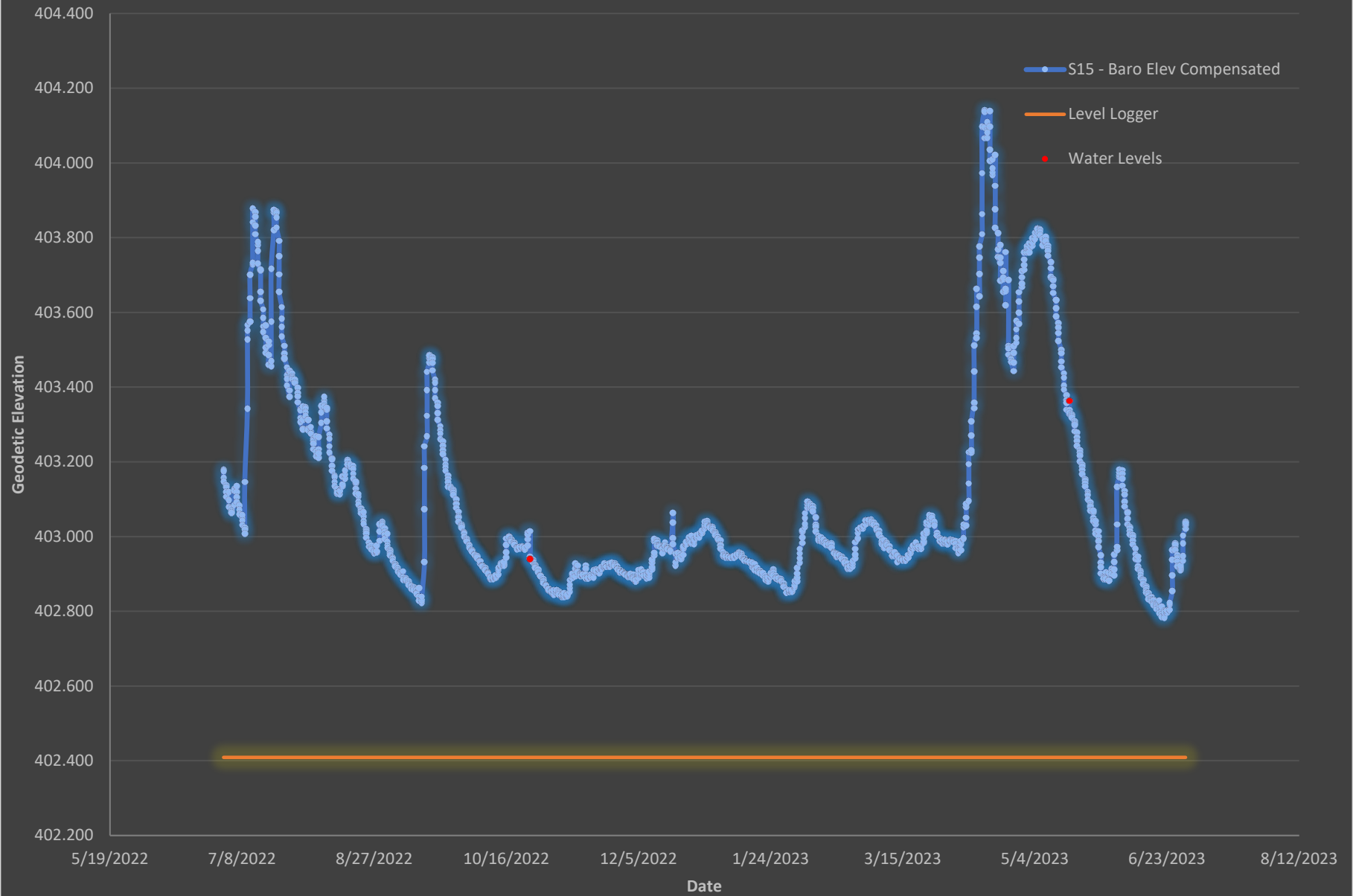
S12 Water Elevations



T14 Water Elevations



T15 Water Elevations



APPENDIX D2
Discrete Flow Measurements

FLOW METERING DATA (cubic meters per second)

Date	FM14	FM15	FM16	FM17	FM18	FM19	FM20
	Flow Rate (m ³ /s)						
21-Jun-21	0.04	0.43	0.008		0.006		
22-Jun-21						0.20	
14-Jul-21	~0	0.13					
13-Oct-21	3.33	2.62	Unsafe*	0.056	0.287		
14-Oct-21						2.02	0.48
28-Jun-22	N/A	1.53	0.071		0.020		
29-Jun-22						0.93	
08-Aug-22	N/A	1.65	0.013		0.021		
09-Aug-22						0.76	
02-Nov-22	N/A	0.43	0.013		0.074		
03-Nov-22						0.21	
29-Jun-23	~0		0.002		0.001	0.12	
30-Jun-23		0.70					

Note 1: ~0 indicates a near zero value.

