Appendix 19: 2022 Aquatic Effects Monitoring Program (AEMP) Report

Aquatic Effects Monitoring Program 2022 Annual Report

Meliadine Gold Mine

Prepared for:

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PLAIN LANGUAGE SUMMARY

Introduction

This document presents the findings of the 2022 Aquatic Effects Monitoring Program (AEMP) for Agnico Eagle's Meliadine Gold Mine near Rankin Inlet, Nunavut. The AEMP is a requirement of the Type A Water Licence (2AM-MEL-1631). The main purpose of the AEMP is to evaluate the short-term and long-term effects of the mine on the aquatic environment and verify that the mine is operating as planned.

The scope of the 2022 AEMP involved water quality monitoring and a phytoplankton community study in Meliadine Lake and water quality monitoring in three smaller lakes located near the mine: Lake B7, Lake D7, and Lake A8. For the Meliadine Lake study, water sampling was completed at the near-field (NF) area (MEL-01) in the East Basin and mid-field (MF) area (MEL-02) once under the ice in April and monthly during the open water season (July, August, and September). Reference Area 1 (MEL-03) was sampled monthly during the open water season, and Reference Areas 2 and 3 (MEL-04 and MEL-05) were sampled in August, coinciding with the phytoplankton sampling program. Water quality sampling was completed at the Peninsula Lakes in July and August.

Each study was carried out to answer key questions (**Table ES-1**) regarding the potential for activities at the mine to affect the aquatic environment.

Table ES-1. Key Questions for the Meliadine Lake and Peninsula Lakes Studies

Component	Key Questions
Meliadine Lake	
Water Quality	Are concentrations of key parameters in effluent less than limits specified in the Water Licence?
	Has water quality in the exposure areas changed over time, relative to reference/baseline areas?
	Is water quality consistent with predictions in the Final Environmental Impact Statement (FEIS) and below guidelines to protect aquatic life and human health?
Phytoplankton Community	Is the phytoplankton community affected by potential mine-related changes in water quality in Meliadine Lake?
Peninsula Lakes	
Water Quality	Is water quality consistent with predictions in the FEIS and below guidelines to protect aquatic life and human health?
	Has water quality in the exposure areas changed over time, relative to baseline conditions?

Meliadine Lake Study

The AEMP was designed to assess whether mining activities are affecting water quality and the health of the aquatic ecosystem in Meliadine Lake. Discharge of treated surface contact water (effluent) is the mining-related activity with the greatest potential to cause changes in water quality, particularly in the East Basin. Water quality in Meliadine Lake is also subject to natural and interannual climate variability. Based on regional climate data from Rankin Inlet, 2019 and 2021 were two years with the highest annual precipitation going back to 1980. The effect of high rainfall was evident in higher concentrations of several parameters in August and September 2019, which was a year with relatively low discharge of effluent to Meliadine Lake.

Effluent Quality

The mine discharged effluent (treated contact water) to Meliadine Lake from July 1st to August 2nd and from August 23rd to September 25th. Discharge was stopped in August because the water level in the Containment Pond 1 (CP1) reached its lower operating level. Less water was discharged in 2022 compared to 2021 and 2020 due to the combined effect of less precipitation in the winter and spring/summer and more capacity in CP1 (lower freeze-up level) ahead of spring freshet. Effluent samples were collected weekly when water was discharged to Meliadine Lake, and there were no exceedances of the effluent quality limits in the Water Licence. Furthermore, no effects were observed to Rainbow Trout or zooplankton (*Daphnia magna*) in the acute toxicity tests or in the chronic toxicity test with *Lemna minor* (aquatic plant). Together, the effluent chemistry data and toxicity test results demonstrate that water discharged to Meliadine Lake is safe for aquatic life.

Meliadine Lake Water Quality

There were no exceedances of AEMP Action Levels in 2022. The concentrations for parameters of interest were well below guidelines meant to protect aquatic life and drinking water quality.

Water chemistry results from 2022 indicate some parameters in Meliadine Lake are elevated compared to the baseline and pre-construction phases (pre-2018). In general, changes in water quality have been more pronounced in the East Basin (MEL-01) compared to the mid-field (MEL-02) and far-field reference areas. Parameters that have increased over time throughout Meliadine Lake include major ions (chloride, calcium, sulfate, etc.), organic carbon, and a few metals (arsenic, molybdenum, strontium, and uranium).

The relative influence of effluent versus high precipitation on water quality in Meliadine Lake is difficult to accurately estimate with the available data. However, the timing of lake-wide changes for some parameters coincides with high rainfall totals in 2019 and 2021, which suggests that interannual climate

variability has contributed to some of the changes in water quality observed in Meliadine Lake in recent years.

Phytoplankton Community

Phytoplankton, or algae, form the base of the aquatic food web, providing energy and nutrients for various aquatic invertebrates that are important sources of food for fish. The phytoplankton study was conducted in August at the NF, MF, and reference areas to determine if effluent is causing effects to the phytoplankton community. The focus of the assessment during the early operations has been on determining if effluent is causing nutrient enrichment and increases in primary productivity in the East Basin of Meliadine Lake. Nutrient enrichment is evaluated by looking at indicators of primary productivity (chlorophyll-a and phytoplankton biomass) and the structure of the phytoplankton community.

Productivity – Phytoplankton biomass is variable from year to year, particularly in the East Basin. The two years with the highest biomass, 2019 and 2021, had the highest rainfalls recorded over the last four decades. The observed increase in biomass in 2019 and 2021 was temporary, with biomass in the subsequent year (2020 and 2022, respectively) decreasing to levels similar to the MF and reference areas. Unlike phytoplankton biomass, which hasn't shown any trend, chlorophyll-a has steadily increased in the NF and MF areas during operations. It's unclear why chlorophyll-a follows a different trend than biomass, but neither of the endpoints was strongly correlated with phosphorus, nitrogen, or organic carbon concentrations in the East Basin.

Community Structure – The phytoplankton community composition (number and biomass of various taxa) at the NF and MF areas closely resembles the reference areas in most years going back to 2016, (the first year of sampling at all five study areas). Two years stand out where the phytoplankton community was noticeably different in the NF and MF areas: 2020 (NF and MF) and 2022 (NF only). The phytoplankton results for these years/areas had relatively low community biomass. 2020 and 2022 were also very different in terms of effluent discharge and loading to the East Basin (high in 2020, low in 2022), yet the phytoplankton community structure followed a similar pattern of change in the NF area. This suggests that the underlying factor(s) responsible for changes in the phytoplankton community structure may be unrelated to mining.

Results of the multi-year phytoplankton monitoring program indicate there have been increases in chlorophyll-a concentrations in the NF, but no discernable trends in biomass and community composition in the NF. While the specific factors influencing interannual and spatial differences in phytoplankton biomass and chlorophyll-a are not fully understood, there is little evidence of effluent-related nutrient enrichment or toxicological impairment to the phytoplankton community in the East Basin of Meliadine Lake.

The FEIS (Agnico Eagle, 2014) predicted that the phytoplankton community structure in the East Basin of Meliadine Lake could change due to increases in nitrogen, but the changes would be minor compared to baseline conditions. Furthermore, phytoplankton productivity was predicted to remain within the range of baseline conditions. The findings from the multiyear phytoplankton study are consistent with the predictions in the FEIS.

Peninsula Lakes Study

Snowpack Chemistry

Off-site migration of dust and aerial emissions have the potential to affect water quality in lakes close to the mine. The snowpack sampling program is completed in late winter (typically April) to determine the extent and magnitude of off-site migration of metals and other parameters of interest. The snowpack chemistry results from 2022 indicate concentrations of metals and major ions in snow samples collected north of the main camp and near WRSF3 were similar to background. The sampling location on the north side of Lake A8 had higher concentrations of several metals compared to background, in particular arsenic and iron. This monitoring station is south of Tiriganiaq Pits 1 and 2 and downwind from the prevailing wind direction. The findings are consistent with the 2020 and 2021 snowpack chemistry results and provide context for interpreting the source of changes in water quality for Lake A8, Lake B7, and Lake D7.

Peninsula Lakes Water Quality

Water quality monitoring was completed at three replicate stations in each of the Peninsula Lakes in July and August. Lake A8 and Lake B7 are located next to major infrastructure; Lake A8 is located south of Tiriganiaq Pit 1 and 2 and Lake B7 is located west of the Tailings Storage Facility (TSF). Lake D7 is located west of Lake B7. Water quality data from Lake D7 provides information on the spatial extent of potential mining-related effects from dust, emissions, and alterations to the landscape and hydrology during construction and operations.

Water quality results from Lake A8, Lake B7, and Lake D7 in 2022 were generally comparable to recent years and there were no exceedances of AEMP Action Levels in any of the samples collected in 2022. Water quality in Lake D7 has remained stable in recent years despite increased surface activity at the mine. Arsenic and molybdenum exceeded their respective Normal Ranges in 2022, but the magnitude of the difference was less than 20% and concentrations in 2022 were similar to concentrations observed in recent years. Water quality in Lake B7 and Lake A8 has changed significantly for some parameters during operations. Sulfate and arsenic are the two parameters where the timing and magnitude of the change point to the mine as the underlying cause. Since 2019, sulfate concentrations increased by 70-80% in Lake A8 and Lake B7. Over that same period, arsenic concentrations increased 4-fold in Lake A8 and 8-

fold in Lake B7. The proximity of the lakes to the TSF, the prevailing wind direction, the temporal trend compared to the mine plan, and the snowpack chemistry data suggest the TSF is the probable source.

Conclusions from the 2022 AEMP

- There were no exceedances of AEMP Action Levels for any parameters in Meliadine Lake or the Peninsula Lakes linked to activities at the mine in 2022. The AEMP Action Levels are lower than the water quality guidelines for the protection of aquatic life, the human health drinking water guidelines, or in the case of fluoride, arsenic, or iron, the site-specific water quality objectives.
- Effluent has contributed to higher concentrations of some major ions, nutrients, and metals in the East Basin of Meliadine Lake over time. The effect of effluent on water quality in other areas of the Meliadine Lake is difficult to distinguish compared to the confounding effect of natural and regional interannual climate variability. On-going water quality monitoring should help decipher the effect of effluent discharge vs precipitation on water quality in Meliadine Lake. Changes in water quality in the East Basin align with what was predicted in the FEIS.
- Phytoplankton biomass has not shown year-over-year changes in the East Basin during operations (2018-2022) that are consistent with nutrient enrichment or toxicological impairment. Furthermore, the composition of the phytoplankton community in the East Basin has closely resembled the community in the MF and reference areas except for 2020 and 2022. The subtle differences in the community composition among the different areas and between years may be partly related to changes in water quality associated with high rainfall in the preceding years (2019 and 2021).
- Surface activities at the mine have caused changes in water quality in Lake A8 and Lake B7. The source of the change is likely the off-site migration of fine particulate dust from the TSF based on the results from the snowpack sampling program in April. The spatial extent of the changes in water quality appears to be localized to Lake B7 and Lake A8 based on a) the snowpack chemistry data from locations north and south of the mine, and b) the water quality results from Lake D7 remaining stable during operations and similar to baseline conditions. The 2022 water quality results from the Peninsula Lakes study are consistent with predictions in the FEIS, namely that water quality would change in the small waterbodies near the mine (e.g., Lake B7), but concentrations would not exceed guidelines for the protection of aquatic life, drinking water quality, or site-specific water quality objectives.

Other than routine monitoring as per the AEMP Design Plan, no other management actions or special studies are required for the AEMP in 2023.

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USE & LIMITATIONS OF THIS REPORT

This report has been prepared by Azimuth Consulting Group Inc. for the use of Agnico Eagle Mines Ltd., who has been party to the development of the scope of work for this project and understands its limitations. The extent to which previous investigations were relied on is detailed in the report.

In providing this report and performing the services in preparation of this report Azimuth accepts no responsibility in respect of the site described in this report or for any business decisions relating to the site, including decisions in respect of the management, purchase, sale or investment in the site.

This report and the assessments and recommendations contained in it are intended for the sole and exclusive use of Agnico Eagle.

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In addition, the conclusions and recommendations of this report are based upon applicable legislation existing at the time the report was drafted. Changes to legislation, such as an alteration in acceptable limits of contamination, may alter conclusions and recommendations.

This report is time-sensitive and pertains to a specific site and a specific scope of work. It is not applicable to any other site, development, or remediation other than that to which it specifically refers. Any change in the site, remediation or proposed development may necessitate a supplementary investigation and assessment.

ACRONYMS & GLOSSARY OF TERMS

Acronym / Term	Definition
AEMP	Aquatic Effects Monitoring Program is the primary instrument for determining if the mine is causing changes in the aquatic environment.
AEMP Benchmark	The AEMP Benchmarks are screening guidelines that are protective of aquatic life and human drinking water quality for the project.
AEMP Action Level	The AEMP Action Level is an early warning trigger equal to 75% of the AEMP Benchmark.
AWAR	All-weather Access Road connecting the mine site to Rankin Inlet.
Benthic Invertebrates	Benthic invertebrates refer to the diverse community of small animals that live in these lake bottom sediments (benthic means bottom, and invertebrates are small animals without bones).
Biomass	Biomass is the amount or weight of phytoplankton in per unit of water (µg/L).
Blanks (for quality control)	TB = Travel blanks are analyzed to assess cross contamination occurring during the transport of samples. These samples comprise analyte-free deionized water prepared in the lab by ALS, and travel to the site and back to the lab without being opened. DB = Deionized blanks (or field blanks) are analyzed to verify the "analyte-free" status of the deionized water to help interpret the equipment blank results. These samples are comprised of deionized water poured directly into the sampling containers. EB= Equipment blanks are analyzed to assess cross contamination in the sampling equipment that could lead to elevated concentrations or false positive data. These samples are comprised of analyte-free deionized water passed through the sampling equipment.
CALA	Canadian Association for Laboratory Accreditation
CCME	Canadian Council of Ministers of the Environment
CIRNAC	Crown Indigenous Relations and Northern Affairs Canada
CP	Containment pond / collection pond / control pond: Pond constructed for the collection and temporary storage of surface contact water that is eventually treated and discharged to Meliadine Lake.
CREMP	The Core Receiving Environmental Monitoring Program is the long-term aquatic monitoring program at Agnico Eagle's Meadowbank Complex north of Baker Lake.
DL	Detection limit
DO	Dissolved oxygen

Acronym / Term	Definition
DOC	Dissolved organic carbon: a measure of the amount of organic matter present in water that passes through a 0.45 µm filter.
DQO	Data quality objective: are statements that define the degree of confidence in conclusions from data produced from a sampling program.
ECCC	Environment and Climate Change Canada
EEM	Environmental Effects Monitoring is a science-based monitoring program developed by Environment and Climate Change Canada. EEM describes monitoring that mining companies must undertake to detect and measure changes in aquatic ecosystems (i.e., receiving environments).
EWTP	Effluent Water Treatment Plant treats surface contact water from Collection Pond 1 (CP1) to lower TSS prior to discharge to Meliadine Lake.
FEIS	Final Environmental Impact Statement
FEQG	Federal Environmental Quality Guidelines are water quality guidelines developed by Environment and Climate Change Canada.
IQ	Inuit Qaujimaningit and Inuit Qaujimajatuqangit: -> Inuit Qaujimaningit encompasses Inuit traditional knowledge (and variations thereof or Inuit Qaujimajatuqangit), local and community-based knowledge, as well as Inuit epistemology as it relates to Inuit Societal Values and Inuit Knowledge. -> Inuit Qaujimajatuqangit are the guiding principles of Inuit social values (NIRB 2018).
KivIA	Kivalliq Inuit Association
MDMER	Metal and Diamond Mining Effluent Regulations
MF	Mid-field area in Meliadine Lake (MEL-02)
NF	Near-field in Meliadine Lake (MEL-01)
nMDS	Non-Metric Multidimensional Scaling: a multivariate statistical method used to condense information with multiple variables into a two-dimensional representation of the data. Used here to visually assess differences in benthic invertebrate community structure over space.
NPAG	Non-potentially acid generating refers to rock that is not expected to contribute to low pH conditions in runoff (i.e., surface contact water) that is eventually collected, treated, and discharged to Meliadine Lake.
NML	Non-metals leaching refers to rock that is not expected to contribute to metals concentrations in runoff (i.e., surface contact water) that is eventually collected, treated, and discharged to Meliadine Lake.

Acronym / Term	Definition
NIRB	Nunavut Impact Review Board: The government agency responsible for reviewing and assessing the potential ecosystemic and socio-economic effects of the Meliadine Gold mine Project presented in the Final Environmental Impact Statement.
Normal Range	The normal range refers to the range of baseline/reference conditions within the study area lakes. For the water quality monitoring program, the normal range is use to identify parameters that may have increased in concentration due to activities at the mine.
NWB	Nunavut Water Board: The government agency responsible for regulating water use and management in the Nunavut Settlement Area. Terms and Conditions regarding water use for the Meliadine Gold Project are outlined in Water Licence No: 2AM-MEL1631.
Overburden	Overburden is soil and till that need to be removed prior to developing the open pits.
Parameters	The term used to describe what gets measured in samples of surface water, sediment, and fish tissue collected in the various monitoring programs. Calcium, magnesium, iron, and aluminum are examples of parameters.
Phytoplankton	Phytoplankton are a diverse group of aquatic plant species (algae) that form the base of the food web in Meliadine Lake. Like other plants, they use sunlight, nutrients, and carbon sources to grow.
QA/QC	Quality Assurance are the practices employed (e.g., use of experienced field staff, standard operating procedures (SOPs), field data sheets, and certified laboratories) to collect scientifically defensible samples meeting pre-defined data quality objectives (DQOs). Quality control (QC) refers to samples that are used to evaluate whether field sampling methods and laboratory analytical procedures are producing data that meet DQOs.
REF	Reference areas in Meliadine Lake (MEL-03, MEL-04, and MEL-05)
Safe drinking water	In the context of the AEMP, water is considered safe for drinking if measured concentrations of parameters are below guidelines published by Health Canada.
SETP	Saline Effluent Treatment Plant: treats excess saline groundwater stored in SP1 and SP4 prior to discharge to Melvin Bay. Treated effluent from the SETP is temporarily stored in SP3 before being trucked to Itivia Harbour and discharged to Melvin Bay.
Significance threshold	Significance thresholds are narrative statements that represent attributes of the aquatic environment that must be preserved as the Project develops.
SP	Saline pond: pond constructed for the collection and temporary storage of saline groundwater prior to treatment at the Saline Water Treatment Plant or the Saline Effluent Treatment Plant.

Acronym / Term	Definition
Species richness	Species richness refers to the number of different (distinct) species in a sample. Use to describe the diversity of the phytoplankton and benthic invertebrate communities in Meliadine Lake.
SSWQO	Site-specific water quality objectives are guidelines developed specifically for the lakes around Meliadine that take into consideration background water quality in the region. SSWQOs were developed for fluoride, arsenic, and iron as part of the AEMP (Golder 2014).
Surface contact water	Runoff from rain and snow melt that is collected on site. This water is collected, treated, and discharged to Meliadine Lake.
Tailings	Residual particulate waste left over after ore is processed to extract gold
TDS	Total Dissolved Solids: the total concentration of dissolved substances in water, including inorganic salts and small organic matter (e.g., calcium, magnesium, potassium, carbonates, chlorides).
TGD	Metal Mining Technical Guidance Document for Environmental Effects Monitoring
TKN	Total Kjeldahl nitrogen is the sum of organic nitrogen in water and total ammonia (NH_3)
TN	Total nitrogen is the sum of organic and inorganic nitrogen in water. Total nitrogen = TKN + nitrate + nitrite
TOC	Total Organic Carbon: a measure of the amount of organic matter present
TP	Total phosphorus is the sum of all forms of phosphorus in aquatic systems: inorganic phosphorus, particulate organic phosphorus, and dissolved (soluble) organic phosphorus.
TSF	Tailings Storage Facility is the engineered structure used to store and contain tailings produced during the milling of ore
TSS	Total Suspended Solids: the total concentration of suspended solids that are undissolved in water, including silt, clay, metals, and other organic and inorganic materials.
Waste rock	Waste rock is fragment rock with no economic value that is initially removed during development of the open pit and underground mine workings
WQG	Water quality guideline; generic term referring to guidelines developed by various agencies for protection of aquatic life
Water Licence	The Amended Type A Water Licence (2AM-MEL1631) authorizes Agnico Eagle to use waters and deposit waste in support of mining operations at Meliadine
WMWG	Water Management Working Group: a technical advisory group comprised of regulatory agencies, Agnico Eagle representatives, and consultants that was formed in 2020 as part of the Emergency Amendment to discharge surface contact water with higher concentrations of TDS

Acronym / Term	Definition
WQ-MOP	Water Quality Monitoring and Optimization Plan: a 3-phase plan to develop TDS Benchmarks for end of pipe effluent quality and surface water quality at the edge of the mixing zone in Meliadine Lake.
WRSF	Waste rock and overburden storage facilities

1 INTRODUCTION

1.1 Background

The Meliadine Gold Mine (Mine) is in the Kivalliq District of Nunavut near the western shore of Hudson Bay, in Northern Canada (**Figure 1-1**). The nearest community is Rankin Inlet (coordinates: 62°48’35’’N; 092°05’58’’W), located approximately 25 km south of the Tiriganiaq deposit (coordinates: 63°01’03’’N, 92°12’03’’W). The Mine is located within the Meliadine Lake watershed of the Wilson Water Management Area (Nunavut Water Regulations Schedule 4). Rankin Inlet is an Inuit hamlet on the Kudlulik Peninsula located between Chesterfield Inlet and Arviat. It is the regional centre and the largest community of the Kivalliq region.

The Mine is comprised of a plant site (mill), an emulsion plant, underground workings, open pits, a permanent camp to house staff, an exploration camp, ore stock piles, waste rock storage facilities (WRSF 1&3), a tailings storage facility (TSF), a water management system comprised of containment ponds, dikes, channels, water treatment plants, discharge locations, and other infrastructure to support mining operations. An All-Weather-Access-Road (AWAR) connects the mine to Rankin Inlet. The layout of the mine as of 2022 is shown in **Figure 1-2**.

The Project was approved by the Nunavut Impact Review Board (NIRB) on February 26, 2015, subject to terms and conditions stated in Project Certificate No. 006 (NIRB, 2022) and the Type A Water Licence (2AM-MEL1631) granted by the Nunavut Water Board (NWB) on April 1, 2016. An amended Type A Water Licence was issued on June 23, 2021 (referred to hereafter as the Water Licence).

Meliadine started commercial gold production in 2019. Mining activities during early operations have focused on underground and open-pit mining of the Tiriganiaq gold deposit. Open pit mining continued in Tiriganiaq Open Pit 1 (TIRI01) throughout 2022. Overburden and waste rock from TIR01 was placed in Waste Rock Storage Facility 1 and 3 (WRSF1 & 3). A timeline of major construction activities from 2015 to 2022 is provided in **Table 1-3**.

1.2 Aquatic Effects Monitoring Program

1.2.1 Overview

Part I of the Water Licence outlines the conditions that pertain to monitoring in the aquatic environment. As stated in Part 1 Item 2, Agnico Eagle is required to implement the Aquatic Effects Monitoring Program (AEMP) Design Plan as approved by the NWB. The AEMP Design Plan was updated in December 2022 (Version 2_NWB) to comply with the Type A Water Licence Amendment application (Azimuth, 2022a).

The AEMP is the integrated monitoring program used to determine if the discharge of treated effluent or other activities at the mine are causing changes in water quality and impacts to aquatic life beyond those changes that were predicted in the Final Environmental Impact Statement (FEIS; Agnico Eagle, 2014). The AEMP was developed in consultation with communities, stakeholders, and regulators. Inuit Qaujimajatuqangit (IQ; Traditional Knowledge) helped define and improve the scope of the AEMP, as stated in Section 1.5.1: *Summary of Inuit Qaujimajatuqangit Knowledge, Traditional Land Use, and Concerns of Inuit regarding the Project* in the Main Application for the Type A Water Licence (Agnico Eagle, 2015). The AEMP is currently focused on monitoring changes related to construction and operations, but the AEMP also considers late operations to closure as well as the development of other deposits. The AEMP ultimately provides information used to make decisions on how to minimize, mitigate, and/or manage the potential effects of the mine on the aquatic environment.

1.2.2 Study Design

Monitoring is conducted in Meliadine Lake as well as three lakes close to the mine (known as the Peninsula Lakes) that are potentially impacted by non-point source discharges such as dust and hydrological changes associated with construction of the mine. Meliadine Lake is the final discharge point for effluent (treated surface contact water) collected at the mine, and for this reason more resources are devoted to monitoring changes in the aquatic environment. An overview of the Meliadine Lake and Peninsula Lakes studies is provided below.

Meliadine Lake Study

The Meliadine Lake study was designed to detect mine-related changes and define the spatial and temporal extent of those changes. The study design uses multiple control-impact study design with two exposure areas (near-field [NF], mid-field [MF]) and three reference areas to provide spatial context when interpreting potential changes within and between years. The NF area (MEL-01) is in the East Basin around the diffuser. Changes in water quality and effects to the biological communities caused by discharge of effluent to Meliadine Lake would be expected to occur at MEL-01 first. The MF area (MEL-02) is located approximately 6 km downstream from MEL-01 past the narrows that separates the east and northwest basins. Monitoring data from MEL-02 helps define the spatial extent of potential changes observed at MEL-01. Three reference areas are included in the study design to provide insights into regional trends that would be expected to influence all sampling areas. Reference Area 1 (MEL-03) is in a bay in the northwest basin of Meliadine Lake. Reference Area 2 (MEL-04) is in the northwest area of the lake near the outlet to Peter Lake. Reference Area 3 (MEL-05) is in the southwest basin near the outlet to the Meliadine River.

The current scope of the Meliadine Lake study includes monitoring water, sediment, phytoplankton, benthic invertebrates, fish health, and fish tissue chemistry. To improve efficiency and reduce

redundancy, the scope of biological monitoring under the AEMP was harmonized with the EEM program required under MDMER. Biological monitoring studies (benthic invertebrates and fish) are conducted every 3-years to assess whether discharge of effluent is causing an effect to fish and benthic invertebrate communities. The most recent fisheries and benthic invertebrate community studies for the AEMP and EEM program (Cycle 2) were conducted in 2021 (Azimuth, 2022b and 2022c).

Peninsula Lakes Study

The water quality component of the Peninsula Lakes AEMP is designed to detect changes in water quality related primarily to the deposition of aerial emissions and alteration of watersheds (i.e., changes to natural drainage paths or hydrologic balance) (Agnico Eagle, 2014). Importantly, changes in water quality in the Peninsula Lakes area were predicted to be local and to not extend to Meliadine Lake.

Water quality monitoring is completed at three headwater lakes (Lake A8, Lake B7 and Lake D7; **Figure 1-2**) in July and August to assess whether the Mine is indirectly causing changes in water quality. If changes in water quality are detected, follow-up investigations may be conducted to determine the significance of changes in water quality and potential impacts to aquatic life.

1.3 Objectives and Scope of the 2022 AEMP

The 2022 AEMP was completed to meet regulatory requirements outlined in the Water Licence while also meeting commitments made during the environmental permitting process. The specific objectives of the AEMP are as follows:

- Determine the short- and long-term effects of the mine on the aquatic receiving environment;
- Evaluate the accuracy of predictions made in the FEIS, including the final significance statements regarding impacts to the aquatic ecosystem;
- Assess the efficacy of planned mitigation incorporated into the mine design; and
- Collect data required to identify the need for potential additional mitigation of mine effects within the Management Response Framework.

The scope of the 2022 AEMP involved water quality and phytoplankton community monitoring in Meliadine Lake and water quality monitoring in the Peninsula Lakes (A8, B7, and D7). An overview of the sampling design is provided in **Table 1-1**. Key questions for the water quality and phytoplankton community programs are presented in **Table 1-2**.

Table 1-1. Scope of the 2022 AEMP

Lake/Area	Water Quality Monitoring Program				Phytoplankton Community Study
	Apr	Jul	Aug	Sep	Aug
Meliadine Lake Study					
MEL-01	●	●	●	●	●
MEL-02	●	●	●	●	●
MEL-03		●	●	●	●
MEL-04			●		●
MEL-05			●		●
Peninsula Lakes Study					
A8, B7, D7		●	●		

Table 1-2. Key Questions for the Meliadine Lake and Peninsula Lakes Studies

Component	Key Questions
Meliadine Lake	
Water Quality	Are concentrations of key parameters in effluent less than limits specified in the Water Licence?
	Has water quality in the exposure areas changed over time, relative to reference/baseline areas?
	Is water quality consistent with predictions in the FEIS and below guidelines to protect aquatic life and human health?
Phytoplankton Community	Is the phytoplankton community affected by potential mine-related changes in water quality in Meliadine Lake?
Peninsula Lakes	
Water Quality	Is water quality consistent with predictions in the FEIS and below guidelines to protect aquatic life and human health?
	Has water quality changed over time relative to baseline conditions?

1.4 Report Structure

The 2022 AEMP report is organized into the following sections and their associated appendices.

- **Section 2** Source Characterization – this chapter presents the results off the effluent quality monitoring program and results from the snow core sampling program in 2022. Supplemental figures and tables are provided in **Appendix B**.
- **Section 3** Meliadine Lake Water Quality – this chapter discusses changes in water quality in Meliadine. Supplemental figures and tables are provided in **Appendix C**.
- **Section 4** Peninsula Lakes Water Quality – this chapter discusses changes in water quality in Lake A8, Lake B7, and Lake D7. Supplemental figures and tables are provided in **Appendix D**.
- **Section 5** Phytoplankton Community – this chapter presents the results of the 2022 phytoplankton community monitoring program and long-term trends in primary productivity in Meliadine Lake. Supplemental figures and tables are provided in **Appendix E**.
- **Section 6** Response Framework and Action Level Assessment
- Data quality assurance and quality control methods and results for the 2022 AEMP are provided in **Appendix A**

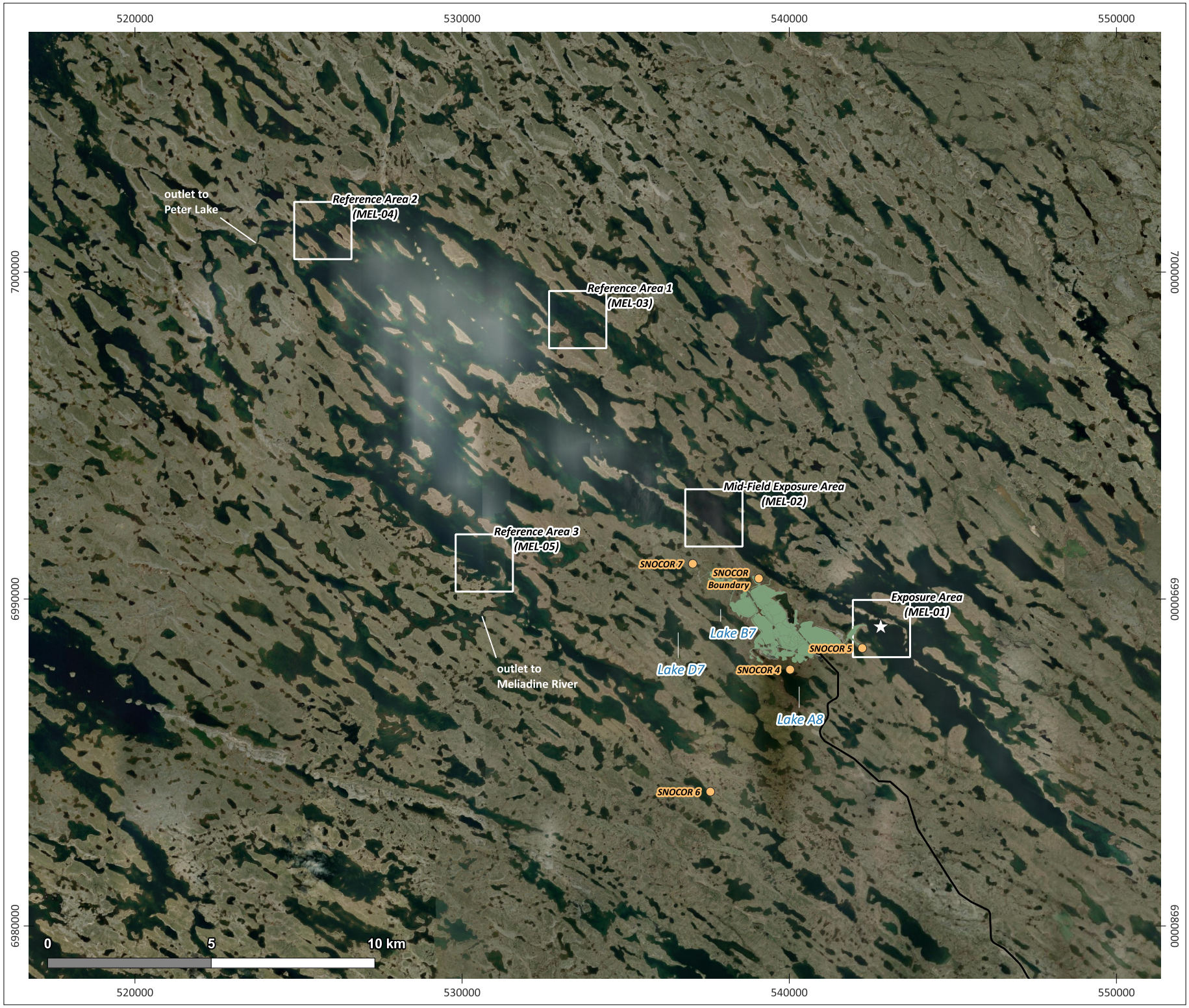


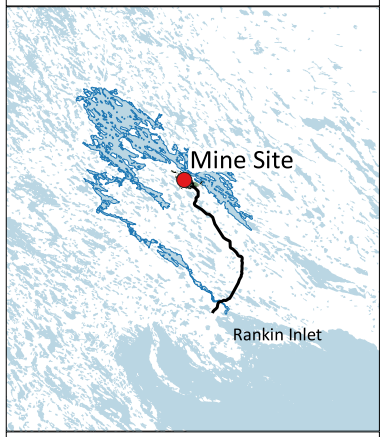
Figure 1-1
Study Area for the Aquatic Effects Monitoring Program

Aquatic Effects Monitoring Program
2022 Annual Report

AZIMUTH

Date:	March 10, 2023
Datum:	NAD 83 UTM Zone 15N
Scale:	1:150,000
Software:	QGIS version 3.22.11-Białowieża
Produced by:	E. Franz

REFERENCES:
1. Basemap imagery from ESRI
2. Mine Plan provided by Agnico Eagle
3. Roads and waterbodies from NRC



Legend

- CP1 Diffuser
- All weather access road
- Meliadine Mine (2022)
- Snowpack Monitoring Station

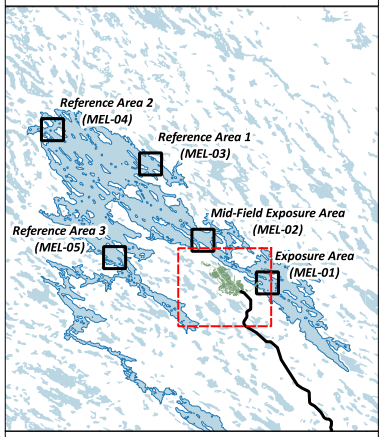
Figure 1-2
Meliadine Mine (2022)

Aquatic Effects Monitoring Program
2022 Annual Report

AZIMUTH

Date:	March 10, 2023
Datum:	NAD 83 UTM Zone 15N
Scale:	1:32,000
Software:	QGIS version 3.22.11-Białowieża
Produced by:	E. Franz

REFERENCES:
1. Basemap imagery from ESRI
2. Mine Plan provided by Agnico Eagle
3. Roads and waterbodies from NRC



Legend

- All weather access road
- CP1 Diffuser
- AEMP Water Quality Station
- Snowpack Monitoring Station

Table 1-3. Summary of Major Development Activities Since the Start of Construction in 2015.

Mine Year	Mine Development Activities and Sequence[a]
2015	- Started construction of industrial pad - Developed ramp to Tiriganiaq underground mine - Constructed portion of rock pad for stockpiles to store ore from Tiriganiaq underground ramp development
2016	- Continued construction of industrial pad - Constructed and operated the temporary landfill - Started temporary storage of waste rock in the future WRSF2 footprint for construction purposes - **Continuous dewatering of Lake H17 between August 21 and October 1 via a temporary diffuser located between MEL-01 and MEL-02 study areas (Golder 2017)**
2017	- Constructed and utilized Type A landfarm - Constructed and began operation of Type A landfill - Erected and closed all main buildings except crusher, paste plant, and crushed ore storage - Erected incinerator - Erected and operated effluent water treatment plant (EWTP) - Installed fuel tanks 3 ML and 250 kL at Portal1 - Erected fuel tank 13.5 ML in Rankin Inlet - **Discharge from CP1 planned for September to October 2017 did not occur due to exceedance of the maximum average concentration (MAC) for TDS of 1,400 mg/L** - **Sewage effluent from the exploration camp STP transported to main camp STP for treatment beginning in November (Golder 2019)**
2018	- Started construction of Ore Storage Pad 2 (OP2) - Erected and closed crusher, paste plant, and crushed ore storage buildings - Erected fuel tank 20 ML in Rankin Inlet - Erected fuel tanks 6 ML and 250 kL at industrial pad - Started process commissioning at end of Q4 - **Discharge of treated surface contact water from CP1 from June 21 to September 3**
2019	- Completed industrial pad - Completed construction of OP2 - Started to place filtered tailings in Cell 1 of TSF at end of Q1 - Started full capacity ore processing early Q2 - Created temporary waste rock storage area within footprint of Tiriganiaq Pit 2 from construction of Saline Pond 2 (SP2) - Began placement of waste materials from Saline Pond 4 (SP4) in WRSF1 - **Discharge of treated surface contact water from CP1 from July 9 to October 5**
2020	- Place waste rock from temporary storage within footprint of Tiriganiaq Pit 2 to construct haul roads for open pits and to WRSFs - Create temporary waste rock storage area between footprints of Tiriganiaq Pits 1 and 2 from construction of SP4 - Start to mine Tiriganiaq Pit 2 - Begin placement of waste materials from Tiriganiaq Pit 2 within WRSF3 - **Discharge of treated surface contact water from CP1 from June 5 to October 4**
2021	- Start to mine Tiriganiaq Pit 1 - Begin placement of waste rock and overburden from Tiriganiaq Pit 1 in WRSF1 - Continue placement of waste rock and overburden from Tiriganiaq Pit 2 in WRSF1 - Pause mining of Tiriganiaq Pit 2 - **Discharge of treated surface contact water from CP1 between July 13 and October 16**
2022	- Continue placement of Waste Rock and Overburden from Tiriganiaq Pit 1 in WRSF1 - Begin placement of overburden from Tiriganiaq Pit 1 in WRSF3 - Start Construction of OP2 Stage 2 - Construction of CP2 and associated CP2 Berm, Channels 9 and 10, east of WRSF3 - Continue mining of Tiriganiaq Pit 1 - **Discharge of treated surface contact water from CP1 from July 1 to August 2 and August 23 to September 25**

Notes:
Key water management activities are **bolded**.
[a] This table was adapted from the mine Waste Management Plan (Agnico Eagle 2020).

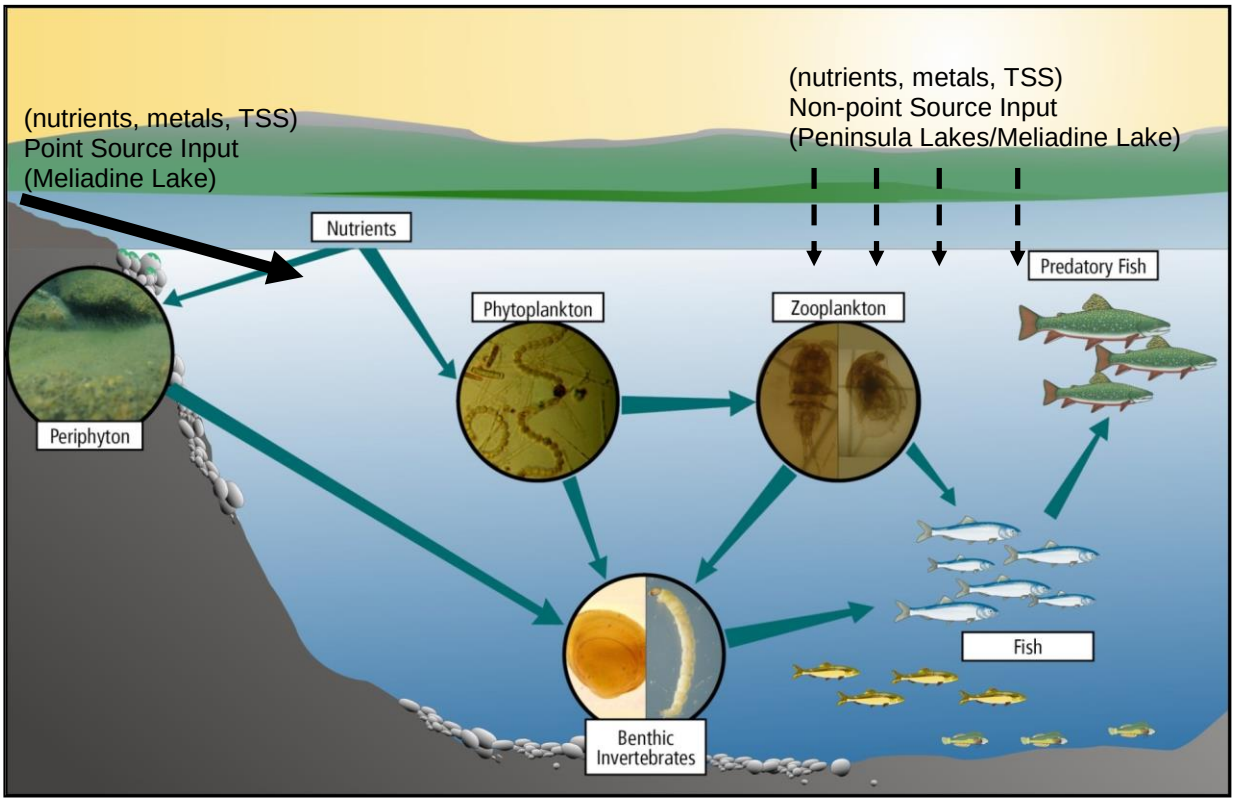
2 SOURCE CHARACTERIZATION

This section of the report summarizes the current understanding of how mining operations impact water quality in Meliadine Lake and the Peninsula Lakes. Mining operations have the potential to affect water quality in the aquatic receiving environment through discharge of treated effluent, accidental spills, altered hydrology due to construction activities, and aerial emissions and dust deposition (**Figure 2-1**). Effluent (treated surface contact water) is the main source of potential changes in water quality to Meliadine Lake. Agnico Eagle monitors discharge volumes and collects water from the Final Discharge Point (MEL-14) for chemistry and toxicity testing to ensure effluent quality is safe for aquatic life. The discharge volumes and chemistry results are used to calculate monthly and annual loadings, which in turn are used to help interpret spatial and temporal changes in water quality in Meliadine Lake.

The Peninsula Lakes are not receiving environments for effluent. They are, however, potentially impacted by the cumulative effect of altered hydrology and evaporation, dust, and aerial emissions. The effect of dust and aerial emissions are evaluated using chemistry results from the snow core monitoring program conducted in later winter each year.

Figure 2-1. Depiction of point source and non-point source inputs to the aquatic environment

Note: This figure was originally prepared in the AEMP Design Plan (Golder, 2016).



2.1 Findings from the 2022 Effluent Quality and Snow Chemistry Programs

- No exceedances of the effluent quality limits in the Water Licence were reported in any of the weekly samples collected at MEL-14 (the final discharge point) in 2022.
- Less water was discharged from CP1 to Meliadine Lake in 2022 compared to recent years. Low rates of discharge combined with acceptable effluent chemistry, resulted in less loadings for all parameters of interest in 2022 compared to 2020 and 2021.
- Water discharged to Meliadine Lake was not acutely toxic to Rainbow Trout or the aquatic invertebrate *D. magna*.
- There were no sublethal effects to frond yield or biomass in the aquatic plant *L. minor* in 2022.
- The snow chemistry results show that metals are accumulating in the snowpack south of Tiriganiaq Pit 1 and 2 near the shore of Lake 8. There was no evidence to suggest surface activities at the mine are contributing to off-site migration of metals north of the Camp or in the vicinity of WRSF3.

2.2 MEL-14 Effluent Monitoring Program

Agnico Eagle implements a Water Management Plan to minimize impacts to the quantity and quality of surface water at the Mine and surrounding waterbodies. Water discharged to Meliadine Lake is surface contact water (i.e., precipitation and runoff that encounters mine infrastructure such as tailings, waste rock, and roads). Surface contact water is intercepted and diverted toward Containment Ponds (CPs) through a network of dikes, channels, and culverts. Six CPs are currently used to manage surface contact water collected on Site (**Table 2-1**). Five (CP2 through CP6) are situated adjacent to major infrastructure (**Figure 1-2**) and are ultimately directed toward CP1 prior to treatment and discharge to Meliadine Lake. Other sources of water to CP1 include direct runoff from the CP1 catchment and treated wastewater from the Sewage Treatment Plant (STP). Water management for the CPs involves drawing down the water levels before freeze-up to create capacity to store runoff during freshet.

Table 2-1. Surface Contact Water Management Plan.

Source	Collection Pond
Industrial Site Pad, Ore Storage Pad 2 (OP2), Landfill	CP1
WRSF1	CP1, CP4, CP5
WRSF3	CP2 and CP6
Tiriganiaq Pit 1	Salinity based - CP4/CP5, SP1, or Tiriganiaq Pit 2
TSF	CP1 and CP3

2.2.1 Discharge from CP1 to Meliadine Lake

Water in CP1 is discharged to Meliadine Lake after treatment at the Effluent Water Treatment Plant (EWTP). The volume of water (m^3) discharged from CP1 to Meliadine Lake since 2018 is shown in **Figure 2-2**. Monthly discharge volumes to Meliadine through the permanent diffuser from 2018 through 2022 are presented in **Table 2-2**.

Approximately 436,600 m^3 of treated contact water was discharged to Meliadine Lake in 2022 from July 1st to August 2nd and from August 23rd to September 25th. Over 100,000 m^3 of the 2022 discharge was released from July 1st to July 9th to create capacity in CP1 during freshet. Runoff during freshet was lower in 2022 compared to previous years and discharge to Meliadine Lake was temporarily paused for 20 days from August 3rd to August 22nd, when the water level in CP1 reached its lower operating level The volume of water discharged to Meliadine Lake in 2022 was the second lowest since the EWTP came online in 2018 and was approximately half the 2021 discharge volume.

Figure 2-2. Daily Discharge (m³) from CP1 to Meliadine Lake, 2018-2022.

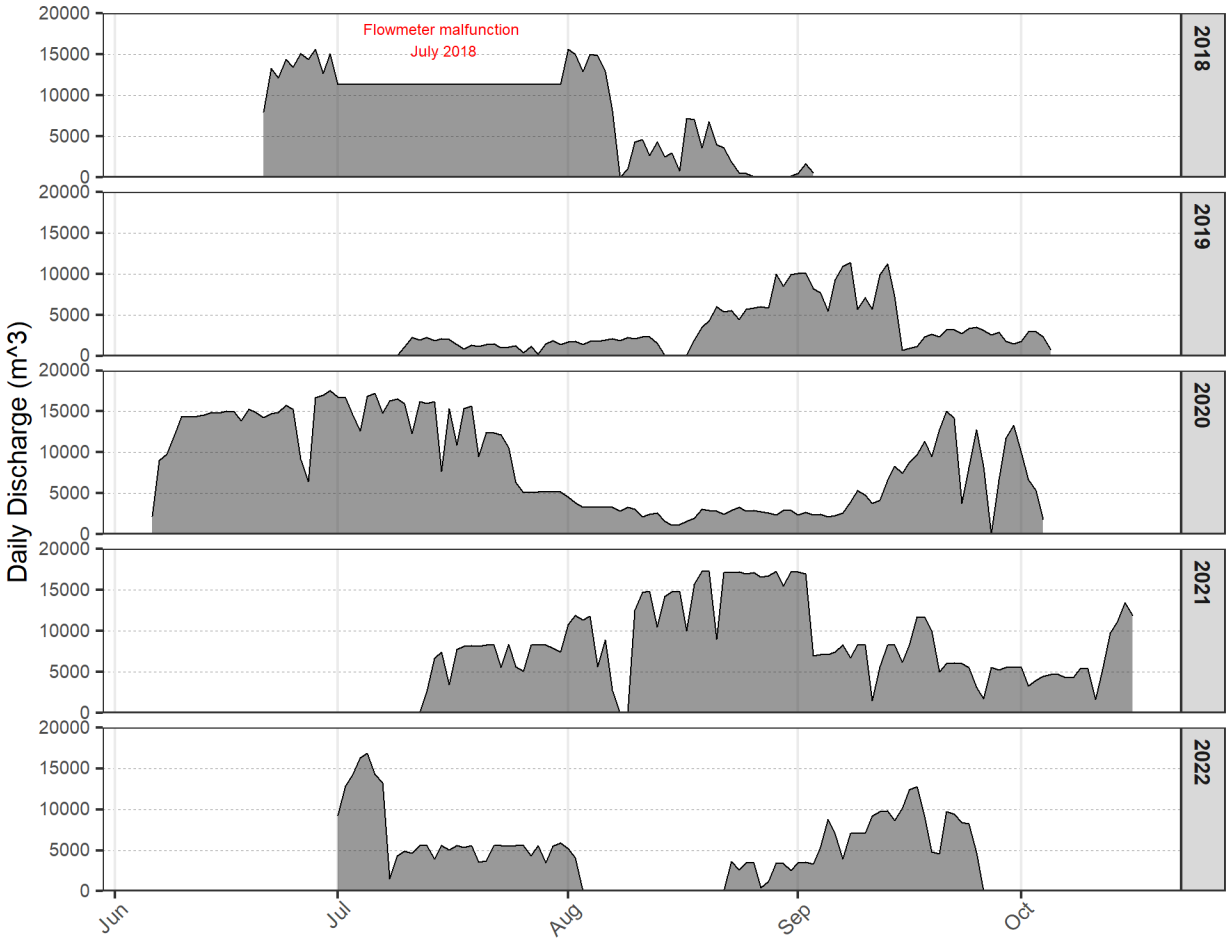


Table 2-2. Monthly discharge (m³) from CP1 to Meliadine Lake, 2018-2022.

Month	2018		2019		2020		2021		2022	
	Days	Discharge (m³)	Days	Discharge (m³)	Days	Discharge (m³)	Days	Discharge (m³)	Days	Discharge (m³)
June	10	134,272	0	0	26	352,954	0	0	0	0
July	na*	352,551	24	30,614	31	366,094	19	133,439	31	214,709
August	26	153,066	31	107,540	31	83,454	29	397,398	11	33,585
September	3	2,632	30	157,912	30	214,845	30	221,210	25	188,337
October	0	0	5	10,707	3	13,829	16	99,079	0	0
Totals	***70***	***642,521***	***89***	***306,773***	***121***	***1,031,179***	***94***	***851,126***	***67***	***436,631***

Notes
* No daily discharge date for July 2018 because of a malfunction with the flow meter.

2.2.2 Chemistry

Effluent monitoring at the Final Discharge Point (MEL-14) is required under the MDMER and the Water Licence. The purpose of the effluent monitoring program is to ensure that water discharged to Meliadine Lake is safe for aquatic life. The conditions regarding disposal of contact water from CP1 to Meliadine Lake are outlined in Part F of the Water Licence:

- Effluent quality limits are not exceeded for parameters listed in **Table 2-3**, and
- Water from MEL-14 is not acutely lethal to Rainbow Trout as per the Environment Canada's Biological Test Method (EPS/1/RM/13).

Table 2-3 MEL-14 effluent limits in the Type A Amended Water Licence (2AM-MEL1631).

Parameter	Units	Maximum Average Concentration	Maximum Concentration in a Grab Sample
pH [a]	-	6.0 | 9.5	6.0 | 9.5
Total Dissolved Solids (calculated) [b]	mg/L	3,500	4,500
Total Suspended Solids [a]	mg/L	15	30
Total Phosphorus [c]	mg/L	2	4
Total Ammonia [c]	mg/L	14	18
Aluminum [c]	mg/L	2	3
Arsenic	mg/L	0.3	0.6
Copper [d]	mg/L	0.2	0.4
Nickel [a]	mg/L	0.5	1
Lead [a]	mg/L	0.1	0.2
Zinc [d]	mg/L	0.4	0.8
Total Cyanide	mg/L	0.5	1
Total Petroleum Hydrocarbons [c]	mg/L	5	5

Notes:
All concentrations are total values (i.e., unfiltered).
[a] Adopted from Metal and Diamond Mining Effluent Regulations (Government of Canada, 2022).
[b] Increased limits for TDS in 2020 as per the Amendment Water Licence (NWB, 2020).
[c] Not a parameter included in MDMER Schedule 4 (authorized limits of deleterious substances).
[d] Limit for the Water Licence is lower than authorized limits in MDMER.

Effluent samples were collected weekly from MEL-14 during discharge and submitted to the accredited laboratory Bureau Veritas (Nepean, ON) for analysis. The first sampling event was on July 4th and the last event was on September 24th. In total, ten samples were collected in 2022. Chemistry results for individual samples are provided in **Table 2-4** for all the parameters listed in the Water Licence and a few others of interest. The concentrations of key parameters are shown in **Figure 2-3** (TDS and constituent ions), **Figure 2-4** (nutrients), and **Figure 2-5** (metals). Summary statistics and the complete list of results for every parameter are provided in **Appendix B1**.

Key findings from the 2022 effluent chemistry data that are relevant for the Meliadine Lake water quality assessment are:

- No exceedances of effluent limits were reported in 2022.
- Total dissolved solids (TDS) concentrations in individual samples were well below the maximum grab limit of 4,500 mg/L (**Table 2-4**). Concentrations were lowest in early July (900 mg/L) and trended higher throughout the discharge period. The maximum TDS concentration was 2,050 mg/L in the second last weekly sampling event on September 19th (**Table 2-5**).
- Chloride is the dominant major ion in surface contact water collected at the mine. As a percentage of the constituent ions in TDS, chloride accounts for 40-45% (**Figure 2-3**). Sodium, calcium, and sulphate are also important constituents of TDS at this mine. The relative percent contribution of chloride to TDS in 2022 was similar to previous years (**Figure 2-6**) and below the 60% threshold that would trigger development of a site-specific water quality objective (SSWQO) under the Adaptive Management Plan for Water Management (Agnico Eagle, 2021).

2.2.3 Toxicity Testing

Acute Toxicity Testing

Acute toxicity tests with Rainbow Trout (96-hr survival) and *D. magna* (48-hr survival) were conducted on July 4th, Augusts 1st, August 29th, and September 19th. Acute toxicity testing for *D. magna* is required under MDMER but is not required for the Water Licence. The acute toxicity test results for *D. magna* are included in herein as another line of evidence in the effluent quality assessment. Acute toxicity tests were conducted at AquaTox Testing & Consulting, in Puslinch (ON) according to standard test methods in the MDMER.

The 2022 test results are presented in **Table 2-4** along with the MEL-14 chemistry results. Water from MEL-14 was not acutely toxic to Rainbow Trout or *D. magna* in the four tests conducted in 2022. These findings add to the multi-year dataset that shows effluent discharged to Meliadine Lake does not pose a direct risk to fish or invertebrate survival.

Chronic (Sublethal) Toxicity Testing

The MDMER requires operating mines to complete sublethal toxicity testing on effluent discharged to the aquatic receiving environment. The purpose of sublethal toxicity testing is to provide an estimate of the potential effects on biological components (phytoplankton, zooplankton, benthic invertebrates, fish, macrophytes) in aquatic environments receiving mine effluent regardless of whether these receptor groups are being directly monitored in the field (Environment Canada, 2012). Mines that demonstrate effluent is not causing sublethal effects in the standard tests are allowed to conduct sublethal testing on the most sensitive species rather than conduct tests on fish, aquatic invertebrates, and primary

producers[1]. In 2019, Environment and Climate Change Canada (ECCC) agreed that future sublethal toxicity testing only needed to be conducted on *Lemna minor*, the species with the lowest IC25. This 7-day test measures growth inhibition in the form of reduced frond yield and dry weight biomass.

Water from MEL-14 was collected for sublethal testing on July 4th. There were no effects to *L. minor* biomass or growth endpoints relative to the laboratory control treatment. TDS and chloride concentrations were 1,120 mg/L and 380 mg/L, respectively. Reductions in frond yield have occurred in full-strength effluent with TDS concentrations as low as 1,140 mg/L, but as shown in **Figure 2-8**, the dose-response relationship is highly variable. Effects to frond yield may occur when TDS and chloride concentrations exceed 1,300 mg/L and 500 mg/L, respectively.

2.2.4 Loadings to Meliadine Lake

Loadings from CP1 to Meliadine Lake are calculated monthly (during discharge months) as per Part 2, Division 2, Section 20 of the MDMER (Government of Canada, 2022). Monthly loadings are calculated according to the following equation:

$$ML = \frac{(C \times V)}{1{,}000}$$

Where:

ML = monthly loading in kg,

C = monthly mean concentration of parameters measured in MEL-14 samples in mg/L, and

V = is the total monthly volume of water discharged to Meliadine Lake from CP1 in m^3.

Annual loadings for selected parameters of interest for the Meliadine Lake are shown in **Figure 2-7**. Monthly and cumulative loadings since 2018, the first year of discharge from CP1 to Meliadine Lake, are provided in **Appendix B2**. A high-level overview of the loadings information is provided below, but the results for individual parameters of interest are discussed in greater detail within the Meliadine Lake water quality chapter and, in the case of nutrients, the phytoplankton community chapter.

Loadings were lower in 2022 for all parameters of interest compared to 2020 and 2021. The comparatively low volume of water discharged from CP1 to Meliadine Lake in 2022 was the main reason for lower loadings. Among the major ions, chloride and sulphate loadings were approximately 50%

[1] Schedule 5, subsection 6(3): "After three years, the tests shall be conducted once per calendar quarter on the species referred to in subsection 5(1) or (2), as the case may be, whose results for all the tests conducted in accordance with subsections (1) and (2) — including such tests conducted in addition to the number required by those subsections — produce the lowest geometric mean, taking into account the inhibition concentration that produces a 25% effect or an effective concentration of 25%."

lower in 2022 compared to 2021. The annual loadings for arsenic, cobalt, iron, lithium, manganese, nickel, and strontium were also well below levels observed in 2020 and 2021.

The effect of the large volume of water discharged in 2020 under the Emergency Authorization is evident in **Figure 2-7**, particularly for arsenic and manganese. The annual loadings of arsenic and manganese in 2020 accounted for 71% and 69% of the total loadings from CP1 to Meliadine Lake since 2018.

2.3 Snow Core Monitoring Program

The snow monitoring program provides insight into off-site dust migration during the winter months and potential impacts to water quality for lakes on the Peninsula. Snow core samples were collected at five dustfall monitoring stations on April 4th, 2022 according to the standard procedure developed by the Environment Department. The monitoring stations are shown in **Figure 1-2**. Monitoring station SNOCOR6 is located approximately 4.5 km southeast of Tiriganiaq Pit 1 and provides an estimate of the ambient background concentration of various parameters in the snow pack. The other four locations are located around the perimeter of the Mine. SNOCOR7 is northwest of the emulsion plant, SNOCOR Boundary is located north of the main camp, SNOCOR4 is located north of the Lake A8, and SNOCOR5 is located east of WRSF3 and south of the Exploration Camp. Off-site dust migration is most likely to be detected at SNOCOR4 given its proximity to Tiriganiaq Pits 1 and 2 and the prevailing wind direction from the northwest. Snow samples were analyzed for conventional parameters, organic carbon, and total and dissolved metals at Bureau Veritas Labs (Nepean, ON).

The potential for off-site dust migration to impact water quality was assessed by comparing the snow chemistry results from the four stations close to the Mine against the background results from SNOCOR6. Off-site dust migration was qualitatively rated according to the magnitude of the difference between samples: negligible (< 5-times background); low (5 to 10-times background); moderate (10 to 20-times background), and high (> 20-times background). The snow core chemistry results are provided in **Table 2-6**. The total and dissolved concentrations of a few selected metals from 2020-2022 are shown in **Figure 2-9** and **Figure 2-10**.

Snow Pack Chemistry

Aerial emissions and dust deposition were not significant pathways for off-site migration of metals to the north or east of the mine during the winter based on the chemistry data from SNOCOR7 (NW), SNOCOR Boundary (N), and SNOCOR5 (SE) in 2022 (**Table 2-6**). SNOCOR4 located south of Tiriganiaq Pits 1 and 2 had many parameters that were detected at concentrations greater than 5-times background and a few that were above 10-times background. The list of parameters that are elevated in snow due to surface activities at the mine included calcium and magnesium (corroborated by hardness, alkalinity, and TDS) and the following metals (unfiltered fraction): aluminum, arsenic, copper, lead, iron,

manganese, silicon, and sulfur. Of this list, arsenic and iron were detected at concentrations greater than 20-times background. Dissolved concentrations for the metals listed above were either non-detect or low relative to the unfiltered sample. Turbidity and TSS results at SNOCOR4 were identical to background and similar to samples collected at the other locations around the mine. The low TSS and turbidity results, together with the high concentrations of arsenic, iron, etc. in the unfiltered fraction, suggest the metals are associated with small particles (filtered out at 0.45 µm). This is an important observation from a water quality perspective, as metals in the dissolved phase are typically more mobile and bioavailable in aquatic systems.

TSS and turbidity results from April 2022 were well-below levels observed in 2020 (February and April) and 2021 (April). Background TSS concentrations in 2020 and 2021 were between 11 mg/L and 48 mg/L. TSS concentrations were significantly higher closer to the mine, particularly at SNOCOR4. TSS concentrations in February and April 2020 were 390 mg/L and 3,800 mg/L, respectively. In April 2021, TSS was 580 mg/L. The highest metals concentrations since the start of the program in 2020 were measured in the April 2020 sample from SNOCOR4 (**Figure 2-9** and **Figure 2-10**). However, there doesn't appear to be a positive relationship between TSS and metals concentrations in the snow samples. The highest concentration of arsenic was detected in SNOCOR4 in April 2020, but the second highest concentration was measured in April 2022 when TSS measured 1.1 mg/L. TSS and turbidity may provide a coarse estimate of off-site dust migration, but the TSS and turbidity data should not be used to making inferences about off-site loadings of metals to the tundra.

The list of parameters detected above background at SNOCOR4 have the potential to affect water quality in Lake A8. There isn't an equivalent station for monitoring the effect of dust or emissions on water quality in Lake B7, but the SNOCOR4 chemistry results are likely representative of chemistry results in the snowpack around Lake B7. The snow chemistry data are used to support the water quality assessment for the Peninsula Lakes in **Section 4**.

Table 2-4 MEL-14 effluent chemistry compared to limits in the Type A Amended Water Licence

Parameter	Units	Effluent Limits	Date									
		Max Grab	7/4/2022	7/11/2022	7/18/2022	7/25/2022	8/1/2022	8/29/2022	9/5/2022	9/12/2022	9/19/2022	9/24/2022
Field and Conventional Parameters												
Temperature	°C	-	14.8	-	15.9	18.6	11.1	8.1	10.8	10.3	9.4	9.1
pH (field)	pH units	6 | 9.5	7.18	7.29	7.2	7.35	7.28	7.22	7.16	7.06	7.24	7.87
pH (lab)	pH units	-	7.41	7.75	7.67	7.17	7.62	7.77	7.71	7.77	7.6	7.65
Sp. Conductivity (field)	uS/cm	-	1741	1800	2069	2042	2200	2619	2546	2802	3300	3600
Hardness (as $CaCO_3$)	mg/L	-	342	362	403	409	408	457	493	571	722	737
Total Suspended Solids	mg/L	30	4	3	3	3	2	2	3	3	3	4
TDS, Major Ions, Nutrients												
TDS (Measured)	mg/L	4500	1120	1070	1160	1150	1270	1410	1380	1590	2050	2030
TDS (Calculated)	mg/L	-	940	970	1000	1100	1200	1300	1400	1500	1800	2000
Chloride	mg/L	-	380	410	440	470	510	570	630	640	790	840
Alkalinity, Total	mg/L	-	52	60	55	34	62	69	68	73	68	67
Sulphate	mg/L	-	170	170	180	150	200	210	230	250	310	340
Ammonia (as N)	mg/L	18	0.23	0.26	0.084	0.17	0.21	*< 0.05*	0.097	0.72	1.5	*< 0.05*
Nitrate (as N)	mg/L	-	10.2	9.19	7.7	6.6	6.37	3.63	5.12	10.1	14.7	16.7
Total Phosphorus	mg/L	4	0.061	0.038	*< 0.02*	*< 0.02*	0.031	0.023	*< 0.02*	*< 0.02*	0.025	0.025
Unionized Ammonia	mg/L	-	0.0012	0.0022	*< 0.00061*	0.0016	0.00099	*< 0.00061*	*< 0.00061*	0.0019	0.0056	-
Organic Carbon												
DOC	mg/L	-	6.2	6.8	6.2	6.9	8.6	8.7	8.2	8.2	9.3	8.9
TOC	mg/L	-	6.9	7.0	7.2	7.9	8.9	9.0	8.7	8.3	9.8	10.0
Metals												
Aluminum (T)	mg/L	3	0.403	0.31	0.358	0.373	0.302	0.326	0.389	0.382	0.355	0.528
Arsenic (T)	mg/L	0.6	0.00681	0.00571	0.00676	0.0052	0.00454	0.00478	0.00456	0.00476	0.00408	0.00307
Cadmium (T)	mg/L	-	0.000014	0.000019	0.000014	*< 1e-05*	0.000012	0.000011	*< 1e-05*	0.000013	0.000018	*< 2e-05*
Chromium (T)	mg/L	-	*< 0.001*	*< 0.001*	*< 0.001*	*< 0.001*	*< 0.001*	*< 0.001*	*< 0.001*	*< 0.001*	*< 0.001*	*< 0.002*
Cobalt (T)	mg/L	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Copper (T)	mg/L	0.4	0.00294	0.00288	0.00255	0.00244	0.00264	0.00249	0.00257	0.00246	0.00221	0.0021

Table 2-4 MEL-14 effluent chemistry compared to limits in the Type A Amended Water Licence

Parameter	Units	Effluent Limits	Date									
		Max Grab	7/4/2022	7/11/2022	7/18/2022	7/25/2022	8/1/2022	8/29/2022	9/5/2022	9/12/2022	9/19/2022	9/24/2022
Iron (T)	mg/L	-	0.034	0.023	0.033	0.022	0.012	0.011	0.01	0.021	0.015	*< 0.02*
Lead (T)	mg/L	0.2	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 4e-04*
Manganese (T)	mg/L	-	0.0522	0.0657	0.0353	0.0192	0.0919	0.0171	0.0177	0.0588	0.0591	0.0331
Mercury (T)	mg/L	-	*< 1e-05*	*< 1e-05*	*< 1e-05*	*< 1e-05*	*< 1e-05*	*< 1e-05*	*< 1e-05*	*< 1e-05*	*< 1e-05*	*< 1e-05*
Molybdenum (T)	mg/L	-	0.0041	0.0044	0.0052	0.0058	0.0059	0.0065	0.0061	0.0059	0.0058	0.0054
Nickel (T)	mg/L	1	0.004	0.0039	0.0037	0.0037	0.0042	0.004	0.0043	0.0049	0.0065	0.0059
Selenium (T)	mg/L	-	0.00043	0.00041	0.00043	0.00044	0.0004	0.00026	0.0003	0.00048	0.00065	0.00063
Thallium (T)	mg/L	-	1/0/1900	1/0/1900	1/0/1900	1/0/1900	1/0/1900	1/0/1900	1/0/1900	1/0/1900	1/0/1900	1/0/1900
Uranium (T)	mg/L	-	0.00106	0.00078	0.00036	0.00028	0.00123	0.0014	0.00129	0.002	0.00262	0.00174
Zinc (T)	mg/L	0.8	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	0.0074	*< 0.005*	*< 0.005*	*< 0.01*
Other Parameters												
Cyanide (Total)	mg/L	1	0.00113	0.00074	0.00088	0.00108	0.00108	0.00122	0.00271	0.00253	0.00108	0.00212
Radium-226	Bq/l	-	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	0.011	0.011	*< 0.005*	0.009	0.013
Toxicity Tests												
Rainbow trout survival	LC50	-	100	-	-	-	100	100	-	-	100	100
Daphnia magna survival	LC50	-	100	-	-	-	100	100	-	-	100	100
Lemna minor biomass	IC25	-	>97	-	-	-	-	-	-	-	-	-
Lemna minor frond number	IC25	-	>97	-	-	-	-	-	-	-	-	-

Notes:
Italicized values are below the limit of detection
LC50 = the concentration that causes a 50% reduction in survival.
IC25 = the concentration that causes a 25% reduction in endpoints for the *L. minor* test.

Table 2-5. The fraction of total dissolved solids comprised of chloride in effluent samples from MEL-14 in 2022

Month and Day	Chloride	TDS (Measured)		TDS (Calculated)	
	mg/L	mg/L	% Cl	mg/L	% Cl
July-04	380	1120	34%	940	40%
July-11	410	1070	38%	970	42%
July-18	440	1160	38%	1000	44%
July-25	470	1150	41%	1100	43%
August-01	510	1270	40%	1200	43%
August-29	570	1410	40%	1300	44%
September-05	630	1380	46%	1400	45%
September-12	640	1590	40%	1500	43%
September-19	790	2050	39%	1800	44%
September-24	840	2030	41%	2000	42%

Figure 2-3. Total dissolved solids and constituent ions in end-of-pipe effluent at MEL-14, 2018-2022

Notes: Calculated TDS was added to the Amended Water Licence in 2020. The limit for TDS applies to calculated TDS. Prior to 2020, calculated TDS was not reported by the laboratory.

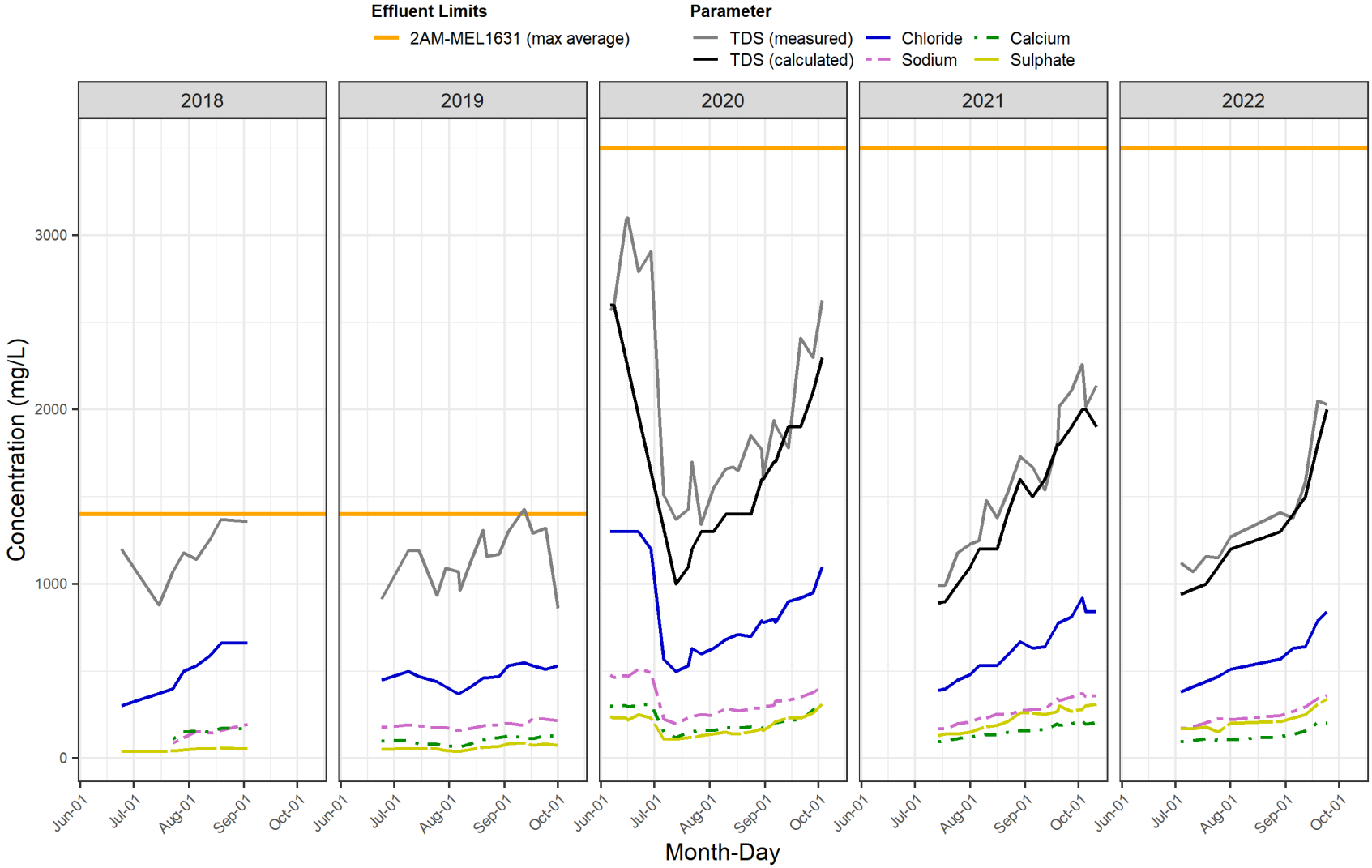


Figure 2-4. Concentrations of nutrients measured in end-of-pipe samples from MEL-14, 2018-2022

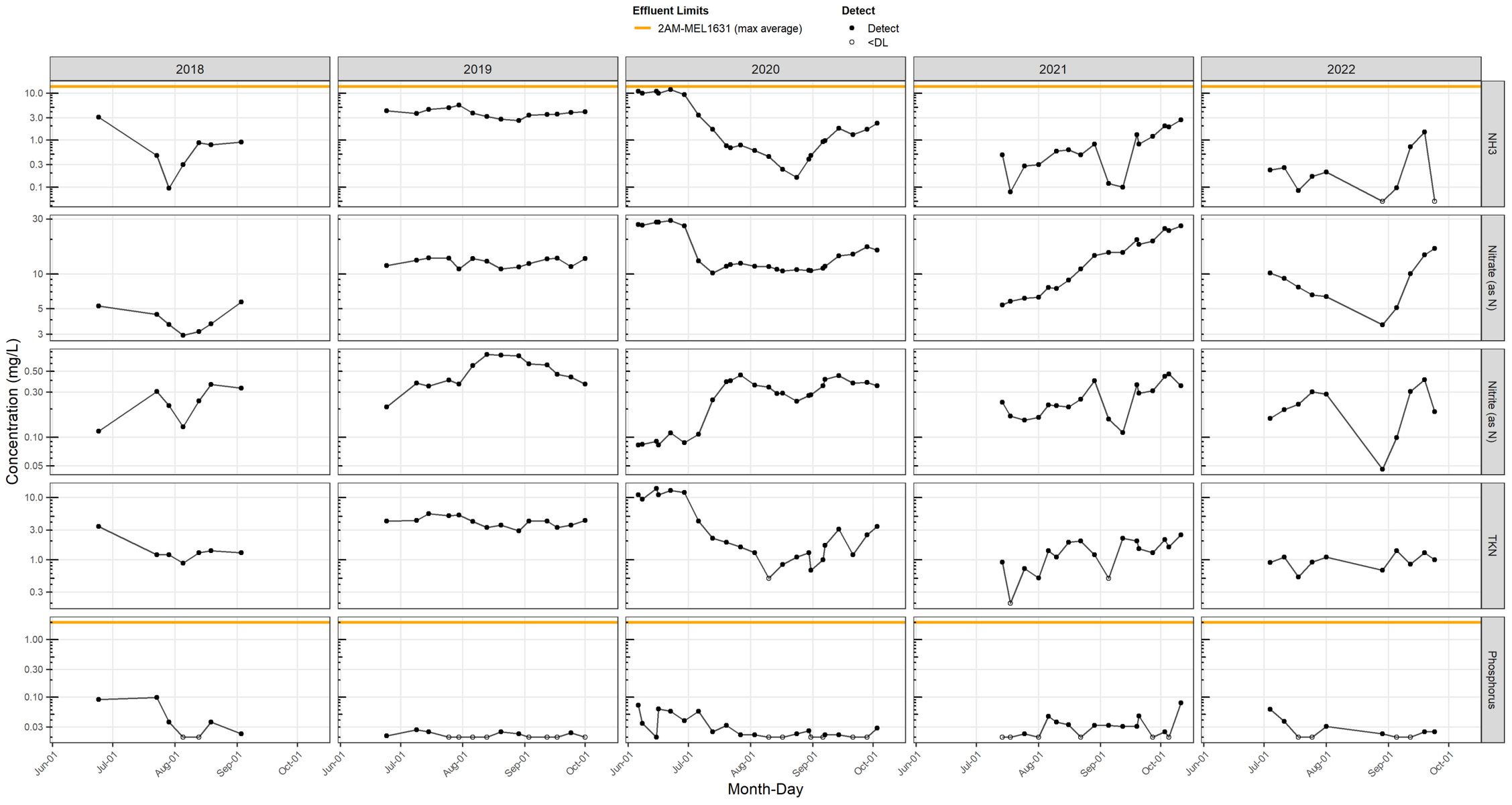


Figure 2-5. Concentrations of metals measured in end-of-pipe samples from MEL-14, 2018-2022

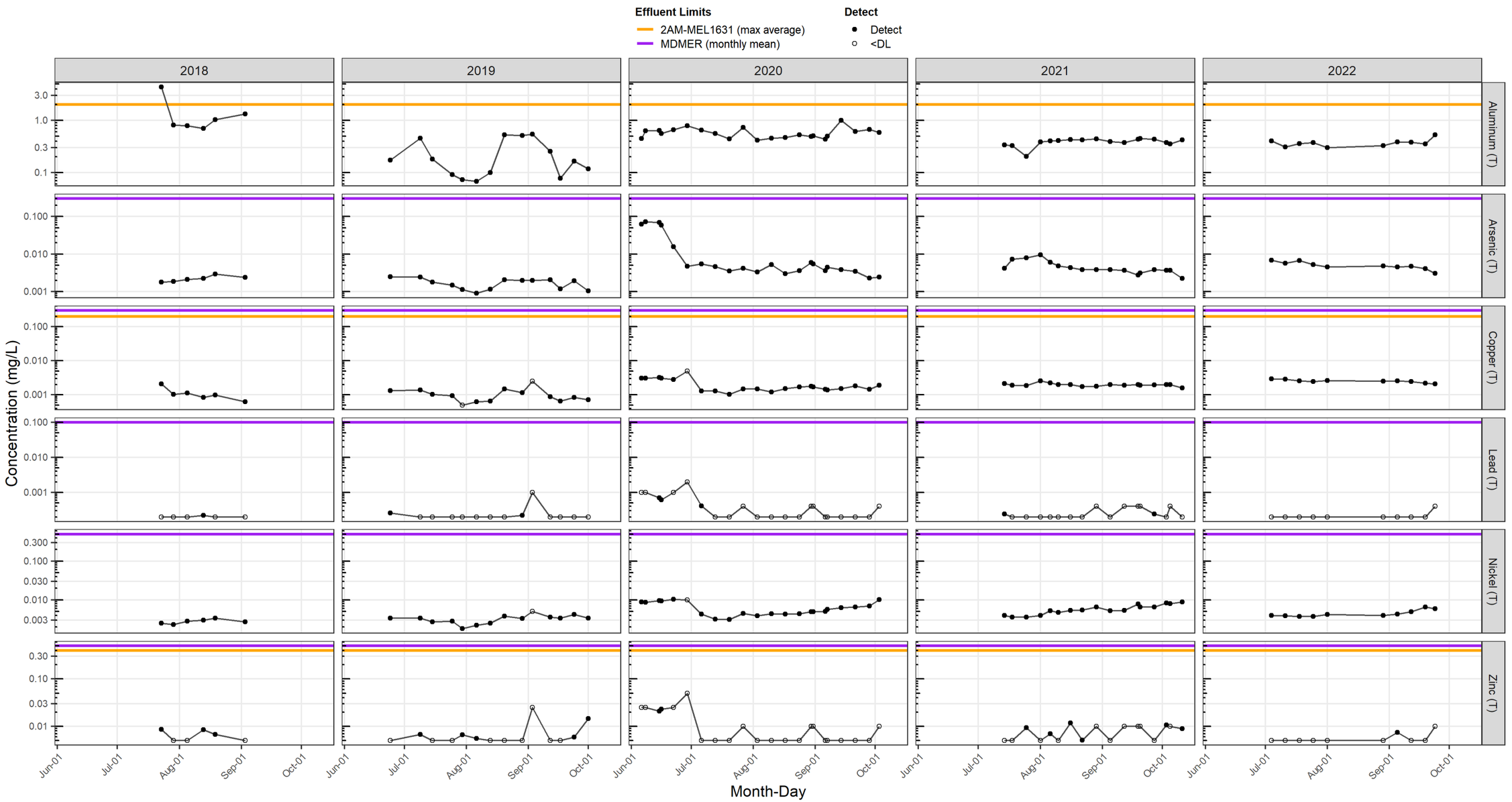


Figure 2-6. Percent composition of major ions in effluent from MEL-14

Notes: The red dashed line at 60% represents the limit for chloride that would trigger development of a site-specific water quality objective.

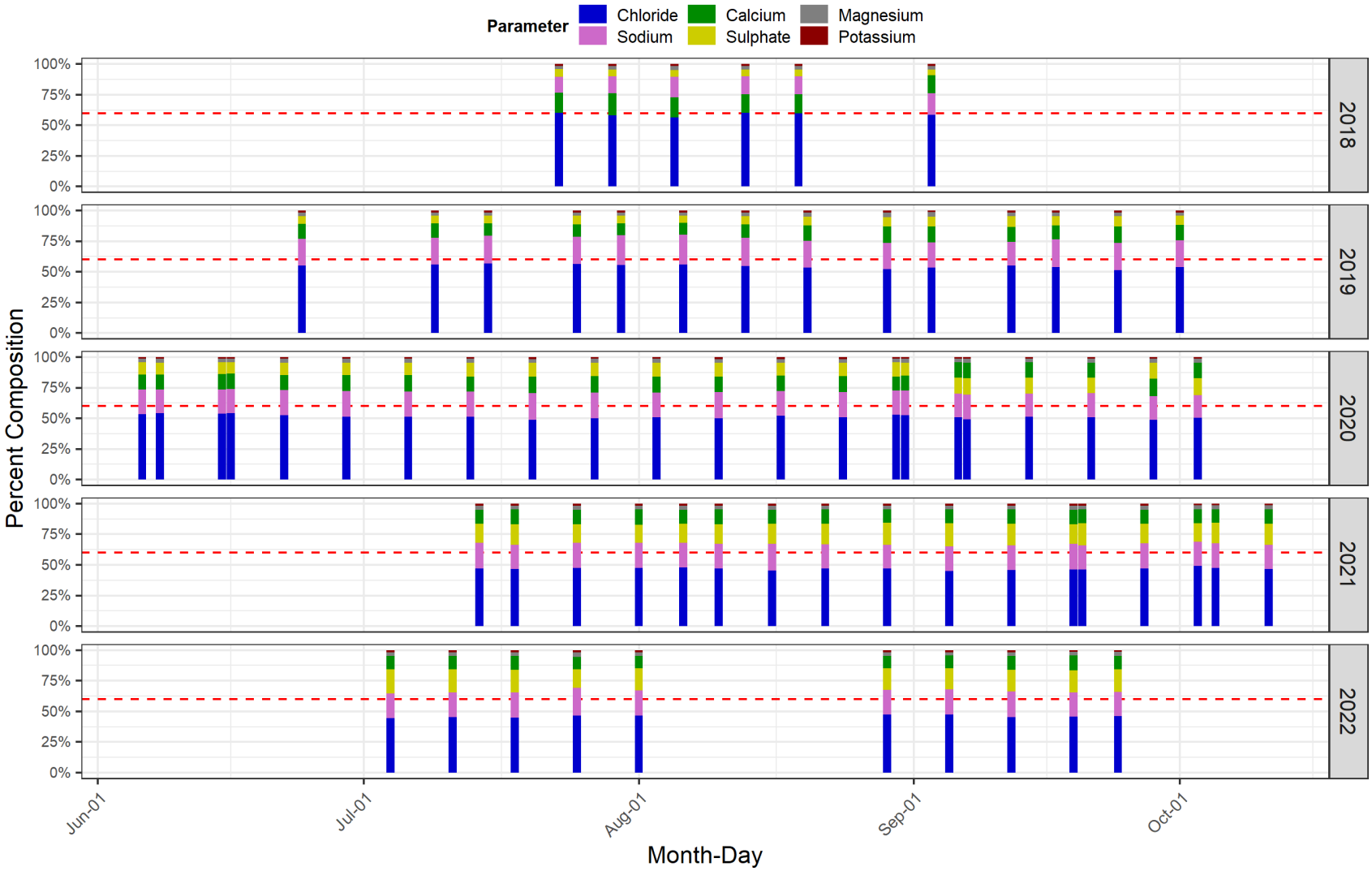


Figure 2-7. Annual loadings (kg) from CP1 to Meliadine Lake for selected parameters

Notes: The numbers above each bar indicate the percent contribution to the cumulative load (e.g., the annual load of sulphate in 2022 accounts for 18% of the cumulative loading from 2018-2022).

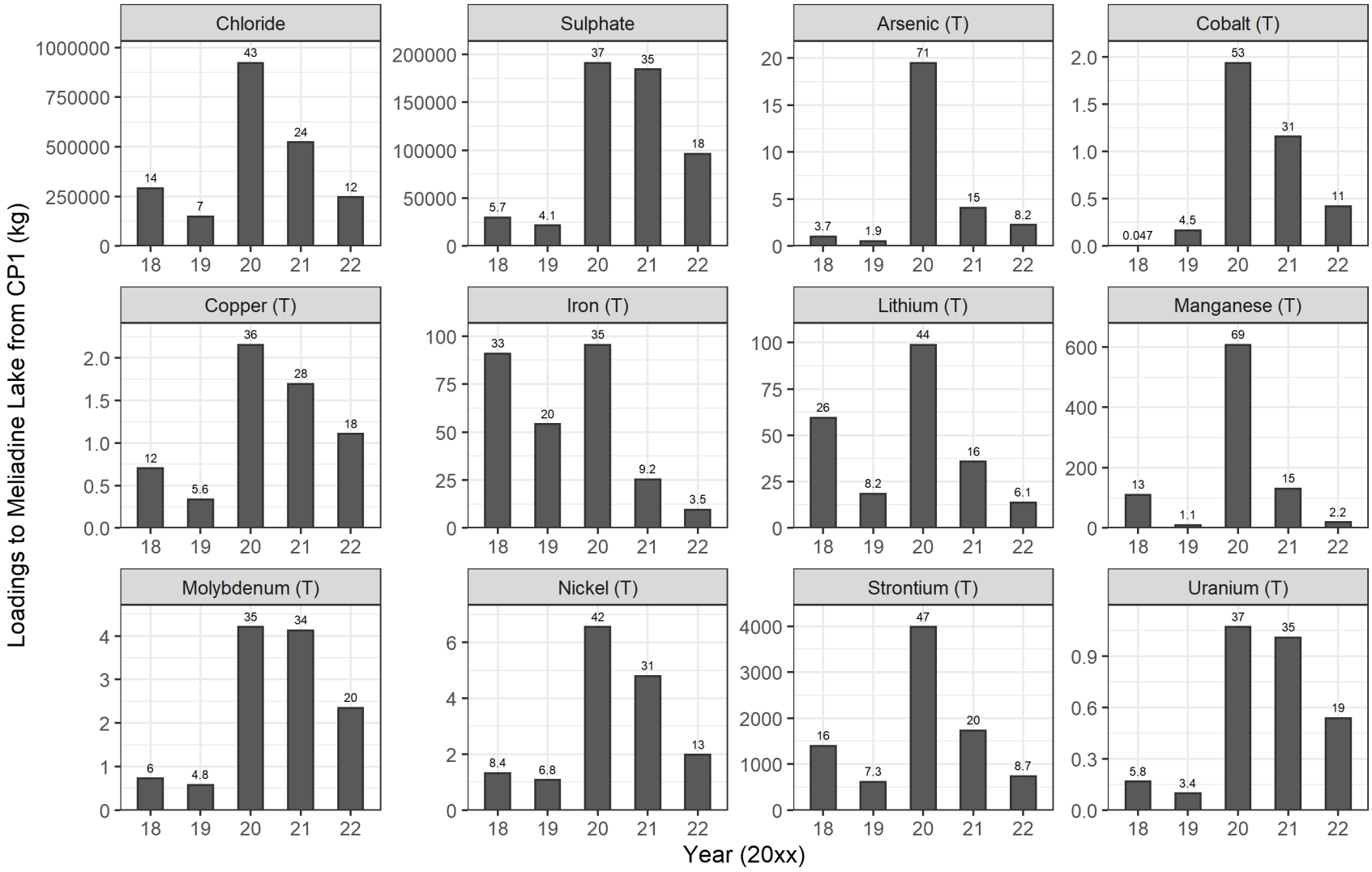


Figure 2-8. *Lemna minor* sublethal toxicity test results compared to measured concentrations of TDS in effluent from MEL-14.

Notes: The vertical bars represent the 95th percent confidence interval for samples where effects to biomass or frond yield were observed at less than full strength effluent.
The green outlined symbol indicates the results from 2022.

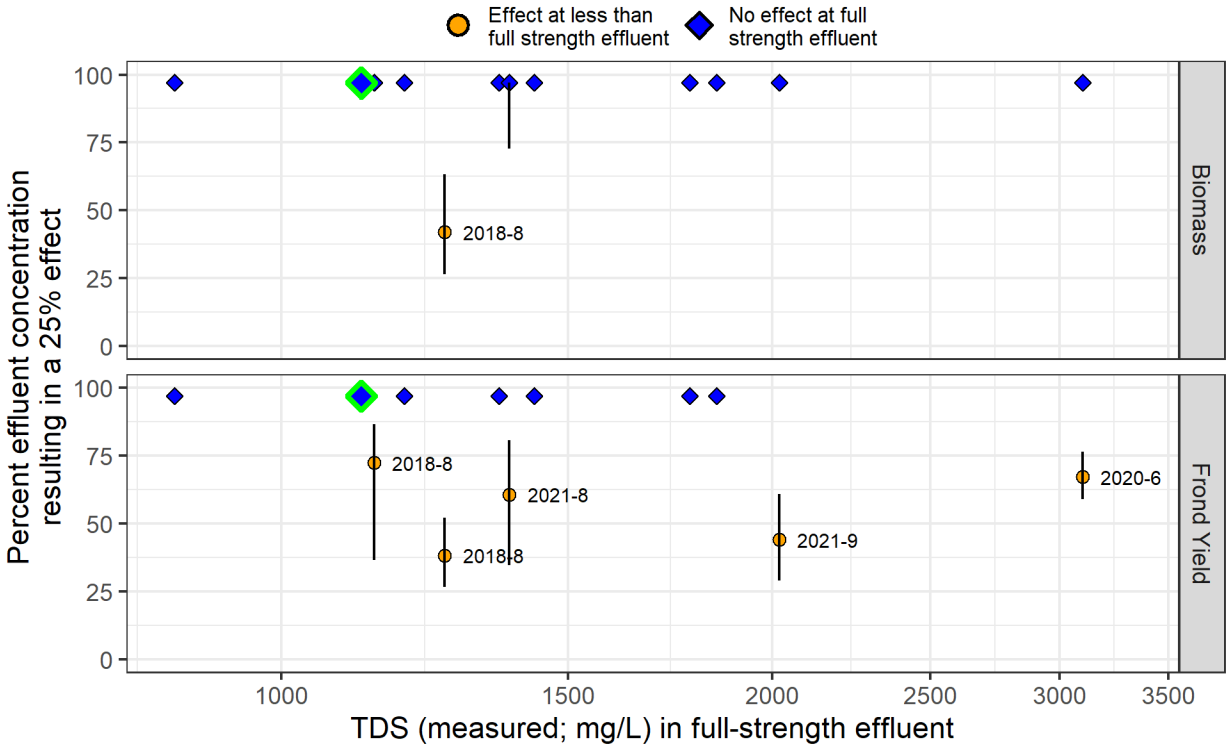


Table 2-6. Concentrations of parameters of interest in snow core samples in April 2022

Parameter	Units	DL	SNOCOR6	SNOCOR7	SNOCOR BOUNDARY	SNOCOR4	SNOCOR5
			Background	Emulsion Plant	North of Camp	South of Tiri Pits 1 & 2 (Lake A8)	East of WRSF 3
Calculated Parameters							
Hardness (T)	mg/L	0.5	7.14	***2.19***	3.36	84.3	3.7
Hardness (D)	mg/L	0.5	4.23	3.35	3.17	20.5	***2.26***
Alkalinity, Bicarbonate	mg/L	1	***4.5***	***4.4***	***2.1***	27	***2.1***
Alkalinity, Carbonate	mg/L	1	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Conventional Parameters							
pH (lab)	pH		6.66	7.23	6.31	7.49	6.37
Alkalinity, Total	mg/L	1	***4.5***	***4.5***	***2.1***	27	***2.1***
Conductivity (lab)	uS/cm	1	20	*<10*	280	35	20
Total Dissolved Solids	mg/L	10	58	***15***	***16***	800	***31***
Total Suspended Solids	mg/L	10	***1.1***	***0.78***	***1.7***	***1.1***	***1.6***
Turbidity	NTU	0.1	1.5	1	2	1.5	2.3
DOC	mg/L	0.4	***1.5***	***0.87***	***0.46***	***1.1***	2.3
TOC	mg/L	0.4	2	***1.3***	***1.1***	***1.6***	3.2
Major Ions & Nutrients							
Calcium (T)	mg/L	0.05	2.12	0.6	0.988	25.4	1.08
Magnesium (T)	mg/L	0.05	0.447	***0.168***	***0.218***	5.05	***0.247***
Potassium (T)	mg/L	0.05	0.334	***0.174***	***0.235***	1.91	0.326
Sodium (T)	mg/L	0.05	1.23	0.825	0.826	4.19	0.877
Sulphate	mg/L	1	***1.1***	***0.79***	***1.1***	6.1	***0.69***
Chloride	mg/L	1	***2.1***	***1.4***	***1.3***	5.4	***1.7***
Total Metals							
Aluminum (T)	mg/L	0.003	0.275	0.0787	0.144	4.39	0.194
Antimony (T)	mg/L	0.0005	*<0.00050*	*<0.00050*	*<0.00050*	*<0.0010*	***0.00056***
Arsenic (T)	mg/L	0.0001	0.0432	0.00159	0.00839	1.5	0.00646
Barium (T)	mg/L	0.001	0.0062	***0.0032***	***0.0042***	0.0637	0.0066
Cadmium (T)	mg/L	0.00001	***0.00002***	***0.000018***	***0.000017***	0.000179	***0.000016***
Chromium (T)	mg/L	0.001	***0.0015***	*<0.0010*	*<0.0010*	0.0133	***0.001***
Cobalt (T)	mg/L	0.0002	*<0.00020*	*<0.00020*	*<0.00020*	0.00462	***0.00021***
Copper (T)	mg/L	0.0005	0.00435	0.00324	***0.00184***	0.0442	0.00453
Iron (T)	mg/L	0.01	1.15	0.12	0.383	23.5	0.481
Lead (T)	mg/L	0.0002	0.0201	***0.00083***	0.00216	0.328	0.00155
Lithium (T)	mg/L	0.002	*<0.0020*	*<0.0020*	*<0.0020*	***0.0055***	*<0.0020*
Manganese (T)	mg/L	0.001	0.0238	0.0057	0.0095	0.413	0.0332
Molybdenum (T)	mg/L	0.001	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0020*	*<0.0010*
Nickel (T)	mg/L	0.001	*<0.0010*	*<0.0010*	*<0.0010*	0.0125	*<0.0010*
Selenium (T)	mg/L	0.0001	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00020*	*<0.00010*
Silicon (T)	mg/L	0.1	***0.34***	*<0.10*	***0.16***	5.8	***0.31***
Strontium (T)	mg/L	0.003	*<0.003*	*<0.003*	*<0.003*	*<0.006*	*<0.006*
Thallium (T)	mg/L	0.00001	*<0.000010*	*<0.000010*	*<0.000010*	0.000055	*<0.000010*
Uranium (T)	mg/L	0.0001	*<0.00010*	*<0.00010*	*<0.00010*	***0.00038***	*<0.00010*
Zinc (T)	mg/L	0.005	***0.0088***	***0.0085***	***0.0091***	0.045	***0.0094***

Table 2-6. Concentrations of parameters of interest in snow core samples in April 2022

Parameter	Units	DL	SNOCOR6	SNOCOR7	SNOCOR BOUNDARY	SNOCOR4	SNOCOR5
			Background	Emulsion Plant	North of Camp	South of Tiri Pits 1 & 2 (Lake A8)	East of WRSF 3
Dissolved Metals							
Aluminum (D)	mg/L	0.003	***0.0104***	***0.0133***	***0.0104***	0.0933	***0.0097***
Antimony (D)	mg/L	0.0005	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Arsenic (D)	mg/L	0.0001	0.0148	0.00102	0.00364	0.12	0.00325
Barium (D)	mg/L	0.001	***0.0027***	***0.0032***	***0.0027***	***0.0027***	***0.0021***
Cadmium (D)	mg/L	0.00001	*<0.000010*	***0.000016***	***0.000026***	*<0.000010*	*<0.000010*
Chromium (D)	mg/L	0.001	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Cobalt (D)	mg/L	0.0002	*<0.00020*	*<0.00020*	*<0.00020*	***0.00027***	*<0.00020*
Copper (D)	mg/L	0.0002	0.00147	0.00244	0.00108	0.00334	0.00178
Iron (D)	mg/L	0.005	0.0302	***0.0182***	0.0315	0.0435	0.0319
Lead (D)	mg/L	0.0002	***0.00047***	*<0.00020*	***0.00021***	0.00121	*<0.00020*
Lithium (D)	mg/L	0.002	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*
Manganese (D)	mg/L	0.001	0.006	***0.004***	0.0061	0.0093	0.0183
Molybdenum (D)	mg/L	0.001	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Nickel (D)	mg/L	0.001	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Selenium (D)	mg/L	0.0001	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Silicon (D)	mg/L	0.1	*<0.10*	*<0.10*	*<0.10*	***0.2***	*<0.10*
Strontium (D)	mg/L	0.001	***0.0045***	***0.0036***	***0.0041***	0.0293	***0.0021***
Uranium (D)	mg/L	0.0001	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Vanadium (D)	mg/L	0.005	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*
Zinc (D)	mg/L	0.005	*<0.0050*	***0.01***	***0.0077***	*<0.0050*	*<0.0050*

Notes
Italicized numbers are less than the DL
Italicized and bold numbers indicate measured concentrations that were <5-times the DL
5 to 10-times background
10 to 20-times background
>20 times background

Figure 2-9. Metals concentrations in snow core samples, 2020-2022

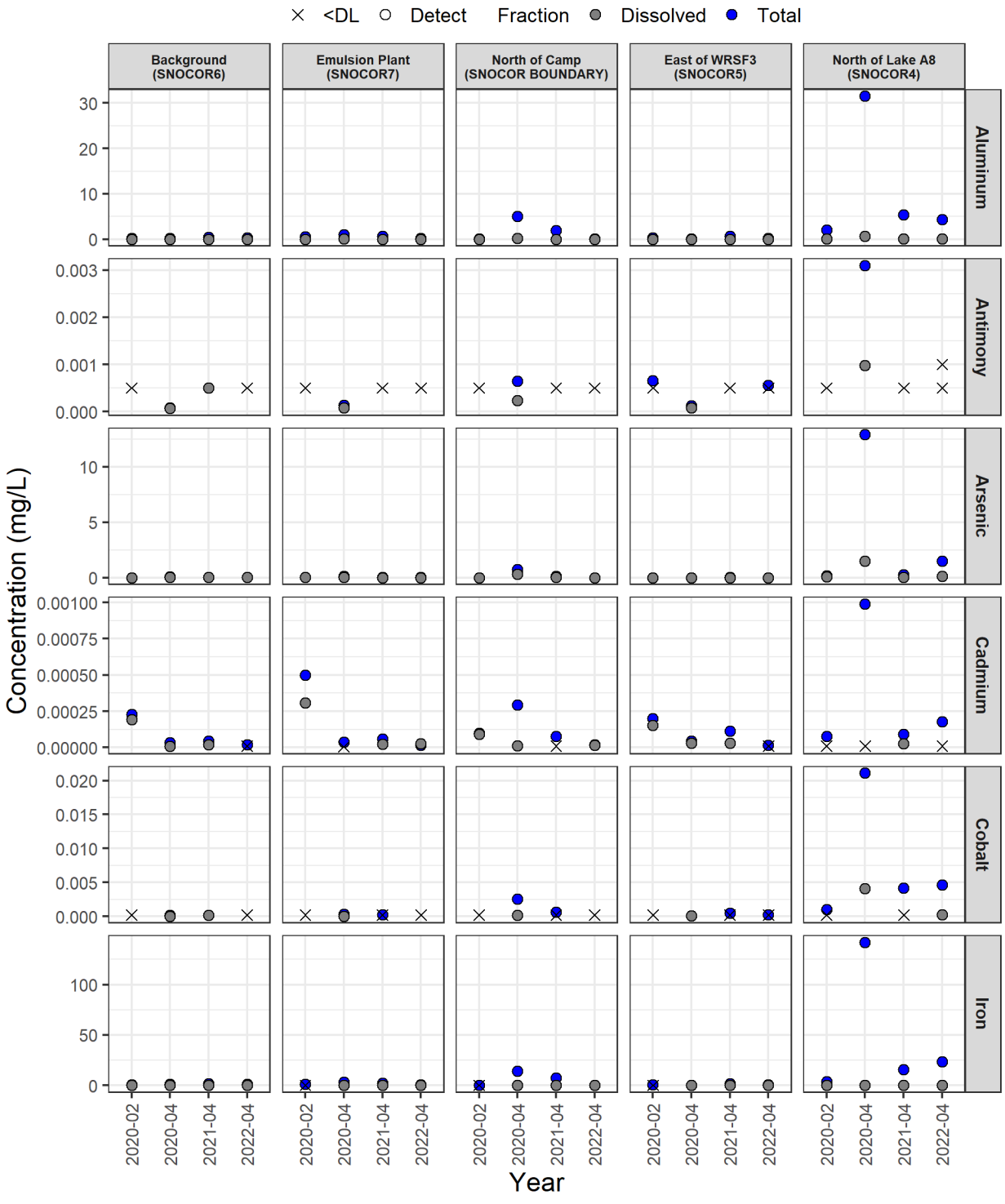
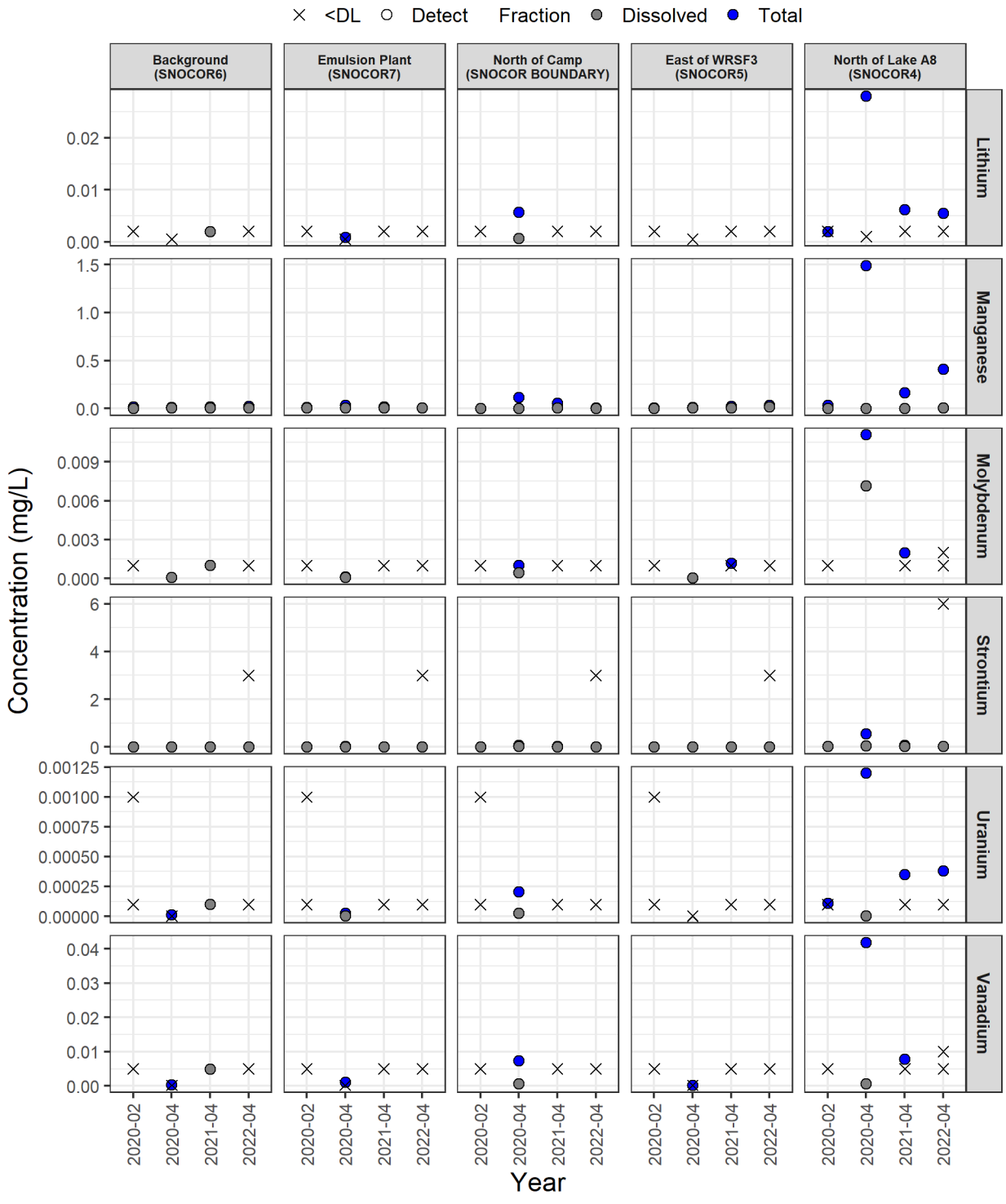


Figure 2-10. Metals concentrations in snow core samples, 2020-2022



3 MELIADINE LAKE WATER QUALITY

3.1 Introduction

This chapter presents water quality results from Meliadine Lake in 2022. Sampling areas and stations within each area are shown in **Figure 3-1**. Water sampling was carried out according to the schedule in the AEMP Design Plan and recommendations in the 2021 AEMP report (Azimuth, 2022c). Sampling dates, coordinates, and depths are provided in **Table 3-1**.

The Meliadine Lake water sampling program is designed primarily to detect changes in water quality during the open-water season, coinciding with discharge of effluent from CP1. Samples were collected monthly in July, August, and September from the near-field around the diffuser (NF; MEL-01), the mid-field area (MF; MEL-02) located to the northwest, past the narrows, and Reference Area 1 (REF1; MEL-03). Reference Areas 2 and 3 (MEL-04 and MEL-05) were sampled in August to bolster the dataset for looking at lake-wide changes in water quality. One winter sampling event was completed at MEL-01 and MEL-02 in April to assess the spatial extent of changes in water quality closer to the mine. Water samples are not collected from reference areas in the winter due to health and safety concerns associated with safely accessing these remote areas. This precludes a more formal assessment of mine-related vs natural changes in water quality during the prolonged ice-covered season.

Objectives and Key Questions

The objectives of the Meliadine Lake water quality program are to:

- Determine if the Mine is causing changes to water quality in Meliadine Lake,
- Evaluate the accuracy of predicted changes in water quality,
- Assess whether mitigation measures are effective at reducing impacts to the aquatic environment, and
- Provide recommendations (as required) for follow-up monitoring or mitigation to lower the impact of mining-related activities on changes in water quality.

The approach to meeting these objectives focused answering these key questions:

1. *Are concentrations of parameters in the effluent less than limits specified in the Water Licence?*

   Approach – This question was answered in **Section 2.2.2**. There were no exceedances of limits in the Water Licence in 2022.

2. *Has water quality in the exposure areas changed over time, relative to reference/baseline areas?*

Approach – This question is answered using information from the normal range screening assessment and scatter plots showing spatial and temporal trends between and within the exposure and reference areas.

3. *Is water quality consistent with predictions outlined in the Final Environmental Impact Statement (FEIS) and less than AEMP Action Levels[2]?*

   Approach – This two-part question relies on information presented in the normal range assessment (i.e., is water quality similar to, or different from baseline) and the water quality screening against the AEMP Action Levels (aka trigger values).

3.2 Findings from the 2022 Water Quality Program

- Water quality in Meliadine Lake is safe for aquatic life and for human health.
- There were no exceedances of the AEMP Action Levels linking to mining activities in 2022 and the concentrations of most parameters are low compared to their respective AEMP Action Levels. As in previous years, dissolved copper was detected at concentrations in MEL-01 during the winter that naturally exceed the AEMP Action Level. Absolute concentrations of copper have not changed in Meliadine Lake compared to the baseline period.
- Effluent has contributed to higher concentrations of some major ions, nutrients, and metals in the East Basin of Meliadine Lake over time. The effect of effluent on water quality in other areas of the Meliadine Lake is difficult to distinguish compared to the confounding effects of natural variability and interannual climate variability. On-going water quality monitoring should help decipher the effect of effluent discharge vs precipitation on water quality in Meliadine Lake.
- TDS and chloride concentrations in the East Basin of Meliadine remain well below predictions in the FEIS (Agnico Eagle, 2014) and the updated hydrodynamic model (Tetra Tech, 2020).
- The 2022 water quality results from Meliadine Lake do not require additional management actions as per the Low Action Level assessment and AEMP Response Framework. The study design for the 2023 AEMP in Meliadine Lake will follow the same scope and schedule as the 2022 AEMP.

[2] AEMP Action Levels refer to 75% of the AEMP Benchmark for a given parameter. The AEMP Benchmarks correspond to the lowest water quality guideline for protection of aquatic life and human health, or site-specific water quality objectives in the case of fluoride, arsenic, and iron. AEMP Action Levels and Benchmarks for the Meliadine Lake AEMP are listed in **Table C1-1**.

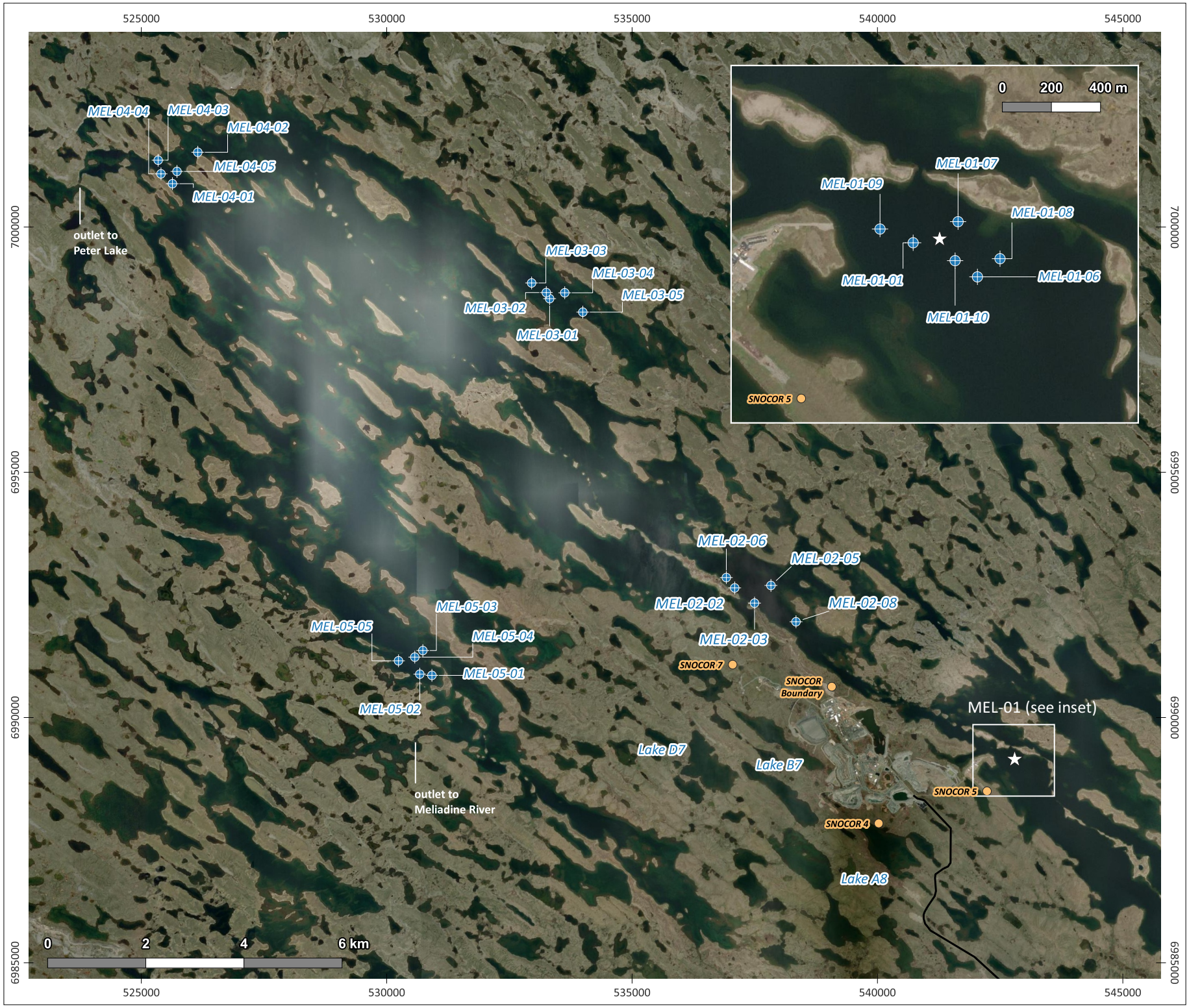


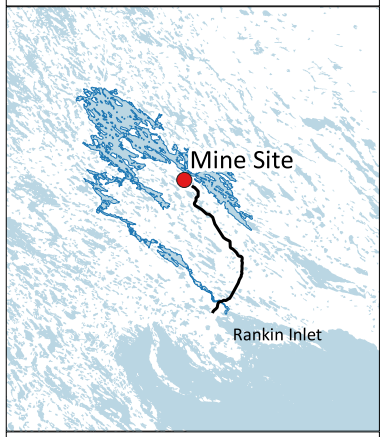
Figure 3-1
Meliadine Lake Water Quality Sampling Stations

Aquatic Effects Monitoring Program
2022 Annual Report

AZIMUTH

Date:	March 10, 2023
Datum:	NAD 83 UTM Zone 15N
Scale:	1:100,000 ; inset = 1:20,000
Software:	QGIS version 3.22.11-Białowieża
Produced by:	E. Franz

REFERENCES:
1. Basemap imagery from ESRI
2. Mine Plan provided by Agnico Eagle
3. Roads and waterbodies from NRC



Legend

- CP1 Diffuser
- All weather access road
- AEMP Water Quality Station
- Snowpack Monitoring Station

Table 3-1. Meliadine Lake water sampling events in 2022

Area	Station ID	Depth[a]	Easting	Northing	Distance to the Diffuser	April	July	August	September
MEL-01 Near-field	MEL-01-01	9.4	542690	6989132	109 m	**April 6** LP, WQ	**July 10** LP, WQ	**August 18** LP, WQ, Phyto	**September 16** LP, WQ
	MEL-01-06	8.8	542952	6988993	219 m				
	MEL-01-07	7.7	542873	6989218	102 m				
	MEL-01-08	7.5	543044	6989067	259 m				
	MEL-01-09	7.1	542555	6989188	246 m				
	MEL-01-10	10.5	542861	6989059	110 m				
MEL-02 Mid-field	MEL-02-02	10.0	537093	6992642	6,689 m	**April 7** LP, WQ	**July 10** LP, WQ	**August 18** LP, WQ, Phyto	**September 14** LP, WQ
	MEL-02-03	9.8	537497	6992332	6,183 m				
	MEL-02-05	9.4	537831	6992692	6,101 m				
	MEL-02-06	10.2	536922	6992853	6,946 m				
	MEL-02-08	9.7	538342	6991952	5,264 m				
MEL-03 Reference Area 1	MEL-03-01	9.5	533321	6998540	16 km	Not sampled	**July 19** LP, WQ	**August 20** LP, WQ, Phyto	**September 14** LP, WQ, Phyto
	MEL-03-02	10.5	533253	6998664					
	MEL-03-03	10.5	532954	6998860					
	MEL-03-04	8.0	533629	6998660					
	MEL-03-05	8.1	533997	6998265					
MEL-04 Reference Area 2	MEL-04-01	8.3	525634	7000884	21 km	Not sampled	Not sampled	**August 20** LP, WQ, Phyto	Not sampled
	MEL-04-02	9.8	526151	7001525					
	MEL-04-03	10.7	525343	7001363					
	MEL-04-04	8.9	525401	7001085					
	MEL-04-05	8.5	525727	7001134					
MEL-05 Reference Area 3	MEL-05-01	9.6	530922	6990859	19.5 km	Not sampled	Not sampled	**August 14** LP, WQ, Phyto	Not sampled
	MEL-05-02	9.8	530675	6990883					
	MEL-05-03	8.6	530737	6991365					
	MEL-05-04	9.9	530573	6991231					
	MEL-05-05	10.5	530241	6991156					

Notes:
[a] Depth in meters at the fixed monitoring locations.
LP = limnology profile (temperature, dissolved oxygen, pH, and specific conductivity).
WQ = water chemistry.
Phyto = phytoplankton community survey and chlorophyll-a.

3.3 Methods

Limnology measurements (temperature, dissolved oxygen, pH, and specific conductivity) were taken at 1 m depth intervals from the lake surface to within approximately 1 m of the sediment. Water samples were collected from approximately mid-depth at each station (~4 to 5 m below the surface) using a Kemmerer grab sampler during the open-water sampling events or an electric submersible pump connected to a length of C-Flex (Cole Parmer) silicon tubing for the winter sampling event. Bottles for chemistry analysis were pre-labelled before going into the field and handled (i.e., preserved and filtered) according to specifications provided by ALS Environmental. Water for dissolved organic carbon, dissolved nutrients, and dissolved metals were filtered using a syringe and 0.45 µm disc filter provided by ALS. A checklist is included with the field data sheet to verify the samples requiring filtration and to ensure preservation is handled correctly.

Water samples were sent to ALS Environmental in Winnipeg, MB. Analyses were conducted at the laboratory in Winnipeg, Edmonton, and Burnaby. The laboratory in Winnipeg arranges sample shipping to various ALS locations based on the analytical capabilities at these locations and the detection limits (DLs) for the project. ALS is an analytical laboratory accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA). The list of parameters included in the AEMP are provided in **Table 3-2**. Target DLs are listed in the appendices.

In addition to the monthly limnology profiles, Agnico Eagle collected continuous readings for temperature and specific conductivity at MEL-01-07 and MEL-01-10. The sondes were positioned 2 m above the sediment in the water column and programed to record data every 5 minutes. The sonde at MEL-01-10 functioned as intended and produced reliable temperature and specific conductivity data from July 4th until September 24th. The sonde deployed at MEL-01-07 did not produce reliable data. The technicians suspect that the sonde may have been touching or laying on the bottom of the lake. The specific conductivity readings started at 150 µS/cm and increased gradually to 285 µS/cm in late August. By comparison, specific conductivity in the *in-situ* profiles from July and August were 110-133 µS/cm. The laboratory conductivity results from July, August, and September verified that the logger data at MEL-01-07 was unreliable.

Table 3-2. Water quality parameters collected for the AEMP

AEMP Water Quality Parameters
Field Measurements. Depth, pH, specific conductivity, dissolved oxygen, temperature, Secchi depth (open-water), ice thickness
Conventional Parameters and Major Ions. Bicarbonate alkalinity, chloride, carbonate alkalinity, turbidity, conductivity, hardness, calcium, potassium, magnesium, sodium, sulphate, pH, total alkalinity, total dissolved solids (TDS) and total suspended solids (TSS).
Nutrients and Organic Carbon. Ammonia-nitrogen, total Kjeldahl nitrogen, nitrate-nitrogen, nitrite-nitrogen, orthophosphate, total phosphorus, total organic carbon, dissolved organic carbon, reactive silica.
Total and Dissolved metals. Aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, iron, lead, lithium, manganese, mercury, molybdenum, nickel, selenium, silver, strontium, thallium, tin, titanium, uranium, vanadium, and zinc.
Other Parameters. Total cyanide, free cyanide, and weak acid dissociable (WAD) cyanide

3.3.1 Data Analysis

Data Management and Summary Statistics

Water quality data for the Meliadine project are managed within the EQuIS database administered by Agnico Eagle. Water quality data are uploaded directly to EQuIS by the different laboratories. Data analysis, including summary statistics, plotting, and statistical analyses were conducted using R (Core Team, 2022). Descriptive summary statistics for the current year are provided in **Appendix C1**. Summary statistics are calculated separately for the winter and open-water sampling events in Meliadine Lake.

Water Quality Screening Assessment (Benchmarks and Action Levels)

Individual samples collected from Meliadine Lake were screened against the AEMP Benchmarks and corresponding Low-Action-Levels (aka triggers). Benchmarks and corresponding Action Levels are provided in **Table C1-1**.

Spatial and Temporal Trends

Changes in water quality in Meliadine Lake were evaluated by comparing current water quality to the normal range and using plots. *Normal range* refers to the natural water quality conditions in Meliadine Lake using data collected during the baseline period (1995 to 2013) and chemistry data from the three reference areas collected to the end of 2020. The upper 90th percentile is used as the limit for determining whether current concentrations have changed relative to baseline/reference conditions. Parameters measured in water from the NF and MF areas (MEL-01 and MEL-02) were considered outside the normal range if the median concentration of samples collected during the open water period exceeded the 90th percentile of reference/baseline concentrations. The approach to calculating

the normal range for water quality parameters was outlined in detail in the 2019 AEMP report (Azimuth, 2020).

Data from the winter sampling events (typically March or April) are not included in the assessment for three reasons. First, water sampling during the winter is only conducted at the NF and MF areas as per the AEMP Design Plan. Conditions under ice at the reference areas were not characterized during the baseline period or during operation, which means the normal ranges are a relevant point of comparison for water quality in the winter. Second, discharge to Meliadine Lake is limited to open water period. The winter water quality results for MEL-01 and MEL-02 in 2022 are provided **Appendix C1** and shown in the figures in **Appendix C2**.

A generalized workflow was developed to short-list the number of parameters that were carried forward in the discussion:

- Parameters with fewer than 50% detected concentrations are excluded from the spatial and temporal trend assessment. Monthly water quality results were examined to verify that the frequency of non-detects was consistent in each month (**Appendix C2**).
- A long-list of parameters was developed that included any parameter that exceeded the normal range in samples collected from MEL-01 or MEL-02 in the current year. Sample-by-sample screening is a coarse tool for assessing changes in water quality because in any given event there may be results that exceed the normal range naturally, as opposed to the mine being the underlying cause of the change. In any case, sample-by-sample screening provides a long-list of parameters to carry forward for closer scrutiny.
- The normal range assessment involved comparing the annual mean concentration to normal range. If the mean concentration was greater than the normal range, there is a high degree of certainty that the parameter has increased over time. Whether the change is due to mining activities, natural variability, or a combination of the two was primarily assessed using plots showing the changes over time.

Comparison to Predicted Changes in Water Quality

An important aspect of the water quality assessment for Meliadine Lake is determining if the pattern, timing, and magnitude of changes in water quality generally align with the predicted changes based on the approved design plan for the mine. Predicted future changes in water quality also provide a point of comparison with which to evaluate how effectively the mine is managing water quality on site.

Water quality in the NF area MEL-01 in the East Basin was evaluated against the following statement:

> *Water quality in the East Basin of Meliadine Lake is predicted to change relative to baseline conditions, but aquatic life and health-based guidelines would be met at 100 m from the diffuser.*

The narrative statement of "water quality meeting guidelines at the edge of the mixing zone" was based on modelling of effluent mixing and dilution estimates completed as part of the FEIS in 2014. Predicted concentrations were developed for several parameters at the edge of the mixing zone, as well as for TDS, chloride, and sodium beyond the mixing zone in the East Basin of Meliadine Lake. The model was based on the extent of the approved mine plan in the 2014 FEIS, conservative assumptions regarding effluent quality, and the preliminary diffuser design. The *far-field*[3] effluent mixing model in Volume 7 of the FEIS predicted TDS, chloride, and sodium would increase gradually over time in the East Basin to maximum concentrations of 176 mg/L for TDS, 66 mg/L for chloride, and 19 mg/L for sodium in the last year of operations.

The major inputs to the 2014 model (e.g., mine plan and effluent quality) are no longer valid, and in 2020, Agnico Eagle commissioned Tetra Tech to complete a multi-year simulation of effluent mixing in the sub-basin of the East Basin (termed the *model domain* in Tetra Tech's report) that included the final diffuser design, updated bathymetry in the model domain, and the conservative assumption that effluent discharged to Meliadine Lake would have a maximum average concentration of TDS of 3,500 mg/L, equal to the proposed limit in the Water Licence Amendment application. Two multi-year scenarios were modelled, a base case "normal" precipitation scenario, in which TDS concentrations were predicted to increase to 170 mg/L, and a wet-year scenario, in which where TDS concentrations were predicted to increase to 183 mg/L, to provide a more accurate prediction of changes in TDS between 2020 and 2028 (current life-of-mine) for the East Basin. Comparisons of observed results to predicted concentrations will include both the original FEIS model and the updated model.

3.3.2 Quality Assurance and Quality Control

Water chemistry QA/QC involved following appropriate sampling procedures, collecting field duplicates and blanks, laboratory QC, and data analysis QA/QC procedures as outlined in the AEMP Design Plan (Azimuth, 2022a). A detailed summary of the QA/QC results for the 2022 AEMP water chemistry program is provided in **Appendix A** for Meliadine Lake and the Peninsula Lakes. The key findings from the QA/QC assessment in 2022 are summarized as follows:

***In-situ* profiles** – The field team noted that the Manta II water quality meter was not functioning properly when the profiles were taken at MEL-05 on August 14th. The conductivity readings ranged from 111 to 118 µS/cm. Laboratory conductivity measured in the samples from 4 m were approximately 80 µS/cm. The *in-situ* specific conductivity results were flagged as unreliable and were removed from the data set. The temperature, pH, and dissolved oxygen readings were withing their respective ranges and were retained in the dataset.

[3] Far-field in this case means the broader east basin. This is not to be confused with the reference areas in Meliadine Lake

Sample Integrity – The water quality program was successfully implemented in 2022. The lab did not report any lost or damaged bottles. Hold-times were exceeded for some parameters, and the temperature inside the coolers was often above 10°C due the 5–7-day transit time from Site to the lab. Long-term monitoring results from the AEMP and other monitoring programs in Nunavut indicate the effects of temperature and hold-time exceedances on data quality are negligible.

Blanks – Several parameters were detected in the DI and EB samples submitted in 2022. The magnitude of the detected concentrations in the various blanks was less than 10-times the DL except for ammonia in the April EB. Ammonia concentrations were highly variable in the field duplicates from April, indicating laboratory variability may be partly responsible. Detected concentrations of various parameters in the blanks merely indicates the *potential* for cross-contamination. Close examination of the water quality data from 2022 indicated concentrations were consistent with previously-reported results, and potential for cross-contamination to bias the interpretation of the 2022 water quality data is considered unlikely.

Field Duplicates – Ten duplicate samples were collected in 2022, equal to 11.6% duplicate sampling frequency (86 samples were collected in 2022). Of the 1,160 comparisons across the 10 duplicate samples in 2022, only 25 parameters (or 2% of the duplicate results) exceeded the data quality objectives (DQOs[4]), indicating there was good precision between the field duplicate samples in 2022. Most of the parameters that exceeded the DQOs had concentrations that were <5-times the DL in the duplicate. Chemistry data are inherently more variable near the DL. There were only 6 DQO exceedances for parameters with concentrations >5-times the DL: ammonia, TKN, DKN, and total phosphorus (April DUP-1; MEL-02-02), dissolved manganese (July DUP-3; B7-01), and TDS (August DUP-1; MEL-03-01).

The field duplicate results indicate good precision (low variability) for most parameters. There is more uncertainty associated with concentrations measured close to the DL, however, the effect on interpretating data in the AEMP is negligible, as the AEMP Benchmarks and Action Level concentrations (i.e., water quality guidelines) are typically an order of magnitude or higher than the DLs.

Laboratory QC Assessment – The laboratory QC assessment completed by ALS the water quality data were accurate (based on the method blanks, matrix spikes, and lab control samples) and precise (based on the laboratory duplicates). There were no data quality issues with the laboratory results that resulted in data being flagged as unreliable.

[4] Two DQOs are used to evaluate precision between field duplicates depending on the concentrations in the samples. If the concentrations in the samples and duplicate are > 5-times the DL, the DQO is a relative percent difference (RPD) between the two samples of <30%. If the concentration between sample and duplicate is < 5-times the DL, the DQO is a difference between the sample and duplicate of <2-times the DL. This approach is based on how ALS Environmental evaluates precision between laboratory duplicate samples.

3.4 Results and Discussion

Water quality results for Meliadine Lake are discussed in the following sections:

- *In-situ* water quality from the limnology profiles in 2021 (**Section 3.4.1**),
- Water chemistry compared to AEMP Action Levels and Benchmarks (**Section 3.4.2**),
- Comparison to FEIS Predictions (**Section 3.4.4**),
- Temporal and spatial trends (**Section 3.4.3**), and
- Low Action Level assessment (**Section 3.4.4**).

Tabulated chemistry results, summary statistics, and supplemental plots are provided in **Appendix C**.

3.4.1 *In-situ* Water Quality

Field-measured water quality parameters provide important "real-time" information on potential changes to water quality and are an important tool for assessing water quality in Meliadine Lake. The discussion below is based on data presented in the following figures:

- **Figure 3-2** shows the dissolved oxygen (DO), temperature, and pH results for each area and sampling event. These water quality parameters are consistent within each area for a given sampling event. An average for each parameter, area, and event was calculated to make it easier to visualize differences among the study areas.
- **Figure 3-3** shows the specific conductivity profiles for each replicate station and event in 2022. These data help illustrate spatial and temporal patterns of effluent dispersion in the East Basin.
- **Figure 3-4** shows the continuous temperature and conductivity readings from the data logger deployed at MEL-01-10 in 2022. The continuous temperature and specific conductivity data recorded at MEL-01-01 in 2021 are included in the figure to illustrate how the volume and timing of effluent discharge influence water temperature and conductivity in the immediate vicinity of the diffuser.
- **Figure 3-5** shows the conductivity profiles by area and event from 2013 to 2022. Note that only one sampling event was completed in the East Basin of Meliadine Lake in August 2013.

Temperature, Dissolved Oxygen, and pH

Conditions in Meliadine Lake varied naturally in 2022 according to seasonal patterns of change reported in previous AEMP cycles. Meliadine Lake was well oxygenated and largely unstratified in the winter and open water sampling events (**Figure 3-2**). Field pH readings in 2022 were on the slightly basic side of circumneutral (7 to 7.75) from July through September and slightly more acidic in the winter. Minor differences in pH are often observed in open water vs ice covered conditions in northern lakes based on

nearly 20 years of monitoring at Meadowbank. Water temperatures can vary somewhat among the study areas, especially in July when ice comes off the lake. In general, water temperatures vary by less than 2°C among the study areas. By mid-September, the water temperature is uniform throughout the lake.

The *in-situ* water temperature data shows that effluent from CP1 can influence the water temperature in the immediate vicinity of the diffuser. After peak discharge in the first week of July, the water temperature at MEL-01-10 increased from 11°C to 14°C between on July 9th and July 13th (**Figure 3-4**). Water temperature peaked at 17°C in late July, and when discharge stopped on August 2nd, water temperature measured at MEL-01-10 dropped to 14°C. A similar pattern was observed in logger data from MEL-01-01 in 2021 after peak discharge in August. The effect of effluent on water temperature in MEL-01 is short-term and localized based on the limnology profile data in July, August, and September.

Conductivity

Conductivity is a measure of the electrical conductivity in water, and as the amount of salt (ionic parameters) increases, conductivity also rises. *In-situ* conductivity readings provide insight into the spatial and temporal pattern of effluent mixing in MEL-01. The conductivity profiles are also useful for evaluating long-term changes in water quality throughout Meliadine Lake that may be linked to interannual climate variability.

A summary of the 2022 conductivity results are provided below.

- As in previous years, higher conductivity was reported in the under-ice profiles collected at MEL-01 and MEL-02 in April compared to the open-water period (**Figure 3-3**). Higher conductivity readings were measured near the bottom of the lake at the MEL-01 stations, which suggests that effluent discharged in September 2021 may not have fully mixed with surface water in the East Basin between September 2021 and April 2022. The conductivity results from MEL-02 show cryo-concentration of salts in water immediately below the ice, but no evidence of stratification that would suggest incomplete effluent mixing and migration of the effluent plume past the narrows that separates the East Basin from the rest of Meliadine Lake.
- Conductivity measured 110 µS/cm at MEL-01 and 95 µS/cm at MEL-02 in mid-July. Conditions within the East Basin were unstratified except at MEL-01-06 and MEL-01-10 where the plume was detected at 7-8 m in the water column (**Figure 3-3**). MEL-01-06 and MEL-01-10 are located 100 m and 250 m SE of the diffuser, respectively and the results indicate the plume was migrating from NW to SE in the same direction as the prevailing wind and waves. The same pattern of effluent mixing was documented in the August 2021 plume delineation survey (Azimuth, 2022c).
- The conductivity profiles taken on August 18th at the MEL-01 stations were nearly identical (111 µS/cm) and very similar to readings taken in mid-July except at MEL-01-08 where conductivity

increased slightly near the bottom of the lake. Conditions in the East Basin were generally well-mixed after discharge from CP1 to Meliadine Lake was paused on August 2nd based on these data and the continuous conductivity readings collected at MEL-01-10 (**Figure 3-4**).

- Discharge to Meliadine Lake resumed on August 23rd, and the plume was detected by the continuous data logger at MEL-01-10 and in the profiles completed at MEL-01-01, MEL-01-07, and MEL-01-9 in mid-September (**Figure 3-4**). The profiles on September 16th indicate wind and wave conditions were causing the plume to migrate NW of the diffuser.

Long-term trends in conductivity among the Meliadine Lake study areas are shown in **Figure 3-5**. This figure clearly shows that conductivity has increased over time at all study areas (lines moving to the right on the x axis). As expected, the largest increase in conductivity has occurred at MEL-01. Looking at the results from August, conductivity has increased 75% from 63 µS/cm in 2013 to 111 µS/cm in 2022. The biggest year-over-year change occurred between 2019 (82 µS/cm) and 2020 (107 µS/cm) coinciding with the large volume of water discharged in June and July 2020. Conductivity has increased at the MF and reference areas, but compared to MEL-01, the magnitude of the year-over-year change is less pronounced. There is also evidence that water quality, including conductivity, is changing more broadly in the region. This topic is explored for specific parameters of interest in **Section 3.4.3**.

Figure 3-2 Dissolved Oxygen, pH, and temperature results from the 2022 limnology profiles.

Notes: The average value was computed for each month/area/depth (n=6 profiles at MEL-01; n=5 profiles at the other areas). The data were smoothed using Locally Estimated Scatterplot Smoothing (LOESS).

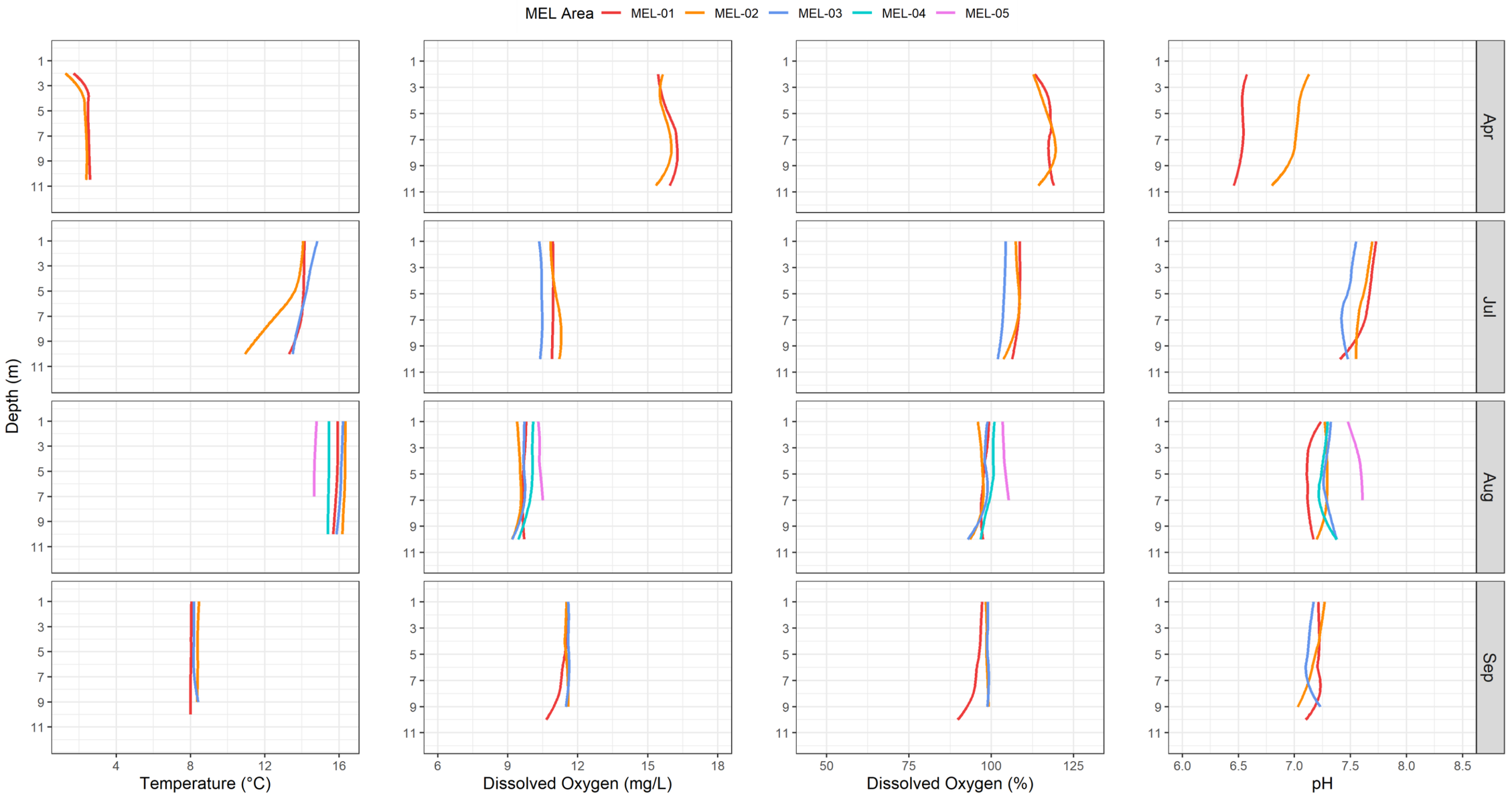


Figure 3-3 Specific conductivity (µS/cm) results from the 2022 limnology profiles

Notes: n=6 limnology profiles at MEL-01; n=5 limnology profiles at the other areas. MEL-05 results in August were flagged as anomalous due to an issue with the probe.

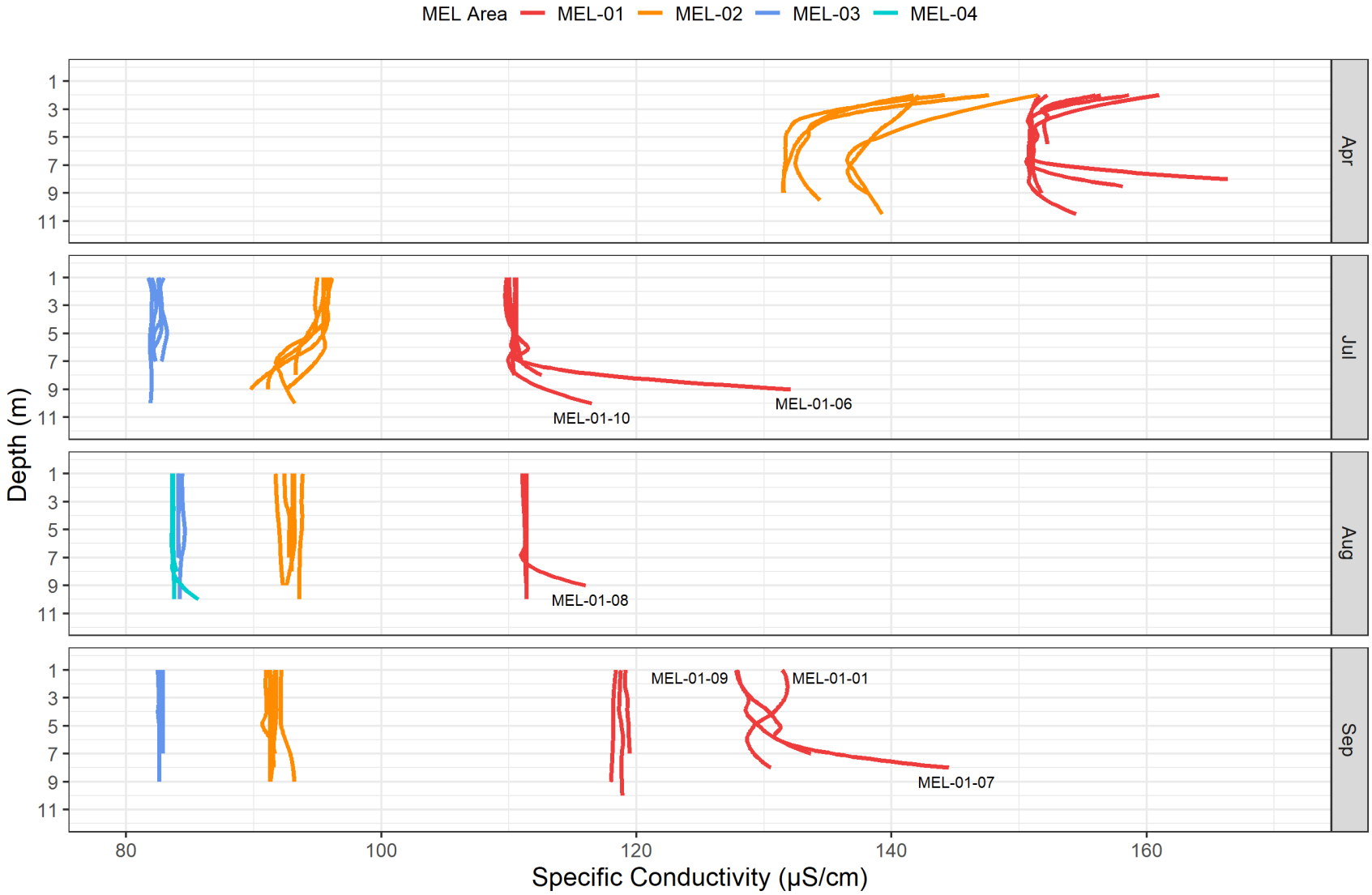


Figure 3-4 Temperature and specific conductivity readings from data loggers at MEL-01 in 2021 and 2022.

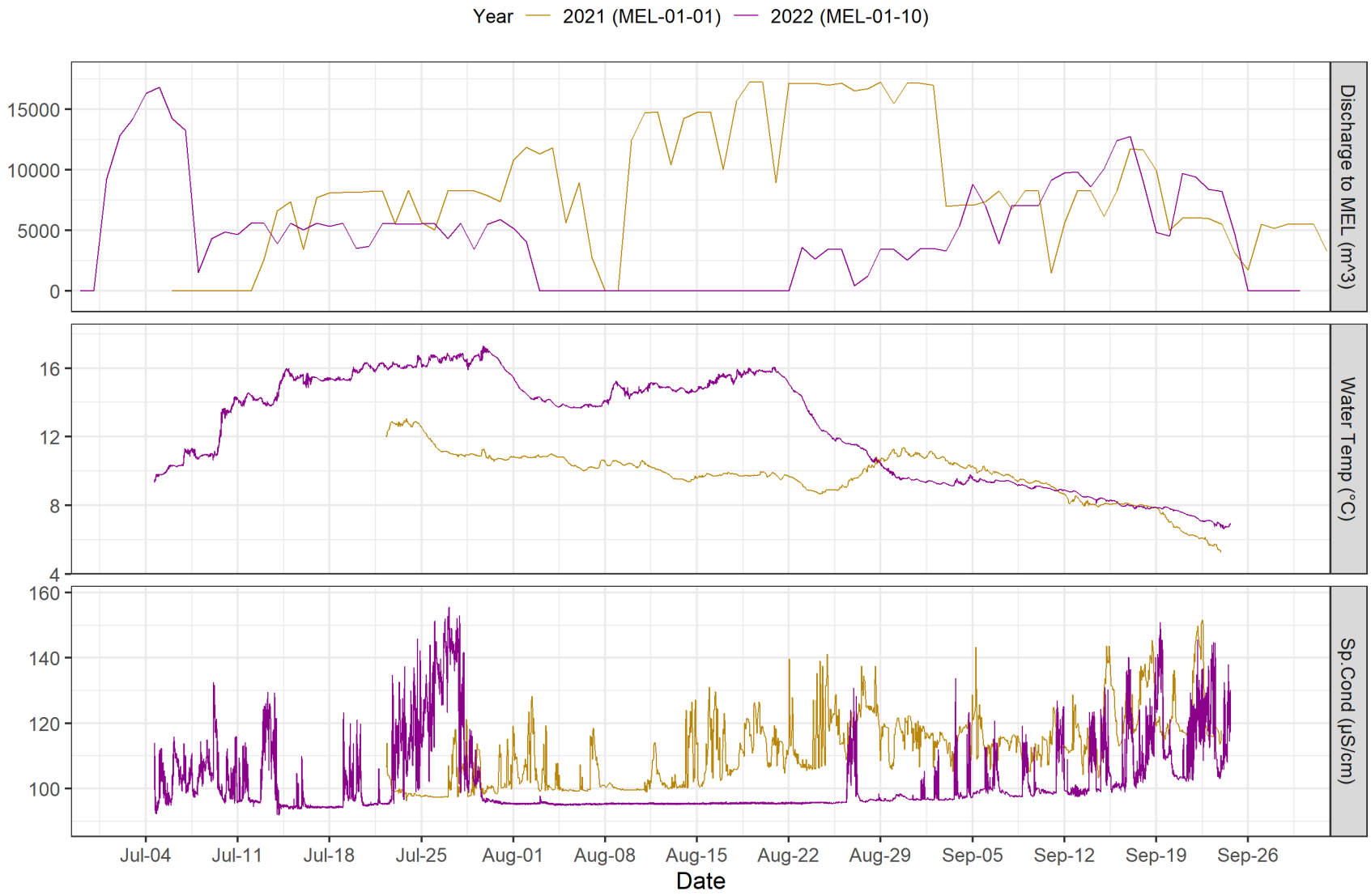
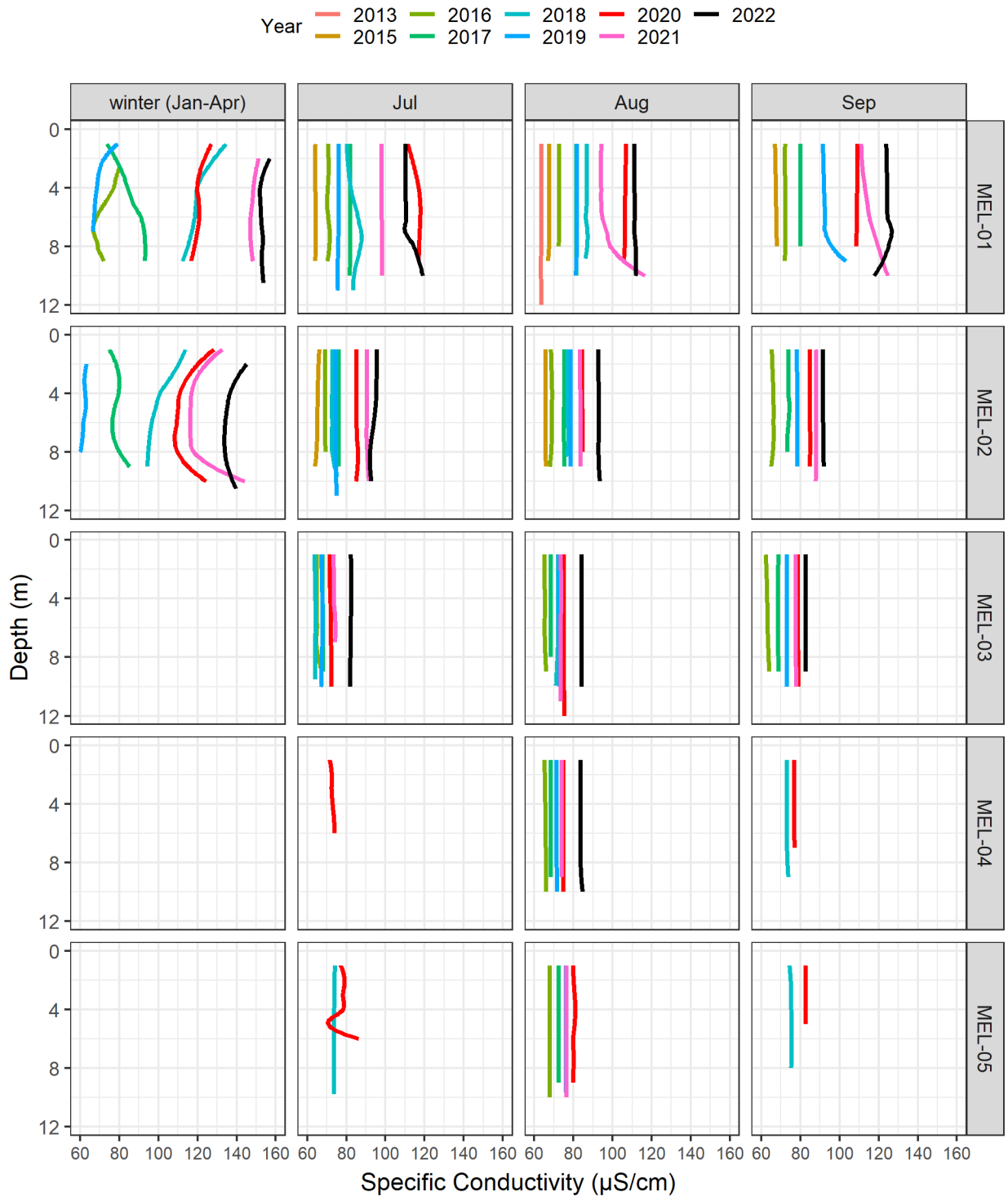


Figure 3-5 Long-term changes in specific conductivity (µS/cm) in Meliadine Lake (2015-2022)

Notes: The profiles present the average value for each year/month/area.
More than 1 winter sampling event was completed in 2015 and 2016 at MEL-01 and MEL-02.
The data were smoothed using Locally Estimated Scatterplot Smoothing (LOESS).



3.4.2 Water Quality Screening Assessment

There were no exceedances of AEMP Action Levels in any of the samples collected in 2022 except for dissolved copper at MEL-01 (**Figure 3-6**). The results for copper are discussed in more detail below and do not appear to be related to the mine. In addition, zinc concentrations, which have exceeded the AEMP Action Levels in previous years, were all below those levels in 2022 (**Figure 3-7**). As for the other parameters of interest for the AEMP, concentrations remain well below the AEMP Action Levels (**Figure 3-8**).

Dissolved copper exceeded the Action Level in all the samples collected from MEL-01 in April, two of the samples from MEL-02 in April, and one sample from MEL-01 in September. Copper concentrations and associated Action Levels and Benchmarks for these samples are provided in **Table 3-3**. The exceedances were observed in samples with lower pH (6.5) measured in the field at the time of sampling (**Figure 3-2**). pH strongly influences copper bioavailability, and water with low pH tends to have correspondingly low guidelines. As shown in **Figure 3-6**, copper concentrations have remained stable dating back to 2013. Further, the observed concentrations in Meliadine Lake are well within the range of ambient copper concentrations reported for Nunavut (ECCC, 2021). Lastly, copper concentrations in the MEL-14 effluent continued to be low (2 to 3 µg/L) in 2022 (**Section 2.2.2**). In short, the exceedances of the AEMP Benchmark for copper are natural, transient, and low in magnitude. Current concentrations of copper do not pose a risk to the health of aquatic life in Meliadine Lake.

Table 3-3. Samples that exceeded the AEMP Action Level for copper in 2022

Sampling Event	Station	Dissolved Copper (µg/L)	Action Level		Benchmark	
			Value (µg/L)	Screening Quotient	Value (µg/L)	Screening Quotient
April	MEL-01-01	1.38	0.699	1.97	0.932	1.48
	MEL-01-06	1.38	0.572	2.41	0.763	1.81
	MEL-01-07	1.42	0.609	2.33	0.812	1.75
	MEL-01-08	1.28	0.797	1.61	1.06	1.2
	MEL-01-09	1.27	0.668	1.9	0.891	1.43
	MEL-01-10	1.41	0.674	2.09	0.899	1.57
	MEL-02-05	1.26	1.2	1.05	1.6	0.785
	MEL-02-08	1.34	1.18	1.13	1.57	0.851
September	MEL-01-08	0.903	0.858	1.05	1.14	0.79

Notes:
Benchmark = FWAL guideline (BLM; ECCC, 2021); Action Level = 75% of the Benchmark.
Screening Quotient = dissolved concentration ÷ criteria.

Figure 3-6. Copper concentrations in Meliadine Lake compared to the AEMP Benchmark

Notes: Screening quotients = concentration (µg/L) ÷ AEMP Benchmark (copper BLM; ECCC, 2021).

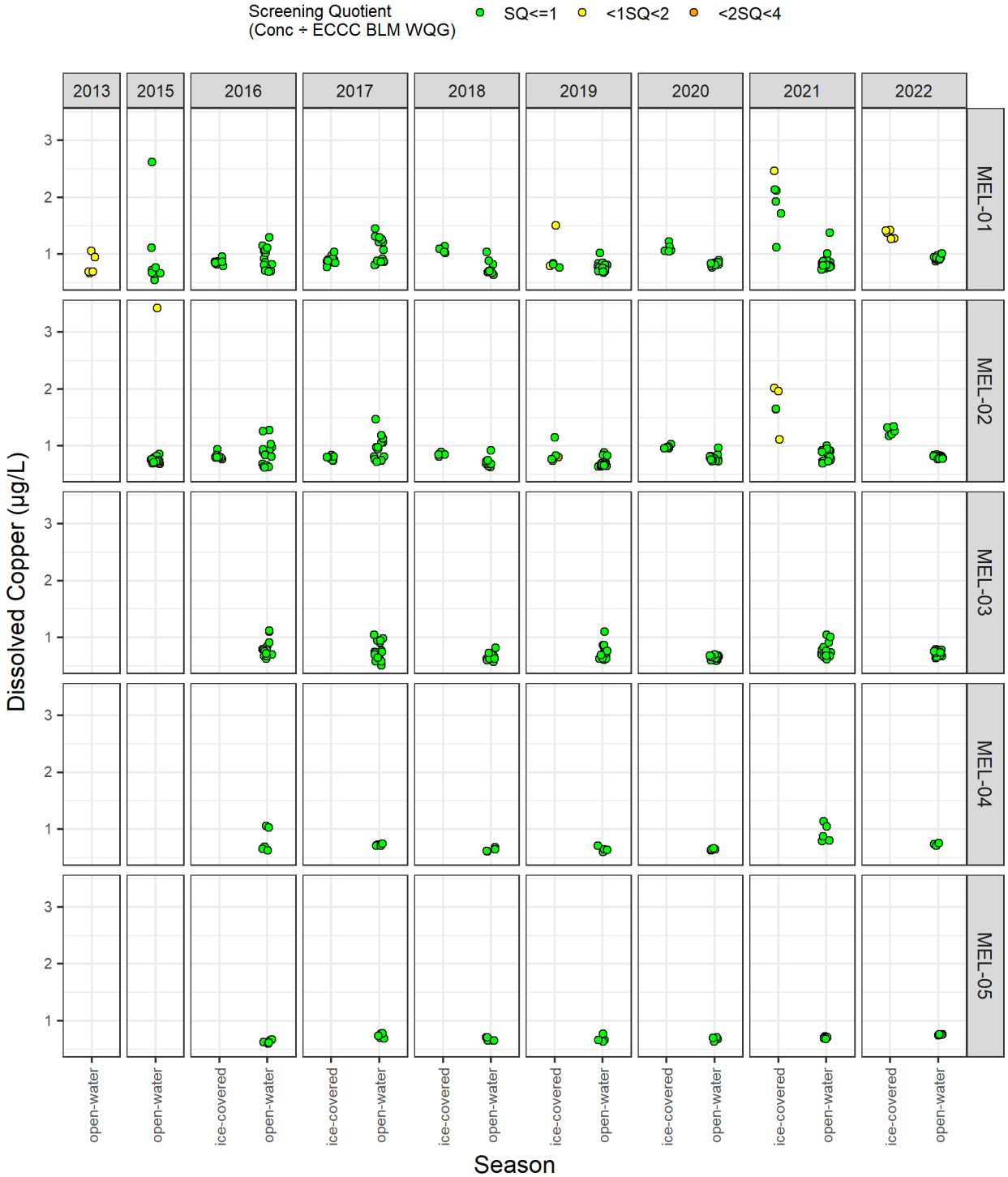


Figure 3-7. Zinc concentrations in Meliadine Lake compared to the AEMP Benchmark

Notes: Screening quotient = concentration (µg/L) ÷ AEMP Benchmark (CCME WQG).

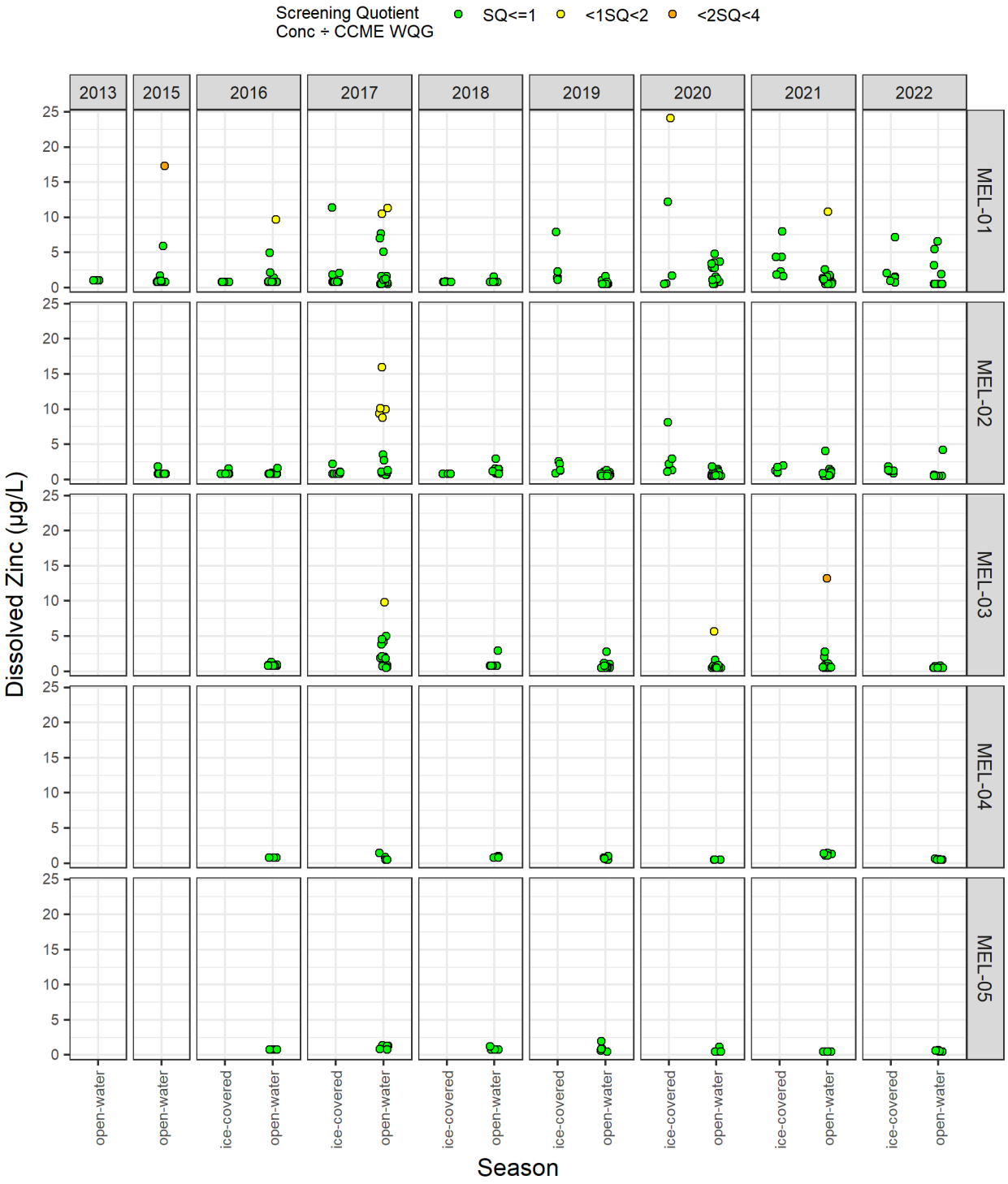
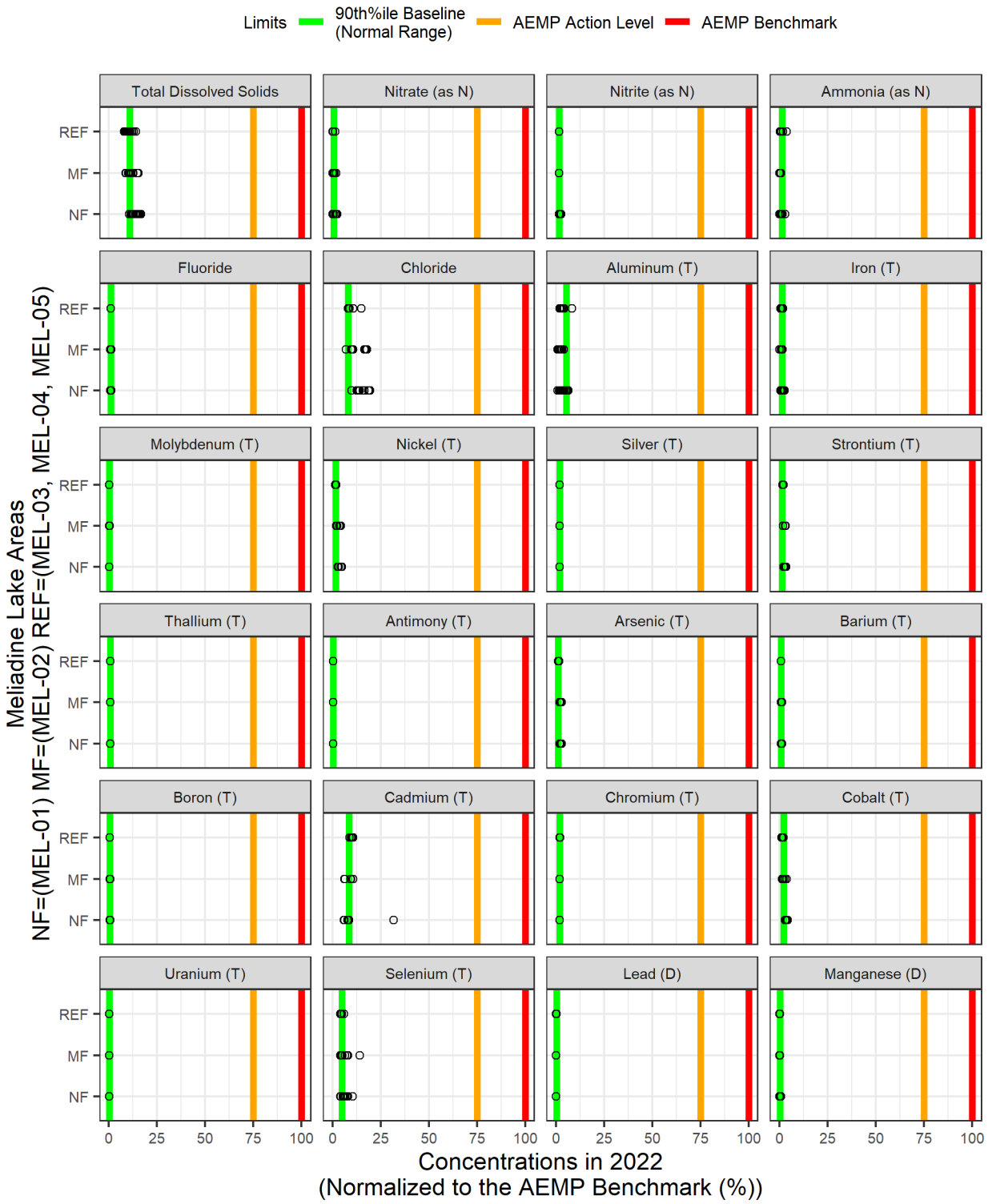


Figure 3-8. Water chemistry results from 2022 compared to the Normal Range, AEMP Action Levels, AEMP Benchmarks



3.4.3 Spatial and Temporal Trends

This section describes spatial and temporal changes in water quality in Meliadine Lake. Parameters that have increased relative to baseline/reference conditions are flagged for closer examination by comparing concentrations against the normal range of baseline/reference conditions. Changing water quality could be due to mining related activities (e.g., effluent discharge), but could also be due to natural and interannual climate variability. Spatial and temporal trends for parameters of interest are provided in a series of condensed temporal plots in **Figure 3-15** to **Figure 3-20** to support the assessment. The condensed temporal plots, as the name implies, condense sampling events on the x axis to help visualize changes in water quality among the exposure and reference areas and differences over time.

Regional Changes in Water Quality in the Kivalliq

Northern aquatic ecosystems are particularly sensitive to the effects of climate change and ensuing alterations in the hydrologic cycle (Wrona et al., 2016). Increases in the frequency and severity of extreme rain events, thawing permafrost, altered snow pack and ice conditions, and increased evapotranspiration are a few of the processes that are contributing to changes in water quality throughout the Arctic.

The Climate Atlas of Canada (Prairie Climate Centre; https://climateatlas.ca/) provide spatial and temporal (1950 through 2080) predictions across Canada for a range of weather-related metrics based on the mean of 24 climate models and two carbon output scenarios (low carbon [LC] and high carbon [HC]). Starting the models in 1950 allows for comparisons with more than 70 years of observed weather data. Over the next 30 years, mean annual temperatures are predicted to rise by 2.4°C to 2.9°C and annual precipitation is expected to increase by 8% to 10% for the LC and HC scenarios, respectively, in the Rankin Inlet region.

To help explain the influence of interannual climate variability on water quality in Meliadine Lake, data from two reference lakes sampled as part of the long-term monitoring program at the Meadowbank Mine near Baker Lake were included in the assessment[5]. The two lakes, Inuggugayualik Lake (INUG) and Pipedream Lake (PDL), are located well-beyond the influence of mining activities and provide insight into regional changes in water quality that may be affecting lakes throughout the Kivalliq. Monitoring at INUG has occurred every year since 2006, with multiple sampling events in the winter and summer (July, August, and September). PDL was added to the monitoring program in 2009. Water chemistry is

[5] Temporal trends for INUG and PDL are discussed in the Core Receiving Environment Monitoring Program (CREMP) annual report.

naturally different in INUG and PDL compared to Meliadine Lake, but for the purpose of examining long-term trends, the important point of comparison is the relative change for the parameters of interest.

Temporal trends at INUG and PDL for TDS, major ions, and metals of interest are shown in **Figure 3-9**. The plots include data from the open water season (July-September) going back to 2006 for INUG and 2009 for PDL. Historical data with high detection limits were omitted from the plots. The annual mean concentrations from 2013 to 2022 are shown in **Table 3-4**. 2013 was selected as the starting point for looking at temporal trends because of the limited number of sampling events in Meliadine Lake in the 2000's and comparatively high detection limits for metals of interest.

Major Ions – The concentrations of chloride, calcium, magnesium, potassium, and sodium have increased at INUG and PDL between 10% and 20% over the past 10 years. Similar increases were observed for hardness (20% at INUG; 14% at PDL) and conductivity (14% at INUG; 17% at PDL). TDS concentrations have remained relatively stable at both lakes since 2013, which is not consistent with observed increase in conductivity, hardness, and major ions. The absolute concentrations of the major ions mentioned above are quite low, so even moderate increases may not be reflected in TDS.

Organic Carbon – One of the more well-known effects of climate change in the Arctic is thawing of the permafrost. Changes to permafrost, when combined with more frequent and severe precipitation, have the potential to increase erosion of organic and mineral soils from the surrounding tundra to nearby aquatic environments (Rawlins et al. 2021). Based on similar concentrations of TOC and DOC at INUG and PDL, organic carbon occurs primarily in the dissolved phase (<0.45 µm) in these lakes (**Table 3-4**). Looking specifically at DOC, organic carbon has increased 11% at INUG and 16% at PDL since 2013.

Metals – The concentrations of arsenic, lithium, molybdenum, strontium, and uranium have increased in recent years at MEL-01 and MEL-02, but there is evidence that mining activities are not entirely responsible for the observed change. Molybdenum and lithium are routinely measured near or below the limit of detection at INUG and PDL and provide limited value for distinguishing mining vs climate-related changes in water quality at Meliadine Lake. Arsenic, strontium, and uranium are detected at INUG and PDL and do provide meaningful insight into temporal changes in the region. The magnitude of the increases was similar for INUG and PDL: strontium (14-17%); uranium (19-24%); arsenic (50-53%) (**Table 3-4**). There is some uncertainty with respect to the relative increase for arsenic because concentrations were below the DL of 0.1 µg/L at INUG and slightly above the DL at PDL (0.15 µg/L) (**Figure 3-9**). The uncertainty regarding the historical data and results close to DL is somewhat negated by the fact that the biggest year-over-year change for both lakes occurred between 2021 and 2022 (25% at INUG and 37% at PDL). Overall, the long-term dataset for arsenic, strontium, and uranium provides compelling evidence that the concentrations of some metals are increasing more broadly in the region.

Summary – the long-term dataset from INUG and PDL provide compelling evidence that water quality in the Kivalliq region has changed over the past 10 years. The relative percent changes described above for

TDS, organic carbon, and select metals are provided here to illustrate that water quality has changed and will likely continue to change because of interannual climate variability.

Normal Range Assessment

The temporal and spatial trends are presented with a focus on understanding the timing of the changes in relation to effluent discharge and the exceptionally high rainfall total from June and July 2019 that appears to have influenced the concentrations of several parameters throughout the lake. Parameters that exceeded the normal range in at least one sample at MEL-01 during the open water period in 2022 are listed in **Table 3-5**. Spatial and temporal trends are discussed by parameter group (major ions, nutrients, and metals). It's worth noting that as climate change affects water quality at the regional scale, more parameters could be added to the list of Normal Range exceedances in the future.

Table 3-4. Mean concentrations for selected parameters at the reference lakes for the Meadowbank CREMP (July, August, September)

Lake & Parameter	Units	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	% increase '13 to '22
Inuggugayualik Lake (INUG)												
TDS	mg/L	12.7	*	14.9	13.5	11.5	12.5	13.7	13.7	12.5	13.3	5%
Conductivity	µS/cm	14	16	16	15	15	16	16	16	16	16	14%
Hardness	mg/L	5.4	5.6	5.8	5.6	5.7	5.7	6	5.9	5.6	6.5	20%
Alkalinity, Total	mg/L	4.9	*	5.1	5	5	5.4	5.4	5	5	5.4	10%
Chloride	mg/L	0.66	0.73	0.75	0.73	0.74	0.8	0.82	0.8	0.73	0.74	12%
Calcium	mg/L	1.1	1.1	1.2	1.1	1.1	1.1	1.2	1.2	1.1	1.3	18%
Magnesium	mg/L	0.68	0.7	0.7	0.67	0.72	0.7	0.72	0.7	0.7	0.77	13%
Potassium	mg/L	0.35	0.39	0.39	0.38	0.38	0.36	0.38	0.37	0.39	0.42	20%
Sodium	mg/L	0.5	0.56	0.56	0.58	0.6	0.55	0.58	0.57	0.55	0.58	16%
Fluoride	mg/L	0.055	0.063	0.058	0.061	0.058	0.063	0.065	0.064	0.057	0.059	7%
Sulphate	mg/L	0.86	0.88	0.88	0.82	0.84	0.93	0.92	0.97	0.88	0.91	6%
TOC	mg/L	2.1	1.9	1.8	1.8	1.9	2.00	2.0	2.2	2.2	2.2	5%
DOC	mg/L	1.9	1.8	1.7	1.8	1.8	1.9	2.0	2.3	2.2	2.1	11%
Arsenic	µg/L	0.10	0.10	0.10	0.11	0.12	0.12	0.12	0.11	0.12	0.15	50%
Lithium	µg/L	0.51	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	nc
Molybdenum	µg/L	<0.05	<0.05	0.054	0.05	0.05	0.05	0.05	0.05	0.05	0.057	14%
Strontium	µg/L	6.3	6.4	6.5	6.4	6.5	6.4	6.6	6.8	6.2	7.4	17%
Uranium	µg/L	0.052	0.041	0.048	0.046	0.046	0.039	0.051	0.057	0.07	0.062	19%
Pipedream Lake (PDL)												
TDS	mg/L	16.0	*	15.5	17.0	14.5	15.1	14.4	16.6	15.8	16.1	0%
Conductivity	µS/cm	20.1	22.7	22.2	21.3	21.3	22.37	22.3	23.0	23.4	23.5	17%
Hardness	mg/L	8.36	8.82	8.82	8.65	8.59	8.74	9.27	9.40	9.21	9.50	14%
Alkalinity, Total	mg/L	6.95	*	7.66	7.42	7.37	8.28	8.22	7.36	7.95	8.30	19%
Chloride	mg/L	0.59	0.60	0.60	0.59	0.61	0.64	0.67	0.66	0.64	0.70	19%
Calcium	mg/L	2.16	2.20	2.25	2.20	2.18	2.17	2.37	2.36	2.34	2.39	11%
Magnesium	mg/L	0.77	0.77	0.78	0.77	0.79	0.78	0.81	0.81	0.82	0.86	11%
Potassium	mg/L	0.32	0.35	0.35	0.35	0.35	0.33	0.35	0.35	0.37	0.38	18%
Sodium	mg/L	0.46	0.48	0.50	0.52	0.51	0.48	0.50	0.50	0.49	0.52	14%
Fluoride	mg/L	0.035	0.039	0.035	0.038	0.035	0.038	0.043	0.040	0.036	0.040	13%
Sulphate	mg/L	1.59	1.63	1.63	1.56	1.66	1.73	1.83	1.85	1.79	1.86	18%
TOC	mg/L	1.63	1.67	1.59	1.52	1.75	1.74	1.66	1.84	1.65	1.78	9%
DOC	mg/L	1.54	1.61	1.54	1.46	1.60	1.60	1.75	2.05	1.67	1.78	16%
Arsenic	µg/L	0.15	0.16	0.14	0.18	0.18	0.18	0.17	0.17	0.17	0.23	53%
Lithium	µg/L	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	nc
Molybdenum	µg/L	<0.05	0.054	0.051	0.057	0.053	0.051	0.052	0.051	<0.05	0.054	7%
Strontium	µg/L	9.02	9.13	9.28	9.18	8.95	9.01	9.73	10.06	9.52	10.28	14%
Uranium	µg/L	0.024	0.024	0.022	0.026	0.023	0.021	0.025	0.026	0.030	0.029	24%

Notes
* Results were flagged as unreliable in 2014.
Results with elevated detection limits were excluded from the assessment.
% increase not calculated for lithium because the concentrations for most samples were <DL.

Figure 3-9. Water quality trends for selected parameters at INUG and PDL, 2006-2022

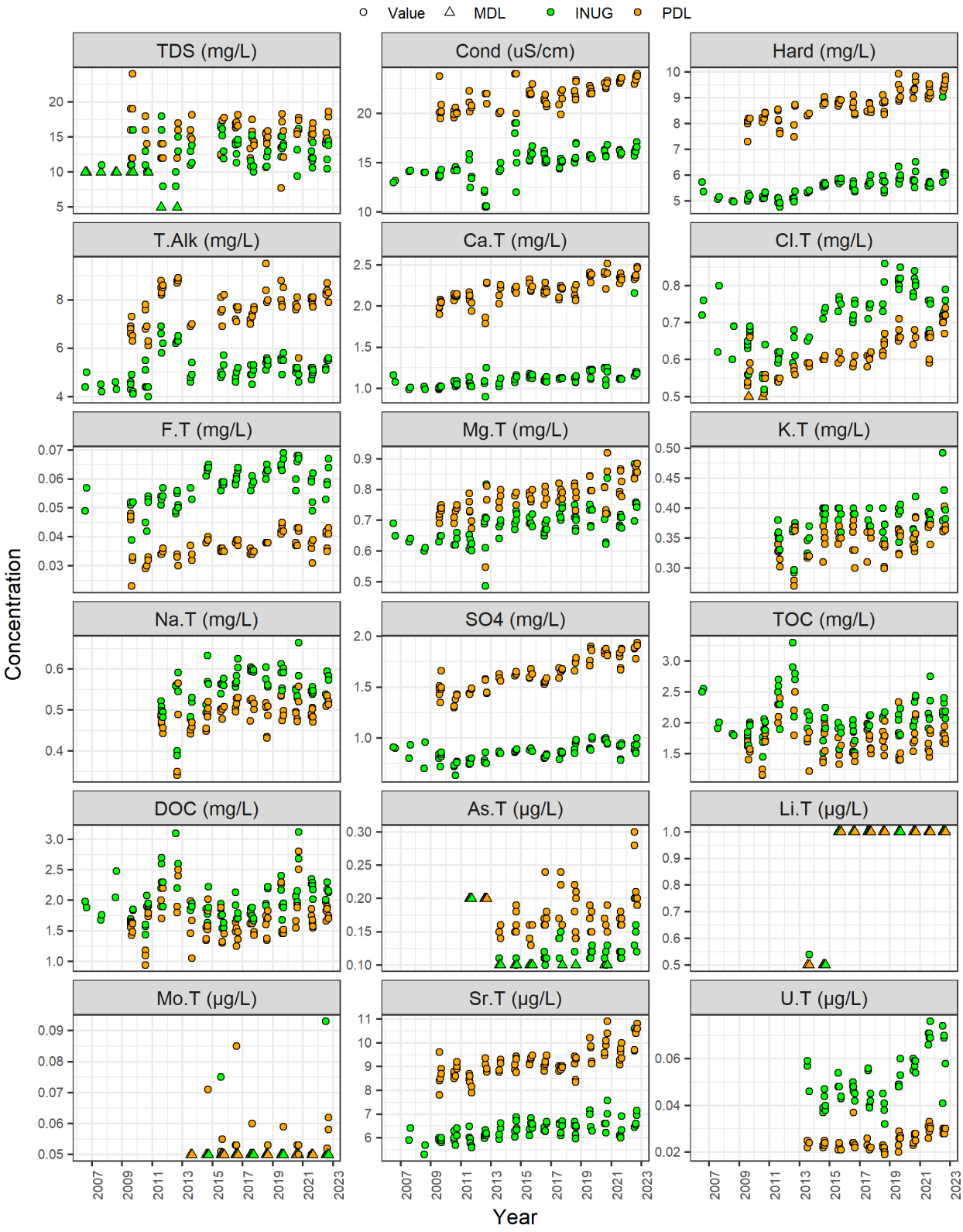


Table 3-5. Normal Range assessment for Meliadine Lake in 2022

Parameter	Units	Detection Limit	Normal Range	Mean Concentration (July-Sept)				
				MEL-01 (n=18)	MEL-02 (n=15)	MEL-03 (n=15)	MEL-04 (n=5)	MEL-05 (n=5)
Conventional Parameters								
Conductivity (lab)	µS/cm	1	77.5	116	93.6	86.4	83.4	85
Hardness	mg/L	0.2	23.4	31.3	26.5	24.4	24.4	25.5
Total Dissolved Solids	mg/L	13	54	64.5	54.1	51.5	43.6	48.8
TDS (Calculated)	mg/L	1	39.6	56.4	45.5	42.1	40.5	41.8
Major Ions								
Alkalinity, Bicarbonate	mg/L	1.2	25	26.5	24.3	23.4	23.6	24.8
Alkalinity, Total	mg/L	1	20.5	21.7	19.9	19.2	19.3	20.3
Calcium (T)	mg/L	0.01	7.33	9.56	8.28	7.76	7.81	8.28
Chloride	mg/L	0.1	9.56	16.2	12	10.9	9.83	10
Fluoride	mg/L	0.02	0.028	*0.0275*	*0.0259*	*0.0266*	*0.027*	*0.0272*
Magnesium (T)	mg/L	0.004	1.18	1.79	1.41	1.3	1.26	1.31
Potassium (T)	mg/L	0.02	0.954	1.19	1.06	1.03	1.03	1
Reactive Silica (SiO2)	mg/L	0.01	0.268	0.399	0.3	0.26	0.272	0.338
Sodium (T)	mg/L	0.02	4.85	8.01	6.07	5.6	5.23	5.18
Sulphate	mg/L	0.3	3.87	6.43	4.64	4.02	3.82	4.03
Nutrients								
Ammonia (as N)	mg/L	0.005	0.0174	0.0141	-	0.0119	-	-
Nitrate (as N)	mg/L	0.005	0.018	0.0176	-	-	-	-
Total Diss Phosphorus	mg/L	0.001 | 0.003	0.00314	-	0.00207	0.00229	0.00148	-
Total Kjeldahl Nitrogen	mg/L	0.05	0.25	0.313	0.221	0.224	0.181	0.199
Total Phosphorus	mg/L	0.001 | 0.003	0.006	0.00677	0.00388	0.00317	0.00404	0.00306
Organic/Inorganic Carbon								
Dissolved Organic Carbon	mg/L	0.5	2.72	4.19	3.82	3.17	2.62	3.23
Total Organic Carbon	mg/L	0.5	3	3.92	3.56	2.9	2.59	3.08
Total Metals								
Aluminum (T)	µg/L	1	5.32	3.58	*1.95*	3.4	2.3	2.12
Arsenic (T)	µg/L	0.02	0.275	0.576	0.592	0.333	0.312	0.417
Barium (T)	µg/L	0.02	8.05	8.62	7.85	7.79	7.81	8.08
Boron (T)	µg/L	5	6.52	*7.44*	*5.47*	-	-	*5.08*
Cobalt (T)	µg/L	0.005	0.016	0.0269	0.0136	0.0117	*0.0097*	0.0111
Copper (T)	µg/L	0.05	0.86	0.949	0.807	0.747	0.753	0.778
Iron (T)	µg/L	1	15	23.2	11.1	10	8.4	10.3
Lithium (T)	µg/L	0.5	0.72	1.18	*0.937*	*0.817*	*0.818*	*0.916*
Manganese (T)	µg/L	0.05	3.06	7.3	3.11	1.9	2.2	2.89
Molybdenum (T)	µg/L	0.05	0.107	0.138	0.125	*0.0874*	0.141	0.101
Nickel (T)	µg/L	0.05	0.441	0.795	0.554	0.429	0.432	0.404
Strontium (T)	µg/L	0.02	36.1	59.4	46.7	41.4	39.4	42.2
Titanium (T)	µg/L	0.05	0.17	*0.0836*	-	0.149	-	-
Uranium (T)	µg/L	0.001	0.0164	0.0265	0.0183	0.0178	0.0161	0.0189
Dissolved Metals								
Copper (D)	µg/L	0.05	0.861	0.939	0.809	0.731	0.731	0.757
Manganese (D)	µg/L	0.05	1.2	0.648	0.412	0.356	0.175	0.371

Notes:
Italicized numbers indicate the mean concentration was <2*DL.
"-" = annual mean not calculated because more the 50% of the values were < DL.
Light shaded values indicate the mean concentration exceeded the normal range.
Dark shaded values indicate the mean concentration exceeded the normal range by 20% or more.

Table 3-6. Annual mean concentrations at MEL-01 for parameters that exceed the Normal Range in 2022

Parameter	Normal Range	Annual Mean Concentration (Open-Water Season) [a]									2022 Rank	% Change from			Recent trend (2020-2022)
		2013	2015	2016	2017	2018	2019	2020	2021	2022		Normal Range	2013	2021	
TDS & Constituent Ions (mg/L)															
Total Dissolved Solids	54	40.3	38	45.1	53.4	54.4	49.2	70.6	56.9	64.5	2	19%	60%	13%	Stable
TDS (Calculated)	39.6	-	33.1	37	41.5	42.4	41	55.3	51.8	56.4	**1**	42%	nc	9%	Stable
Alkalinity, Total	20.5	16.9	14.1	15.8	17.3	16.1	16.5	19.5	17.5	21.7	**1**	6%	28%	24%	Increasing
Calcium (T)	7.33	6.17	6.36	7.22	7.85	7.77	7.16	8.79	8.4	9.56	**1**	30%	55%	14%	Increasing
Chloride	9.56	7.57	8.6	9.35	10.6	12.7	11.9	17.8	16.2	16.2	2	69%	114%	0%	Stable
Magnesium (T)	1.18	1.05	1.1	1.23	1.37	1.39	1.31	1.74	1.63	1.79	**1**	52%	70%	10%	Stable
Potassium (T)	0.954	0.83	0.847	0.886	1.01	0.979	0.98	1.16	1.12	1.19	**1**	25%	43%	6%	Stable
Sodium (T)	4.85	3.85	4.37	4.8	5.32	5.63	5.58	8.17	7.7	8.01	2	65%	108%	4%	Stable
Sulphate	3.87	3.27	3.6	4.02	4.73	4.23	4.31	5.68	5.8	6.43	**1**	66%	97%	11%	Increasing
Nutrients & Organic Carbon (mg/L)															
Total Kjeldahl Nitrogen	0.25	0.207	0.168	0.138	0.221	0.233	0.218	0.267	0.244	0.313	**1**	25%	51%	28%	Increasing
Total Phosphorus	0.006	0.0037	0.00644	0.00848	0.00652	0.00624	0.00617	0.00785	0.00731	0.00677	4	13%	83%	-7%	Decreasing
Dissolved Organic Carbon	2.72	2.68	2.88	2.69	3.32	3.07	2.8	3.44	3.47	4.19	**1**	54%	56%	21%	Increasing
Total Organic Carbon	3	2.77	2.94	2.69	3.28	3.15	2.85	3.44	3.4	3.92	**1**	31%	42%	15%	Increasing
Metals (µg/L)															
Arsenic (T)	0.275	0.42	0.338	0.4	0.434	0.385	0.398	0.523	0.524	0.576	**1**	109%	37%	10%	Increasing
Barium (T)	8.05	6.57	6.82	7.33	7.95	8.33	7.68	8.49	8.44	8.62	**1**	7%	31%	2%	Stable
Boron (T)	6.52	10	4.74	6.88	5.03	4.95	5.49	7.6	7.46	7.44	4	14%	-26%	0%	Stable
Cobalt (T)	0.016	0.10	0.0207	0.025	0.0225	0.0244	0.0275	0.0302	0.0361	0.0269	5	68%	-73%	-25%	Decreasing
Copper (T)	0.86	1.15	0.706	0.77	0.984	0.832	0.806	0.848	1.07	0.949	4	10%	-17%	-11%	Stable
Iron (T)	15	24	19.7	22.2	25.4	25.1	32.4	25.9	31.4	23.2	7	55%	-3%	-26%	Decreasing
Lithium (T)	0.72	0.712	0.624	0.928	0.696	1.51	1.12	1.53	1.28	1.18	4	64%	66%	-8%	Stable
Manganese (T)	3.06	3.37	5.63	7.27	5.85	5.97	9.33	8.32	9.46	7.3	4	139%	117%	-23%	Decreasing
Molybdenum (T)	0.107	0.0968	0.0621	0.0565	0.0827	0.077	0.0766	0.104	0.108	0.138	**1**	29%	43%	28%	Increasing
Nickel (T)	0.441	0.692	0.534	0.566	0.699	0.672	0.638	0.781	0.733	0.795	**1**	80%	15%	8%	Stable
Strontium (T)	36.1	29	29	32.6	37.3	50.7	45.4	67.1	58.5	59.4	2	65%	105%	2%	Stable
Uranium (T)	0.0164	0.0166	0.0139	0.0148	0.0185	0.0174	0.0155	0.0189	0.0215	0.0265	**1**	62%	60%	23%	Increasing
Copper (D)	0.861	0.812	0.846	0.928	1.08	0.751	0.785	0.827	0.854	0.939	2	9%	16%	10%	Stable

Notes:
[a] Sample sizes: 2013 (n=5 all in August); 2015-2019 (n=15; 5 replicate samples per month [July, August, September]). 2020-2022 (n=18; a 6th station was added to MEL-01 in 2020).
% Change from = the difference between the annual mean concentration in 2022 and the normal range or mean concentration in 2021 or 2013.
"-" = TDS calculated was not reported in 2013.
Light shaded values indicate the mean concentration exceeded the normal range.
Dark shaded values indicate the mean concentration exceeded the normal range by 20% or more.

Major Ions

Major ions (dissolved salts) are the seven ionic compounds found in greatest abundance in freshwater systems. They include the cations: calcium, magnesium, potassium, and sodium; as well as the anions: chloride, bicarbonate, and sulphate. In addition to their direct measurement in water, these seven ions are also reflected in measures of total alkalinity, conductivity, TDS, and hardness, and these composite parameters tend co-vary with the major ions as shown in the condensed temporal plot of data going back to 2013 (**Figure 3-15**).

The discussion below focuses on chloride because it is the dominant ion comprising TDS in effluent from CP1. Other major ions generally follow the same pattern as chloride. The annual mean concentrations for TDS, chloride, calcium, sodium, and sulphate at MEL-01, MEL-02, and MEL-03 are shown in **Figure 3-10**. The monthly mean concentrations for TDS and chloride since 2018, along with percent change from previous sampling event, are provided in **Table 3-7**; this table highlights when moderate to large changes in TDS or chloride occurred across the various sampling areas to help determine whether the changes are best explained by effluent discharge or by climatic events.

Chloride concentrations in the East Basin (MEL-01) have more than doubled in the past 10 years, from 7.6 mg/L in 2013 to 16.2 mg/L in 2022 (**Table 3-5**). The relatively large increases in TDS and chloride often occur after peak effluent discharge from CP1. This suggests effluent is the primary cause of higher chloride concentrations at MEL-01. Approximately 710,000 m^3 of water with relatively high concentrations of TDS were discharged in June and July 2020, and chloride concentrations at MEL-01 increased 39% between September 2019 and July 2020. A similar monthly increase was also observed in September 2021 coinciding with peak discharge to drawdown water levels in CP1 before winter.

Effluent is the primary source of the increased concentration of major ions at MEL-01 and potentially MEL-02, but there is evidence that interannual climate variability is a contributing factor for some of the increases observed in Meliadine Lake. In 2019, unusually high rainfall led to increased runoff from the tundra. Runoff wasn't measured directly, but the large volume of surface contact water collected at the mine and directed to CP1 in 2019 supports this conclusion. Only 300,000 m^3 of water was discharged to Meliadine Lake in 2019 because TDS concentrations in CP1 often exceeded the Water Licence limit of 1,400 mg/L, meaning discharge to Meliadine Lake was suspended. Of the 300,000 m^3, only 30,000 m^3 was discharged in July. Despite the relatively low loadings of chloride and other major ions (**Appendix B2**), chloride concentrations increased 16% at MEL-01 (Aug-Sep), 24% at MEL-02 (Jul-Aug), and 35% at MEL-03 (Aug-Sep; **Table 3-5**). Differences in the catchment and basin-specific mixing patterns may explain why the timing of the step-increase was observed in different intervals at MEL-02 compared to MEL-01 and MEL-03. The main takeaway is that the timing broadly coincides with abundant rainfall in 2019 and not effluent discharge to Meliadine Lake.

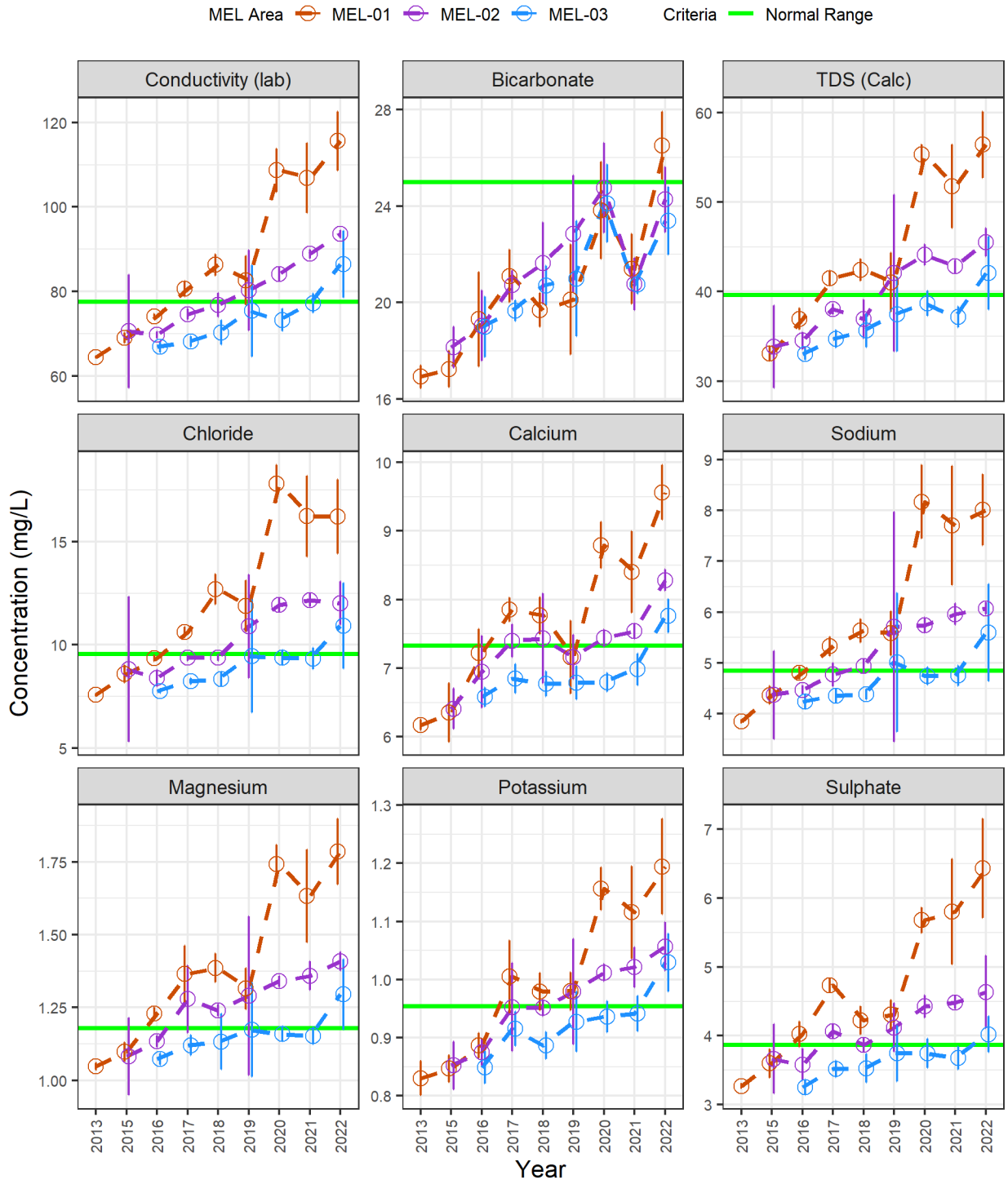
Table 3-7. Monthly mean concentrations for TDS and chloride in Meliadine Lake since 2018

	Top number = Monthly Mean[a] Concentration in mg/L Bottom number in parentheses = % change from previous sampling event													
Year	**2018**		**2019**			**2020**			**2021**			**2022**		
Month [b]	Jun&Jul	Aug	Jun&Jul	Aug	Sep	Jun&Jul	Aug	Sep	Jun&Jul	Aug	Sep	Jun&Jul	Aug	Sep
CP1 Discharge (m^3)	486,823	153,066	30,614	107,540	157,912	719,048	83,454	228,674	133,439	397,398	221,210	214,709	33,585	188,337
Rain (mm)	44.2	52.8	140	112.7	78.5	12.2	32.5	64.8	86.4	60.6	63.9	48.0	46.0	41.6
Total Dissolved Solids														
MEL-01	55.4 (-3)	53.4 (-4)	49.6 (-7)	41.6 (-16)	56.4 (36)	83.4 (48)	61.0 (-27)	67.4 (10)	53.7 (-20)	52.7 (-2)	64.5 (22)	71.7 (11)	59.2 (-17)	62.7 (6)
MEL-02	42.2 (-14)	49.4 (17)	48.6 (-2)	52.0 (7)	49.2 (-5)	49.0 (0)	51.4 (5)	47 (-9)	50.6 (8)	47.2 (-7)	59.2 (25)	54 (-9)	48.6 (-10)	59.8 (23)
MEL-03	40.5 (0)	37.3 (-8)	44 (18)	39.6 (-10)	*	51.2 (29)-	40.2 (-21)	44.0 (9)	42.2 (-4)	58.2 (38)	43.2 (-26)	50.8 (18)	44.8 (-12)	58.8 (31)
MEL-04	-	47.2	-	47.6 (1)	-	-	47.4 (0)	-	-	57.6 (22)	-	-	43.6 (-24)	-
MEL-05	-	49	-	50.2 (2)	-	-	46 (-8)	-	-	44 (-4)	-	-	48.8 (11)	-
Chloride														
MEL-01	12.6 (16)	12.8 (2)	10.7 (-16)	11.6 (8)	13.4 (16)	18.6 (39)	17.9 (-4)	16.9 (-6)	14.3 (-15)	16.2 (13)	18.2 (12)	15.9 (-13)	15.4 (-3)	17.3 (12)
MEL-02	9.23 (-1)	9.52 (3)	10.2 (7)	12.6 (24)	9.89 (-22)	11.8 (19)	12.3 (4)	11.6 (-6)	11.9 (3)	12.4 (4)	12.2 (-2)	12.8 (5)	11.9 (-7)	11.4 (-4)
MEL-03	7.99 (-5)	8.59 (8)	8.2 (-5)	8.59 (5)	11.6 (35)	8.93 (-23)	9.61 (8)	9.62 (0)	8.75 (-9)	9.32 (7)	9.93 (7)	10.1 (2)	10.1 (0)	12.6 (25)
MEL-04	-	8.34	-	8.85 (6)	-	-	9.56 (8)	-	-	9.31 (-3)	-	-	9.83 (6)	-
MEL-05	-	8.5	-	8.96 (5)	-	-	9.42 (5)	-	-	9.64 (2)	-	-	10 (4)	-

Notes:
[a] The monthly mean is based on 5 samples per area. A 6th station was added to MEL-01 starting in 2020.
[b] Rainfall totals for June and July were summed. The same approach was taken for CP1 discharge in June and July (applicable for 2018 and 2020, the only 2 years where discharge occurred in June).
* TDS results from MEL-03 were flagged as anomalous in September 2019 (120 mg/L) and excluded from analysis.
Yellow values indicate the monthly mean concentration increased by 10-20% compared to the previous sampling event.
Orange values indicate the monthly mean concentration increased by >20% compared to the previous sampling event.

Figure 3-10. Spatial and temporal changes in TDS and constituent major ions in Meliadine Lake from 2013 to 2022

Notes: Points represent the annual mean concentration (July, August, and September). Error bars represent 1 standard deviation of the annual mean concentration. Points are horizontally jittered to avoid overplotting.