Note 2: N/A indicates the site was inaccessible, due to the presence of a beaver dam.

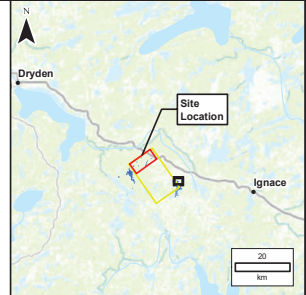
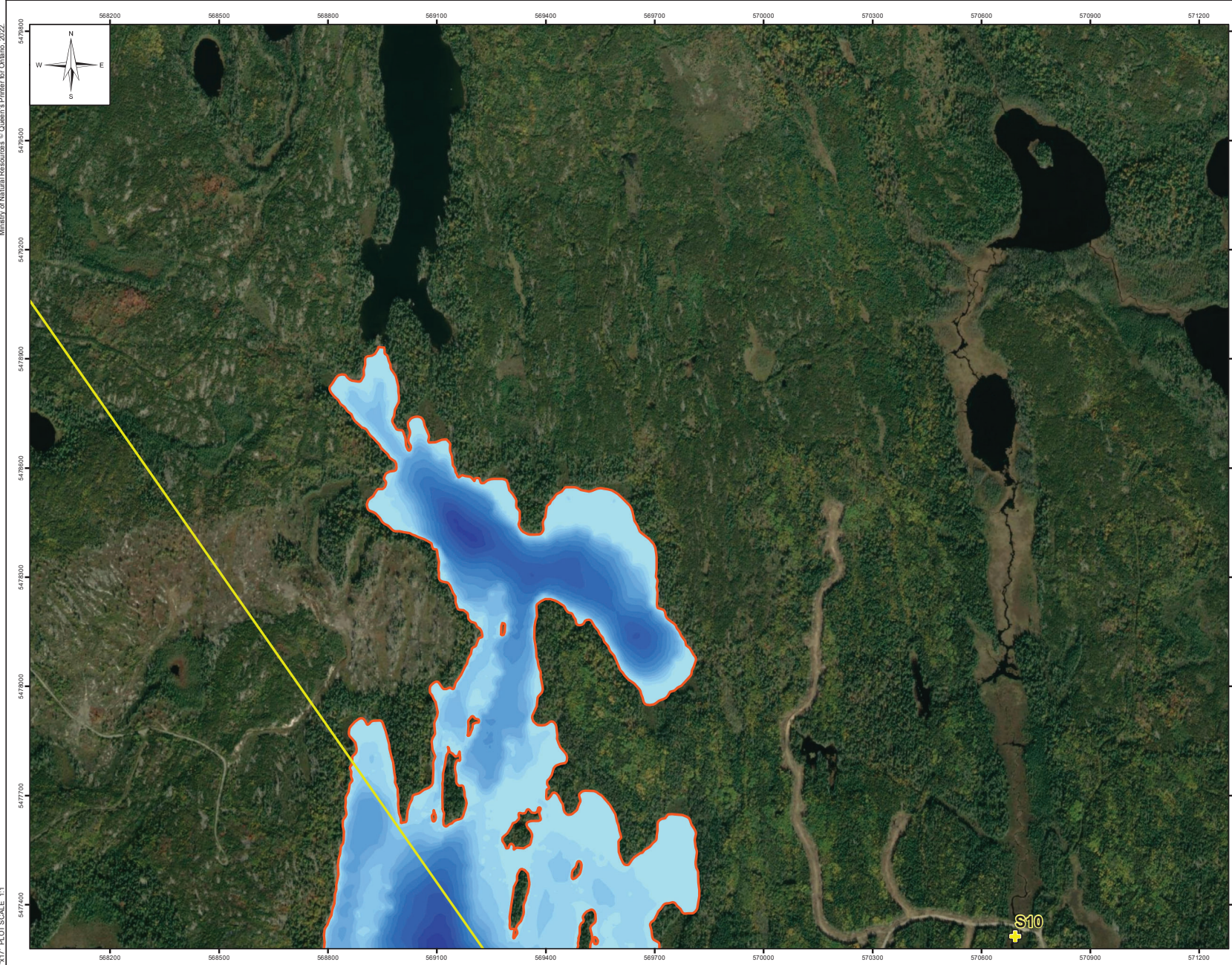
Note 3: Unsafe* indicates conditions that were unsafe for the operator to enter or traverse the stream.