Nutrients & Organic Carbon

Temporal and spatial trends in key nutrient parameters and organic carbon are presented below. The assessment focuses on parameters that exceeded the normal range in 2022: total Kjeldahl nitrogen (TKN), phosphorus, and organic carbon. The ecological significance of the changes in nutrient concentrations are discussed in the context of the phytoplankton community study in **Section 5**.

Phosphorus

The Sewage Treatment Plant (STP) and EWTP have been effective at removing phosphorus from water that is ultimately discharged to Meliadine Lake. In 2022, the annual mean concentration of phosphorus at MEL-01 for the open water period was 0.0067 mg/L. This continues the downward trend from the peak concentration of 0.0079 measured in 2020 (**Figure 3-11, Table 3-8**). Phosphorus also decreased at MEL-02 and MEL-03 in 2022 and concentrations at MEL-02 dropped below the 0.004 mg/L limit for ultra-oligotrophic classification according to the CCME framework (2004). Lake-wide, phosphorus appears to be trending toward concentrations more representative of the baseline period. A more in-depth discussion on nutrient loadings to Meliadine Lake is provided in **Section 5** as supporting information for interpreting changes in primary productivity in Meliadine Lake.

Table 3-8. Annual mean[a] total phosphorus concentrations (mg/L) and percent change within and among the exposure areas and Reference Area 1 from 2013 to 2022

Year	NF			MF			REF1		
	MEL-01			MEL-02			MEL-03		
	Mean (mg/L)	Rank	Yearly % Increase	Mean (mg/L)	Rank	Yearly % Increase	Mean (mg/L)	Rank	Yearly % Increase
Baseline	1997 = 0.017 ; 1998 = 0.0055 ; 1999 = 0.004								
	2000 = 0.012 ; 2008 = 0.0042 ; 2009 = 0.0047 ; 2011 = 0.0043								
2013	0.0037	9	-	na		-	na		-
2015	0.00644	6	74%	0.005	4	-	na		-
2016	0.00848	1	32%	0.00468	5	-6%	0.00479	1	-
2017	0.00652	5	-23%	0.00537	2	15%	0.00468	2	-2%
2018	0.00624	7	-4%	0.00298	8	-45%	0.00286	7	-39%
2019	0.00617	8	-1%	0.00417	6	40%	0.00325	5	14%
2020	0.00785	2	27%	0.00569	1	36%	0.00327	4	1%
2021	0.00731	3	-7%	0.00529	3	-7%	0.00397	3	21%
2022	0.00677	4	-7%	0.00388	7	-27%	0.00317	6	-20%

Notes:
[a] The annual mean is based on 15 samples (5 station x 3 monthly events [July, August, September]). A 6th station was added to MEL-01 in 2020 (n=18 in 2020-2022).
"na" indicates sampling was not conducted. "-"indicates % change between years and areas was not calculated.

Nitrogen

Spatial and temporal trends in nitrogen focus on nitrate, the dominant inorganic form of nitrogen in effluent, and on total Kjeldahl nitrogen, which is the sum of organic nitrogen and ammonia. Total nitrogen is the sum of nitrate, nitrite, and TKN.

Nitrate concentrations were lower at MEL-01 in 2022 compared to 2021 and stable at MEL-02 and MEL-03. There were individual samples at MEL-01 that exceeded the Normal Range in 2022, but average concentration from all samples in July-September was below the Normal Range (0.018 mg/L). This downward trend from the peak nitrate concentrations observed in 2020 is directly related to the substantial decrease in loadings in 2021 and 2022 (**Figure B2-11**). Current concentrations in the East Basin remain elevated compared to 2013, 2015, and 2016, but are dropping to levels similar to MEL-02 and MEL-03, which have been stable during operations (**Figure 3-11**).

TKN trended up at MEL-01 and MEL-03 in 2022 compared to 2021 but remained stable at MEL-02. The similar pattern of change at MEL-01 and MEL-03 in 2022 suggests effluent was not the source. The fact that concentrations were stable at MEL-02 in 2022 supports this conclusion, as does the long-term dataset showing consistent patterns across the three monitoring areas.

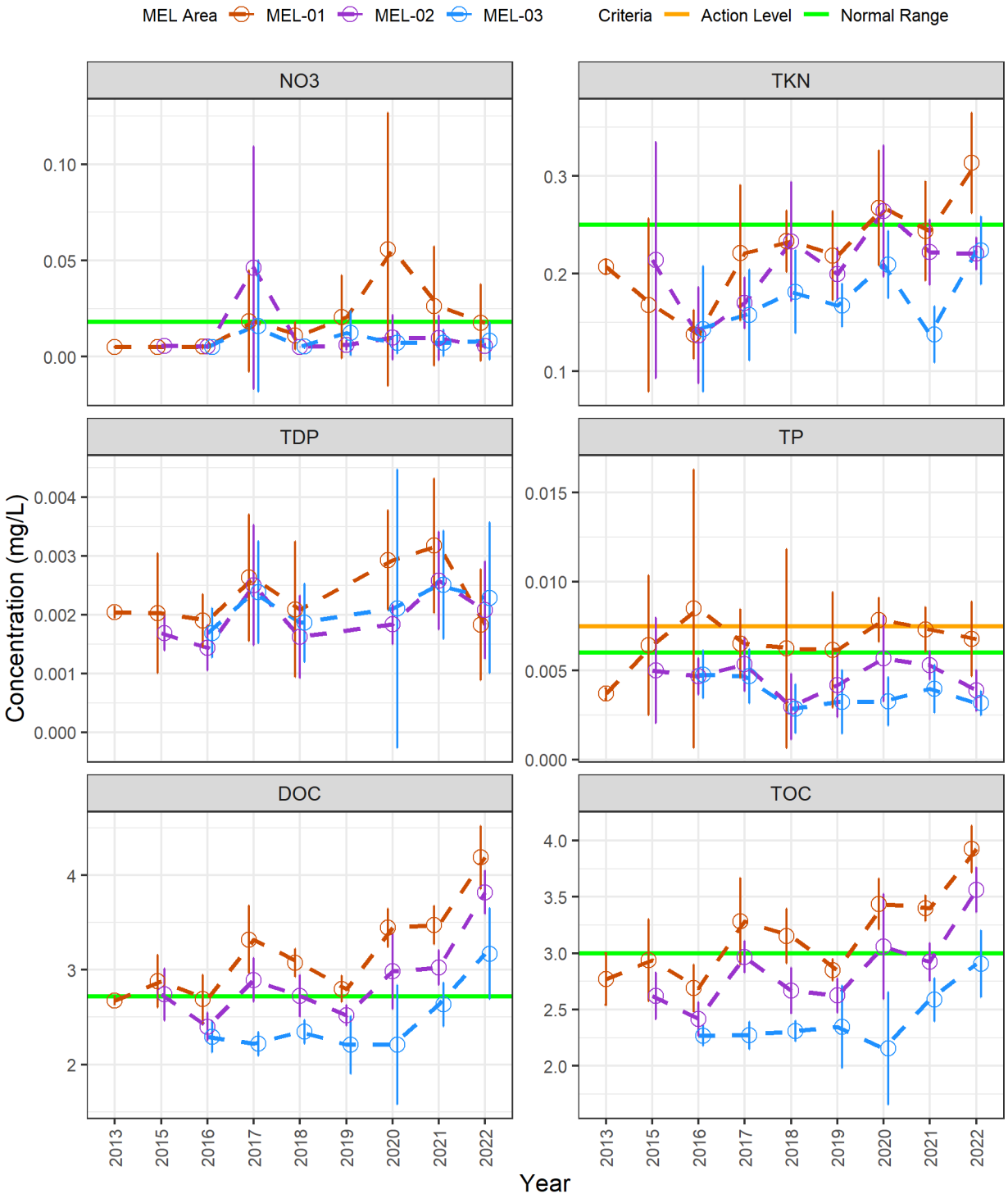
Organic Carbon

Long-term monitoring of organic carbon suggests there are basin-specific differences extending back to the baseline period, with concentrations of both TOC and DOC highest at MEL-01 and lowest at the reference areas (**Figure C2-24** [DOC] and **Figure C2-25** [TOC]). The annual mean concentrations reflect this pattern (**Figure 3-11**) and the similarity between DOC and TOC indicates that most carbon is present in dissolved form.

The results from MEL-01, MEL-02, and MEL-03 clearly show organic carbon is increasing in Meliadine Lake. As discussed earlier, organic carbon concentrations have increased in the region due to interannual climate variability. Using 2013 as the point of comparison, concentrations in the East Basin have increased 56% over the past 10 year. The biggest year-over-year increases occurred between 2016 and 2017 (2.69-3.32 mg/L or 23%) and 2021 and 2022 (3.47-4.19 mg/L or 21%). The timing of the increase between 2016 and 2017 coincides with dewatering of Lake H17 to create CP1 in August and September 2016. The consistent increases seen at all three areas since 2019 suggest the influence of a broader source, such as interannual climate variability. The contribution of effluent to increases in DOC and TOC in the East Basin is negligible given concentrations in effluent samples from MEL-14 in 2022 were in the range of 6-10 mg/L (**Table 2-4**).

Figure 3-11. Spatial and temporal changes in key nutrients and organic carbon in Meliadine Lake from 2013 to 2021

Notes: NO3 = nitrate (as N); TKN = total Kjeldahl nitrogen; TDP = total dissolved phosphorus; TP = total phosphorus; TOC = Total Organic Carbon; DOC = Dissolved Organic Carbon.
The Action Level for nitrate is 2.17 mg/L. Points are horizontally jittered to avoid overplotting.



Metals

The temporal and spatial trends for metals that exceeded the Normal Range at MEL-01 in 2020 are illustrated in **Figure 3-12**. Metals that exceed the normal range at MEL-01 broadly fall in one of two categories: those that have always exceeded the Normal Range dating back to the baseline period and those that have recently exceeded the Normal Range. The list of metals that have *always* exceeded the Normal Range at MEL-01 going back to 2013 include arsenic, cobalt, iron, manganese, and nickel. Metals that have trended above the normal range more *recently* include molybdenum, strontium, and uranium.

Temporal trends for cobalt, lithium, manganese, iron, and nickel are either stable (2020-2022) or decreasing throughout Meliadine Lake. Furthermore, the concentrations of these parameters are well-below their respective AEMP Action Levels (**Figure 3-8**) and are not a concern for aquatic life or human health. For these reasons, cobalt, manganese, iron, and nickel are not carried forward in the spatial and temporal trends assessment.

The discussion of spatial and temporal trends for metals is focused on arsenic, molybdenum, strontium, and uranium because these parameters have increased in recent years, and the timing of the increase coincides with effluent discharge, notably in 2020 and 2021 (~1.8 Mm). There is also evidence of regional increases, so that context will be explored as well.

Arsenic

Arsenic is the parameter with the most complicated pattern of temporal and spatial changes in recent years. There is evidence that the large volume of effluent released in June and July 2020 caused significant changes in arsenic, particularly at MEL-02. However, notable increases in arsenic were observed in MEL-01, MEL-02, and MEL-03 in 2019 when less water was discharge from CP1 and loadings to Meliadine Lake were low. The evidence for effluent vs natural variability/climate change as contributing factors to the increase in arsenic is presented below.

Natural Variability and Climate Change –Arsenic concentrations have routinely exceeded the Normal Range at MEL-01, indicating conditions are naturally different in the East Basin and other areas in Meliadine Lake (e.g., MEL-03, MEL-04, and MEL-05) (**Figure 3-12**). The area around the mine site is highly mineralized, so differences in water quality among the difference basins is not surprising.

The potential effect of the large rainfall event on arsenic concentrations in Meliadine Lake is evident in the monthly mean results from 2019 (**Table 3-9**). Arsenic concentrations increased 50% during the open water season in 2019 from 0.30 µg/L in July to 0.47 µg/L in September. Relatively big increases were observed between August 2018 and July 2019 at MEL-02 and MEL-03 as well. Arsenic loadings were low in each month in 2018 and 2019, demonstrating that effluent was not a significant source of the increase in arsenic concentrations observed lake-wide in 2019. That leaves rainfall and associated runoff from the tundra as the most likely explanation for the increase in concentration in 2019. This

explanation is supported by the regional water quality results from the Meadowbank reference lakes where concentrations increased 50% and 53% from 2013 to 2022 (**Table 3-4**).

Effluent-related changes – 71% of the total arsenic load released in effluent from CP1 since 2018 occurred in 2020 (**Figure 2-7**). As shown in **Figure B2-2**, most of the total load in 2020 occurred in June, the first month of discharge under the Emergency Authorization. Discharge from CP1 started in early June when ice was still on Meliadine Lake and CP1. This is important for two reasons. First, ice cover would have reduced the volume of water in CP1 and concentrated metals and other parameters in a smaller volume of water. Higher concentrations of all parameters of interest were measured in the MEL-14 samples in June 2020. Second, the ice on Meliadine Lake would have protected the water from wind-driven mixing, reducing mixing in the East Basin before migrating past the Narrows and into MF study area. This hypothesis is supported by the 91 % increase in arsenic between September 2019 and July 2020 at MF MEL-02 (2.8 µg/L to 5.3 µg/L; **Table 3-9**). Arsenic concentrations increased to a lesser extent at MEL-01 over the same period. Higher concentrations of arsenic were subsequently reported between the September 2020 and July 2021 sampling events at MEL-02 (49%) and MEL-03 (42%).

Summary – Arsenic concentrations at MEL-01 and MEL-02 have increased, likely due to the cumulative effect of high rainfall (2019 and 2021) and mine-related loadings (2020). Arsenic concentrations in the Meadowbank reference lakes increased by about 50% since 2013. The relative contribution of loadings vs runoff to higher arsenic concentrations at MEL-03, MEL-04, and MEL-05 in recent years is uncertain. Continued monitoring in Meliadine Lake and the Meadowbank reference lakes will help to better understand the main drivers of arsenic concentrations both within and beyond the East Basin. However, mitigation and further studies are not warranted because current concentrations remain well below the site-specific water quality guideline (25 µg/L) and the human health drinking water guideline (10 µg/L).

Table 3-9. Monthly mean concentrations for arsenic (µg/L) in Meliadine Lake since 2018

	Top number = Monthly Mean[a] Concentration in µg/L Bottom number in parentheses = % change from previous sampling event													
Year	**2018**		**2019**			**2020**			**2021**			**2022**		
Month [b]	Jun&Jul	Aug	Jun&Jul	Aug	Sep	Jun&Jul	Aug	Sep	Jun&Jul	Aug	Sep	Jun&Jul	Aug	Sep
CP1 Discharge (m^3)	486,823	153,066	30,614	107,540	157,912	719,048	83,454	228,674	133,439	397,398	221,210	214,709	33,585	188,337
Rain (mm)	44.2	52.8	140	112.7	78.5	12.2	32.5	64.8	86.4	60.6	63.9	48.0	46.0	41.6
Arsenic														
MEL-01	0.353 (-29)	0.417 (18)	0.303 (-27)	0.42 (39)	0.472 (12)	0.513 (9)	0.508 (-1)	0.549 (8)	0.595 (8)	0.506 (-15)	0.471 (-7)	0.482 (2)	0.642 (33)	0.605 (-6)
MEL-02	0.259 (-8)	0.255 (-2)	0.321 (26)	0.287 (-11)	0.278 (-3)	0.532 (91)	0.431 (-19)	0.451 (5)	0.67 (49)	0.525 (-22)	0.485 (-8)	0.6 (24)	0.661 (10)	0.515 (-22)
MEL-03	0.2 (-10)	0.193 (-4)	0.233 (21)	0.215 (-8)	0.219 (2)	0.271 (24)	0.261 (-4)	0.283 (8)	0.402 (42)	0.324 (-19)	0.296 (-9)	0.321 (8)	0.37 (15)	0.309 (-16)
MEL-04	-	0.200	-	0.218 (9)	-	-	0.25 (15)	-	-	0.316 (26)	-	-	0.312 (-1)	-
MEL-05	-	0.251	-	0.256 (2)	-	-	0.319 (25)	-	-	0.343 (8)	-	-	0.417 (22)	-

Notes:

[a] The monthly mean is based on 5 samples per area. A 6th station was added to MEL-01 starting in 2020.

[b] Rainfall totals for June and July were summed. The same approach was taken for CP1 discharge in June and July (applicable for 2018 and 2020, the only 2 years where discharge occurred in June).

Yellow values indicate the monthly mean concentration increased by 10-20% compared to the previous sampling event.

Orange values indicate the monthly mean concentration increased by >20% compared to the previous sampling event.

Strontium

Strontium has increased steadily throughout Meliadine Lake since 2015. The gradual increase observed at MEL-02 and MEL-03 has started well before 2018 (when discharge of treated effluent from CP1 started) (**Figure 3-8**). The long-term dataset for INUG and PDL also suggests strontium is increasing as part of a wider regional trend. Between 2013 and 2022, concentrations at INUG and PDL increased between 14% and 17% (**Table 3-4**). The relative increase over the same 10-year period was 114% at MEL-01, 66% at MEL-02, and 33-38% at the MEL reference areas (**Table 3-11**). Except for MEL-01 in 2018 and 2020, effluent does not appear to be a major factor influencing strontium concentrations in Meliadine Lake. This is supported by the gradual increase seen at MEL-02 and MEL-03 since monitoring started in 2015. The AEMP Benchmark for strontium is 2,500 µg/L for the protection of aquatic life (ECCC, 2020). Concentrations measured 55-70 µg/L at MEL-01 in 2022, equal to less than 2% of the AEMP Benchmark.

Molybdenum and Uranium

These two metals are grouped together because they have shown similar temporal and spatial patterns of change over the past 10 years (**Figure 3-12**; **Table 3-11**); they also have similar patterns in effluent loading to Meliadine Lake (**Figure 2-7**). At MEL-01, both metals increased briefly in 2017, dropped through 2019 (high rainfall/low effluent year), and have increased each year since then. About 70% of the loadings were split evenly between 2020 and 2021, followed by 10% in 2022. The patterns diverge for MEL-02, with the molybdenum trend more closely tracking MEL-01 and the uranium trend more closely tracking MEL-03. In the rest of Meliadine Lake, both metals have shown higher increases than seen in the regional reference lakes (**Table 3-11**). While this may reflect natural differences between the Meadowbank reference lakes and Meliadine Lake (e.g., the way that high precipitation affects concentrations of individual metals in the local landscape), it may also be due to effluent. Parsing out the relative contribution of climate change, natural variability, and effluent is not possible with the available data, but on-going water quality monitoring should help us understand the effect of effluent discharge vs precipitation moving forward. Importantly, current concentrations remain well below levels associated with effects to aquatic life (Mo = 73 µg/L; U = 15 µg/L) and human health (U = 20 µg/L). Monitoring in 2023 will help determine if the change observed in 2022 is part of a regional change associated with natural factors or related to mining activities.

Table 3-10. Monthly mean[a] concentrations for molybdenum and uranium (µg/L) in Meliadine Lake since 2019

	Top number = Monthly Mean Concentration in µg/L Bottom number in parentheses = % change from previous sampling event											
Year	**2019**			**2020**			**2021**			**2022**		
Month [b]	Jun&Jul	Aug	Sep	Jun&Jul	Aug	Sep	Jun&Jul	Aug	Sep	Jun&Jul	Aug	Sep
CP1 Discharge (m^3)	30,614	107,540	157,912	719,048	83,454	228,674	133,439	397,398	221,210	214,709	33,585	188,337
Rain (mm)	140	112.7	78.5	12.2	32.5	64.8	86.4	60.6	63.9	48.0	46.0	41.6
Molybdenum												
MEL-01	0.061 (-32)	0.072 (19)	0.096 (31)	0.095 (-1)	0.10 (5)	0.115 (15)	0.093 (-20)	0.10 (10)	0.13 (29)	0.124 (-6)	0.130 (4)	0.160 (25)
MEL-02	0.067 (-31)	0.069 (3)	0.074 (8)	0.11 (42)	0.10 (-5)	0.077 (-23)	0.079 (3)	0.086 (8)	0.0896 (5)	0.0914 (2)	0.169 (85)	0.114 (-33)
MEL-03	0.064 (-19)	0.065 (1)	0.081 (25)	0.063 (-23)	0.11 (73)	0.072 (-34)	0.071 (-1)	0.08 (12)	0.0882 (10)	0.078 (-12)	0.084 (8)	0.10 (18)
MEL-04	-	0.067 (-3)	-	-	0.109 (64)	-	-	0.0732 (-33)	-	-	0.141 (93)	-
MEL-05	-	0.082 (-1)	-	-	0.149 (82)	-	-	0.0788 (-47)	-	-	0.101 (28)	-
Uranium												
MEL-01	0.014 (-16)	0.016 (14)	0.017 (6)	0.020 (18)	0.019 (-6)	0.0182 (-3)	0.0175 (-4)	0.020 (15)	0.027 (34)	0.025 (-9)	0.023 (-5)	0.032 (35)
MEL-02	0.014 (-5)	0.016 (8)	0.015 (-1)	0.017 (8)	0.016 (-5)	0.015 (-6)	0.016 (5)	0.017 (7)	0.016 (-6)	0.019 (21)	0.018 (-4)	0.018 (-2)
MEL-03	0.014 (11)	0.015 (6)	0.017 (10)	0.014 (-17)	0.014 (-1)	0.015 (7)	0.014 (-4)	0.017 (19)	0.0144 (-15)	0.017 (15)	0.018 (11)	0.0185 (1)
MEL-04	-	0.014 (15)	-	-	0.013 (-11)	-	-	0.015 (20)	-	-	0.0161 (5)	-
MEL-05	-	0.013 (10)	-	-	0.013 (2)	-	-	0.015 (15)	-	-	0.019 (24)	-

Notes:

[a] The monthly mean is based on 5 samples per area. A 6th station was added to MEL-01 in 2021.

[b] Rainfall totals for June and July were summed. The same approach was taken for CP1 discharge in June and July (applicable for 2020 when water was discharged in June).

Yellow values indicate the monthly mean concentration increased by 10-20% compared to the previous sampling event.

Orange values indicate the monthly mean concentration increased by >20% compared to the previous sampling event.

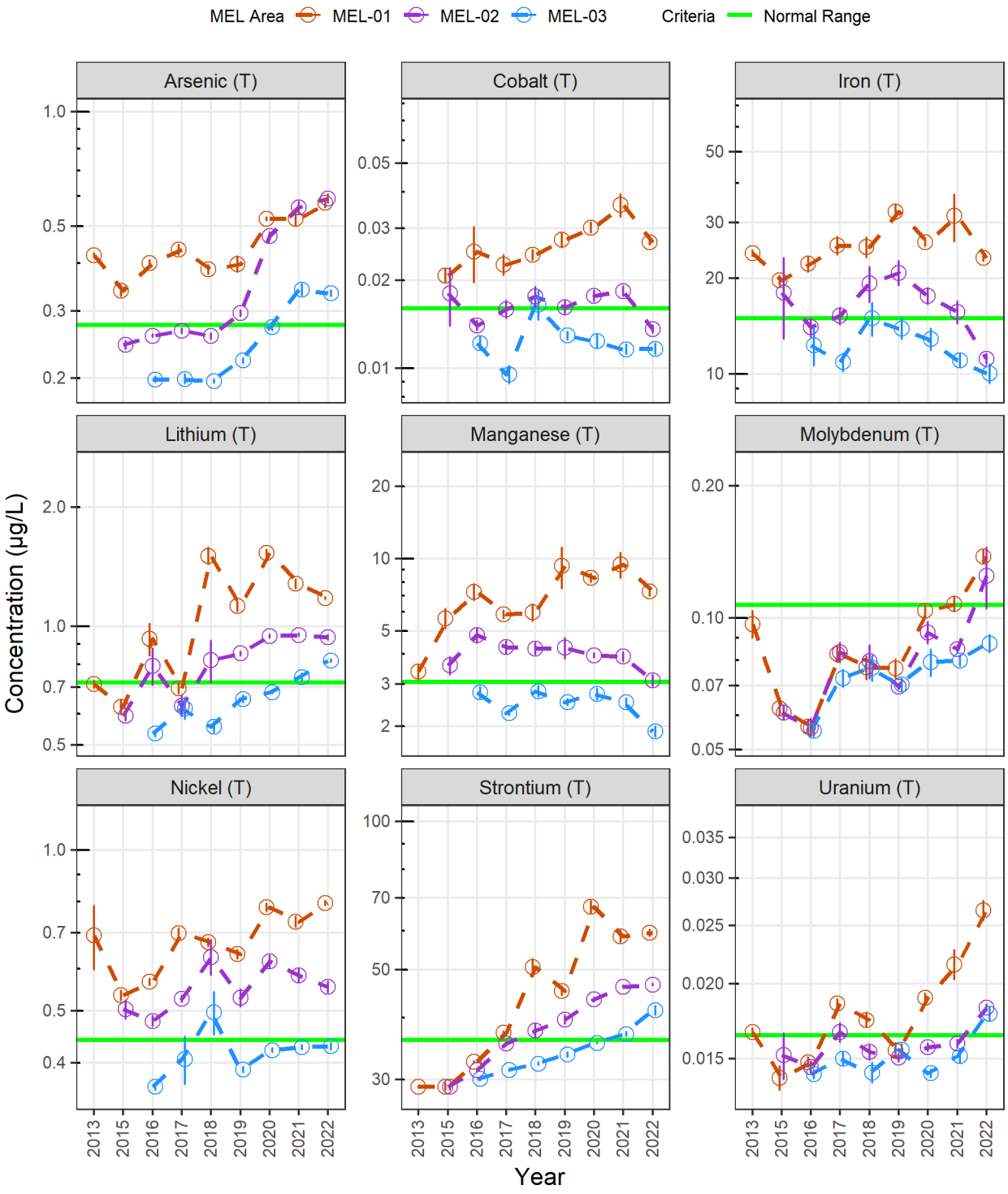
Table 3-11. Concentrations of key metals from 2013 to 2022 in Meliadine Lake and regional reference lakes.

Parameter	Area	Normal Range	Annual Mean Concentration (µg/L) (Open-Water Season)										2022 Rank	% Change from		
			2013	2014	2015	2016	2017	2018	2019	2020	2021	2022		Normal Range	'13, '15', or '16	2021
Arsenic (T)	MEL-01	0.275	0.42	-	0.338	0.4	0.434	0.385	0.398	0.523	0.524	0.576	**1**	109%	37%	10%
	MEL-02		-	-	0.244	0.258	0.266	0.257	0.296	0.471	0.56	0.592	**1**	115%	143%	6%
	MEL-03		-	-	-	0.198	0.199	0.196	0.222	0.271	0.341	0.333	2	21%	68%	-2%
	MEL-04		-	-	-	0.192	0.17	0.20	0.218	0.25	0.316	0.312	2	13%	63%	-1%
	MEL-05		-	-	-	0.245	0.244	0.251	0.256	0.319	0.343	0.417	**1**	52%	70%	22%
	INUG	-	0.10	0.1	0.10	0.11	0.12	0.12	0.12	0.11	0.12	0.15	**1**	-	50%	25%
	PDL	-	0.15	0.16	0.14	0.18	0.18	0.18	0.17	0.17	0.17	0.23	**1**	-	53%	37%
Molybdenum (T)	MEL-01	0.107	0.0968	-	0.0621	0.0565	0.0827	0.077	0.0766	0.104	0.108	0.138	**1**	29%	43%	28%
	MEL-02		-	-	0.0608	0.0561	0.0833	0.0796	0.0697	0.0925	0.0847	0.125	**1**	17%	106%	48%
	MEL-03		-	-	-	0.0553	0.0727	0.0768	0.0703	0.0791	0.0798	0.0874	**1**	-18%	58%	10%
	MEL-04		-	-	-	0.059	0.0702	0.0688	0.0666	0.109	0.0732	0.141	**1**	32%	139%	93%
	MEL-05		-	-	-	0.0672	0.077	0.0832	0.082	0.149	0.0788	0.101	2	-6%	50%	28%
	INUG	-	0.05	0.05	0.054	0.05	0.05	0.05	0.05	0.05	0.05	0.057	**1**	-	14%	14%
	PDL	-	0.050	0.054	0.051	0.057	0.053	0.051	0.052	0.051	0.050	0.054	2	-	7%	7%
Strontium (T)	MEL-01	36.1	29	-	29	32.6	37.3	50.7	45.4	67.1	58.5	59.4	2	65%	105%	2%
	MEL-02		-	-	29	31.3	35.5	37.7	39.6	43.5	46.2	46.7	**1**	29%	61%	1%
	MEL-03		-	-	-	30.1	31.4	32.3	33.7	35.6	37.1	41.4	**1**	15%	38%	12%
	MEL-04		-	-	-	29.7	31.4	32.2	33.3	36.5	35.6	39.4	**1**	9%	33%	11%
	MEL-05		-	-	-	31.3	32.9	32.4	34.4	36.5	37.8	42.2	**1**	17%	35%	12%
	INUG	-	6.3	6.4	6.5	6.4	6.5	6.4	6.6	6.8	6.2	7.4	**1**	-	17%	19%
	PDL	-	9.0	9.1	9.3	9.2	9.0	9.0	9.7	10.1	9.5	10.3	**1**	-	14%	8%
Uranium (T)	MEL-01	0.016	0.02	-	0.0139	0.0148	0.0185	0.0174	0.0155	0.0189	0.0215	0.0265	**1**	62%	60%	23%
	MEL-02		-	-	0.0152	0.0145	0.0166	0.0154	0.0151	0.0157	0.0159	0.0183	**1**	12%	20%	15%
	MEL-03		-	-	-	0.0141	0.015	0.0142	0.0155	0.0142	0.0152	0.0178	**1**	9%	26%	17%
	MEL-04		-	-	-	0.0124	0.0151	0.0125	0.0144	0.0128	0.0153	0.0161	**1**	-2%	30%	5%
	MEL-05		-	-	-	0.0124	0.0151	0.0118	0.013	0.0133	0.0153	0.0189	**1**	15%	52%	24%
	INUG	-	0.052	0.041	0.048	0.046	0.046	0.039	0.051	0.057	0.07	0.062	2	-	19%	-11%
	PDL	-	0.024	0.024	0.022	0.026	0.023	0.021	0.025	0.026	0.030	0.029	2	-	24%	-2%

Notes:
"-" = the concentrations were below the DL for a given year.
Light shaded values indicate the mean concentration exceeded the normal range.
Dark shaded values indicate the mean concentration exceeded the normal range by 20% or more.

Figure 3-12. Concentrations of metals that exceed the normal range in Meliadine Lake since 2013

Notes: Results are plotted in log scale. Points represent the annual mean concentration (July, August, and September). Error bars represent 1 standard deviation of the annual mean concentration. Points are horizontally jittered to avoid overplotting.



3.4.4 Comparison to Water Quality Predictions

The prediction for TDS and chloride in the 2014 FEIS (Agnico Eagle, 2014) and the updated Tetra Tech model (Tetra Tech, 2020) are shown in **Figure 3-13** and **Figure 3-14**, respectively. Current TDS and chloride concentrations in MEL-01 were compared against both sets of predictions to determine if water management activities on Site are functioning as intended.

Total Dissolved Solids

The Tetra Tech model predicts TDS will increase more rapidly than in the original far-field mixing model in the 2014 FEIS. The Tetra Tech base case[6] model predicted maximum TDS concentrations at the edge of the mixing zone would increase rapidly from 89 mg/L in 2020 to 153 mg/L in 2021. From 2022 to 2028, a relatively minor increase in TDS of 17 mg/L is expected. The 2014 FEIS predicted a more gradual increase in TDS from early through late operations, with peak TDS of 176 mg/L occurring around 2030 before gradually decreasing as the mine transitions from operations to closure. The timing of mine development in the 2014 FEIS is slightly different than the current life of the mine based on development of the Tiriganiaq deposit.

Monthly mean concentrations of TDS (calculated) at MEL-01 in July, August, and September 2022 were 71 mg/L, 59 mg/L, and 62 mg/L, respectively. The East Basin has shown capacity to assimilate major ions from CP1 and TDS has increased gradually, as predicted in the 2014 FEIS, as opposed to the dramatic increase that was predicted in the Tetra Tech model (**Figure 3-13**). The discrepancy between the modelled and observed increase in TDS is due to the combined effect of less effluent and lower concentrations of TDS in effluent. TDS concentrations in weekly samples from MEL-14 in 2022 ranged between 900 mg/L in July to 2,000 mg/L in September. By comparison, the Tetra Model assumed a continuous concentration of 3,500 mg/L, equal to the maximum average concentration in the Water Licence.

Chloride

Chloride concentrations in the 18 samples collected at MEL-01 in July, August, and September ranged from 12 mg/L to 20 mg/L, nearly identical to 2021. Current concentrations are approximately 50% lower than the predicted concentration of 38 mg/L at the edge of the mixing zone in 2022 assuming median effluent concentrations and average dilution (Tetra Tech, 2020) (**Figure 3-14**).

[6] The base case scenario used estimates for mean precipitation. The wet year scenario corresponds to wet conditions applied to years 2021, 2025 and 2026, with year 2025 corresponding to a 100-year return period precipitation (Golder, August 2020). Other years present an average trend in terms of precipitation.

Figure 3-13. Predicted Changes in Total Dissolved Solids (calculated; mg/L) in the East Basin of Meliadine Lake Compared to Observed Results

Notes: The FEIS (2014) predictions (purple line) were presented in Volume 7.4-A of Agnico Eagle (2014). The blue dashed line represents the updated model prediction for changes in TDS from 2018 to 2028 (Tetra Tech 2020). The dots represent the observed TDS calculated data collected to date from the NF area as part of the AEMP.

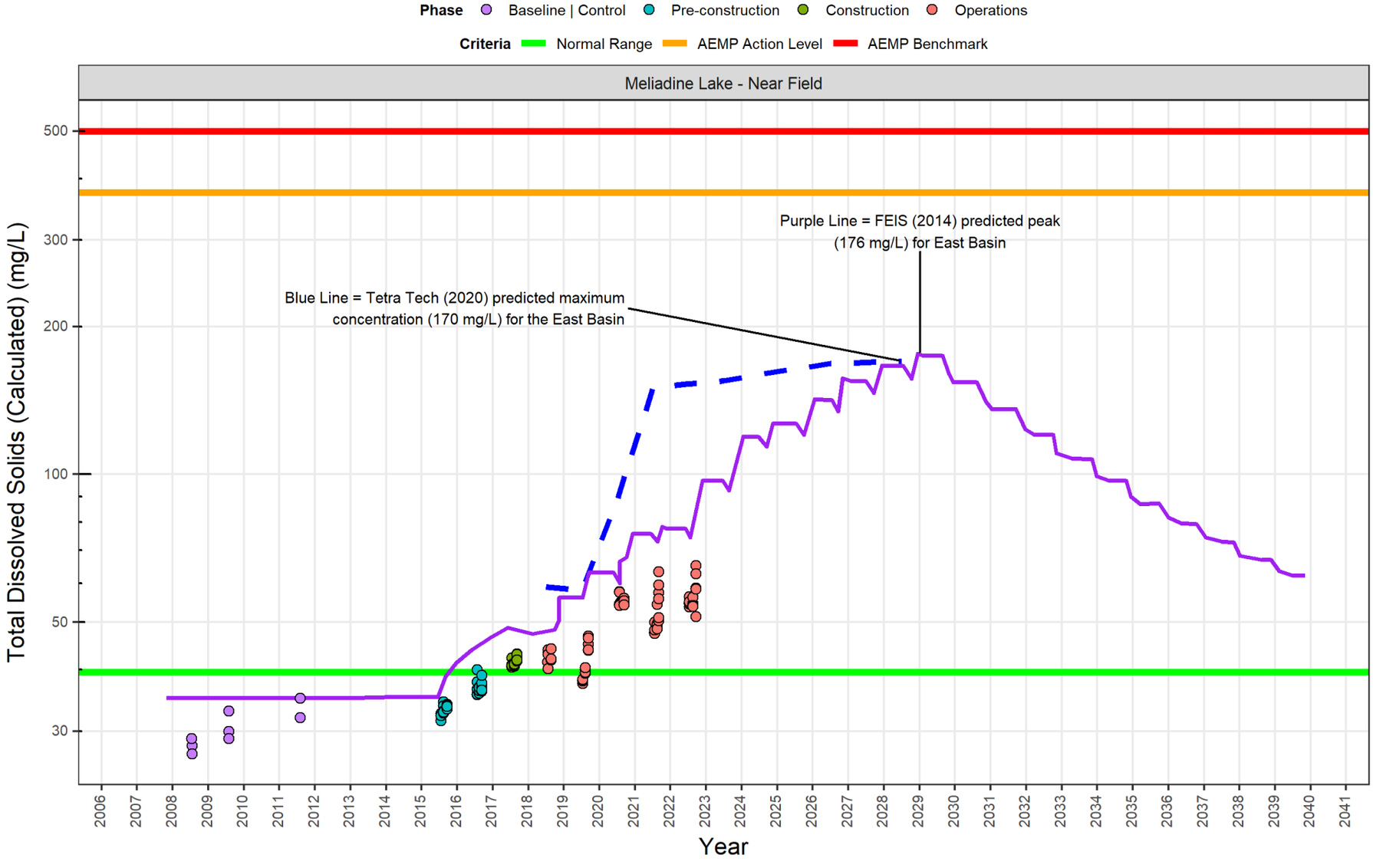
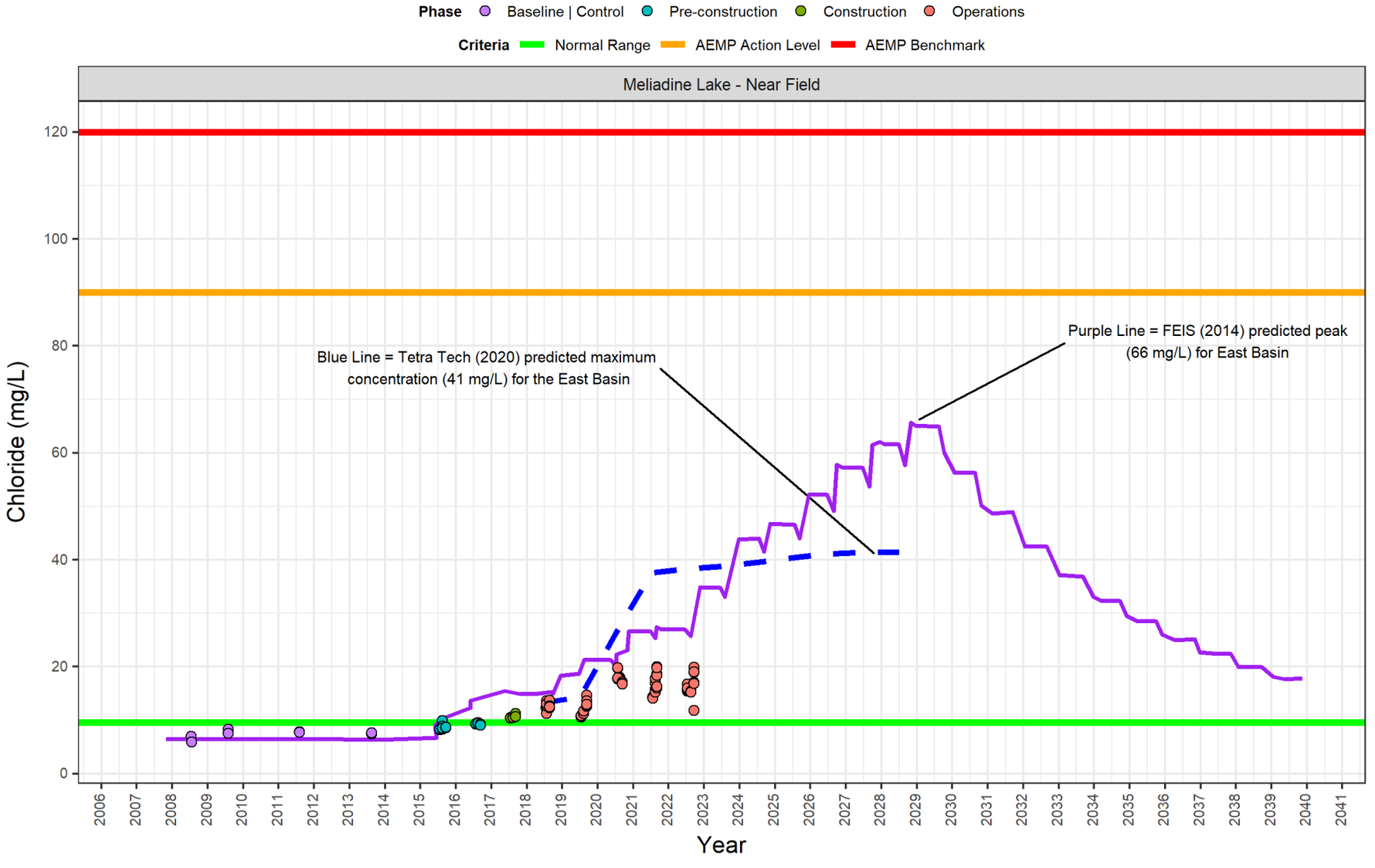


Figure 3-14. Predicted Changes in Chloride (mg/L) in the East Basin of Meliadine Lake Compared to Observed Results

Notes: The FEIS (2014) predictions (purple line) were presented in Volume 7.4-A of Agnico Eagle (2014). The blue dashed line represents the updated model prediction for changes in chloride from 2018 to 2028 (Tetra Tech 2020). The dots represent the observed chloride data collected to date from the NF area as part of the AEMP.



3.5 Conclusions and Recommendations

Results of the 2022 Meliadine Lake water quality monitoring program are summarized below in the context of the key questions. The Low Action Level assessment for the Meliadine Lake water quality results is presented in **Section 6.1**.

Key Question: Are concentrations of parameters in the effluent less than limits specified in the Water Licence?

There were no exceedances of limits in the Water Licence in 2022 (**Section 2.2.2**).

Key Question: Has water quality in the exposure areas changed over time, relative to reference/baseline areas?

The concentrations of major ions (chloride, calcium, sulfate) and arsenic, molybdenum, strontium, and uranium have increased over time in the East Basin. Effluent is likely a contributing factor for some of the recent changes in water quality observed in the East Basin. Changes in water quality have also been observed in the MF and reference areas, and the timing coincides with historically high rainfall in 2019 and 2021. The potential effect of effluent on water quality outside the East Basin is difficult to account for because of the confounding effects of natural variability among the basins and the effect of high rainfall in 2019. On-going water quality monitoring should help decipher whether effluent, natural variability, or interannual climate variability are the leading cause of changes in water quality in Meliadine Lake.

Key Question: Is water quality consistent with predictions outlined in the Final Environmental Impact Statement (FEIS) and less than AEMP Action Levels?

The 2014 FEIS predicted *minor changes* in water quality at the edge of the mixing zone and no residual impacts from effluent discharge in Meliadine Lake outside the mixing zone (e.g., at the NF area)[7]. *Minor changes* were defined as a measurable increase in a parameter that is outside the range of baseline values (e.g., above the normal range) but below guidelines for the protection of aquatic life and drinking water quality. The TDS and chloride results from 2022 are well below predicted concentrations. Furthermore, the water quality screening assessment (**Section 3.4.2**) showed that current water quality is well below guidelines meant to protect aquatic life and human health. In short, *minor* changes in water quality have occurred, consistent with what was predicted in the FEIS.

[7] See Section 7.4.7 (Residual Impact Summary) in the FEIS for more information (Volume 7; Agnico Eagle 2014)

Recommendations

Water quality monitoring in 2023 is recommended on the same schedule as outlined in the AEMP Design Plan (Azimuth, 2022a).

3.6 Condensed Temporal Water Quality Plots

The condensed temporal plots show concentrations of major ions, nutrients, and metals in surface water samples from Meliadine Lake going back to 2013. The dates on the x-axis are *condensed* to show the results for samples collected during the open water sampling events (July through September) each year. The green line indicates the normal range, which corresponds to the upper 90th percentile concentration for samples collected during baseline and from the reference areas.

List of Condensed Temporal Plots

Figure 3-15. Concentrations of TDS and constituent ions (Ca, Mg, K, Na, Cl, SO_4) since 2013.

Figure 3-16. Conductivity, hardness, and concentrations of selected nutrients since 2013.

Figure 3-17. Concentrations of aluminum, arsenic, barium, and boron since 2013.

Figure 3-18. Concentrations of cobalt, copper, iron, and lead since 2013.

Figure 3-19. Concentrations of lithium, manganese, molybdenum, and nickel since 2013.

Figure 3-20. Concentrations of strontium, titanium, uranium, and zinc since 2013.

Figure 3-15. Concentrations of TDS and constituent ions (Ca, Mg, K, Na, Cl, SO_4) since 2013.

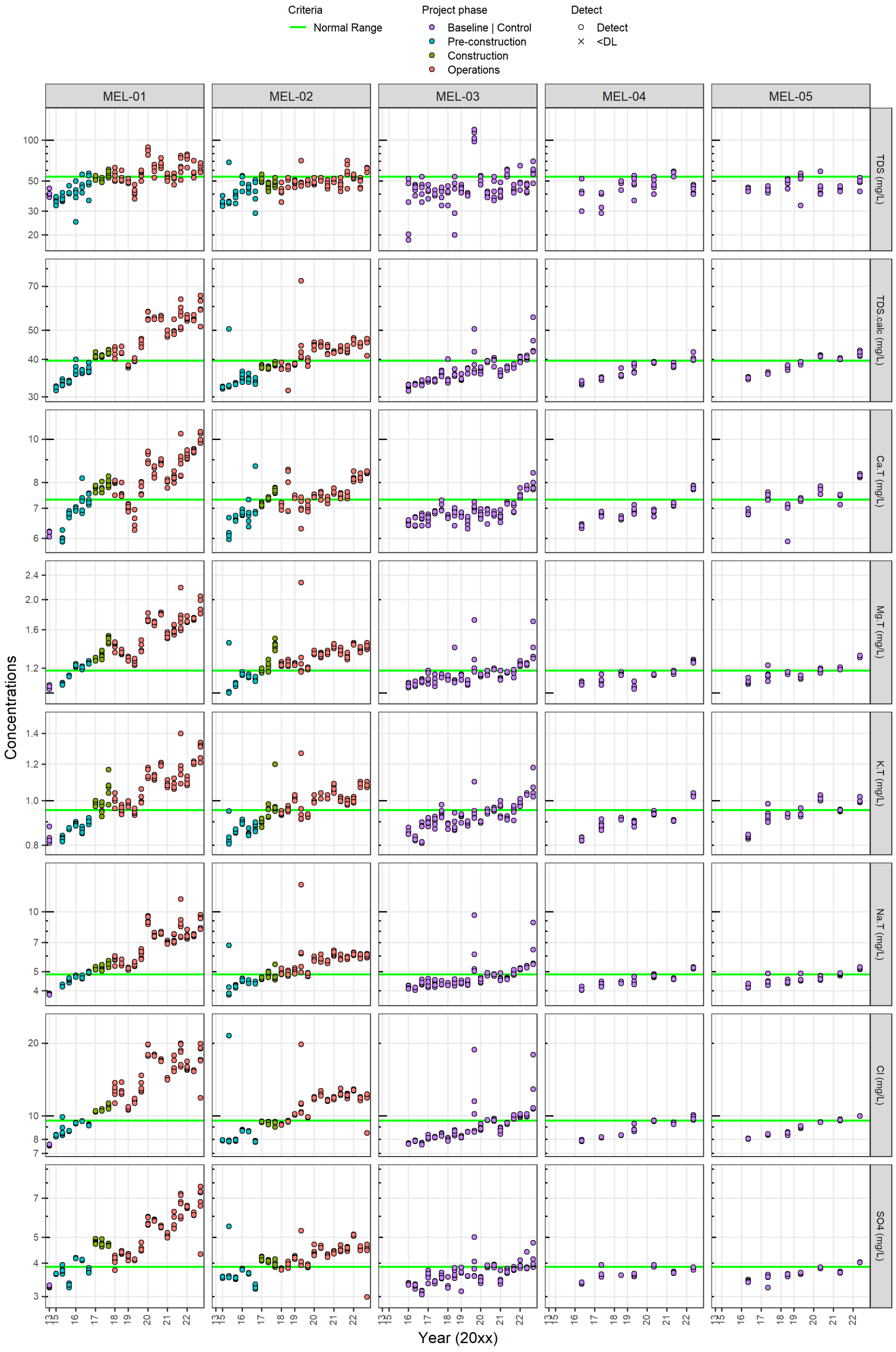


Figure 3-16. Conductivity, hardness, and concentrations of selected nutrients since 2013.

Notes: Ammonia (NH3) concentrations in August and September 2021 should be interpreted with caution because of elevated detection limits at the lab during these two sampling events (see “x” symbols for non-detects in 2021).

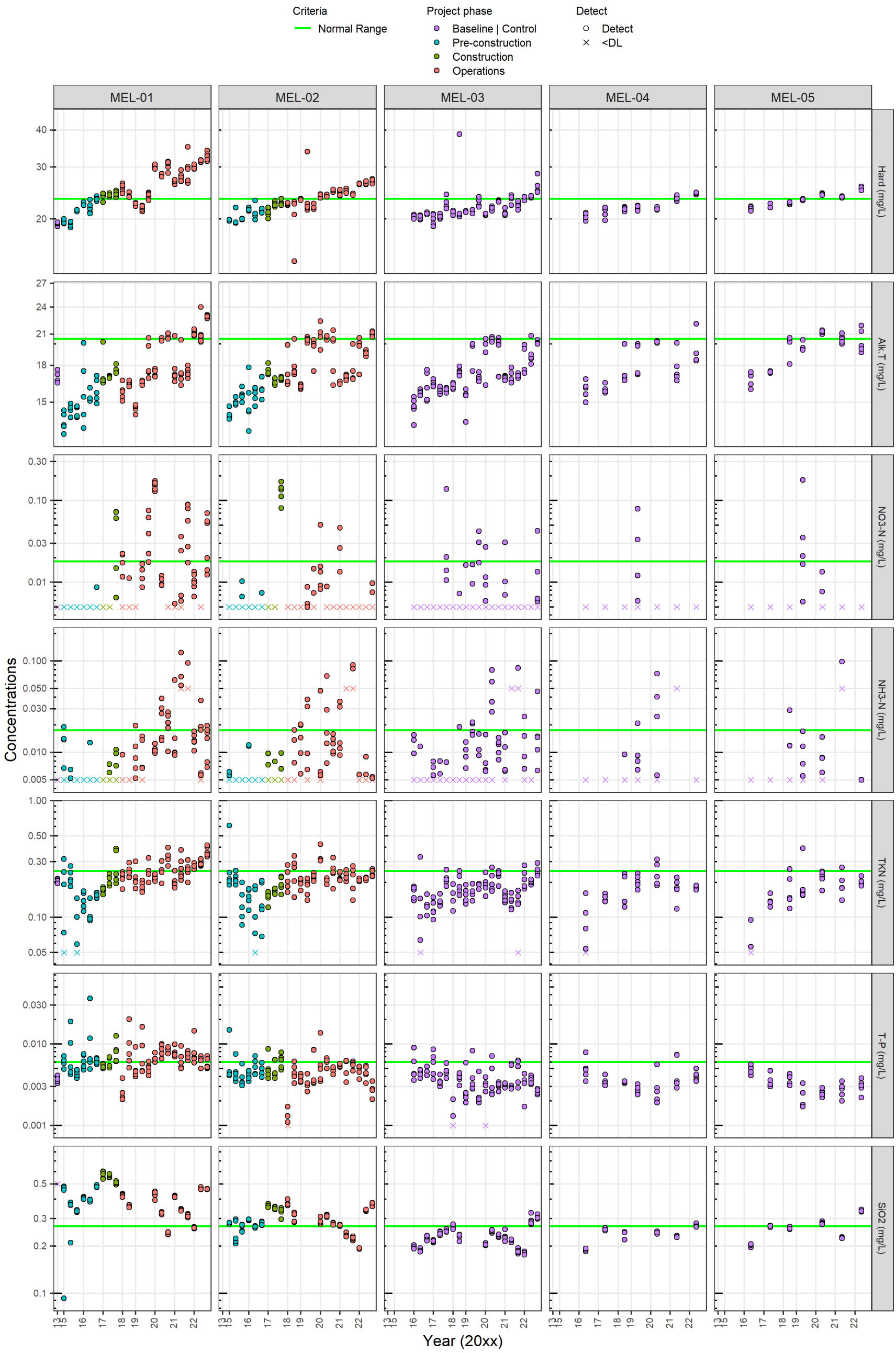


Figure 3-17. Concentrations of aluminum, arsenic, barium, and boron since 2013.

Notes: Detection limits have changed over time for some parameters.

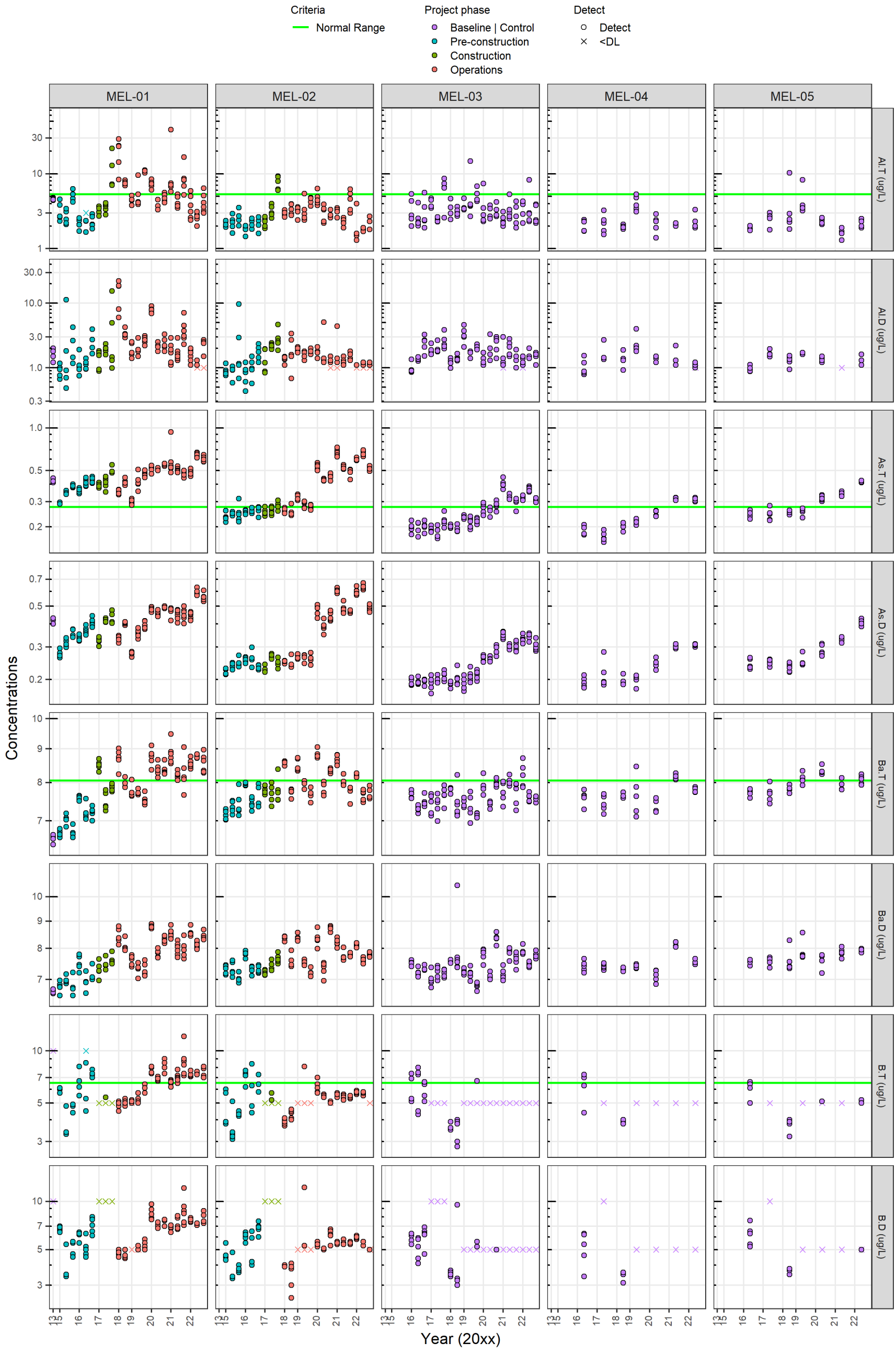


Figure 3-18. Concentrations of cobalt, copper, iron, and lead since 2013.

Notes: Detection limits have changed over time for some parameters.

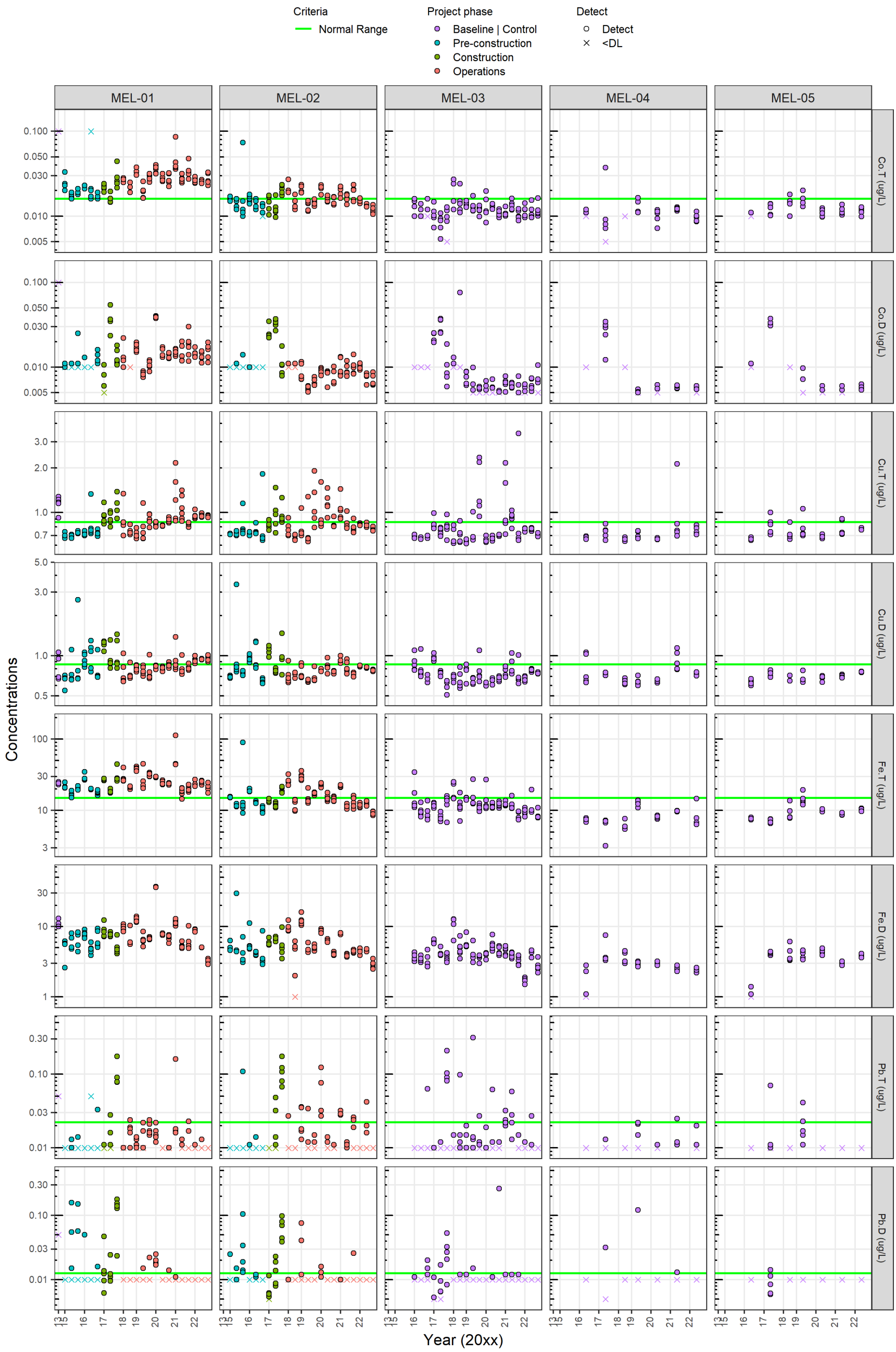


Figure 3-19. Concentrations of lithium, manganese, molybdenum, and nickel since 2013.

Notes: Detection limits have changed over time for some parameters.

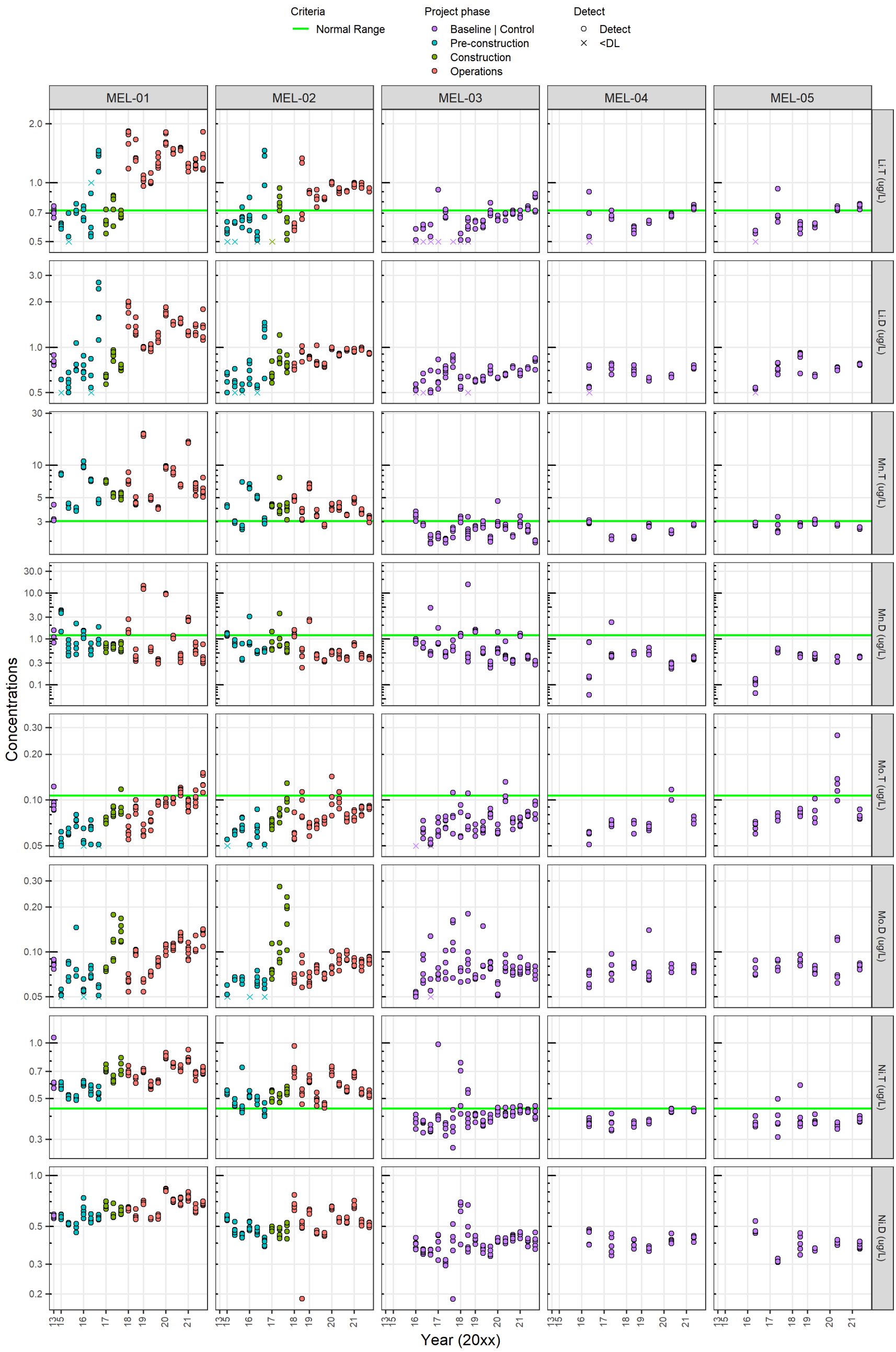
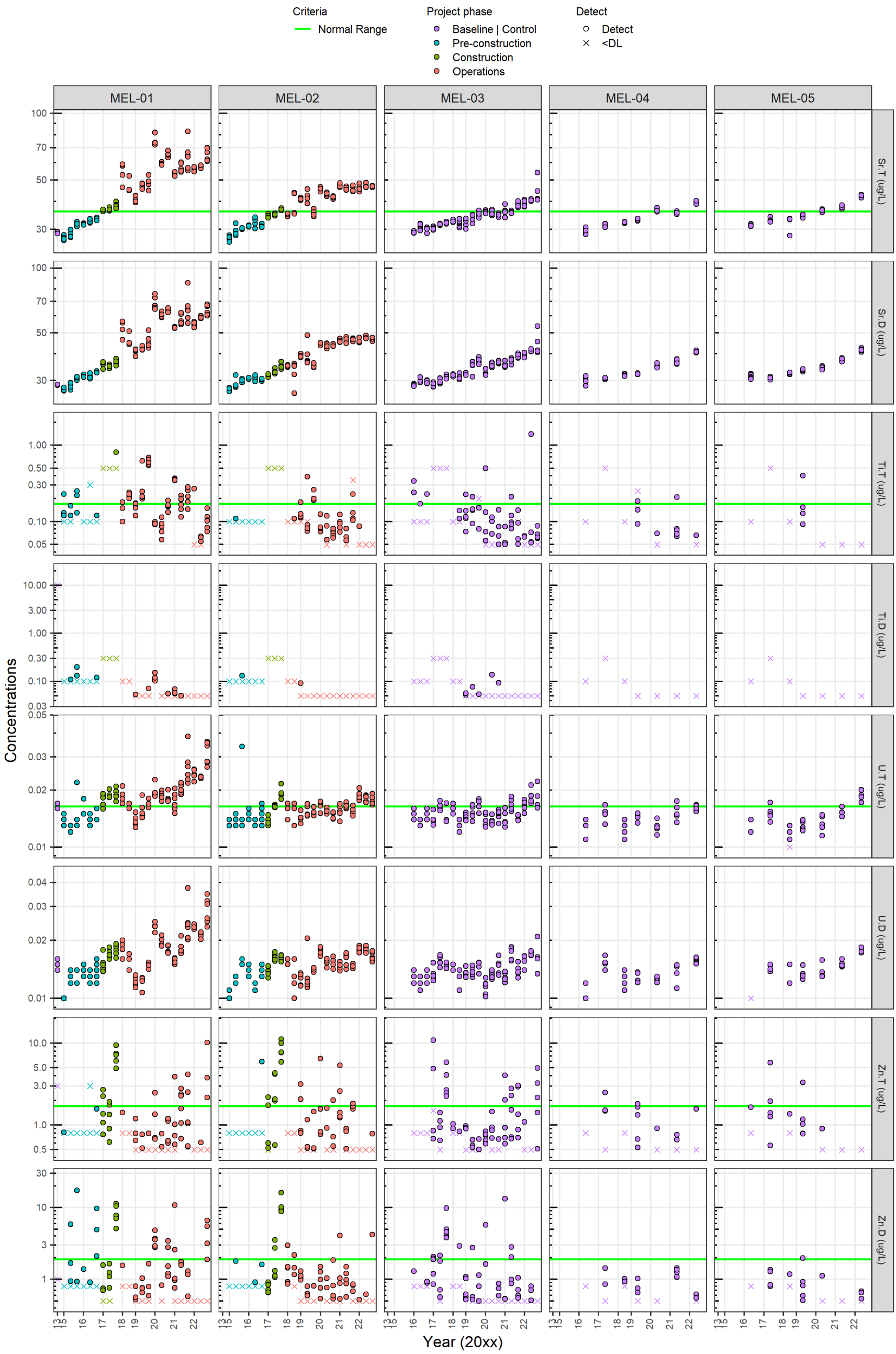


Figure 3-20. Concentrations of strontium, titanium, uranium, and zinc since 2013.

Notes: Detection limits have changed over time for some parameters.



4 PENINSULA LAKES WATER QUALITY

4.1 Introduction

Lakes A8, B7, and D7, located near the mine, are monitored annually because of the potential for air emissions and alteration of the local hydrology to impact water quality. Sampling was completed in July and August as per the AEMP Design Plan.

Objectives and Key Questions

The Peninsula Lakes water quality program has four objectives, as stated in the AEMP Design Plan (Azimuth, 2022a):

- Determine if water quality in lakes close to the mine is changing,
- Evaluate the accuracy of predicted changes in water quality,
- Assess whether mitigation measures are effective at reducing impacts to the aquatic environment, and
- Provide recommendations (as required) for follow-up monitoring or mitigation to lower the impact of mining-related activities on changes in water quality.

The approach to meeting these objectives is centered around answering the following key questions: *1) Has water quality in the exposure areas changed over time relative to baseline conditions, and 2) are concentrations greater than AEMP Action Levels?*

4.2 Findings from the 2022 Peninsula Lakes Water Quality Program

- Lake D7 is located furthest from the mine, and there is no evidence that mining activities are contributing to changes in water quality. The concentrations of some parameters (arsenic and molybdenum) are changing due to the cumulative effects of interannual climate variability. The magnitude and timing of the increase at Lake D7 is consistent with observations from long-term water quality monitoring at reference lakes for the Meadowbank Core Receiving Environmental Monitoring Program (CREMP).
- Surface activities at the mine have contributed to changes in water quality in Lake A8 and Lake B7. Sulphate concentrations (associated with SO_2 emissions) provide the clearest indication of mining related effects to water quality. Several metals have increased at Lake A8 and Lake B7 in recent years as well, notably arsenic, barium, lithium, molybdenum, strontium, and uranium. The temporal trends and magnitude of change is specific for each metal, but mining activities and high rainfall are both implicated in the observed changes in concentration, especially since 2019.

- No exceedances of AEMP Action Levels were reported in any of the samples collected from Lake D7, Lake A8, or Lake B7 in 2022. Arsenic concentrations in Lake B7 are getting close to the AEMP Action Level and if the temporal trend continues at the same rate, concentrations in 2023 may exceed the AEMP Action Level. Ongoing efforts to control off-site migration of dust and reduce emissions should continue to be implemented to mitigate changes in water quality at Lake B7 and Lake A8.

4.3 Methods

4.3.1 Study Areas and Sample Collection

In-situ water quality measurements (temperature, dissolved oxygen (% and mg/L), pH, and specific conductivity) were recorded at the three fixed sampling stations in each lake. Measurements were recorded at discrete intervals just below the surface and every 0.5 m through the water column. The bottom profile was taken within 0.5 m of the sediment water interface.

Surface water samples were collected 1 m below the surface using a Kemmerer grab. Samples were processed and analyzed according to methods described previously for Meliadine Lake.

Table 4-1. Overview of sampling completed in Lake A8, Lake B7, and Lake D7 in 2022

Area	Station ID	Depths[b]	UTM (zone 15V)		Sampling[a]	
		Total	Easting	Northing	July	August
Lake A8	A8-01	2.3	540007	6987659	July 24	Aug 17
	A8-02	2.2	540211	6987204	July 24	Aug 17
	A8-03	1.7	540925	6987421	July 24	Aug 17
Lake B7	B7-01	1.0	538631	6989096	July 24 (FD)	Aug 16
	B7-02	1.7	538195	6989436	July 24	Aug 16
	B7-03	1.7	537713	6989798	July 24	Aug 16
Lake D7	D7-01	1.7	536390	6989340	July 27	Aug 17 (FD)
	D7-02	1.7	536567	6988868	July 27	Aug 17
	D7-03	1.8	536852	6988689	July 27	Aug 17

Notes:
[a] Water and limno profiles = ✓ ; Field duplicate sample collected = FD.
[b] Total depths are reported as the average if the station was sampled more than once (Golder, 2018).

4.3.2 Data Analysis

Water Quality Screening Assessment

The AEMP Benchmarks are the effects thresholds meant to protect aquatic life and drinking water quality for the Project. AEMP Benchmarks and corresponding Action Levels apply equally at Meliadine and the Peninsula Lakes except for sulphate, lead, cadmium, cobalt, copper, manganese, and zinc. Aquatic life guidelines for these parameters vary according to site-specific water quality characteristics,

resulting in lake-specific, and in some cases, sample specific guidelines. The phosphorus benchmark of 0.01 mg/L for oligotrophic status is not used in the Peninsula Lakes study because samples collected during the baseline period often exceeded the 0.01 mg/L limit for oligotrophic conditions.

Temporal Trend Assessment

Temporal changes in water chemistry were determined by comparing current water quality result against the normal ranges for each lake/parameter combination. The temporal trend assessment was supported by plots showing changes in water quality over time.

The normal range of baseline conditions for Lake A8, Lake B7, and Lake D7 were defined in the 2018 AEMP (Golder, 2019). Data included in the normal range calculations were collected during the baseline period from 1995 to 2011 and during the pre-construction period from 2015 to 2017 (pre-construction). Golder conducted a review of the baseline data as part of the 2018 normal range assessment and concluded that conventional parameters, major ions, and selected nutrients from 1995 to 2011 were fit for use in the normal range estimation. However, nitrogen and metals data from the baseline were not included in the normal range calculations because detection limits in these samples were not comparable with more recent detection limits. Statistical methods used to estimate the normal range of concentrations for the Peninsula Lakes are described in the 2019 AEMP/EEMP report (Golder, 2019). Parameters where the annual mean/median concentration that *exceeded* the normal range were carried forward for closer examination.

Comparison to FEIS Predictions

Water quality modeling was completed as part of the 2014 FEIS submission to predict how construction and mining activities would affect water quality in small lakes located in the A, B, and D watersheds on the peninsula[8]. The original Project Certificate No.006 included development of deposits that require dewatering of Lake A8 and nearby Lake A6. Based on the expectation that Lake A8 would be dewatered to make way for development of other deposits south of Tiriganiaq, water quality predictions were developed for the baseline phase (pre-development) and post-closure phases (after the lake is flooded) for Lake A8, but not for constructions and operations. For the Type A Water Licence Application, Lake B7, Lake A8, and Lake D7 were removed from the final design because the lakes are underlain by a zone of talik (permanently unfrozen ground) (Agnico Eagle, 2015).

For waterbodies that were included in the water quality model for the construction and operations period, changes to water quality were predicted to occur due to diversion of water, alteration of the

[8] Refer to Table 7.4-A2 (Inventory of Waterbodies) in Appendix 7.4-A of the FEIS (Agnico Eagle 2014) for lakes that were carried forward for water quality modelling.

watershed size and contributing areas, natural hydrological processes, evaporation, and aerial deposition of particulate matter (modelled as TSS), nutrients from blasting activities, and metals (modelled by individual metal parameter).Water quality was predicted to change in waterbodies closest to the mine (e.g., Lake B7), but for most water quality parameters, these changes were predicted to be *minor*. *Minor* changes, in the context of the FEIS, are defined as an increase from baseline but less than guidelines for the protection of aquatic life, drinking water quality, and SSWQO. During operations, water quality was predicted to meet MMER (now MDMER) discharge limits at all CPs on site, except for arsenic in CP3 during operations, which receives runoff from the TSF. Arsenic infiltration and seepage are minimized by dewatering (dry stacking) the tailings and subsequent freezing (Agnico Eagle, 2015).

4.4 Results and Discussion

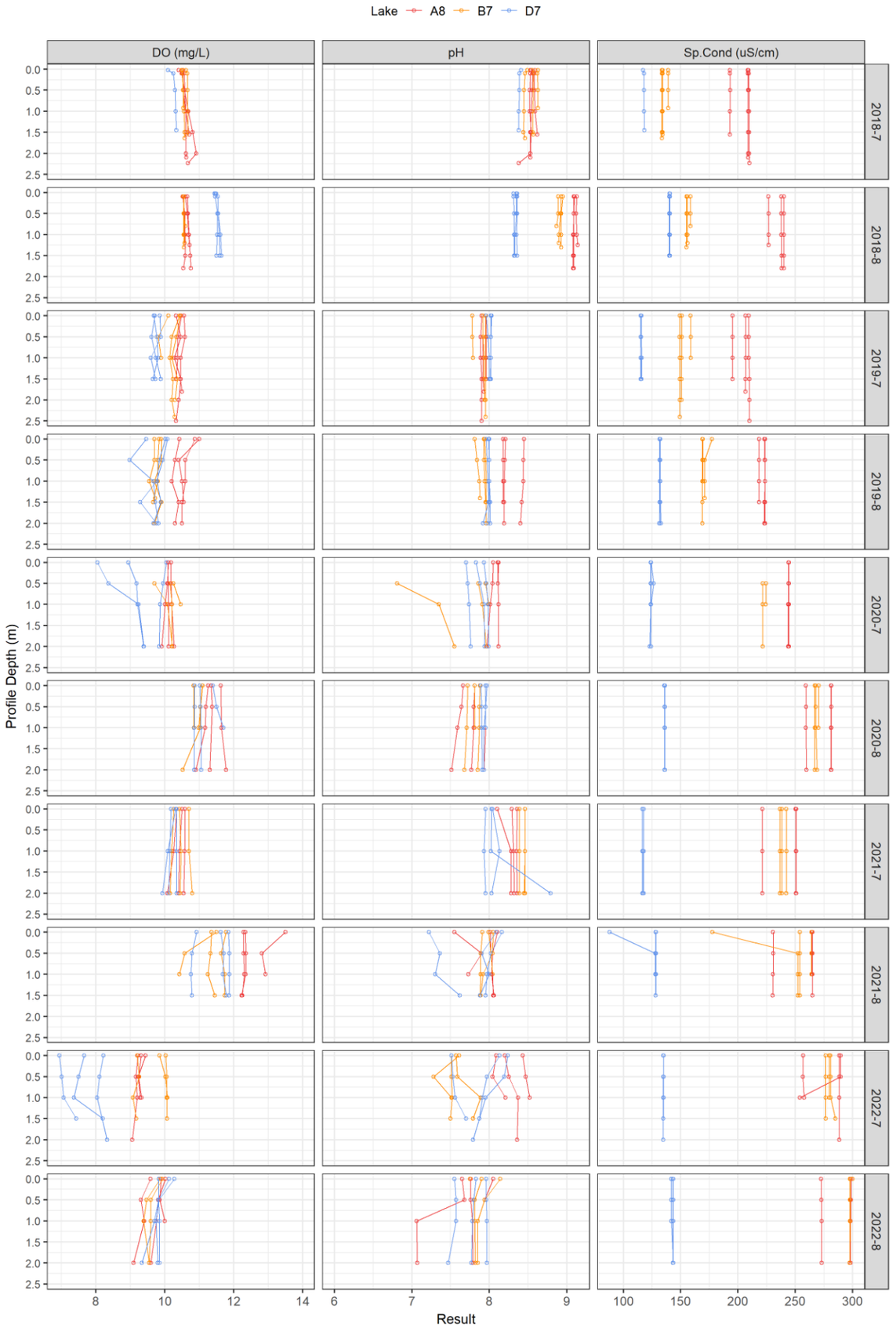
The water quality assessment for each lake focuses on parameters that have increased over time based on the normal range assessment. Plots showing the change in concentrations of key major ions, nutrients, and metals are provided in **Section 4.6**. A comprehensive summary of upper and lower Normal Range thresholds, along with summary statistics for each of the investigated water quality parameters, are provided in **Appendix D1**.

4.4.1 Field-Measured Water Quality Parameters

Limnology profiles for the Peninsula Lakes in July and August 2022 are shown in **Figure 4-1**. The small size and shallow depth of the Peninsula Lakes promotes mixing from wind and wave action and uniform dissolved oxygen, temperature, specific conductivity, and pH among the replicate stations. Dissolved oxygen concentrations were above 10 mg/L in each lake. The Peninsula Lakes are slightly alkaline, with pH typically measuring between 7.5 and 8.5. pH has remained stable during operations.

Specific conductivity was in the range of 130-140 µS/cm at Lake D7 in 2022. Conductivity fluctuates somewhat from year to year in Lake D7, but conditions have remained stable during operations. Not surprisingly, conductivity has changed significantly at Lake B7 and Lake A8 as surface activity increases in the area around Tiriganiaq Pit 1 and 2 and the TSF. Over the past 5 years, conductivity in Lake B7 has approximately doubled, from 130-150 µS/cm in 2018 to 275-300 in 2022 (**Figure 4-1**). Since 2020, conductivity in Lake B7 and Lake A8 have shown the same pattern of change in each sampling event.

Figure 4-1. *In-situ* limnology profiles at the Peninsula Lakes, 2018 – 2022



4.4.2 Lake D7

Summary statistics and water quality screening results for Lake D7 are provided in **Table 4-2** for the short list of parameters that exceeded the Normal Range in at least one sample in 2022. There is no aquatic life water quality guideline for reactive silica, but the concentrations of ammonia, arsenic, molybdenum, and vanadium were below compared to their respective AEMP Action Levels.

The short list of parameters included reactive silica, ammonia, arsenic, molybdenum, and vanadium. The relative increase in the annual mean concentration above the Normal Range was 13% for ammonia, 20% for arsenic, 12% for molybdenum, and 17% for vanadium. Reactive silica nearly tripled between 2021 and 2022 (0.20 to 0.57 mg/L; **Table 4-3**). Reactive silica was below the Normal Range in Lake A8 and Lake B7, which indicates the increase at Lake D7 between 2021 and 2022 was unrelated to mining activities.

Other than arsenic, there are no parameters in Lake D7 showing year-over-year increasing trends based on the AEMP results since 2015. As discussed in the Meliadine Lake water quality section, arsenic appears to be trending higher in lakes throughout the Kivalliq (**Figure 4-4**). Since 2015, arsenic concentrations in Lake D7 have increased by approximately 40% from 1.01 µg/L to 1.44 µg/L (**Table 4-3**). This finding is consistent with the magnitude of the increase in arsenic at the reference lakes for the Meadowbank CREMP. Any influence of the mine on arsenic concentrations in Lake D7 appears to be negligible compared to the gradual increase observed over time due to the combined effect of natural variability and climate change.

The concentrations of other key parameters were either stable or decreased in 2022 compared to recent years (see plots in **Section 4.6**). Aluminum saw the biggest year-over-year change with the annual mean concentration decreasing by nearly 70% from 13.8 µg/L in 2021 to 5.4 µg/L in 2022. Aluminum concentrations in Lake D7 in 2021 were outside the range observed during construction and early operations, and the increase was attributed to runoff during freshet. The water quality results for aluminum from 2020-2022 illustrate that water quality can change rapidly from year-to-year in lakes on the peninsula due to factors unrelated to mining.

4.4.3 Lake A8

Summary statistics and water quality screening results for Lake A8 are provided in **Table 4-4** for the short list of parameters that exceeded the Normal Range in at least one sample in 2022. Based on the annual mean concentration, sodium, sulphate, aluminum, arsenic, boron, molybdenum, and uranium exceeded the Normal Range in 2022. Aluminum and boron concentrations are typically measured near the detection limits, and the marginal exceedances of the Normal Range in 2022 are likely related to natural variability rather than mining activities. No exceedances of AEMP Benchmarks or Action Levels were detected in any of the samples collected from Lake A8 in July and August 2022.

Water quality in Lake A8 has changed in recent years coinciding with increased surface activity at the mine. There is also evidence to suggest high rainfall in 2019 and 2021 contributed to some of the observed changes in water quality in Lake A8, although the effect of high rainfall and runoff is not apparent for all parameters that exceed the Normal Range. Sulphate is the parameter that shows the clearest indication of changes caused by mining activities (**Figure 4-2**). Sulphate, and other major ions, increased during the construction phase before dropping in 2018. However, sulphate has been steadily increasing by 16% to 24% year-over-year since 2019 (**Table 4-6**). Sulphate concentrations were predicted to increase in lakes near the site due to SO_2 emissions, and concentrations in Lake A8 in 2022 are within the range predicted in the 2014 FEIS for Lake A1[9] during operations (median: 9.5 mg/L; max: 16.8 mg/L).

Nitrate concentrations in Lake A8 were variable in 2022. Concentrations in July were below the limit of detection in all three samples (0.005 mg/L). By August, concentrations had increased to 0.016-0.029 mg/L (~ 3-5-fold increase). The difference in concentrations between the July and August sampling events is the reason for the variability shown in **Figure 4-3**. It is unclear whether the relatively high concentrations in August are related to mining activities or if the change is natural. Similar increases in nitrate have also been observed at Lake D7 in 2019 and 2020, suggesting the change in Lake A8 may be natural.

Arsenic, molybdenum, and uranium concentrations have increased over time, and the temporal pattern broadly overlaps with increased surface activity at the mine. However, high rainfall in 2019 and 2021 also appears to have contributed to changes in water quality in Lake A8. For arsenic, concentrations increased 113% between 2019 and 2020, remained relatively stable between 2020 and 2021 (9% decrease), and increased 90% between 2021 and 2022 (**Table 4-6**). Molybdenum and uranium showed the same pattern of change as arsenic, but with a lower magnitude of increase between years. The step increases in arsenic, molybdenum, and uranium were detected one year after the high rainfall events (**Figure 4-4**). The reason for the lag between high rainfall and higher concentrations of these metals observed in Lake A8 is unclear. Development of the mine has altered the landscape and hydrology of lakes near the mine, and this could be affecting the timing of runoff captured in lakes close to the mine.

4.4.4 Lake B7

As in previous years, several parameters were measured at concentrations above the Normal Range in Lake B7 in 2022 (**Table 4-5**). Changes in water quality in Lake B7 are apparent when looking at the results for TDS and constituent major ions (sodium, chloride, and sulphate; **Figure 4-2**) and some metals (arsenic, barium, lithium, molybdenum, strontium, and uranium; **Figure 4-4**, **Figure 4-5**).

[9] Predictions were not developed for Lake A8 during operations because the mine plan calls for Lake A8 to be dewatered.

No parameters exceeded the AEMP Action Levels in 2022, but arsenic concentrations ranged from 12.2-17.7 µg/L in the six samples collected in July and August. The AEMP Action Level for arsenic is 18.8 µg/L. Arsenic may exceed the AEMP Action Level in Lake B7 in 2023 if concentrations continue the same upward trend that has been observed in recent years.

The proximity of Lake B7 to the TSF likely explains some of the observed changes in metals concentrations in recent years. However, there is uncertainty about the relative contribution of fugitive dust/aerial emissions vs runoff from high precipitation because high rainfall events overlap with increased surface activity at the mine. The biggest changes in water quality occurred between 2019 and 2020, with step increases greater than 50% observed for antimony, arsenic, lithium, molybdenum, and uranium (**Table 4-7**). Molybdenum concentrations changed the most between 2019 and 2020, going from 0.17 µg/L to 1.42 µg/L, equal to a 714% increase. Molybdenum concentrations decreased by 80% between 2020 and 2021, indicating the source was mainly transient. Molybdenum concentrations remain elevated compared to baseline, but well-below concentrations in 2020.

Arsenic and uranium also increased substantially between 2019 and 2020 (As = 200%; U = 74%). However, unlike molybdenum which decreased substantially between August 2020 and July 2021, arsenic and uranium have continued to trend higher over the past two years (**Table 4-7**). This implies the source of arsenic and uranium to Lake B7 is ongoing. The snowpack chemistry results support this conclusion (**Figure 2-9** and **Figure 2-10**), as does the 7-fold increase in arsenic from 2019 to 2022. Changes in water quality due to the mine were predicted in the FEIS, but the temporal trends observed in Lake B7 (and Lake A8) reflect the cumulative effect of surface activity at the mine and runoff from high rainfall.

Table 4-2. Lake D7 Water Quality Assessment.

Parameter	Units	Detection Limit	Screening Criteria				Summary Statistics for Lake D7 in 2022							
			Normal Range	FEIS	Benchmark	Action Level	N	N<DL	Mean	Median	SD	SE	Min	Max
Nutrients and Organic Carbon														
Reactive Silica (SiO_2)	mg/L	0.02 | 0.5	0.28	-	-	-	6	0	**0.57**	0.57	0.011	0.0047	0.55	0.58
Ammonia (as N)	mg/L	0.005	0.009	0.086	0.141	0.106	6	0	**0.010**	0.010	0.0039	0.0016	0.006	0.0149
Total Metals														
Arsenic (T)	µg/L	0.02	1.2	1.3	25	18.8	6	0	**1.44**	1.43	0.040	0.017	1.39	1.5
Molybdenum (T)	µg/L	0.05	0.48	0.61	73	54.8	6	0	**0.54**	0.54	0.029	0.012	0.50	0.575
Vanadium (T)	µg/L	0.05	0.07	0.71	120	90	6	0	**0.082**	0.084	0.0082	0.0034	0.071	0.089

Notes:
"-"mean, SD, and SE is not calculated if >50% of the samples were below the detection limit.
Bold values indicate the mean concentration is greater than the upper limit of the normal range.
Gray highlighted cells indicate the mean concentration exceeds the FEIS prediction (Agnico Eagle, 2014).

Table 4-3. Annual mean concentrations for parameters that exceeded the Normal Range at Lake D7 in 2022.

Parameter	Units	Normal Range	Annual Mean Concentration							
			2015	2016	2017	2018	2019	2020	2021	2022
Reactive Silica (SiO2)	mg/L	0.28	0.18	0.27	0.14	0.21	NA	0.39	0.20	0.57
Ammonia (as N)	mg/L	0.009	0.0086	0.0056	0.0072	0.022	0.019	0.032	0.037	0.010
Arsenic (T)	µg/L	1.2	1.02	1.10	0.97	1.03	1.11	1.29	1.13	1.44
Molybdenum (T)	µg/L	0.48	0.33	0.41	0.45	0.53	0.38	0.51	0.47	0.54
Vanadium (T)	µg/L	0.07	0.16	0.057	0.057	0.071	0.111	0.092	0.10	0.082

Notes:
"NA" = reactive silica was not analyzed in 2019.

Table 4-4. Lake A8 Water Quality Assessment

Parameter	Units	Detection Limit	Screening Criteria				Summary Statistics for Lake A8 in 2022							
			Normal Range	FEIS	Benchmark	Action Level	N	N<DL	Mean	Median	SD	SE	Min	Max
Major Ions														
Fluoride	mg/L	0.02	0.04	8.3	2.8	2.1	6	0	0.039	0.0385	0.0021	0.00085	0.036	0.042
Reactive Silica (SiO_2)	mg/L	0.5	1.3		-	-	6	0	1.03	1.08	0.298	0.122	0.7	1.51
Sodium (T)	mg/L	0.02	8.4		-	-	6	0	**9.99**	10.4	1.2	0.489	7.9	11.2
Sulphate	mg/L	0.3	9.3	11.6	218	164	6	0	**10.5**	11.0	1.44	0.589	8.45	11.8
Nutrients and Organic Carbon														
Ammonia (as N)	mg/L	0.005	0.011	0.118	0.141	0.106	6	0	0.0105	0.011	0.00257	0.00105	0.0072	0.0135
Nitrate (as N)	mg/L	0.005	0.015	0.2	2.9	2.17	6	3	-	0.0104	-	-	0.005	0.0291
DOC	mg/L	0.5	4.9	-	-	-	6	0	4.72	4.6	0.694	0.283	4.04	5.77
TOC	mg/L	0.5	4.7	-	-	-	6	0	4.57	4.48	0.561	0.229	3.93	5.46
Total Metals														
Aluminum (T)	µg/L	1	3	4.6	100	75	6	0	**3.2**	3.15	0.576	0.235	2.4	4
Arsenic (T)	µg/L	0.02	2.4	1.7	25	18.8	6	0	**9.26**	11.2	3.36	1.37	4.83	11.6
Boron (T)	µg/L	5	5	27	1500	1120	6	2	**6.03**	7.55	2.75	1.12	5.0	8.3
Iron (T)	µg/L	1	67	96	1060	795	6	0	53.1	54	12.8	5.22	38	73.1
Lead (T)	µg/L	0.01	0.03	2	5	3.75	6	0	0.0237	0.0255	0.00737	0.00301	0.013	0.033
Manganese (T)	µg/L	0.05	13	30	120	90	6	0	9.25	8.93	2.92	1.19	5.62	13.9
Molybdenum (T)	µg/L	0.05	0.22	0.59	73	54.8	6	0	**0.356**	0.351	0.0644	0.0263	0.282	0.466
Uranium (T)	µg/L	0.001	0.054	0.061	15	11.2	6	0	**0.064**	0.0648	0.00417	0.0017	0.0575	0.0689

Notes:
"-"mean, SD, and SE is not calculated if >50% of the samples were below the detection limit.
Bold values indicate the mean concentration is greater than the upper limit of the normal range.
Gray highlighted cells indicate the mean concentration exceeds the FEIS prediction (Agnico Eagle, 2014).

Table 4-5. Lake B7 Water Quality Assessment.

Parameter	Units	Detection Limit	Screening Criteria			Summary Statistics for Lake B7 in 2022							
			Normal Range	Benchmark	Action Level	N	N<DL	Mean	Median	SD	SE	Min	Max
Major Ions													
Chloride	mg/L	0.1	25	120	90	6	0	**44.3**	44.5	0.993	0.405	43.1	45.4
Sodium (T)	mg/L	0.02	7.5	-	-	6	0	**9.29**	9.3	0.308	0.126	8.98	9.64
Sulphate	mg/L	0.3	6	218	164	6	0	**10.6**	10.6	0.765	0.312	9.84	11.4
Nutrients and Organic Carbon													
Ammonia (as N)	mg/L	0.005	0.025	0.141	0.106	6	0	0.0152	0.0132	0.00671	0.00274	0.0093	0.0283
Nitrate (as N)	mg/L	0.005	0.005	2.9	2.17	6	5	-	0.005	-	-	0.005	0.0054
Orthophosphate (PO4-P)	mg/L	0.001	0.001	-	-	6	3	-	0.00105	-	-	0.001	0.0015
Dissolved Organic Carbon	mg/L	0.5	5.5	-	-	6	0	**5.66**	5.71	0.384	0.157	5.13	6.03
Total Metals													
Antimony (T)	µg/L	0.02	0.02	6	4.5	6	0	**0.0358**	0.0355	0.00371	0.00151	0.032	0.04
Arsenic (T)	µg/L	0.02	1.8	25	18.8	6	0	**14.2**	13.4	2.07	0.844	12.2	17.7
Barium (T)	µg/L	0.02	20	1000	750	6	0	**28.1**	28.2	0.662	0.27	27.3	28.9
Cobalt (T)	µg/L	0.005	0.05	1.02	0.765	6	0	**0.051**	0.0524	0.00676	0.00276	0.0397	0.0584
Lithium (T)	µg/L	0.5	7.5	-	-	6	0	**20.2**	20	1.1	0.45	19.1	21.5
Manganese (T)	µg/L	0.05	8.6	120	90	6	0	**9.69**	9.67	1.09	0.445	8.51	11.2
Molybdenum (T)	µg/L	0.05	0.24	73	54.8	6	0	**0.315**	0.318	0.0117	0.00476	0.301	0.328
Selenium (T)	µg/L	0.04	0.04	1	0.75	6	3	-	0.042	-	-	0.04	0.053
Strontium (T)	µg/L	0.02	155	2500	1880	6	0	**314**	311	14.6	5.96	300	335
Thallium (T)	µg/L	0.005	0.005	0.8	0.6	6	3	-	0.0052	-	-	0.005	0.0062
Uranium (T)	µg/L	0.001	0.03	15	11.2	6	0	**0.0675**	0.0673	0.00166	0.000678	0.0656	0.0699
Vanadium (T)	µg/L	0.05	0.01	-	-	6	0	**0.0665**	0.0665	0.00266	0.00109	0.063	0.071

Notes:
"-"mean, SD, and SE is not calculated if >50% of the samples were below the detection limit.
Bold values indicate the mean concentration is greater than the upper limit of the normal range.

Table 4-6. Yearly increase in the concentrations of parameters that exceed the Normal Range in Lake A8

Parameter	Normal Range	2022		2021		2020		2019
		mean	% Change from '21	mean	% Change from '20	mean	% Change from '19	mean
Nutrients and Organic Carbon (mg/L)								
Sodium (T)	8.4	9.99	34%	7.48	-3%	7.68	28%	6
Sulphate	9.3	10.5	16%	9.06	21%	7.49	24%	6.05
Total Metals (µg/L)								
Aluminum (T)	3	3.2	-41%	5.38	20%	4.47	-13%	5.15
Arsenic (T)	2.4	9.26	90%	4.88	-9%	5.39	131%	2.33
Boron (T)	5	6.03	8%	5.57	3%	5.43	9%	5.000
Molybdenum (T)	0.22	0.356	31%	0.272	-1%	0.274	44%	0.19
Uranium (T)	0.054	0.064	19%	0.0537	11%	0.0484	33%	0.0363

Notes:
% Change = refers to the year change in the mean concentration.

Table 4-7. Yearly increase in the concentrations of parameters that exceed the Normal Range in Lake B7

Parameter	Normal Range	2022		2021		2020		2019
		mean	% Change from '21	mean	% Change from '20	mean	% Change from '19	mean
Major Ions (mg/L)								
Chloride	25	44.3	10%	40.2	3%	38.9	45%	26.9
Sodium (T)	7.5	9.29	21%	7.68	12%	6.86	28%	5.35
Sulphate	6	10.6	12%	9.44	15%	8.22	39%	5.9
Organic Carbon (mg/L)								
DOC	5.5	5.66	2%	5.56	13%	4.92	18%	4.16
Total Metals (µg/L)								
Antimony (T)	0.02	0.036	2%	0.035	-49%	0.069	167%	0.026
Arsenic (T)	1.8	14.2	127%	6.25	15%	5.45	204%	1.79
Barium (T)	20	28.1	11%	25.4	3%	24.7	28%	19.4
Cobalt (T)	0.05	0.051	-4%	0.053	-24%	0.070	34%	0.052
Lithium (T)	7.5	20.2	2%	19.8	1%	19.6	56%	12.6
Manganese (T)	8.6	9.69	64%	5.9	-4%	6.13	-20%	7.65
Molybdenum (T)	0.24	0.32	5%	0.30	-79%	1.42	714%	0.17
Strontium (T)	155	314	4%	302	11%	273	33%	205
Uranium (T)	0.03	0.068	20%	0.056	29%	0.044	74%	0.025
Vanadium (T)	0.01	0.067	20%	0.055	3%	0.054	-25%	0.072

Notes:
% Change = refers to the year change in the mean concentration.

4.5 Conclusions and Recommendations

Results of the 2022 water quality monitoring program for the Peninsula Lakes are summarized below. The Low Action Level assessment for the Peninsula Lakes water quality results is presented in **Section 6.1**.

Key Question: Has water quality in the exposure areas changed over time relative to baseline conditions?

The concentrations of some parameters have increased over time in Lake A8, Lake B7, and Lake D7. Changes in water quality at Lake D7 are attributed to natural variability and/or climate change (e.g., high rainfall), whereas the changes observed in Lake A8 and Lake B7 include sources from the mine (dust and emissions). The evidence of off-site migration from dust and emissions is compelling based on the snowpack chemistry results, but high rainfall in 2019 and 2021 also had a significant effect on water quality in Lake A8 and Lake B7.

Key Question: Are concentrations greater than AEMP Action Levels?

No exceedances of AEMP Action Levels were reported in any of the samples collected from Lake D7, Lake A8, or Lake B7 in 2022. Arsenic concentrations in Lake B7 are getting close to the AEMP Action Level and if the temporal trend continues at the same rate, concentrations in 2023 may exceed the AEMP Action Level. Ongoing efforts to control off-site migration of dust and reduce emissions should continue to be implemented to mitigate changes in water quality at Lake B7 and Lake A8.

Recommendations

Routine monitoring is recommended at Lake D7, Lake B7, and Lake A8 in 2023.

4.6 Water Quality Plots

The following figures show the average annual concentration (± 1SD) for selected major ions, nutrients, and metals in surface water samples from the Peninsula Lakes since 2015. The green line indicates the normal range, which corresponds to the upper 90th prediction interval or percentile of baseline concentrations (pre-2018). Plots showing concentrations over time for individual samples are provided in **Appendix D2**.

List of Plots

Figure 4-2. Total dissolved solids and constituent major Ions in the Peninsula Lakes since 2015.

Figure 4-3. Concentrations of selected nutrients in the Peninsula Lakes since 2015.

Figure 4-4. Annual mean concentrations of aluminum, arsenic, barium, cobalt, copper, and lithium in the Peninsula Lakes since 2015.

Figure 4-5. Annual mean concentrations of manganese, molybdenum, strontium, uranium, vanadium, and zinc in the Peninsula Lakes since 2015.