Note 4: (blue) Uncertainty exceeds USGS standards for ADCP measurement; flow should be considered as approximate.

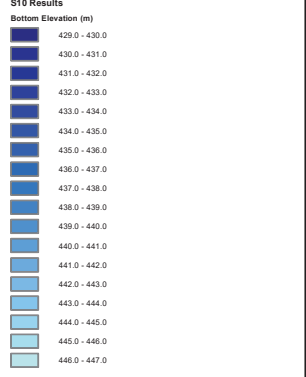
APPENDIX D3
Lake Bathymetry

Portions of data Produced by KGS Group, under License with the Ontario Ministry of Natural Resources - Queen's Printer for Ontario, 2022.

Filename: R:\Projects\2021\121-3836-002\Dryden\GIS\MXDs\Completed Bath\21-3836-002_Fig01.mxd
FIG 01 SCALE: 1:1

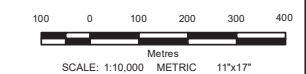


- LEGEND:**
- Water Level Logger
 - RSA Boundary
 - LSA Boundary
 - Edge of Water (445.9 m)



NOTES:

1. All units are metric and in metres unless otherwise specified. Map Projection shown is Universal Transverse Mercator, NAD 1983 CSRS, Zone 15. Elevations are in metres (CGVD2013).
2. Bathymetric survey was completed between June-October 2021. Water level at the time of survey ranged from 442.81 to 446.48 m.



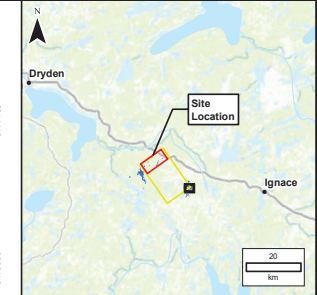
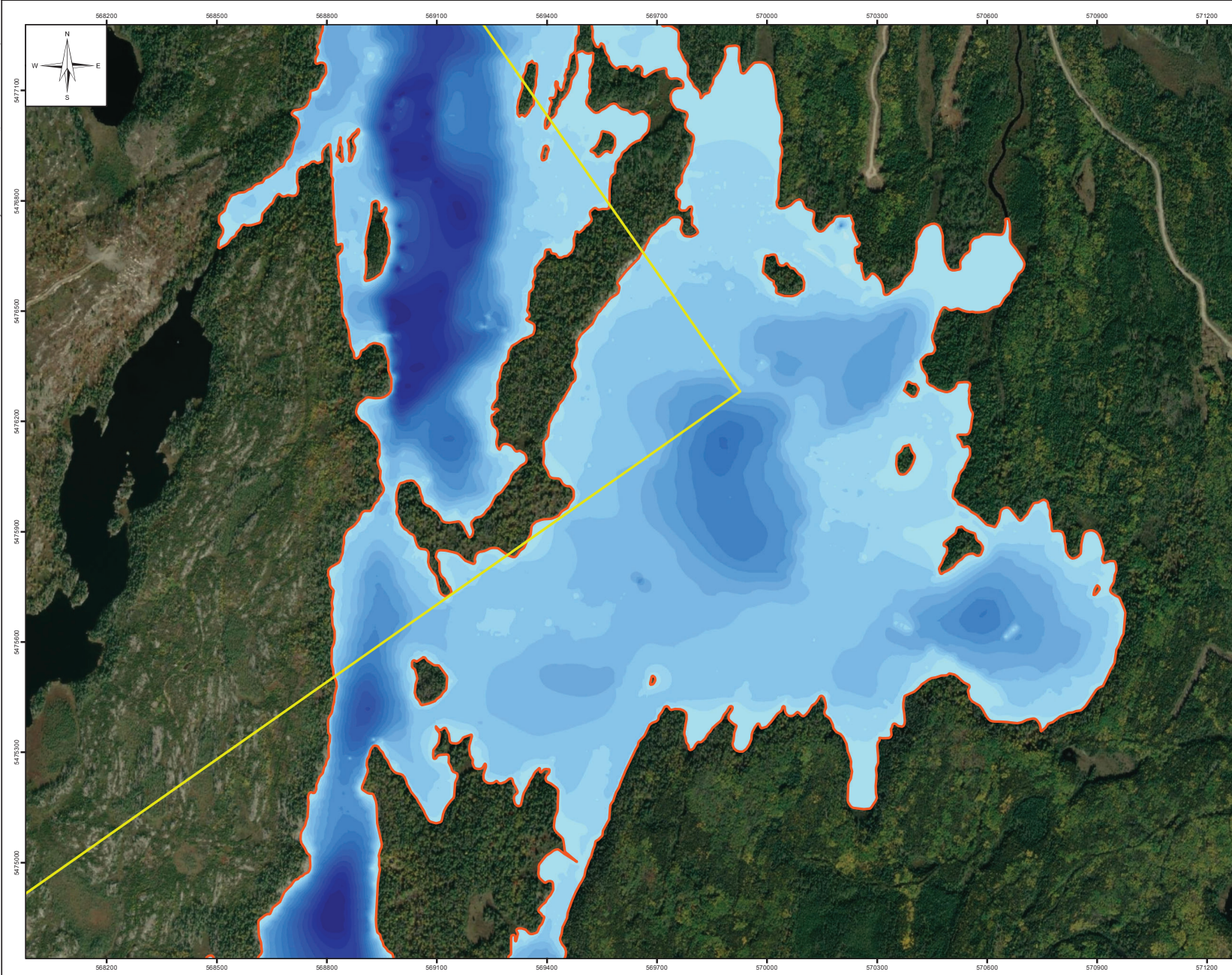
1	23/11/30	ISSUED FOR USE	JWM	MSW
0	23/11/24	ISSUED WITH FINAL REPORT	JWM	MSW