Figure 4-2. Total dissolved solids and constituent major Ions in the Peninsula Lakes since 2015.

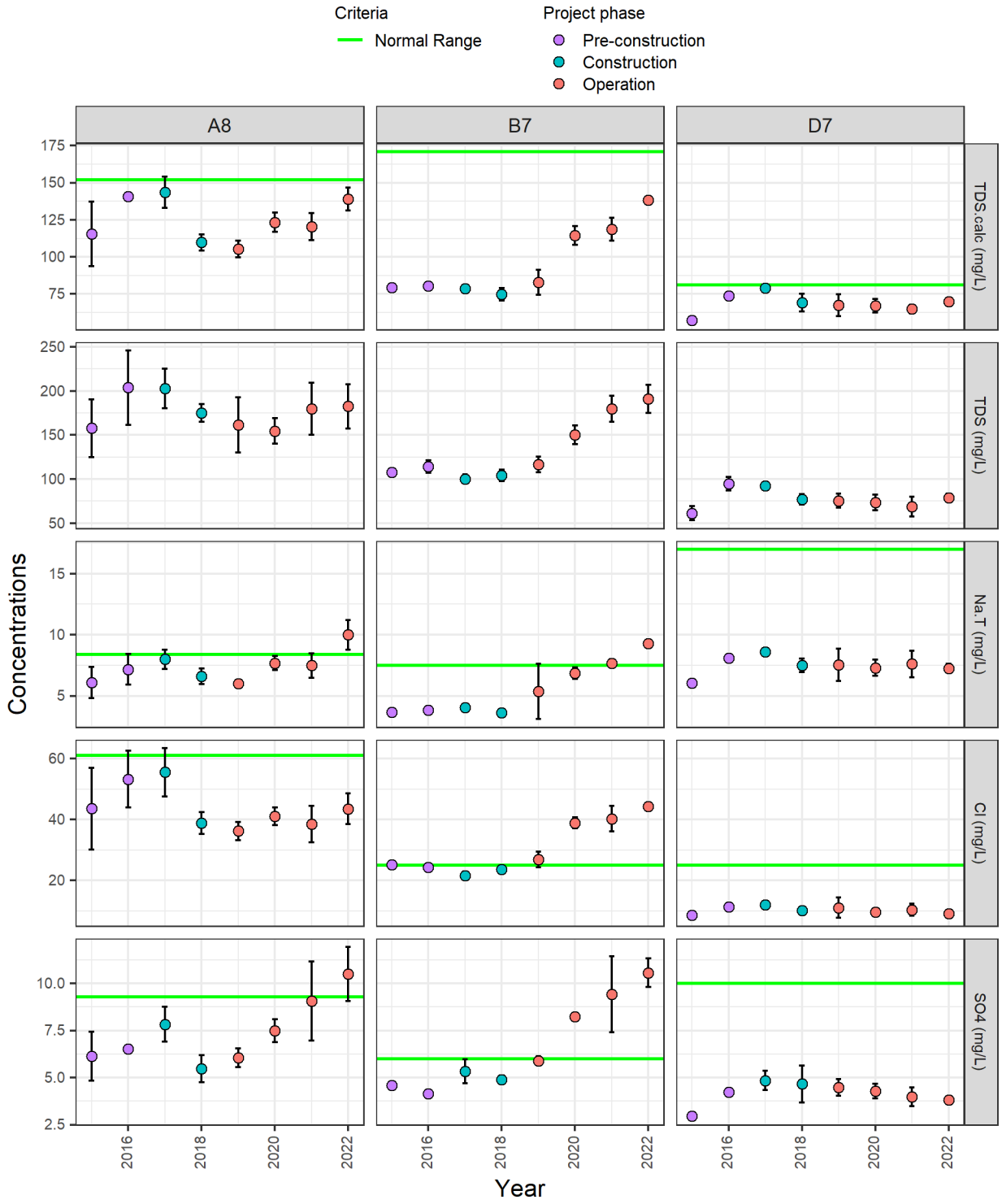


Figure 4-3. Concentrations of selected nutrients in the Peninsula Lakes since 2015.

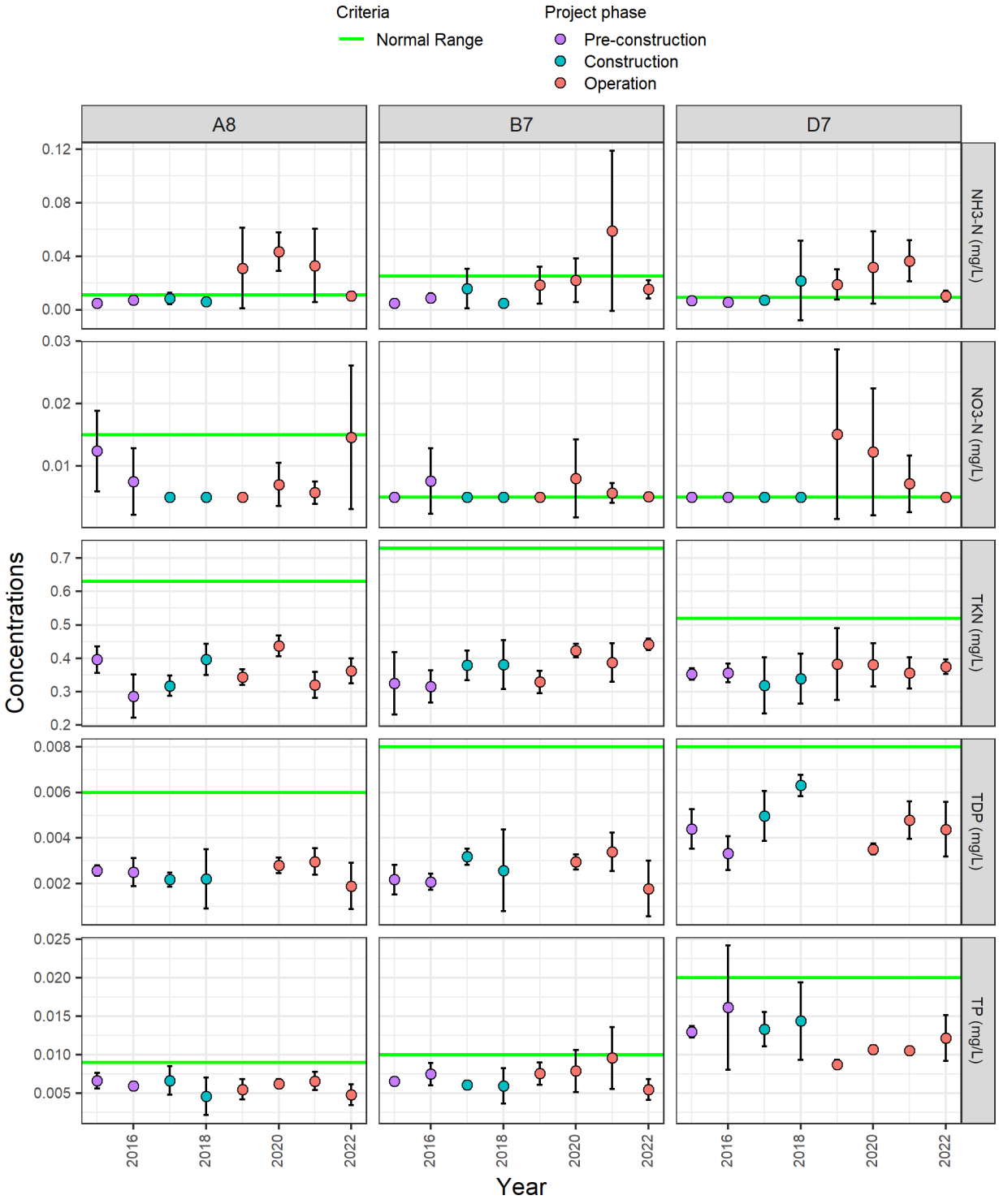


Figure 4-4. Annual mean concentrations of aluminum, arsenic, barium, cobalt, copper, and lithium in the Peninsula Lakes since 2015.

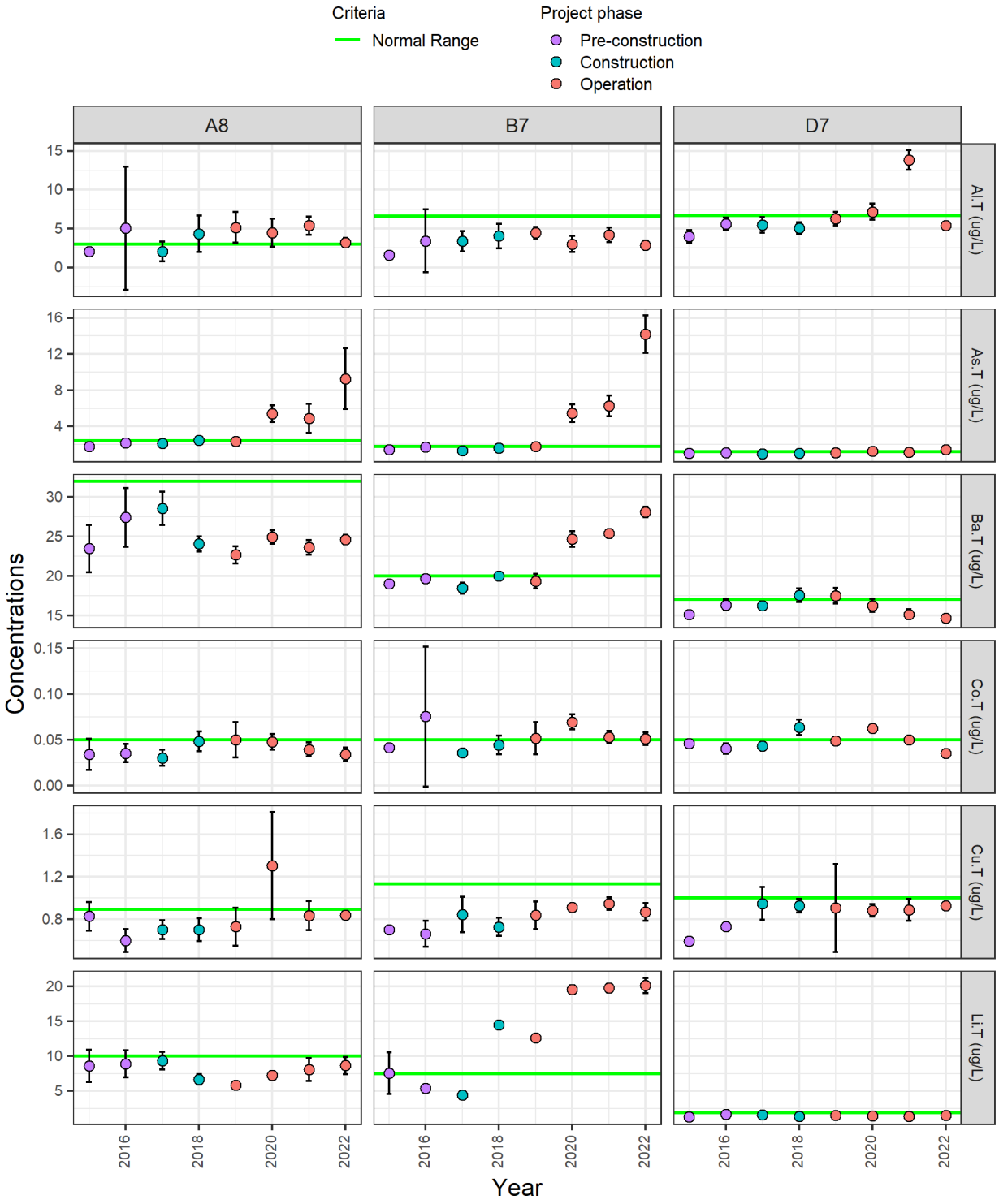
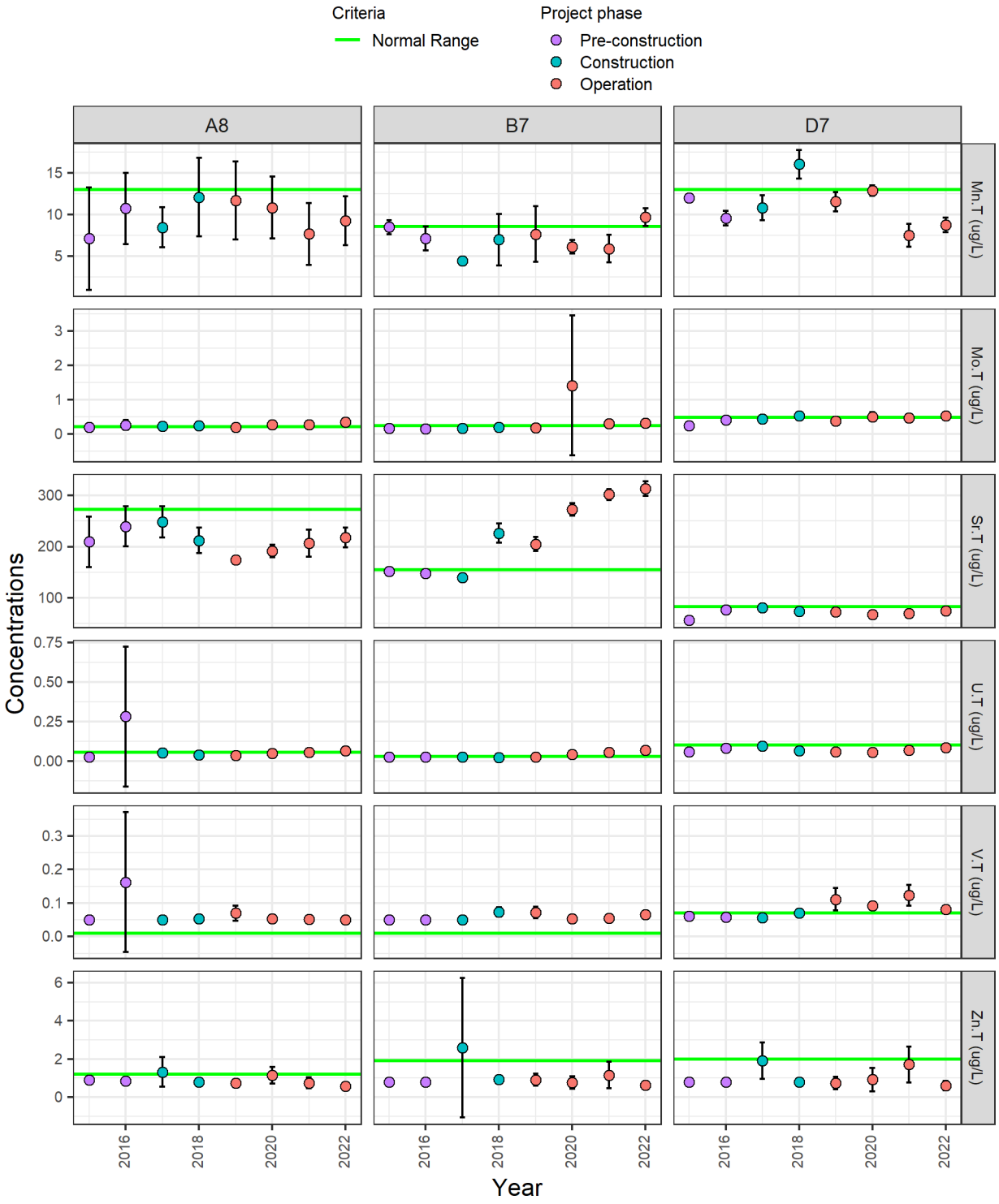


Figure 4-5. Annual mean concentrations of manganese, molybdenum, strontium, uranium, vanadium, and zinc in the Peninsula Lakes since 2015.



5 PHYTOPLANKTON COMMUNITY

5.1 Introduction

This chapter presents findings of the August 2022 phytoplankton study in Meliadine Lake. Sampling areas and stations are collocated with the water quality monitoring stations shown in **Figure 3-1**.

Phytoplankton, or algae, are a diverse group of primary producers that exist freely in the water column, converting sunlight to chemical energy via the photosynthetic pigment chlorophyll-a. Phytoplankton populations and their subsequent photosynthetic productivity will fluctuate due to several factors, most of which are related to seasonal changes. During the open water period, when light levels and temperature are their highest, nutrient availability is likely the most important factor driving phytoplankton growth and populations (Wetzel, 2001). Chlorophyll-a, the primary pigment used by phytoplankton for photosynthesis, is often measured in water to estimate the primary productivity of lakes. However, a more direct measurement of primary productivity is phytoplankton biomass, or the weight of all the algae per unit of water (mg/m^3).

Phytoplankton studies have provided meaningful insight into the structure and function of the phytoplankton community in Meliadine Lake as the mine transitioned from the pre-construction phase (2015) to operations. Furthermore, as the only biological monitoring program conducted annually under the AEMP, the phytoplankton study provides important information on the health of the aquatic environment in Meliadine Lake in years when fish and benthic invertebrate studies aren't completed as part of the 3-year AEMP and EEM cycle (2018, 2021, 2024, etc).

Objectives and Key Question

The key question for the phytoplankton study is,

> *Is the phytoplankton community in Meliadine Lake adversely affected by potential mine-related changes in water quality?*

Various lines of evidence are explored to help answer this question, including:

1. Spatial and temporal patterns in nutrient concentrations. Increased nutrient loads to Meliadine Lake could result in the stimulation of phytoplankton productivity.
2. Spatial and temporal patterns in phytoplankton metrics. This includes looking at key metrics (biomass, density, and taxa richness) across all taxa (i.e., *total*) or by major taxa group (MTG), as well as looking more closely at changes in community structure using multivariate analyses.

3. Nutrient-productivity relationships. This portion of the analysis involves looking at the spatial/temporal patterns in phytoplankton productivity metrics and comparing them to corresponding nutrient concentrations to determine if the patterns are linked.
4. Assess spatial and temporal patterns in Trophic Status Index (TSI). TSI has been used to classify estimated productivity of lakes based on phosphorus, chlorophyll-a, and/or Secchi depth.

5.2 Findings from the 2022 Phytoplankton Study

- Phosphorus and nitrate concentrations decreased in the East Basin of Meliadine Lake in 2022 compared to 2020 and 2021. Phosphorus concentrations have been trending lower since 2017, coinciding with the Sewage Treatment Plant (STP) coming online.
- Chlorophyll-a concentrations at the near-field (NF) and mid-field (MF) areas continued the increasing trend seen since the onset of the operations period in 2020. Chlorophyll-a concentrations at reference location MEL-03 were higher in 2022 than previously observed, but in general chlorophyll-a at the reference areas has remained stable over time. The increase in chlorophyll-a observed at the NF and MF areas was not correlated with nitrogen or phosphorus concentrations in surface water. It is important to note that chlorophyll-a is only an indicator of phytoplankton productivity; phytoplankton biomass (see next bullet) is a more direct measure of primary productivity.
- Phytoplankton biomass at the NF area in 2022 was lower than that observed in 2021 but was similar to that observed in 2020 at approximately 250 mg/m^3. Phytoplankton biomass in the NF area is typically higher than the MF and reference areas, indicating the East Basin of Meliadine Lake may be a naturally more productive area.
- Multivariate analysis indicated that the NF phytoplankton community was structurally different from the communities in the MF and reference areas, and that the community composition in all areas was slightly different than in 2021. It is unclear whether the structural differences in the community were due to effluent (specifically nitrate) as was predicted in the FEIS (Agnico Eagle, 2014), or due to some other natural local or regional factor.
- Routine monitoring of phytoplankton community and chlorophyll-a is recommended in 2023 to verify that discharge of effluent to Meliadine Lake is not causing changes in primary productivity or significant changes in the structure of the phytoplankton community.

5.3 Methods

Plankton monitoring for the AEMP started in 2015 and involved phytoplankton and zooplankton sampling at several points during the year. A critical review of the data from 2015 to 2017 showed limited value in retaining zooplankton as a core component of the AEMP because of high spatial and

temporal variability in abundance and biomass (Golder, 2018). Phytoplankton monitoring was not initially included as a core component of the AEMP because there was some uncertainty about the utility of phytoplankton for monitoring mine-related changes in primary productivity. The use of phytoplankton as a biomonitoring tool for changes in the environment is well established (Pienitz et al., 2004), but there can be considerable spatial and temporal variability in community response to environmental conditions that can confound, or obscure, the identification of changes caused by human activities. To streamline the assessment, Golder recommended one sampling event per year in August, the month with the least variability in phytoplankton community endpoints based on the analysis of three-years' worth of data (2015 – 2017). Phytoplankton sampling has been conducted once per year in August as part of the AEMP since 2018. The methods of the 2022 phytoplankton sampling are outlined in this section and are generally consistent with those used in all previous years of sampling.

5.3.1 Field Methods

The phytoplankton study was conducted in parallel with the Meliadine Lake water quality sampling in August 2022. The phytoplankton study involved sampling for taxonomy (biomass, richness, and density) and chlorophyll-a. Secchi depth was also recorded to provide another line of evidence when assessing nutrient/productivity relationships. The annual mean and standard error of the Secchi depth readings in each area are provided in **Table 5-1**.

Sampling areas and stations are shown in **Figure 3-1**. Coordinates are listed in **Table 3-1**.

Table 5-1 Secchi depth from the open-water sampling events in 2022.

Area	Secchi Depth (m)	
	Mean	Standard Error
MEL-01	5.0	0.0
MEL-02	7.1	0.1
MEL-03	8.2	0.6
MEL-04	8.3	0.2
MEL-05	8.6	0.2

Field collections and sample analyses were generally conducted according to methods outlined in the AEMP Design Plan (Azimuth, 2022a). Water was collected at two-meter intervals from the surface to within 2 m of the bottom of the lake using a Kemmerer. Discrete samples from each depth interval were combined in a clean 20-L bucket to form a composite sample. Triplicate subsamples of the depth-integrated composite were collected for chlorophyll-a. Chlorophyll-a samples were obtained by vacuum filtering 500 mL of water through a Whatman glass fiber type C filter with a nominal pore size of 1.2 µm. Filters were shipped frozen to the Biogeochemical Analytical Service Laboratory at the University of

Alberta for analysis. Water samples for phytoplankton taxonomy were preserved with 4 mL of Lugol's solution, sealed, and stored in the dark for transportation to Plankton-R-Us (Winnipeg) for taxonomic identification to the lowest practical level and for density and biomass (based on biovolumes).

Prior to 2021, water from the depth-integrated sample was also submitted for nutrient analysis. This program was discontinued for the 2021 field program because nutrient data is also collected monthly (discrete samples) as part of the routine water quality monitoring program. Nutrients data from the August sampling event was paired with the taxonomy and chlorophyll-a data to explore nutrient/productivity relationships.

5.3.2 Laboratory Methods

Phytoplankton Taxonomy

Phytoplankton taxonomic identification was conducted by certified taxonomists at Plankton R Us Inc. (Winnipeg, MB). Phytoplankton were identified and enumerated using the appropriate keys and procedures listed below:

1. Standard taxonomic keys were used and provided with the final counts.
2. Sub-samples (approximately 100 mL) were dispensed into Utermohl-type settling chambers and allowed to settle for a 24-hour period.
3. Each sub-sample was first scanned at increasing magnification under an inverted microscope.
4. All organisms encountered were identified to the lowest possible taxonomic level.
5. Once the identifications were made, the counts are completed. At least 20 random fields were counted until a total count of at least 100 was made for the dominant species if possible.
6. The data was then enumerated by total cell count (cells/mL):

$$Cells\ mL^{-1} = \mathrm{N} \times \left(\frac{A_t}{A_c}\right) \times \left(\frac{1}{V}\right)$$

   Where:
   A_t= the area of the settling chamber (mm^2),
   A_c= the area of the chamber counted (mm^2),
   N= the number of units (cells) counted of a specific species, and
   V= the volume settled.

7. Cell counts were converted to wet weight biomass (mg/m^3) by estimating cell volume. Estimates of cell volume for each species were obtained by measurements of up to 50 cells of an individual species and applying the geometric formula best fitted to the shape of the cell (Vollenweider, 1968; Rott, 1981). A specific gravity of 1 was assumed for cellular mass.

Chlorophyll-a

Chlorophyll-a analysis was carried out at the University of Alberta according to the standard method *Determination of Chlorophyll-a in Water by Fluorometry* (Welschmeyer, 1994). The analytical procedure involved extraction, filtration, and flourometric analysis (Shimadzu RF-1501 Spectrofluorophotometer). Chlorophyll-a concentrations were calculated based on 500 mL of water filtered for each sample.

5.3.3 Data Analysis

Summary statistics and data analyses were conducted using R version 3.6.2 (R Core Team, 2022). Phytoplankton metrics (biomass, density, and taxa richness) for individual taxa were summed across all taxa (i.e., total of all organisms) and across major taxa groups (i.e., dinoflagellates, diatoms, cyanophytes, cryptophytes, chrysophytes, chlorophytes, and euglenophytes). Nutrient results from the water quality section were merged with the phytoplankton and chlorophyll-a results to investigate nutrient-productivity relationships.

Temporal and Spatial Trends

Time series plots organized by sampling area were used to highlight spatial and temporal patterns in nutrients, chlorophyll-a, and phytoplankton metrics. Phytoplankton populations grow and shrink seasonally, meaning species richness, biomass, and density are expected to vary annually, in response to regional climate patterns, and spatially in response to basin-specific factors such as morphology, timing of ice-off, and nutrient status. A fundamental premise of the temporal and spatial trend assessment was that the phytoplankton community in the various areas of Meliadine Lake will vary from year-to-year, but the NF, MF, and reference area communities should follow the same pattern of change each year. If, however, the phytoplankton community at the NF and MF areas diverges from previous years and from the reference areas, it may indicate water quality is influencing the structure of the community.

Community Structure

Differences in the phytoplankton community among areas and over time were determined using non-metric multidimensional scaling (nMDS). nMDS is an ordination method that takes multidimensional taxonomic data (e.g., biomass for each taxon for each phytoplankton sample) and collapses the information into two or three dimensions that capture major patterns of variation in the underlying data. Azimuth follows a nMDS approach based on the reference condition approach (RCA) outlined in the EEM Technical Guidance Document (Environment Canada, 2012). The fundamental premise of RCA is that a suitably large set of baseline and/or reference data can be used to characterize unimpaired conditions in terms of a variety of biological attributes. Patterns in reference area phytoplankton community structure are examined first, to determine the range of reference conditions. Patterns in community structure at the NF (MEL-01) and MF (MEL-02) areas are explored in the context of the

results for the reference areas. In the 2021 AEMP report, nMDS was performed using the biomass and richness of major taxa groups as the inputs. In the current report, the approach has been revised to include information for all commonly observed individual taxa.

Statistical analyses for nMDS were completed in R using the statistical package 'vegan' (version 2.5-6) according to the following workflow:

- Biomass data were compiled for all individual samples collected in August from 2013 to 2022 except for those collected at MEL-06 in 2021. To limit the influence of rarely observed taxa, individual taxa that accounted for less than 2% of any individual sample were excluded from the analysis. Raw biomass values were log(x+1) transformed to reduce the influence of dominant taxa.
- The above data set was turned into a Bray-Curtis distance matrix. Next, nMDS was run on the matrix; Shepard plots and stress values were used to optimize results. Stress, in the context of nMDS, refers to how distorted the representation of the data are in two or three dimensions relative to the original multi-dimensionality of the data. Lower stress means a better fit of the data in the reduced dimensionality. Multiple iterations of the analysis are completed to determine which position (or ordination) of points in two or three dimensions produces the lowest stress value.
- The guidelines outlined in Clarke (1993) are commonly used to evaluate stress values as follows: <0.05 = excellent, <0.10 = good, <0.20 = usable, >0.20 = not acceptable. However, stress of nMDS ordinations tends to increase with increasing sample size and decrease with an increasing number of dimensions, independent of the structure of the underlying data (Dexter et al, 2018). Given the large number of phytoplankton samples collected over the course of monitoring at Meliadine Lake, it is expected that stress of a suitable nMDS may exceed the threshold of 0.20. Therefore, stress was considered alongside other factors such as ease of interpretation when evaluating the potential nMDS ordinations.
- nMDS results were visualized by first plotting 90th, 95th and 99th percentile probability ellipses using the reference data only. The next step involved adding nMDS scores for NF (MEL-01) and MF (MEL-02) areas for each year. The 90th, 95th and 99th percentile probability ellipses provide a concise way of visualizing whether the phytoplankton community at the NF and MF areas are within the range of baseline/reference conditions for Meliadine Lake.

In the future, other statistical approaches may be implemented on a case-by-case basis to supplement the RCA analyses if the underlying data supports a more detailed investigation of spatial and temporal trends.

Trophic Status

Trophic status is a means of classifying estimated productivity of a lake based on concentrations of key nutrients and chlorophyll-a, and on water transparency. The three main categories of productivity are:

- Oligotrophic (low nutrients, low productivity),
- Mesotrophic (intermediate productivity), and
- Eutrophic (high nutrients, high productivity).

Three parameters are used in the classification of trophic status: total phosphorus, chlorophyll-a, and water transparency. Phosphorus is the primary nutrient used in trophic status indexes because it often limits primary productivity in freshwater systems. Chlorophyll-a is the primary pigment used for photosynthesis in phytoplankton and is used as a surrogate measure of primary production. Water transparency, measured with a Secchi disk, is also used as a coarse indicator of phytoplankton biomass.

Three trophic status indices are included in the assessment as summarized below.

- Vollenweider (1968) – A general classification scheme based on ranges of TP, chlorophyll-a and Secchi depth (**Table 5-2**).
- CCME (2004) – A total phosphorus-specific scheme using trigger ranges (**Table 5-3**).
- Carlson (1977) – Independent index scores for TP, chlorophyll-a and Secchi depth (**Table 5-4**), calculated as follows:

$$TSI_{TP} = 10\ (6 - \left[\frac{\ln\ (^{48}/_{TP})}{\ln 2}\right])$$

$$TSI_{Chl} = 10\ (6 - \left[\frac{2.04 - 0.68(\ln Chl)}{\ln 2}\right])$$

$$TSI_{Secchi} = 10\ (6 - \left[\frac{\ln\ \text{Secchi}}{\ln 2}\right])$$

Table 5-2. Trophic classification for lakes based on ranges of total phosphorus, chlorophyll-a and Secchi depth (Vollenweider, 1968).

Trophic Status	Total Phosphorus (mg/L)		Chlorophyll-a (µg/L)		Secchi Depth (m)	
	Mean	Range	Mean	Range	Mean	Range
Oligotrophic	0.008	0.003 to 0.018	1.7	0.3 to 4.5	9.9	5.4 to 28.3
Mesotrophic	0.027	0.011 to 0.096	4.7	3.0 to 11.0	4.2	1.5 to 8.1
Eutrophic	0.084	0.016 to 0.386	14.3	3.0 to 78.0	2.5	0.8 to 7.0

Notes:
Reference = Vollenweider, 1968.

Table 5-3. Trophic classification for lakes based on total phosphorus trigger ranges (CCME, 2004).

Trophic Status	Total Phosphorus (mg/L)
Ultra-oligotrophic (very nutrient-poor)	<0.004
Oligotrophic (nutrient-poor)	0.004 to 0.010
Mesotrophic (containing a moderate level of nutrients)	0.010 to 0.020
Meso-eutrophic (containing moderate to high levels of nutrients)	0.020 to 0.035
Eutrophic (nutrient-rich)	0.035 to 0.100
Hyper-eutrophic (very nutrient-rich)	>0.100

Notes:
Reference = CCME, 2004.

Table 5-4. Trophic status index and general trophic classifications for lakes (Carlson, 1977).

Trophic State Index	Total Phosphorus (mg/L)	Chlorophyll-a (µg/L)	Secchi Depth (m)	General Trophic Classification
<30 to 40	0 to 0.012	0 to 2.6	>8.0 to 4	Oligotrophic
40 to 50	0.012 to 0.024	2.6 to 20	4 to 2	Mesotrophic
50 to 70	0.024 to 0.096	20 to 56	2 to 0.5	Eutrophic
70 to 100+	0.096 to 0.38+	56 to 155+	0.5 to <0.25	Hyper-eutrophic

Notes:
Reference = Carlson, 1977.

The trophic status index (TSI; Carlson, 1977) can be a helpful tool to describe the trophic status of a lake and is useful for monitoring potential spatial or temporal differences in trophic status across locations in Meliadine Lake and/or monitoring years in the AEMP program. TSI is commonly used as a surrogate for direct measurement of phytoplankton communities in studies where such data is not available such as in water quality monitoring programs. In the AEMP, phytoplankton community data is collected every year and therefore the TSI is best used as a supporting piece of information that aids in the interpretation of other measures of productivity such as phytoplankton density and biomass. The TSI calculations outlined in Carlson (1977; **Table 5-4**) were used in this report to support the interpretation of the other lines of evidence relevant to the phytoplankton community.

5.4 Quality Assurance and Quality Control

Phytoplankton and chlorophyll-a QA/QC followed the general approach outlined in the AEMP Design Plan. The phytoplankton QA/QC program includes field duplicates, laboratory duplicates, and blanks for chlorophyll-a. Details of the QA/QC program are provided in **Appendix A** and summarized below.

- *Field Duplicates* – Three field duplicates were collected for phytoplankton taxonomy and chlorophyll-a in 2022, DUP-MEL-AUG-01 associated with MEL-03-01, DUP-MEL-AUG-02 associated with MEL-01-01 and DUP-MEL-AUG-03 associated with MEL-05-03. The data quality objective for field duplicates is less than 50% relative percent difference between the sample and duplicate. The DQO was met for chlorophyll-a in all sample-duplicate pairs and for total biomass and total density

in 2 of 3 sample-duplicate pairs. The RPDs for total biomass and total density at MEL-03-01 were 66% and 74%, respectively, which exceeded the DQO of 50%. However, variability is expected in field collected phytoplankton samples (as seen in **Figure 5-4**) and is mitigated in the study design by collecting 5 discrete samples from each sampling area. Therefore, the RPD exceedances for one duplicate sample are not expected to impact the findings of this report.

- *Laboratory Duplicates* – Laboratory QC for phytoplankton samples included three randomly selected replicate subsamples (from MEL-01-07, MEL-02-02, MEL-05-05). The relative percent difference between the sample and laboratory duplicate was less than the DDQ of 25%.
- *Field Blanks* – Three field blank samples were analyzed for chlorophyll-a and all three registered below detection limits.

All the laboratory results used in analysis and reporting were screened in a manner similar to the water quality data. A review of the data entry involved an independent party checking a minimum of 10% of the data for completeness, data entry errors, transcription errors, and invalid data.

Overall, the phytoplankton and chlorophyll-a QA/QC results indicate good collection and analytical methods and a high degree of replicability in sampling.

5.5 Results and Discussion

5.5.1 Background – Historical Data

Phytoplankton studies in Meliadine Lake and other lakes in the region were completed in the late 1990s to support the environmental assessment process. Four locations were sampled throughout Meliadine Lake in July, August, and September of 1997 and 1998. Chrysophytes (golden brown algae) were the dominant taxa group in terms of density and biomass. The community composition was similar throughout the lake and community succession followed a similar pattern of season change during the open water season each year (Golder, 2012). Biomass estimates in 1997 were in the range of 300 to 600 µg/L in July and August. The following year, biomass was approximately 2-fold higher, with values as high as 1,900 µg /L at the south basin in the vicinity of the current monitoring area MEL-05 (**Table 5-5**).

The historical data from the late 1990's was not formally included in the dataset for evaluating spatial and temporal trends in the AEMP because of differences in the collection methods. The data are provided for context only with phytoplankton data collected during the AEMP. One additional baseline phytoplankton sampling event was completed in the NF area in August 2013 as part of a wider program tasked with collecting data to help develop the AEMP. Phytoplankton data from this program were included in the AEMP as a point of comparisons for the recent baseline period because the same taxonomist was used for the analysis. However, due to differences in field sampling methods, the results

from the 2013 baseline program should be used with caution when comparing against data collected as part of the AEMP.

Table 5-5. Phytoplankton Community Data from Meliadine Lake in 1997 and 1998.

Site	AEMP Area	Date	Density (No. cells/L)	Biomass (mg/m^3)	Richness (No. taxa/site)
ML-E	MEL-01	19 Jul 97	2,008,000	529	56
		17 Aug 97	3,844,000	636	65
		17 Jul 98	2,593,000	1,887	75
		4 Sep 98	4,933,000	1,362	78
ML-S	MEL-05	20 Jul 97	1,863,000	627	73
		16 Aug 97	1,871,000	437	63
		25 Jul 98	3,736,000	1,119	67
		1 Sep 98	5,713,000	1,996	80
ML-SE	SE of MEL-05	22 Jul 98	2,991,000	1,772	83
ML-W	MEL-04	20 Jul 97	2,175,000	483	46
		16 Aug 97	1,135,000	342	52
		27 Jul 98	3,026,000	828	68

5.5.2 Nutrient Loading to Meliadine Lake

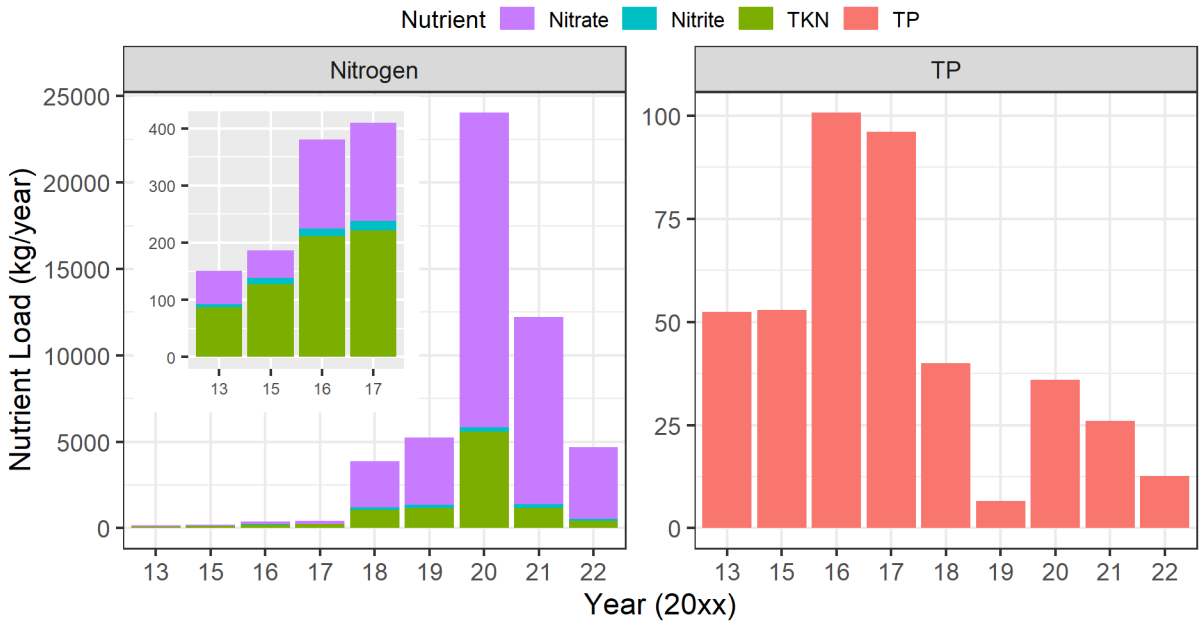
Loadings are calculated each month based on the average monthly concentration measured in samples from MEL-14 and the total volume of effluent discharged to Meliadine Lake. The monthly loadings for key nutrients (e.g., nitrate [NO_3], nitrite [NO_2], total Kjeldahl nitrogen [TKN] [10], and total phosphorous) are presented in this section to help interpret the phytoplankton taxonomy and chlorophyll-a results. Monthly and cumulative loadings for other nutrients are provided in **Appendix B**.

The comparatively low volume of water discharged to Meliadine Lake in 2022 resulted in correspondingly low loadings of nitrogen species and phosphorus (**Figure 5-1**). Residual nitrogen from explosives residue found in waste rock is the primary source of nitrogen in contact water that is ultimately discharged to Meliadine Lake. Inorganic nitrate was the dominant form of nitrogen in the effluent, followed by organic nitrogen as TKN and relatively small amounts of nitrite.

In 2022, 12.6 kg of phosphorus was added to Meliadine Lake in water from CP1, a 50% reduction compared to 2021 and 66% reduction compared to 2020. Phosphorus concentrations have remained consistent in samples collected from MEL-14 since the main camp sewage treatment plant started operating in 2018 (**Figure 2-4**). Phosphorus loadings vary from year to year based mainly on the volume of water discharged to Meliadine Lake.

[10] Total Kjeldahl nitrogen is the sum of organic nitrogen and ammonia. Total nitrogen is the sum of nitrate, nitrite, and TKN.

Figure 5-1. Annual loadings (kg/year) of nitrogen and total phosphorus to Meliadine Lake.



5.5.3 Chlorophyll-a

Chlorophyll-a concentrations from 2015 to 2022 are shown in **Figure 5-2**. The mean and standard deviation by area and year are provided in **Table 5-6**. Seven years of monitoring data for chlorophyll-a – not including 2019[11] – indicate the NF and MF areas of Meliadine Lake have become more productive compared to the reference areas. Chlorophyll-a concentrations showed the same year-over-year pattern of increase at MEL-01 and MEL-02. At the NF area (MEL-01), the average chlorophyll-a concentration was 3.3 µg/L in 2022. At the MF area (MEL-02), the average chlorophyll-a concentration has increased in each of the last 5 years and was 1.5 µg/L in 2022[12]. The AEMP Benchmark for chlorophyll-a is 4.5 µg/L based on an evaluation of chlorophyll-a and trophic status by DDMI (2013).

Chlorophyll-a concentrations in the reference areas have not shown the same year-over-year increasing pattern as that observed in the NF and MF areas. However, the average chlorophyll-a concentration at MEL-03 in 2022 was the highest measured in any AEMP program at 0.88 µg/L. Average concentrations at MEL-04 and MEL-05 were similar to those reported in previous years at 0.66 µg/L and 0.5 µg/L,

[11] Chlorophyll-a data from 2019 were flagged during the QC assessment because a different filter type was used in 2019, which resulted in lower-than expected results across all stations.

[12] The previous version of the AEMP Design Plan (Golder, 2016) had an AEMP Benchmark for chlorophyll-a of 4.5 µg/L based on an evaluation of chlorophyll-a and trophic status by DDMI (2013). The AEMP Benchmark was not carried forward in Version 2 of the AEMP Design Plan (Azimuth, 2022a) because phytoplankton taxonomy is a more relevant endpoint for assessing nutrient enrichment.

respectively. Despite the higher than usual average chlorophyll-a concentrations observed at MEL-03 in 2022, concentrations in the three reference areas remain well below concentrations observed in the NF and MF areas (**Table 5-6; Figure 5-2**.).

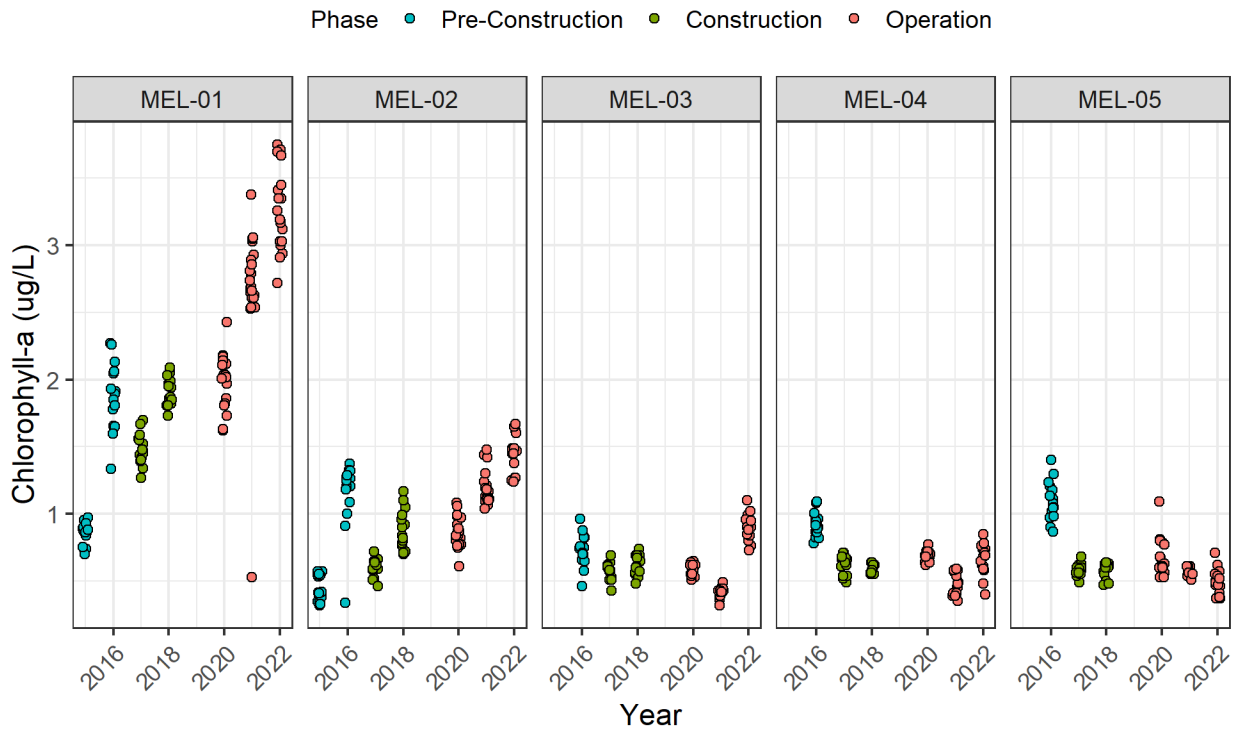
Table 5-6. Chlorophyll-a (µg/L; mean ± 1SD) in Meliadine Lake from 2015 to 2022.

Area	2015	2016	2017	2018	2020	2021	2022
MEL-01	0.86 ± 0.061	1.9 ± 0.17	1.5 ± 0.11	1.9 ± 0.076	2.0 ± 0.18	2.6 ± 0.26	3.3 ± 0.14
MEL-02	0.45 ± 0.080	1.2 ± 0.17	0.61 ± 0.040	0.88 ± 0.11	0.89 ± 0.10	1.2 ± 0.15	1.5 ± 0.073
MEL-03	-	0.73 ± 0.099	0.57 ± 0.061	0.61 ± 0.072	0.58 ± 0.042	0.42 ± 0.024	0.88 ± 0.050
MEL-04	-	0.93 ± 0.086	0.61 ± 0.066	0.58 ± 0.035	0.69 ± 0.038	0.47 ± 0.078	0.66 ± 0.071
MEL-05	-	1.1 ± 0.13	0.58 ± 0.036	0.58 ± 0.059	0.68 ± 0.091	0.57 ± 0.024	0.50 ± 0.022

Notes:
"-"indicates the phytoplankton study was not completed in these areas in 2015.

Figure 5-2 Chlorophyll-a Concentrations (µg/L) in Meliadine Lake from 2015 to 2022.

Notes: Triplicate samples are collected at each area/station replicate in August.



5.5.4 Phytoplankton Community

The primary metrics used to evaluate the health of the phytoplankton community in Meliadine Lake are total biomass and total richness. Phytoplankton density results are tabulated and plotted to support the discussion as needed, but are less informative on their own relative to biomass, which integrates size and density elements.

Results for the phytoplankton community are presented as follows:

- Mean phytoplankton biomass from 2013 to 2022 are presented in **Table 5-7**.
- Summary statistics for major taxa group biomass and density for samples collected in 2022 are presented in **Table 5-8**.
- Per-sample richness, biomass, and density are shown in **Figure 5-3**.
- Major taxa richness, biomass, and density are shown in **Figure 5-4** (absolute values) and **Figure 5-5** (percent).
- Summary statistics for richness, biomass, and density across all years are provided in **Appendix E1**.

Biomass

NF area MEL-01 typically has the highest biomass compared to the other sampling areas in Meliadine Lake (**Table 5-7**). Since the onset of operations, phytoplankton biomass has been quite variable. It is worth noting that the two years with the highest biomass, 2019 and 2021, had the highest rainfalls recorded over the last four decades. As discussed in the regional trend assessment of water quality (**Section 3.4.3**), increased precipitation associated with interannual climate variability and associated runoff can lead to higher concentrations of many constituents. These changes can remove certain constraints on phytoplankton productivity, leading to higher biomass. Unless the inputs are ongoing, the effects on productivity would be temporary. This was the case in 2020 and 2022, which were much drier years, and biomass at MEL-01 was more similar to the rest of the lake (**Figure 5-3**). While the specific factors driving this pattern are not fully understood, there is little evidence to suggest effluent-related nutrient enrichment or toxicological impairment.

Phytoplankton biomass at the MF area MEL-02 have been relatively stable since the onset of monitoring at this area in 2015. This area had a much smaller decrease in biomass in 2022 than all the other areas.

Biomass at the reference areas has generally decreased over the last four years, with 2022 having the lowest total community biomass observed to date. Given the lack of similar pattern at either the NF or MF areas suggests that this pattern is likely indicative of interannual variability in lake conditions.

Table 5-7. Phytoplankton biomass (mg/m^3; mean ± 1SD) in Meliadine Lake from 2013-2022

Area	2013[a]	2015	2016	2017	2018	2019	2020	2021	2022
MEL-01	153 ± 8	336 ± 29	350 ± 54	316 ± 39	339 ± 27	426 ± 24	211 ± 26	395 ± 46	248 ± 63
MEL-02	-	220 ± 35	252 ± 44	222 ± 42	207 ± 88	260 ± 58	170 ± 28	205 ± 47	192 ± 31
MEL-03	-	-	231 ± 17	206 ± 25	276 ± 26	229 ± 18	204 ± 39	185 ± 57	131 ± 18
MEL-04	-	-	156 ± 65	201 ± 22	241 ± 15	214 ± 28	140 ± 29	157 ± 23	103 ± 34
MEL-05	-	-	227 ± 71	216 ± 25	147 ± 14	204 ± 36	147 ± 18	156 ± 19	107 ± 29

Notes:
"-" = phytoplankton study was not completed in these areas.
[a] = Sampling methods were different between the baseline program in 2013 and the AEMP (discrete sampling in 2013 vs depth-integrated for the AEMP since 2015). Direct comparisons between 2013 and 2015-2021 should be made with caution.

Chrysophytes have generally been the dominant major taxa group in the Meliadine Lake phytoplankton community across the monitoring period. In 2022, relative to total community biomass, they comprised between 38% (MEL-01) to 70% (MEL-02) across all areas (**Table 5-8**, **Figure 5-5**). The next most common major taxa by biomass were dinoflagellates, diatoms, cryptophytes, and chlorophytes (green algae; **Figure 5-4, Figure 5-5**)**.** Diatoms accounted for an average of 21% of the total biomass at the NF area and only 5% to 6% of the MF and reference areas. Dinoflagellates also accounted for a larger proportion of the total biomass at MEL-01 (29%) relative to the MF and reference areas (17 to 20%; **Figure 5-5)**. Overall, the relative proportion of total biomass in each major taxa group in 2022 was consistent with results observed in 2015 to 2021 and similar to other studies on phytoplankton community assemblages in northern latitude lakes (Bergström et al., 2021).

Annual variability in total phytoplankton biomass is primarily related to variability in chrysophyte biomass. Similar to 2021, the chrysophyte genus *Dinobryon* was dominant in terms of biomass in most samples collected in the MF and reference areas of Meliadine Lake in 2022 (**Table E1-2**). This genus forms large chain-like colonies and can swim in a directed fashion using flagella to stay in the photic zone (Dodds and Whiles, 2010). The large colonies are also less susceptible to predation by zooplankton. At the NF area MEL-01, the dominant genus was the dinoflagellate *Peridinium* in 4 of 6 samples. Both dinoflagellate and chrysophyte species are highly motile and capable of mixotrophy (i.e., capable of generating energy either through photosynthesis or through consumption of bacteria; Fee, 1976; Findlay et al., 2001). Together, these attributes explain the dominance of these genera in terms of total phytoplankton biomass as shown in **Figure 5-4**.

Cyanobacteria comprised less than 1% of the total phytoplankton biomass among the NF and MF areas in 2022 (**Table 5-8**). This is worth highlighting because cyanobacteria are commonly associated with algal blooms related to nutrient enrichment (Codd, 2000). This phenomenon is well documented in temperate and boreal areas in Canada, and more recently cyanobacteria biomass has been used as line of evidence when investigating eutrophication in Arctic lakes in Canada caused by climate change

(Ayala-Borda et al., 2021). Low cyanobacteria biomass is one indicator of a healthy phytoplankton community in Meliadine Lake.

Richness

Taxa richness is generally positively correlated with total biomass in the Meliadine AEMP dataset (**Figure 5-4**). For example, years with lower biomass at NF areas MEL-01 (i.e., 2013, 2020 and 2022) had fewer taxa than observed in the years with higher biomass. This provides some context for the 2022 total taxa richness results, which, as observed for total community biomass, were among the lowest numbers observed since the onset of monitoring. It is important to note that this pattern is more consistent with natural variability than with what would be expected with a substantial shift in nutrient concentrations (e.g., eutrophication), which has been shown to increase phytoplankton biomass and decrease taxa richness (McQuatters-Gollop et al., 2009).

Chrysophytes were the most diverse major taxa group at all locations in 2022; the number of unique chrysophyte taxa ranged from 9 at MEL-04 and MEL-05 to 13 at MEL-01 (**Figure 5-4**). Chlorophytes and diatoms were also well represented in terms of the number of taxa, but due to the comparatively small size of individual chlorophytes and diatoms relative to chrysophytes, they accounted for only a small proportion of the total biomass (**Figure 5-5).** Subtle shifts in species dominance are part of natural succession patterns that phytoplankton communities undergo in response to a variety of physical (e.g., climactic), chemical (e.g., water quality), and biological factors (e.g., trophic interactions). These subtle changes in the phytoplankton community among the different areas and over time are discussed in the following section.

Table 5-8 Phytoplankton biomass (mg/m³) and density (cells/L) by major taxa in 2022

Notes: Chloro = chlorophytes; Chryso = chrysophytes; Crypto = cryptophytes; Dino = dinoflagellates; Cyano = cyanobacteria;
Euglenophytes were also considered as a major taxa group, but accounted for <1% of the biomass and density in all samples and were therefore not included in this summary table

Area	Sample ID	Biomass (mg/m³)							Density (cells/L)						
		Chloro	Chryso	Diatoms	Crypto	Dino	Cyano	Total	Chloro	Chryso	Diatoms	Crypto	Dino	Cyano	Total
MEL-01	MEL-0101	8	50	33	20	48	1	160	313,112	908,784	197,776	77,240	7,600	14,968	1,519,480
	MEL-0106	11	83	43	9	54	0	200	108,560	1,067,232	271,648	18,568	9,400	400	1,475,808
	MEL-0107	7	110	52	15	79	0	263	145,480	1,707,408	318,552	54,488	12,800	600	2,239,328
	MEL-0108	14	99	52	25	73	1	264	169,032	1,492,288	306,736	119,744	10,000	1,000	2,098,800
	MEL-0109	15	128	79	31	87	0	340	418,472	1,993,768	388,344	129,528	12,600	200	2,943,112
	MEL-0110	10	91	59	8	95	1	264	253,240	1,468,336	280,800	10,984	12,800	800	2,026,960
	Average	**5%**	**38%**	**21%**	**8%**	**30%**	**<1%**	**249**	**11%**	**70%**	**15%**	**3%**	**1%**	**<1%**	**2,050,581**
MEL-02	MEL-0202	1	160	15	8	22	0	206	7,584	1,143,872	77,472	73,240	4,200	200	1,306,568
	MEL-0203	5	191	9	8	22	0	235	173,416	1,438,432	74,272	80,024	4,400	200	1,770,744
	MEL-0205	7	127	14	4	35	0	187	84,624	866,896	101,008	29,736	6,600	200	1,089,064
	MEL-0206	7	86	10	4	43	0	150	195,368	613,256	143,896	9,184	8,200	200	970,104
	MEL-0208	15	104	12	9	39	0	179	510,864	910,000	28,968	52,888	8,000	400	1,511,120
	Average	**5%**	**68%**	**6%**	**3%**	**18%**	**<1%**	**191**	**15%**	**74%**	**7%**	**4%**	**1%**	**<1%**	**1,329,520**
MEL-03	MEL-0301	4	95	3	7	24	0	133	75,440	1,008,360	45,104	72,640	4,000	0	1,205,544
	MEL-0302	2	104	9	4	24	0	143	50,688	944,304	112,360	43,104	4,400	0	1,154,856
	MEL-0303	7	86	6	5	28	0	132	93,592	1,038,696	10,984	36,920	5,000	200	1,185,392
	MEL-0304	4	103	11	9	20	0	147	79,424	1,017,144	51,688	80,424	3,600	0	1,232,280
	MEL-0305	1	66	3	1	30	0	101	29,136	756,120	8,984	600	5,200	200	800,240
	Average	**3%**	**69%**	**5%**	**4%**	**20%**	**<1%**	**131**	**6%**	**86%**	**4%**	**4%**	**<1%**	**<1%**	**1,115,662**
MEL-04	MEL-0401	5	53	4	4	14	1	81	158,648	662,328	67,056	22,552	2,000	28,736	941,320
	MEL-0402	11	83	3	5	15	0	117	317,296	944,104	31,136	36,920	1,600	0	1,331,056
	MEL-0403	5	65	3	7	43	0	123	72,640	705,632	75,840	37,920	6,800	0	898,832
	MEL-0404	14	83	9	10	17	5	138	176,016	1,037,096	126,328	88,008	2,800	57,472	1,487,720
	MEL-0405	4	28	4	1	16	0	55	130,712	511,264	39,720	800	2,600	200	685,496
	Average	**7%**	**60%**	**5%**	**5%**	**21%**	**1%**	**103**	**16%**	**73%**	**6%**	**3%**	**<1%**	**1%**	**1,068,885**
MEL-05	MEL-0501	5	80	11	8	18	0	122	145,080	727,184	87,424	87,008	3,400	0	1,050,096
	MEL-0502	2	98	3	4	25	0	132	23,152	634,992	52,688	9,384	4,200	0	724,416
	MEL-0503	2	42	3	4	16	0	67	94,192	319,896	66,856	22,952	3,400	0	507,296
	MEL-0504	1	85	7	4	31	0	128	7,984	585,704	37,136	22,752	5,000	0	658,576
	MEL-0505	3	63	5	2	13	0	86	100,976	428,656	52,688	8,184	2,800	0	593,304
	Average	**3%**	**68%**	**5%**	**4%**	**19%**	**<1%**	**107**	**11%**	**76%**	**9%**	**4%**	**1%**	**0%**	**706,738**

Figure 5-3 Phytoplankton richness, biomass (mg/m^3), and density (cells/L), 2013-2022

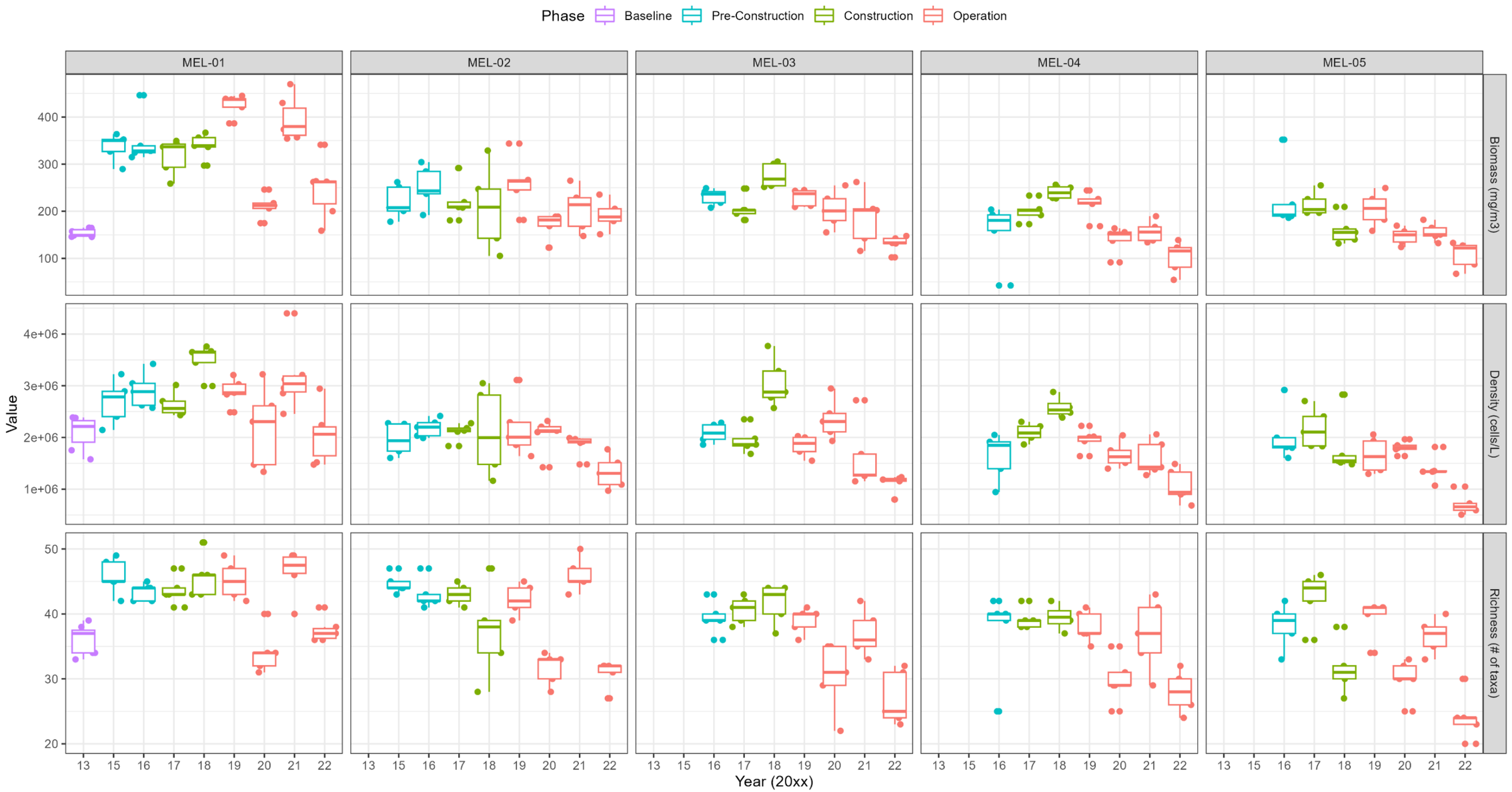


Figure 5-4. Mean phytoplankton richness, biomass (mg/m^3), and density (cells/L) by major taxa, 2013-2022

Notes: Major taxa group endpoints (richness, biomass, and density) for each area-year are based on the average (arithmetic mean) of the individual replicates.

Figure 5-5. Relative richness, biomass (mg/m^3), and density (cells/L) by major taxa, 2013-2022

Notes: Major taxa richness, biomass, and density shown as the proportion of the total based on the average for each area/year.

Community Structure

Finer patterns in community structure across sampling areas and years were explored with multivariate non-metric multidimensional scaling (nMDS) analysis[13]. Two nMDS dimensions were derived from the transformed phytoplankton community data. The two-dimensional ordination was selected to best represent the community. The stress value of that configuration (0.23) was slightly higher than the guideline of 0.2 outlined by Clarke (1993), but was considered acceptable for this application based on considerations of other factors such as sample size and ease of interpretation outlined in **Section 5.3.3.**

The ordination plot showing results for samples collected from *reference* areas or during baseline monitoring and their associated 90th, 95th and 99th percentile probability ellipses is presented in the left panel of **Figure 5-6**. These probability ellipses represent the phytoplankton community at the reference areas across all sampling events. The reference area ellipse helps identify those samples or areas that diverge from the normal range of reference conditions in Meliadine Lake. This approach to comparing the NF and MF areas assumes that the phytoplankton communities were similar throughout Meliadine Lake during the baseline period. This assumption cannot be tested because the reference areas were not sampled in 2013 or 2015. For this reason, the probability ellipses may not fully represent the phytoplankton community on a lake-wide basis.

Results for samples collected from *exposure* areas relative to the reference area probability ellipses are presented in the right panel of **Figure 5-6**. The ordination results are also shown by year in **Figure 5-7** to illustrate the relative change for the NF, MF, and reference areas within and across years. Results from the NF area in 2013 and the NF and MF areas in 2015 are shown in the ordination plots for context, but should be interpreted with caution because the reference areas were not sampled concurrently.

The correlation matrix at the right of **Figure 5-7** shows the correlation between the biomass and richness of each major taxa group and Axis 1 and 2 of the nMDS. The strongest correlations between each nMDS Axis and major phytoplankton taxa are as follows:

- **Axis 1** – No major taxa were significantly positively correlated with nMDS Axis 1[14]. Chrysophyte biomass and richness were most strongly negatively correlated with nMDS Axis 1. Within each year, samples from different areas were generally not separated much along Axis 1. More variation along Axis 1 was observed when comparing between years, which likely reflects natural variability in the phytoplankton community throughout Meliadine Lake. Year to year variations along Axis 1 were generally consistent among the NF, MF, and reference areas (**Figure 5-7**).

[13] A description of the nMDS analysis using the 'Vegan' software package is presented here: (Link)

[14] The Spearman critical value at a significance level of p = 0.05 is 0.197.

- **Axis 2** – Chrysophyte biomass and richness were the two endpoints most strongly positively correlated with nMDS Axis 2. As previously mentioned, the chrysophyte *Dinobryon sociale Ehrenberg* was the dominant taxa in terms of biomass at the MF and reference areas in 2022. Chrysophyte biomass accounted for 61 to 70% of the total biomass in these areas but only 38% of the total biomass at the NF area. The reference and MF samples had more positive nMDS Axis 2 scores than the NF samples and are mostly ordinated on the top half of the plot in the 2022 panel of **Figure 5-7**. Diatom richness was most strongly negatively correlated with nMDS Axis 2. Diatoms accounted for 21% of the total biomass at the NF area and only 5% to 6% of the total biomass at the MF and reference areas which is consistent with the ordination of the NF samples from 2022 in the bottom half of the plot (**Figure 5-7**).

Differences in the community composition are interpreted using the ordination plots in two ways: 1) by comparing the absolute position of each point relative to the probability ellipses, and 2) by comparing the location of each point relative to other areas for a given year. For example, the position of the NF and MF areas relative to one another and to the reference areas varies among years.

The key messages from the nMDS analysis are as follows:

- Community composition lake-wide is subject to influence from regional factors year to year, as indicated by the shift in the ordination of reference samples over time (as seen in **Figure 5-7**).
- The MF and reference area tend to follow a similar pattern of change from year-to-year to except in 2020 when the phytoplankton community at MEL-02 more closely resembled MEL-01.
- The composition of the phytoplankton community at the NF area has also followed a similar pattern as the reference locations from year-to-year except for 2020 and 2022 when the NF samples had lower values on both nMDS axes (particularly on nMDS Axis 2). The 2013 baseline results for MEL-01 (the only area sampled that year) also had lower values on both axes and were largely outside the 99th percentile ellipse, suggesting that differences in phytoplankton community composition in the East Basin may be due, at least in part, to factors unrelated to mining.

The FEIS predicted that increased nitrogen concentrations in the East Basin could cause a shift in the community structure to favor algae that efficiently assimilate nitrogen (Agnico Eagle, 2014). Some change to the community were expected, but so far it is unclear whether the differences in the phytoplankton community observed at NF MEL-01 (2020 and 2022) and MF MEL-02 (2020) were due to mine-related influence or natural differences in productivity between the east basin and other areas within Meliadine Lake. These two years had quite dissimilar effluent discharge characteristics (2020 with higher discharge; 2022 with less than half of that in 2020), implying that factor(s) other than effluent were responsible for the low total biomass in both those years.

Figure 5-6. Ordination of the reference and exposure area phytoplankton results by phase and location for Meliadine Lake.

Notes: Left panel = results for reference and baseline samples and their associated probability ellipses.
Right panel = exposure samples shown relative to reference area probability ellipses.
Green, orange, and red ellipses = 90th, 95th, and 99th percentile of the baseline/reference phytoplankton community.
2022 data is plotted separately for ease of comparison but is part of the operation phase

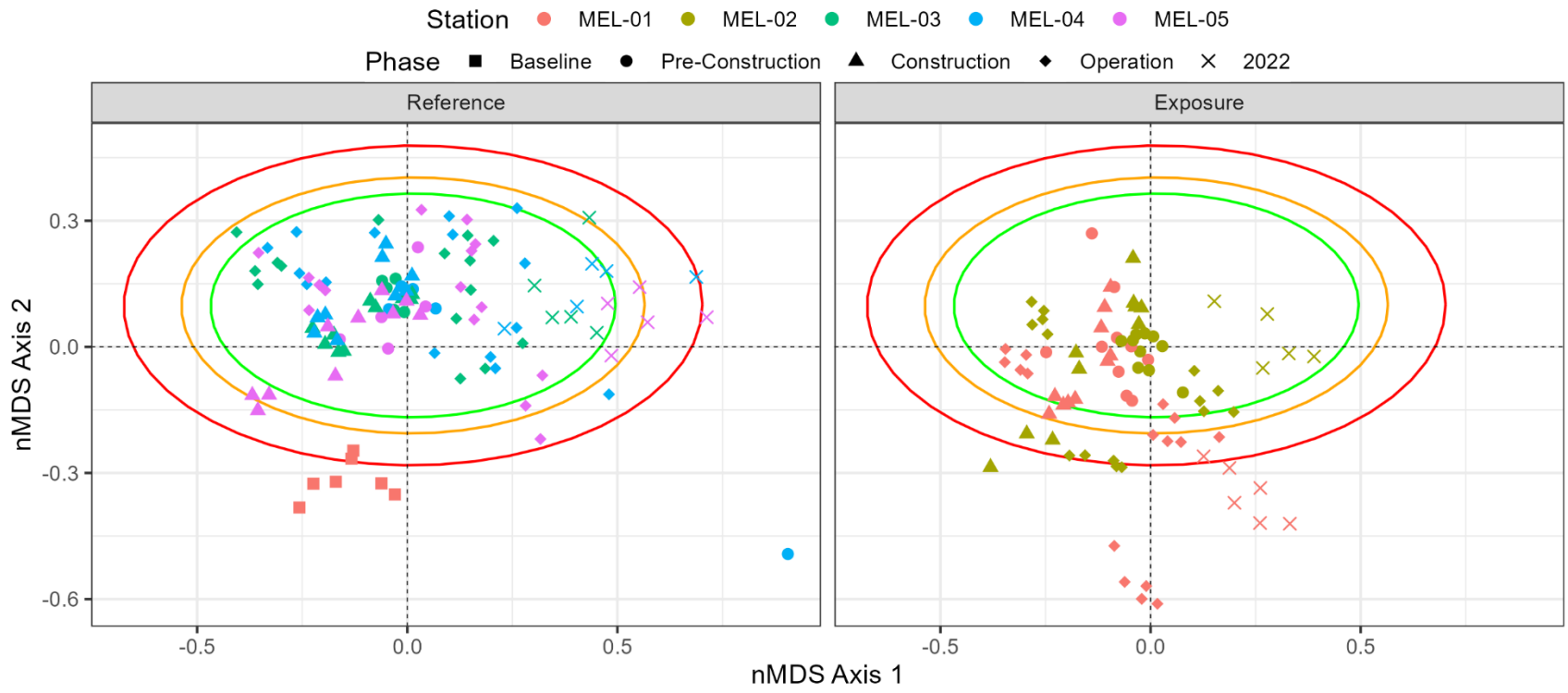
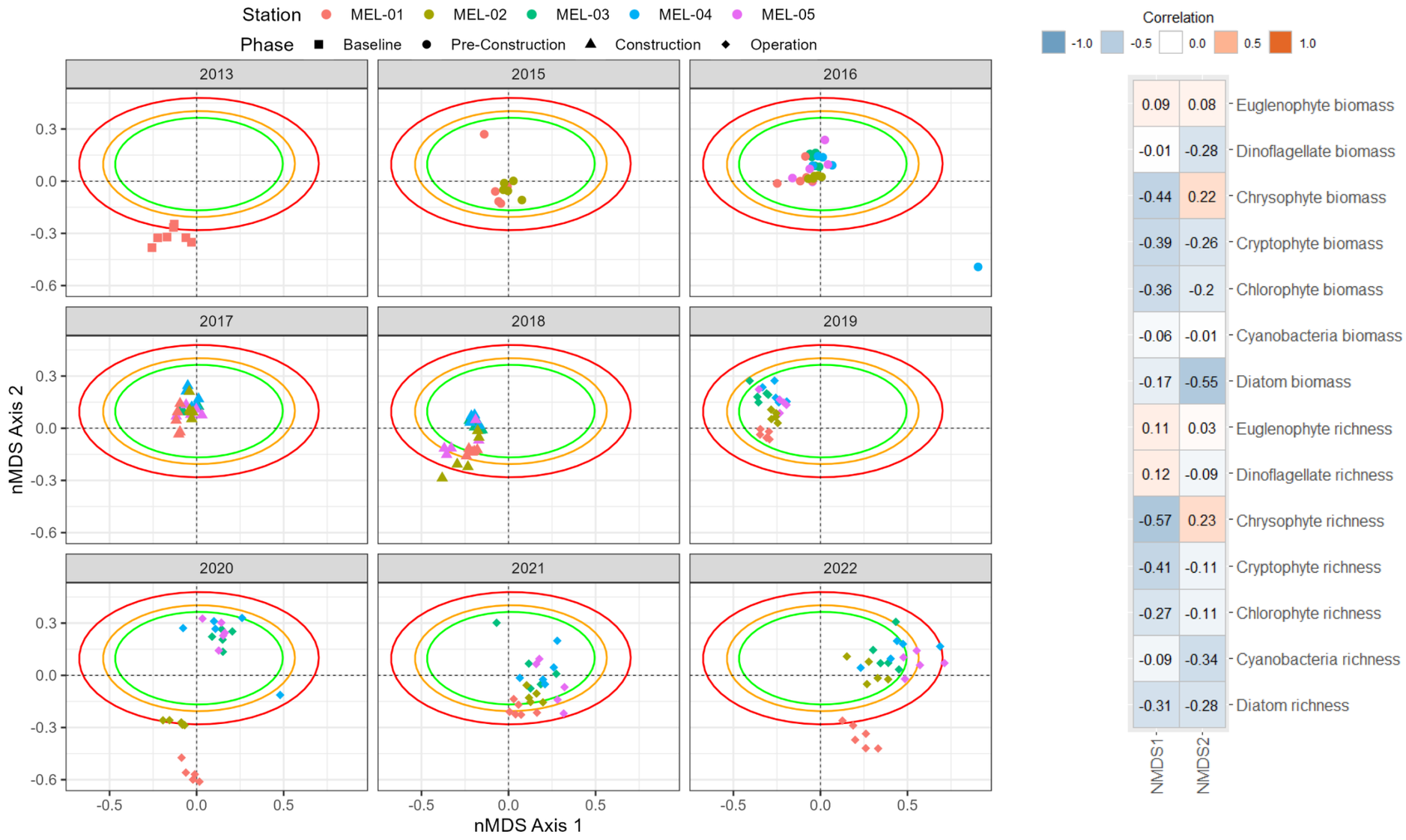


Figure 5-7. Non-metric multidimensional scaling (nMDS) results showing ordination of the phytoplankton results by year and location for Meliadine Lake.

Notes: Green, orange, and red ellipses = 90th, 95th, and 99th percentile of the baseline/reference phytoplankton community.
The correlation matrix displays correlations for individual taxa that were significantly correlated ($p < 0.01$) with one or more dimension of the nMDS



5.5.5 Nutrient-Productivity Relationships

Nutrient-productivity relationships were explored using chlorophyll-a and total phytoplankton biomass as primary productivity endpoints. Key nutrients DOC, nitrogen, and phosphorus were used to assess if effluent discharged to Meliadine Lake is contributing to changes in productivity. The current state of science indicates that phytoplankton productivity is co-limited by nitrogen and phosphorus (Lewis and Wurtsbaugh, 2008), with DOC also influencing primary productivity (Bergström and Karlsson, 2019). Micronutrients such as calcium, iron, silicon, and trace metals are also required for normal growth for some algal species, so can also influence productivity (Fondriest, 2014).

The 2020 AEMP Report (Azimuth, 2021) provided a concise overview of the effect of nitrogen and phosphorus on primary productivity, but new research is continually being published on changes in primary productivity in northern latitude lakes, particularly in response to climate change. DOC was added as a key explanatory variable in 2021 because of possible climate-related increases in DOC concentration associated with higher rainfall, runoff, and erosion of terrestrial soils (Rawlins et al. 2021).

Phytoplankton biomass is the most important metric for productivity and chlorophyll-a is used as a key indicator; the relationship between the two is shown by year in **Figure 5-8**. In general, there is a positive relationship within each year, but that relationship appears to be driven by differences between the MF and reference areas (generally lower in biomass and chlorophyll-a) and the NF area (generally higher in both). The increases in chlorophyll-a observed at NF MEL-01 in the last two years (**Figure 5-2**) are not associated with progressively higher variable total biomass (**Figure 5-8**), suggesting that the relative amount of the photosynthetic pigment has changed over time. Photosynthesis is highly variable and chlorophyll-a content is subject to hourly changes based on light intensity. In general, smaller algal cells have proportionately more chlorophyll-a than larger cells, and there is a general shift towards larger size cells during seasonal succession (Felip and Catalan, 2000; Kasprzak et al., 2008).

Nitrogen, DOC, and phosphorus do not appear to be strongly influencing phytoplankton biomass based on data collected at the NF, MF, and reference areas in Meliadine Lake since 2013 (**Figure 5-9**). There is some evidence of a weak positive relationship between chlorophyll-a and both DOC and nitrogen when looking at data from all years and all areas in Meliadine Lake (**Figure 5-9**) and when looking specifically at the NF area (**Figure 5-10**). However, the opposite relationships were evident for total biomass, which may be more reflective of changes in the relative amount of chlorophyll-a per mg of phytoplankton biomass (see previous paragraph) rather than a change in productivity.

Figure 5-8. Relationship between chlorophyll-a and phytoplankton biomass for Meliadine Lake by year, 2015 through 2022

Notes: Chlorophyll-a data from 2019 were flagged during the QC assessment because a different filter type was used in 2019, which resulted in lower-than expected results across all stations.

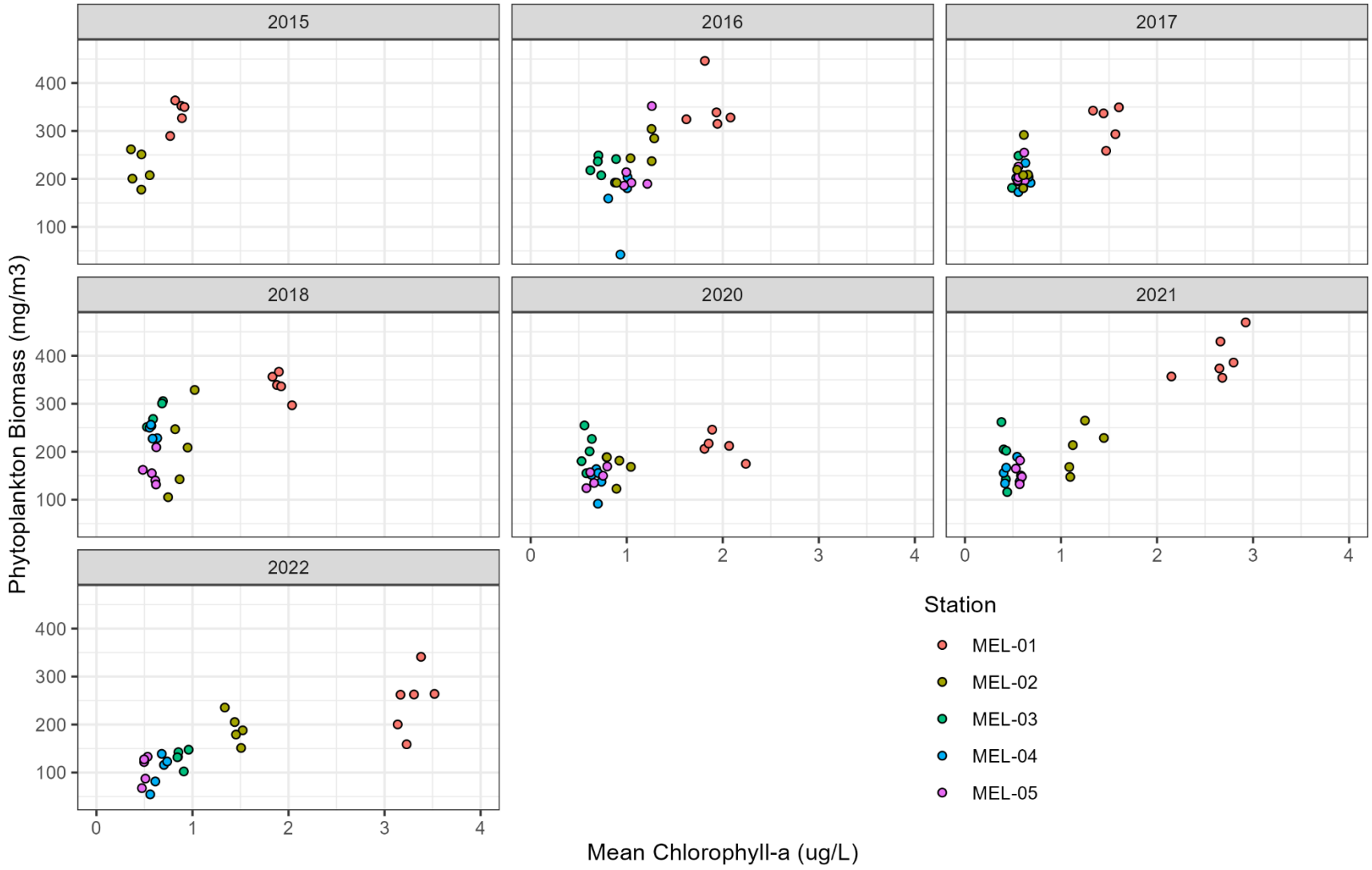


Figure 5-9. Relationship between nutrient concentrations (DOC, nitrogen, and phosphorus) and phytoplankton biomass and chlorophyll-a in Meliadine Lake, 2013-2022

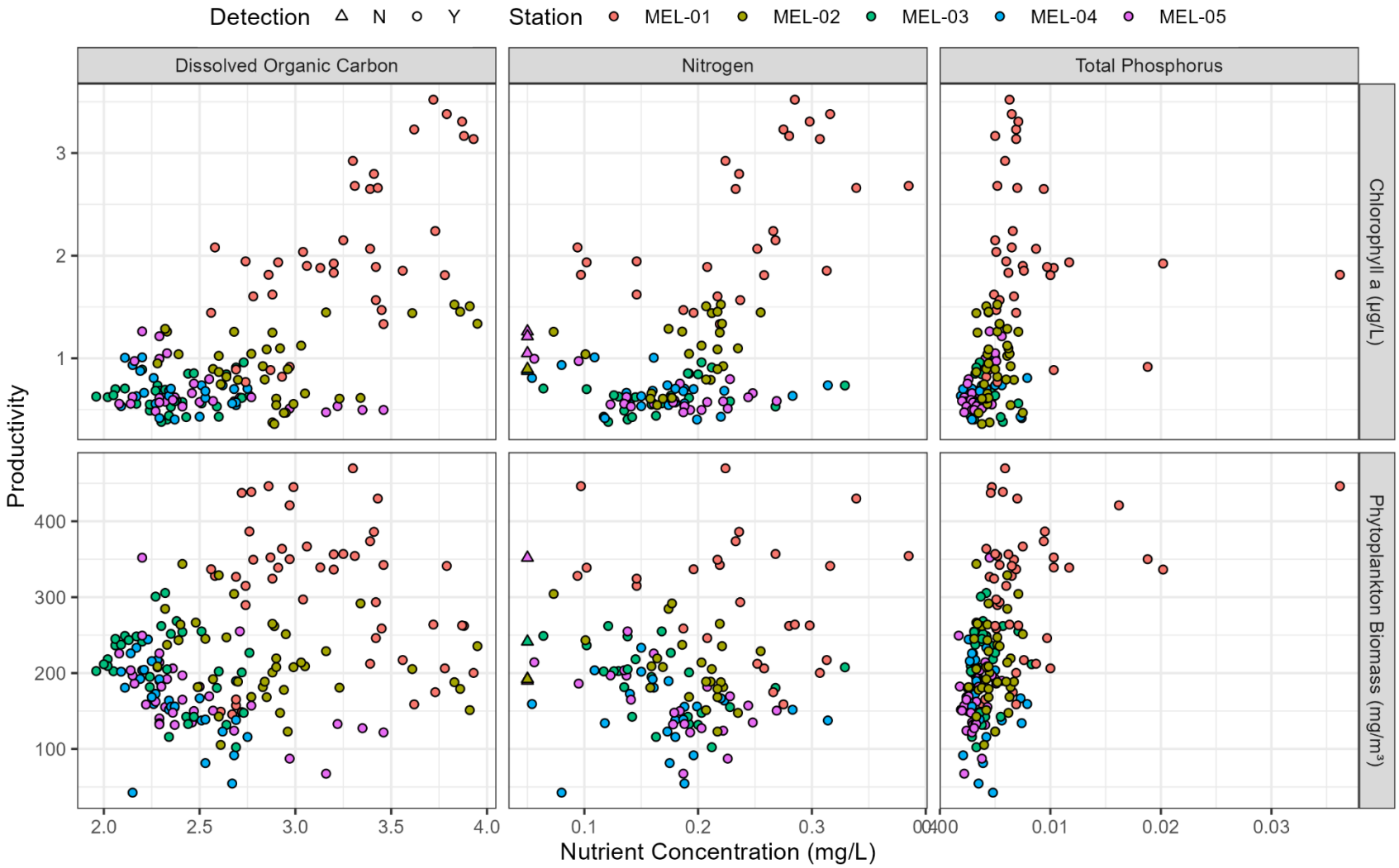
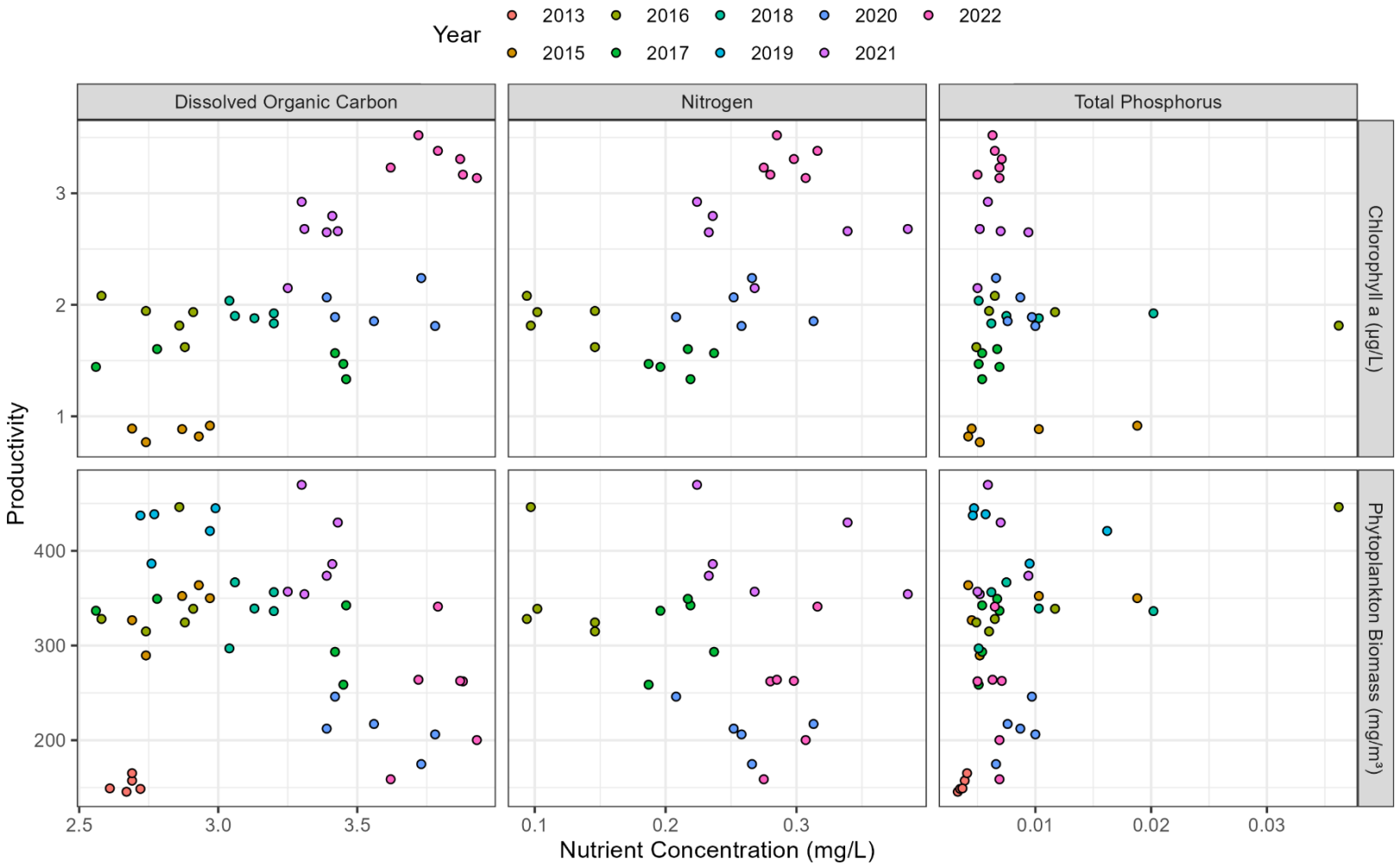


Figure 5-10. Relationship between nutrient concentrations (DOC, nitrogen, and phosphorus) and phytoplankton biomass and chlorophyll-a at the near-field area (MEL-01), 2013-2022.

Notes: Chlorophyll-a results from 2019 (light blue dots) are presented for context, but should be interpreted with caution as discussed previously.

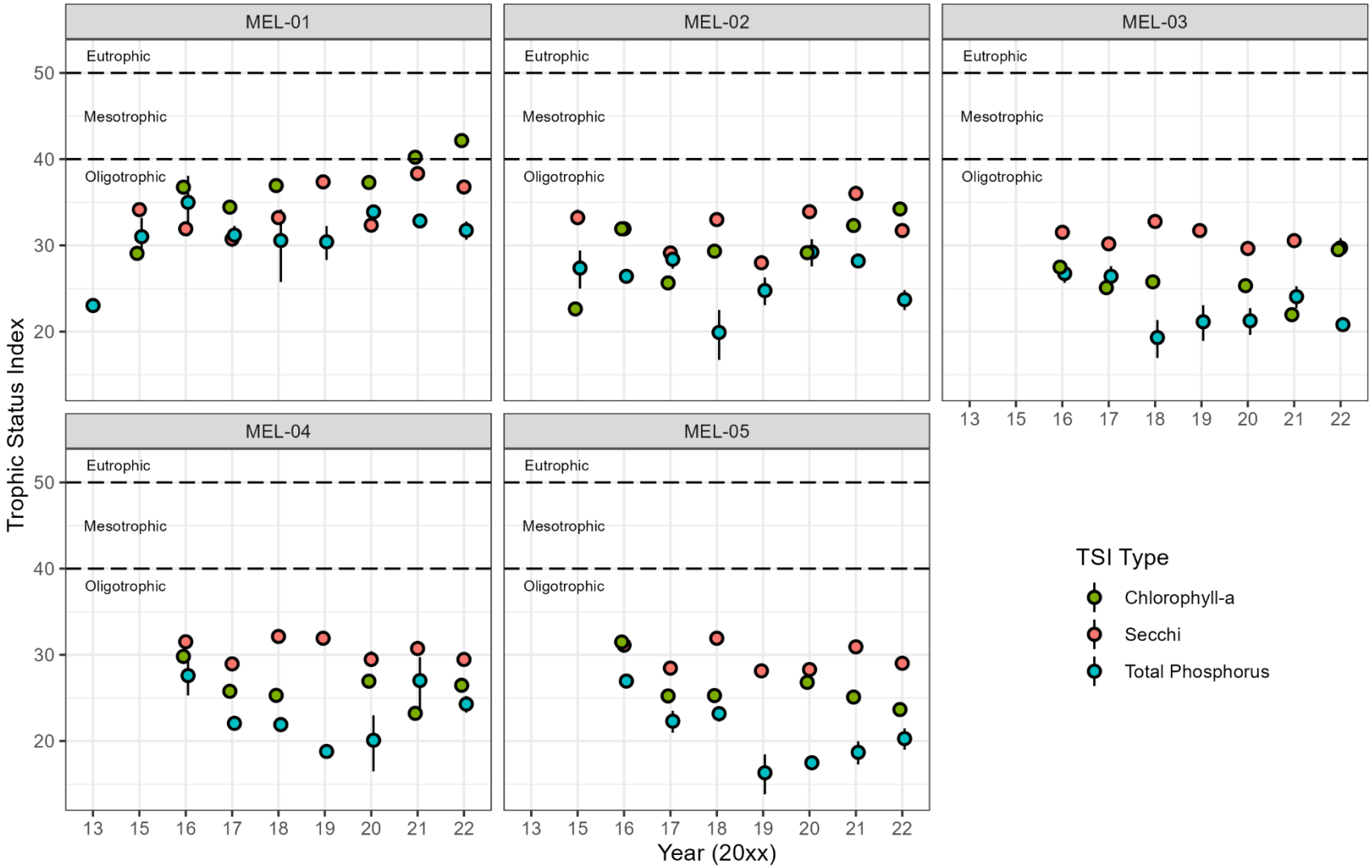


5.5.6 Trophic Status Index

Trophic status index (TSI) results (mean ± 1 standard error) for total phosphorus, chlorophyll-a and Secchi depth are presented for each sampling area in **Figure 5-11.** Overall, the TSI results indicate that at all sampling areas the trophic status of the lake can be considered oligotrophic. As expected based on the trend of increasing chlorophyll-a in the last two years (see **Section 5.5.3**), the chlorophyll-a TSI increased again in 2022, remaining slightly above the value of 40 which marks the transition from oligotrophic to mesotrophic (Carlson 1977). However, the mean calculated TSIs for both Secchi depth and total phosphorus at MEL-01 in 2022 were less than 40 and had decreased relative to those observed in 2021. These results are consistent with the divergent patterns in biomass and chlorophyll-a as measures of productivity in the NF area. Similar to previous years, mean TSI values for all three parameters (i.e., Secchi depth, chlorophyll-a, and total phosphorus) were higher at the NF area relative to the MF and reference areas, which is consistent with the narrative that the East Basin of Meliadine Lake is more productive than the MF and reference areas.

Figure 5-11. Trophic Status Index values for Meliadine Lake, 2013 through 2022

Notes: points represent the mean; vertical bars represent 1 standard error.



5.6 Conclusions and Recommendations

Conclusions for the 2022 phytoplankton study are summarized below in the context of the key question stated in **Section 5.1**. The phytoplankton results are incorporated into the Low Action Level assessment for toxicological impairment and nutrient enrichment in **Section 6.1** and **Section 6.2**, respectively.

Key Question: Is the phytoplankton community in Meliadine Lake adversely affected by potential mine-related changes in water quality?

Unlike the water quality results, which show clear mining-related changes at the NF and MF sampling areas, no consistent mining-related effects to phytoplankton production or community structure have been identified.

Productivity

Phytoplankton total biomass, the most direct measure of community productivity, has been variable across years but has not shown any consistent increasing or decreasing trends related to mining. In contrast, chlorophyll-a, which is used as an indicator of productivity, trended higher at the NF and MF areas again in 2022, showing a sharp rise since 2020. The lack of corroboration between these two metrics suggests that the amount of chlorophyll-a per unit phytoplankton biomass may be increasing, potentially in response to reduced water clarity. However, neither phytoplankton biomass nor chlorophyll-a were strongly correlated with nutrient concentrations in the East Basin. Overall, results from the 2022 phytoplankton study demonstrate that despite higher loadings of some nitrogen parameters since 2018, there is no evidence to suggest nutrient enrichment is occurring in the form of year-over-year increases in total phytoplankton biomass.

Community Structure

The FEIS (Agnico Eagle, 2014) predicted the concentration of nitrogen would increase in the East Basin of Meliadine Lake, which in turn *could* result in a shift in phytoplankton community structure. Only a minor change in phytoplankton community structure was predicted compared to baseline conditions and phytoplankton productivity was predicted to remain similar to baseline. The multivariate analysis of individual taxa biomass showed that both the NF and MF areas tracked well with reference areas in most years. The main exceptions were differences identified in 2020 (NF and MF) and 2022 (NF only), all of which were associated with relatively low community biomass. However, these two years had divergent effluent discharge patterns (i.e., highest to date in 2020 and relatively low in 2022), suggesting that the underlying drivers of the observed patterns may be unrelated to mining.

Recommendations

Collectively, the phytoplankton community and nutrient data provide useful information to help detect potential effects to primary productivity resulting from nutrient enrichment in Meliadine Lake. Phytoplankton monitoring is recommended for 2023 according to the same study design as 2022.

6 RESPONSE FRAMEWORK AND LOW ACTION LEVEL ASSESSMENT

The AEMP Response Framework links monitoring results to management actions to ensure activities at the mine do not adversely impact water quality for aquatic life, human consumption, and the useability of the fishery in Meliadine Lake. The goal is to identify changes early and implement follow-up actions before adverse effects are observed. Follow-up actions may include confirming the change, targeted studies to understand the spatial extent or ecological significance of the change, or mitigation if the source is clearly linked to mining activities.

The Low Action Levels were updated in Version 2 of the AEMP Design Plan submitted to the NWB in December 2022 (Azimuth, 2022c). The Low Action Level assessment integrates various results/analyses to determine if a change has occurred that warrants further investigation. The assessment criteria include comparisons to baseline and/or reference data (e.g., normal range assessment), water quality guidelines (i.e., AEMP Benchmarks and Action Levels), or statistical comparisons. The assessment criteria are deliberately conservative so that Low Action Level exceedances are addressed before impacts occur to aquatic life, drinking water quality, or the useability of the fishery. If a Low Action Level is reached, then Medium and High Action Levels will be developed to further support adaptive management.

The Low Action Level Assessment is intended primarily for Meliadine Lake, but the same principles are applied when assessing changes in water quality in the Peninsula Lakes. Discharge of effluent is the most likely pathway for changes in water quality and effects to aquatic life in Meliadine Lake. Because effluent contains metals and nutrients, two impact hypotheses were developed: toxicological impairment and nutrient enrichment. An overview of each hypothesis is provided below followed by a summary of the findings from the 2022 AEMP in the context of the Action Level Assessment for toxicological impairment and nutrient enrichment.

6.1 Low Action Level Assessment – Toxicological Impairment

Mining activities have the potential to increase concentrations of parameters that could exert toxic effects on primary producers (algae), aquatic invertebrates, and fish and impact the quality of drinking water for human consumption. Toxicological impairment is evaluated using information from sublethal toxicity testing on effluent from MEL-14, comparing water quality to the AEMP Benchmarks, and the phytoplankton study in August 2022. Results from the individual sections are summarized below.

Effluent Quality

The criterion for end-of-pipe toxicity is defined as a persistent sublethal toxic effect observed in the same test organism in three consecutive sampling events. One round of sublethal toxicity testing was completed with effluent from MEL-14 collected on July 4, 2022. The tests were conducted using *Lemna minor* because it has consistently shown the greatest sensitivity to the effects of effluent.

There were no effects to frond yield or dry weight biomass in the 7-d test. In 2021, effects to frond yield were reported in the August and September tests, but no effects were observed for biomass. Based on the *L. minor* toxicity test results from August and September 2021 and July 2022, **the Low Action Level was not exceeded for end-of-pipe toxicity in 2022.**

Water Quality – Meliadine Lake

Three conditions must be met for a Low Action Level exceedance for toxicological impairment:

1. At least one parameter exceeds the AEMP Action Level meant to protect aquatic life and/or human health,
2. Concentrations have increased relative to baseline/reference conditions (i.e., the normal range assessment, and
3. There is a clear trend showing concentrations at MEL-01 diverge from the reference areas (temporal plots or statistics).

Findings from **Section 3.4** are summarized below to support the conclusion that the **Low Action Level for toxicological impairment was not exceeded for drinking water quality or aquatic life.**

AEMP Action Level Screening – Copper naturally exceeded the AEMP Action Level based on the aquatic life guideline derived using the biotic ligand model (**Section 3.4.2**). There were no mining-related exceedances of the AEMP Action Levels in 2022 and concentrations for most parameters are below 10% of the AEMP Action Level (**Figure 3-8**).

Temporal Assessment – Water quality is different among the various basins, and in general concentrations of most ions and metals are higher in the East Basin compared to the MF and reference areas. However, parameters that exceeded the normal range in the East Basin are also trending higher at the MF and reference areas. Among the parameters that have clearly increased over time throughout Meliadine Lake are TDS and constituent major ions (chloride, sodium, calcium, sulphate) and arsenic, barium, lithium, molybdenum, strontium, and uranium.

Divergent Trends? – The temporal trends for various parameters observed at MEL-01 are broadly reflected at the MF and the reference areas. Water quality tends to be more variable in the East Basin compared to other areas, but there is little evidence of diverging trends among the various study areas. In short, parameters that are increasing at MEL-01 are also increasing at MEL-02, and the reference

areas (MEL-03, MEL-04, and MEL-05). Much of the focus is on parameters that have increased, but water quality plots show that the concentrations of several metals of toxicological importance to aquatic life, including copper, nickel, lead, and zinc have remained stable going back to the baseline period.

Changes in water quality in the East Basin broadly coincide with effluent discharge from 2018-2022. However, there is mounting evidence that the effects of climate change are contributing to changes in water quality throughout the Kivalliq. More rain fell in the summer of 2019 than in any year going back to 1980, and 2021 was also an unusually wet year compared to the recent historical record (past 40 years). High rainfall in 2019 coincided with some of the biggest changes in water quality in the East Basin, the MF area (MEL-02), and Reference Area 1 (MEL-03). Based on the timing of the rain event, the spatial extent of changes in water quality (lake-wide), and low discharge and loadings from CP1 to Meliadine Lake in 2019, there is a strong case that high rainfall (and runoff) has contributed to some of the changes in water quality observed in Meliadine Lake since 2019.

Measured concentrations of TDS and chloride at MEL-01 in 2022 were below predicted concentrations in the FEIS (Agnico Eagle, 2014) and the updated water quality model prepared for the Water Licence Amendment Application in 2021 (Tetra Tech, 2020).

No management actions are needed to address uncertainties or concerns for water quality in Meliadine Lake in 2023.

Water Quality – Peninsula Lakes

The purpose of the Low Action Level Assessment is to determine if management actions are needed to address unexpected changes in water quality at Lake D7, Lake A8, and Lake B7 caused by non-point source discharges (e.g., dust deposition). The Low Action Level Assessment for the Peninsula Lakes study follows the approach for Meliadine Lake described above, but only for points 1) and 2).

Findings from **Section 4.4** are summarized below to support the conclusion that the **Low Action Level for toxicological impairment was not exceeded for drinking water[15] quality or aquatic life.**

AEMP Action Level Screening – There were no exceedances of the AEMP Action Levels in Lake A8, Lake B7, or Lake D7 in 2022. Arsenic more than doubled in Lake B7 in 2022 compared to 2021 (127% increase). If the trend continues, concentrations may exceed the AEMP Action Level (18.8 µg/L) in 2023.

Temporal Assessment – Mining-related changes in water quality from the combined effect of aerial emissions, dust, and altered hydrology are localized to Lake A8 and Lake B7 and do not extend to

[15] Lake B7 and Lake A8 are within the site boundary and are not accessible to the public.

Lake D7. Water quality in Lake D7 has changed compared to baseline for some parameters, but the underlying cause is likely natural or related to interannual climate variability.

Water quality in Lake A8 and Lake B7 has changed quite significantly compared to baseline conditions. High rainfall likely caused some of the changes in water quality observed in Lake A8 and Lake B7, but increased activity at the mine (e.g., expansion of the TSF) is likely the biggest cause of the changes in water quality observed in Lake A8 and Lake B7 since 2018.

Efforts to control off-site migration of dust should continue.

Phytoplankton

A fundamental premise of the temporal and spatial trend assessment is the phytoplankton community in the various areas of Meliadine Lake in August will vary from year to year, but the NF, MF, and reference area communities should follow the same pattern of change in each year. If, however, the phytoplankton community at the NF and MF areas diverges from previous years and from the reference areas, it may indicate water quality is influencing the structure of the community. The primary concern for effects to phytoplankton is related to increased productivity associated with nutrient inputs. However, metals present in the effluent can also cause toxicological effects to the algal community.

Two conditions must be met for a Low Action Level exceedance for toxicological impairment for the phytoplankton study:

1. Phytoplankton community metrics at the Near-field area are outside the range of baseline/reference conditions, and
2. The direction and magnitude of the change are indicative of toxicological impairment.

Results presented in **Section 5.5** are summarized below to support the conclusion that **there is no evidence of toxicological impairment to the phytoplankton community caused by effluent discharge to Meliadine Lake.**

Biomass, density, and richness have shown considerable interannual variability in the East Basin since 2019. All three metrics were higher in the East Basin in 2019 and 2021, coinciding with peak rainfall, and lower in 2020 and 2022. Biomass and density at the MF and reference areas showed less interannual variability, but species richness at the MF and reference areas followed the same pattern of change as the East Basin (up in 2019 and 2021; down in 2020 and 2022).

Multivariate analysis of the 2022 phytoplankton data confirms findings from previous surveys that showed the phytoplankton community in the East Basin is different than the reference areas (i.e., outside the 99th percentile of reference; **Figure 5-7**). The algal community in the East Basin showed the biggest difference from the reference areas in 2020 and 2022. Given there were no exceedances of the

AEMP Action Levels, toxicological impairment is not a probable cause of the observed difference in the phytoplankton community composition between the NF and reference areas in 2022.

6.2 Low Action Level Assessment – Nutrient Enrichment

Treated effluent contains nutrients that have the potential to cause an increase in primary productivity in the East Basin. Changes in primary productivity can, under certain conditions, lead to changes in the overall health of freshwater aquatic communities. Nutrient enrichment is evaluated using data from the water quality monitoring program (**Section 3.4**) and the phytoplankton study (**Section 5.5**).

Water Quality

Total phosphorus is the parameter used to determine if activities at the mine are causing nutrient enrichment in Meliadine Lake. The AEMP Benchmark for total phosphorus is 0.01 mg/L, corresponding to the upper limit of oligotrophic status in the CCME guidance document for managing freshwater systems (CCME, 2004). The phosphorus guideline is not associated with adverse effects to aquatic life.

The annual mean concentration of phosphorus at MEL-01 was 0.0067 mg/L, slightly above the normal range of baseline/reference conditions (0.006 mg/L) but below the AEMP Action Level (0.0075 mg/L). Phosphorus concentrations have been trending lower in recent years and the annual mean concentrations at MEL-02 and MEL-03 were below the ultra-oligotrophic limit of 0.004 mg/L. The low concentrations of phosphorus observed at MEL-02 and MEL-03 in 2022 are typical of background/reference conditions at other lakes in the Kivalliq region.

The annual mean concentration of phosphorus was below the AEMP Action Levels; therefore, the Low Action Level for nutrient enrichment was not exceeded in 2022.

Phytoplankton

Phytoplankton indices such as community structure and biomass provide a direct estimate of whether effluent discharged to Meliadine Lake is contributing to changes in primary productivity. Annual phytoplankton community monitoring since 2015 has consistently shown that the East Basin of Meliadine Lake is a more productive area compared to the MF and reference areas, but the biomass results (**Section 5.5.4**), nutrient-productivity relationships (**Section 5.5.5**), and the trophic status index (TSI) assessment (**Section 5.5.6**) demonstrate that effluent is not resulting in wide-spread and divergent changes in productivity in the East Basin compared to the MF and reference areas. The phytoplankton community data from 2022 further supports the conclusion that **the Low Action Level for nutrient enrichment was not exceeded in 2022.** Furthermore, rainfall rather than effluent discharge appears to be a more important factor influencing primary productivity and the composition of the phytoplankton community, especially in the East Basin. Overall, the phytoplankton community in the East Basin is functionally intact and supports healthy fish and benthic invertebrate communities.

6.3 Scope of the 2023 AEMP

The 2023 AEMP will be carried out according to the AEMP Design Plan (Azimuth, 2022c). The scope of this year's program will focus on monitoring changes in water quality (limnology and chemistry) and phytoplankton community in Meliadine Lake and water quality in the Peninsula Lakes (Lake D7, Lake A8, and Lake B7). Routine effluent chemistry monitoring and sublethal toxicity testing will be completed as per the Water Licence and MDMER.

Table 6-1. Scope of the 2023 AEMP for Meliadine Lake and the Peninsula Lakes.

Area	Winter (April)	July	August	September
MEL-01	Water Quality	Water Quality	Water Quality Phytoplankton	Water Quality
MEL-02	Water Quality	Water Quality	Water Quality Phytoplankton	Water Quality
MEL-03	-	Water Quality	Water Quality Phytoplankton	Water Quality
MEL-04	-	-	Water Quality Phytoplankton	-
MEL-05	-	-	Water Quality Phytoplankton	-
Peninsula Lakes (Lake A8, B7, D7)	-	Water Quality	Water Quality	-

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APPENDICES

APPENDIX A
QUALITY ASSURANCE / QUALITY CONTROL

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A.1 INTRODUCTION

The objective of quality assurance and quality control (QA/QC) is to assure that the chemical and biological data collected are representative of the material or populations being sampled, are of known quality, have sufficient laboratory precision to be highly repeatable, are properly documented, and are scientifically defensible. *Quality Assurance* (QA) refers to the practices employed to collect scientifically defensible samples meeting pre-defined data quality objectives (DQOs). This includes the use of experienced field staff, standard operating procedures, field data sheets, and certified laboratories. *Quality Control* (QC) refers to the measures taken to verify that the specific DQOs are met.

An overview of the QA/QC methods for the water quality and phytoplankton community monitoring programs are provided herein. A more detailed overview of the QA/QC procedures for the water quality monitoring program are provided in the *AEMP Design Plan* (Azimuth, 2022).

A.2 WATER CHEMISTRY

A.2.1 Field Methods

Field Data and Sample Collection

Standard QA procedures for the water chemistry program include thoroughly rinsing the sampling equipment (pump and tubing in the winter; Kemmerer in the summer) to prevent cross-contamination between areas. Field collected limnology data focused primarily on measurements using a multiprobe meter. The meter was calibrated before field measures according to manufacturer instructions. Agnico Eagle Environment department maintains a calibration log for each field instrument used to collect field measurements. QA methods used to prevent cross-contamination between locations and from the equipment itself included wearing nitrile gloves and rinsing the sample equipment with surface water prior to collecting samples.

Careful documentation and handling of all samples and data is a key component of QA/QC in a field program. Field data were recorded on customized field data sheets. Sample bottles were labeled appropriately with the sample ID, date and project identification and sample containers were stored according to laboratory handling instructions. Field data sheets were scanned after each field program. Information that was recorded in the field (e.g., field measurements, station information, etc.) was transcribed into an EQUIS database administered by Agnico Eagle.

Sample Shipping and Handling

Shipments of samples to the analytical laboratories were accompanied by chain-of-custody (CoC) forms detailing sample identification, reporting requirements, and sample handling information. CoC forms not only inform the laboratory of sample details, they also help ensure that sample handling instructions are followed and that all samples are accounted for. ALS reports concerns surrounding sample submission as *sample integrity* issues in the Sample Receipt Confirmation (SRC) email after the samples are received. For ALS reports, the results are typically recorded in the sample integrity assessment for one of three reasons: (1) samples were damaged during transport, (2) the temperature inside the cooler was above 10°C when received by the laboratory, or (3) the recommend hold-time was exceeded prior to analysis. Sample integrity issues don't necessarily mean the data are unusable; rather, this information is meant to help the client make an informed decision on how to proceed with analysis and using the results.

The Meliadine Environment Department plans water sampling events to minimize the amount of time that samples are in transit between Site and the lab. Hold-time recommendations for water quality parameters are provided by ALS. The times vary from a low of 0.25 days for pH to six months for metals. Hold-times for water samples are always exceeded for pH (15 minutes) and nitrate, nitrite, orthophosphate, and turbidity (3-d). Total dissolved solids and total suspended solids often exceed the 7-d recommended hold-time. On occasion, parameters with 14-d recommended hold-times are exceeded (e.g., alkalinity, cyanides). Correspondence with the lab regarding hold-time exceedance hasn't led to establishing definitive benchmarks for data quality. ALS recommends "professional judgement" when interpreting chemistry data for parameters that exceeded hold-times for analysis. Any effect of exceeding the recommended hold-times on data quality is negligible based on the long-term monitoring programs at Meliadine and Meadowbank.

Blanks

Blanks are samples that do not contain the variable to be analyzed. They are used to assess and control sample contamination (BC MOE, 2013). Blank samples are collected once per sample event, and are submitted *blind* to the laboratory. Blank sample collection, particularly equipment blank samples, requires careful planning, attention to detail, focuses on the importance of cleanliness and generally provides a good opportunity to refine sample collection skills. Three different types of *blank* samples are included in the AEMP: travel blanks, field blanks and equipment blanks.

Travel blanks (TB) – Travel blanks are provided by the analytical laboratory for the purpose of testing for contamination associated with travel (i.e., hold time, heat/cold, moisture, desiccation, leaching, etc.). Travel blanks consist of de-ionized (DI) water provided in sampling bottles by ALS and receive the same treatment as field samples during shipment, handling, storage, and laboratory analysis.

Field blanks (aka Deionized Water Blanks [DI]) – Field blanks are used to detect potential contamination during sample collection, handling, shipping and laboratory analysis. Field blanks are prepared by filling the sample bottles with DI water provided by ALS.

Equipment blanks (EB) – Equipment blanks are used to detect potential contamination from sampling equipment. To obtain an equipment blank, DI water is run through the equipment and then transferred to a sample bottle. Filtered analyses for the EB are collected in the same manner as the lake samples using the syringe and 0.45 µm filter.

Results from the field, equipment and travel blanks are examined for detectable concentrations of any of the parameters measured. If a parameter is detected in a blank, the results for the batch of samples submitted with the blank are compared with the measured concentration in the blank. Results that are less than 10-times the detected concentration in the equipment blank are flagged to examine the potential for cross-contamination to affect the results. This threshold does not apply to pH measurements, as DLs are not available for the pH scale.

Field Duplicates

Field duplicates are used to identify the precision of field sampling methods and laboratory analysis and within-station variability. Field duplicate are submitted *blind* to the laboratory and analysed using the same methods and equipment as original samples. The target frequency of field duplicate sample collection is approximately 10% of the total number of samples collected.

The DQOs for water quality parameters are based on the magnitude of the concentrations in the samples. For parameters with concentrations > 5 time the DL, the field duplicates are assessed using the relative percent difference (RPD) between the duplicate samples:

$$RPD = \frac{(A - B)}{(\frac{A + B}{2})} x\ 100$$

where: A = analytical result; B = duplicate result.

The DQOs for these parameters are equal to 1.5 times the laboratory RPDs. The laboratory RPDs for water chemistry for most analytes is 20% and the DQOs for field duplicate water samples were ±30%. For parameters without a laboratory RPD DQO, the field duplicate DQO was set to ±40% by default. Use of a 1.5 times multiplier for field duplicates is based on guidance from the Canadian Council of Ministers for the Environment (CCME) that states that acceptance limits for field-based QC samples are broader than laboratory QC and are typically 1.5 to 2 times the laboratory QC limits (CCME 2016).

The uncertainty in concentrations increases near to the detection limit and the acceptance criteria are relaxed for parameters measured < 5-times the DL. For parameters with concentrations measured at <

5-times the DL, the DQO is an absolute difference between duplicates < 2-times the DL (referred to in the tables as DIFF).

The RPD and DIFF values may be either positive or negative and ideally should provide a mix of the two, clustered around zero. RPDs and DIFF values are not calculated when one of the samples (i.e., either A or B above) is below detection and the other is not. If an RPD or DIFF value falls outside the field duplicate DQO it is flagged for review. The importance of reduced precision becomes more important when concentrations are near regulatory guidelines (CCME, 2016).

A.2.2 Laboratory Methods

ALS is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA). Performance evaluations are conducted under CALA's accreditation program for laboratory methods, protocols, and QC samples. There are four types of QC samples components of the water chemistry laboratory QC program to assess analytical precision, bias, and completeness:

Laboratory Duplicate – The laboratory randomly chooses samples to re-run as duplicates. A new aliquot from the same sample is analyzed from the start in the same manner as the original aliquot taken from the bottle/jar. The difference between the two analyses is a measure of the variability associated with duplicate analyses of the same sample in the laboratory.

Results of the laboratory duplicates are assessed by measuring the RPD as a percentage between original and duplicate measurements which is referred to as a measure of precision by the laboratory. For full discussion of the RPD calculation, see **Section A.2.1**. Laboratory duplicate DQOs are parameter-specific and depend on the concentration in the sample. The RPD DQOs for lab duplicates are lower than for field duplicates given that the same aliquot is split.

Method Blank (MB) – An analyte-free matrix (e.g., de-ionized water) is subjected to the entire analytical process to demonstrate that the analytical system itself does not introduce contamination. Blanks are examined for detectable concentrations of any of the parameters measured; no parameter in blanks should exceed laboratory method detection limits (MDLs). If an analyte is detected in a blank, the results for the batch of samples submitted with the blank are compared with the measured concentration in the blank. Results that are less than 10-times the detected analyte concentration in the blank are flagged to examine the potential for cross-contamination to affect the results.

Matrix Spike (MS) / Matrix Duplicate (MD) – A known amount of a compound chemically similar to the target analyte is added to samples to ascertain any matrix effects on recoveries and to determine the accuracy and precision of the method in this matrix.

Laboratory Control Sample (LCS) – An LCS is a well-characterized sample of known analytes and concentration. A reference material (i.e., certified reference material) containing certified amounts of

target analytes, may be used as an LCS. Percent recovery of the target analytes in the LCS is compared to established control limits and assists in determining whether the methodology is in control and whether the laboratory is capable of making accurate and precise measurements at the required reporting limit.

Certified Reference Material (CRM) – These are parameters (e.g., metals, conductivity, etc.) with a known concentration against which the lab must achieve a precision of within ±10% of the CRM.

The lowest available detection limits (DL) were specified for all the chemical analyses for the Meliadine AEMP water quality program. A shift in DLs for any given water quality parameter was reviewed, and the laboratory asked to explain the change in DLs. Changes in DLs by the laboratory could limit the ability to compare results across samples. Any changes in DLs that resulted in the DL being close to the result (i.e., less half the result) for any given parameter was flagged for further scrutiny.

Dissolved concentrations of nutrients and metals were compared to their corresponding total concentrations. If the dissolved concentration exceeded the corresponding total concentration, the parameter was re-analyzed by ALS. If the dissolved concentration after re-analysis was still 20% greater than the corresponding total concentration and both concentrations were greater than 10-times the DL the dissolved concentration was flagged.

A.2.3 Results and Discussion

Results of the QA/QC analysis are discussed below. Results are presented in the following tables:

- **Table A-1** – sample integrity observations (e.g., broken sample containers, mislabeled containers), cooler temperature upon delivery to the lab, and parameters that exceeded the recommended hold-times for analysis
- **Table A-2** – blank samples in 2022
- **Table A-3** to **Table A-5** – assessment of cross-contamination and variability in the field/lab methods on the reliability of the water quality results
- **Table A-6** – field duplicate samples in 2022

Sample Shipping and Handling

No sample integrity observations were identified for the water chemistry samples collected in April, July, August, and September. The temperatures measured inside the coolers were 12°C in April, 16-22°C in July, 3°C in August, and 18°C in September. The target temperature for samples arriving at ALS is between 5°C and 10°C. The list of parameters that exceeded the recommended hold-times were similar to previous years. In most cases, the samples arrived at the lab within 14-days of sampling.

Blanks

The table below summarizes the number of parameters detected in each of the blanks that were submitted for analysis in 2022. Travel blanks were not available for the April and July sampling events and the EB sample was not collected in the July sampling event. These blanks will be included in the 2023 AEMP.

Summary of parameters detected in blank samples in 2022

Event and Blank	Count	Count <DL	Count >DL	Parameters > 10*DL
April				
DI	121	105	16	0
EB	121	103	18	Ammonia (as N)
July				
DI	121	117	4	0
EB (not collected)	-	-	-	-
August				
TB	121	120	1	0
DI	121	117	4	0
EB	121	98	23	0
September				
TB	121	119	2	0
DI	121	115	6	0
EB	121	107	14	0

Total phosphorus was measured in the August TB at 0.0011 mg/L (DL = 0.001 mg/L). Ammonia (as N) and TOC were measured in the September TB. The ammonia concentration was 0.026 mg/L, approximately 5-times the DL of 0.005 mg/L. TOC measured 1.5 mg/L, equal to 3-times the DL. These parameters were measured below their respective DLs in the DI blanks and in the laboratory method blanks.

Similar to previous years, a few parameters were detected above their respective DLs in the DI and EB samples in 2022. The EB samples had more detected parameters compared to the DI samples. Ammonia was >10-times the DL in EB sample in April. All other parameters were measured at concentrations <10-times their respective DLs (**Table A-2**).

Measured concentrations in the EB samples were compared with the minimum measured concentration from the samples at MEL-01 in each sampling event to determine if cross-contamination and variability in the field and lab methods has the potential to affect the reliability of the water quality results. Those results are shown in **Table A-3** (April), **Table A-4** (August), and **Table A-5** (September). Parameters where the minimum concentration at MEL-01 was > 5-times the concentration in the blank were considered reliable (i.e., the potential for cross-contamination to influence the results are small

compared to the measured concentration[1]). The parameters listed below were given a cautionary flag because the concentrations in the lake samples (based on MEL-01) were within a factor of 5 compared to the EB samples. There is higher uncertainty associated with the samples from Meliadine Lake and the Peninsula Lakes for the parameters/events listed below. The reliability of the data is further evaluated by looking at spatial and temporal trends within and among areas.

Parameters where the measured concentration is < 5-times the EB

April	August	September
Ammonia, Total (as N)	Turbidity	Aluminum - Total
Total Kjeldahl Nitrogen	Ammonia, Total (as N)	Iron - Total
Total Dissolved Phosphorus	Dissolved Kjeldahl Nitrogen	Tin - Total
Boron - Total	Total Dissolved Nitrogen	Titanium - Total
Iron - Total	Total Phosphorus	Zinc - Total
Lead - Total	Lead - Total	Zinc - Dissolved
Zinc - Total	Molybdenum - Total	
Boron - Dissolved	Molybdenum - Dissolved	

Field Duplicates

Eighty-seven (87) samples and 10 duplicates were collected from Meliadine Lake and the Peninsula Lakes in 2022. One field duplicate is collected for approximately every 10 samples. One duplicate was collected in April (9%), three duplicates were collected in July (12%), four duplicates were collected in August (11%), and two duplicates were collected in September (13%). There were 1,160 comparisons across the 10 duplicate samples in 2022. Only 25 parameters exceeded the DQOs, equal to 2% of the field duplicate comparisons. Of the 25 parameters that exceeded the DQOs, only six parameters were detected at concentrations > 5-times the DL:

- April DUP-1 (MEL-02-02): ammonia, TKN, DKN, and total phosphorus
- July DUP-3 (B7-01): dissolved manganese
- August DUP-1 (MEL-03-01): TDS (measured)

As expected, there is greater variability between duplicate samples for parameters measured closer to the DL. Turbidity, nitrogen species (e.g., ammonia and TKN), phosphorus (dissolved), aluminum, and

[1] This approach is consistent with how ALS flags unreliable results for the laboratory method blanks.

molybdenum were the parameters that most often exceeded the DQO for parameters measuring <5-times the DL.

The field duplicate results indicate high precision for most parameters. There is more uncertainty associated with concentrations measured close to the DL, however, the effect on interpretating data in the AEMP is negligible, as the AEMP Benchmarks and Action Level concentrations (i.e., water quality guidelines) are typically an order of magnitude or higher than the DLs.

Parameters that exceeded the DQOs for the field duplicates in 2022

Event	Sample ID	Duplicate	Parameters that exceeded DQOs	DQO based on[a]
April	MEL-02-02	DUP-01	Ammonia, Total (as N)	**RPD**
			Dissolved Kjeldahl Nitrogen	**RPD**
			Total Dissolved Nitrogen	**RPD**
			Phosphorus (P)-Total	**RPD**
July	MEL-01-06	DUP-01	Turbidity	DIFF
			Aluminum (Al)-Total	DIFF
	MEL-03-01	DUP-2	Total Suspended Solids	DIFF
	B7-01	DUP-3	Turbidity	DIFF
			Manganese (Mn)-Dissolved	**RPD**
August	MEL-03-01	DUP-1	Total Dissolved Solids	**RPD**
			Aluminum (Al)-Total	DIFF
			Iron (Fe)-Total	DIFF
			Molybdenum (Mo)-Total	DIFF
			Titanium (Ti)-Total	DIFF
			Aluminum (Al)-Dissolved	DIFF
			Molybdenum (Mo)-Dissolved	DIFF
	MEL-01-01	DUP-2	Total Dissolved Solids	DIFF
			Dissolved Kjeldahl Nitrogen	DIFF
			Total Dissolved Nitrogen	DIFF
			Molybdenum (Mo)-Dissolved	DIFF
	MEL-05-05	DUP-3	Turbidity	DIFF
			Phosphorus (P)-Dissolved	DIFF
	D7-01	DUP-4	Phosphorus (P)-Dissolved	DIFF
September	MEL-01-08	DUP-1	Ammonia, Total (as N)	DIFF

Notes:

[a] RPD DQO is <30% difference between duplicate samples (applicable when concentrations are > 5-times DL)
DIFF DQO is a difference between duplicate samples of < 2-times the DL

Laboratory QC Results

ALS provides a thorough account of their QC assessment in each COA that is issued[2]. These results are provided in **Table A-1**. The various components of the QC assessment are provided to help make informed decisions when interpreting the data. The QC program is comprised of four main elements:

- **Laboratory Duplicates** – there were no exceedances of DQOs for the laboratory duplicate samples.
- **Method blanks (MB)** – A small number of parameters were detected the MB samples in 2022: vanadium (dissolved) in July, alkalinity in August, and thorium (total and dissolved) in September. Vanadium and thorium are not parameters of interest (concern) and alkalinity is measured well-above the DL. The MB exceedances are inconsequential for interpreting the water quality results.
- **Matrix Spike (MS)** – MS recovery is periodically flagged in the QC assessment due to high concentrations of some parameters in the sample. These instances are typically associated with parameters such as major cations (e.g., calcium, magnesium, etc.) or certain metals with detected results above the DL (i.e., strontium). Reactive silica (reactive as SiO_2) is another parameter that is prone to interferences in MS recovery. ALS does not flag MS recovery due to high background concentrations as DQO exceedances.
- **Laboratory Control Samples (LCS)** – there were no exceedances of DQOs for the laboratory control samples in 2022.

A.2.4 Water Quality QA/QC Summary

Sample Integrity – The water quality program was successfully implemented in 2022. The lab did not report any lost or damaged bottles. Hold-times were exceeded for some parameters, and the temperature inside the coolers was often above 10°C due the 5–7-day transit time from Site to the lab. Long-term monitoring results from the AEMP and other monitoring program in Nunavut indicate the effect of temperature and hold-time exceedances on data quality are negligible.

Blanks – There were several analytes detected in the DI and EB samples submitted in 2022. The magnitude of the detected concentrations in the various blanks was less than 10-times the DL except for ammonia in the April EB. Ammonia concentrations were highly variable in the field duplicates from April,

[2] The COA may include data qualifiers that relate to the sample "batch". The sample batch may include samples that are from other projects and the qualifiers included in the COA may relate to those and not the AEMP samples. In general, this does not impact the assessment of laboratory QA; however, in some instances, data qualifiers in the COA related to sample heterogeneity may not relate to AEMP samples. The Microsoft Excel® report that accompanies the COA includes tabs with detailed assessments of laboratory QA that are project specific and can be reviewed in conjunction with the COAs.

indicating laboratory variability may be partly responsible. Detected concentrations of various parameters in the blanks merely indicates the *potential* for cross-contamination. Close examination of the water quality data from 2022 indicated concentrations were consistent with previously-reported results, and potential for cross-contamination to bias the interpretation of the 2022 water quality data is considered unlikely.

For the 2023 AEMP, TB, DI, and EB samples will be included in every sampling event.

Field Duplicates – There was good precision between the field duplicate samples in 2022. There were only six measurements where the DQO was exceeded and the measured concentration was greater than 5-times the DL.

Laboratory QC Assessment – The laboratory QC assessment completed by ALS the water quality data were accurate (based on the method blanks, matrix spikes, and lab control samples) and precise (based on the laboratory duplicates). There were no data quality issues with the laboratory results that resulted in data being flagged as unreliable for use in the analysis.

Table A-1. Laboratory QA/QC summary for water samples analyzed at ALS Environmental in 2022

Event	Lab ID	Samples	Date Sampled	Date Received	Sample Integrity Observations	Temperature (°C)	Hold-time Exceedances	Data Qualifiers for Water Samples[a]			Adjusted Detection Limits (mg/L unless stated otherwise)			Laboratory QC Samples							
														Laboratory Duplicates		Method Blanks		Matrix Spike		Laboratory Control Samples	
								Qualifier	Sample ID	Parameters	Parameters	Target DL	Actual DL	Parameters	Qualifier	Parameters	Qualifier	Parameters	Qualifier	Parameters	Qualifier
April	L2699898	MEL-01	6-Apr	20-Apr	None	12.3	Alk, NO3, NO2, Turb, TDS, TSS, pH, Diss O-PO4, CN, TDP	DLM	MEL-01-08, -09	Ti.T	TP & TDP	0.001	0.003	None	-	None	-	Ca, Mg, Na, Sr	MS-B	None	-
	L2699901	Narrows & Blanks	8-Apr	20-Apr	None	12.3	Alk, NO3, NO2, Turb, TDS, TSS, pH, Diss O-PO4, CN, TDP	DLM	MEL-NAR-02	Ti.T	TP & TDP	0.001	0.003	None	-	None	-	None	-	None	-
											SiO2	0.01	0.5								
	L2699904	MEL-02	7-Apr	20-Apr	None	12.3	Alk, NH3, NO3, NO2, Turb, TDS, TSS, pH, Diss O-PO4	DLM	MEL-02-08	Ti.T	TP & TDP	0.001	0.003	None	-	None	-	Ca, Mg, Na, Sr	MS-B	None	-
								DTMF	MEL-02-02, DUP	Mn.D											
July	L2723206	MEL-01, MEL-02, DUP-01	10-Jul	19-Jul	None	Not recorded	NO3, NO2, Turb, TDS, TSS, pH, Diss O-PO4, CN, TP, TDP	None	-	-	TP	0.001	0.003	None	-	None	-	Ca, Mg, Na, Sr	MS-B	None	-
	L2724622	MEL-03-04, -05	19-Jul	26-Jul	None	21.7	Turb, pH, NO3, NO2, Diss O-PO4, TP, TDP, CN	None	-	-	None	-	-	None	-	None	-	Ca, Mg, Na, Sr	MS-B	None	-
	L2724629	MEL-03-01, DUP-2, DI-blank	19-Jul	26-Jul	None	22.1	Alk, Turb, pH, NO3, NO2, Diss O-PO4, TP, TDP, CN	None	-	-	None	-	-	None	-	V-D	B	Ca, Mg, Na, Sr	MS-B	None	-
	L2725035	MEL-03-02, -03	19-Jul	26-Jul	None	16.8	TDS, TSS, Turb, pH, NO3, NO2, Diss O-PO4, TP, TDP, CN	None	-	-	None	-	-	None	-	None	-	Ca, Mg, Na, Sr	MS-B	None	-
	L2725859	Lake B7, DUP-03	24-Jul	2-Aug	None	21.6	TDS, TSS, Turb, pH, Alk, NO3, NO2, Diss O-PO4	None	-	-	TP	0.001	0.003	None	-	V-D	B	None	-	None	-
	L2725861	Lake A8	24-Jul	2-Aug	None	21.6	TDS, TSS, Turb, pH, Alk, NO3, NO2, Diss O-PO4	None	-	-	TDS	13	20	None	-	None	-	None	-	None	-
											TN	0.0051	0.050								
											TP	0.001	0.003								
	L2726501	Lake D7	27-Jul	4-Aug	None	22.8	TDS, TSS, Turb, pH, NO3, NO2, Diss O-PO4	None	-	-	None	-	-	None	-	None	-	None	-	None	-
August	L2729094	MEL-05, DUP-03	14-Aug	22-Aug	None	6.4	TDS, TSS, Turb, pH, NO3, NO2, Diss O-PO4, TP	DTMF	MEL-05-01	Mo-D	TP (DUP-3)	0.001	0.003	None	-	None	-	SiO2, Ca, Mg, Na, Sr	MS-B	None	-
	L2730439	Lakes A8, B7, D7 and DUP-04	16-17 Aug	29-Aug	None	3.0	TDS, TSS, Turb, pH, Alk, NO3, NO2, Diss O-PO4, TDP, CN	None	-	-	TP	0.001	0.003	None	-	None	-	Ca, Mg, Na, Sr	MS-B	None	-
	L2730440	MEL-03, DUP-01	20-Aug	26-Aug	None	3.0	TDS, TSS, Turb, pH, Alk, NO3, NO2, Diss O-PO4, TDP, TP	DTC	DUP-01	Al.D, Zn.D	None	-	-	None	-	None	-	SiO2	MS-B	None	-
								DTMF	MEL-03-01	Mo.D											
	L2730441	MEL-02	18-Aug	26-Aug	None	3.0	TDS, TSS, Turb, pH, Alk, NO3, NO2, Diss O-PO4, TDP	DTMF	MEL-02-03, 05, 08	Mo-D	TP & TDP	0.001	0.003	None	-	Alk	B	None	-	None	-
	L2730442	MEL-01, DUP-02	18-Aug	26-Aug	None	3.0	TDS, TSS, Turb, pH, Alk, NO3, NO2, Diss O-PO4	DTMF	DUP-02	Mo-D	None	-	-	None	-	None	-	Ca, Mg, Na, Sr	MS-B	None	-
	L2730443	MEL-04	20-Aug	26-Aug	None	3.0	TDS, TSS, Turb, pH, Alk, NO3, NO2, Diss O-PO4	None	-	-	None	-	-	None	-	Alk	B	None	-	None	-
	L2730444	Blanks	20-Aug	26-Aug	None	3.0	TDS, TSS, Turb, pH, Alk, NO3, NO2, Diss O-PO4, TDP, TP	None	-	-	None	-	-	None	-	None	-	None	-	None	-

Table A-1. Laboratory QA/QC summary for water samples analyzed at ALS Environmental in 2022

Event	Lab ID	Samples	Date Sampled	Date Received	Sample Integrity Observations	Temperature (°C)	Hold-time Exceedances	Data Qualifiers for Water Samples[a]			Adjusted Detection Limits (mg/L unless stated otherwise)			Laboratory QC Samples							
														Laboratory Duplicates		Method Blanks		Matrix Spike		Laboratory Control Samples	
								Qualifier	Sample ID	Parameters	Parameters	Target DL	Actual DL	Parameters	Qualifier	Parameters	Qualifier	Parameters	Qualifier	Parameters	Qualifier
September	L2733869	MEL-03	14-Sep	22-Sep	None	18	TDS, TSS, Turb, pH, Alk, NO3, NO2, Diss O-PO4	None	-	-	TDP	0.001	0.002	None	-	Th (T & D)	B	None	-	None	-
	L2733885	MEL-02	14-Sep	22-Sep	None	18	TDS, TSS, Turb, pH, Alk, NO3, NO2, Diss O-PO4	DTC	MEL-02-08	Zn.D	TDP	0.001	0.002	None	-	Th (T & D)	B	SiO2	MS-B	None	-
	L2733905	MEL-01	16-Sep	22-Sep	None	18	Turb, pH, Alk, NO3, NO2, Diss O-PO4	DTC	MEL-01-06, -08	Zn.D	TP Th.T	0.001	0.003	None	-	Th (T & D)	B	Ca, Mg, Na, Sr	MS-B	None	-
	L2733910	Blanks	16-Sep	22-Sep	None	18	Turb, pH, Alk, NO3, NO2, Diss O-PO4	None	-	-	None	-	-	None	-	Th (T & D)	B	None	-	None	-
	L2733925	DUP-03	14-Sep	22-Sep	None	18	TDS, TSS, Turb, pH, Alk, NO3, NO2, Diss O-PO4	None	-	-	None	-	-	None	-	Th (T & D)	B	None	-	None	-
	L2733929	DUP-01	16-Sep	22-Sep	None	18	Turb, pH, Alk, NO3, NO2, Diss O-PO4	DTC	DUP-01	Zn.D	None	-	-	None	-	Th (T & D)	B	Ca, Mg, Na, Sr	MS-B	None	-

Notes:

[a] Field blanks are assessed in **Table A-2**.

Parameters

CN = cyanide species
Ca = calcium
Diss O-PO_4 = dissolved orthophosphate
Mg = magnesium
Na = sodium
NO2 = nitrite
NO3 = nitrate
SiO2 = reactive silica
Sr = Strontium
TDS = total dissolved solids
TDP = total dissolved phosphorus
Th = Thorium
TP = Total phosphorus
TSS = total suspended solids
Turb = turbidity
Zn = zinc

Data and Laboratory QC qualifiers:

B = Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
DLM = Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity)
DTC = Dissolved concentration exceeds total. Results were confirmed by re-analysis.
DTMF = Dissolved concentration exceeds total for field-filtered samples. Metallic contaminants may have been introduced to dissolved sample during field filtration.
MS-B = Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Table A-2. Laboratory detection limits and blanks (travel, de-ionized, and equipment), Meliadine AEMP, 2022

Month		April			July		August				September			
Client Sample ID			DI-WINTER-01	EB-WINTER-01		FB-JUL-01		TB-AUGT-01	DI-AUGT-01	EB-AUGT-01		TB-SEPT-01	DI-SEPT-01	EB-SEPT-01
Date Sampled		April DLs	4/8/2022	4/8/2022	July DLs	7/19/2022	August DLs	8/20/2022	8/20/2022	8/20/2022	September DLs	9/16/2022	9/16/2022	9/16/2022
ALS Sample ID			L2699901-3	L2699901-4		L2724629-3		L2730444-3	L2730444-2	L2730444-1		L2733910-3	L2733910-2	L2733910-1
Parameter	**Units**		Water	Water		Water		Water	Water	Water		Water	Water	Water
Physical Tests (Water)														
Conductivity	µS/cm	1	**1.8**	**1.3**	1	**1.1**	1	*<1.0*	*<1.0*	**1.1**	1	*<1.0*	*<1.0*	*<1.0*
Hardness (as CaCO3)	-	0.2	*<0.20*	*<0.20*	0.2	*<0.20*	0.2	*<0.20*	*<0.20*	*<0.20*	0.2	*<0.20*	*<0.20*	*<0.20*
Total Suspended Solids	mg/L	1	*<1.0*	*<1.0*	1	*<1.0*	1	*<1.0*	*<1.0*	*<1.0*	1	*<1.0*	*<1.0*	*<1.0*
Total Dissolved Solids	mg/L	4	*<4.0*	*<4.0*	4	*<4.0*	4	*<4.0*	*<4.0*	*<4.0*	4	*<4.0*	*<4.0*	*<4.0*
Turbidity	NTU	0.1	*<0.10*	*<0.10*	0.1	*<0.10*	0.1	*<0.10*	*<0.10*	**0.11**	0.1	*<0.10*	*<0.10*	*<0.10*
Anions and Nutrients (Water)														
Alkalinity, Total (as CaCO3)	mg/L	1	**1**	*<1.0*	1	*<1.0*	1	*<1.0*	*<1.0*	*<1.0*	1	*<1.0*	*<1.0*	*<1.0*
Ammonia, Total (as N)	mg/L	0.005	**0.0089**	0.198	0.005	*<0.0050*	0.005	*<0.0050*	**0.009**	**0.0089**	0.005	**0.026**	*<0.0050*	*<0.0050*
Bicarbonate (HCO3)	mg/L	1.2	**1.2**	*<1.2*	1.2	*<1.2*	1.2	*<1.2*	*<1.2*	*<1.2*	1.2	*<1.2*	*<1.2*	*<1.2*
Bromide (Br)	mg/L	0.1	*<0.10*	*<0.10*	0.1	*<0.10*	0.1	*<0.10*	*<0.10*	*<0.10*	0.1	*<0.10*	*<0.10*	*<0.10*
Carbonate (CO3)	mg/L	0.6	*<0.60*	*<0.60*	0.6	*<0.60*	0.6	*<0.60*	*<0.60*	*<0.60*	0.6	*<0.60*	*<0.60*	*<0.60*
Chloride (Cl)	mg/L	0.1	*<0.10*	*<0.10*	0.1	*<0.10*	0.1	*<0.10*	*<0.10*	*<0.10*	0.1	*<0.10*	*<0.10*	*<0.10*
Fluoride (F)	mg/L	0.02	*<0.020*	*<0.020*	0.02	*<0.020*	0.02	*<0.020*	*<0.020*	*<0.020*	0.02	*<0.020*	*<0.020*	*<0.020*
Hydroxide (OH)	mg/L	0.34	*<0.34*	*<0.34*	0.34	*<0.34*	0.34	*<0.34*	*<0.34*	*<0.34*	0.34	*<0.34*	*<0.34*	*<0.34*
Nitrate and Nitrite as N	mg/L	0.0051	*<0.0051*	*<0.0051*	0.0051	*<0.0051*	0.0051	*<0.0051*	*<0.0051*	**0.0084**	0.0051	*<0.0051*	*<0.0051*	*<0.0051*
Nitrate (as N)	mg/L	0.005	*<0.0050*	*<0.0050*	0.005	*<0.0050*	0.005	*<0.0050*	*<0.0050*	**0.0084**	0.005	*<0.0050*	*<0.0050*	*<0.0050*
Nitrite (as N)	mg/L	0.001	*<0.0010*	*<0.0010*	0.001	*<0.0010*	0.001	*<0.0010*	*<0.0010*	*<0.0010*	0.001	*<0.0010*	*<0.0010*	*<0.0010*
Total Kjeldahl Nitrogen	mg/L	0.05	*<0.050*	**0.189**	0.05	*<0.050*	0.05	*<0.050*	*<0.050*	*<0.050*	0.05	*<0.050*	*<0.050*	*<0.050*
Dissolved Kjeldahl Nitrogen	mg/L	0.05	**0.368**	*<0.050*	0.05	*<0.050*	0.05	*<0.050*	*<0.050*	**0.119**	0.05	*<0.050*	*<0.050*	*<0.050*
Total Dissolved Nitrogen	mg/L	0.05	**0.368**	*<0.050*	0.05	*<0.050*	0.05	*<0.050*	*<0.050*	**0.127**	0.05	*<0.050*	*<0.050*	*<0.050*
Orthophosphate-Dissolved (as P)	mg/L	0.001	*<0.0010*	*<0.0010*	0.001	*<0.0010*	0.001	*<0.0010*	*<0.0010*	*<0.0010*	0.001	*<0.0010*	*<0.0010*	*<0.0010*
Phosphorus (P)-Total Dissolved	mg/L	0.001	*<0.0010*	**0.0011**	0.001	*<0.0010*	0.001	*<0.0010*	*<0.0010*	*<0.0010*	0.001	*<0.0010*	*<0.0010*	*<0.0010*
Phosphorus (P)-Total	mg/L	0.001	*<0.0010*	*<0.0010*	0.001	**0.0017**	0.001	**0.0011**	*<0.0010*	**0.0011**	0.001	*<0.0010*	*<0.0010*	*<0.0010*
Silica, Reactive (as SiO2)	mg/L	0.01	*<0.010*	**0.017**	0.01	*<0.010*	0.01	*<0.010*	*<0.010*	*<0.010*	0.01	*<0.010*	*<0.010*	*<0.010*
Sulfate (SO4)	mg/L	0.3	*<0.30*	*<0.30*	0.3	*<0.30*	0.3	*<0.30*	*<0.30*	*<0.30*	0.3	*<0.30*	*<0.30*	*<0.30*
Cyanides (Water)														
Cyanide, Weak Acid Diss	mg/L	0.001	*<0.0010*	*<0.0010*	0.001	*<0.0010*	0.001	*<0.0010*	*<0.0010*	*<0.0010*	0.001	*<0.0010*	*<0.0010*	*<0.0010*
Cyanide, Total	mg/L	0.001	*<0.0010*	*<0.0010*	0.001	*<0.0010*	0.001	*<0.0010*	*<0.0010*	*<0.0010*	0.001	*<0.0010*	*<0.0010*	*<0.0010*
Cyanide, Free	mg/L	0.001	*<0.0010*	*<0.0010*	0.001	*<0.0010*	0.001	*<0.0010*	*<0.0010*	*<0.0010*	0.001	*<0.0010*	*<0.0010*	*<0.0010*
Organic / Inorganic Carbon (Water)														
Dissolved Organic Carbon	mg/L	0.5	*<0.50*	**0.53**	0.5	**1.06**	0.5	*<0.50*	*<0.50*	*<0.50*	0.5	*<0.50*	**0.55**	*<0.50*
Total Organic Carbon	mg/L	0.5	*<0.50*	*<0.50*	0.5	*<0.50*	0.5	*<0.50*	*<0.50*	*<0.50*	0.5	**1.5**	*<0.50*	*<0.50*

Table A-2. Laboratory detection limits and blanks (travel, de-ionized, and equipment), Meliadine AEMP, 2022

	Month	April			July		August				September			
	Client Sample ID		DI-WINTER-01	EB-WINTER-01		FB-JUL-01		TB-AUGT-01	DI-AUGT-01	EB-AUGT-01		TB-SEPT-01	DI-SEPT-01	EB-SEPT-01
	Date Sampled	April DLs	4/8/2022	4/8/2022	July DLs	7/19/2022	August DLs	8/20/2022	8/20/2022	8/20/2022	September DLs	9/16/2022	9/16/2022	9/16/2022
	ALS Sample ID		L2699901-3	L2699901-4		L2724629-3		L2730444-3	L2730444-2	L2730444-1		L2733910-3	L2733910-2	L2733910-1
Parameter	**Units**		Water	Water		Water		Water	Water	Water		Water	Water	Water
Total Metals (Water)														
Aluminum (Al)-Total	mg/L	0.001	*<0.0010*	*<0.0010*	0.001	*<0.0010*	0.001	*<0.0010*	*<0.0010*	*<0.0010*	0.001	*<0.0010*	*<0.0010*	**0.0022**
Antimony (Sb)-Total	mg/L	0.00002	*<0.000020*	*<0.000020*	0.00002	*<0.000020*	0.00002	*<0.000020*	*<0.000020*	*<0.000020*	0.00002	*<0.000020*	*<0.000020*	*<0.000020*
Arsenic (As)-Total	mg/L	0.00002	**0.000023**	*<0.000020*	0.00002	*<0.000020*	0.00002	*<0.000020*	*<0.000020*	**0.000033**	0.00002	*<0.000020*	*<0.000020*	**0.000037**
Barium (Ba)-Total	mg/L	0.00002	**0.000039**	**0.000046**	0.00002	*<0.000020*	0.00002	*<0.000020*	*<0.000020*	**0.000047**	0.00002	*<0.000020*	*<0.000020*	**0.00003**
Beryllium (Be)-Total	mg/L	0.000005	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*
Bismuth (Bi)-Total	mg/L	0.000005	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*
Boron (B)-Total	mg/L	0.005	*<0.0050*	**0.0052**	0.005	*<0.0050*	0.005	*<0.0050*	*<0.0050*	*<0.0050*	0.005	*<0.0050*	*<0.0050*	*<0.0050*
Cadmium (Cd)-Total	mg/L	0.000005	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*
Calcium (Ca)-Total	mg/L	0.01	**0.026**	**0.017**	0.01	*<0.010*	0.01	*<0.010*	*<0.010*	**0.014**	0.01	*<0.010*	*<0.010*	**0.017**
Cesium (Cs)-Total	mg/L	0.000005	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*
Chromium (Cr)-Total	mg/L	0.0001	*<0.00010*	*<0.00010*	0.0001	*<0.00010*	0.0001	*<0.00010*	*<0.00010*	*<0.00010*	0.0001	*<0.00010*	*<0.00010*	*<0.00010*
Cobalt (Co)-Total	mg/L	0.000005	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*
Copper (Cu)-Total	mg/L	0.00005	*<0.000050*	*<0.000050*	0.00005	*<0.000050*	0.00005	*<0.000050*	*<0.000050*	*<0.000050*	0.00005	*<0.000050*	**0.000058**	*<0.000050*
Gallium (Ga)-Total	mg/L	0.00005	*<0.000050*	*<0.000050*	0.00005	*<0.000050*	0.00005	*<0.000050*	*<0.000050*	*<0.000050*	0.00005	*<0.000050*	*<0.000050*	*<0.000050*
Iron (Fe)-Total	mg/L	0.001	*<0.0010*	**0.001**	0.001	*<0.0010*	0.001	*<0.0010*	*<0.0010*	**0.0018**	0.001	*<0.0010*	*<0.0010*	**0.0054**
Lanthanum (La)-Total	mg/L	0.00001	*<0.000010*	*<0.000010*	0.00001	*<0.000010*	0.00001	*<0.000010*	*<0.000010*	*<0.000010*	0.00001	*<0.000010*	*<0.000010*	*<0.000010*
Lead (Pb)-Total	mg/L	0.00001	**0.000012**	*<0.000010*	0.00001	*<0.000010*	0.00001	*<0.000010*	*<0.000010*	**0.000012**	0.00001	*<0.000010*	*<0.000010*	*<0.000010*
Lithium (Li)-Total	mg/L	0.0005	*<0.00050*	*<0.00050*	0.0005	*<0.00050*	0.0005	*<0.00050*	*<0.00050*	*<0.00050*	0.0005	*<0.00050*	*<0.00050*	*<0.00050*
Magnesium (Mg)-Total	mg/L	0.004	*<0.0040*	*<0.0040*	0.004	*<0.0040*	0.004	*<0.0040*	*<0.0040*	*<0.0040*	0.004	*<0.0040*	**0.0072**	*<0.0040*
Manganese (Mn)-Total	mg/L	0.00005	*<0.000050*	*<0.000050*	0.00005	*<0.000050*	0.00005	*<0.000050*	*<0.000050*	**0.000073**	0.00005	*<0.000050*	*<0.000050*	**0.000169**
Mercury (Hg)-Total	ug/L	0.0005	*<0.00050*	*<0.00050*	0.0005	*<0.00050*	0.005	*<0.0050*	*<0.0050*	*<0.0050*	0.005	*<0.0050*	*<0.0050*	*<0.0050*
Molybdenum (Mo)-Total	mg/L	0.00005	*<0.000050*	*<0.000050*	0.00005	*<0.000050*	0.00005	*<0.000050*	**0.00012**	*<0.000050*	0.00005	*<0.000050*	*<0.000050*	*<0.000050*
Niobium (Nb)-Total	mg/L	0.0001	*<0.00010*	*<0.00010*	0.0001	*<0.00010*	0.0001	*<0.00010*	*<0.00010*	*<0.00010*	0.0001	*<0.00010*	*<0.00010*	*<0.00010*
Nickel (Ni)-Total	mg/L	0.00005	*<0.000050*	*<0.000050*	0.00005	*<0.000050*	0.00005	*<0.000050*	*<0.000050*	*<0.000050*	0.00005	*<0.000050*	**0.000094**	*<0.000050*
Phosphorus (P)-Total	mg/L	0.05	*<0.050*	*<0.050*	0.05	*<0.050*	0.05	*<0.050*	*<0.050*	*<0.050*	0.05	*<0.050*	*<0.050*	*<0.050*
Potassium (K)-Total	mg/L	0.02	*<0.020*	*<0.020*	0.02	*<0.020*	0.02	*<0.020*	*<0.020*	*<0.020*	0.02	*<0.020*	*<0.020*	*<0.020*
Rhenium (Re)-Total	mg/L	0.000005	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*
Rubidium (Rb)-Total	mg/L	0.000005	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	**0.0000072**	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*
Selenium (Se)-Total	mg/L	0.00004	*<0.000040*	*<0.000040*	0.00004	*<0.000040*	0.00004	*<0.000040*	*<0.000040*	*<0.000040*	0.00004	*<0.000040*	*<0.000040*	*<0.000040*
Silicon (Si)-Total	mg/L	0.05	*<0.050*	*<0.050*	0.05	*<0.050*	0.05	*<0.050*	*<0.050*	*<0.050*	0.05	*<0.050*	*<0.050*	*<0.050*
Silver (Ag)-Total	mg/L	0.000005	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*
Sodium (Na)-Total	mg/L	0.02	*<0.020*	**0.029**	0.02	*<0.020*	0.02	*<0.020*	*<0.020*	*<0.020*	0.02	*<0.020*	*<0.020*	*<0.020*

Table A-2. Laboratory detection limits and blanks (travel, de-ionized, and equipment), Meliadine AEMP, 2022

Month		April			July		August				September			
Client Sample ID			DI-WINTER-01	EB-WINTER-01		FB-JUL-01		TB-AUGT-01	DI-AUGT-01	EB-AUGT-01		TB-SEPT-01	DI-SEPT-01	EB-SEPT-01
Date Sampled		April DLs	4/8/2022	4/8/2022	July DLs	7/19/2022	August DLs	8/20/2022	8/20/2022	8/20/2022	September DLs	9/16/2022	9/16/2022	9/16/2022
ALS Sample ID			L2699901-3	L2699901-4		L2724629-3		L2730444-3	L2730444-2	L2730444-1		L2733910-3	L2733910-2	L2733910-1
Parameter	**Units**		Water	Water		Water		Water	Water	Water		Water	Water	Water
Strontium (Sr)-Total	mg/L	0.00002	**0.000048**	**0.000146**	0.00002	*<0.000020*	0.00002	*<0.000020*	*<0.000020*	**0.000073**	0.00002	*<0.000020*	*<0.000020*	**0.000072**
Sulfur (S)-Total	mg/L	0.5	*<0.50*	*<0.50*	0.5	*<0.50*	0.5	*<0.50*	*<0.50*	*<0.50*	0.5	*<0.50*	*<0.50*	*<0.50*
Tantalum (Ta)-Total	mg/L	0.0001	*<0.00010*	*<0.00010*	0.0001	*<0.00010*	0.0001	*<0.00010*	*<0.00010*	*<0.00010*	0.0001	*<0.00010*	*<0.00010*	*<0.00010*
Tellurium (Te)-Total	mg/L	0.00002	*<0.000020*	*<0.000020*	0.00002	*<0.000020*	0.00002	*<0.000020*	*<0.000020*	*<0.000020*	0.00002	*<0.000020*	*<0.000020*	*<0.000020*
Thallium (Tl)-Total	mg/L	0.000005	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*
Thorium (Th)-Total	mg/L	0.000005	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*
Tin (Sn)-Total	mg/L	0.00002	*<0.000020*	*<0.000020*	0.00002	*<0.000020*	0.00002	*<0.000020*	*<0.000020*	*<0.000020*	0.00002	*<0.000020*	*<0.000020*	**0.000022**
Titanium (Ti)-Total	mg/L	0.00005	*<0.000050*	*<0.000050*	0.00005	*<0.000050*	0.00005	*<0.000050*	*<0.000050*	*<0.000050*	0.00005	*<0.000050*	*<0.000050*	**0.000066**
Tungsten (W)-Total	mg/L	0.00001	*<0.000010*	*<0.000010*	0.00001	*<0.000010*	0.00001	*<0.000010*	*<0.000010*	*<0.000010*	0.00001	*<0.000010*	*<0.000010*	*<0.000010*
Uranium (U)-Total	mg/L	0.000001	*<0.0000010*	*<0.0000010*	0.000001	*<0.0000010*	0.000001	*<0.0000010*	*<0.0000010*	*<0.0000010*	0.000001	*<0.0000010*	*<0.0000010*	*<0.0000010*
Vanadium (V)-Total	mg/L	0.00005	*<0.000050*	*<0.000050*	0.00005	*<0.000050*	0.00005	*<0.000050*	*<0.000050*	*<0.000050*	0.00005	*<0.000050*	*<0.000050*	*<0.000050*
Yttrium (Y)-Total	mg/L	0.000005	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*
Zinc (Zn)-Total	mg/L	0.0005	**0.00054**	**0.00052**	0.0005	**0.00061**	0.0005	*<0.00050*	*<0.00050*	*<0.00050*	0.0005	*<0.00050*	**0.00197**	**0.00149**
Zirconium (Zr)-Total	mg/L	0.00001	*<0.000010*	*<0.000010*	0.00001	*<0.000010*	0.00001	*<0.000010*	*<0.000010*	*<0.000010*	0.00001	*<0.000010*	*<0.000010*	*<0.000010*
Dissolved Metals (Water)														
Aluminum (Al)-Dissolved	mg/L	0.001	*<0.0010*	*<0.0010*	0.001	*<0.0010*	0.001	*<0.0010*	*<0.0010*	*<0.0010*	0.001	*<0.0010*	*<0.0010*	*<0.0010*
Antimony (Sb)-Dissolved	mg/L	0.00002	*<0.000020*	*<0.000020*	0.00002	*<0.000020*	0.00002	*<0.000020*	*<0.000020*	*<0.000020*	0.00002	*<0.000020*	*<0.000020*	*<0.000020*
Arsenic (As)-Dissolved	mg/L	0.00002	*<0.000020*	*<0.000020*	0.00002	*<0.000020*	0.00002	*<0.000020*	**0.000024**	*<0.000020*	0.00002	*<0.000020*	*<0.000020*	*<0.000020*
Barium (Ba)-Dissolved	mg/L	0.00002	**0.00004**	**0.000027**	0.00002	*<0.000020*	0.00002	*<0.000020*	*<0.000020*	**0.000029**	0.00002	*<0.000020*	*<0.000020*	*<0.000020*
Beryllium (Be)-Dissolved	mg/L	0.000005	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*
Bismuth (Bi)-Dissolved	mg/L	0.000005	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*
Boron (B)-Dissolved	mg/L	0.005	*<0.0050*	**0.0052**	0.005	*<0.0050*	0.005	*<0.0050*	*<0.0050*	*<0.0050*	0.005	*<0.0050*	*<0.0050*	*<0.0050*
Cadmium (Cd)-Dissolved	mg/L	0.000005	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*
Calcium (Ca)-Dissolved	mg/L	0.01	**0.038**	**0.021**	0.01	*<0.010*	0.01	*<0.010*	**0.011**	**0.027**	0.01	*<0.010*	**0.015**	**0.018**
Cesium (Cs)-Dissolved	mg/L	0.000005	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*
Chromium (Cr)-Dissolved	mg/L	0.0001	*<0.00010*	*<0.00010*	0.0001	*<0.00010*	0.0001	*<0.00010*	*<0.00010*	*<0.00010*	0.0001	*<0.00010*	*<0.00010*	*<0.00010*
Cobalt (Co)-Dissolved	mg/L	0.000005	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*
Copper (Cu)-Dissolved	mg/L	0.00005	*<0.000050*	*<0.000050*	0.00005	*<0.000050*	0.00005	*<0.000050*	*<0.000050*	**0.000065**	0.00005	*<0.000050*	*<0.000050*	**0.00012**
Gallium (Ga)-Dissolved	mg/L	0.00005	*<0.000050*	*<0.000050*	0.00005	*<0.000050*	0.00005	*<0.000050*	*<0.000050*	*<0.000050*	0.00005	*<0.000050*	*<0.000050*	*<0.000050*
Iron (Fe)-Dissolved	mg/L	0.001	*<0.0010*	*<0.0010*	0.001	*<0.0010*	0.001	*<0.0010*	*<0.0010*	*<0.0010*	0.001	*<0.0010*	*<0.0010*	*<0.0010*
Lanthanum (La)-Dissolved	mg/L	0.00001	*<0.000010*	*<0.000010*	0.00001	*<0.000010*	0.00001	*<0.000010*	*<0.000010*	*<0.000010*	0.00001	*<0.000010*	*<0.000010*	*<0.000010*
Lead (Pb)-Dissolved	mg/L	0.00001	**0.000012**	*<0.000010*	0.00001	*<0.000010*	0.00001	*<0.000010*	*<0.000010*	*<0.000010*	0.00001	*<0.000010*	*<0.000010*	*<0.000010*
Lithium (Li)-Dissolved	mg/L	0.0005	*<0.00050*	*<0.00050*	0.0005	*<0.00050*	0.0005	*<0.00050*	*<0.00050*	*<0.00050*	0.0005	*<0.00050*	*<0.00050*	*<0.00050*

Table A-2. Laboratory detection limits and blanks (travel, de-ionized, and equipment), Meliadine AEMP, 2022

	Month	April			July		August				September			
	Client Sample ID		DI-WINTER-01	EB-WINTER-01		FB-JUL-01		TB-AUGT-01	DI-AUGT-01	EB-AUGT-01		TB-SEPT-01	DI-SEPT-01	EB-SEPT-01
	Date Sampled	April DLs	4/8/2022	4/8/2022	July DLs	7/19/2022	August DLs	8/20/2022	8/20/2022	8/20/2022	September DLs	9/16/2022	9/16/2022	9/16/2022
	ALS Sample ID		L2699901-3	L2699901-4		L2724629-3		L2730444-3	L2730444-2	L2730444-1		L2733910-3	L2733910-2	L2733910-1
Parameter	Units		Water	Water		Water		Water	Water	Water		Water	Water	Water
Magnesium (Mg)-Dissolved	mg/L	0.004	*<0.0040*	*<0.0040*	0.004	*<0.0040*	0.004	*<0.0040*	*<0.0040*	*<0.0040*	0.004	*<0.0040*	*<0.0040*	*<0.0040*
Manganese (Mn)-Dissolved	mg/L	0.00005	*<0.000050*	*<0.000050*	0.00005	*<0.000050*	0.00005	*<0.000050*	*<0.000050*	*<0.000050*	0.00005	*<0.000050*	*<0.000050*	*<0.000050*
Mercury (Hg)-Dissolved	ug/L	0.0005	*<0.00050*	*<0.00050*	0.0005	*<0.00050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum (Mo)-Dissolved	mg/L	0.00005	*<0.000050*	*<0.000050*	0.00005	*<0.000050*	0.00005	*<0.000050*	*<0.000050*	**0.000079**	0.00005	*<0.000050*	*<0.000050*	*<0.000050*
Nickel (Ni)-Dissolved	mg/L	0.00005	*<0.000050*	*<0.000050*	0.00005	*<0.000050*	0.00005	*<0.000050*	*<0.000050*	*<0.000050*	0.00005	*<0.000050*	*<0.000050*	*<0.000050*
Niobium (Nb)-Dissolved	mg/L	0.0001	*<0.00010*	*<0.00010*	0.0001	*<0.00010*	0.0001	*<0.00010*	*<0.00010*	*<0.00010*	0.0001	*<0.00010*	*<0.00010*	*<0.00010*
Phosphorus (P)-Dissolved	mg/L	0.05	*<0.050*	*<0.050*	0.05	*<0.050*	0.05	*<0.050*	*<0.050*	*<0.050*	0.05	*<0.050*	*<0.050*	*<0.050*
Potassium (K)-Dissolved	mg/L	0.02	*<0.020*	*<0.020*	0.02	*<0.020*	0.02	*<0.020*	*<0.020*	*<0.020*	0.02	*<0.020*	*<0.020*	*<0.020*
Rhenium (Re)-Dissolved	mg/L	0.000005	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*
Rubidium (Rb)-Dissolved	mg/L	0.000005	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	**0.0000073**	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*
Selenium (Se)-Dissolved	mg/L	0.00004	*<0.000040*	*<0.000040*	0.00004	*<0.000040*	0.00004	*<0.000040*	*<0.000040*	*<0.000040*	0.00004	*<0.000040*	*<0.000040*	*<0.000040*
Silicon (Si)-Dissolved	mg/L	0.05	*<0.050*	*<0.050*	0.05	*<0.050*	0.05	*<0.050*	*<0.050*	*<0.050*	0.05	*<0.050*	*<0.050*	*<0.050*
Silver (Ag)-Dissolved	mg/L	0.000005	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*
Sodium (Na)-Dissolved	mg/L	0.02	*<0.020*	**0.029**	0.02	*<0.020*	0.02	*<0.020*	*<0.020*	**0.039**	0.02	*<0.020*	*<0.020*	*<0.020*
Strontium (Sr)-Dissolved	mg/L	0.00002	**0.000057**	**0.000149**	0.00002	*<0.000020*	0.00002	*<0.000020*	*<0.000020*	**0.000062**	0.00002	*<0.000020*	*<0.000020*	**0.000071**
Sulfur (S)-Dissolved	mg/L	0.5	*<0.50*	*<0.50*	0.5	*<0.50*	0.5	*<0.50*	*<0.50*	*<0.50*	0.5	*<0.50*	*<0.50*	*<0.50*
Tantalum (Ta)-Dissolved	mg/L	0.0001	*<0.00010*	*<0.00010*	0.0001	*<0.00010*	0.0001	*<0.00010*	*<0.00010*	*<0.00010*	0.0001	*<0.00010*	*<0.00010*	*<0.00010*
Tellurium (Te)-Dissolved	mg/L	0.00002	*<0.000020*	*<0.000020*	0.00002	*<0.000020*	0.00002	*<0.000020*	*<0.000020*	*<0.000020*	0.00002	*<0.000020*	*<0.000020*	*<0.000020*
Thallium (Tl)-Dissolved	mg/L	0.000005	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*
Thorium (Th)-Dissolved	mg/L	0.000005	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*
Tin (Sn)-Dissolved	mg/L	0.00002	*<0.000020*	*<0.000020*	0.00002	*<0.000020*	0.00002	*<0.000020*	*<0.000020*	*<0.000020*	0.00002	*<0.000020*	*<0.000020*	*<0.000020*
Titanium (Ti)-Dissolved	mg/L	0.00005	*<0.000050*	*<0.000050*	0.00005	*<0.000050*	0.00005	*<0.000050*	*<0.000050*	*<0.000050*	0.00005	*<0.000050*	*<0.000050*	*<0.000050*
Tungsten (W)-Dissolved	mg/L	0.00001	*<0.000010*	*<0.000010*	0.00001	*<0.000010*	0.00001	*<0.000010*	*<0.000010*	*<0.000010*	0.00001	*<0.000010*	*<0.000010*	*<0.000010*
Uranium (U)-Dissolved	mg/L	0.000001	*<0.0000010*	*<0.0000010*	0.000001	*<0.0000010*	0.000001	*<0.0000010*	*<0.0000010*	*<0.0000010*	0.000001	*<0.0000010*	*<0.0000010*	*<0.0000010*
Vanadium (V)-Dissolved	mg/L	0.00005	*<0.000050*	*<0.000050*	0.00005	*<0.000050*	0.00005	*<0.000050*	*<0.000050*	*<0.000050*	0.00005	*<0.000050*	*<0.000050*	*<0.000050*
Yttrium (Y)-Dissolved	mg/L	0.000005	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*
Zinc (Zn)-Dissolved	mg/L	0.0005	*<0.00050*	*<0.00050*	0.0005	*<0.00050*	0.0005	*<0.00050*	*<0.00050*	*<0.00050*	0.0005	*<0.00050*	*<0.00050*	**0.00131**
Zirconium (Zr)-Dissolved	mg/L	0.00001	*<0.000010*	*<0.000010*	0.00001	*<0.000010*	0.00001	*<0.000010*	*<0.000010*	*<0.000010*	0.00001	*<0.000010*	*<0.000010*	*<0.000010*

Notes

Bold values = concentration > DL but < 10-times the DL

Shaded values = concentration are > 10-times the DL

Table A-3. April 2022 Equipment Blank assessment

Parameter	Units	April DLs	DI-WINTER-01	EB-WINTER-01	Potential Impact of Detected Concentrations in the Blanks	
Month			April			
Client Sample ID			DI-WINTER-01	EB-WINTER-01		
Date Sampled			4/8/2022	4/8/2022		
ALS Sample ID			L2699901-3	L2699901-4		
			Water	Water	Minimum Concentration at MEL-01	Ratio [a]
Physical Tests (Water)						
Conductivity	µS/cm	1	**1.8**	**1.3**	143	79
Anions and Nutrients (Water)						
Alkalinity, Total (as CaCO3)	mg/L	1	**1**	*<1.0*	26.5	27
Ammonia, Total (as N)	mg/L	0.005	**0.0089**	0.198	0.0099	0.1
Bicarbonate (HCO3)	mg/L	1.2	**1.2**	*<1.2*	34.8	29
Total Kjeldahl Nitrogen	mg/L	0.05	*<0.050*	**0.189**	0.308	1.6
Dissolved Kjeldahl Nitrogen	mg/L	0.05	**0.368**	*<0.050*	0.308	6.2
Total Dissolved Nitrogen	mg/L	0.05	**0.368**	*<0.050*	0.355	7.1
Phosphorus (P)-Total Dissolved	mg/L	0.001	*<0.0010*	**0.0011**	0.0024	2.2
Silica, Reactive (as SiO2)	mg/L	0.01	*<0.010*	**0.017**	0.525	31
Organic / Inorganic Carbon (Water)						
Dissolved Organic Carbon	mg/L	0.5	*<0.50*	**0.53**	4.99	9.4
Total Metals (Water)						
Arsenic (As)-Total	mg/L	0.00002	**0.000023**	*<0.000020*	0.000542	27
Barium (Ba)-Total	mg/L	0.00002	**0.000039**	**0.000046**	0.0126	274
Boron (B)-Total	mg/L	0.005	*<0.0050*	**0.0052**	0.0103	2.0
Calcium (Ca)-Total	mg/L	0.01	**0.026**	**0.017**	13.3	512
Iron (Fe)-Total	mg/L	0.001	*<0.0010*	**0.001**	0.0049	4.9
Lead (Pb)-Total	mg/L	0.00001	**0.000012**	*<0.000010*	0.000013	1.3
Sodium (Na)-Total	mg/L	0.02	*<0.020*	**0.029**	10.8	372
Strontium (Sr)-Total	mg/L	0.00002	**0.000048**	**0.000146**	0.0817	560
Zinc (Zn)-Total	mg/L	0.0005	**0.00054**	**0.00052**	0.00052	1.0
Dissolved Metals (Water)						
Barium (Ba)-Dissolved	mg/L	0.00002	**0.00004**	**0.000027**	0.013	481
Boron (B)-Dissolved	mg/L	0.005	*<0.0050*	**0.0052**	0.0101	1.9
Calcium (Ca)-Dissolved	mg/L	0.01	**0.038**	**0.021**	13.2	629
Lead (Pb)-Dissolved	mg/L	0.00001	**0.000012**	*<0.000010*	*<0.000010*	< DL
Sodium (Na)-Dissolved	mg/L	0.02	*<0.020*	**0.029**	11.4	393
Strontium (Sr)-Dissolved	mg/L	0.00002	**0.000057**	**0.000149**	0.08	537

Notes

Bold values = concentration > DL but < 10-times the DL

Shaded values = concentration are > 10-times the DL

Shaded values = ratio between the minimum concentration at MEL-01 and the EB (or DL) is < 5.

Table A-4. August 2022 Equipment Blank assessment

Parameter	Units	August DLs	TB-AUG-01	DI-AUG-01	EB-AUG-01	Potential Impact of Detected Concentrations in the Blanks	
Month			August				
Client Sample ID			TB-AUG-01	DI-AUG-01	EB-AUG-01		
Date Sampled			8/20/2022	8/20/2022	8/20/2022		
ALS Sample ID			L2730444-3	L2730444-2	L2730444-1	Minimum Concentration at MEL-01	Ratio [a]
			Water	Water	Water		
Physical Tests (Water)							
Conductivity	µS/cm	1	*<1.0*	*<1.0*	**1.1**	110	100
Turbidity	NTU	0.1	*<0.10*	*<0.10*	**0.11**	0.33	3
Anions and Nutrients (Water)							
Ammonia, Total (as N)	mg/L	0.005	*<0.0050*	**0.009**	**0.0089**	0.0056	0.63
Nitrate and Nitrite as N	mg/L	0.0051	*<0.0051*	*<0.0051*	**0.0084**	*<0.0051*	< DL
Nitrate (as N)	mg/L	0.005	*<0.0050*	*<0.0050*	**0.0084**	*<0.005*	< DL
Dissolved Kjeldahl Nitrogen	mg/L	0.05	*<0.050*	*<0.050*	**0.119**	0.227	2
Total Dissolved Nitrogen	mg/L	0.05	*<0.050*	*<0.050*	**0.127**	0.227	1.8
Phosphorus (P)-Total	mg/L	0.001	**0.0011**	*<0.0010*	**0.0011**	0.005	4.5
Total Metals (Water)							
Arsenic (As)-Total	mg/L	0.00002	*<0.000020*	*<0.000020*	**0.000033**	0.000615	19
Barium (Ba)-Total	mg/L	0.00002	*<0.000020*	*<0.000020*	**0.000047**	0.00871	185
Calcium (Ca)-Total	mg/L	0.01	*<0.010*	*<0.010*	**0.014**	9.32	666
Iron (Fe)-Total	mg/L	0.001	*<0.0010*	*<0.0010*	**0.0018**	0.0228	13
Lead (Pb)-Total	mg/L	0.00001	*<0.000010*	*<0.000010*	**0.000012**	0.000013	1.1
Manganese (Mn)-Total	mg/L	0.00005	*<0.000050*	*<0.000050*	**0.000073**	0.00799	109
Molybdenum (Mo)-Total	mg/L	0.00005	*<0.000050*	**0.00012**	*<0.000050*	0.000118	2
Strontium (Sr)-Total	mg/L	0.00002	*<0.000020*	*<0.000020*	**0.000073**	0.0566	775
Dissolved Metals (Water)							
Arsenic (As)-Dissolved	mg/L	0.00002	*<0.000020*	**0.000024**	*<0.000020*	0.000571	29
Barium (Ba)-Dissolved	mg/L	0.00002	*<0.000020*	*<0.000020*	**0.000029**	0.00797	275
Calcium (Ca)-Dissolved	mg/L	0.01	*<0.010*	**0.011**	**0.027**	9.54	353
Copper (Cu)-Dissolved	mg/L	0.00005	*<0.000050*	*<0.000050*	**0.000065**	0.000929	14
Molybdenum (Mo)-Dissolved	mg/L	0.00005	*<0.000050*	*<0.000050*	**0.000079**	0.000123	2
Sodium (Na)-Dissolved	mg/L	0.02	*<0.020*	*<0.020*	**0.039**	7.6	195
Strontium (Sr)-Dissolved	mg/L	0.00002	*<0.000020*	*<0.000020*	**0.000062**	0.0576	929

Notes

Bold values = concentration > DL but < 10-times the DL

Shaded values = concentration are > 10-times the DL

Shaded values = ratio between the minimum concentration at MEL-01 and the EB (or DL) is < 5.

Table A-5. September 2022 Equipment Blank assessment

Parameter	Units	September DLs	TB-SEPT-01	DI-SEPT-01	EB-SEPT-01	Potential Impact of Detected Concentrations in the Blanks	
Month		September					
Client Sample ID			TB-SEPT-01	DI-SEPT-01	EB-SEPT-01		
Date Sampled			9/16/2022	9/16/2022	9/16/2022		
ALS Sample ID			L2733910-3	L2733910-2	L2733910-1	Minimum Concentration at MEL-01	Ratio [a]
			Water	Water	Water		
Total Metals (Water)							
Aluminum (Al)-Total	mg/L	0.001	*<0.0010*	*<0.0010*	**0.0022**	0.003	1
Arsenic (As)-Total	mg/L	0.00002	*<0.000020*	*<0.000020*	**0.000037**	0.000574	15.5
Barium (Ba)-Total	mg/L	0.00002	*<0.000020*	*<0.000020*	**0.00003**	0.00827	276
Calcium (Ca)-Total	mg/L	0.01	*<0.010*	*<0.010*	**0.017**	9.81	577
Copper (Cu)-Total	mg/L	0.00005	*<0.000050*	**0.000058**	*<0.000050*	0.000925	18.5
Iron (Fe)-Total	mg/L	0.001	*<0.0010*	*<0.0010*	**0.0054**	0.0176	3.3
Magnesium (Mg)-Total	mg/L	0.004	*<0.0040*	**0.0072**	*<0.0040*	1.8	450
Manganese (Mn)-Total	mg/L	0.00005	*<0.000050*	*<0.000050*	**0.000169**	0.00467	28
Nickel (Ni)-Total	mg/L	0.00005	*<0.000050*	**0.000094**	*<0.000050*	0.000697	14
Strontium (Sr)-Total	mg/L	0.00002	*<0.000020*	*<0.000020*	**0.000072**	0.0609	846
Tin (Sn)-Total	mg/L	0.00002	*<0.000020*	*<0.000020*	**0.000022**	0.000022	1.0
Titanium (Ti)-Total	mg/L	0.00005	*<0.000050*	*<0.000050*	**0.000066**	0.000074	1.1
Zinc (Zn)-Total	mg/L	0.0005	*<0.00050*	**0.00197**	**0.00149**	0.00217	1.5
Dissolved Metals (Water)							
Calcium (Ca)-Dissolved	mg/L	0.01	*<0.010*	**0.015**	**0.018**	9.52	529
Copper (Cu)-Dissolved	mg/L	0.00005	*<0.000050*	*<0.000050*	**0.00012**	0.000903	7.5
Strontium (Sr)-Dissolved	mg/L	0.00002	*<0.000020*	*<0.000020*	**0.000071**	0.0601	846
Zinc (Zn)-Dissolved	mg/L	0.0005	*<0.00050*	*<0.00050*	**0.00131**	0.00189	1.4

Notes

Bold values = concentration > DL but < 10-times the DL

Shaded values = concentration are > 10-times the DL

Shaded values = ratio between the minimum concentration at MEL-01 and the EB (or DL) is < 5.

Table A-6. Water quality field duplicate results for the 2022 AEMP

Month	Units	Relative Percent Differece DQOs		April DLs	April DUP-1 (MEL-02-02)				
Station					MEL-02-02	DUP	Field Dup Method [a]	Result [b] (RPD or Diff)	Outcome
Date Sampled					4/7/2022	4/7/2022			
ALS Sample ID		Lab	Field		L2699904-1	L2699904-6			
Parameter					Water	Water			
Physical Tests									
Conductivity	uS/cm	10	15	1.0	146	146	RPD	0	Pass RPD
Hardness (as CaCO3)	-		40	0.20	42.3	42.1	RPD	0.5	Pass RPD
pH	pH		40	0.10	7.5	7.4	RPD	2.3	Pass RPD
Total Suspended Solids	mg/L		40	1.0	*<1.0*	*<1.0*	*<DL*	*<DL*	*<DL*
Total Dissolved Solids	mg/L		40	13.33	75.00	73.00	RPD	2.7	Pass RPD
Turbidity	NTU	15	23	0.10	0.17	0.18	DIFF	-0.01	Pass Diff
Anions and Nutrients									
Alkalinity, Total (as CaCO3)	mg/L	20	30	1.0	27.6	27.4	RPD	0.7	Pass RPD
Ammonia, Total (as N)	mg/L	20	30	0.0050	0.033	0.17	RPD	-133.8	Fail
Bicarbonate (HCO3)	mg/L	20	30	1.2	33.70	33.4	RPD	0.9	Pass RPD
Bromide (Br)	mg/L	20	30	0.10	*<0.10*	*<0.10*	*<DL*	*<DL*	*<DL*
Carbonate (CO3)	mg/L	20	30	0.60	*<0.60*	*<0.60*	*<DL*	*<DL*	*<DL*
Chloride (Cl)	mg/L	20	30	0.10	20.4	20.1	RPD	1.5	Pass RPD
Fluoride (F)	mg/L	20	30	0.020	0.035	0.035	DIFF	0	Pass Diff
Hydroxide (OH)	mg/L	20	30	0.34	*<0.34*	*<0.34*	*<DL*	*<DL*	*<DL*
Nitrate and Nitrite as N	mg/L	20	30	0.0051	0.019	0.019	DIFF	0.0002	Pass Diff
Nitrate (as N)	mg/L	20	30	0.0050	0.019	0.019	DIFF	0.0002	Pass Diff
Nitrite (as N)	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*
Total Kjeldahl Nitrogen	mg/L	20	30	0.050	0.41	0.47	RPD	-14.1	Pass RPD
Total Nitrogen	mg/L	20	30	0.050	0.43	0.49	RPD	-13.5	Pass RPD
Dissolved Kjeldahl Nitrogen	mg/L	20	30	0.050	0.48	0.28	RPD	53.8	Fail
Total Dissolved Nitrogen	mg/L	20	30	0.050	0.50	0.30	RPD	51.2	Fail
Orthophosphate-Dissolved (as P)	mg/L	20	30	0.0010	*<0.0010*	0.0021	*<DL*	*<DL*	*<DL*
Phosphorus (P)-Dissolved	mg/L	20	30	0.0010	0.0020	0.0025	DIFF	-0.0005	Pass Diff
Phosphorus (P)-Total	mg/L	20	30	0.0010	0.0070	0.0097	RPD	-32.3	Fail
Silica, Reactive (as SiO2)	mg/L	20	30	0.010	0.39	0.39	RPD	-1	Pass RPD
TDS (Calculated)	mg/L	20	30		72.30	71.50	RPD	1.1	Pass RPD
Sulfate (SO4)	mg/L	20	30	0.30	7.9	7.8	RPD	2.4	Pass RPD
Cyanides									
Cyanide, Weak Acid Diss	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*
Cyanide, Total	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*
Cyanide, Free	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*
Organic / Inorganic Carbon									
Dissolved Organic Carbon	mg/L	20	30	0.50	4.8	4.8	RPD	-0.2	Pass RPD
Total Organic Carbon	mg/L	20	30	0.50	4.9	4.7	RPD	2.5	Pass RPD
Total Metals									
Aluminum (Al)-Total	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*
Antimony (Sb)-Total	mg/L	20	30	0.000020	*<0.000020*	*<0.000020*	*<DL*	*<DL*	*<DL*
Arsenic (As)-Total	mg/L	20	30	0.000020	0.00070	0.00071	RPD	-1.9	Pass RPD
Barium (Ba)-Total	mg/L	20	30	0.000020	0.013	0.014	RPD	-1.5	Pass RPD
Beryllium (Be)-Total	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Bismuth (Bi)-Total	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Boron (B)-Total	mg/L	20	30	0.0050	0.0096	0.0097	DIFF	-0.0001	Pass Diff
Cadmium (Cd)-Total	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Calcium (Ca)-Total	mg/L	20	30	0.010	12.5	12.4	RPD	0.8	Pass RPD
Chromium (Cr)-Total	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*
Cobalt (Co)-Total	mg/L	20	30	0.000005	0.000016	0.000015	DIFF	0.0000014	Pass Diff
Copper (Cu)-Total	mg/L	20	30	0.000050	0.0010	0.0011	RPD	-2.8	Pass RPD
Iron (Fe)-Total	mg/L	20	30	0.0010	0.0012	0.0013	DIFF	-0.0001	Pass Diff
Lead (Pb)-Total	mg/L	20	30	0.000010	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*
Lithium (Li)-Total	mg/L	20	30	0.00050	0.0016	0.0016	DIFF	0.00001	Pass Diff
Magnesium (Mg)-Total	mg/L	20	30	0.0040	2.5	2.4	RPD	0.4	Pass RPD
Manganese (Mn)-Total	mg/L	20	30	0.000050	0.00037	0.00031	RPD	18.9	Pass RPD
Mercury (Hg)-Total	ug/L	20	30	0.00050	0.00053	0.00082	DIFF	-0.00029	Pass Diff
Molybdenum (Mo)-Total	mg/L	20	30	0.000050	0.00023	0.00017	DIFF	0.000068	Pass Diff
Niobium (Nb)-Total	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*
Nickel (Ni)-Total	mg/L	20	30	0.000050	0.00090	0.00090	RPD	-0.2	Pass RPD
Phosphorus (P)-Total	mg/L	20	30	0.050	*<0.050*	*<0.050*	*<DL*	*<DL*	*<DL*
Potassium (K)-Total	mg/L	20	30	0.020	1.9	1.9	RPD	-0.5	Pass RPD
Selenium (Se)-Total	mg/L	20	30	0.000040	0.000082	0.000056	DIFF	0.000026	Pass Diff
Silicon (Si)-Total	mg/L	20	30	0.050	0.19	0.19	DIFF	0.004	Pass Diff
Silver (Ag)-Total	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Sodium (Na)-Total	mg/L	20	30	0.020	10.50	10.60	RPD	-0.9	Pass RPD
Strontium (Sr)-Total	mg/L	20	30	0.000020	0.073	0.071	RPD	1.8	Pass RPD
Sulfur (S)-Total	mg/L	20	30	0.50	3.0	3.0	RPD	0.7	Pass RPD
Thallium (Tl)-Total	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Tin (Sn)-Total	mg/L	20	30	0.000020	*<0.000020*	*<0.000020*	*<DL*	*<DL*	*<DL*
Titanium (Ti)-Total	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*
Tungsten (W)-Total	mg/L	20	30	0.000010	0.00011	0.000096	RPD	14.5	Pass RPD
Uranium (U)-Total	mg/L	20	30	0.000001	0.000016	0.000019	RPD	-16.8	Pass RPD
Vanadium (V)-Total	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*
Zinc (Zn)-Total	mg/L	20	30	0.00050	*<0.00050*	*<0.00050*	*<DL*	*<DL*	*<DL*
Zirconium (Zr)-Total	mg/L	20	30	0.000010	0.000022	0.000019	DIFF	0.000003	Pass Diff
Dissolved Metals									
Aluminum (Al)-Dissolved	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*
Antimony (Sb)-Dissolved	mg/L	20	30	0.000020	*<0.000020*	*<0.000020*	*<DL*	*<DL*	*<DL*
Arsenic (As)-Dissolved	mg/L	20	30	0.000020	0.00065	0.00070	RPD	-7.7	Pass RPD
Barium (Ba)-Dissolved	mg/L	20	30	0.000020	0.014	0.014	RPD	1.5	Pass RPD
Beryllium (Be)-Dissolved	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Bismuth (Bi)-Dissolved	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Boron (B)-Dissolved	mg/L	20	30	0.0050	0.0098	0.0095	DIFF	0.0003	Pass Diff
Cadmium (Cd)-Dissolved	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Calcium (Ca)-Dissolved	mg/L	20	30	0.010	13.10	13.00	RPD	0.8	Pass RPD
Chromium (Cr)-Dissolved	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*
Cobalt (Co)-Dissolved	mg/L	20	30	0.000005	0.000018	0.000019	DIFF	-0.000001	Pass Diff
Copper (Cu)-Dissolved	mg/L	20	30	0.000050	0.0012	0.0012	RPD	2.6	Pass RPD
Iron (Fe)-Dissolved	mg/L	20	30	0.0010	0.0029	0.0028	DIFF	1E-04	Pass Diff
Lead (Pb)-Dissolved	mg/L	20	30	0.000010	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*
Lithium (Li)-Dissolved	mg/L	20	30	0.00050	0.0016	0.0016	DIFF	4E-05	Pass Diff
Magnesium (Mg)-Dissolved	mg/L	20	30	0.0040	2.3	2.4	RPD	-0.9	Pass RPD
Manganese (Mn)-Dissolved	mg/L	20	30	0.000050	0.00091	0.00090	RPD	2	Pass RPD
Mercury (Hg)-Dissolved	ug/L	20	30	0.00050	0.00060	0.00064	DIFF	-4E-05	Pass Diff
Molybdenum (Mo)-Dissolved	mg/L	20	30	0.000050	0.00013	0.00014	DIFF	-0.000011	Pass Diff
Nickel (Ni)-Dissolved	mg/L	20	30	0.000050	0.00099	0.0010	RPD	-1.9	Pass RPD
Niobium (Nb)-Dissolved	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*
Phosphorus (P)-Dissolved	mg/L	20	30	0.050	*<0.050*	*<0.050*	*<DL*	*<DL*	*<DL*
Potassium (K)-Dissolved	mg/L	20	30	0.020	1.7	1.7	RPD	0	Pass RPD
Selenium (Se)-Dissolved	mg/L	20	30	0.000040	*<0.000040*	0.000066	*<DL*	*<DL*	*<DL*
Silicon (Si)-Dissolved	mg/L	20	30	0.050	0.18	0.18	DIFF	-0.006	Pass Diff
Silver (Ag)-Dissolved	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Sodium (Na)-Dissolved	mg/L	20	30	0.020	10.10	10.00	RPD	1	Pass RPD
Strontium (Sr)-Dissolved	mg/L	20	30	0.000020	0.075	0.075	RPD	-0.8	Pass RPD
Sulfur (S)-Dissolved	mg/L	20	30	0.50	3.0	3.1	RPD	-2.3	Pass RPD
Thallium (Tl)-Dissolved	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Tin (Sn)-Dissolved	mg/L	20	30	0.000020	*<0.000020*	*<0.000020*	*<DL*	*<DL*	*<DL*
Titanium (Ti)-Dissolved	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*
Tungsten (W)-Dissolved	mg/L	20	30	0.000010	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*
Uranium (U)-Dissolved	mg/L	20	30	0.000001	0.000026	0.000025	RPD	4.7	Pass RPD
Vanadium (V)-Dissolved	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*
Zinc (Zn)-Dissolved	mg/L	20	30	0.00050	0.00084	0.00057	DIFF	0.00027	Pass Diff
Zirconium (Zr)-Dissolved	mg/L		40	0.000010	0.000014	0.000012	DIFF	0.000002	Pass Diff

Notes:

[a] Field Dup Methods are based on the concentrations:

RPD = relative percent difference is used to compare field duplicates when the measured concentration is > 5x the DL

DIFF = when concentrations < 5* DL

[b] Results refer to the RPD or absolute difference in concentration

DQO for RPDs is < Field RPD values

DQO for DIFF is < 2x the DL

Italicized numbers are below detection limits.

Table A-6. Water quality field duplicate results for the 2022 AEMP

Month	Units	Relative Percent Differece DQOs		July MDLs	July DUP-1 (MEL-01-06)					July DUP-2 (MEL-03-01)				
Station					MEL-01-06	DUP-1	Field Dup Method [a]	Result [b] (RPD or Diff)	Outcome	MEL-03-01	DUP-2	Field Dup Method [a]	Result [b] (RPD or Diff)	Outcome
Date Sampled					7/10/2022	7/10/2022				7/19/2022	7/19/2022			
ALS Sample ID		Lab	Field		L2723206-7	L2723206-12				L2724629-1	L2724629-2			
Parameter					Water	Water				Water	Water			
Physical Tests														
Conductivity	uS/cm	10	15	1.0	111	109	RPD	1.8	Pass RPD	83.7	82.9	RPD	1	Pass RPD
Hardness (as CaCO3)	-		40	0.20	29.8	29.9	RPD	-0.3	Pass RPD	23.1	23	RPD	0.4	Pass RPD
pH	pH		40	0.10	7.4	7.4	RPD	0	Pass RPD	7.4	7.4	RPD	0.1	Pass RPD
Total Suspended Solids	mg/L		40	1.0	1.6	*<1.0*	*<DL*	*<DL*	*<DL*	1.4	4.4	DIFF	-3	Fail
Total Dissolved Solids	mg/L		40	13	63	61	DIFF	2	Pass Diff	49.0	46.0	DIFF	3	Pass Diff
Turbidity	NTU	15	23	0.10	0.56	0.36	DIFF	0.2	Fail	0.21	0.23	DIFF	-0.02	Pass Diff
Anions and Nutrients														
Alkalinity, Total (as CaCO3)	mg/L	20	30	1.0	21.4	20.9	RPD	2.4	Pass RPD	17.3	17.5	RPD	-1.1	Pass RPD
Ammonia, Total (as N)	mg/L	20	30	0.0050	0.013	0.0070	DIFF	0.0061	Pass Diff	*<0.0050*	*<0.0050*	*<DL*	*<DL*	*<DL*
Bicarbonate (HCO3)	mg/L	20	30	1.2	26.1	25.5	RPD	2.3	Pass RPD	21.1	21.4	RPD	-1.4	Pass RPD
Bromide (Br)	mg/L	20	30	0.10	*<0.10*	*<0.10*	*<DL*	*<DL*	*<DL*	*<0.10*	*<0.10*	*<DL*	*<DL*	*<DL*
Carbonate (CO3)	mg/L	20	30	0.60	*<0.60*	*<0.60*	*<DL*	*<DL*	*<DL*	*<0.60*	*<0.60*	*<DL*	*<DL*	*<DL*
Chloride (Cl)	mg/L	20	30	0.10	15.7	15.9	RPD	-1.3	Pass RPD	10.10	10.10	RPD	0	Pass RPD
Fluoride (F)	mg/L	20	30	0.020	0.026	0.026	DIFF	0	Pass Diff	0.027	0.027	DIFF	0	Pass Diff
Hydroxide (OH)	mg/L	20	30	0.34	*<0.34*	*<0.34*	*<DL*	*<DL*	*<DL*	*<0.34*	*<0.34*	*<DL*	*<DL*	*<DL*
Nitrate and Nitrite as N	mg/L	20	30	0.0051	0.011	0.017	DIFF	-0.0066	Pass Diff	*<0.0051*	*<0.0051*	*<DL*	*<DL*	*<DL*
Nitrate (as N)	mg/L	20	30	0.0050	0.011	0.017	DIFF	-0.0066	Pass Diff	*<0.0050*	*<0.0050*	*<DL*	*<DL*	*<DL*
Nitrite (as N)	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*
Total Kjeldahl Nitrogen	mg/L	20	30	0.050	0.27	0.27	RPD	0.4	Pass RPD	0.18	0.17	DIFF	0.003	Pass Diff
Total Nitrogen	mg/L	20	30	0.050	0.23	0.23	DIFF	0.009	Pass Diff	*<0.0051*	*<0.0051*	*<DL*	*<DL*	*<DL*
Dissolved Kjeldahl Nitrogen	mg/L	20	30	0.050	0.24	0.24	DIFF	0.002	Pass Diff	0.18	0.16	DIFF	0.019	Pass Diff
Total Dissolved Nitrogen	mg/L	20	30	0.050	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*	0.18	0.16	DIFF	0.019	Pass Diff
Orthophosphate-Dissolved (as P)	mg/L	20	30	0.0010	0.0035	0.0025	DIFF	0.001	Pass Diff	0.0010	*<0.0010*	*<DL*	*<DL*	*<DL*
Phosphorus (P)-Dissolved	mg/L	20	30	0.0030			DIFF	0	Pass Diff	0.0031	0.0019	DIFF	0.0012	Pass Diff
Phosphorus (P)-Total	mg/L	20	30	0.0030	0.0066	0.0075	DIFF	-0.0009	Pass Diff	0.0036	0.0048	DIFF	-0.0012	Pass Diff
Silica, Reactive (as SiO2)	mg/L	20	30	0.010	0.26	0.27	RPD	-1.9	Pass RPD	0.18	0.18	RPD	0.6	Pass RPD
TDS (Calculated)	mg/L	20	30		54.5	54.7	RPD	-0.4	Pass RPD	39.1	39.4	RPD	-0.8	Pass RPD
Sulfate (SO4)	mg/L	20	30	0.30	6.5	6.5	RPD	-0.6	Pass RPD	3.9	3.9	RPD	0.3	Pass RPD
Cyanides														
Cyanide, Weak Acid Diss	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*
Cyanide, Total	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*
Cyanide, Free	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*
Organic / Inorganic Carbon														
Dissolved Organic Carbon	mg/L	20	30	0.50	4.6	5.2	RPD	-14.1	Pass RPD	3.2	3.4	RPD	-4.9	Pass RPD
Total Organic Carbon	mg/L	20	30	0.50	4.0	4.4	RPD	-9.6	Pass RPD	2.9	2.8	RPD	1.4	Pass RPD
Total Metals														
Aluminum (Al)-Total	mg/L	20	30	0.0010	0.0050	0.0030	DIFF	0.002	Fail	0.0022	0.0022	DIFF	0	Pass Diff
Antimony (Sb)-Total	mg/L	20	30	0.000020	*<0.000020*	*<0.000020*	*<DL*	*<DL*	*<DL*	*<0.000020*	*<0.000020*	*<DL*	*<DL*	*<DL*
Arsenic (As)-Total	mg/L	20	30	0.000020	0.00049	0.00048	RPD	1.7	Pass RPD	0.00032	0.00031	RPD	0.6	Pass RPD
Barium (Ba)-Total	mg/L	20	30	0.000020	0.0088	0.0086	RPD	1.6	Pass RPD	0.0082	0.0079	RPD	3.2	Pass RPD
Beryllium (Be)-Total	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Bismuth (Bi)-Total	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Boron (B)-Total	mg/L	20	30	0.0050	0.0072	0.0074	DIFF	-0.0002	Pass Diff	*<0.0050*	*<0.0050*	*<DL*	*<DL*	*<DL*
Cadmium (Cd)-Total	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Calcium (Ca)-Total	mg/L	20	30	0.010	9.2	9.2	RPD	-0.2	Pass RPD	7.8	7.5	RPD	3.1	Pass RPD
Chromium (Cr)-Total	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*
Cobalt (Co)-Total	mg/L	20	30	0.000005	0.000029	0.000027	RPD	7.1	Pass RPD	0.000012	0.000012	DIFF	1E-07	Pass Diff
Copper (Cu)-Total	mg/L	20	30	0.000050	0.00093	0.00092	RPD	0.8	Pass RPD	0.00076	0.00077	RPD	-0.8	Pass RPD
Iron (Fe)-Total	mg/L	20	30	0.0010	0.027	0.022	RPD	20.2	Pass RPD	0.0095	0.0091	RPD	4.3	Pass RPD
Lead (Pb)-Total	mg/L	20	30	0.000010	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*
Lithium (Li)-Total	mg/L	20	30	0.00050	0.0012	0.0012	DIFF	-2E-05	Pass Diff	0.00083	0.00080	DIFF	0.00003	Pass Diff
Magnesium (Mg)-Total	mg/L	20	30	0.0040	1.7	1.7	RPD	-0.6	Pass RPD	1.2	1.2	RPD	0.8	Pass RPD
Manganese (Mn)-Total	mg/L	20	30	0.000050	0.0083	0.0078	RPD	5.1	Pass RPD	0.0019	0.0019	RPD	1	Pass RPD
Mercury (Hg)-Total	ug/L	20	30	0.00050	*<0.0000050*		*<DL*	*<DL*	*<DL*	*<0.0050*	0.00073	*<DL*	*<DL*	*<DL*
Molybdenum (Mo)-Total	mg/L	20	30	0.000050	0.00012	0.00012	DIFF	1E-06	Pass Diff	0.000081	0.000079	DIFF	2E-06	Pass Diff
Niobium (Nb)-Total	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*
Nickel (Ni)-Total	mg/L	20	30	0.000050	0.00081	0.00083	RPD	-2.6	Pass RPD	0.00046	0.00045	RPD	3.1	Pass RPD
Phosphorus (P)-Total	mg/L	20	30	0.050	*<0.050*	*<0.050*	*<DL*	*<DL*	*<DL*	*<0.050*	*<0.050*	*<DL*	*<DL*	*<DL*
Potassium (K)-Total	mg/L	20	30	0.020	1.1	1.1	RPD	-0.9	Pass RPD	0.97	0.97	RPD	0	Pass RPD
Selenium (Se)-Total	mg/L	20	30	0.000040	*<0.000040*	0.000056	*<DL*	*<DL*	*<DL*	*<0.000040*	0.000046	*<DL*	*<DL*	*<DL*
Silicon (Si)-Total	mg/L	20	30	0.050	0.19	0.11	DIFF	0.085	Pass Diff	0.094	0.087	DIFF	0.007	Pass Diff
Silver (Ag)-Total	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Sodium (Na)-Total	mg/L	20	30	0.020	7.7	7.6	RPD	1.3	Pass RPD	5.2	5.2	RPD	0.6	Pass RPD
Strontium (Sr)-Total	mg/L	20	30	0.000020	0.057	0.057	RPD	-0.2	Pass RPD	0.038	0.038	RPD	0	Pass RPD
Sulfur (S)-Total	mg/L	20	30	0.50	2.5	2.2	DIFF	0.3	Pass Diff	1.3	1.3	DIFF	0	Pass Diff
Thallium (Tl)-Total	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Tin (Sn)-Total	mg/L	20	30	0.000020	*<0.000020*	*<0.000020*	*<DL*	*<DL*	*<DL*	*<0.000020*	*<0.000020*	*<DL*	*<DL*	*<DL*
Titanium (Ti)-Total	mg/L	20	30	0.000050	0.00027	*<0.000050*	*<DL*	*<DL*	*<DL*	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*
Tungsten (W)-Total	mg/L	20	30	0.000010	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*
Uranium (U)-Total	mg/L	20	30	0.000001	0.000024	0.000025	RPD	-1.2	Pass RPD	0.000017	0.000017	RPD	1.2	Pass RPD
Vanadium (V)-Total	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*
Zinc (Zn)-Total	mg/L	20	30	0.00050	*<0.00050*	*<0.00050*	*<DL*	*<DL*	*<DL*	*<0.00050*	0.00063	*<DL*	*<DL*	*<DL*
Zirconium (Zr)-Total	mg/L	20	30	0.000010	0.000010	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*
Dissolved Metals														
Aluminum (Al)-Dissolved	mg/L	20	30	0.0010	0.0017	0.0013	DIFF	0.0004	Pass Diff	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*
Antimony (Sb)-Dissolved	mg/L	20	30	0.000020	*<0.000020*	*<0.000020*	*<DL*	*<DL*	*<DL*	*<0.000020*	*<0.000020*	*<DL*	*<DL*	*<DL*
Arsenic (As)-Dissolved	mg/L	20	30	0.000020	0.00045	0.00044	RPD	2.9	Pass RPD	0.00033	0.00032	RPD	2.8	Pass RPD
Barium (Ba)-Dissolved	mg/L	20	30	0.000020	0.0085	0.0086	RPD	-0.2	Pass RPD	0.0078	0.0077	RPD	1.5	Pass RPD
Beryllium (Be)-Dissolved	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Bismuth (Bi)-Dissolved	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Boron (B)-Dissolved	mg/L	20	30	0.0050	0.0077	0.0075	DIFF	0.0002	Pass Diff	*<0.0050*	*<0.0050*	*<DL*	*<DL*	*<DL*
Cadmium (Cd)-Dissolved	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Calcium (Ca)-Dissolved	mg/L	20	30	0.010	9.1	9.1	RPD	0.7	Pass RPD	7.2	7.1	RPD	1.4	Pass RPD
Chromium (Cr)-Dissolved	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*
Cobalt (Co)-Dissolved	mg/L	20	30	0.000005	0.000014	0.000014	DIFF	-3E-07	Pass Diff	*<0.0000050*	0.000006	*<DL*	*<DL*	*<DL*
Copper (Cu)-Dissolved	mg/L	20	30	0.000050	0.00091	0.00090	RPD	0.9	Pass RPD	0.00069	0.00067	RPD	3.5	Pass RPD
Iron (Fe)-Dissolved	mg/L	20	30	0.0010	0.0090	0.0089	RPD	1.1	Pass RPD	0.0017	0.0016	DIFF	1E-04	Pass Diff
Lead (Pb)-Dissolved	mg/L	20	30	0.000010	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*
Lithium (Li)-Dissolved	mg/L	20	30	0.00050	0.0012	0.0012	DIFF	2E-05	Pass Diff	0.00075	0.00074	DIFF	0.00001	Pass Diff
Magnesium (Mg)-Dissolved	mg/L	20	30	0.0040	1.7	1.8	RPD	-2.9	Pass RPD	1.2	1.2	RPD	-1.6	Pass RPD
Manganese (Mn)-Dissolved	mg/L	20	30	0.000050	0.0014	0.0014	RPD	-1.5	Pass RPD	0.00038	0.00037	RPD	2.2	Pass RPD
Mercury (Hg)-Dissolved	ug/L	20	30	0.00050	*<0.0000050*		*<DL*	*<DL*	*<DL*	*<0.0050*	*<0.00050*	*<DL*	*<DL*	*<DL*
Molybdenum (Mo)-Dissolved	mg/L	20	30	0.000050	0.00011	0.00011	DIFF	-1E-06	Pass Diff	0.000081	0.000077	DIFF	0.000004	Pass Diff
Nickel (Ni)-Dissolved	mg/L	20	30	0.000050	0.00078	0.00081	RPD	-4.4	Pass RPD	0.00045	0.00040	RPD	12.4	Pass RPD
Niobium (Nb)-Dissolved	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*
Phosphorus (P)-Dissolved	mg/L	20	30	0.050	*<0.050*	*<0.050*	*<DL*	*<DL*	*<DL*	*<0.050*	*<0.050*	*<DL*	*<DL*	*<DL*
Potassium (K)-Dissolved	mg/L	20	30	0.020	1.1	1.1	RPD	-0.9	Pass RPD	0.95	0.96	RPD	-0.2	Pass RPD
Selenium (Se)-Dissolved	mg/L	20	30	0.000040	*<0.000040*	0.000052	*<DL*	*<DL*	*<DL*	*<0.000040*	*<0.000040*	*<DL*	*<DL*	*<DL*
Silicon (Si)-Dissolved	mg/L	20	30	0.050	0.13	0.13	DIFF	-0.002	Pass Diff	0.091	0.089	DIFF	0.002	Pass Diff
Silver (Ag)-Dissolved	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Sodium (Na)-Dissolved	mg/L	20	30	0.020	7.5	7.7	RPD	-2.5	Pass RPD	5.2	5.5	RPD	-5.2	Pass RPD
Strontium (Sr)-Dissolved	mg/L	20	30	0.000020	0.056	0.054	RPD	3.5	Pass RPD	0.038	0.039	RPD	-2.8	Pass RPD
Sulfur (S)-Dissolved	mg/L	20	30	0.50	2.3	2.3	DIFF	0.02	Pass Diff	1.5	1.4	DIFF	0.06	Pass Diff
Thallium (Tl)-Dissolved	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Tin (Sn)-Dissolved	mg/L	20	30	0.000020	*<0.000020*	*<0.000020*	*<DL*	*<DL*	*<DL*	*<0.000020*	*<0.000020*	*<DL*	*<DL*	*<DL*
Titanium (Ti)-Dissolved	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*
Tungsten (W)-Dissolved	mg/L	20	30	0.000010	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*
Uranium (U)-Dissolved	mg/L	20	30	0.000001	0.000024	0.000023	RPD	5.9	Pass RPD	0.000017	0.000015	RPD	6.9	Pass RPD
Vanadium (V)-Dissolved	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*
Zinc (Zn)-Dissolved	mg/L	20	30	0.00050	*<0.00050*	*<0.00050*	*<DL*	*<DL*	*<DL*	*<0.00050*	0.00089	*<DL*	*<DL*	*<DL*
Zirconium (Zr)-Dissolved	mg/L		40	0.000010	0.000010	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*

Notes:

[a] Field Dup Methods are based on the concentrations:

RPD = relative percent difference is used to compare field duplicates when the measured concentration is > 5x the DL

DIFF = when concentrations < 5* DL

[b] Results refer to the RPD or absolute difference in concentration

DQO for RPDs is < Field RPD values

DQO for DIFF is < 2x the DL

Italicized numbers are below detection limits.