REVISIONS / ISSUE

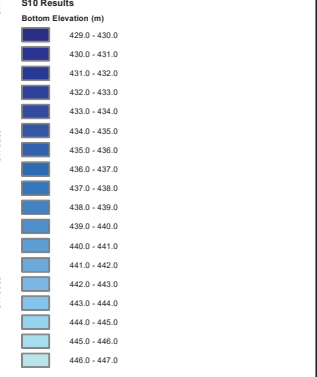


NWMO ENVIRONMENTAL BASELINE
SAMPLE COLLECTION

S10 BATHYMETRY SURVEY
SHEET 11 OF 16



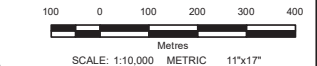
- LEGEND:**
- Water Level Logger
 - RSA Boundary
 - LSA Boundary
 - Edge of Water (445.9 m)



NOTES:

1. All units are metric and in metres unless otherwise specified.
Map Projection shown is Universal Transverse Mercator, NAD 1983 CSRS, Zone 15.
Elevations are in metres (CGVD2013).

2. Bathymetric survey was completed between June-October 2021. Water level at the time of survey ranged from 442.81 to 446.48 m.



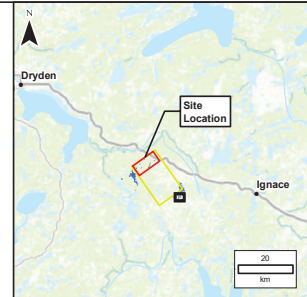
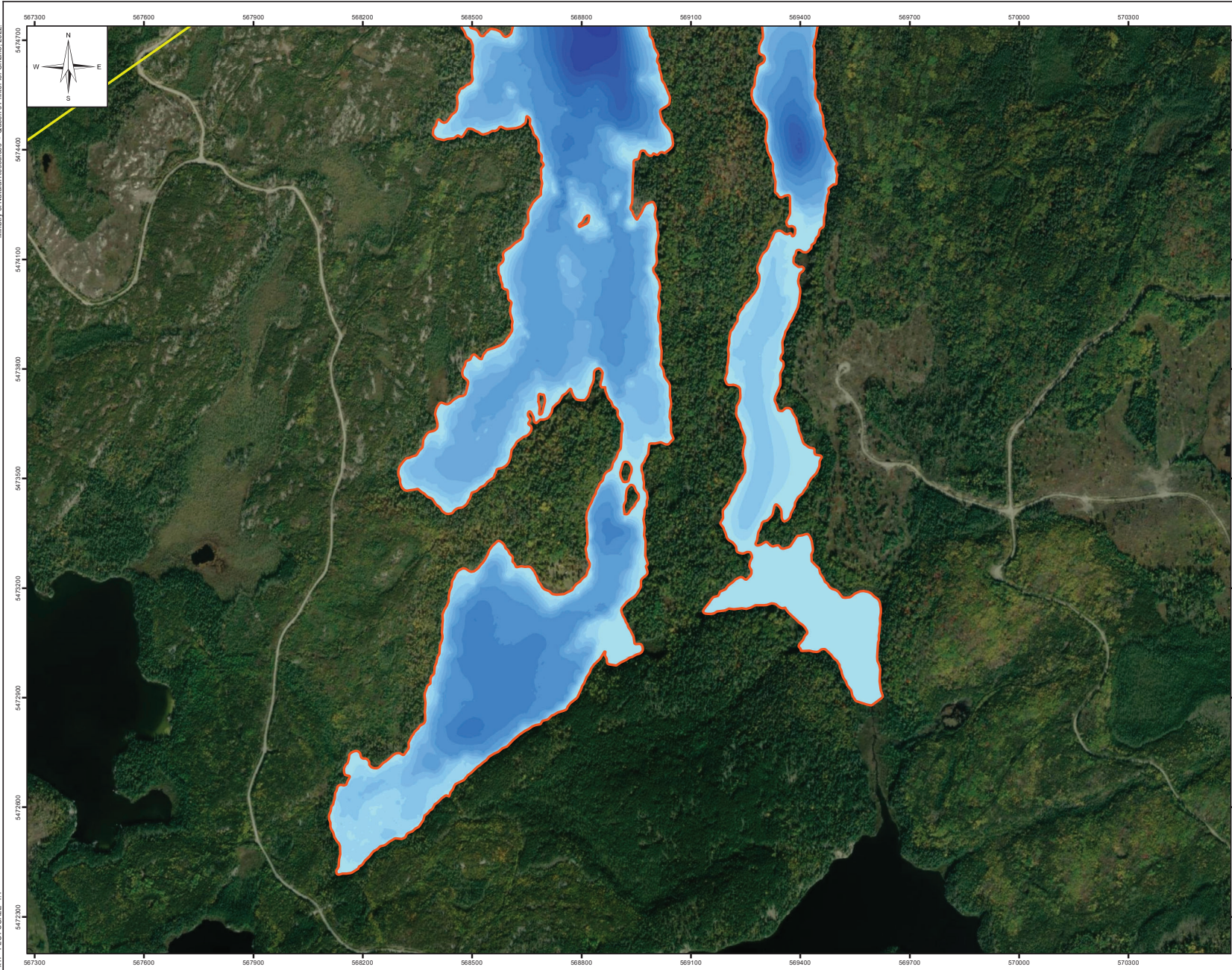
1	23/11/30	ISSUED FOR USE	JWM	MSW
0	23/11/24	ISSUED WITH FINAL REPORT	JWM	MSW

REVISIONS / ISSUE



NWMO ENVIRONMENTAL BASELINE
SAMPLE COLLECTION

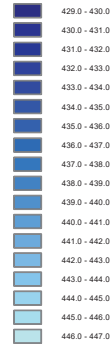
S10 BATHYMETRY SURVEY
SHEET 12 OF 16



- LEGEND:**
- Water Level Logger
 - RSA Boundary
 - LSA Boundary
 - Edge of Water (445.9 m)

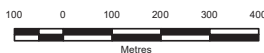
S10 Results

Bottom Elevation (m)



NOTES:

1. All units are metric and in metres unless otherwise specified.
 Map Projection shown is Universal Transverse Mercator,
 NAD 1983 CSRS, Zone 15.
 Elevations are in metres (CGVD2013).
2. Bathymetric survey was completed between June-October
 2021. Water level at the time of survey ranged from 442.81
 to 446.48 m.



1	23/11/20	ISSUED FOR USE	JWM	MSW
0	23/11/24	ISSUED WITH FINAL REPORT	JWM	MSW
NO.	BY/AMEND	DESCRIPTION	ISSUED BY	CHECKED BY

REVISIONS / ISSUE

KGS
 GROUP

nwmo
 NUCLEAR WASTE
 MANAGEMENT
 ORGANIZATION

**NWMO ENVIRONMENTAL BASELINE
 SAMPLE COLLECTION**

**S10 BATHYMETRY SURVEY
 SHEET 13 OF 16**

NOVEMBER 2023

FIGURE 01.13

1