Table A-6. Water quality field duplicate results for the 2022 AEMP

Month	Units	Relative Percent Differece DQOs		July MDLs	July DUP-3 (B7-01)				
Station					B7-01	DUP-3	Field Dup Method [a]	Result [b] (RPD or Diff)	Outcome
Date Sampled					7/24/2022	7/24/2022			
ALS Sample ID		Lab	Field		L2725859-1	L2725859-4			
Parameter					Water	Water			
Physical Tests									
Conductivity	uS/cm	10	15	1.0	274	275	RPD	-0.4	Pass RPD
Hardness (as CaCO3)	-		40	0.20	102	101	RPD	1	Pass RPD
pH	pH		40	0.10	7.9	7.9	RPD	0.4	Pass RPD
Total Suspended Solids	mg/L		40	1.0	1.3	1.9	DIFF	-0.6	Pass Diff
Total Dissolved Solids	mg/L		40	13	174.0	171.0	RPD	1.7	Pass RPD
Turbidity	NTU	15	23	0.10	0.39	0.68	DIFF	-0.29	Fail
Anions and Nutrients									
Alkalinity, Total (as CaCO3)	mg/L	20	30	1.0	54.3	52.2	RPD	3.9	Pass RPD
Ammonia, Total (as N)	mg/L	20	30	0.0050	0.014	0.018	DIFF	-0.0041	Pass Diff
Bicarbonate (HCO3)	mg/L	20	30	1.2	66.2	63.7	RPD	3.8	Pass RPD
Bromide (Br)	mg/L	20	30	0.10	0.19	0.20	DIFF	-0.01	Pass Diff
Carbonate (CO3)	mg/L	20	30	0.60	*<0.60*	*<0.60*	*<DL*	*<DL*	*<DL*
Chloride (Cl)	mg/L	20	30	0.10	44	43.9	RPD	0.2	Pass RPD
Fluoride (F)	mg/L	20	30	0.020	0.040	0.040	DIFF	0	Pass Diff
Hydroxide (OH)	mg/L	20	30	0.34	*<0.34*	*<0.34*	*<DL*	*<DL*	*<DL*
Nitrate and Nitrite as N	mg/L	20	30	0.0051	0.0054	0.0052	DIFF	0.0002	Pass Diff
Nitrate (as N)	mg/L	20	30	0.0050	0.0054	0.0052	DIFF	0.0002	Pass Diff
Nitrite (as N)	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*
Total Kjeldahl Nitrogen	mg/L	20	30	0.050	0.45	0.41	RPD	7.9	Pass RPD
Total Nitrogen	mg/L	20	30	0.050	-	-	*<DL*	*<DL*	*<DL*
Dissolved Kjeldahl Nitrogen	mg/L	20	30	0.050	0.41	0.40	RPD	3	Pass RPD
Total Dissolved Nitrogen	mg/L	20	30	0.050	0.42	0.41	RPD	3.2	Pass RPD
Orthophosphate-Dissolved (as P)	mg/L	20	30	0.0010	0.0015	*<0.0010*	*<DL*	*<DL*	*<DL*
Phosphorus (P)-Dissolved	mg/L	20	30	0.0030	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*
Phosphorus (P)-Total	mg/L	20	30	0.0030	0.0054	0.0040	DIFF	0.0014	Pass Diff
Silica, Reactive (as SiO2)	mg/L	20	30	0.010	1.5	1.4	RPD	5.5	Pass RPD
TDS (Calculated)	mg/L	20	30		138.0	136.0	RPD	1.5	Pass RPD
Sulfate (SO4)	mg/L	20	30	0.30	11.4	11.4	RPD	0	Pass RPD
Cyanides									
Cyanide, Weak Acid Diss	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*
Cyanide, Total	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*
Cyanide, Free	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*
Organic / Inorganic Carbon									
Dissolved Organic Carbon	mg/L	20	30	0.50	6.0	6.1	RPD	-0.5	Pass RPD
Total Organic Carbon	mg/L	20	30	0.50	5.5	5.8	RPD	-5.5	Pass RPD
Total Metals									
Aluminum (Al)-Total	mg/L	20	30	0.0010	0.0029	0.0040	DIFF	-0.0011	Pass Diff
Antimony (Sb)-Total	mg/L	20	30	0.000020	0.000040	0.000038	DIFF	0.000002	Pass Diff
Arsenic (As)-Total	mg/L	20	30	0.000020	0.018	0.018	RPD	0	Pass RPD
Barium (Ba)-Total	mg/L	20	30	0.000020	0.029	0.028	RPD	1.7	Pass RPD
Beryllium (Be)-Total	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Bismuth (Bi)-Total	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Boron (B)-Total	mg/L	20	30	0.0050	0.016	0.017	DIFF	-0.0008	Pass Diff
Cadmium (Cd)-Total	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Calcium (Ca)-Total	mg/L	20	30	0.010	35.5	36.5	RPD	-2.8	Pass RPD
Chromium (Cr)-Total	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*
Cobalt (Co)-Total	mg/L	20	30	0.000005	0.000058	0.000061	RPD	-3.9	Pass RPD
Copper (Cu)-Total	mg/L	20	30	0.000050	0.00096	0.00098	RPD	-2.2	Pass RPD
Iron (Fe)-Total	mg/L	20	30	0.0010	0.10	0.10	RPD	-1	Pass RPD
Lead (Pb)-Total	mg/L	20	30	0.000010	0.000061	0.000065	RPD	-6.3	Pass RPD
Lithium (Li)-Total	mg/L	20	30	0.00050	0.019	0.020	RPD	-2.6	Pass RPD
Magnesium (Mg)-Total	mg/L	20	30	0.0040	3.6	3.7	RPD	-1.4	Pass RPD
Manganese (Mn)-Total	mg/L	20	30	0.000050	0.011	0.011	RPD	-1.8	Pass RPD
Mercury (Hg)-Total	ug/L	20	30	0.00050	0.0018	0.0012	DIFF	0.00064	Pass Diff
Molybdenum (Mo)-Total	mg/L	20	30	0.000050	0.00030	0.00031	RPD	-1.3	Pass RPD
Niobium (Nb)-Total	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*
Nickel (Ni)-Total	mg/L	20	30	0.000050	0.00086	0.00086	RPD	-0.9	Pass RPD
Phosphorus (P)-Total	mg/L	20	30	0.050	*<0.050*	*<0.050*	*<DL*	*<DL*	*<DL*
Potassium (K)-Total	mg/L	20	30	0.020	2.1	2.1	RPD	-0.5	Pass RPD
Selenium (Se)-Total	mg/L	20	30	0.000040	0.000053	0.000060	DIFF	-0.000007	Pass Diff
Silicon (Si)-Total	mg/L	20	30	0.050	0.75	0.76	RPD	-1.6	Pass RPD
Silver (Ag)-Total	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Sodium (Na)-Total	mg/L	20	30	0.020	9.1	9.0	RPD	0.6	Pass RPD
Strontium (Sr)-Total	mg/L	20	30	0.000020	0.30	0.31	RPD	-2.3	Pass RPD
Sulfur (S)-Total	mg/L	20	30	0.50	4.0	3.9	RPD	2.8	Pass RPD
Thallium (Tl)-Total	mg/L	20	30	0.000005	0.000006	0.000006	DIFF	1E-07	Pass Diff
Tin (Sn)-Total	mg/L	20	30	0.000020	*<0.000020*	*<0.000020*	*<DL*	*<DL*	*<DL*
Titanium (Ti)-Total	mg/L	20	30	0.000050	*<0.000050*	0.000066	*<DL*	*<DL*	*<DL*
Tungsten (W)-Total	mg/L	20	30	0.000010	0.000036	0.000038	DIFF	-0.000002	Pass Diff
Uranium (U)-Total	mg/L	20	30	0.000001	0.000070	0.000068	RPD	2.8	Pass RPD
Vanadium (V)-Total	mg/L	20	30	0.000050	0.000071	0.000076	DIFF	-0.000005	Pass Diff
Zinc (Zn)-Total	mg/L	20	30	0.00050	0.00067	0.00059	DIFF	0.00008	Pass Diff
Zirconium (Zr)-Total	mg/L	20	30	0.000010	*<0.000010*	0.000010	*<DL*	*<DL*	*<DL*
Dissolved Metals									
Aluminum (Al)-Dissolved	mg/L	20	30	0.0010	0.0021	0.0024	DIFF	-0.0003	Pass Diff
Antimony (Sb)-Dissolved	mg/L	20	30	0.000020	0.000034	0.000047	DIFF	-0.000013	Pass Diff
Arsenic (As)-Dissolved	mg/L	20	30	0.000020	0.014	0.014	RPD	0	Pass RPD
Barium (Ba)-Dissolved	mg/L	20	30	0.000020	0.027	0.027	RPD	-1.1	Pass RPD
Beryllium (Be)-Dissolved	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Bismuth (Bi)-Dissolved	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Boron (B)-Dissolved	mg/L	20	30	0.0050	0.016	0.017	DIFF	-0.0007	Pass Diff
Cadmium (Cd)-Dissolved	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Calcium (Ca)-Dissolved	mg/L	20	30	0.010	34.8	34.5	RPD	0.9	Pass RPD
Chromium (Cr)-Dissolved	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*
Cobalt (Co)-Dissolved	mg/L	20	30	0.000005	0.000044	0.000042	RPD	5.1	Pass RPD
Copper (Cu)-Dissolved	mg/L	20	30	0.000050	0.00093	0.00094	RPD	-0.4	Pass RPD
Iron (Fe)-Dissolved	mg/L	20	30	0.0010	0.027	0.031	RPD	-12.2	Pass RPD
Lead (Pb)-Dissolved	mg/L	20	30	0.000010	0.000014	0.000016	DIFF	-0.000002	Pass Diff
Lithium (Li)-Dissolved	mg/L	20	30	0.00050	0.019	0.019	RPD	-1.1	Pass RPD
Magnesium (Mg)-Dissolved	mg/L	20	30	0.0040	3.7	3.6	RPD	1.9	Pass RPD
Manganese (Mn)-Dissolved	mg/L	20	30	0.000050	0.00075	0.0012	RPD	-42.4	Fail
Mercury (Hg)-Dissolved	ug/L	20	30	0.00050	0.0013	0.00057	DIFF	0.00072	Pass Diff
Molybdenum (Mo)-Dissolved	mg/L	20	30	0.000050	0.00032	0.00031	RPD	1	Pass RPD
Nickel (Ni)-Dissolved	mg/L	20	30	0.000050	0.00086	0.00082	RPD	4.4	Pass RPD
Niobium (Nb)-Dissolved	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*
Phosphorus (P)-Dissolved	mg/L	20	30	0.050	*<0.050*	*<0.050*	*<DL*	*<DL*	*<DL*
Potassium (K)-Dissolved	mg/L	20	30	0.020	2.1	2.1	RPD	-1	Pass RPD
Selenium (Se)-Dissolved	mg/L	20	30	0.000040	*<0.000040*	*<0.000040*	*<DL*	*<DL*	*<DL*
Silicon (Si)-Dissolved	mg/L	20	30	0.050	0.72	0.72	RPD	-0.1	Pass RPD
Silver (Ag)-Dissolved	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Sodium (Na)-Dissolved	mg/L	20	30	0.020	9.2	9.2	RPD	0.3	Pass RPD
Strontium (Sr)-Dissolved	mg/L	20	30	0.000020	0.31	0.30	RPD	2	Pass RPD
Sulfur (S)-Dissolved	mg/L	20	30	0.50	3.9	4.0	RPD	-4.3	Pass RPD
Thallium (Tl)-Dissolved	mg/L	20	30	0.000005	0.000006	0.000006	DIFF	0.0000003	Pass Diff
Tin (Sn)-Dissolved	mg/L	20	30	0.000020	*<0.000020*	*<0.000020*	*<DL*	*<DL*	*<DL*
Titanium (Ti)-Dissolved	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*
Tungsten (W)-Dissolved	mg/L	20	30	0.000010	0.000042	0.000037	DIFF	0.000005	Pass Diff
Uranium (U)-Dissolved	mg/L	20	30	0.000001	0.000072	0.000070	RPD	3.5	Pass RPD
Vanadium (V)-Dissolved	mg/L	20	30	0.000050	0.000059	0.000059	DIFF	0	Pass Diff
Zinc (Zn)-Dissolved	mg/L	20	30	0.00050	*<0.00050*	0.00087	*<DL*	*<DL*	*<DL*
Zirconium (Zr)-Dissolved	mg/L		40	0.000010	*<0.000010*	0.000011	*<DL*	*<DL*	*<DL*

Notes:

[a] Field Dup Methods are based on the concentrations:

RPD = relative percent difference is used to compare field duplicates when the measured concentration is > 5x the DL

DIFF = when concentrations < 5* DL

[b] Results refer to the RPD or absolute difference in concentration

DQO for RPDs is < Field RPD values

DQO for DIFF is < 2x the DL

Italicized numbers are below detection limits.

Table A-6. Water quality field duplicate results for the 2022 AEMP

Month	Units	Relative Percent Differece DQOs		August MDLs	August DUP-1 (MEL-03-01)					August DUP-02 (MEL-01-01)				
Station					MEL-03-01	DUP-1	Field Dup Method [a]	Result [b] (RPD or Diff)	Outcome	MEL-01-01	DUP-2	Field Dup Method [a]	Result [b] (RPD or Diff)	Outcome
Date Sampled					8/20/2022	8/20/2022				8/18/2022	8/18/2022			
ALS Sample ID		Lab	Field		L2730440-1	L2730440-6				L2730442-1	L2730442-7			
Parameter					Water	Water				Water	Water			
Physical Tests														
Conductivity	uS/cm	10	15	1.0	84.8	85.4	RPD	-0.7	Pass RPD	113.0	112	RPD	0.9	Pass RPD
Hardness (as CaCO3)	-		40	0.20	24	23.9	RPD	-1.3	Pass RPD	31	31.2	RPD	0.3	Pass RPD
pH	pH		40	0.10	7.6	7.6	RPD	-0.8	Pass RPD	7.7	7.6	RPD	0.5	Pass RPD
Total Suspended Solids	mg/L		40	1.0	1.4	1.8	DIFF	-0.4	Pass Diff	*<1.0*	1.0	*<DL*	*<DL*	*<DL*
Total Dissolved Solids	mg/L		40	4.0	48	26	RPD	59.5	Fail	58	68	RPD	-15.9	Pass RPD
Turbidity	NTU	15	23	0.10	0.29	0.35	DIFF	-0.06	Pass Diff	0.34	0.36	DIFF	-0.02	Pass Diff
Anions and Nutrients														
Alkalinity, Total (as CaCO3)	mg/L	20	30	1.0	18.1	19.2	RPD	-5.9	Pass RPD	20.9	21	RPD	-0.5	Pass RPD
Ammonia, Total (as N)	mg/L	20	30	0.050	*<0.0050*	0.021	*<DL*	*<DL*	*<DL*	0.0059	0.0060	DIFF	-0.0001	Pass Diff
Bicarbonate (HCO3)	mg/L	20	30	1.2	22.10	23.4	RPD	-5.7	Pass RPD	25.50	25.6	RPD	-0.4	Pass RPD
Bromide (Br)	mg/L	20	30	0.10	*<0.10*	*<0.10*	*<DL*	*<DL*	*<DL*	*<0.10*	*<0.10*	*<DL*	*<DL*	*<DL*
Carbonate (CO3)	mg/L	20	30	0.60	*<0.60*	*<0.60*	*<DL*	*<DL*	*<DL*	*<0.60*	*<0.60*	*<DL*	*<DL*	*<DL*
Chloride (Cl)	mg/L	20	30	0.10	10.0	10.0	RPD	0	Pass RPD	15.40	15.4	RPD	0	Pass RPD
Fluoride (F)	mg/L	20	30	0.020	0.024	0.027	DIFF	-0.003	Pass Diff	0.029	0.029	DIFF	0	Pass Diff
Hydroxide (OH)	mg/L	20	30	0.34	*<0.34*	*<0.34*	*<DL*	*<DL*	*<DL*	*<0.34*	*<0.34*	*<DL*	*<DL*	*<DL*
Nitrate and Nitrite as N	mg/L	20	30	0.0051	*<0.0051*	*<0.0051*	*<DL*	*<DL*	*<DL*	*<0.0051*	*<0.0051*	*<DL*	*<DL*	*<DL*
Nitrate (as N)	mg/L	20	30	0.0050	*<0.0050*	*<0.0050*	*<DL*	*<DL*	*<DL*	*<0.0050*	*<0.0050*	*<DL*	*<DL*	*<DL*
Nitrite (as N)	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*
Total Kjeldahl Nitrogen	mg/L	20	30	0.050	0.19	0.23	DIFF	-0.033	Pass Diff	0.28	0.30	RPD	-7.7	Pass RPD
Total Nitrogen	mg/L	20	30	0.050	0.19	0.23	DIFF	-0.033	Pass Diff	0.28	0.30	RPD	-7.7	Pass RPD
Dissolved Kjeldahl Nitrogen	mg/L	20	30	0.050	0.20	0.20	DIFF	-0.008	Pass Diff	0.23	0.34	DIFF	-0.117	Fail
Total Dissolved Nitrogen	mg/L	20	30	0.050	0.20	0.20	DIFF	-0.008	Pass Diff	0.23	0.34	DIFF	-0.117	Fail
Orthophosphate-Dissolved (as P)	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*
Phosphorus (P)-Dissolved	mg/L	20	30	0.0010	0.0032	0.0022	DIFF	0.001	Pass Diff	0.0025	0.0021	DIFF	0.0004	Pass Diff
Phosphorus (P)-Total	mg/L	20	30	0.0010	0.0032	0.0036	DIFF	-0.0004	Pass Diff	0.0069	0.0059	RPD	15.6	Pass RPD
Silica, Reactive (as SiO2)	mg/L	20	30	0.010	0.33	0.29	RPD	12.7	Pass RPD	0.47	0.47	RPD	-0.9	Pass RPD
TDS (Calculated)	mg/L	20	30	0	40.20	40.50	RPD	-0.7	Pass RPD	54.60	54.30	RPD	0.6	Pass RPD
Sulfate (SO4)	mg/L	20	30	0.30	4.4	3.8	RPD	14.6	Pass RPD	6.1	6.1	RPD	0.8	Pass RPD
Cyanides														
Cyanide, Weak Acid Diss	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*
Cyanide, Total	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*
Cyanide, Free	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*	0.0011	0.0013	DIFF	-0.0002	Pass Diff
Organic / Inorganic Carbon														
Dissolved Organic Carbon	mg/L	20	30	0.50	2.4	2.6	DIFF	-0.2	Pass Diff	3.6	3.6	RPD	-0.3	Pass RPD
Total Organic Carbon	mg/L	20	30	0.50	2.9	2.5	RPD	11.9	Pass RPD	3.7	3.7	RPD	-0.8	Pass RPD
Total Metals														
Aluminum (Al)-Total	mg/L	20	30	0.0010	0.0083	0.0024	DIFF	0.0059	Fail	0.0031	0.0031	DIFF	0	Pass Diff
Antimony (Sb)-Total	mg/L	20	30	0.000020	*<0.000020*	*<0.000020*	*<DL*	*<DL*	*<DL*	*<0.000020*	*<0.000020*	*<DL*	*<DL*	*<DL*
Arsenic (As)-Total	mg/L	20	30	0.000020	0.00039	0.00034	RPD	11.8	Pass RPD	0.00067	0.00067	RPD	0.6	Pass RPD
Barium (Ba)-Total	mg/L	20	30	0.000020	0.0076	0.0075	RPD	2.1	Pass RPD	0.0087	0.0090	RPD	-2.9	Pass RPD
Beryllium (Be)-Total	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Bismuth (Bi)-Total	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Boron (B)-Total	mg/L	20	30	0.0050	*<0.0050*	*<0.0050*	*<DL*	*<DL*	*<DL*	0.0074	0.0073	DIFF	0.0001	Pass Diff
Cadmium (Cd)-Total	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Calcium (Ca)-Total	mg/L	20	30	0.010	7.8	7.9	RPD	-1.9	Pass RPD	9.5	9.4	RPD	1.4	Pass RPD
Chromium (Cr)-Total	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*
Cobalt (Co)-Total	mg/L	20	30	0.000005	0.000015	0.000009	DIFF	0.000006	Pass Diff	0.000026	0.000023	DIFF	0.0000034	Pass Diff
Copper (Cu)-Total	mg/L	20	30	0.000050	0.00079	0.00077	RPD	2.6	Pass RPD	0.00099	0.00092	RPD	7.1	Pass RPD
Iron (Fe)-Total	mg/L	20	30	0.0010	0.020	0.010	RPD	64.4	Fail	0.026	0.025	RPD	3.9	Pass RPD
Lead (Pb)-Total	mg/L	20	30	0.000010	0.000027	*<0.000010*	*<DL*	*<DL*	*<DL*	0.000013	*<0.000010*	*<DL*	*<DL*	*<DL*
Lithium (Li)-Total	mg/L	20	30	0.00050	0.00084	0.00083	DIFF	0.00001	Pass Diff	0.0011	0.0011	DIFF	3E-05	Pass Diff
Magnesium (Mg)-Total	mg/L	20	30	0.0040	1.3	1.2	RPD	0.8	Pass RPD	1.7	1.8	RPD	-2.3	Pass RPD
Manganese (Mn)-Total	mg/L	20	30	0.000050	0.0027	0.0023	RPD	14.9	Pass RPD	0.0091	0.0091	RPD	-0.3	Pass RPD
Mercury (Hg)-Total	ug/L	20	30	0.0050	*<0.0050*	*<0.0050*	*<DL*	*<DL*	*<DL*	*<0.0050*	*<0.0050*	*<DL*	*<DL*	*<DL*
Molybdenum (Mo)-Total	mg/L	20	30	0.000050	0.000080	0.00024	DIFF	-0.000164	Fail	0.00014	0.00013	DIFF	0.000016	Pass Diff
Niobium (Nb)-Total	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*
Nickel (Ni)-Total	mg/L	20	30	0.000050	0.00044	0.00043	RPD	3.5	Pass RPD	0.00085	0.00085	RPD	-0.7	Pass RPD
Phosphorus (P)-Total	mg/L	20	30	0.050	*<0.050*	*<0.050*	*<DL*	*<DL*	*<DL*	*<0.050*	*<0.050*	*<DL*	*<DL*	*<DL*
Potassium (K)-Total	mg/L	20	30	0.020	1.0	1.0	RPD	0	Pass RPD	1.2	1.2	RPD	-2.4	Pass RPD
Selenium (Se)-Total	mg/L	20	30	0.000040	0.000042	*<0.000040*	*<DL*	*<DL*	*<DL*	*<0.000040*	0.000050	*<DL*	*<DL*	*<DL*
Silicon (Si)-Total	mg/L	20	30	0.050	0.13	0.13	DIFF	0.001	Pass Diff	0.22	0.22	DIFF	-0.006	Pass Diff
Silver (Ag)-Total	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Sodium (Na)-Total	mg/L	20	30	0.020	5.4	5.2	RPD	2.5	Pass RPD	7.7	7.9	RPD	-1.8	Pass RPD
Strontium (Sr)-Total	mg/L	20	30	0.000020	0.041	0.041	RPD	-0.2	Pass RPD	0.058	0.059	RPD	-2.1	Pass RPD
Sulfur (S)-Total	mg/L	20	30	0.50	1.5	1.4	DIFF	0.12	Pass Diff	2.4	2.4	DIFF	-0.02	Pass Diff
Thallium (Tl)-Total	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Tin (Sn)-Total	mg/L	20	30	0.000020	*<0.000020*	*<0.000020*	*<DL*	*<DL*	*<DL*	*<0.000020*	*<0.000020*	*<DL*	*<DL*	*<DL*
Titanium (Ti)-Total	mg/L	20	30	0.000050	0.0014	0.000063	DIFF	0.001337	Fail	0.000064	0.000058	DIFF	0.000006	Pass Diff
Tungsten (W)-Total	mg/L	20	30	0.000010	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*
Uranium (U)-Total	mg/L	20	30	0.000001	0.000021	0.000018	RPD	16.8	Pass RPD	0.000024	0.000023	RPD	3.4	Pass RPD
Vanadium (V)-Total	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*
Zinc (Zn)-Total	mg/L	20	30	0.00050	*<0.00050*	*<0.00050*	*<DL*	*<DL*	*<DL*	*<0.00050*	*<0.00050*	*<DL*	*<DL*	*<DL*
Zirconium (Zr)-Total	mg/L	20	30	0.000010	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*
Dissolved Metals														
Aluminum (Al)-Dissolved	mg/L	20	30	0.0010	0.0015	0.0065	DIFF	-0.005	Fail	0.0011	*<0.0010*	*<DL*	*<DL*	*<DL*
Antimony (Sb)-Dissolved	mg/L	20	30	0.000020	*<0.000020*	*<0.000020*	*<DL*	*<DL*	*<DL*	*<0.000020*	*<0.000020*	*<DL*	*<DL*	*<DL*
Arsenic (As)-Dissolved	mg/L	20	30	0.000020	0.00035	0.00033	RPD	5.6	Pass RPD	0.00059	0.00061	RPD	-4.7	Pass RPD
Barium (Ba)-Dissolved	mg/L	20	30	0.000020	0.0075	0.0076	RPD	-0.9	Pass RPD	0.0082	0.0082	RPD	0.1	Pass RPD
Beryllium (Be)-Dissolved	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Bismuth (Bi)-Dissolved	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Boron (B)-Dissolved	mg/L	20	30	0.0050	*<0.0050*	*<0.0050*	*<DL*	*<DL*	*<DL*	0.0073	0.0070	DIFF	0.0003	Pass Diff
Cadmium (Cd)-Dissolved	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Calcium (Ca)-Dissolved	mg/L	20	30	0.010	7.3	7.4	RPD	-1.6	Pass RPD	9.6	9.6	RPD	0	Pass RPD
Chromium (Cr)-Dissolved	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*
Cobalt (Co)-Dissolved	mg/L	20	30	0.000005	0.000005	0.000006	DIFF	-5E-07	Pass Diff	0.000015	0.000016	DIFF	-0.0000014	Pass Diff
Copper (Cu)-Dissolved	mg/L	20	30	0.000050	0.00080	0.00073	RPD	9	Pass RPD	0.00094	0.00093	RPD	1.3	Pass RPD
Iron (Fe)-Dissolved	mg/L	20	30	0.0010	0.0043	0.0041	DIFF	0.0002	Pass Diff	0.0051	0.0048	DIFF	0.0003	Pass Diff
Lead (Pb)-Dissolved	mg/L	20	30	0.000010	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*
Lithium (Li)-Dissolved	mg/L	20	30	0.00050	0.00077	0.00076	DIFF	1E-05	Pass Diff	0.0011	0.0011	DIFF	3E-05	Pass Diff
Magnesium (Mg)-Dissolved	mg/L	20	30	0.0040	1.3	1.3	RPD	0.8	Pass RPD	1.8	1.8	RPD	1.1	Pass RPD
Manganese (Mn)-Dissolved	mg/L	20	30	0.000050	0.00045	0.00046	RPD	-2.4	Pass RPD	0.00020	0.00019	DIFF	5E-06	Pass Diff
Mercury (Hg)-Dissolved	ug/L	20	30	0.00050	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Molybdenum (Mo)-Dissolved	mg/L	20	30	0.000050	0.000084	0.00023	DIFF	-0.000148	Fail	0.00013	0.00060	DIFF	-0.000465	Fail
Nickel (Ni)-Dissolved	mg/L	20	30	0.000050	0.00039	0.00036	RPD	7.2	Pass RPD	0.00073	0.00072	RPD	1	Pass RPD
Niobium (Nb)-Dissolved	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*
Phosphorus (P)-Dissolved	mg/L	20	30	0.050	*<0.050*	*<0.050*	*<DL*	*<DL*	*<DL*	*<0.050*	*<0.050*	*<DL*	*<DL*	*<DL*
Potassium (K)-Dissolved	mg/L	20	30	0.020	1.0	1.0	RPD	1	Pass RPD	1.2	1.2	RPD	0.8	Pass RPD
Selenium (Se)-Dissolved	mg/L	20	30	0.000040	0.000047	*<0.000040*	*<DL*	*<DL*	*<DL*	*<0.000040*	*<0.000040*	*<DL*	*<DL*	*<DL*
Silicon (Si)-Dissolved	mg/L	20	30	0.050	0.13	0.15	DIFF	-0.014	Pass Diff	0.22	0.23	DIFF	-0.008	Pass Diff
Silver (Ag)-Dissolved	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Sodium (Na)-Dissolved	mg/L	20	30	0.020	5.3	5.4	RPD	-1.5	Pass RPD	7.9	7.7	RPD	2.6	Pass RPD
Strontium (Sr)-Dissolved	mg/L	20	30	0.000020	0.041	0.042	RPD	-1.4	Pass RPD	0.058	0.058	RPD	1.2	Pass RPD
Sulfur (S)-Dissolved	mg/L	20	30	0.50	1.4	1.6	DIFF	-0.21	Pass Diff	2.1	2.2	DIFF	-0.12	Pass Diff
Thallium (Tl)-Dissolved	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Tin (Sn)-Dissolved	mg/L	20	30	0.000020	*<0.000020*	0.000052	*<DL*	*<DL*	*<DL*	*<0.000020*	*<0.000020*	*<DL*	*<DL*	*<DL*
Titanium (Ti)-Dissolved	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*
Tungsten (W)-Dissolved	mg/L	20	30	0.000010	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*
Uranium (U)-Dissolved	mg/L	20	30	0.000001	0.000018	0.000017	RPD	2.3	Pass RPD	0.000022	0.000022	RPD	-1.8	Pass RPD
Vanadium (V)-Dissolved	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*
Zinc (Zn)-Dissolved	mg/L	20	30	0.00050	0.00080	0.0018	DIFF	-0.00096	Pass Diff	*<0.00050*	*<0.00050*	*<DL*	*<DL*	*<DL*
Zirconium (Zr)-Dissolved	mg/L		40	0.000010	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*

Notes:

[a] Field Dup Methods are based on the concentrations:

RPD = relative percent difference is used to compare field duplicates when the measured concentration is > 5x the DL

DIFF = when concentrations < 5* DL

[b] Results refer to the RPD or absolute difference in concentration

DQO for RPDs is < Field RPD values

DQO for DIFF is < 2x the DL

Italicized numbers are below detection limits.

Table A-6. Water quality field duplicate results for the 2022 AEMP

Month	Units	Relative Percent Differece DQOs		August MDLs	August DUP-03 (MEL-05-05)					August DUP-04 (D7-01)				
Station					MEL-05-05	DUP-3	Field Dup Method [a]	Result [b] (RPD or Diff)	Outcome	D7-01	DUP-4	Field Dup Method [a]	Result [b] (RPD or Diff)	Outcome
Date Sampled					8/14/2022	8/14/2022				8/17/2022	8/17/2022			
ALS Sample ID		Lab	Field		L2729094-5	L2729094-6				L2730439-7	L2730439-10			
Parameter					Water	Water				Water	Water			
Physical Tests														
Conductivity	uS/cm	10	15	1.0	82.8	83.6	RPD	-1	Pass RPD	145	145	RPD	0	Pass RPD
Hardness (as CaCO3)	-		40	0.20	25	25.5	RPD	-2	Pass RPD	50	50	RPD	-0.6	Pass RPD
pH	pH		40	0.10	7.4	7.4	RPD	-0.3	Pass RPD	8.0	8.0	RPD	0	Pass RPD
Total Suspended Solids	mg/L		40	1.0	*<1.0*	*<1.0*	*<DL*	*<DL*	*<DL*	*<1.0*	1.1	*<DL*	*<DL*	*<DL*
Total Dissolved Solids	mg/L		40	4.0	50	49	RPD	2	Pass RPD	78	72	RPD	8	Pass RPD
Turbidity	NTU	15	23	0.10	0.32	0.62	DIFF	-0.3	Fail	0.46	0.61	DIFF	-0.15	Pass Diff
Anions and Nutrients														
Alkalinity, Total (as CaCO3)	mg/L	20	30	1.0	21.3	21.8	RPD	-2.3	Pass RPD	52.1	52.4	RPD	-0.6	Pass RPD
Ammonia, Total (as N)	mg/L	20	30	0.050	0.0050	0.0072	DIFF	-0.0022	Pass Diff	0.0060	0.039	DIFF	-0.0332	Pass Diff
Bicarbonate (HCO3)	mg/L	20	30	1.2	26.00	26.6	RPD	-2.3	Pass RPD	63.60	63.9	RPD	-0.5	Pass RPD
Bromide (Br)	mg/L	20	30	0.10	*<0.10*	*<0.10*	*<DL*	*<DL*	*<DL*	*<0.10*	*<0.10*	*<DL*	*<DL*	*<DL*
Carbonate (CO3)	mg/L	20	30	0.60	*<0.60*	*<0.60*	*<DL*	*<DL*	*<DL*	*<0.60*	*<0.60*	*<DL*	*<DL*	*<DL*
Chloride (Cl)	mg/L	20	30	0.10	10.00	10	RPD	0	Pass RPD	9.3	9.1	RPD	2	Pass RPD
Fluoride (F)	mg/L	20	30	0.020	0.028	0.028	DIFF	0	Pass Diff	0.041	0.043	DIFF	-0.002	Pass Diff
Hydroxide (OH)	mg/L	20	30	0.34	*<0.34*	*<0.34*	*<DL*	*<DL*	*<DL*	*<0.34*	*<0.34*	*<DL*	*<DL*	*<DL*
Nitrate and Nitrite as N	mg/L	20	30	0.0051	*<0.0051*	*<0.0051*	*<DL*	*<DL*	*<DL*	*<0.0051*	0.0071	*<DL*	*<DL*	*<DL*
Nitrate (as N)	mg/L	20	30	0.0050	*<0.0050*	*<0.0050*	*<DL*	*<DL*	*<DL*	*<0.0050*	0.0071	*<DL*	*<DL*	*<DL*
Nitrite (as N)	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*
Total Kjeldahl Nitrogen	mg/L	20	30	0.050	0.23	0.19	DIFF	0.034	Pass Diff	0.41	0.45	RPD	-9.4	Pass RPD
Total Nitrogen	mg/L	20	30	0.050	0.23	0.19	DIFF	0.034	Pass Diff	0.41	0.45	RPD	-10.9	Pass RPD
Dissolved Kjeldahl Nitrogen	mg/L	20	30	0.050	0.19	0.18	DIFF	0.012	Pass Diff	0.35	0.34	RPD	2	Pass RPD
Total Dissolved Nitrogen	mg/L	20	30	0.050	0.19	0.18	DIFF	0.012	Pass Diff	0.35	0.35	RPD	0	Pass RPD
Orthophosphate-Dissolved (as P)	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*
Phosphorus (P)-Dissolved	mg/L	20	30	0.0010	0.0043	0.0010	DIFF	0.0033	Fail	0.0051	0.0028	DIFF	0.0023	Fail
Phosphorus (P)-Total	mg/L	20	30	0.0010	0.0038	0.0053	DIFF	-0.0015	Pass Diff	0.010	0.0092	RPD	9.3	Pass RPD
Silica, Reactive (as SiO2)	mg/L	20	30	0.010	0.34	0.41	RPD	-19.2	Pass RPD	0.57	0.56	RPD	1.8	Pass RPD
TDS (Calculated)	mg/L	20	30	0	42.30	42.60	RPD	-0.7	Pass RPD	71.40	71.40	RPD	0	Pass RPD
Sulfate (SO4)	mg/L	20	30	0.30	4.0	4.0	RPD	0	Pass RPD	3.7	3.7	RPD	-0.3	Pass RPD
Cyanides														
Cyanide, Weak Acid Diss	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*
Cyanide, Total	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*
Cyanide, Free	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*	0.0010	*<0.0010*	*<DL*	*<DL*	*<DL*
Organic / Inorganic Carbon														
Dissolved Organic Carbon	mg/L	20	30	0.50	3.0	3.0	RPD	-2	Pass RPD	4.3	4.3	RPD	-0.9	Pass RPD
Total Organic Carbon	mg/L	20	30	0.50	3.1	3.1	RPD	-1	Pass RPD	4.4	4.2	RPD	4.4	Pass RPD
Total Metals														
Aluminum (Al)-Total	mg/L	20	30	0.0010	0.0023	0.0026	DIFF	-0.0003	Pass Diff	0.0046	0.0054	DIFF	-0.0008	Pass Diff
Antimony (Sb)-Total	mg/L	20	30	0.000020	*<0.000020*	*<0.000020*	*<DL*	*<DL*	*<DL*	0.000020	*<0.000020*	*<DL*	*<DL*	*<DL*
Arsenic (As)-Total	mg/L	20	30	0.000020	0.00042	0.00041	RPD	3.6	Pass RPD	0.0014	0.0014	RPD	0.7	Pass RPD
Barium (Ba)-Total	mg/L	20	30	0.000020	0.0081	0.0082	RPD	-0.6	Pass RPD	0.014	0.015	RPD	-1.4	Pass RPD
Beryllium (Be)-Total	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Bismuth (Bi)-Total	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Boron (B)-Total	mg/L	20	30	0.0050	0.0050	0.0050	DIFF	0	Pass Diff	0.015	0.015	DIFF	0	Pass Diff
Cadmium (Cd)-Total	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Calcium (Ca)-Total	mg/L	20	30	0.010	8.3	8.2	RPD	1.1	Pass RPD	15.70000	16.1	RPD	-2.5	Pass RPD
Chromium (Cr)-Total	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*
Cobalt (Co)-Total	mg/L	20	30	0.000005	0.000010	0.000012	DIFF	-0.000002	Pass Diff	0.000034	0.000039	RPD	-15.6	Pass RPD
Copper (Cu)-Total	mg/L	20	30	0.000050	0.00076	0.00076	RPD	0.5	Pass RPD	0.00092	0.00089	RPD	2.8	Pass RPD
Iron (Fe)-Total	mg/L	20	30	0.0010	0.0097	0.010	RPD	-5	Pass RPD	0.039	0.043	RPD	-9	Pass RPD
Lead (Pb)-Total	mg/L	20	30	0.000010	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	0.000012	0.000012	DIFF	0	Pass Diff
Lithium (Li)-Total	mg/L	20	30	0.00050	0.00090	0.00090	DIFF	0	Pass Diff	0.0016	0.0016	DIFF	4E-05	Pass Diff
Magnesium (Mg)-Total	mg/L	20	30	0.0040	1.3	1.3	RPD	3.1	Pass RPD	2.9	2.9	RPD	0	Pass RPD
Manganese (Mn)-Total	mg/L	20	30	0.000050	0.0028	0.0030	RPD	-4.8	Pass RPD	0.0094	0.0096	RPD	-2.1	Pass RPD
Mercury (Hg)-Total	ug/L	20	30	0.0050	*<0.0050*	*<0.0050*	*<DL*	*<DL*	*<DL*	*<0.0050*	*<0.0050*	*<DL*	*<DL*	*<DL*
Molybdenum (Mo)-Total	mg/L	20	30	0.000050	0.00012	0.000094	DIFF	0.000023	Pass Diff	0.00056	0.00060	RPD	-7.5	Pass RPD
Niobium (Nb)-Total	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*
Nickel (Ni)-Total	mg/L	20	30	0.000050	0.00043	0.00039	RPD	9.6	Pass RPD	0.00064	0.00062	RPD	3.2	Pass RPD
Phosphorus (P)-Total	mg/L	20	30	0.050	*<0.050*	*<0.050*	*<DL*	*<DL*	*<DL*	*<0.050*	*<0.050*	*<DL*	*<DL*	*<DL*
Potassium (K)-Total	mg/L	20	30	0.020	1.0	0.99	RPD	3	Pass RPD	1.5	1.5	RPD	1.3	Pass RPD
Selenium (Se)-Total	mg/L	20	30	0.000040	0.000048	0.000044	DIFF	0.000004	Pass Diff	*<0.000040*	0.000046	*<DL*	*<DL*	*<DL*
Silicon (Si)-Total	mg/L	20	30	0.050	0.16	0.17	DIFF	-0.012	Pass Diff	0.28	0.28	RPD	0.7	Pass RPD
Silver (Ag)-Total	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Sodium (Na)-Total	mg/L	20	30	0.020	5.3	5.1	RPD	3.7	Pass RPD	7.6	7.5	RPD	1.3	Pass RPD
Strontium (Sr)-Total	mg/L	20	30	0.000020	0.043	0.042	RPD	1.2	Pass RPD	0.079	0.079	RPD	0.8	Pass RPD
Sulfur (S)-Total	mg/L	20	30	0.50	1.8	1.5	DIFF	0.24	Pass Diff	1.3	1.5	DIFF	-0.19	Pass Diff
Thallium (Tl)-Total	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Tin (Sn)-Total	mg/L	20	30	0.000020	*<0.000020*	*<0.000020*	*<DL*	*<DL*	*<DL*	*<0.000020*	*<0.000020*	*<DL*	*<DL*	*<DL*
Titanium (Ti)-Total	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	0.00013	0.00017	DIFF	-0.000048	Pass Diff
Tungsten (W)-Total	mg/L	20	30	0.000010	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*
Uranium (U)-Total	mg/L	20	30	0.000001	0.000017	0.000019	RPD	-11	Pass RPD	0.000085	0.000085	RPD	-0.6	Pass RPD
Vanadium (V)-Total	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	0.000071	0.000074	DIFF	-3E-06	Pass Diff
Zinc (Zn)-Total	mg/L	20	30	0.00050	*<0.00050*	*<0.00050*	*<DL*	*<DL*	*<DL*	0.00053	*<0.00050*	*<DL*	*<DL*	*<DL*
Zirconium (Zr)-Total	mg/L	20	30	0.000010	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*
Dissolved Metals														
Aluminum (Al)-Dissolved	mg/L	20	30	0.0010	0.0011	0.0015	DIFF	-0.0004	Pass Diff	0.0025	0.0025	DIFF	0	Pass Diff
Antimony (Sb)-Dissolved	mg/L	20	30	0.000020	*<0.000020*	*<0.000020*	*<DL*	*<DL*	*<DL*	*<0.000020*	*<0.000020*	*<DL*	*<DL*	*<DL*
Arsenic (As)-Dissolved	mg/L	20	30	0.000020	0.00040	0.00038	RPD	4.8	Pass RPD	0.0012	0.0013	RPD	-0.8	Pass RPD
Barium (Ba)-Dissolved	mg/L	20	30	0.000020	0.0080	0.0078	RPD	2.2	Pass RPD	0.014	0.014	RPD	-2.2	Pass RPD
Beryllium (Be)-Dissolved	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Bismuth (Bi)-Dissolved	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Boron (B)-Dissolved	mg/L	20	30	0.0050	*<0.0050*	*<0.0050*	*<DL*	*<DL*	*<DL*	0.013	0.013	DIFF	0.0002	Pass Diff
Cadmium (Cd)-Dissolved	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Calcium (Ca)-Dissolved	mg/L	20	30	0.010	7.9	8.1	RPD	-2.8	Pass RPD	15	15	RPD	0	Pass RPD
Chromium (Cr)-Dissolved	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*
Cobalt (Co)-Dissolved	mg/L	20	30	0.000005	0.000005	0.000006	DIFF	-0.0000006	Pass Diff	0.000014	0.000016	DIFF	-0.0000024	Pass Diff
Copper (Cu)-Dissolved	mg/L	20	30	0.000050	0.00076	0.00078	RPD	-3.1	Pass RPD	0.00093	0.00088	RPD	4.7	Pass RPD
Iron (Fe)-Dissolved	mg/L	20	30	0.0010	0.0036	0.0040	DIFF	-0.0004	Pass Diff	0.016	0.014	RPD	13.3	Pass RPD
Lead (Pb)-Dissolved	mg/L	20	30	0.000010	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	0.000012	*<0.000010*	*<DL*	*<DL*	*<DL*
Lithium (Li)-Dissolved	mg/L	20	30	0.00050	0.00087	0.00089	DIFF	-2E-05	Pass Diff	0.0014	0.0014	DIFF	2E-05	Pass Diff
Magnesium (Mg)-Dissolved	mg/L	20	30	0.0040	1.3	1.3	RPD	1.5	Pass RPD	2.9	3.0	RPD	-3	Pass RPD
Manganese (Mn)-Dissolved	mg/L	20	30	0.000050	0.00044	0.00036	RPD	18.2	Pass RPD	0.00031	0.00023	DIFF	0.000073	Pass Diff
Mercury (Hg)-Dissolved	ug/L	20	30	0.00050	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Molybdenum (Mo)-Dissolved	mg/L	20	30	0.000050	0.000092	0.000097	DIFF	-0.000005	Pass Diff	0.00059	0.00058	RPD	2.6	Pass RPD
Nickel (Ni)-Dissolved	mg/L	20	30	0.000050	0.00038	0.00037	RPD	1.9	Pass RPD	0.00057	0.00067	RPD	-16.3	Pass RPD
Niobium (Nb)-Dissolved	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*
Phosphorus (P)-Dissolved	mg/L	20	30	0.050	*<0.050*	*<0.050*	*<DL*	*<DL*	*<DL*	*<0.050*	*<0.050*	*<DL*	*<DL*	*<DL*
Potassium (K)-Dissolved	mg/L	20	30	0.020	0.99	1.00	RPD	-0.6	Pass RPD	1.5	1.5	RPD	0	Pass RPD
Selenium (Se)-Dissolved	mg/L	20	30	0.000040	*<0.000040*	*<0.000040*	*<DL*	*<DL*	*<DL*	*<0.000040*	0.000053	*<DL*	*<DL*	*<DL*
Silicon (Si)-Dissolved	mg/L	20	30	0.050	0.15	0.16	DIFF	-0.002	Pass Diff	0.30	0.29	RPD	1.7	Pass RPD
Silver (Ag)-Dissolved	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Sodium (Na)-Dissolved	mg/L	20	30	0.020	5.3	5.1	RPD	3.4	Pass RPD	7.7	7.6	RPD	1.3	Pass RPD
Strontium (Sr)-Dissolved	mg/L	20	30	0.000020	0.042	0.041	RPD	0.7	Pass RPD	0.082	0.082	RPD	-0.2	Pass RPD
Sulfur (S)-Dissolved	mg/L	20	30	0.50	1.7	1.6	DIFF	0.19	Pass Diff	1.5	1.4	DIFF	0.06	Pass Diff
Thallium (Tl)-Dissolved	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Tin (Sn)-Dissolved	mg/L	20	30	0.000020	*<0.000020*	*<0.000020*	*<DL*	*<DL*	*<DL*	*<0.000020*	*<0.000020*	*<DL*	*<DL*	*<DL*
Titanium (Ti)-Dissolved	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*
Tungsten (W)-Dissolved	mg/L	20	30	0.000010	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*
Uranium (U)-Dissolved	mg/L	20	30	0.000001	0.000018	0.000020	RPD	-10.8	Pass RPD	0.000090	0.000085	RPD	5.5	Pass RPD
Vanadium (V)-Dissolved	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	0.000061	0.000063	DIFF	-0.000002	Pass Diff
Zinc (Zn)-Dissolved	mg/L	20	30	0.00050	0.00065	*<0.00050*	*<DL*	*<DL*	*<DL*	*<0.00050*	*<0.00050*	*<DL*	*<DL*	*<DL*
Zirconium (Zr)-Dissolved	mg/L		40	0.000010	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*

Notes:

[a] Field Dup Methods are based on the concentrations:

RPD = relative percent difference is used to compare field duplicates when the measured concentration is > 5x the DL

DIFF = when concentrations < 5* DL

[b] Results refer to the RPD or absolute difference in concentration

DQO for RPDs is < Field RPD values

DQO for DIFF is < 2x the DL

Italicized numbers are below detection limits.

Table A-6. Water quality field duplicate results for the 2022 AEMP

Month	Units	Relative Percent Differece DQOs		Sep MDLs	September DUP-01 (MEL-01-08)					September DUP-3 (MEL-03-05)				
Station					MEL-01-08	DUP-1	Field Dup Method [a]	Result [b] (RPD or Diff)	Outcome	MEL-03-05	DUP-3	Field Dup Method [a]	Result [b] (RPD or Diff)	Outcome
Date Sampled					9/16/2022	9/16/2022				9/14/2022	9/14/2022			
ALS Sample ID		Lab	Field		L2733905-4	L2733929-1				L2733869-5	L2733925-1			
Parameter					Water	Water				Water	Water			
Physical Tests														
Conductivity	uS/cm	10	15	1.0	119	119	RPD	0	Pass RPD	113	112	RPD	0.9	Pass RPD
Hardness (as CaCO3)	-		40	0.20	31.4	31.8	RPD	-1.3	Pass RPD	28.5	27.7	RPD	2.8	Pass RPD
pH	pH		40	0.10	7.5	7.3	RPD	3.5	Pass RPD	7.5	7.3	RPD	2.3	Pass RPD
Total Suspended Solids	mg/L		40	1.0	1.2	1.0	DIFF	0.2	Pass Diff	*<1.0*	*<1.0*	*<DL*	*<DL*	*<DL*
Total Dissolved Solids	mg/L		40	13.3333333	58	52	DIFF	6	Pass Diff	70	72	RPD	-2.8	Pass RPD
Turbidity	NTU	15	23	0.10	0.46	0.39	DIFF	0.07	Pass Diff	0.32	0.24	DIFF	0.08	Pass Diff
Anions and Nutrients														
Alkalinity, Total (as CaCO3)	mg/L	20	30	1.0	22.9	21.6	RPD	5.8	Pass RPD	20	17.3	RPD	14.5	Pass RPD
Ammonia, Total (as N)	mg/L	20	30	0.0050	0.020	0.0072	DIFF	0.0124	Fail	0.046	0.040	RPD	16.1	Pass RPD
Bicarbonate (HCO3)	mg/L	20	30	1.2	27.9	26.4	RPD	5.5	Pass RPD	24.4	21.1	RPD	14.5	Pass RPD
Bromide (Br)	mg/L	20	30	0.10	*<0.10*	*<0.10*	*<DL*	*<DL*	*<DL*	*<0.10*	*<0.10*	*<DL*	*<DL*	*<DL*
Carbonate (CO3)	mg/L	20	30	0.60	*<0.60*	*<0.60*	*<DL*	*<DL*	*<DL*	*<0.60*	*<0.60*	*<DL*	*<DL*	*<DL*
Chloride (Cl)	mg/L	20	30	0.10	17.1	17.1	RPD	0	Pass RPD	17.9	17.9	RPD	0	Pass RPD
Fluoride (F)	mg/L	20	30	0.020	0.029	0.028	DIFF	0.001	Pass Diff	0.026	0.026	DIFF	0	Pass Diff
Hydroxide (OH)	mg/L	20	30	0.34	*<0.34*	*<0.34*	*<DL*	*<DL*	*<DL*	*<0.34*	*<0.34*	*<DL*	*<DL*	*<DL*
Nitrate and Nitrite as N	mg/L	20	30	0.0051	0.020	0.016	DIFF	0.0042	Pass Diff	0.042	0.042	RPD	2.1	Pass RPD
Nitrate (as N)	mg/L	20	30	0.0050	0.020	0.016	DIFF	0.0042	Pass Diff	0.042	0.042	RPD	2.1	Pass RPD
Nitrite (as N)	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*
Total Kjeldahl Nitrogen	mg/L	20	30	0.050	0.35	0.33	RPD	3.8	Pass RPD	0.29	0.27	RPD	7.8	Pass RPD
Total Nitrogen	mg/L	20	30	0.050	0.37	0.35	RPD	5	Pass RPD	0.34	0.31	RPD	6.8	Pass RPD
Dissolved Kjeldahl Nitrogen	mg/L	20	30	0.050	0.32	0.29	RPD	9.8	Pass RPD	0.30	0.28	RPD	8	Pass RPD
Total Dissolved Nitrogen	mg/L	20	30	0.050	0.34	0.31	RPD	10.9	Pass RPD	0.34	0.32	RPD	7.6	Pass RPD
Orthophosphate-Dissolved (as P)	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*
Phosphorus (P)-Dissolved	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*	*<0.0010*	*<0.0020*	*<DL*	*<DL*	*<DL*
Phosphorus (P)-Total	mg/L	20	30	0.0010	0.0052	0.0046	DIFF	0.0006	Pass Diff	0.0027	0.0026	DIFF	0.0001	Pass Diff
Silica, Reactive (as SiO2)	mg/L	20	30	0.040	0.47	0.48	RPD	-3.6	Pass RPD	0.30	0.33	RPD	-8.5	Pass RPD
TDS (Calculated)	mg/L	20	30		58.70	58.00	RPD	1.2	Pass RPD	55.30	53.30	RPD	3.7	Pass RPD
Sulfate (SO4)	mg/L	20	30	0.30	6.8	6.7	RPD	0.9	Pass RPD	4.8	4.8	RPD	0.4	Pass RPD
Cyanides														
Cyanide, Weak Acid Diss	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*
Cyanide, Total	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*
Cyanide, Free	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*
Organic / Inorganic Carbon														
Dissolved Organic Carbon	mg/L	20	30	0.50	4.2	4.3	RPD	-2.3	Pass RPD	3.2	3.1	RPD	0.3	Pass RPD
Total Organic Carbon	mg/L	20	30	0.50	4.3	4.2	RPD	1.4	Pass RPD	2.9	3.0	RPD	-3.7	Pass RPD
Total Metals														
Aluminum (Al)-Total	mg/L	20	30	0.0010	0.0036	0.0038	DIFF	-0.0002	Pass Diff	0.0038	0.0033	DIFF	0.0005	Pass Diff
Antimony (Sb)-Total	mg/L	20	30	0.000020	*<0.000020*	*<0.000020*	*<DL*	*<DL*	*<DL*	*<0.000020*	*<0.000020*	*<DL*	*<DL*	*<DL*
Arsenic (As)-Total	mg/L	20	30	0.000020	0.00058	0.00062	RPD	-7.5	Pass RPD	0.00032	0.00031	RPD	2.5	Pass RPD
Barium (Ba)-Total	mg/L	20	30	0.000020	0.0083	0.0088	RPD	-5.3	Pass RPD	0.0076	0.0077	RPD	-0.5	Pass RPD
Beryllium (Be)-Total	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Bismuth (Bi)-Total	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Boron (B)-Total	mg/L	20	30	0.0050	0.0070	0.0069	DIFF	0.0001	Pass Diff	*<0.0050*	*<0.0050*	*<DL*	*<DL*	*<DL*
Cadmium (Cd)-Total	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Calcium (Ca)-Total	mg/L	20	30	0.010	9.8	9.9	RPD	-0.4	Pass RPD	8.4	8.3	RPD	1.2	Pass RPD
Chromium (Cr)-Total	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*
Cobalt (Co)-Total	mg/L	20	30	0.000005	0.000026	0.000025	RPD	3.5	Pass RPD	0.000016	0.000013	DIFF	0.0000031	Pass Diff
Copper (Cu)-Total	mg/L	20	30	0.000050	0.00093	0.00093	RPD	-0.5	Pass RPD	0.00073	0.00070	RPD	3.6	Pass RPD
Iron (Fe)-Total	mg/L	20	30	0.0010	0.022	0.021	RPD	2.8	Pass RPD	0.011	0.011	RPD	3.7	Pass RPD
Lead (Pb)-Total	mg/L	20	30	0.000010	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*
Lithium (Li)-Total	mg/L	20	30	0.00050	0.0011	0.0011	DIFF	0	Pass Diff	0.00092	0.00090	DIFF	2E-05	Pass Diff
Magnesium (Mg)-Total	mg/L	20	30	0.0040	1.9	1.9	RPD	-1.1	Pass RPD	1.7	1.7	RPD	-1.7	Pass RPD
Manganese (Mn)-Total	mg/L	20	30	0.000050	0.0054	0.0055	RPD	-1.5	Pass RPD	0.0015	0.0015	RPD	2.6	Pass RPD
Mercury (Hg)-Total	ug/L	20	30	0.0050	*<0.0050*	*<0.0050*	*<DL*	*<DL*	*<DL*	*<0.0050*	*<0.0050*	*<DL*	*<DL*	*<DL*
Molybdenum (Mo)-Total	mg/L	20	30	0.000050	0.00015	0.00015	DIFF	-2E-06	Pass Diff	0.00014	0.00011	DIFF	0.000037	Pass Diff
Niobium (Nb)-Total	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*
Nickel (Ni)-Total	mg/L	20	30	0.000050	0.00077	0.00075	RPD	2.5	Pass RPD	0.00043	0.00040	RPD	5.1	Pass RPD
Phosphorus (P)-Total	mg/L	20	30	0.050	*<0.050*	*<0.050*	*<DL*	*<DL*	*<DL*	*<0.050*	*<0.050*	*<DL*	*<DL*	*<DL*
Potassium (K)-Total	mg/L	20	30	0.020	1.2	1.2	RPD	0	Pass RPD	1.2	1.2	RPD	0	Pass RPD
Selenium (Se)-Total	mg/L	20	30	0.000040	0.000057	0.000048	DIFF	0.000009	Pass Diff	*<0.000040*	*<0.000040*	*<DL*	*<DL*	*<DL*
Silicon (Si)-Total	mg/L	20	30	0.050	0.24	0.24	DIFF	0.003	Pass Diff	0.15	0.19	DIFF	-0.037	Pass Diff
Silver (Ag)-Total	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Sodium (Na)-Total	mg/L	20	30	0.020	8.3	8.3	RPD	-0.2	Pass RPD	8.8	8.9	RPD	-1	Pass RPD
Strontium (Sr)-Total	mg/L	20	30	0.000020	0.062	0.063	RPD	-1.3	Pass RPD	0.054	0.054	RPD	0.7	Pass RPD
Sulfur (S)-Total	mg/L	20	30	0.50	2.8	2.6	RPD	6.7	Pass RPD	1.8	1.8	DIFF	0.07	Pass Diff
Thallium (Tl)-Total	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Tin (Sn)-Total	mg/L	20	30	0.000020	*<0.000020*	*<0.000020*	*<DL*	*<DL*	*<DL*	*<0.000020*	*<0.000020*	*<DL*	*<DL*	*<DL*
Titanium (Ti)-Total	mg/L	20	30	0.000050	0.00010	0.00011	DIFF	-0.000008	Pass Diff	0.000088	0.000083	DIFF	0.000005	Pass Diff
Tungsten (W)-Total	mg/L	20	30	0.000010	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*
Uranium (U)-Total	mg/L	20	30	0.000001	0.000028	0.000027	RPD	6.2	Pass RPD	0.000022	0.000022	RPD	-0.4	Pass RPD
Vanadium (V)-Total	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*
Zinc (Zn)-Total	mg/L	20	30	0.00050	0.0022	0.0023	DIFF	-0.00012	Pass Diff	0.0022	0.0024	DIFF	-0.00025	Pass Diff
Zirconium (Zr)-Total	mg/L	20	30	0.000010	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*
Dissolved Metals														
Aluminum (Al)-Dissolved	mg/L	20	30	0.0010	0.0025	0.0024	DIFF	0.0001	Pass Diff	0.0016	0.0016	DIFF	0	Pass Diff
Antimony (Sb)-Dissolved	mg/L	20	30	0.000020	*<0.000020*	*<0.000020*	*<DL*	*<DL*	*<DL*	*<0.000020*	*<0.000020*	*<DL*	*<DL*	*<DL*
Arsenic (As)-Dissolved	mg/L	20	30	0.000020	0.00056	0.00056	RPD	1.1	Pass RPD	0.00031	0.00030	RPD	4.3	Pass RPD
Barium (Ba)-Dissolved	mg/L	20	30	0.000020	0.0085	0.0082	RPD	3.1	Pass RPD	0.0079	0.0075	RPD	5.7	Pass RPD
Beryllium (Be)-Dissolved	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Bismuth (Bi)-Dissolved	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Boron (B)-Dissolved	mg/L	20	30	0.0050	0.0073	0.0074	DIFF	-0.0001	Pass Diff	*<0.0050*	*<0.0050*	*<DL*	*<DL*	*<DL*
Cadmium (Cd)-Dissolved	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Calcium (Ca)-Dissolved	mg/L	20	30	0.010	9.5	9.7	RPD	-2.2	Pass RPD	8.6	8.3	RPD	3.5	Pass RPD
Chromium (Cr)-Dissolved	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*
Cobalt (Co)-Dissolved	mg/L	20	30	0.000005	0.000013	0.000014	DIFF	-0.000001	Pass Diff	0.000011	0.000010	DIFF	3E-07	Pass Diff
Copper (Cu)-Dissolved	mg/L	20	30	0.000050	0.00090	0.00093	RPD	-3.3	Pass RPD	0.00074	0.00069	RPD	7.2	Pass RPD
Iron (Fe)-Dissolved	mg/L	20	30	0.0010	0.0035	0.0033	DIFF	0.0002	Pass Diff	0.0037	0.0033	DIFF	0.0004	Pass Diff
Lead (Pb)-Dissolved	mg/L	20	30	0.000010	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*
Lithium (Li)-Dissolved	mg/L	20	30	0.00050	0.0011	0.0012	DIFF	-5E-05	Pass Diff	0.00093	0.00091	DIFF	2E-05	Pass Diff
Magnesium (Mg)-Dissolved	mg/L	20	30	0.0040	1.9	1.8	RPD	1.6	Pass RPD	1.7	1.7	RPD	1.2	Pass RPD
Manganese (Mn)-Dissolved	mg/L	20	30	0.000050	0.00037	0.00035	RPD	5.3	Pass RPD	0.00031	0.00030	RPD	2.9	Pass RPD
Mercury (Hg)-Dissolved	ug/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Molybdenum (Mo)-Dissolved	mg/L	20	30	0.000050	0.00014	0.00014	DIFF	-3E-06	Pass Diff	0.00011	0.00011	DIFF	3E-06	Pass Diff
Nickel (Ni)-Dissolved	mg/L	20	30	0.000050	0.00073	0.00072	RPD	0.8	Pass RPD	0.00040	0.00039	RPD	2.3	Pass RPD
Niobium (Nb)-Dissolved	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*
Phosphorus (P)-Dissolved	mg/L	20	30	0.050	*<0.050*	*<0.050*	*<DL*	*<DL*	*<DL*	*<0.050*	*<0.050*	*<DL*	*<DL*	*<DL*
Potassium (K)-Dissolved	mg/L	20	30	0.020	1.3	1.2	RPD	0.8	Pass RPD	1.2	1.2	RPD	0.8	Pass RPD
Selenium (Se)-Dissolved	mg/L	20	30	0.000040	0.000050	0.000044	DIFF	0.000006	Pass Diff	0.000045	*<0.000040*	*<DL*	*<DL*	*<DL*
Silicon (Si)-Dissolved	mg/L	20	30	0.050	0.24	0.24	DIFF	-0.001	Pass Diff	0.16	0.17	DIFF	-0.012	Pass Diff
Silver (Ag)-Dissolved	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Sodium (Na)-Dissolved	mg/L	20	30	0.020	8.3	8.3	RPD	0	Pass RPD	9.0	8.9	RPD	0.9	Pass RPD
Strontium (Sr)-Dissolved	mg/L	20	30	0.000020	0.060	0.062	RPD	-2.5	Pass RPD	0.054	0.052	RPD	3	Pass RPD
Sulfur (S)-Dissolved	mg/L	20	30	0.50	2.6	2.6	RPD	-0.8	Pass RPD	1.9	1.9	DIFF	-0.05	Pass Diff
Thallium (Tl)-Dissolved	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Tin (Sn)-Dissolved	mg/L	20	30	0.000020	0.000040	0.000043	DIFF	-0.000003	Pass Diff	*<0.000020*	*<0.000020*	*<DL*	*<DL*	*<DL*
Titanium (Ti)-Dissolved	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*
Tungsten (W)-Dissolved	mg/L	20	30	0.000010	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*
Uranium (U)-Dissolved	mg/L	20	30	0.000001	0.000026	0.000024	RPD	8	Pass RPD	0.000021	0.000023	RPD	-8.7	Pass RPD
Vanadium (V)-Dissolved	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*
Zinc (Zn)-Dissolved	mg/L	20	30	0.00050	0.0055	0.0045	RPD	19.2	Pass RPD	*<0.00050*	*<0.00050*	*<DL*	*<DL*	*<DL*
Zirconium (Zr)-Dissolved	mg/L		40	0.000010	0.000012	0.000013	DIFF	-1E-06	Pass Diff	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*

Notes:

[a] Field Dup Methods are based on the concentrations:

RPD = relative percent difference is used to compare field duplicates when the measured concentration is > 5x the DL

DIFF = when concentrations < 5* DL

[b] Results refer to the RPD or absolute difference in concentration

DQO for RPDs is < Field RPD values

DQO for DIFF is < 2x the DL

Italicized numbers are below detection limits.

A.3 PHYTOPLANKTON

A.3.1 Field Methods

Water samples for phytoplankton and chlorophyll-a were collected during the August 2022 sampling event. Samples were collected as depth-integrated samples every 2 m from below the surface to within 1 m of the sediment. Sampling gear was thoroughly rinsed between sampling areas to ensure that there was no inadvertent introduction (i.e., cross-contamination) from one area to another. Water samples were stored in a cooler with ice packs until returning to the camp. Water samples were processed back at camp within 6 hours of sampling. Processing involved filtering the water samples for chlorophyll-a and preserving 50 mL of water with Lugol's iodine solution for taxonomy. Chlorophyll-a filters were kept in a freezer until ready to ship. The phytoplankton taxonomy samples were stored in dark containers at room temperature.

Sample Shipping and Handling

The chlorophyll-a samples were shipped on Monday August 22 and arrived at the University of Alberta (Biogeochemical Analytical Service Laboratory) on Monday August 29.

The phytoplankton samples for taxonomy arrived at Plankton R Us (Winnipeg) without any sample integrity concerns.

Field Duplicates

Quality control procedures implemented during field operations during the August 2022 sampling event in Meliadine Lake included the collection of duplicate phytoplankton and chlorophyll-a samples using the same methods and collected at the same time as respective field samples.

Phytoplankton - Three field duplicate phytoplankton samples were collected during the August sampling event: DUP-MEL-AUG-01 associated with MEL-03-01, DUP-MEL-AUG-02 associated with MEL-01-01 and DUP-MEL-AUG-03 associated with MEL-05-03. Duplicate samples were submitted *blind* to the laboratory for analysis in order to assess sampling variability and sample homogeneity. RPDs were calculated by comparing the original sample and the duplicate result for total density and total biomass. RPD values were also calculated for the major taxa groups, but these results are not relied on for QC purposes because of the tendency for small differences in abundance/biomass between the original and the duplicate to cause large differences in the RPD. Thus, we evaluate the quality of these data based on total density and total biomass. For field duplicates, an RPD of 50% for total density and biomass concentrations is considered acceptable.

Chlorophyll-a – Three field duplicate chlorophyll-a samples were collected in 2022 at the same locations as the phytoplankton taxonomy field duplicate samples. An RPD of 50% is considered acceptable for comparing chlorophyll-a concentrations between these samples.

Field Blank

Chlorophyll-a – A set of field blanks consisting of DI water filtered through regular sampling equipment was included in samples delivered to the laboratory. For these blanks to pass DQOs, chlorophyll-a concentrations below detection (<0.04 µg/L) were required.

A.3.2 Laboratory Methods

Water samples collected in 2022 for chlorophyll-a were submitted to the University of Alberta Biogeochemical Analytical Service Laboratory (BASL). Samples collected for taxonomic analysis of phytoplankton were submitted to Plankton-R-Us Inc., a reputable taxonomic laboratory. Overall, the reliability of the analytical results is considered high.

As stated in **Section A.2.1**, the first step in the QC program involves documenting any issues with the sample submission. This step applies to all sampling components. Plankton-R-Us reports sample integrity concerns via email.

Phytoplankton – As a measure of laboratory QA/QC on the enumeration method replicate counts are to be performed on at least 10% of the samples. In 2022 a total of 3 laboratory replicates (12% of the total number of samples) were processed. Replicate samples were randomly chosen and processed at different times from the original analysis to reduce bias as per the AEMP study design (Azimuth 2022). The laboratory replicate is a new aliquot (10 mL) from the sample jar and is counted from the start in the same manner as the original aliquot (10 mL) taken from the jar. Laboratory provided QC results were reviewed in order to determine whether any phytoplankton laboratory DQOs changed in 2022 relative to previous sampling years. An RPD of 25% for total density and biomass concentrations is considered acceptable for laboratory replicates.

Chlorophyll-a - Data were checked for errors or omissions. If necessary, inconsistent results were clarified with the analytical laboratory and any errors were flagged.

A.3.3 Results and Discussion

As described in **Section A.2**, extensive QA/QC measures were used to minimize deviations from the program's DQOs. This section presents the results of QA/QC testing conducted for the phytoplankton portion of the AEMP program to evaluate data quality relative to the DQOs. The QA/QC results presented below for the 2022 AEMP program are summarized in **Section 5.4** of the main report.

Sample Shipping and Handling

Samples collected for chlorophyll-a analysis arrived at the laboratory thawed and at room temperature, despite being shipped in coolers full of ice packs. Keeping samples frozen, particularly during summer months is a recurring challenge for this program given the logistics of shipping samples from Nunavut to the respective laboratories in a timely fashion. The shipment was in transit for longer than normal due to delays with Purolator. The laboratory manager discussed the effect of thawing on data quality with a professor whose expertise is pigment analysis, and their opinion was that the delay of receiving those filters at room temperature may not affect the results significantly (Mingsheng Ma, pers. comm. October 21, 2022).

The phytoplankton samples for taxonomy analysis arrived at Plankton R Us (Winnipeg) without any sample integrity concerns.

Field and Laboratory Duplicates and Blanks

Results of the RPD analysis for phytoplankton field and laboratory duplicates, as well as chlorophyll-a field duplicates are presented in **Table A-7**, **Table A-8** and **Table A-9** respectively. These results are discussed below:

Phytoplankton Duplicates – Total biomass and density RPDS for all of the laboratory duplicates and 2/3 field duplicates met the DQOs indicating good replicability in sample collection and laboratory analysis. RPDs for total biomass and density in the duplicate sample from reference location MEL-03-01 exceeded the DQO of 50%. Variability is expected in field collected phytoplankton samples and is mitigated in the study design by collecting 5 discrete samples from each sampling area. Therefore, the RPD exceedances are not expected to impact the findings of this report. See **Table A-7** for the field duplicate results and, **Table A-8** for the laboratory duplicate results, including RPDs calculated for major taxa groups.

Chlorophyll-a Duplicates– All of the field duplicate RPDs for chlorophyll-a concentrations met the DQOs (RPD < 50%) indicating very good replicability in sample collection. See **Table A-9** for the complete field duplicate results.

Chlorophyll-a Blanks– Chlorophyll-a was less than the laboratory detection limits (<0.04 µg/L) for all field blanks, meeting the lab DQOs.

A.3.4 Phytoplankton QA/QC Summary

The field and laboratory QA/QC for phytoplankton and chlorophyll-a in 2022 met the DQOs except for the field duplicate for phytoplankton taxonomy collected at reference location MEL-03-01. These results indicate good replicability and sample handling in the field and in the laboratory. RPD exceedances observed for 1 field collected phytoplankton taxonomy sample are not expected to impact the findings of the report. Findings of each component of the phytoplankton QA/QC are summarized as follows:

Sample Integrity –Chlorophyll-a samples reached temperatures above freezing when they were received at the laboratory which reflects the challenges of shipping from a remote mine site. After communicating with the laboratory manager who consulted with a professor whose area of expertise is pigment analysis, the thawing of the chlorophyll-a samples during transit is not expected to significantly impact analysis and interpretation of the chlorophyll a data. The phytoplankton samples for taxonomy arrived at Plankton R Us (Winnipeg) without any sample integrity concerns.

Duplicates – The 2022 laboratory duplicate results for phytoplankton taxonomy and field duplicate results for chlorophyll-a were very good with no exceedances of DQO thresholds. Two of three field collected duplicate samples for phytoplankton taxonomy met DQO criteria. RPDs for total biomass and density for the sample and duplicate collected from reference location MEL-03-01 exceeded the DQO of 50% but these exceedances are mitigated by collection of 5 discrete samples from each sampling location and are not expected to impact the findings of the 2022 AEMP.

Blanks – All chlorophyll-a laboratory blanks results were below the reported detection limit.

Table A-7. Field duplicate assessment for the phytoplankton taxonomy results in 2022

Field QA	Date	Sample	Phytoplankton Biomass (mg/m³)							
			Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	Euglenophyte	TOTAL
MEL-03-01	20-Aug-22	Sample	0	4.2	94.7	2.9	7.4	23.6	0	132.8
		DUP-MEL-AUG-01	0	13.1	173.6	14.6	9.5	52.3	0	263.2
		RPD (%)	-	**-102.4**	**-58.8**	**-134.7**	-25.3	**-75.5**	-	**-65.8**
MEL-01-01	18-Aug-22	Sample	0.6	7.7	50.1	32.6	19.9	48.0	0	158.8
		DUP-MEL-AUG-02	0	7.7	58.7	26.4	14.4	54.1	0.6	161.9
		RPD (%)	-	-0.7	-15.8	21.1	32.0	-12.0	-	-1.9
MEL-05-03	14-Aug-22	Sample	0	1.6	42.4	2.8	4.3	16.3	0	67.4
		DUP-MEL-AUG-03	0	2.4	75.3	6.9	4.9	18.1	0	107.6
		RPD (%)	-	-40.7	**-55.9**	**-83.3**	-12.2	-10.9	-	-45.9

Field QA	Date	Sample	Phytoplankton Density (cells/L)							
			Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	Euglenophyte	TOTAL
MEL-03-01	20-Aug-22	Sample	0	75440	1008360	45104	72640	4000	0	1205544
		DUP-MEL-AUG-01	0	324080	1905760	317712	73840	11000	0	2632392
		RPD (%)	-	**-124.4**	**-61.6**	**-150.3**	-1.6	**-93.3**	-	**-74.4**
MEL-01-01	18-Aug-22	Sample	14968	313112	908784	197776	77240	7600	0	1519480
		DUP-MEL-AUG-02	0	180800	1094368	169656	27752	9800	200	1482576
		RPD (%)	-	**53.6**	-18.5	15.3	**94.3**	-25.3	-	2.5
MEL-05-03	14-Aug-22	Sample	0	94192	319896	66856	22952	3400	0	507296
		DUP-MEL-AUG-03	0	58072	455592	39920	9584	3400	0	566568
		RPD (%)	-	47.4	-35.0	**50.5**	**82.2**	0	-	-11.0

Notes:

RPD = Relative Percent Difference (%) = ((original - duplicate) / (original + duplicate)/2) x 100. A negative RPD indicates that the duplicate value is higher than the original sample.

Bolded RPD values exceed 50%.

"-" = RPDs have not been calculated for cases where one or both of the samples is "0".

Table A-8. Laboratory duplicate assessment for the phytoplankton taxonomy results in 2022

Area-Replicate	Date	Sample	Phytoplankton Biomass (mg/m^3)							
			Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	Euglenophyte	TOTAL
MEL -01-07	18-Aug-22	Sample	0.5	7.2	109.5	51.6	14.7	78.8	0	262.2
		Lab dup	0.5	5.2	120.2	49.8	18.7	88.2	0	282.6
		RPD (%)	0	**31.5**	-9.3	3.6	-24.2	-11.3	-	-7.5
MEL-02-02	18-Aug-22	Sample	0.2	0.7	159.9	14.6	8.5	21.5	0	205.2
		Lab dup	0.5	0.6	169.9	11.4	8.6	13.0	0	197.0
		RPD (%)	**-100.0**	14.2	-1.9	24.4	-2.2	**49.3**	-	4.1
MEL-05-05	14-Aug-22	Sample	0	3.2	63.4	5.5	2.4	12.8	0	87.3
		Lab dup	0	2.1	58.7	6.7	2.8	15.0	0	85.4
		RPD (%)	-	**42.8**	7.7	-20.2	-17.6	-16.0	-	2.2

Area-Replicate	Date	Date	Phytoplankton Density (cells/L)							
			Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	Euglenophyte	TOTAL
MEL -01-07	18-Aug-22	Sample	600	145480	1707408	318552	54488	12800	0	2239328
		Lab dup	600	101976	1931512	286416	69856	14200	0	2404560
		RPD (%)	0	**35.2**	-12.3	10.6	-24.7	-10.4	-	-7.1
MEL-02-02	18-Aug-22	Sample	200	7584	1143872	77472	73240	4200	0	1306568
		Lab dup	600	7384	1167024	121376	52688	2800	0	1351872
		RPD (%)	**-100**	2.7	-2.0	**-44.2**	**32.6**	**40.0**	-	-3.4
MEL-05-05	14-Aug-22	Sample	0	100976	428656	52688	8184	2800	0	593304
		Lab dup	0	86408	428656	46504	22152	2800	0	586520
		RPD (%)	-	15.5	0	12.5	**-92.1**	0	-	1.2

Notes:

RPD = Relative Percent Difference (%) = ((original - duplicate) / (original + duplicate)/2) x 100. A negative RPD indicates that the duplicate value is higher than the original sample.

Bolded RPD values exceed 25%.

RPDs have not been calculated for cases where one or both of the samples is "0".

Table A-9. Field duplicate assessment for chlorophyll-a (µg/L) in 2022

Location	Replicate	Chlorophyll-a (µg/L)		RPD (%)
		Sample	Duplicate	
MEL-01-01	2	3.75	2.72	31.8
MEL-03-01	1	0.76	1.10	-36.6
MEL-05-03	3	0.49	0.38	25.3

Notes:
RPD = Relative Percent Difference (%) = ((original – duplicate)/(original + duplicate)/2) x 100
A negative RPD indicates that the duplicate value is higher than the original sample.

APPENDIX B
EFFLUENT QUALITY, 2022

Appendix B1
Effluent Quality – Supporting Data

APPENDIX B1 – TABLES

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Table B1-1. Daily discharge (m^3) from the Effluent Water Treatment Plant in 2022

Total Volume Discharged from CP1 to Meliadine Lake in 2022 = 436,631 m^3					
July		**August**		**September**	
Date	EWTP Discharge (m^3)	Date	EWTP Discharge (m^3)	Date	EWTP Discharge (m^3)
1-Jul	9,256	1-Aug	5,187	1-Sep	3,508
2-Jul	12,861	2-Aug	4,066	2-Sep	3,521
3-Jul	14,190	3-Aug	0	3-Sep	3,339
4-Jul	16,311	4-Aug	0	4-Sep	5,381
5-Jul	16,839	5-Aug	0	5-Sep	8,819
6-Jul	14,237	6-Aug	0	6-Sep	7,014
7-Jul	13,258	7-Aug	0	7-Sep	3,925
8-Jul	1,545	8-Aug	0	8-Sep	7,049
9-Jul	4,354	9-Aug	0	9-Sep	7,051
10-Jul	4,894	10-Aug	0	10-Sep	7,050
11-Jul	4,687	11-Aug	0	11-Sep	9,173
12-Jul	5,625	12-Aug	0	12-Sep	9,762
13-Jul	5,595	13-Aug	0	13-Sep	9,824
14-Jul	3,926	14-Aug	0	14-Sep	8,621
15-Jul	5,611	15-Aug	0	15-Sep	10,095
16-Jul	5,060	16-Aug	0	16-Sep	12,408
17-Jul	5,608	17-Aug	0	17-Sep	12,772
18-Jul	5,363	18-Aug	0	18-Sep	9,133
19-Jul	5,610	19-Aug	0	19-Sep	4,837
20-Jul	3,538	20-Aug	0	20-Sep	4,561
21-Jul	3,695	21-Aug	0	21-Sep	9,707
22-Jul	5,584	22-Aug	0	22-Sep	9,441
23-Jul	5,586	23-Aug	3,635	23-Sep	8,391
24-Jul	5,519	24-Aug	2,640	24-Sep	8,253
25-Jul	5,552	25-Aug	3,503	25-Sep	4,705
26-Jul	5,574	26-Aug	3,449	26-Sep	0
27-Jul	4,329	27-Aug	420	27-Sep	0
28-Jul	5,596	28-Aug	1,232	28-Sep	0
29-Jul	3,466	29-Aug	3,473	29-Sep	0
30-Jul	5,534	30-Aug	3,427	30-Sep	0
31-Jul	5,907	31-Aug	2,553		
July	**214,709**	**August**	**33,585**	**September**	**188,337**

Table B1-2. Chemistry and toxicity test results for MEL-14 samples in 2022

Parameter	Units	Effluent Limits (Grab)		Date									
		Water Licence	MDMER	7/4/2022	7/11/2022	7/18/2022	7/25/2022	8/1/2022	8/29/2022	9/5/2022	9/12/2022	9/19/2022	9/24/2022
Field Parameters													
Temperature	C	-	-	14.8	-	15.9	18.6	11.1	8.1	10.8	10.3	9.4	9.1
pH (field)	pH units	6 | 9.5	6 | 9.5	7.18	7.29	7.2	7.35	7.28	7.22	7.16	7.06	7.24	7.87
DO (%)	%	-	-	81.3	-	99	78.8	115.1	111.7	84.2	70.9	118.5	117
DO (mg/L)	mg/L	-	-	8.19	-	9.73	7.32	12.58	13.09	9.15	-	13.25	14.21
Sp. Conductivity (field)	uS/cm	-	-	1741	1800	2069	2042	2200	2619	2546	2802	3300	3600
Turbidity (field)	NTU	-	-	1.05	-	1.35	1.72	1.3	0.64	-	-	0.88	-
Conventional Parameters													
Hardness (D)	mg/L	-	-	356	352	378	414	416	477	461	571	701	751
Hardness (T)	mg/L	-	-	342	362	403	409	408	457	493	571	722	737
pH (lab)	pH units	-	-	7.41	7.75	7.67	7.17	7.62	7.77	7.71	7.77	7.6	7.65
Total Dissolved Solids	mg/L	4,500	-	1120	1070	1160	1150	1270	1410	1380	1590	2050	2030
Total Dissolved Solids (Calculated)	mg/L	-	-	940	970	1000	1100	1200	1300	1400	1500	1800	2000
Total Suspended Solids	mg/L	30	30	4	3	3	3	2	2	3	3	3	4
Turbidity (lab)	NTU	-	-	0.8	0.8	0.7	0.6	0.6	0.5	0.5	0.4	0.5	0.7
Major Ions													
Alkalinity, Bicarbonate	mg/L	-	-	52	59	54	34	61	69	68	73	68	67
Alkalinity, Carbonate	mg/L	-	-	*< 1*	*< 1*	*< 1*	*< 1*	*< 1*	*< 1*	*< 1*	*< 1*	*< 1*	*< 1*
Alkalinity, Total	mg/L	-	-	52	60	55	34	62	69	68	73	68	67
Calcium (D)	mg/L	-	-	95.7	95.5	104	106	110	129	122	158	195	202
Calcium (T)	mg/L	-	-	93.8	100	112	105	107	124	135	158	205	201
Chloride	mg/L	-	-	380	410	440	470	510	570	630	640	790	840
Fluoride	mg/L	-	-	*< 0.1*	*< 0.1*	*< 0.1*	*< 0.1*	*< 0.1*	*< 0.1*	*< 0.1*	*< 0.1*	*< 0.1*	*< 0.1*
Magnesium (D)	mg/L	-	-	28.4	27.6	28.6	36.3	34.4	37.8	38.1	43	52.3	60.1
Magnesium (T)	mg/L	-	-	26.2	27.2	30	35.4	34	35.8	37.9	42.9	50.7	57.2
Potassium (D)	mg/L	-	-	15.1	15.3	16	19.1	19.1	21.9	21.1	23.6	26.1	28.5
Potassium (T)	mg/L	-	-	14.2	14.9	17	19.2	18.4	20.7	21.6	24	26.9	28.1
Reactive Silica (SiO2)	mg/L	-	-	*< 0.05*	0.072	0.14	0.22	0.27	0.16	0.14	0.75	1.1	0.89
Sodium (D)	mg/L	-	-	182	179	191	234	222	266	250	293	346	369
Sodium (T)	mg/L	-	-	171	181	204	229	221	246	269	295	343	359

Table B1-2. Chemistry and toxicity test results for MEL-14 samples in 2022

Parameter	Units	Effluent Limits (Grab)		Date									
		Water Licence	MDMER	7/4/2022	7/11/2022	7/18/2022	7/25/2022	8/1/2022	8/29/2022	9/5/2022	9/12/2022	9/19/2022	9/24/2022
Sulphate	mg/L	-	-	170	170	180	150	200	210	230	250	310	340
Nutrients													
Ammonia (as N)	mg/L	18	-	0.23	0.26	0.084	0.17	0.21	*< 0.05*	0.097	0.72	1.5	*< 0.05*
Nitrate (as N)	mg/L	-	-	10.2	9.19	7.7	6.6	6.37	3.63	5.12	10.1	14.7	16.7
Nitrate + Nitrite (as N)	mg/L	-	-	10.4	9.38	7.93	6.9	6.66	3.68	5.22	10.4	15.1	16.9
Nitrite (as N)	mg/L	-	-	0.158	0.196	0.224	0.302	0.285	0.046	0.099	0.304	0.408	0.186
Orthophosphate (PO4-P)	mg/L	-	-	*< 0.01*	0.012	*< 0.01*	*< 0.01*	*< 0.01*	*< 0.01*	*< 0.01*	*< 0.01*	*< 0.01*	*< 0.01*
Total Kjeldahl Nitrogen	mg/L	-	-	0.9	1.1	0.53	0.91	1.1	0.68	1.4	0.85	1.3	1
Total Phosphorus	mg/L	4	-	0.061	0.038	*< 0.02*	*< 0.02*	0.031	0.023	*< 0.02*	*< 0.02*	0.025	0.025
Unionized Ammonia (calculated)	mg/L	-	1	0.0012	0.0022	*< 0.00061*	0.0016	0.00099	*< 0.00061*	*< 0.00061*	0.0019	0.0056	-
Organic Carbon													
Dissolved Organic Carbon	mg/L	-	-	6.2	6.8	6.2	6.9	8.6	8.7	8.2	8.2	9.3	8.9
Total Organic Carbon	mg/L	-	-	6.9	7	7.2	7.9	8.9	9	8.7	8.3	9.8	10
Total Metals													
Aluminum (T)	mg/L	3	-	0.403	0.31	0.358	0.373	0.302	0.326	0.389	0.382	0.355	0.528
Antimony (T)	mg/L	-	-	0.00078	0.00087	0.00088	0.00101	0.0009	0.00079	0.00081	0.00076	0.00091	*< 0.001*
Arsenic (T)	mg/L	0.6	0.6	0.00681	0.00571	0.00676	0.0052	0.00454	0.00478	0.00456	0.00476	0.00408	0.00307
Barium (T)	mg/L	-	-	0.0358	0.0409	0.0456	0.0485	0.0507	0.054	0.0599	0.0627	0.0782	0.0786
Beryllium (T)	mg/L	-	-	*< 1e-04*	*< 1e-04*	*< 1e-04*	*< 1e-04*	*< 1e-04*	*< 1e-04*	*< 1e-04*	*< 1e-04*	*< 1e-04*	*< 2e-04*
Bismuth (T)	mg/L	-	-	*< 0.001*	*< 0.001*	*< 0.001*	*< 0.001*	*< 0.001*	*< 0.001*	*< 0.001*	*< 0.001*	*< 0.001*	*< 0.002*
Boron (T)	mg/L	-	-	0.205	0.21	0.243	0.269	0.275	0.301	0.309	0.384	0.359	0.37
Cadmium (T)	mg/L	-	-	0.000014	0.000019	0.000014	*< 1e-05*	0.000012	0.000011	*< 1e-05*	0.000013	0.000018	*< 2e-05*
Chromium (T)	mg/L	-	-	*< 0.001*	*< 0.001*	*< 0.001*	*< 0.001*	*< 0.001*	*< 0.001*	*< 0.001*	*< 0.001*	*< 0.001*	*< 0.002*
Cobalt (T)	mg/L	-	-	0.00111	0.001	0.00096	0.00095	0.00096	0.00059	0.00101	0.00084	0.00103	0.00094
Copper (T)	mg/L	0.4	0.6	0.00294	0.00288	0.00255	0.00244	0.00264	0.00249	0.00257	0.00246	0.00221	0.0021
Iron (T)	mg/L	-	-	0.034	0.023	0.033	0.022	0.012	0.011	0.01	0.021	0.015	*< 0.02*
Lead (T)	mg/L	0.2	2	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 4e-04*
Lithium (T)	mg/L	-	-	0.023	0.0248	0.028	0.0302	0.0308	0.0309	0.031	0.0326	0.0404	0.0442
Manganese (T)	mg/L	-	-	0.0522	0.0657	0.0353	0.0192	0.0919	0.0171	0.0177	0.0588	0.0591	0.0331
Mercury (T)	mg/L	-	-	*< 1e-05*	*< 1e-05*	*< 1e-05*	*< 1e-05*	*< 1e-05*	*< 1e-05*	*< 1e-05*	*< 1e-05*	*< 1e-05*	*< 1e-05*

Table B1-2. Chemistry and toxicity test results for MEL-14 samples in 2022

Parameter	Units	Effluent Limits (Grab)		Date									
		Water Licence	MDMER	7/4/2022	7/11/2022	7/18/2022	7/25/2022	8/1/2022	8/29/2022	9/5/2022	9/12/2022	9/19/2022	9/24/2022
Molybdenum (T)	mg/L	-	-	0.0041	0.0044	0.0052	0.0058	0.0059	0.0065	0.0061	0.0059	0.0058	0.0054
Nickel (T)	mg/L	1	1	0.004	0.0039	0.0037	0.0037	0.0042	0.004	0.0043	0.0049	0.0065	0.0059
Selenium (T)	mg/L	-	-	0.00043	0.00041	0.00043	0.00044	0.0004	0.00026	0.0003	0.00048	0.00065	0.00063
Silicon (T)	mg/L	-	-	*< 0.1*	*< 0.1*	0.11	0.16	0.16	*< 0.1*	0.12	0.37	0.5	0.26
Silver (T)	mg/L	-	-	*< 2e-05*	*< 2e-05*	*< 2e-05*	*< 2e-05*	*< 2e-05*	*< 2e-05*	*< 2e-05*	*< 2e-05*	*< 2e-05*	*< 4e-05*
Strontium (T)	mg/L	-	-	1.09	1.19	1.35	1.42	1.4	1.63	1.69	2.04	2.51	2.49
Sulfur (T)	mg/L	-	-	50	51.1	58.9	66.3	61.3	66.6	71.2	87	105	115
Thallium (T)	mg/L	-	-	0.000024	0.000027	0.000031	0.000032	0.000025	0.000028	0.000028	0.000033	0.000037	0.00003
Tin (T)	mg/L	-	-	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.01*
Titanium (T)	mg/L	-	-	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.01*
Uranium (T)	mg/L	-	-	0.00106	0.00078	0.00036	0.00028	0.00123	0.0014	0.00129	0.002	0.00262	0.00174
Vanadium (T)	mg/L	-	-	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.01*
Zinc (T)	mg/L	0.8	1	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	0.0074	*< 0.005*	*< 0.005*	*< 0.01*
Zirconium (T)	mg/L	-	-	*< 1e-04*	*< 1e-04*	*< 1e-04*	*< 1e-04*	*< 1e-04*	*< 1e-04*	*< 1e-04*	*< 1e-04*	*< 1e-04*	*< 2e-04*
Dissolved Metals													
Aluminum (D)	mg/L	-	-	0.153	0.143	0.118	0.123	0.127	0.133	0.149	0.115	0.109	0.115
Antimony (D)	mg/L	-	-	0.00087	0.00092	0.00082	0.00104	0.00095	0.00082	0.00084	0.00075	0.00089	*< 0.001*
Arsenic (D)	mg/L	-	-	0.00537	0.00466	0.00586	0.00495	0.00389	0.00406	0.00336	0.00341	0.00286	0.00217
Barium (D)	mg/L	-	-	0.0384	0.0433	0.0428	0.0492	0.0502	0.0563	0.056	0.0623	0.0755	0.0763
Beryllium (D)	mg/L	-	-	*< 1e-04*	*< 1e-04*	*< 1e-04*	*< 1e-04*	*< 1e-04*	*< 1e-04*	*< 1e-04*	*< 1e-04*	*< 1e-04*	*< 2e-04*
Bismuth (D)	mg/L	-	-	*< 0.001*	*< 0.001*	*< 0.001*	*< 0.001*	*< 0.001*	*< 0.001*	*< 0.001*	*< 0.001*	*< 0.001*	*< 0.002*
Boron (D)	mg/L	-	-	0.202	0.216	0.228	0.283	0.282	0.341	0.345	0.375	0.386	0.37
Cadmium (D)	mg/L	-	-	0.000019	0.000018	*< 1e-05*	*< 1e-05*	0.000019	0.000015	0.000013	0.000015	0.000015	*< 2e-05*
Chromium (D)	mg/L	-	-	*< 0.001*	*< 0.001*	*< 0.001*	*< 0.001*	*< 0.001*	*< 0.001*	*< 0.001*	*< 0.001*	*< 0.001*	*< 0.002*
Cobalt (D)	mg/L	-	-	0.00111	0.00099	0.00088	0.00101	0.00099	0.00065	0.00076	0.00083	0.00105	0.00094
Copper (D)	mg/L	-	-	0.0027	0.00273	0.0023	0.00245	0.00268	0.00265	0.00267	0.0023	0.00224	0.00202
Iron (D)	mg/L	-	-	0.0115	0.0068	0.0153	0.0121	0.0066	0.0078	0.0066	*< 0.005*	0.0056	*< 0.01*
Lead (D)	mg/L	-	-	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 4e-04*
Lithium (D)	mg/L	-	-	0.0203	0.0254	0.0264	0.0315	0.032	0.0311	0.0332	0.0321	0.0381	0.0449
Manganese (D)	mg/L	-	-	0.0486	0.0636	0.0323	0.0174	0.0934	0.0167	0.0168	0.0575	0.0591	0.0318

Table B1-2. Chemistry and toxicity test results for MEL-14 samples in 2022

Parameter	Units	Effluent Limits (Grab)		Date									
		Water Licence	MDMER	7/4/2022	7/11/2022	7/18/2022	7/25/2022	8/1/2022	8/29/2022	9/5/2022	9/12/2022	9/19/2022	9/24/2022
Mercury (D)	mg/L	-	-	*< 1e-05*	*< 1e-05*	*< 1e-05*	*< 1e-05*	*< 1e-05*	*< 1e-05*	*< 1e-05*	*< 1e-05*	*< 1e-05*	*< 1e-05*
Molybdenum (D)	mg/L	-	-	0.0045	0.0044	0.0049	0.006	0.0062	0.0066	0.0058	0.0058	0.0056	0.0056
Nickel (D)	mg/L	-	-	0.0041	0.0038	0.0034	0.0038	0.0044	0.0042	0.0043	0.0044	0.0066	0.0059
Selenium (D)	mg/L	-	-	0.00044	0.00039	0.0004	0.00041	0.00042	0.0003	0.00026	0.00044	0.00063	0.00068
Silicon (D)	mg/L	-	-	*< 0.1*	*< 0.1*	*< 0.1*	0.14	0.16	0.11	*< 0.1*	0.36	0.45	0.25
Silver (D)	mg/L	-	-	*< 2e-05*	*< 2e-05*	*< 2e-05*	*< 2e-05*	*< 2e-05*	*< 2e-05*	*< 2e-05*	*< 2e-05*	*< 2e-05*	*< 4e-05*
Strontium (D)	mg/L	-	-	1.21	1.2	1.28	1.48	1.43	1.71	1.61	2.01	2.34	2.4
Sulfur (D)	mg/L	-	-	56.6	53.5	52.7	64.2	64.2	70.4	70.1	80.4	105	119
Thallium (D)	mg/L	-	-	0.000024	0.000028	0.000027	0.000034	0.000029	0.000027	0.00003	0.000033	0.000038	0.000028
Tin (D)	mg/L	-	-	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.01*
Titanium (D)	mg/L	-	-	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.01*
Uranium (D)	mg/L	-	-	0.001	0.00077	0.00026	0.00022	0.00121	0.00134	0.00125	0.0019	0.00255	0.00157
Vanadium (D)	mg/L	-	-	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.01*
Zinc (D)	mg/L	-	-	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.01*
Zirconium (D)	mg/L	-	-	*< 1e-04*	*< 1e-04*	*< 1e-04*	*< 1e-04*	*< 1e-04*	*< 1e-04*	*< 1e-04*	*< 1e-04*	*< 1e-04*	*< 2e-04*
Other Parameters													
Biological Oxygen Demand	mg/L	-	-	3	*< 2*	*< 2*	*< 2*	*< 2*	*< 2*	*< 2*	2	*< 2*	*< 2*
Cyanide (free)	mg/L	-	-	0.0037	0.003	*< 0.002*	*< 0.002*	0.0041	0.0023	*< 0.002*	*< 0.002*	*< 0.002*	*< 0.002*
Cyanide (Total)	mg/L	1	1	0.00113	0.00074	0.00088	0.00108	0.00108	0.00122	0.00271	0.00253	0.00108	0.00212
Cyanide (WAD)	mg/L	-	-	0.001	0.00074	0.00063	0.00082	0.00095	0.00068	0.0016	0.0022	0.0015	0.0011
Radium-226	Bq/L	-	1.11	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.005*	0.011	0.011	*< 0.005*	0.009	0.013
Hydrocarbons													
F1 (C6-C10)	mg/L	-	-	*< 0.025*	*< 0.025*	*< 0.025*	*< 0.025*	*< 0.025*	*< 0.025*	*< 0.025*	*< 0.025*	*< 0.025*	*< 0.025*
F1 (C6-C10)-BTEX	mg/L	-	-	*< 0.025*	*< 0.025*	*< 0.025*	*< 0.025*	*< 0.025*	*< 0.025*	*< 0.025*	*< 0.025*	*< 0.025*	*< 0.025*
F2 (C10-C16)	mg/L	-	-	*< 0.1*	*< 0.1*	*< 0.1*	*< 0.1*	*< 0.1*	*< 0.1*	*< 0.1*	*< 0.1*	*< 0.1*	*< 0.1*
F3 (C16-C34)	mg/L	-	-	*< 0.2*	*< 0.2*	*< 0.2*	*< 0.2*	*< 0.2*	*< 0.2*	*< 0.2*	*< 0.2*	*< 0.2*	*< 0.2*
F4 (C34-C50)	mg/L	-	-	*< 0.2*	*< 0.2*	*< 0.2*	*< 0.2*	*< 0.2*	*< 0.2*	*< 0.2*	*< 0.2*	*< 0.2*	*< 0.2*
Volatile Organics													
Benzene	mg/L	-	-	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*
Ethylbenzene	mg/L	-	-	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*

Table B1-2. Chemistry and toxicity test results for MEL-14 samples in 2022

Parameter	Units	Effluent Limits (Grab)		Date									
		Water Licence	MDMER	7/4/2022	7/11/2022	7/18/2022	7/25/2022	8/1/2022	8/29/2022	9/5/2022	9/12/2022	9/19/2022	9/24/2022
m,p-Xylenes	mg/L	-	-	0.00049	*< 4e-04*	*< 4e-04*	*< 4e-04*	*< 4e-04*	*< 4e-04*	*< 4e-04*	*< 4e-04*	*< 4e-04*	*< 4e-04*
o-Xylene	mg/L	-	-	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*
Toluene	mg/L	-	-	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*	*< 2e-04*	0.00027
Xylenes	mg/L	-	-	0.00049	*< 4e-04*	*< 4e-04*	*< 4e-04*	*< 4e-04*	*< 4e-04*	*< 4e-04*	*< 4e-04*	*< 4e-04*	*< 4e-04*
Toxicity Tests													
Rainbow trout survival	LC50	-	-	100	-	-	-	100	100	-	-	100	100
D. magna survival	LC50	-	-	100	-	-	-	100	100	-	-	100	100
L. minor biomass	IC25	-	-	>97	-	-	-	-	-	-	-	-	-
L. minor frond number	IC25	-	-	>97	-	-	-	-	-	-	-	-	-

Table B1-3. Chemistry results from the snow core samples collected in April 2022

Parameter	Units	DL	SNOCOR6	SNOCOR7	SNOCOR BOUNDARY	SNOCOR4	SNOCOR5
			Background	NW of Mine (Emulsion Plant)	North of Camp	South of Tiriganiaq Pits 1 & 2 (Lake A8)	East of WRSF 3
Calculated Parameters							
Hardness (T)	mg/L	0.5	7.14	2.19	3.36	84.3	3.7
Hardness (D)	mg/L	0.5	4.23	3.35	3.17	20.5	2.26
Alkalinity, Bicarbonate	mg/L	1	4.5	4.4	2.1	27	2.1
Alkalinity, Carbonate	mg/L	1	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Conventional Parameters							
pH (lab)	pH		6.66	7.23	6.31	7.49	6.37
Alkalinity, Total	mg/L	1	4.5	4.5	2.1	27	2.1
Conductivity (lab)	uS/cm	1	20	*<10*	280	35	20
Total Dissolved Solids	mg/L	10	58	15	16	800	31
Total Suspended Solids	mg/L	10	1.1	0.78	1.7	1.1	1.6
Turbidity	NTU	0.1	1.5	1	2	1.5	2.3
Dissolved Organic Carbon	mg/L	0.4	1.5	0.87	0.46	1.1	2.3
Total Organic Carbon	mg/L	0.4	2	1.3	1.1	1.6	3.2
Major Ions & Nutrients							
Calcium (T)	mg/L	0.05	2.12	0.6	0.988	25.4	1.08
Calcium (D)	mg/L	0.05	1.33	1.05	0.983	7.44	0.695
Magnesium (T)	mg/L	0.05	0.447	0.168	0.218	5.05	0.247
Magnesium (D)	mg/L	0.05	0.222	0.173	0.173	0.456	0.127
Potassium (T)	mg/L	0.05	0.334	0.174	0.235	1.91	0.326
Potassium (D)	mg/L	0.05	0.282	0.184	0.221	0.795	0.246
Sodium (T)	mg/L	0.05	1.23	0.825	0.826	4.19	0.877
Sodium (D)	mg/L	0.05	1.31	1.05	0.967	3.94	0.83
Sulphate	mg/L	1	1.1	0.79	1.1	6.1	0.69
Chloride	mg/L	1	2.1	1.4	1.3	5.4	1.7
Total Metals							
Aluminum (T)	mg/L	0.003	0.275	0.0787	0.144	4.39	0.194
Antimony (T)	mg/L	0.0005	*<0.00050*	*<0.00050*	*<0.00050*	*<0.0010*	0.00056
Arsenic (T)	mg/L	0.0001	0.0432	0.00159	0.00839	1.5	0.00646
Barium (T)	mg/L	0.001	0.0062	0.0032	0.0042	0.0637	0.0066
Beryllium (T)	mg/L	0.0001	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00020*	*<0.00010*
Bismuth (T)	mg/L	0.001	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0020*	*<0.0010*
Boron (T)	mg/L	0.05	*<0.050*	*<0.050*	*<0.050*	*<0.10*	*<0.050*
Cadmium (T)	mg/L	0.00001	0.00002	0.000018	0.000017	0.000179	0.000016
Chromium (T)	mg/L	0.001	0.0015	*<0.0010*	*<0.0010*	0.0133	0.001
Cobalt (T)	mg/L	0.0002	*<0.00020*	*<0.00020*	*<0.00020*	0.00462	0.00021
Copper (T)	mg/L	0.0005	0.00435	0.00324	0.00184	0.0442	0.00453
Iron (T)	mg/L	0.01	1.15	0.12	0.383	23.5	0.481
Lead (T)	mg/L	0.0002	0.0201	0.00083	0.00216	0.328	0.00155
Lithium (T)	mg/L	0.002	*<0.0020*	*<0.0020*	*<0.0020*	0.0055	*<0.0020*
Manganese (T)	mg/L	0.001	0.0238	0.0057	0.0095	0.413	0.0332
Molybdenum (T)	mg/L	0.001	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0020*	*<0.0010*
Nickel (T)	mg/L	0.001	*<0.0010*	*<0.0010*	*<0.0010*	0.0125	*<0.0010*
Selenium (T)	mg/L	0.0001	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00020*	*<0.00010*
Silicon (T)	mg/L	0.1	0.34	*<0.10*	0.16	5.8	0.31
Silver (T)	mg/L	0.00002	0.000029	*<0.000020*	*<0.000020*	0.000255	*<0.000020*
Strontium (T)	mg/L	0.001	*<3.0*	*<3.0*	*<3.0*	*<6.0*	*<3.0*
Sulphur (T)	mg/L	3	0.0085	0.0035	0.0048	0.122	0.0041
Thallium (T)	mg/L	0.00001	*<0.000010*	*<0.000010*	*<0.000010*	0.000055	*<0.000010*
Tin (T)	mg/L	0.005	*<0.0050*	*<0.0050*	*<0.0050*	*<0.010*	*<0.0050*
Titanium (T)	mg/L	0.005	0.0107	*<0.0050*	*<0.0050*	0.106	0.0083
Uranium (T)	mg/L	0.0001	*<0.00010*	*<0.00010*	*<0.00010*	0.00038	*<0.00010*
Vanadium (T)	mg/L	0.005	*<0.0050*	*<0.0050*	*<0.0050*	*<0.010*	*<0.0050*
Zinc (T)	mg/L	0.005	0.0088	0.0085	0.0091	0.045	0.0094
Zirconium (T)	mg/L	0.0001	*<0.00010*	*<0.00010*	*<0.00010*	0.00087	*<0.00010*

Table B1-3. Chemistry results from the snow core samples collected in April 2022

Parameter	Units	DL	SNOCOR6	SNOCOR7	SNOCOR BOUNDARY	SNOCOR4	SNOCOR5
			Background	NW of Mine (Emulsion Plant)	North of Camp	South of Tiriganiaq Pits 1 & 2 (Lake A8)	East of WRSF 3
Dissolved Metals							
Aluminum (D)	mg/L	0.003	0.0104	0.0133	0.0104	0.0933	0.0097
Antimony (D)	mg/L	0.0005	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Arsenic (D)	mg/L	0.0001	0.0148	0.00102	0.00364	0.12	0.00325
Barium (D)	mg/L	0.001	0.0027	0.0032	0.0027	0.0027	0.0021
Beryllium (D)	mg/L	0.0001	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Bismuth (D)	mg/L	0.001	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Boron (D)	mg/L	0.05	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Cadmium (D)	mg/L	0.00001	*<0.000010*	0.000016	0.000026	*<0.000010*	*<0.000010*
Chromium (D)	mg/L	0.001	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Cobalt (D)	mg/L	0.0002	*<0.00020*	*<0.00020*	*<0.00020*	0.00027	*<0.00020*
Copper (D)	mg/L	0.0002	0.00147	0.00244	0.00108	0.00334	0.00178
Iron (D)	mg/L	0.005	0.0302	0.0182	0.0315	0.0435	0.0319
Lead (D)	mg/L	0.0002	0.00047	*<0.00020*	0.00021	0.00121	*<0.00020*
Lithium (D)	mg/L	0.002	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*
Manganese (D)	mg/L	0.001	0.006	0.004	0.0061	0.0093	0.0183
Molybdenum (D)	mg/L	0.001	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Nickel (D)	mg/L	0.001	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Selenium (D)	mg/L	0.0001	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Silicon (D)	mg/L	0.1	*<0.10*	*<0.10*	*<0.10*	0.2	*<0.10*
Silver (D)	mg/L	0.00002	*<0.000020*	*<0.000020*	*<0.000020*	*<0.000020*	*<0.000020*
Strontium (D)	mg/L	0.001	0.0045	0.0036	0.0041	0.0293	0.0021
Sulphur (D)	mg/L	3	*<3.0*	*<3.0*	*<3.0*	*<3.0*	*<3.0*
Thallium (D)	mg/L	0.00001	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Tin (D)	mg/L	0.005	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*
Titanium (D)	mg/L	0.005	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*
Uranium (D)	mg/L	0.0001	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Vanadium (D)	mg/L	0.005	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*
Zinc (D)	mg/L	0.005	*<0.0050*	0.01	0.0077	*<0.0050*	*<0.0050*
Zirconium (D)	mg/L	0.0001	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*

Notes

Italicized numbers are less than the analytical detection limit

Yellow = concentration is >5-times background

Orange = concentration is > 5 to 10-times background

Red = concentration is >10 times background

Appendix B2
Effluent Quality – Supplemental Figures

APPENDIX B2 – FIGURES

The following notes apply to all the plots in this appendix.

1. The blue dot represents the monthly mean concentration at MEL-14. The blue vertical line represents the range of concentrations measured in each month.
2. Monthly loadings = monthly mean concentration (mg/L) x monthly discharge (m^3) /1,000.

Figure B2-1. Total suspended solids (TSS) 1
Figure B2-2. Total dissolved solids (TDS measured) 2
Figure B2-3. Chloride 3
Figure B2-4. Sodium 4
Figure B2-5. Calcium 5
Figure B2-6. Magnesium 6
Figure B2-7. Potassium 7
Figure B2-8. Sulphate 8
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Figure B2-10. Reactive Silica 10
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Figure B2-12. Nitrite (as N) 12
Figure B2-13. Nitrate + Nitrite (as N) 13
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Figure B2-17. Orthophosphate 17
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Figure B2-21. Beryllium 22
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Figure B2-34. Nickel 35
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Figure B2-40. Tin 41
Figure B2-41. Titanium 42
Figure B2-42. Uranium 43
Figure B2-43. Vanadium 44
Figure B2-44. Zinc 45
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Figure B2-46. Cyanide (Free) 47
Figure B2-47. Cyanide (Total) 48
Figure B2-48. Radium-226 49

Figure B2-1. Total suspended solids (TSS)

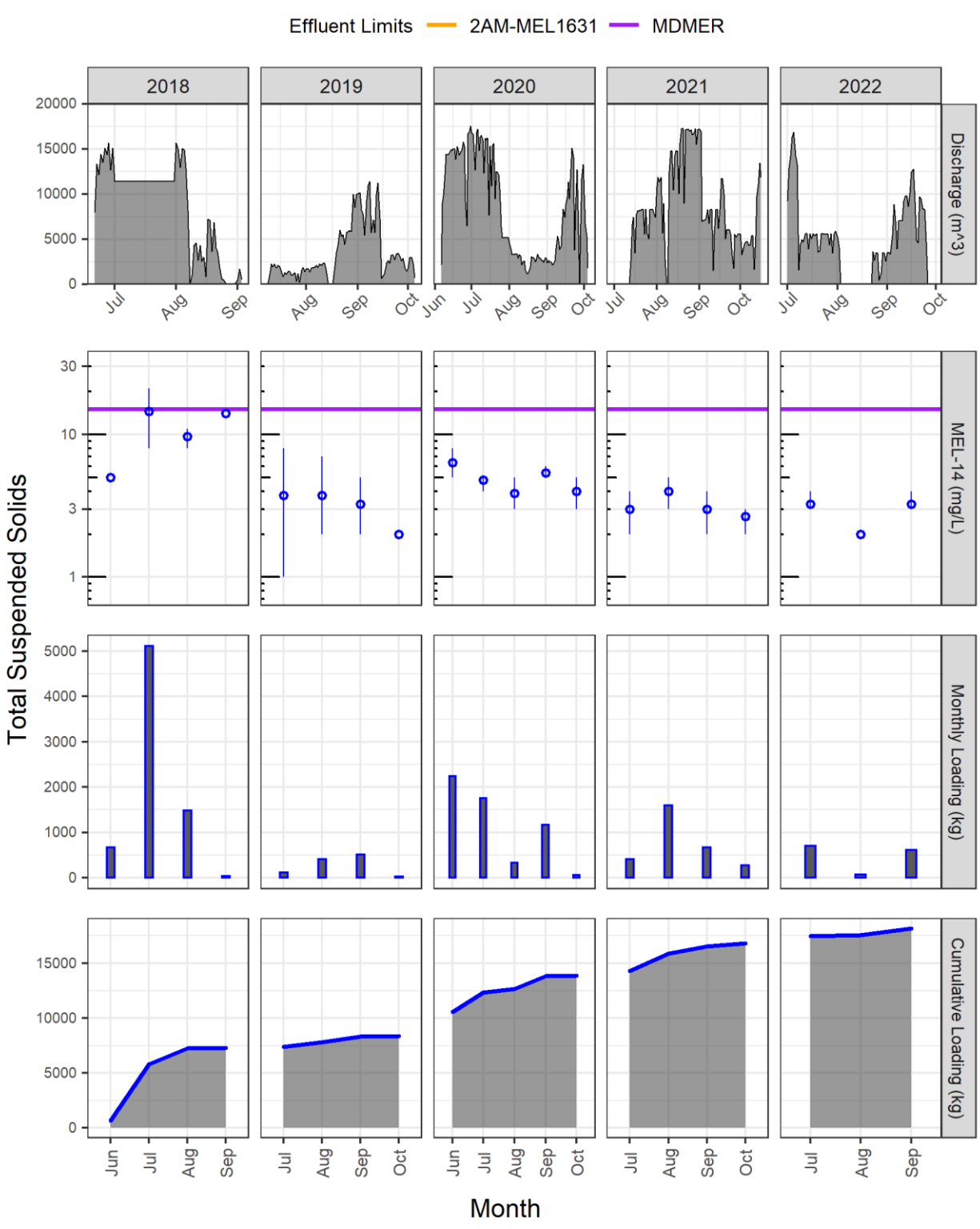


Figure B2-2. Total dissolved solids (TDS measured)

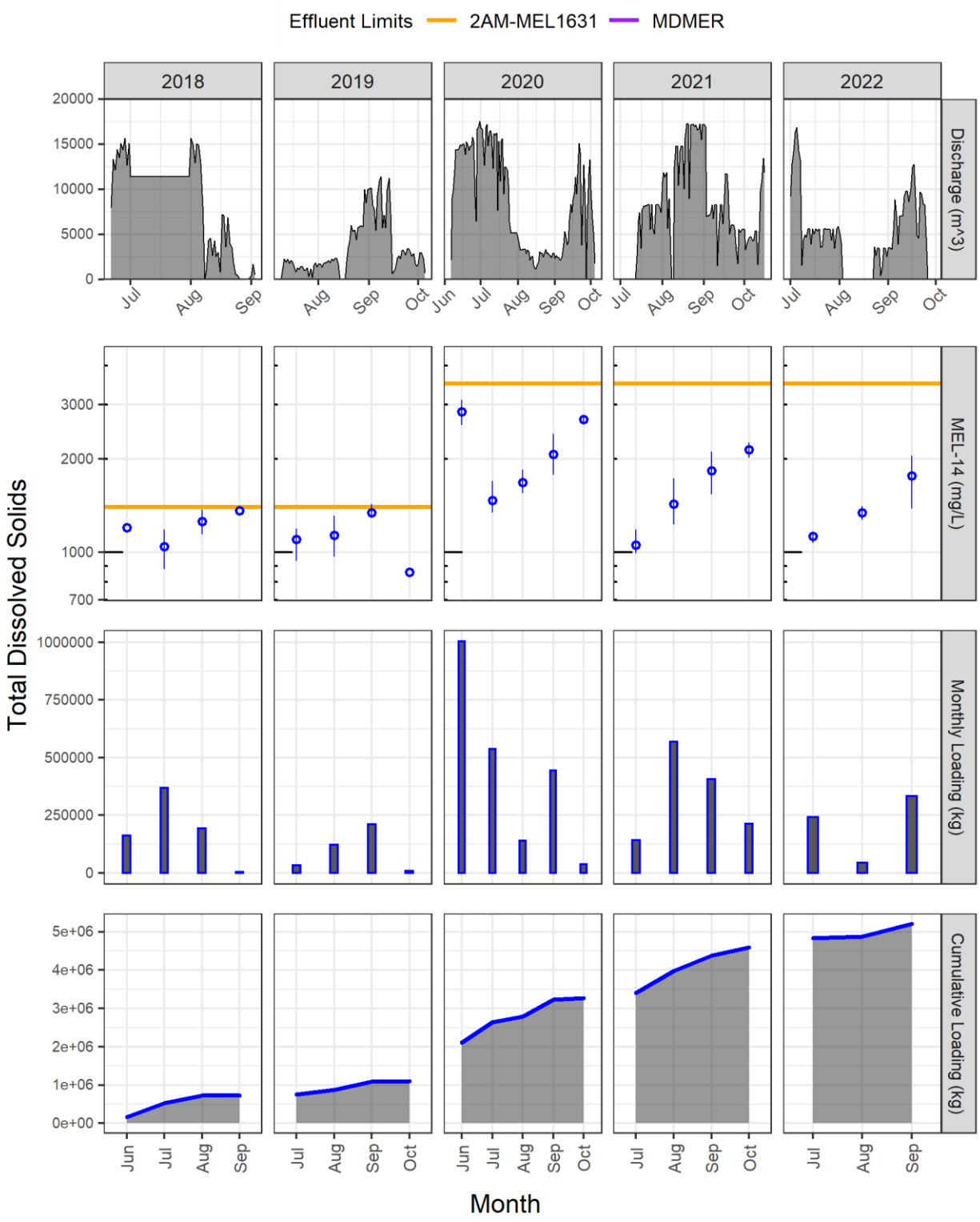
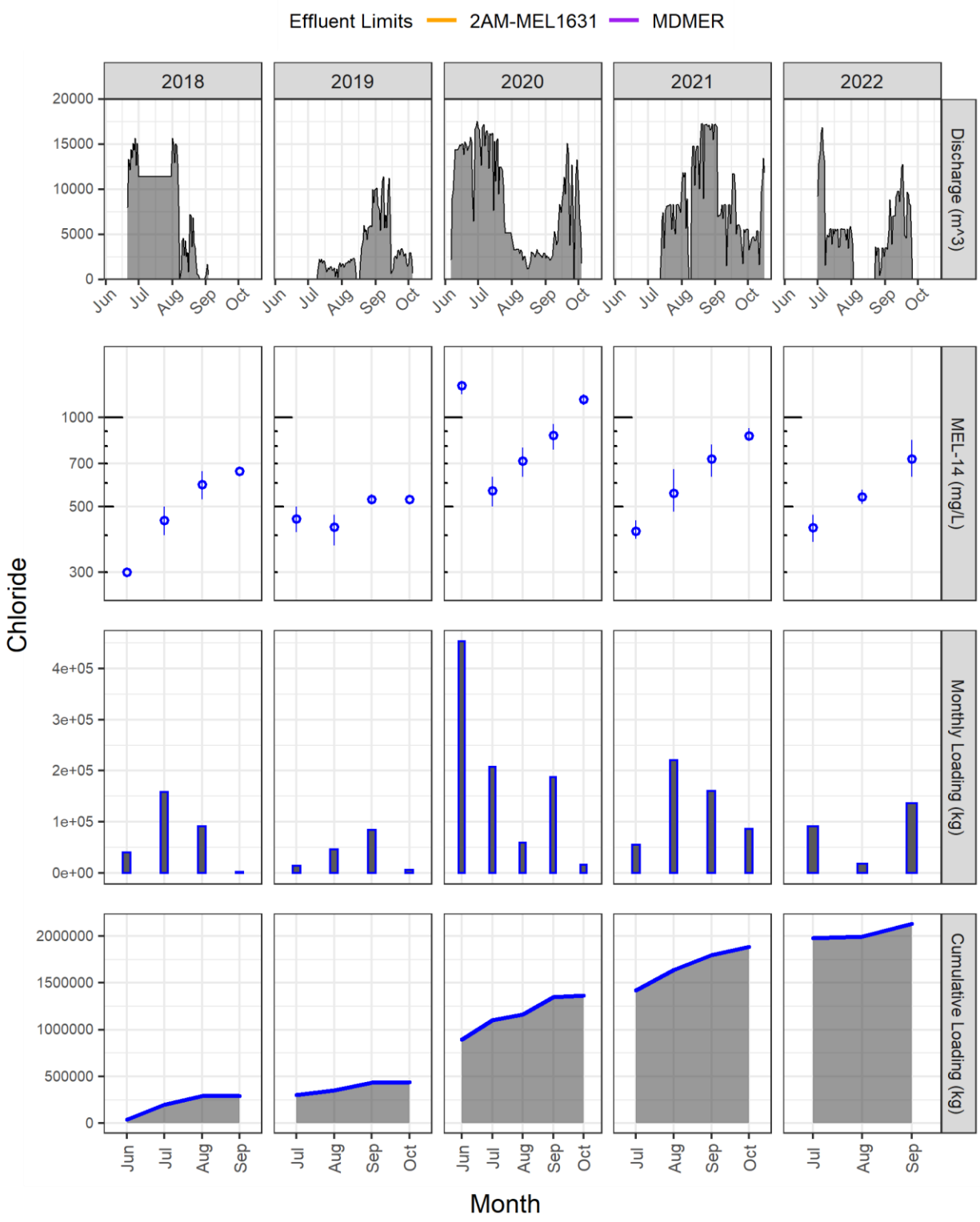


Figure B2-3. Chloride



s

Figure B2-4. Sodium

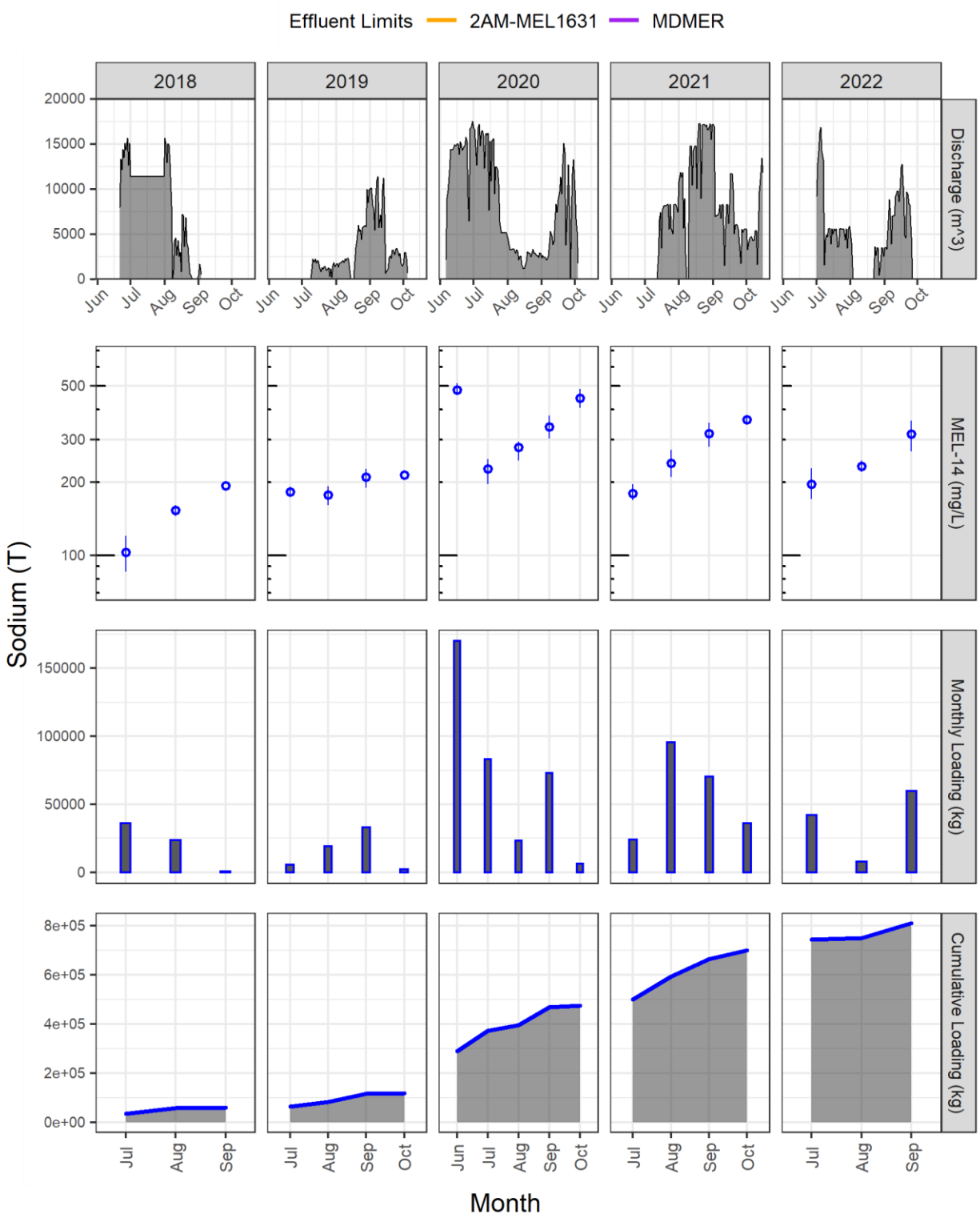


Figure B2-5. Calcium

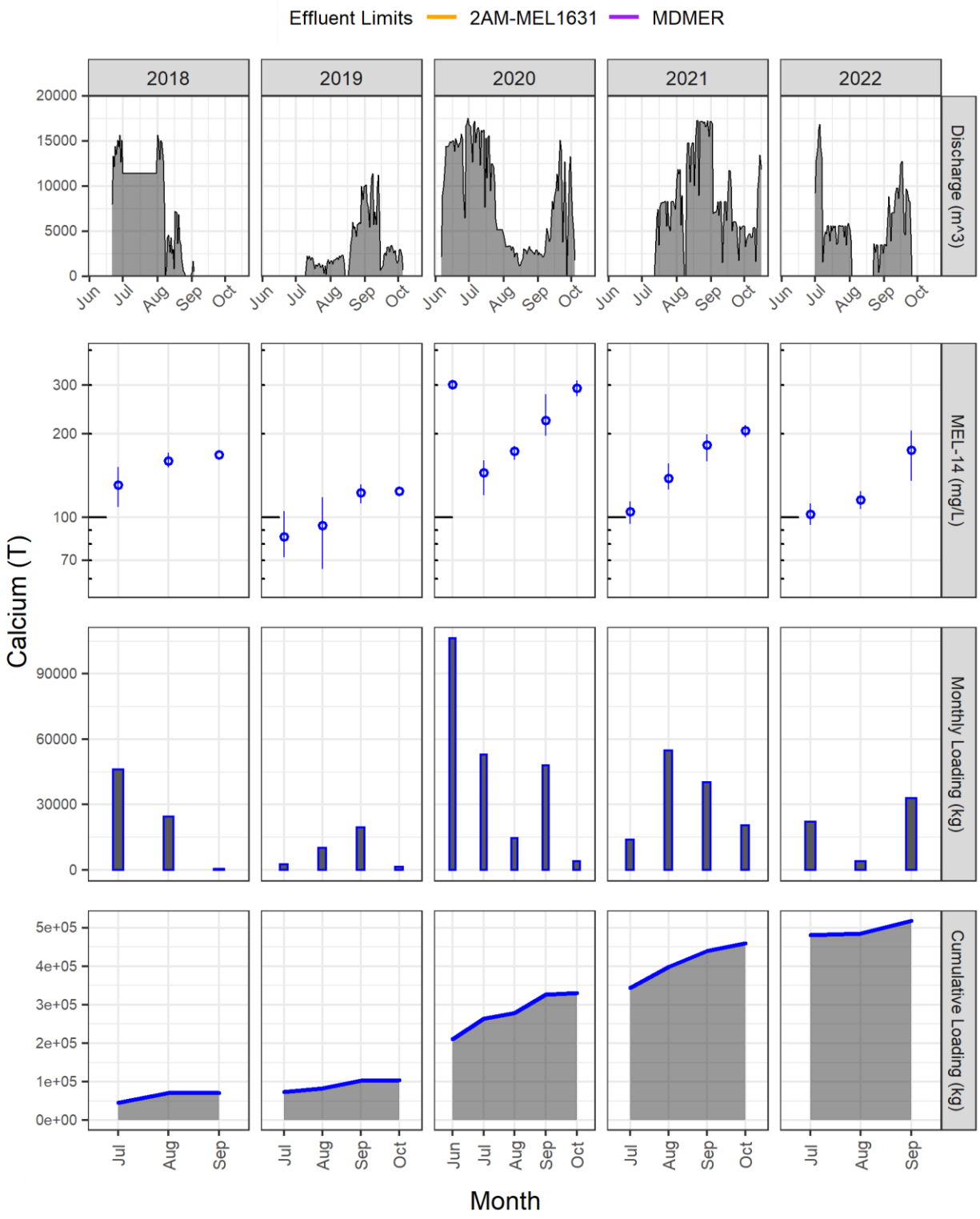


Figure B2-6. Magnesium

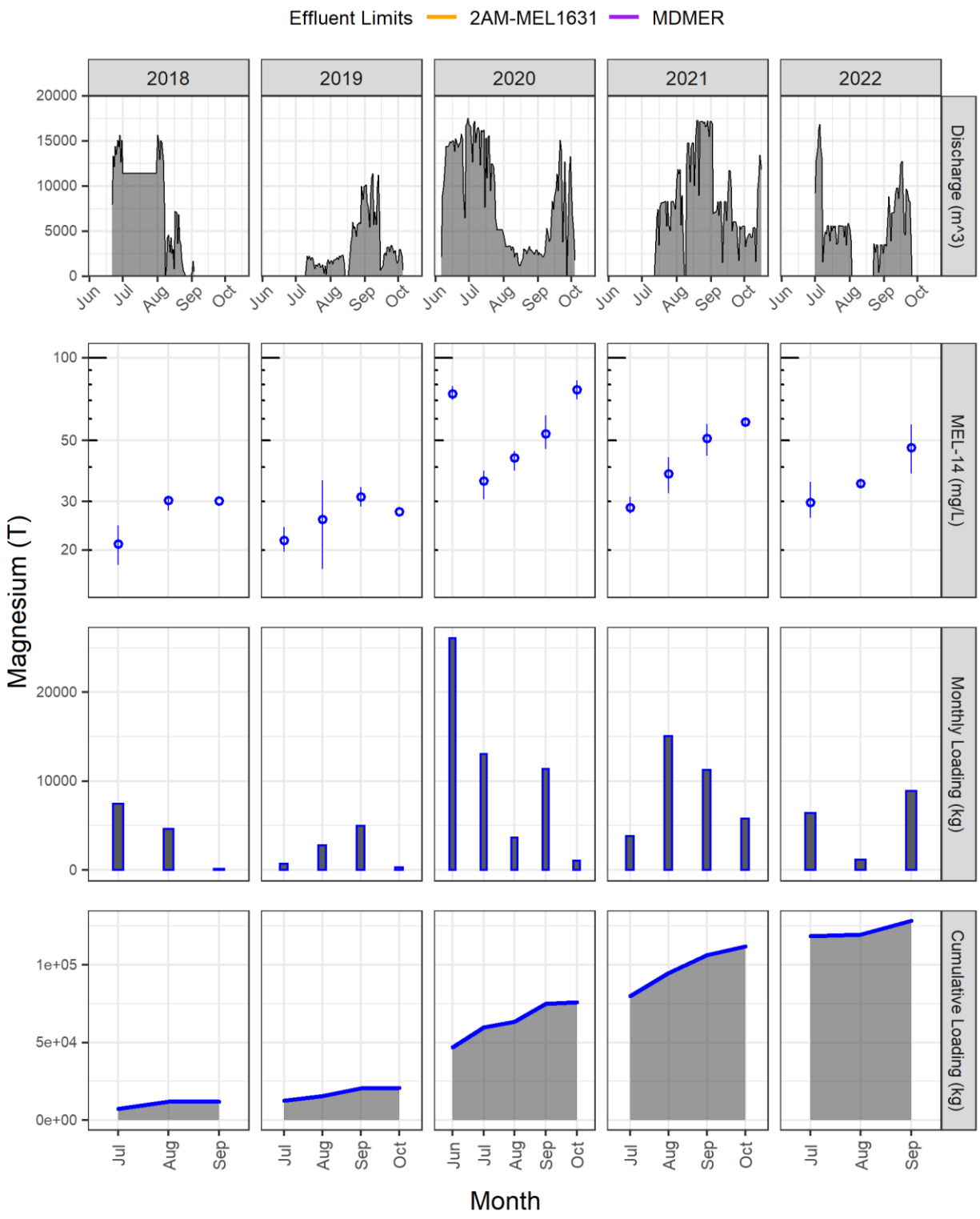


Figure B2-7. Potassium

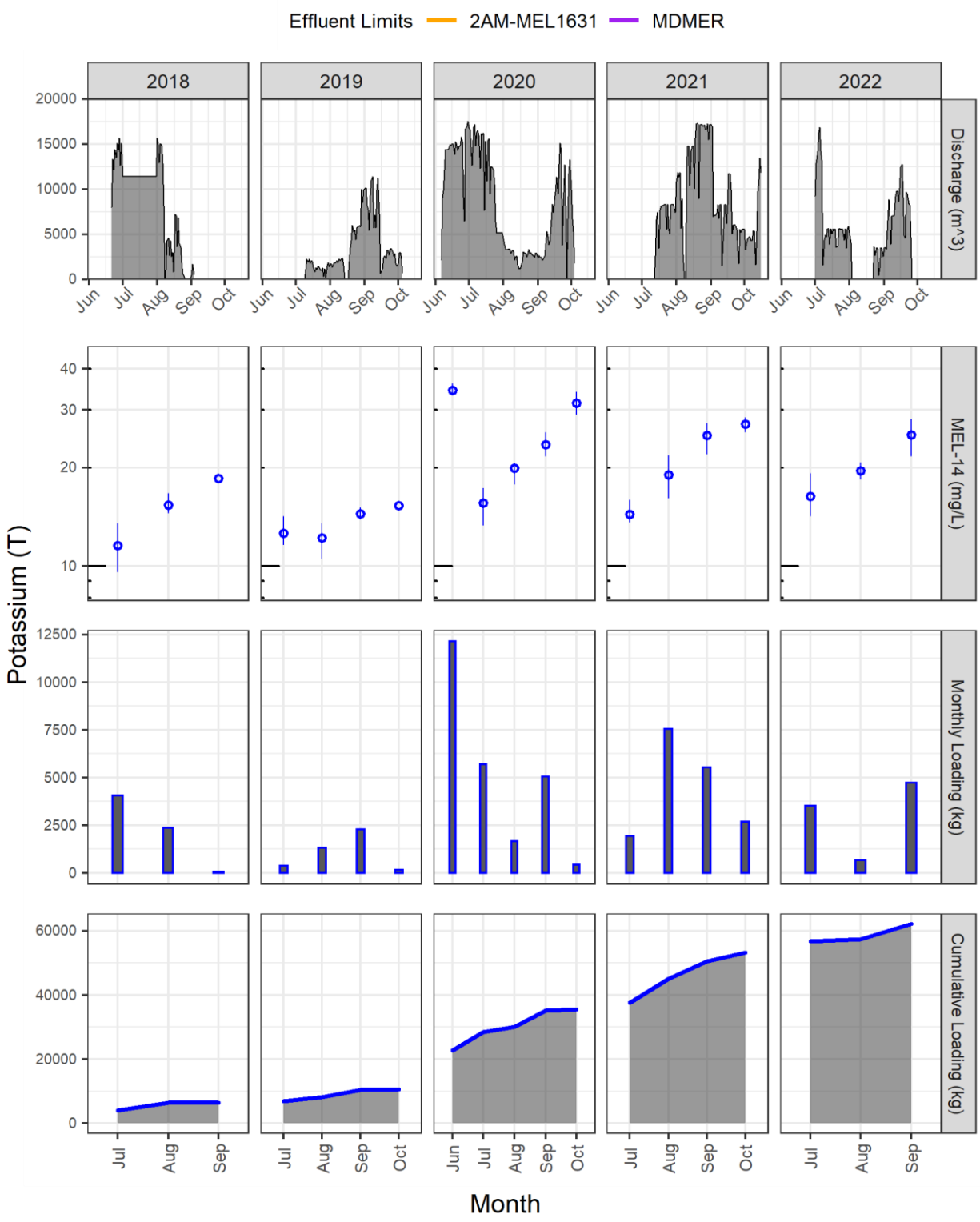


Figure B2-8. Sulphate

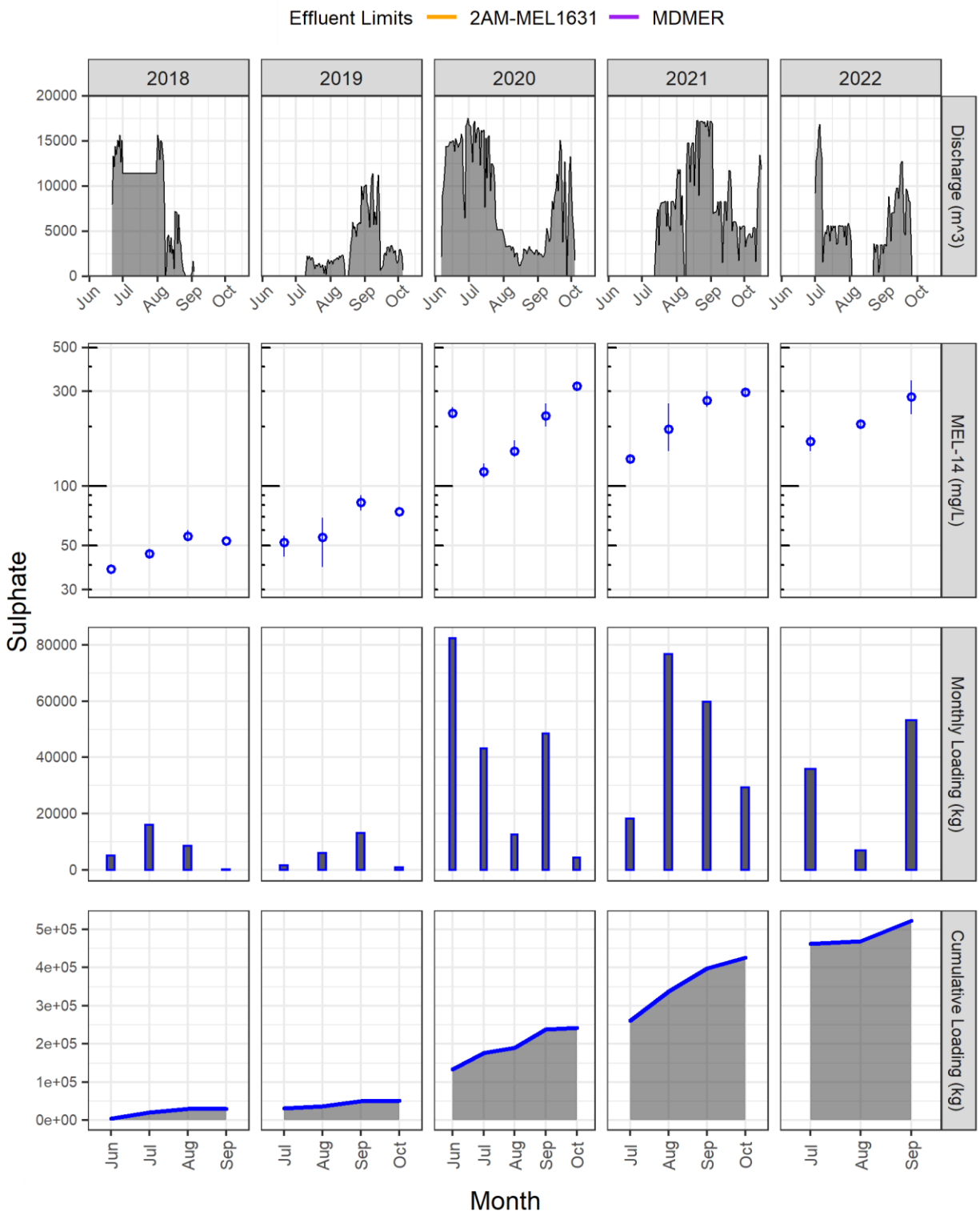


Figure B2-9. Alkalinity (Total)

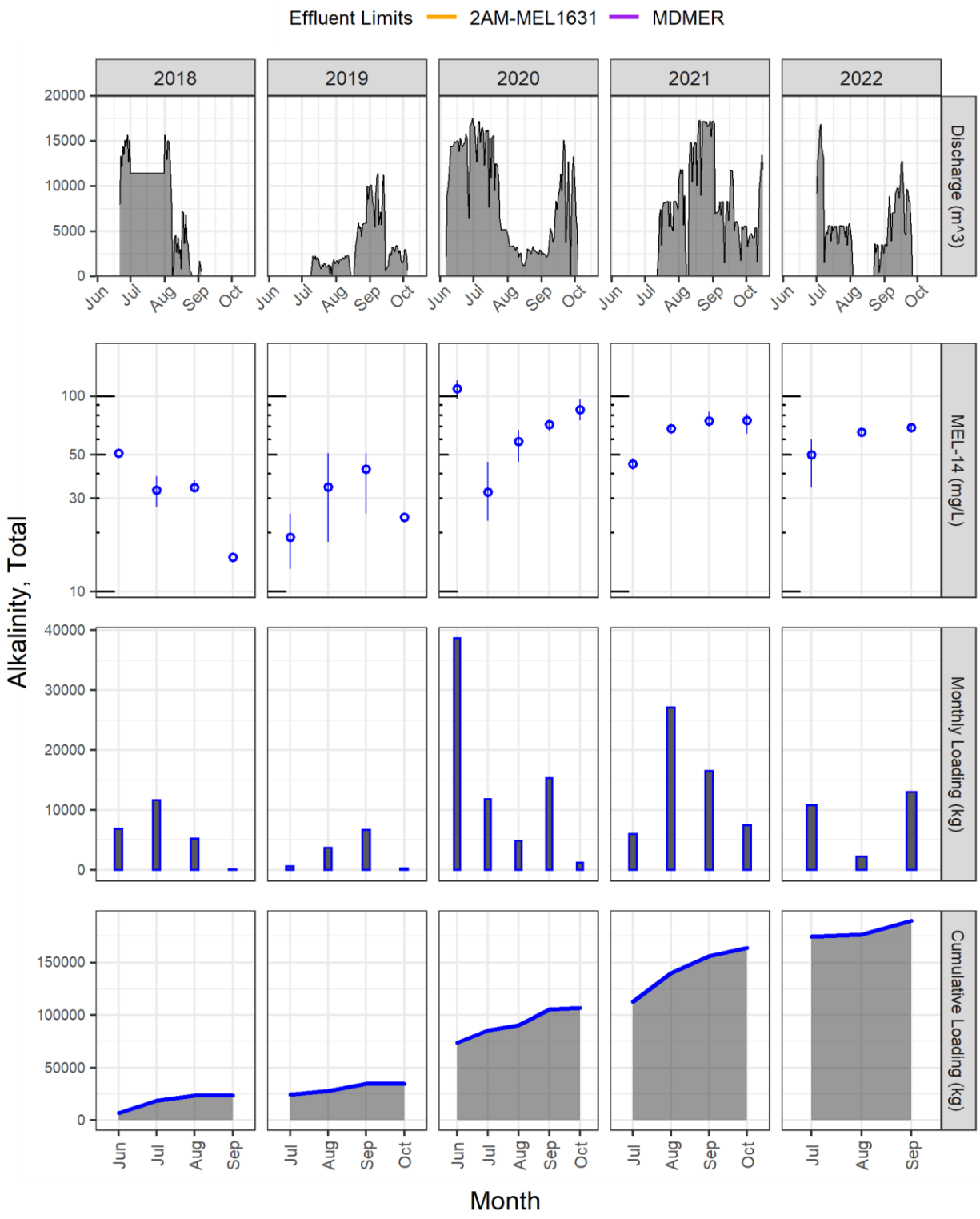


Figure B2-10. Reactive Silica

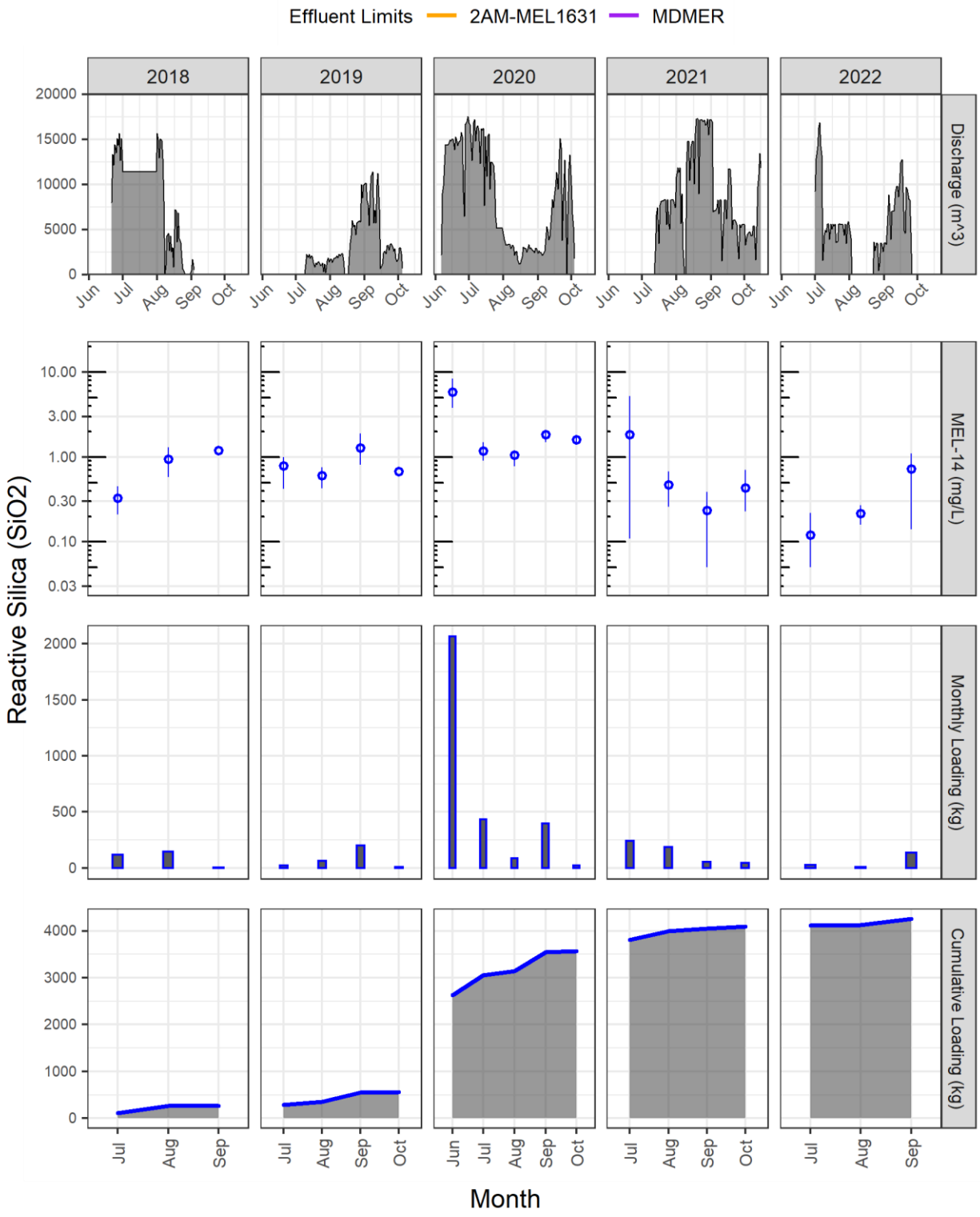


Figure B2-11. Nitrate (as N)

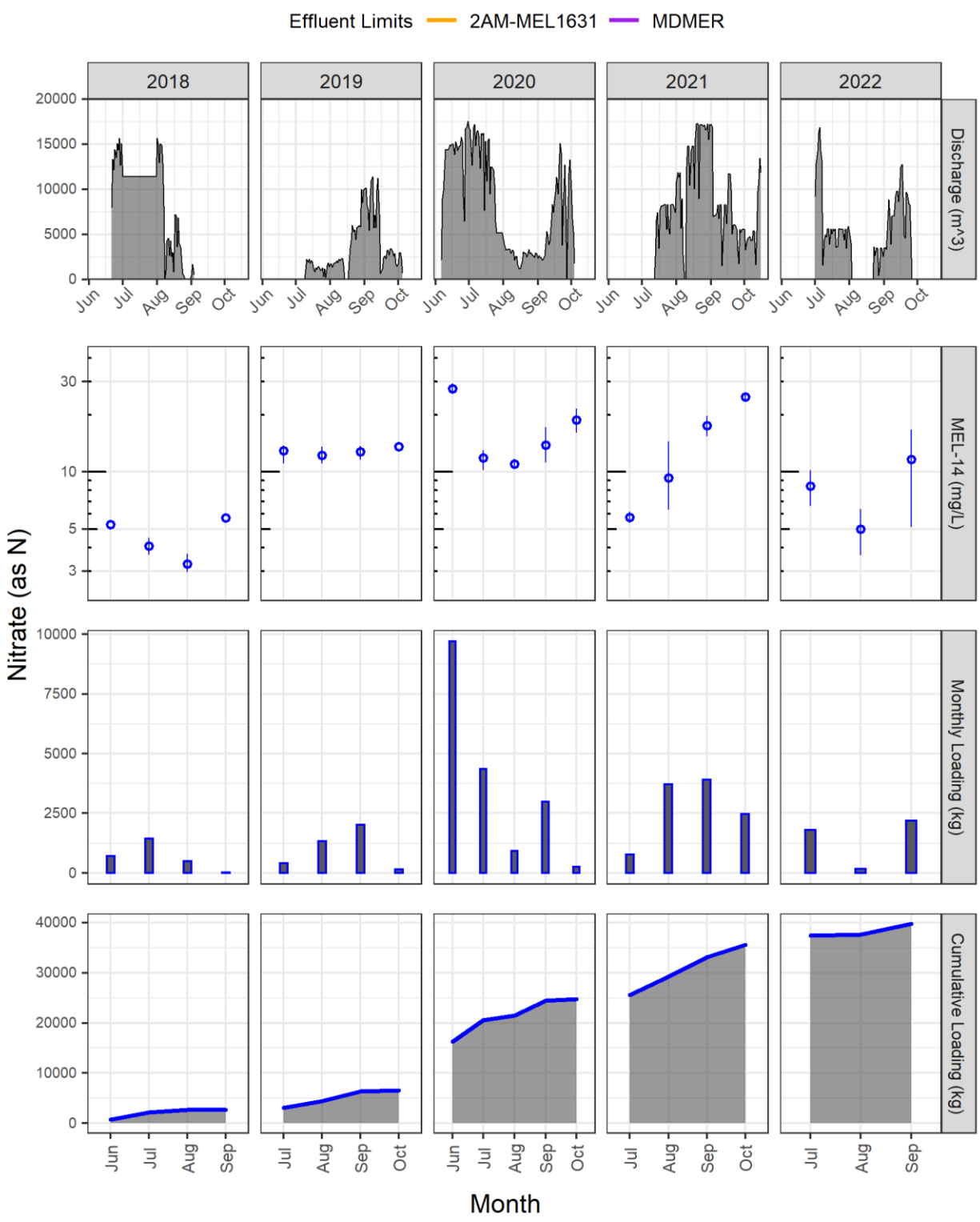


Figure B2-12. Nitrite (as N)

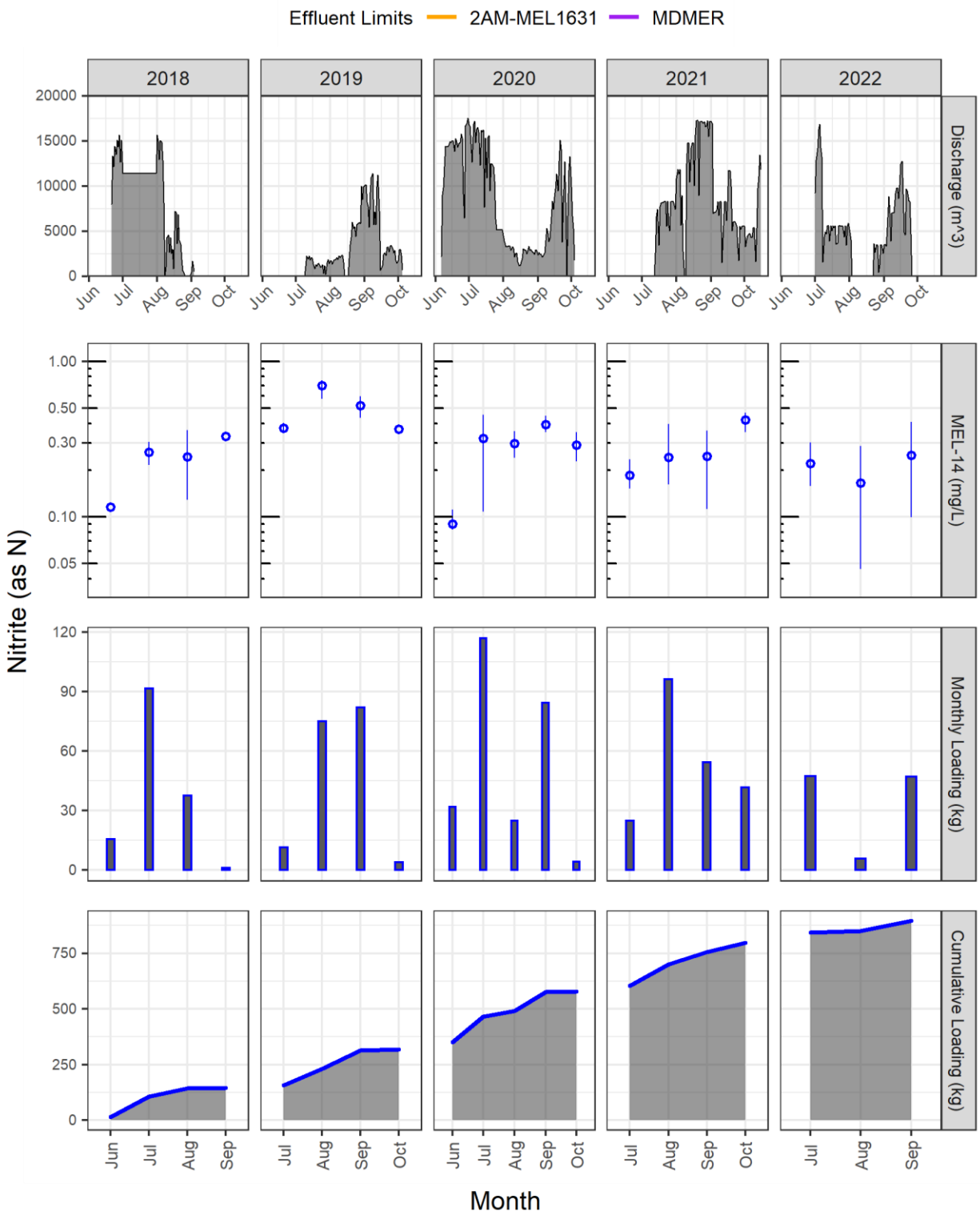


Figure B2-13. Nitrate + Nitrite (as N)

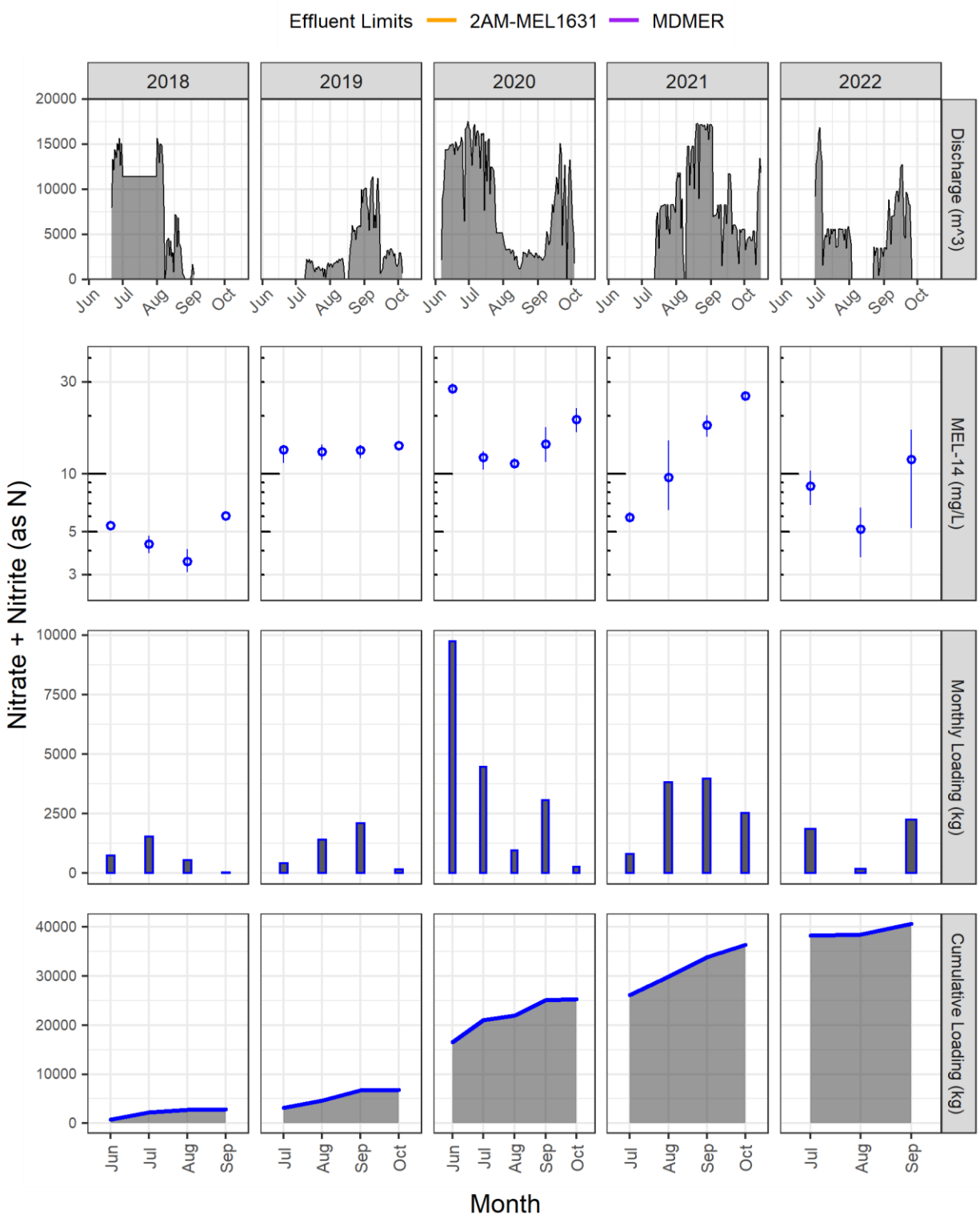


Figure B2-14.Total Kjeldahl nitrogen (TKN)

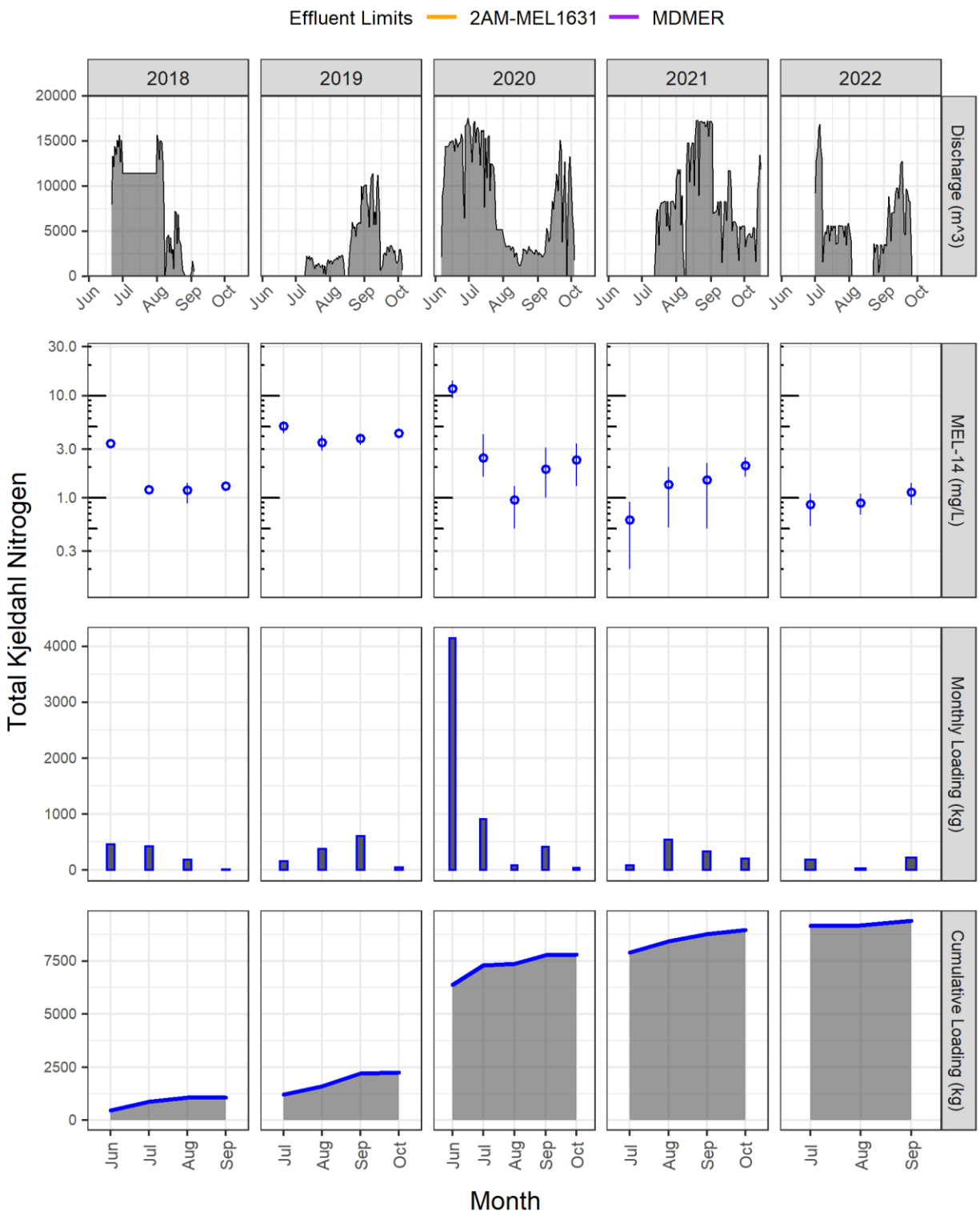


Figure B2-15. Ammonia (as N)

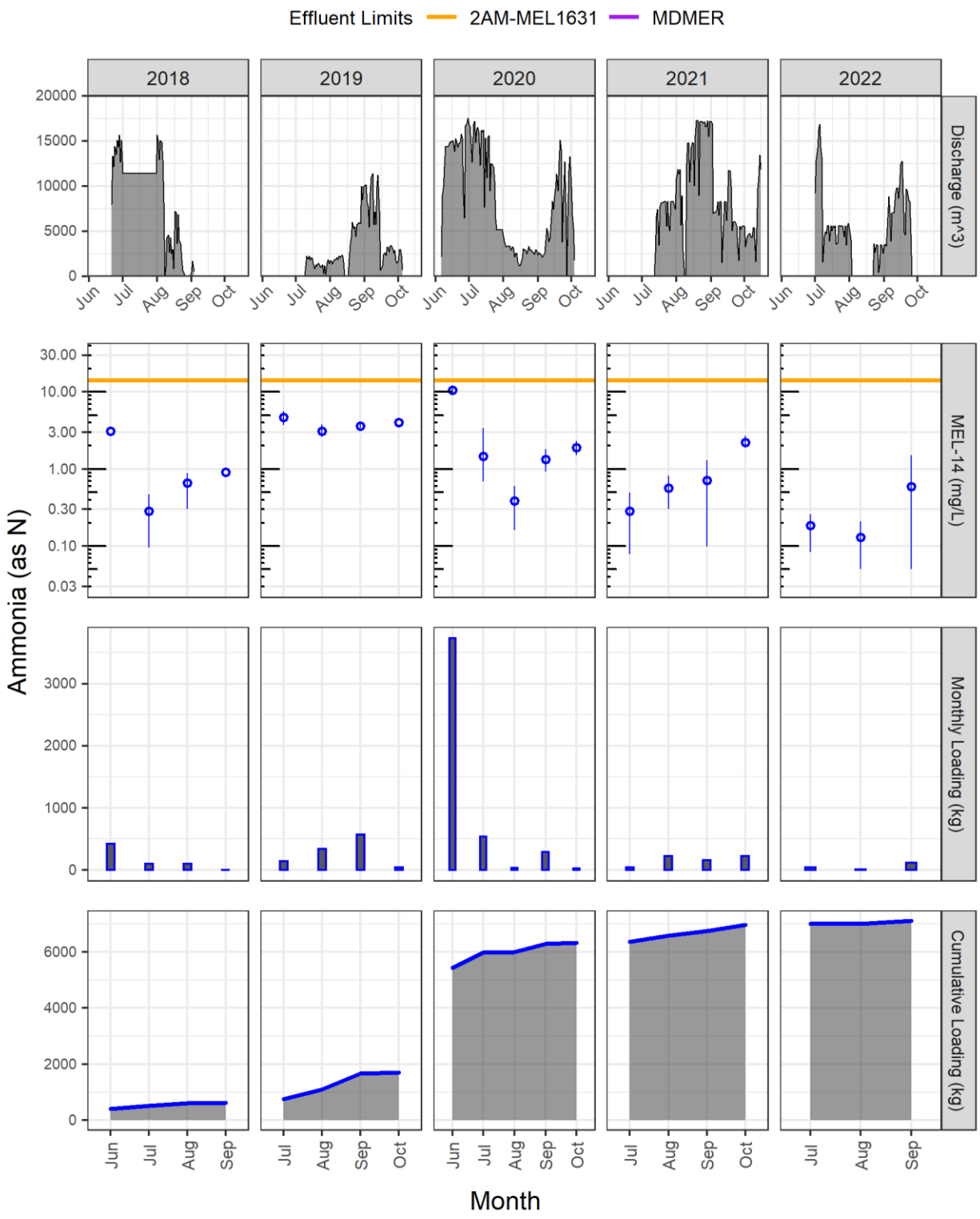


Figure B2-16. Total Phosphorus

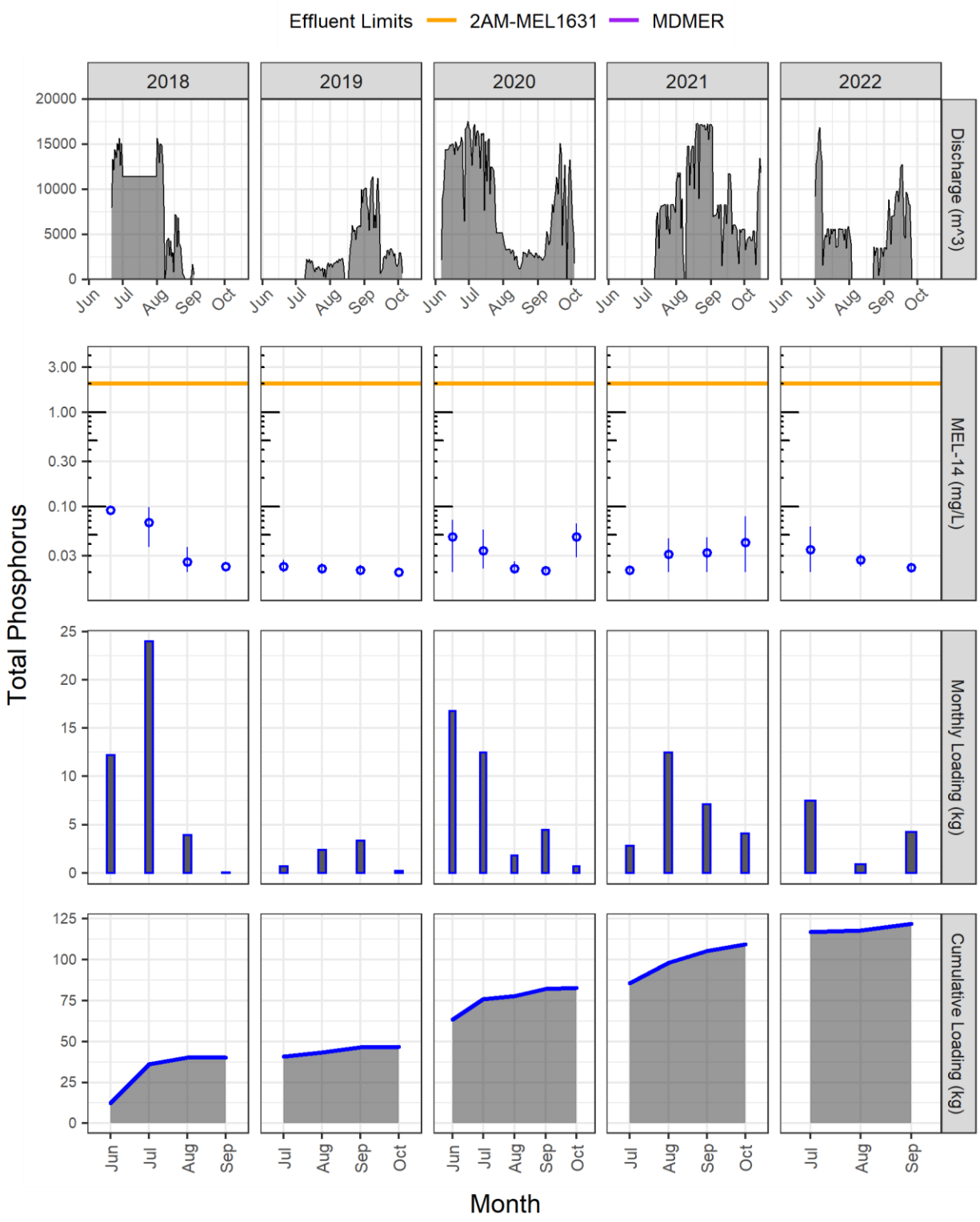


Figure B2-17. Orthophosphate

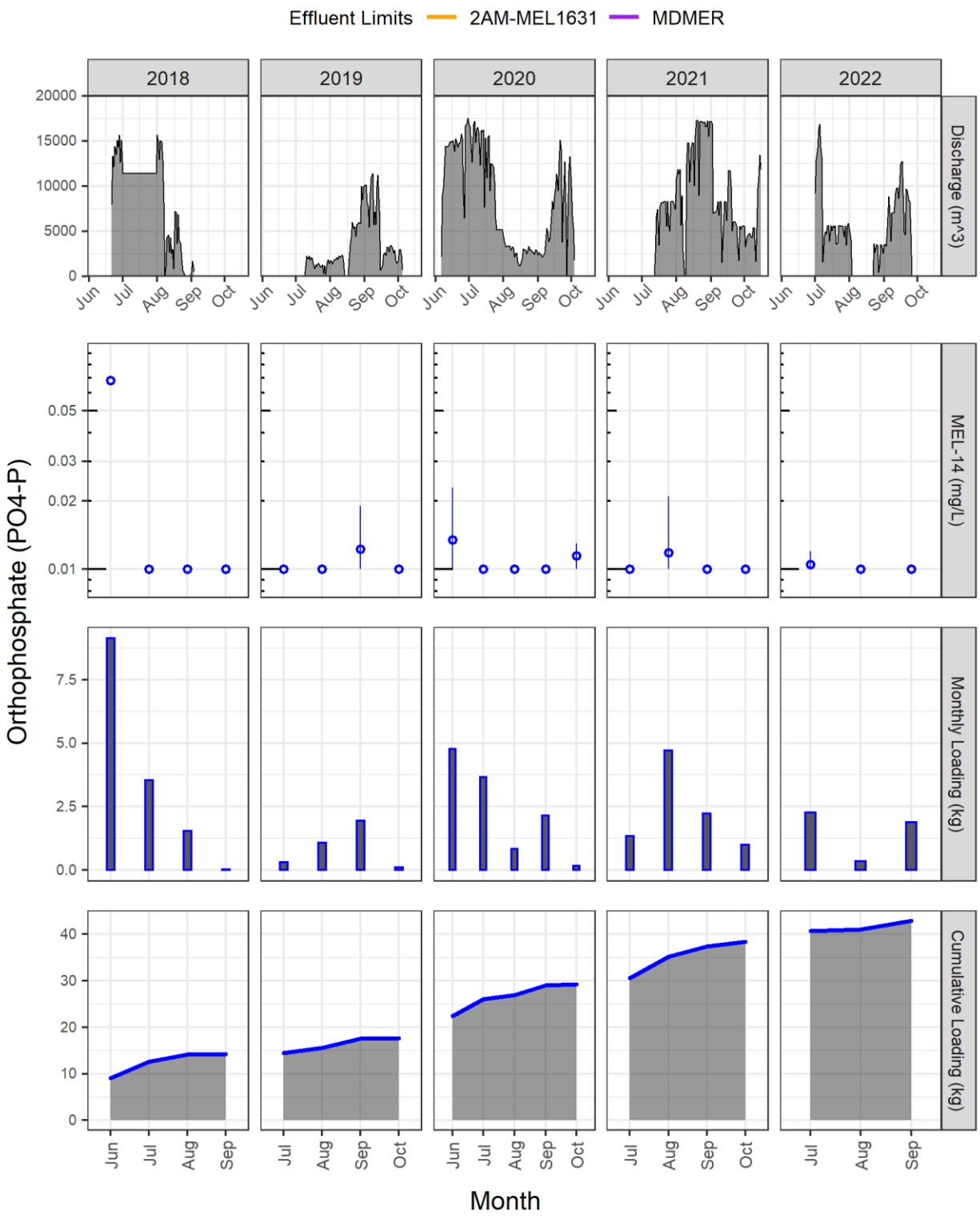


Figure B2-18. Total Organic Carbon (TOC)

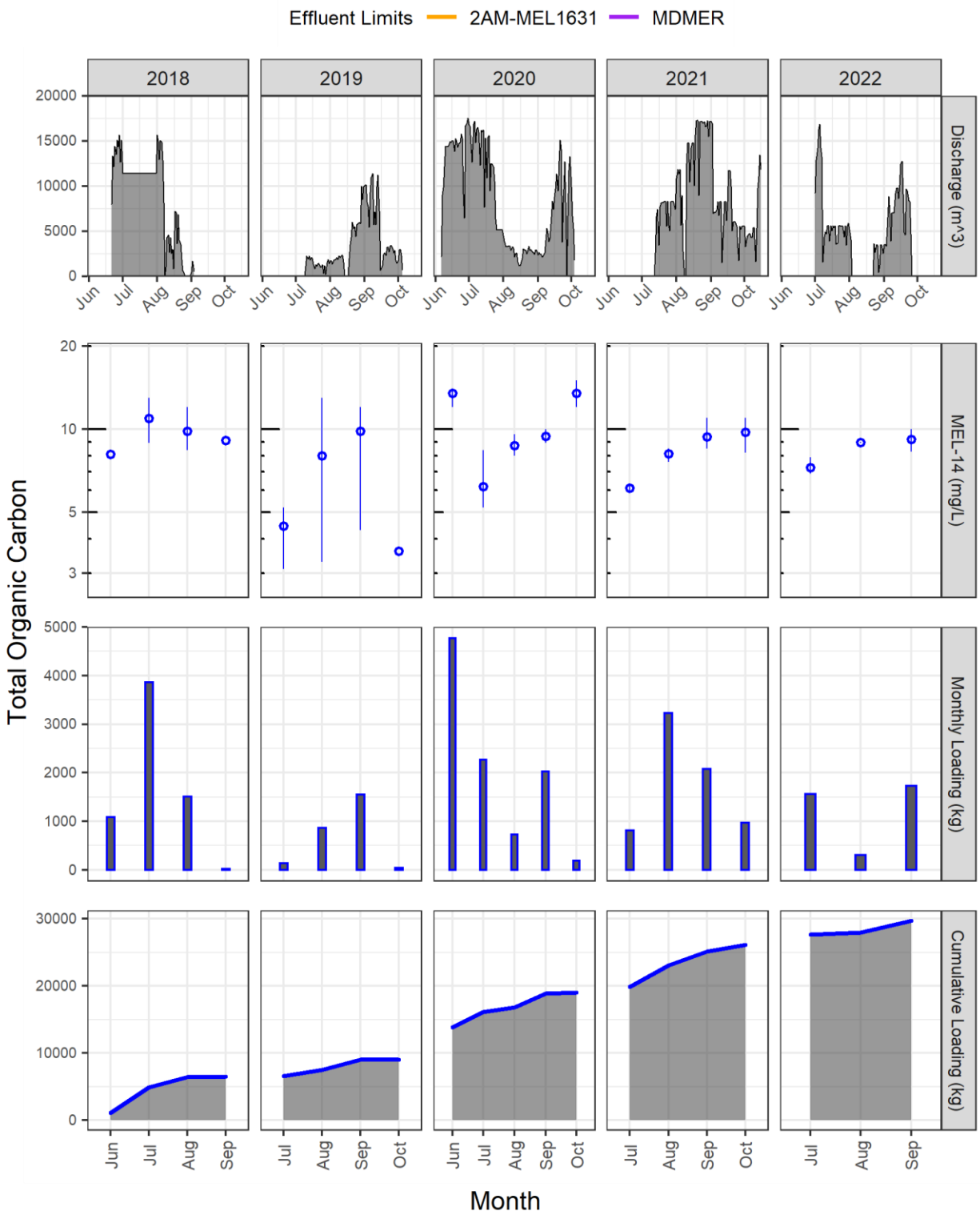


Figure B2-19. Aluminum

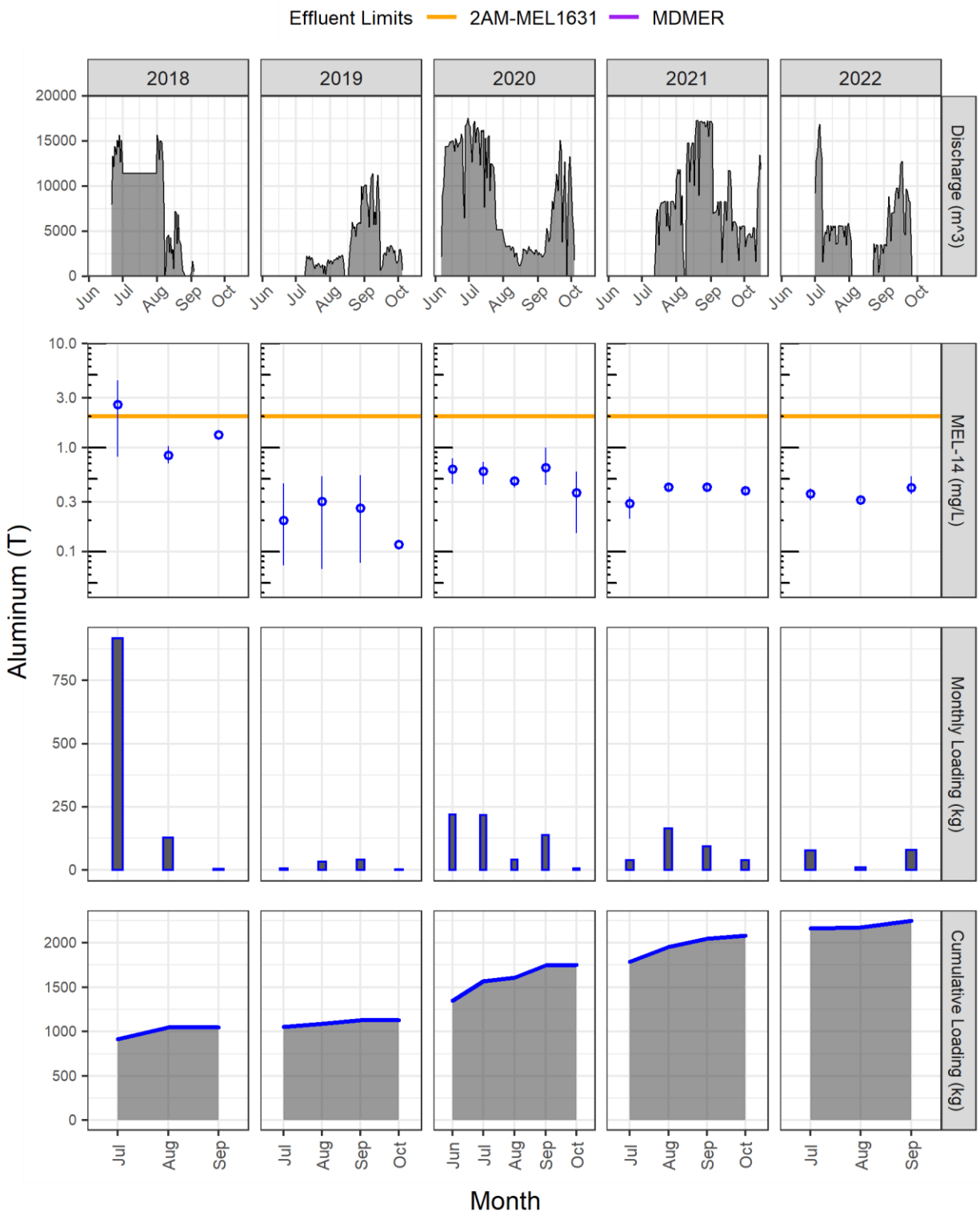


Figure B2-20. Arsenic

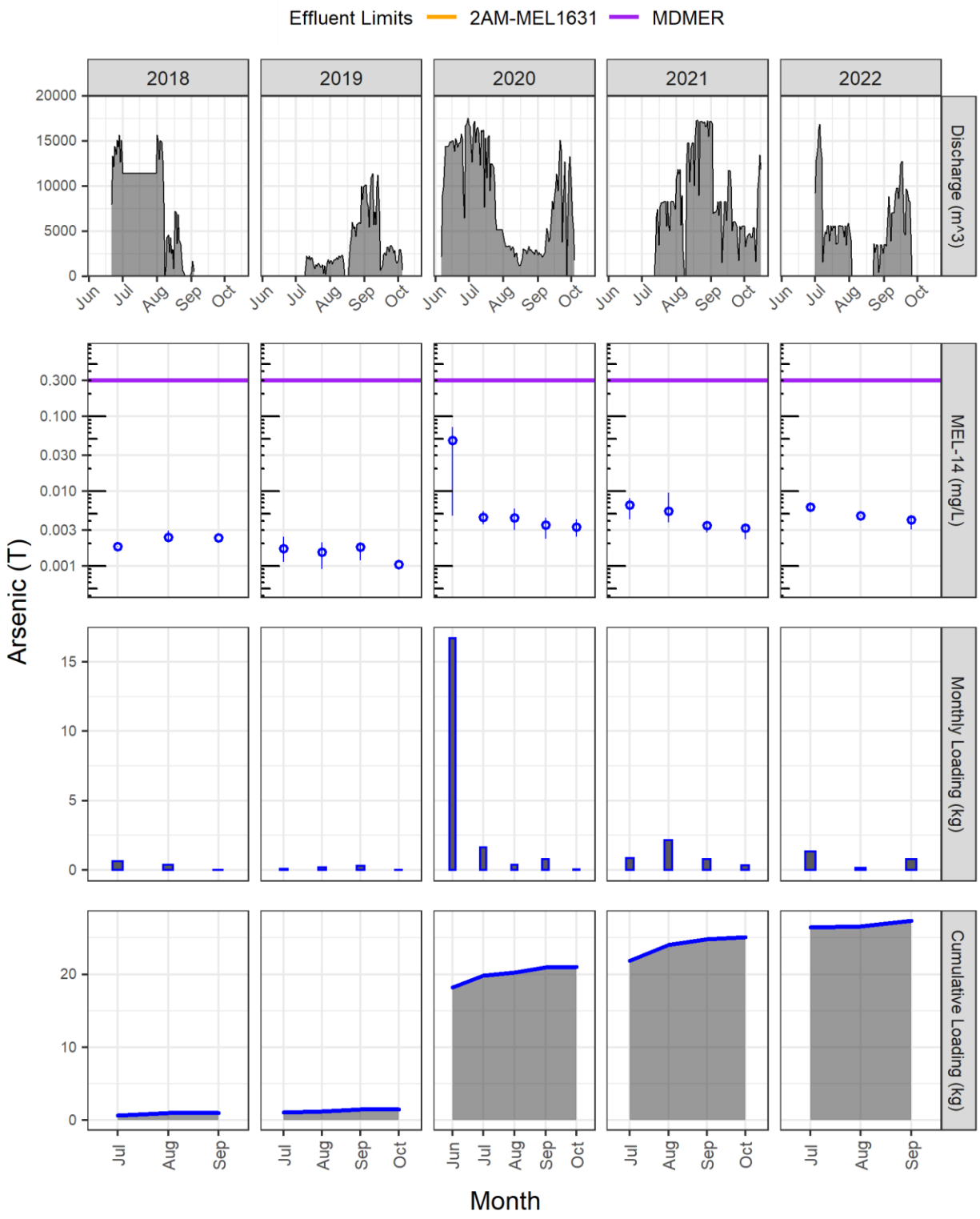


Figure B2-21. Barium

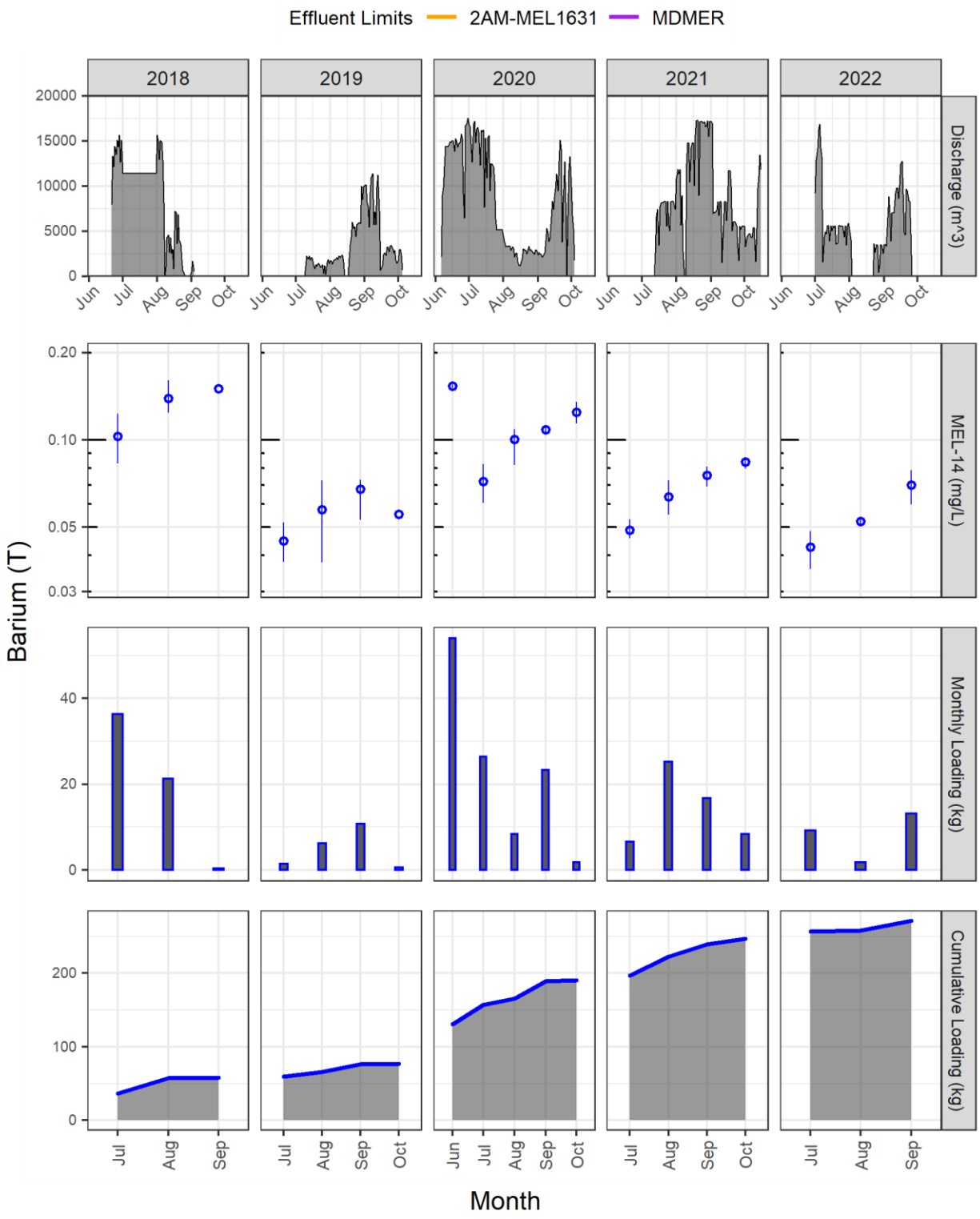


Figure B2-22. Beryllium

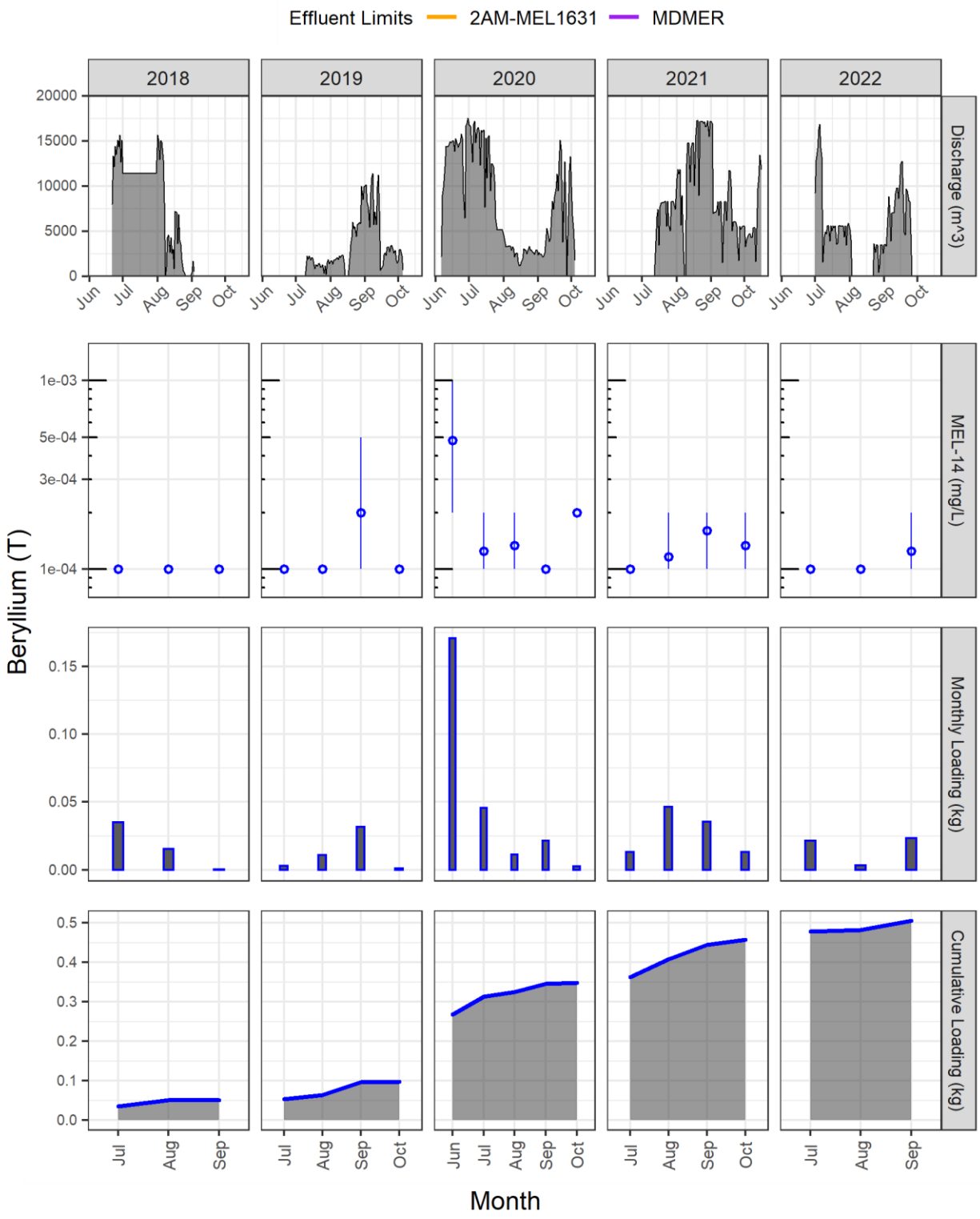


Figure B2-23. Bismuth

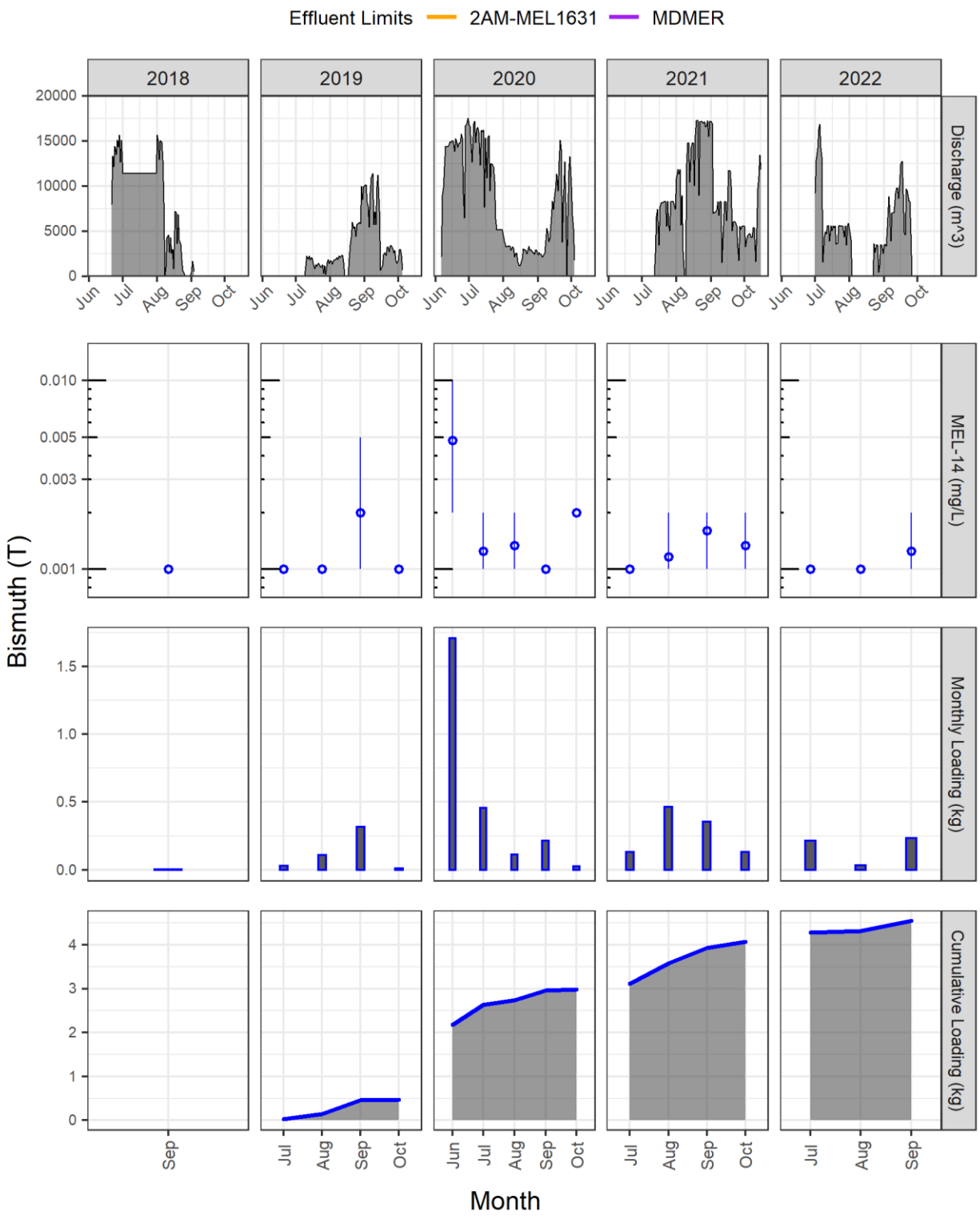


Figure B2-24. Boron

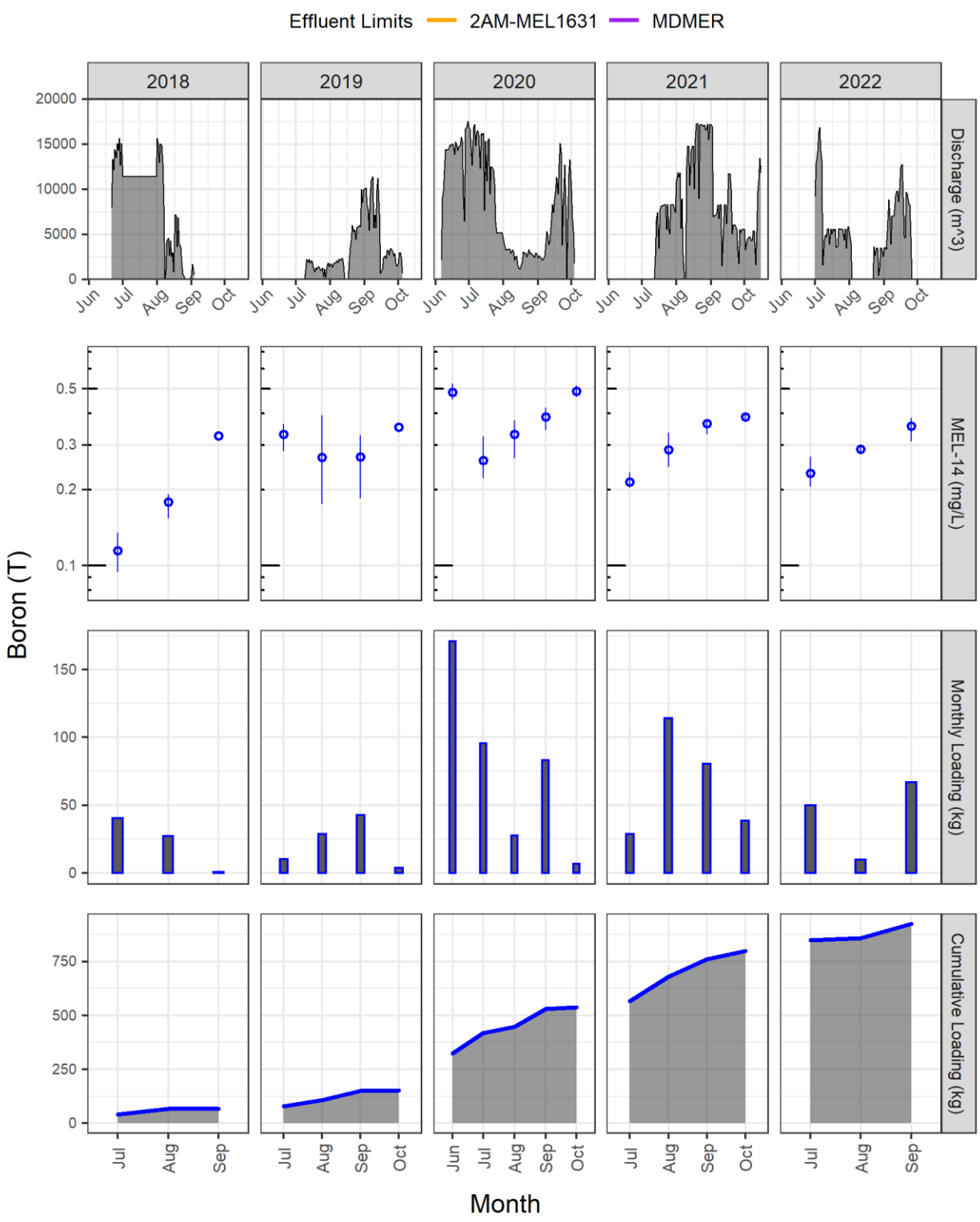


Figure B2-25. Cadmium

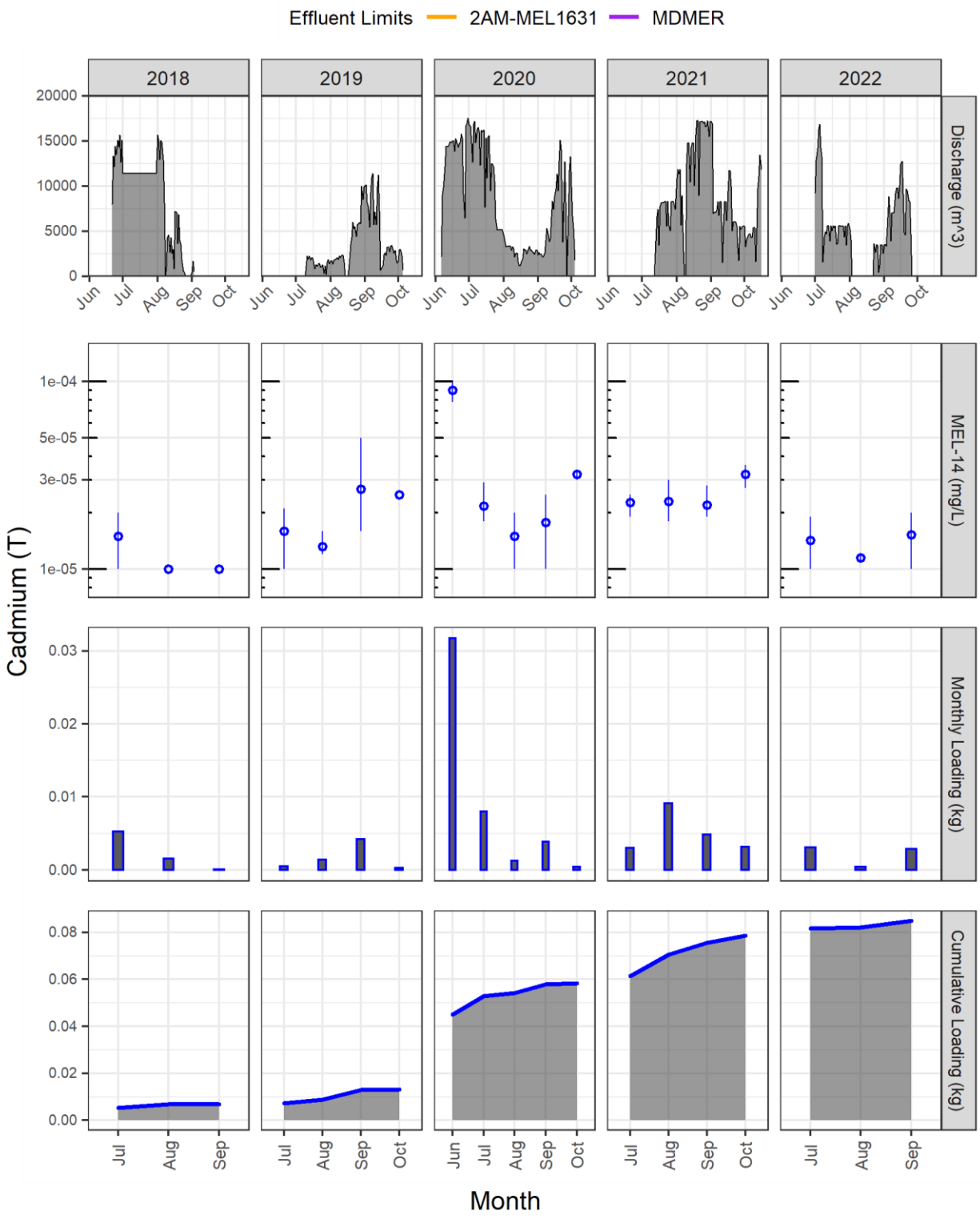


Figure B2-26. Chromium

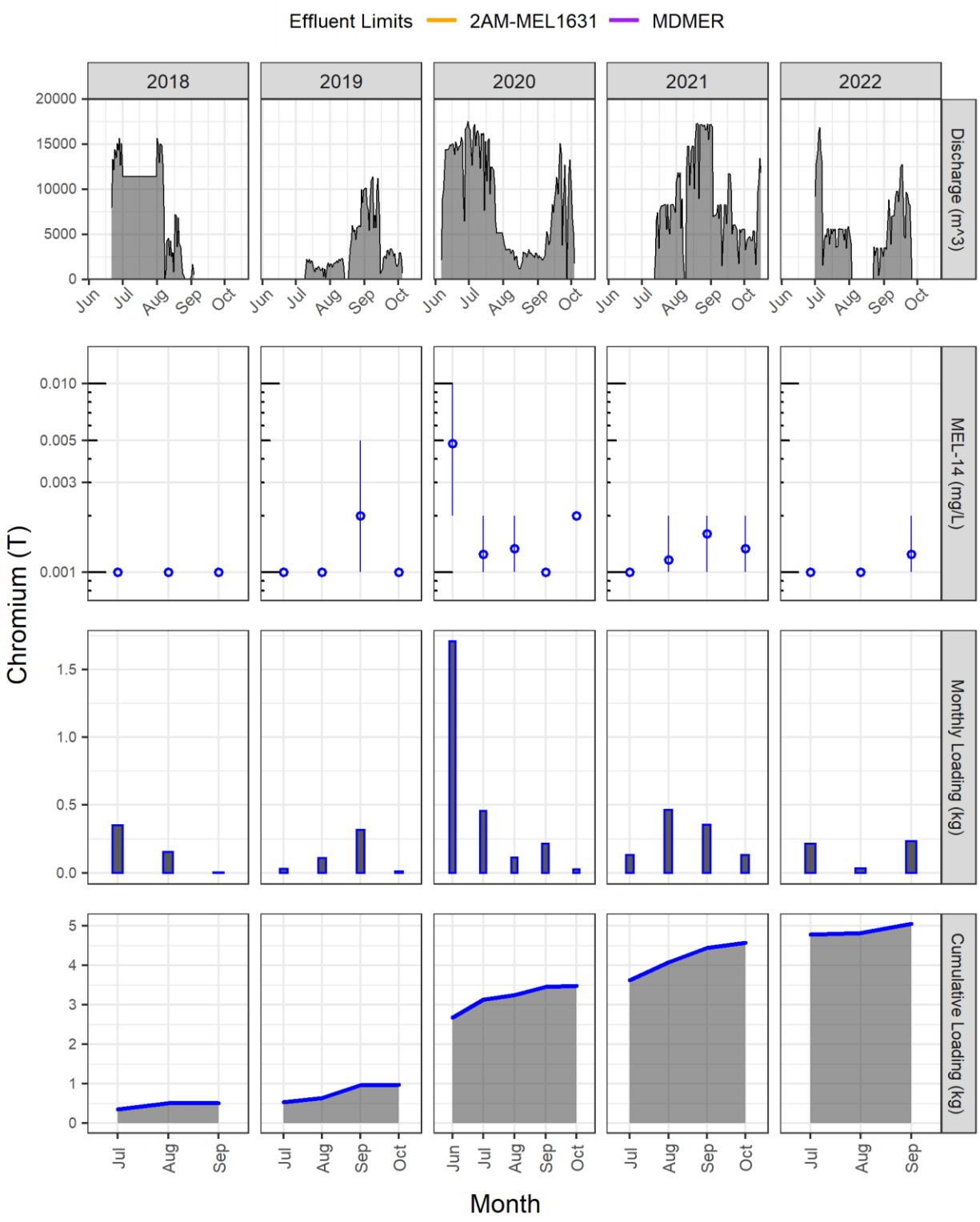


Figure B2-27. Cobalt

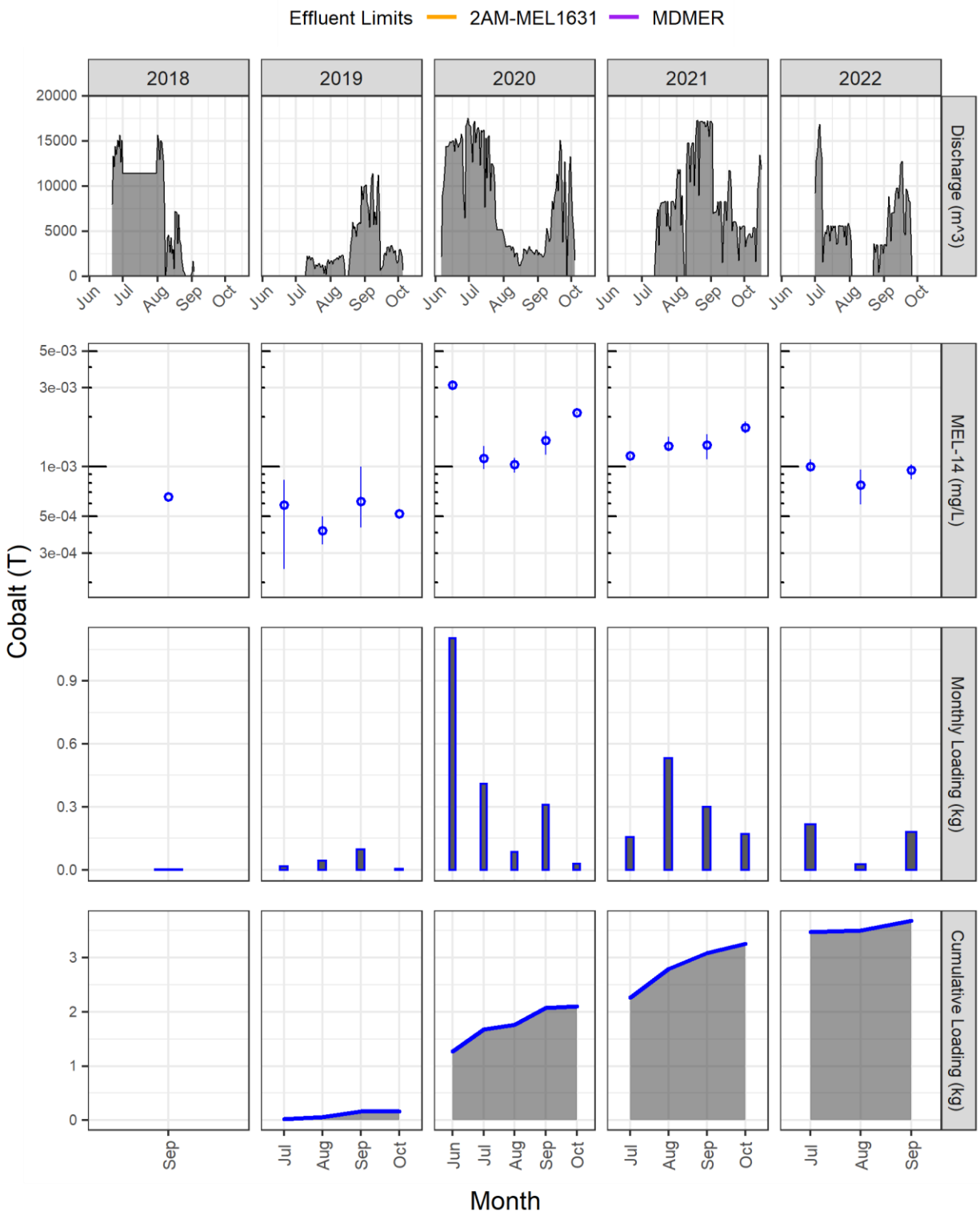


Figure B2-28. Copper

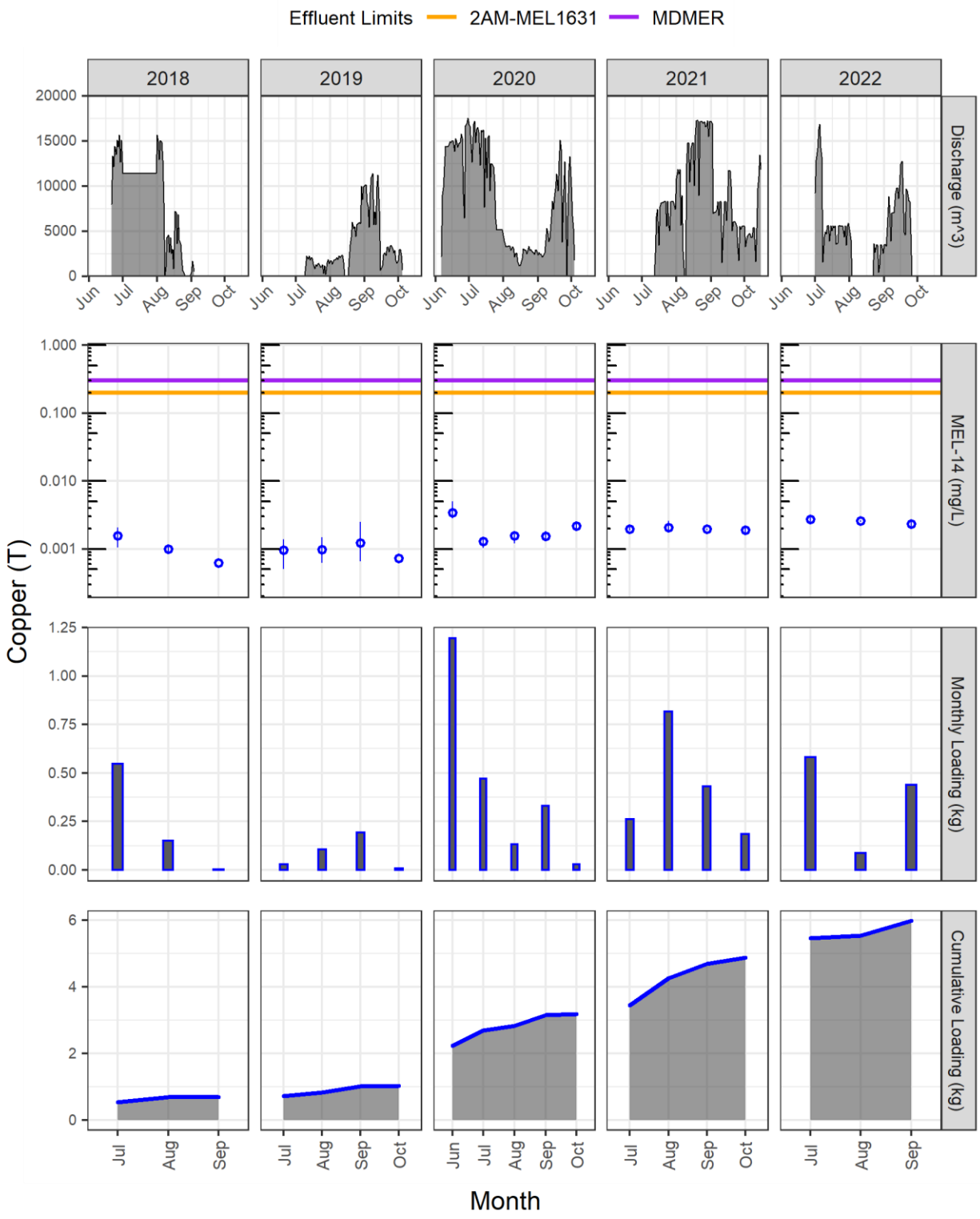


Figure B2-29. Iron

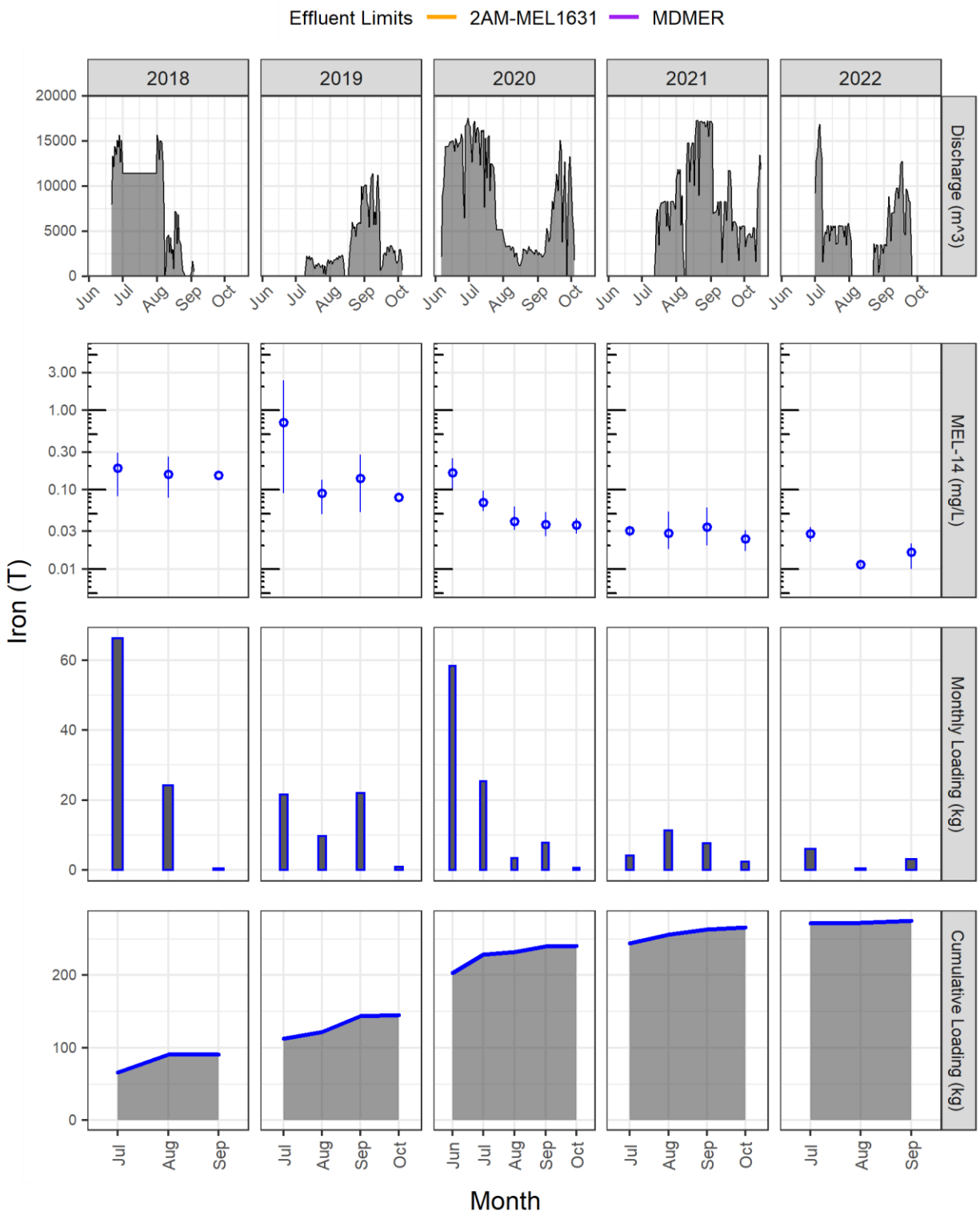


Figure B2-30. Lead

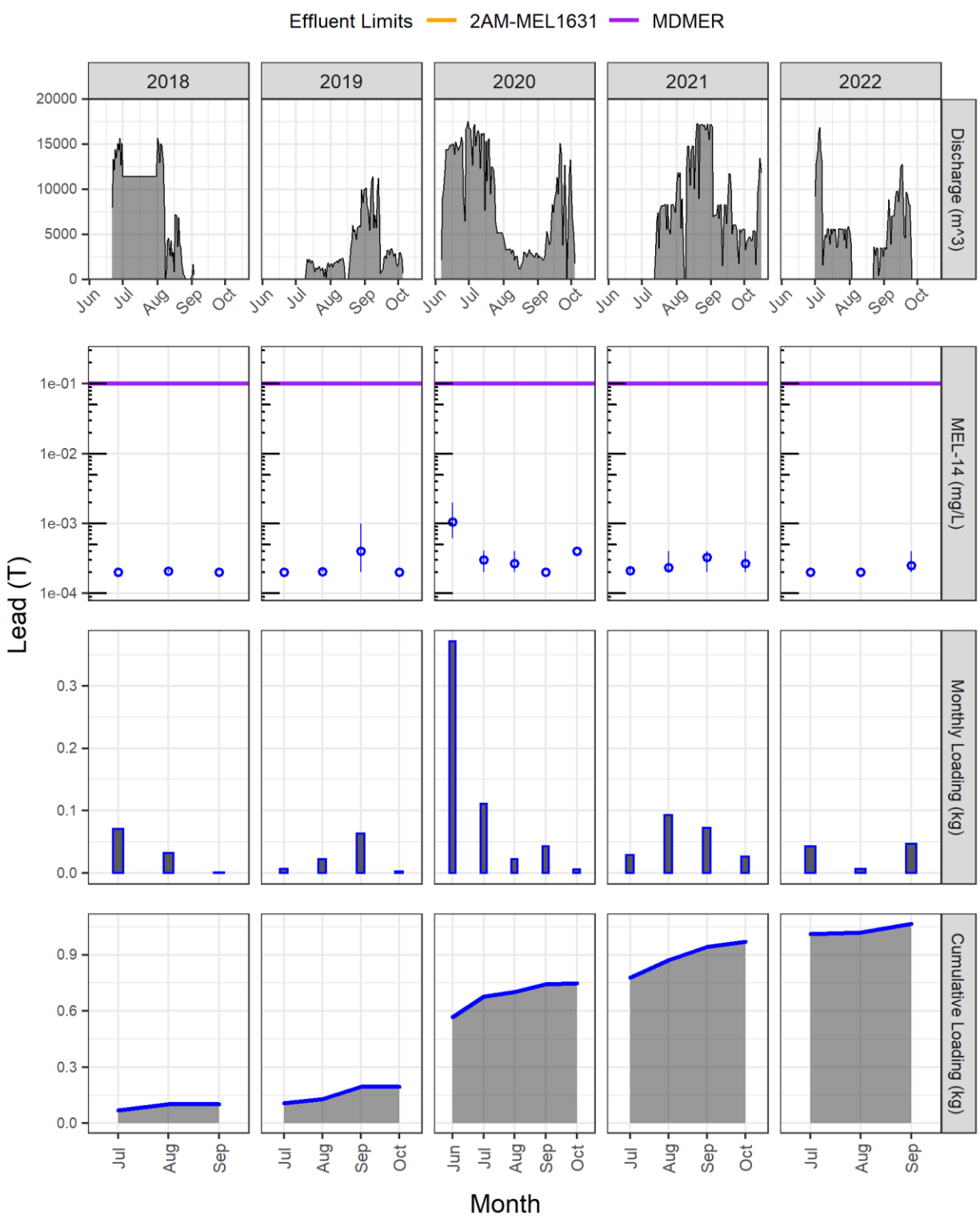


Figure B2-31. Lithium

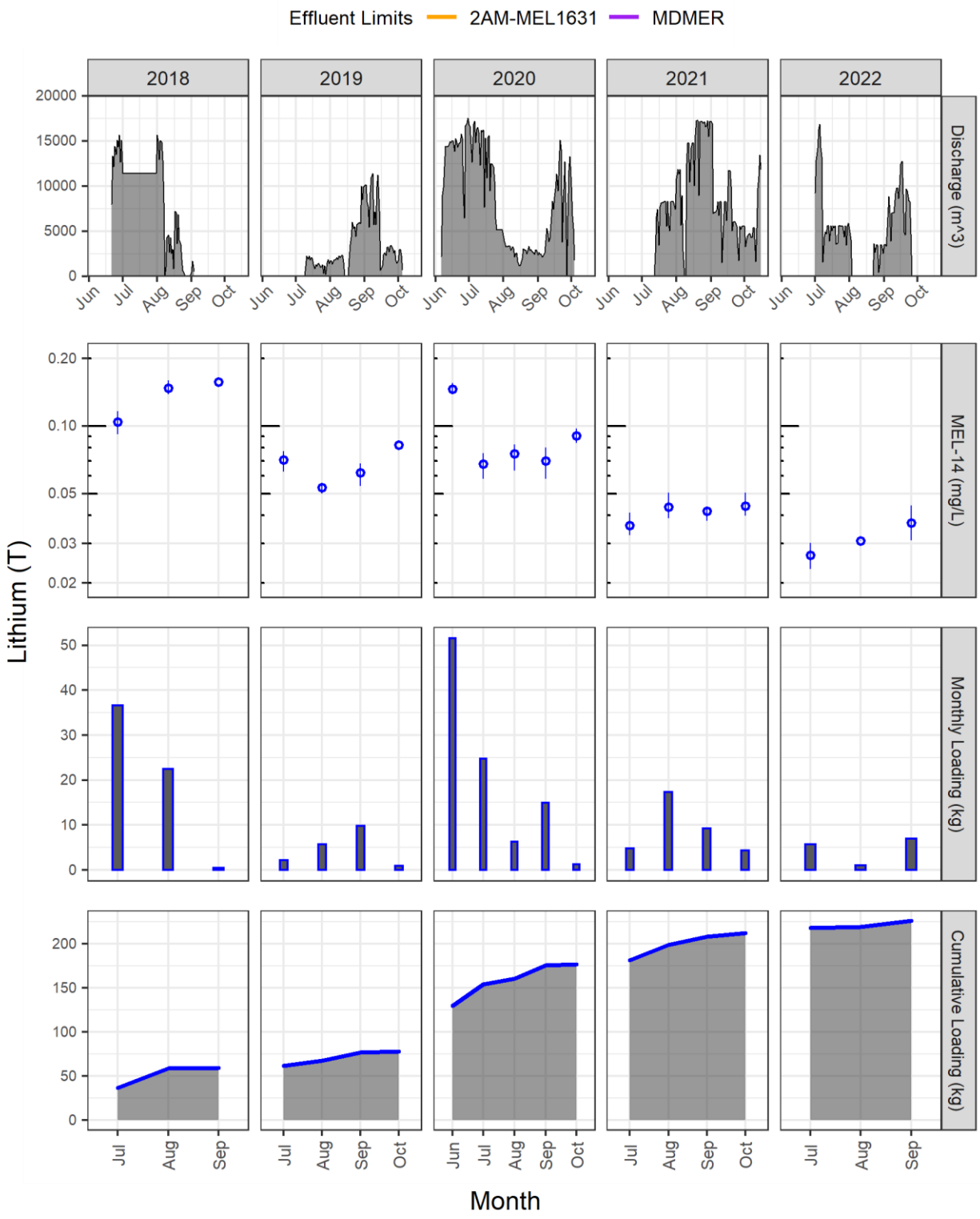


Figure B2-32. Manganese

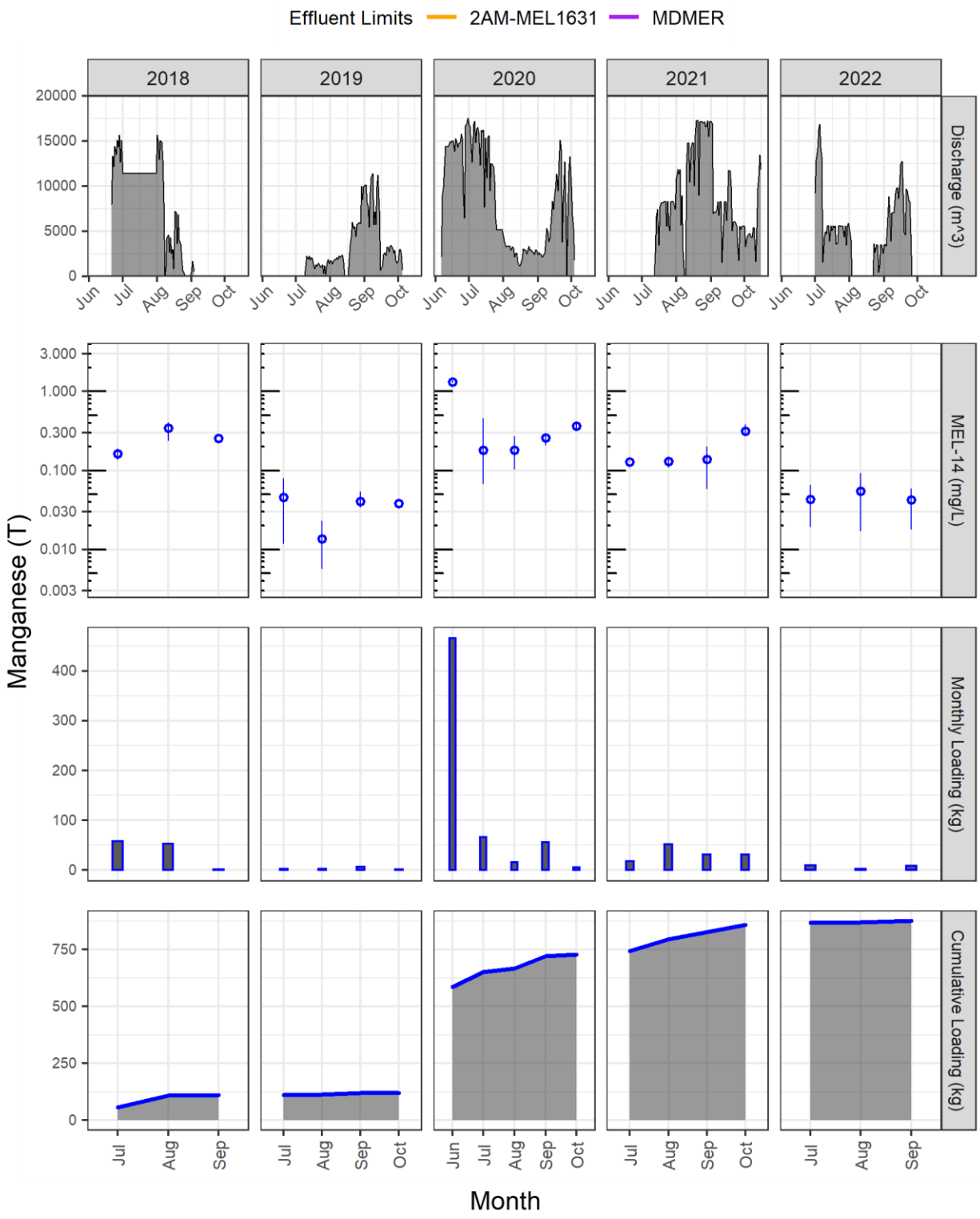


Figure B2-33. Mercury

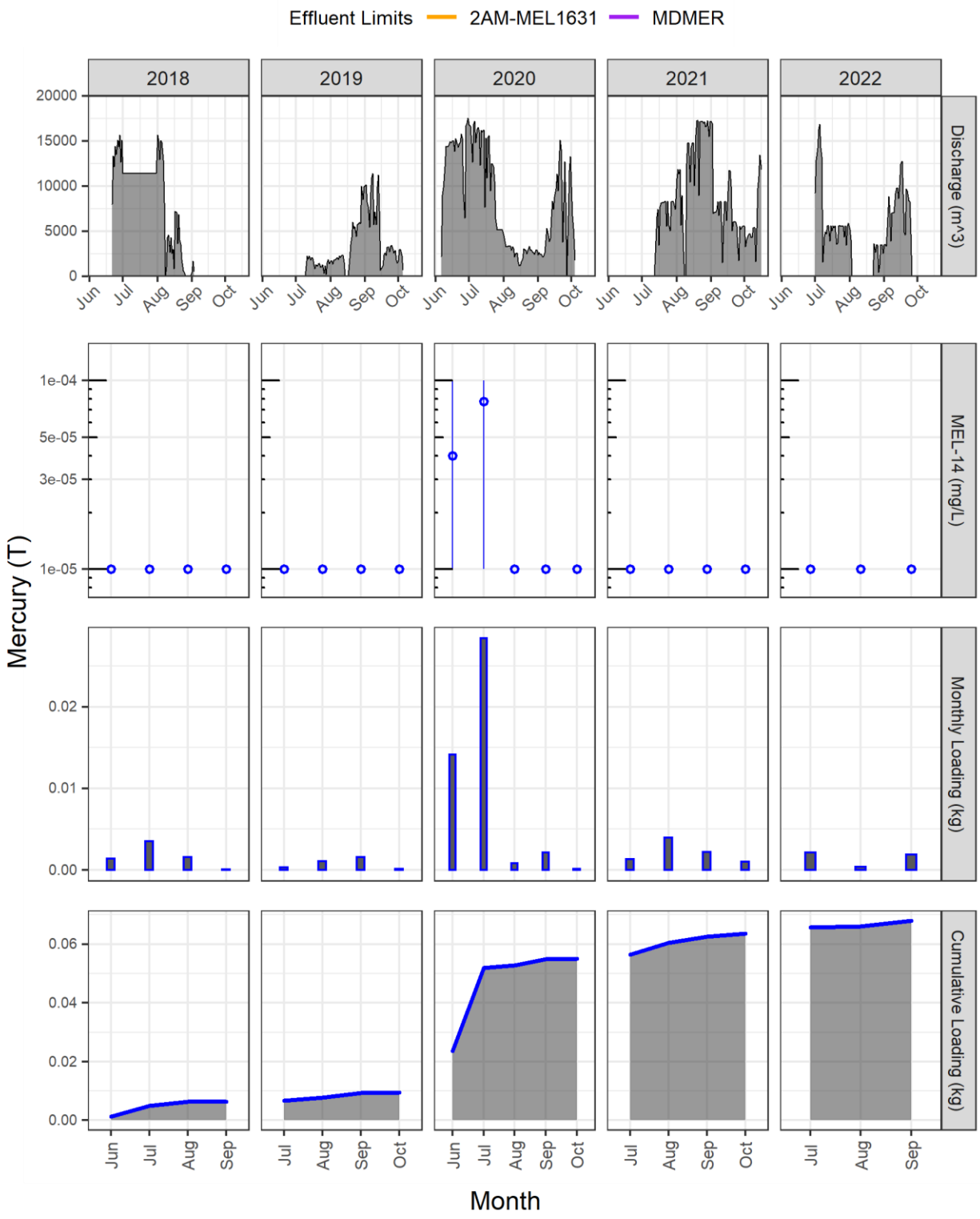


Figure B2-34. Molybdenum

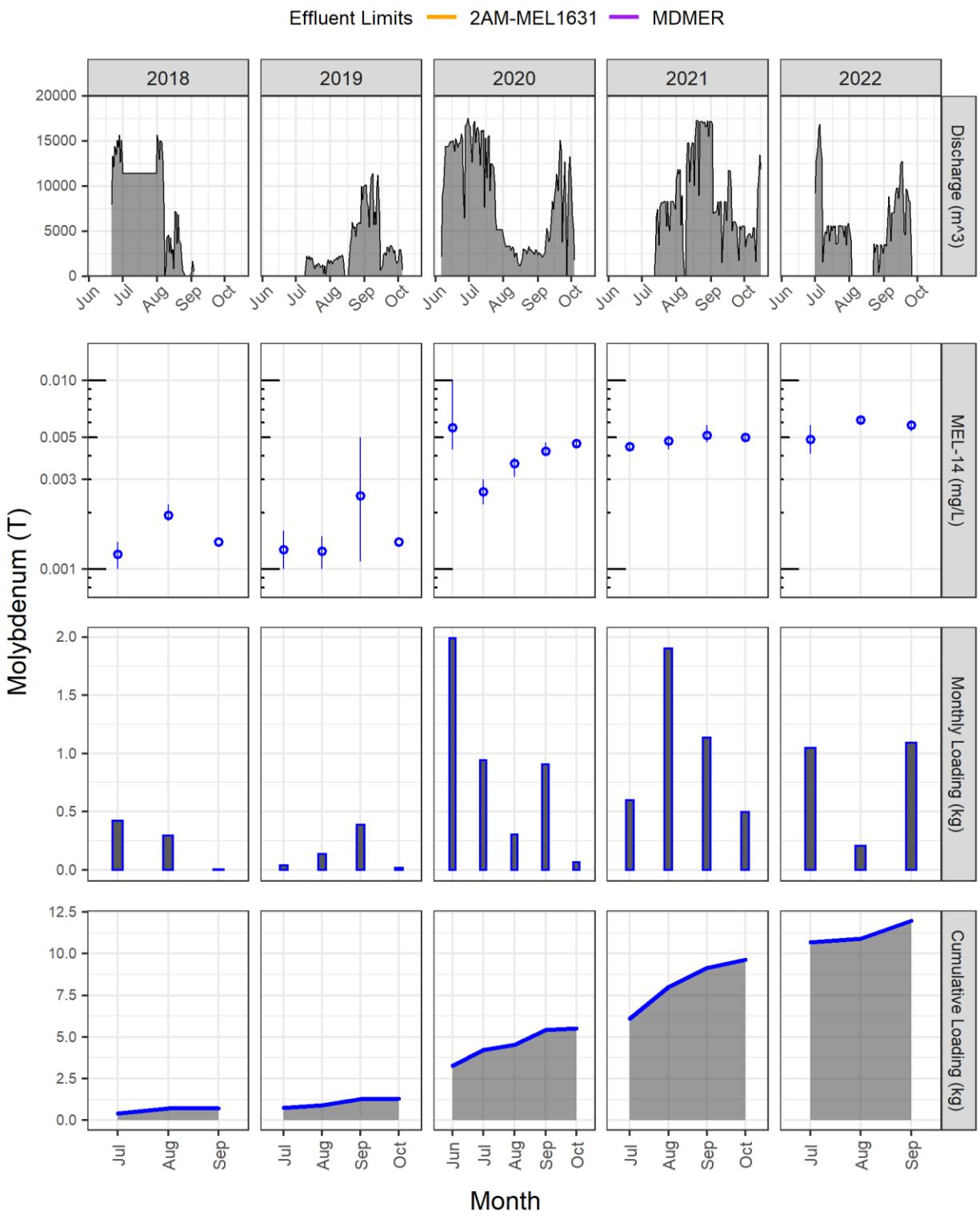


Figure B2-35. Nickel

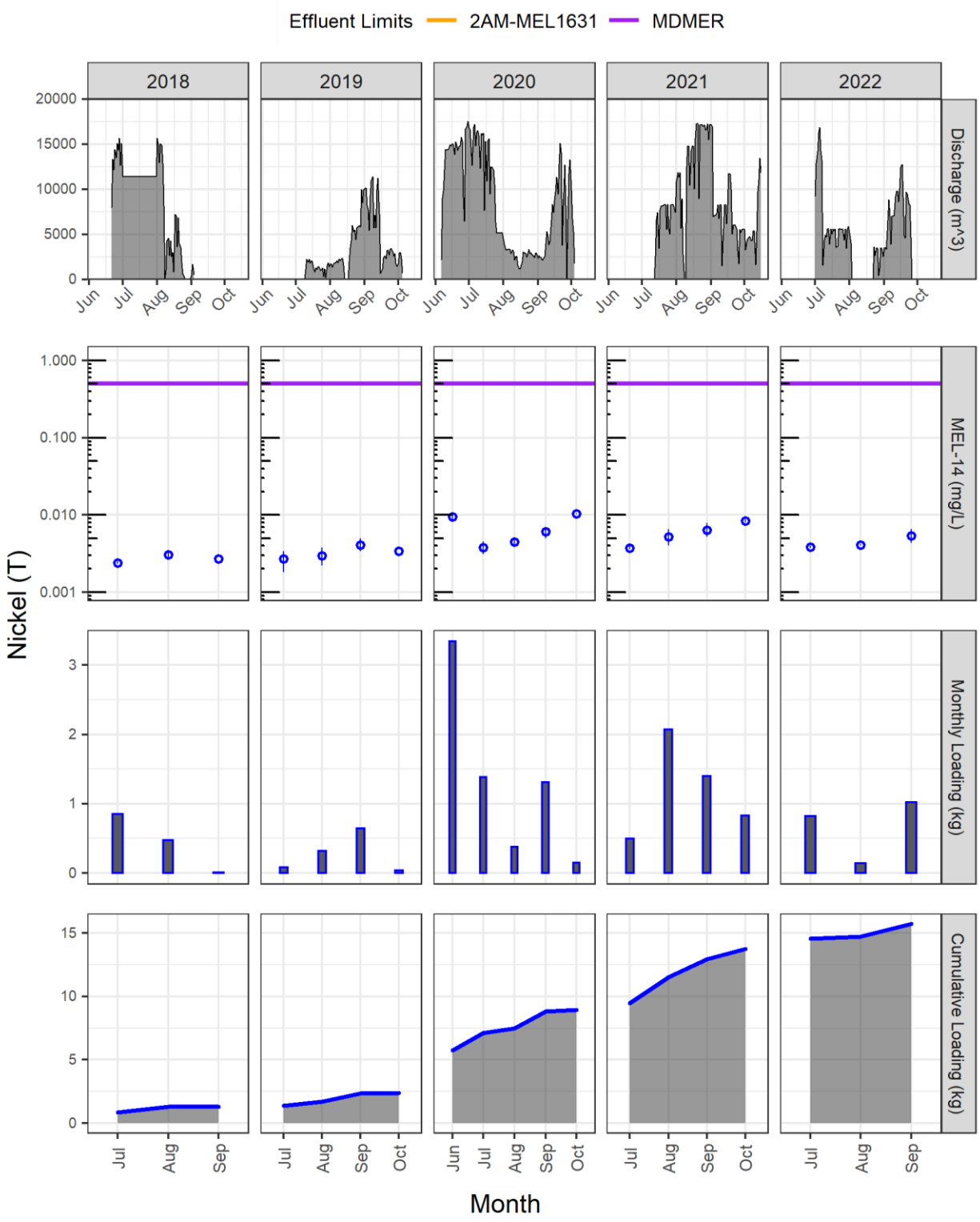


Figure B2-36. Selenium

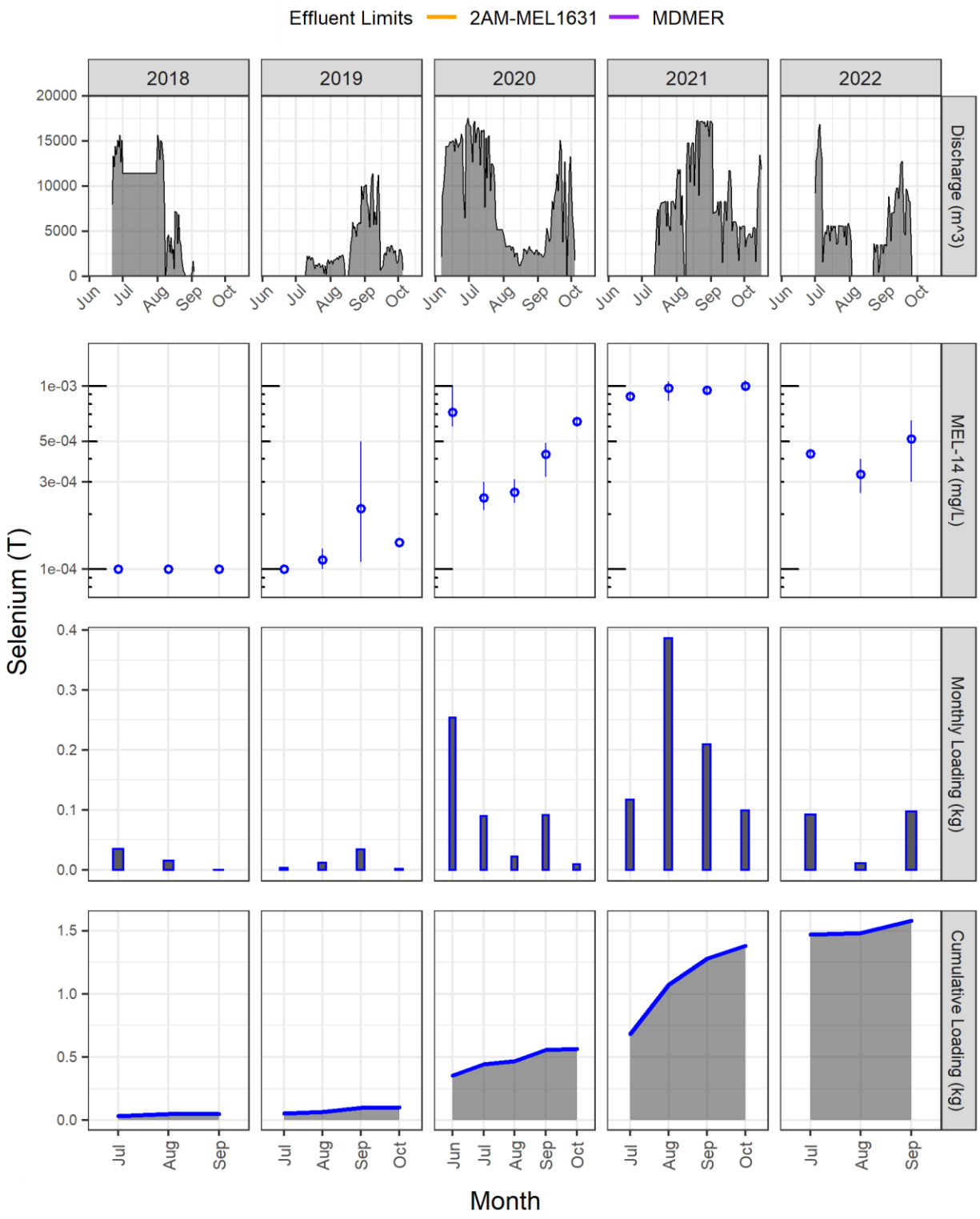


Figure B2-37. Silicon

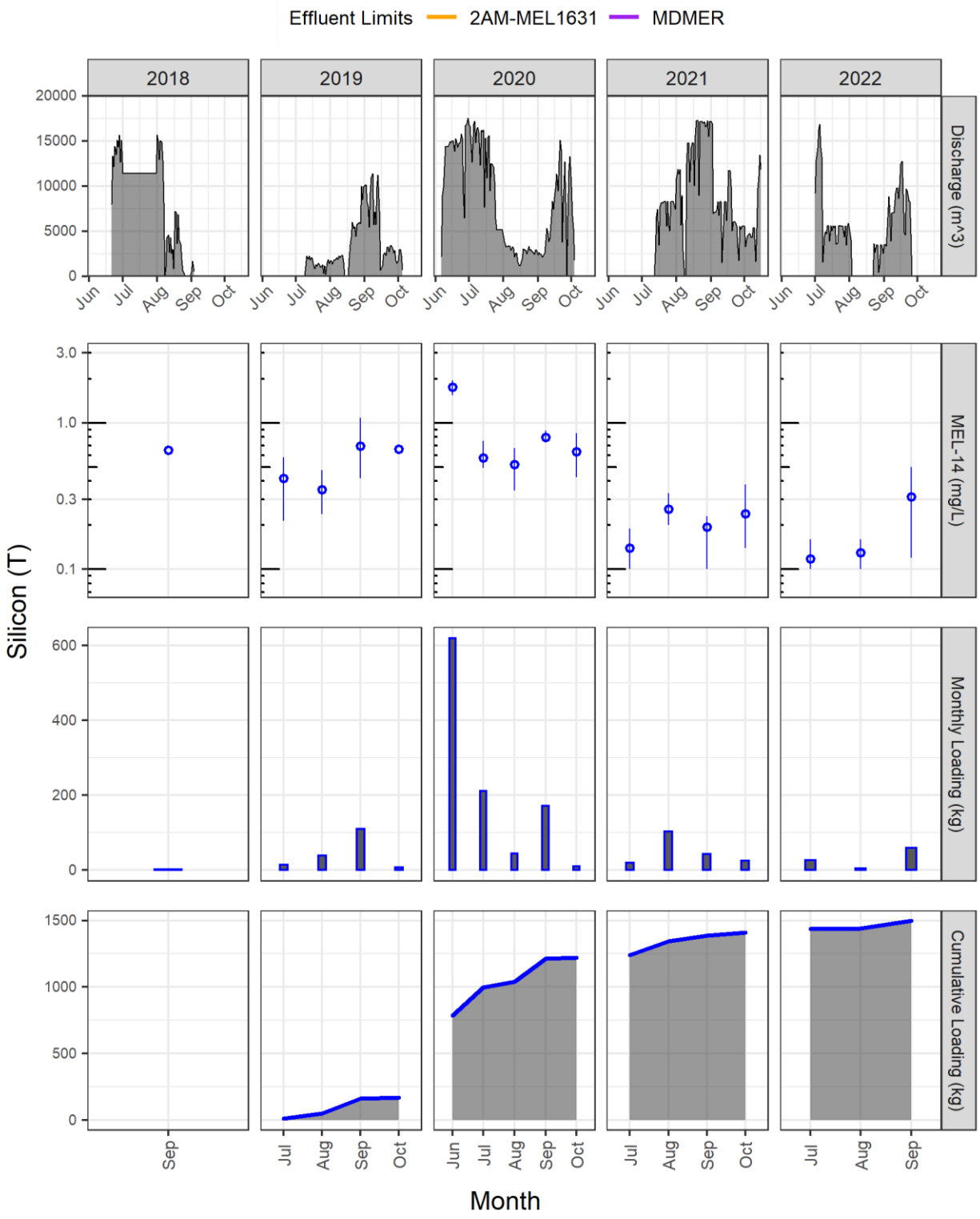


Figure B2-38. Silver

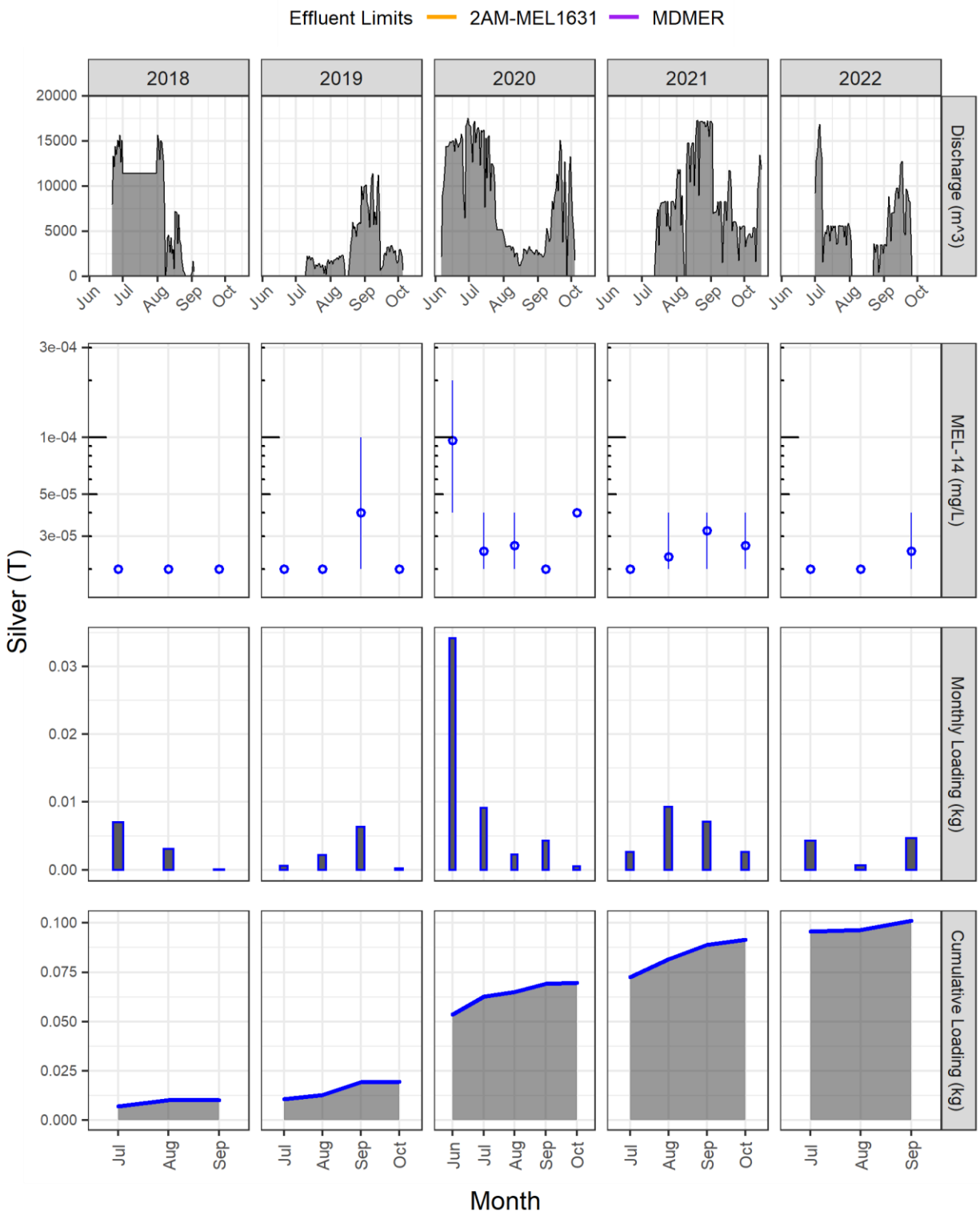


Figure B2-39. Strontium

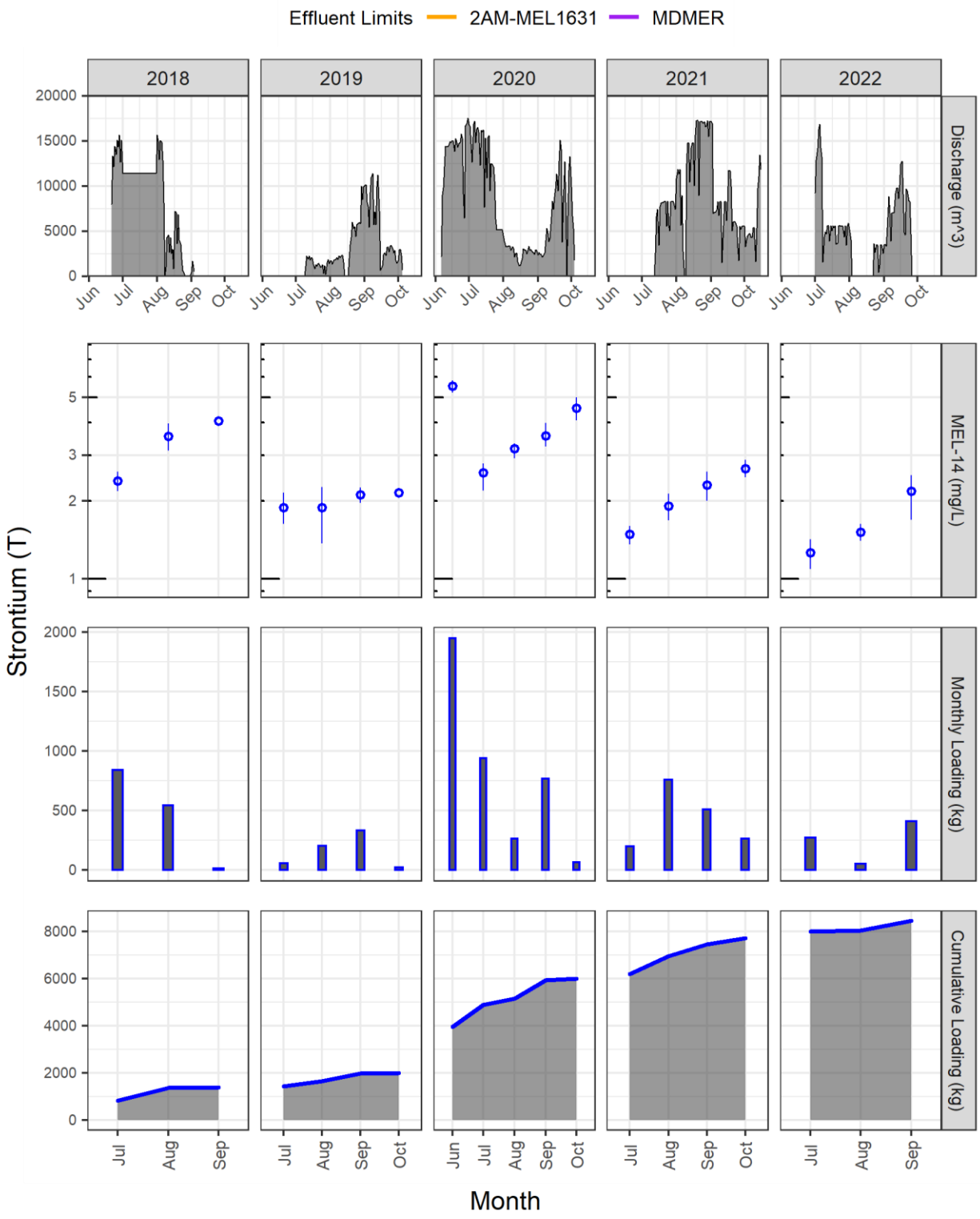


Figure B2-40. Thallium

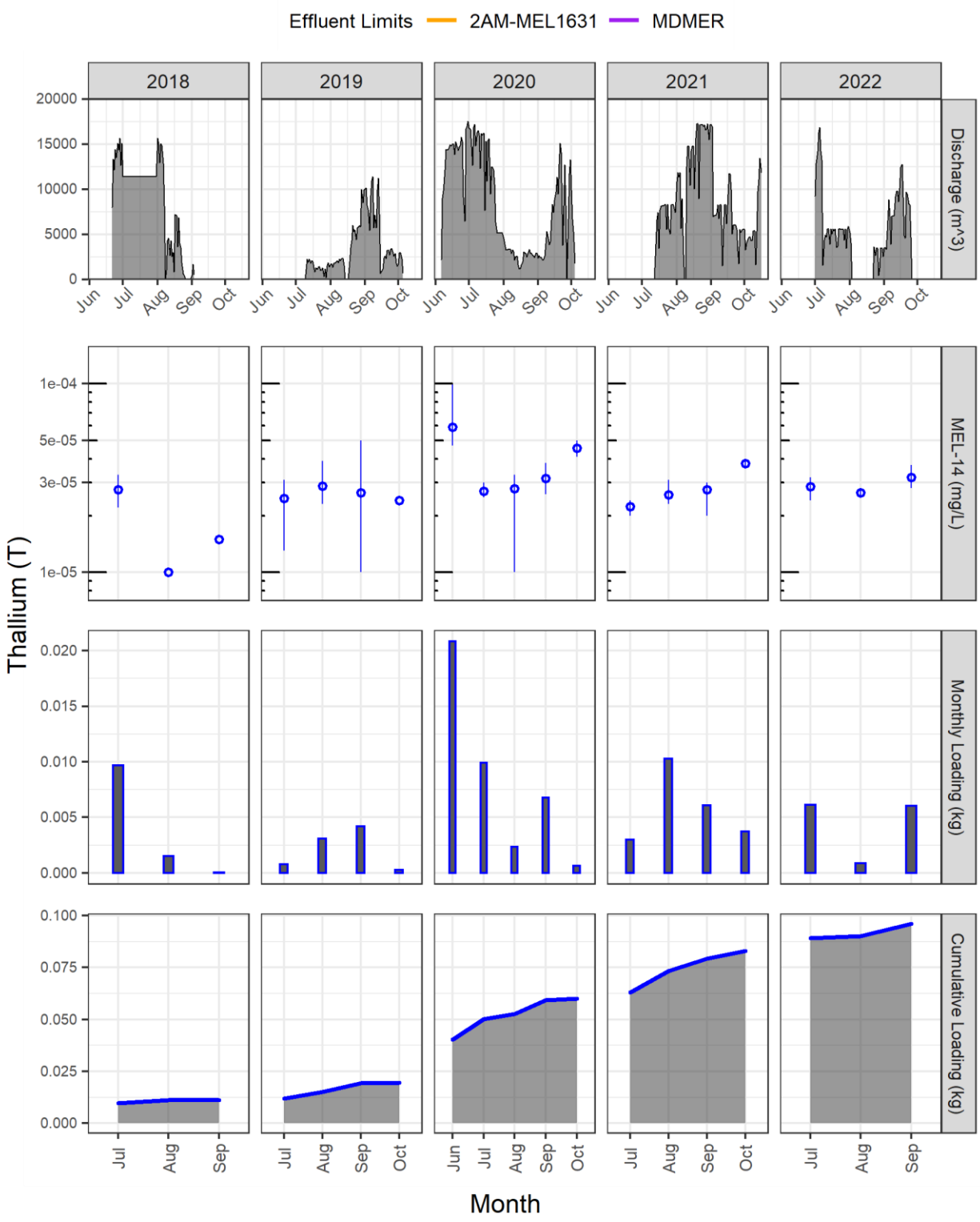


Figure B2-41. Tin

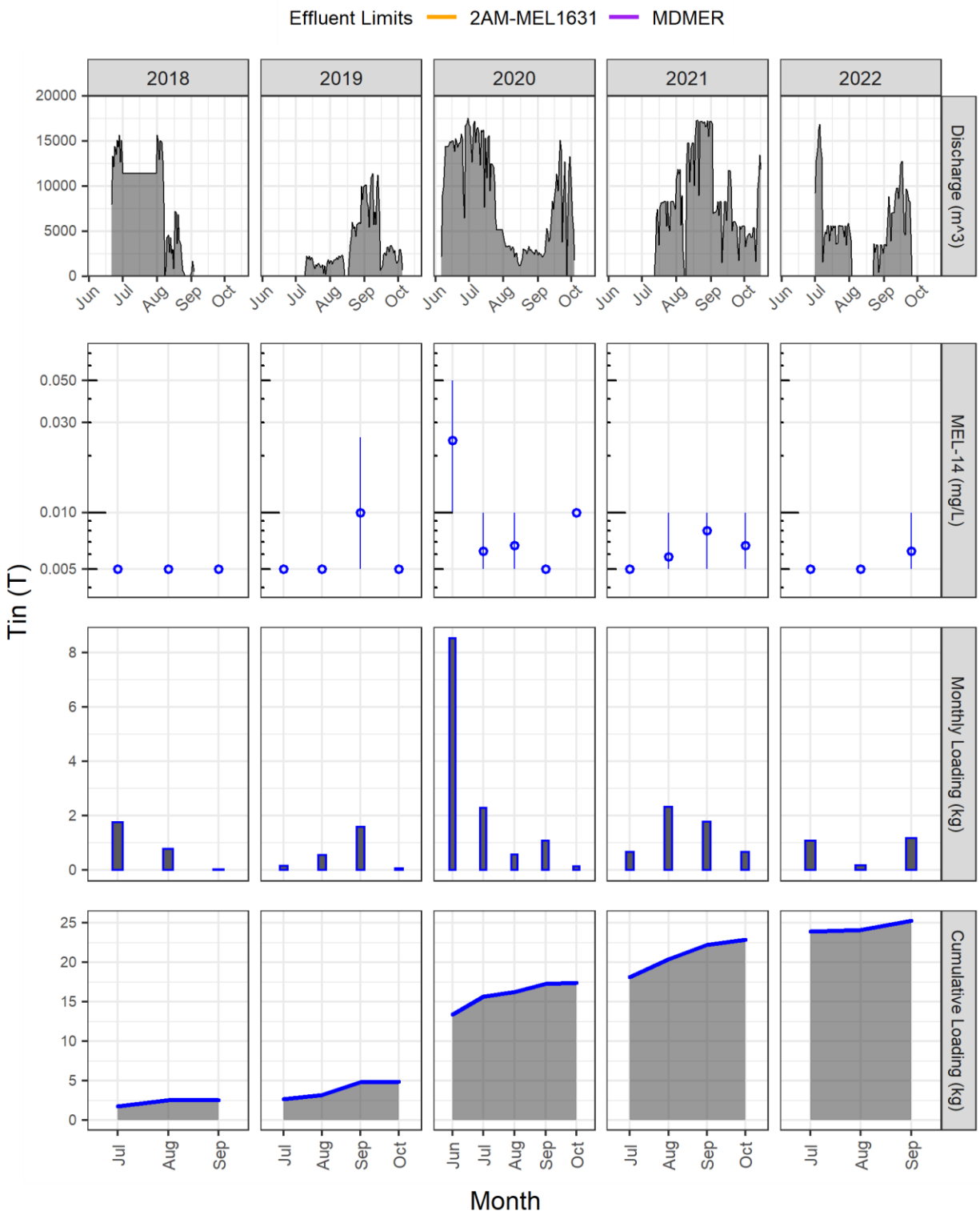


Figure B2-42. Titanium

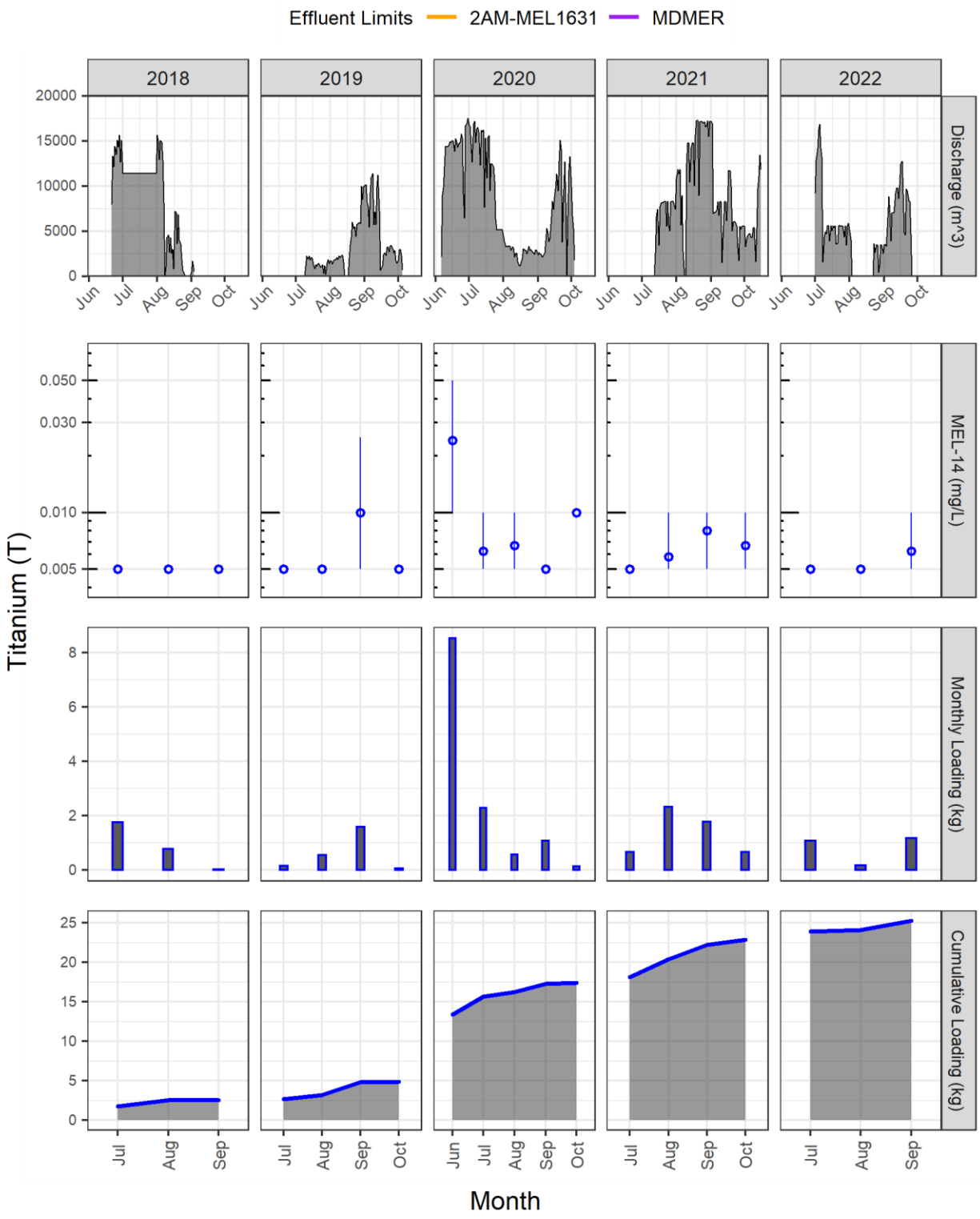


Figure B2-43. Uranium

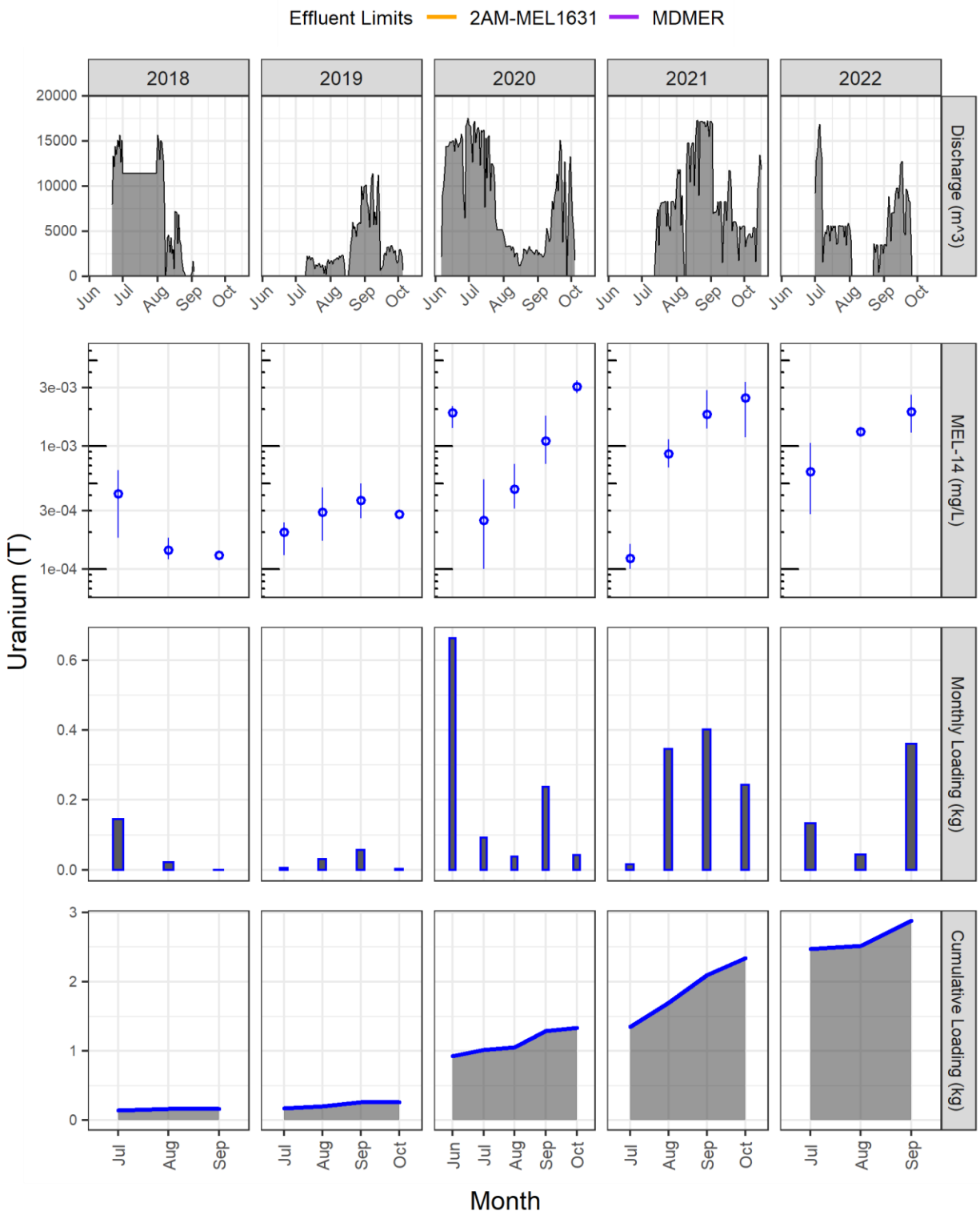


Figure B2-44. Vanadium

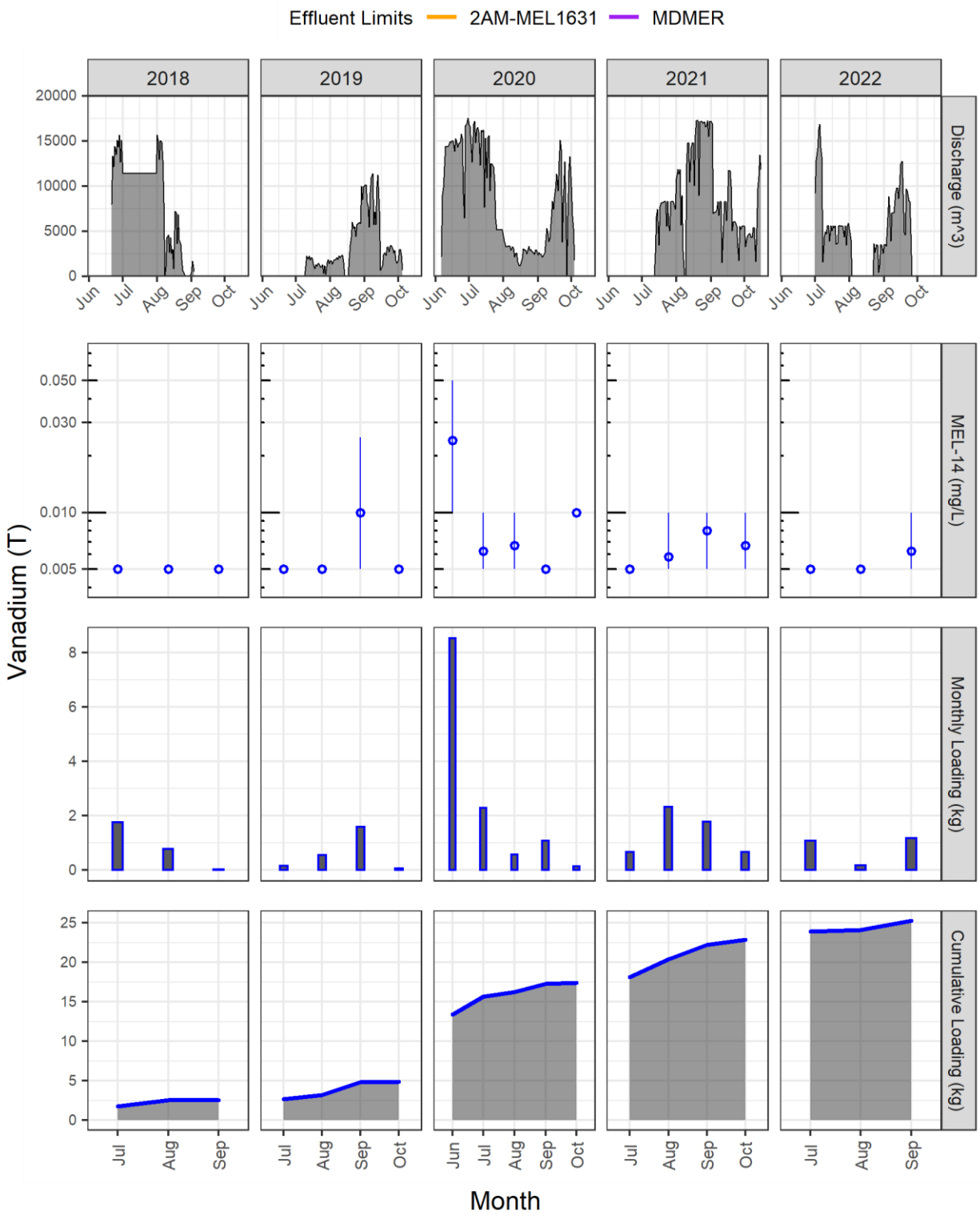


Figure B2-45. Zinc

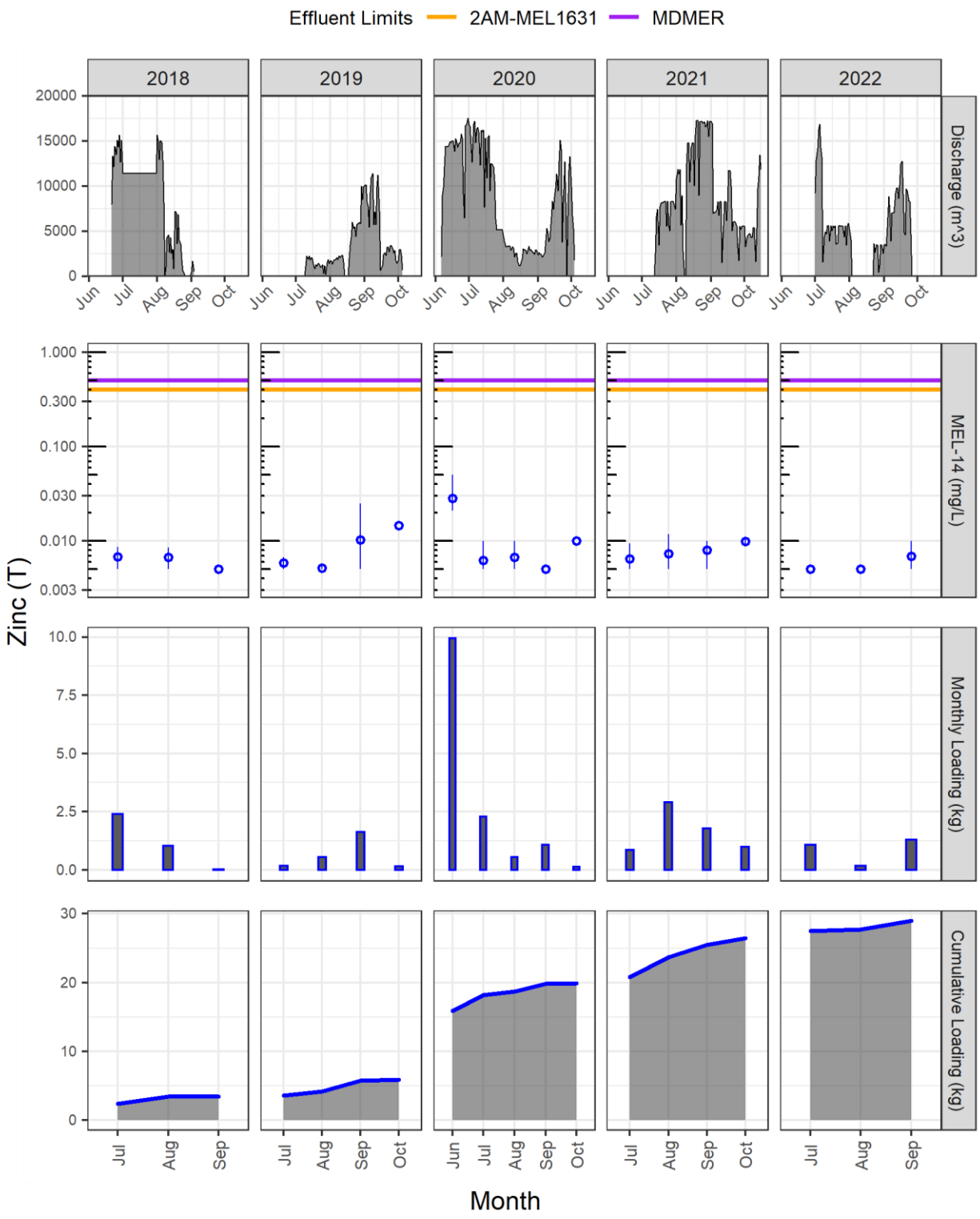


Figure B2-46. Zirconium

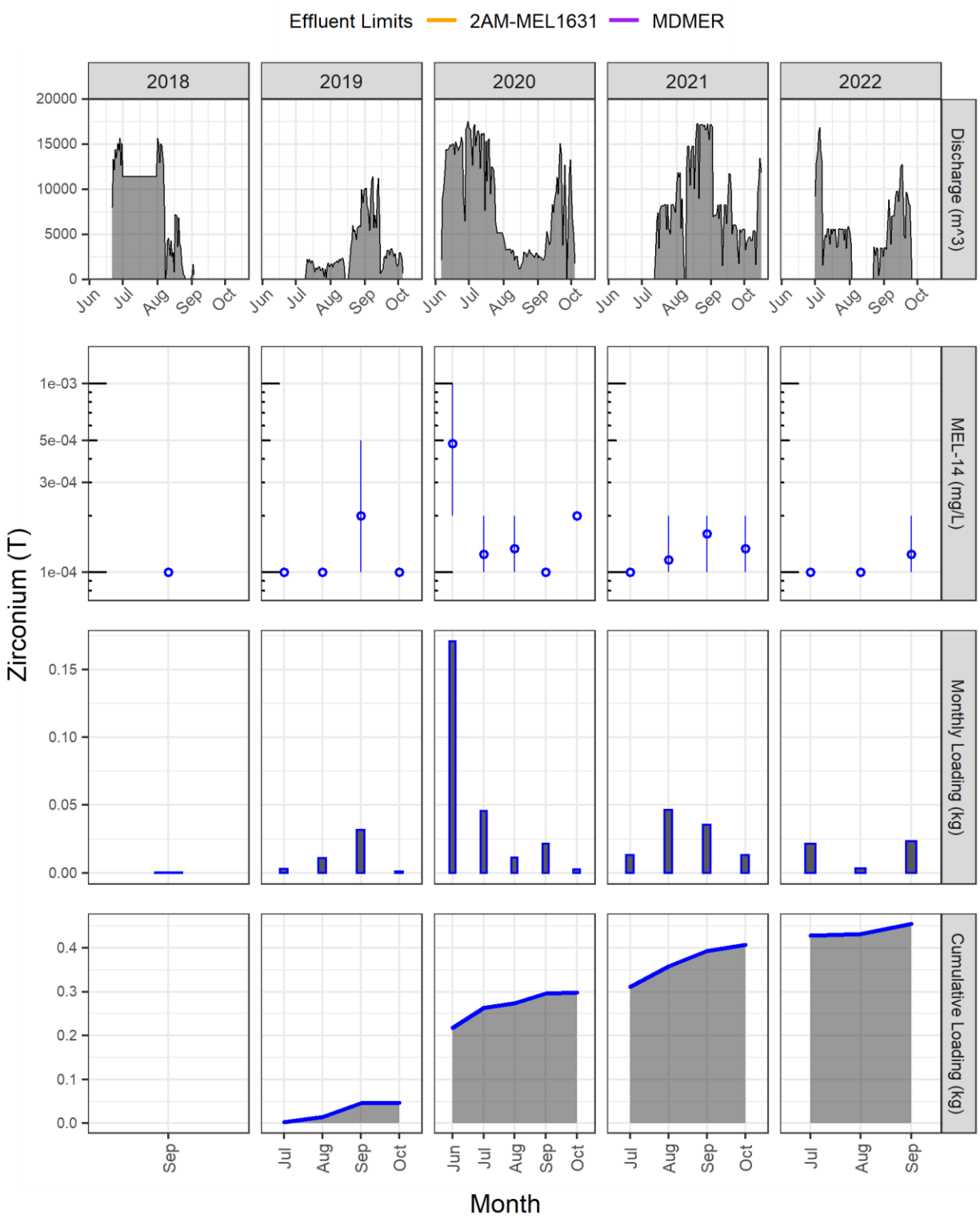


Figure B2-47. Cyanide (Free)

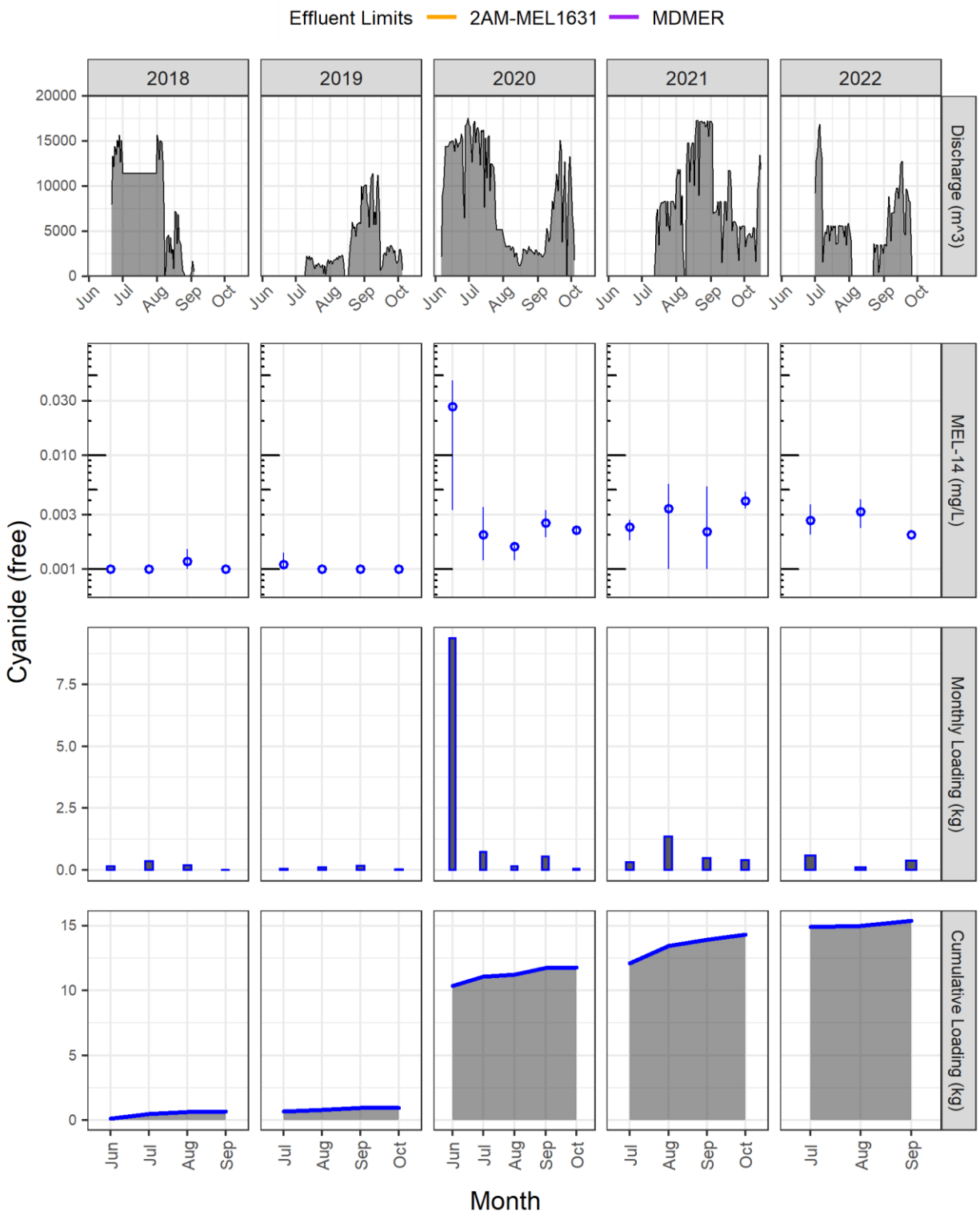


Figure B2-48. Cyanide (Total)

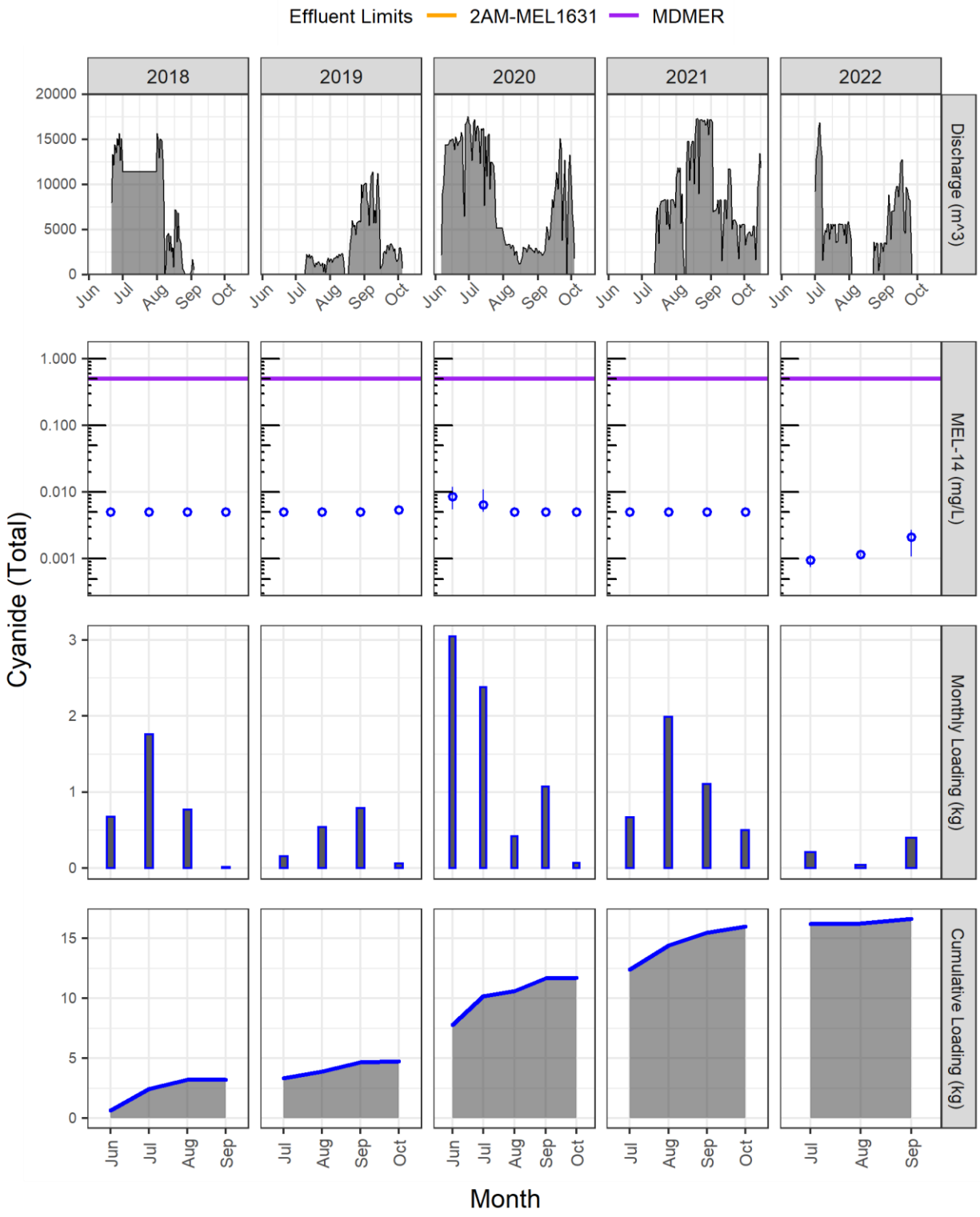
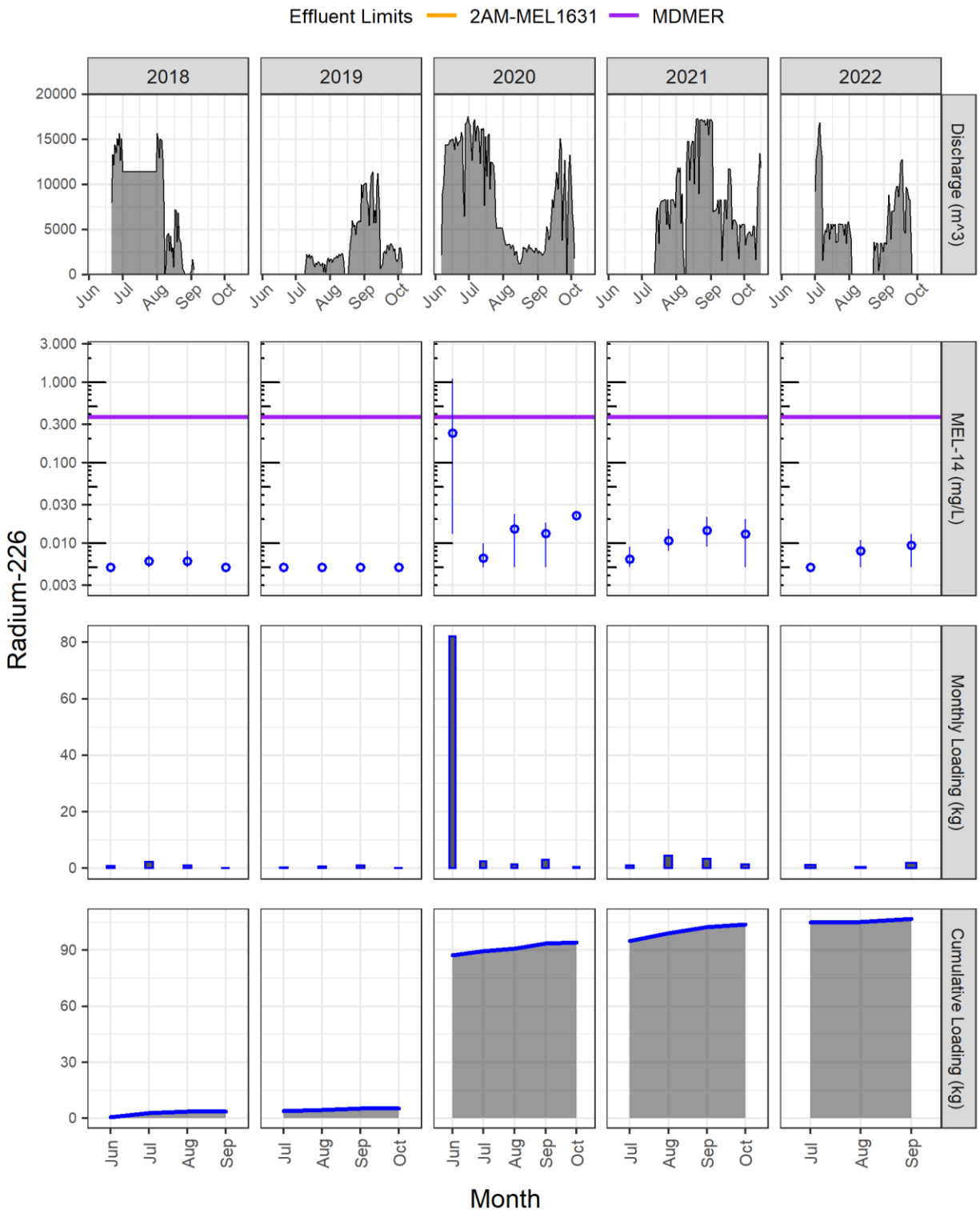


Figure B2-49. Radium-226



APPENDIX C
MELIADINE LAKE WATER QUALITY – SUPPORTING INFORMATION

Appendix C1
Meliadine Lake Water Quality – Data and Summary Statistics

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Federal Environmental Quality Guideline for Copper

The Benchmark for dissolved copper is based on the Environment and Climate Change Canada (ECCC) FWAL guideline published in 2021. The new FWAL for copper applies to dissolved rather than total (unfiltered) copper for three reasons:

1. Bioavailability and toxicity of copper to aquatic life is related to concentration of the copper ion (Cu^{2+}) in water.
2. Concentrations of total copper in Canadian surface waters can be affected by non-bioavailable mineral forms; and
3. Toxicity data used for deriving the guideline are based on exposures to dissolved copper.

Copper toxicity is dependent on the concentration of the free copper ion and site-specific water quality parameters such as temperature, pH, dissolved organic carbon, hardness, alkalinity, chloride, and major cations (e.g., calcium, magnesium, etc.) that are known to modify the bioavailability and toxicity of copper to aquatic organisms. The new FWAL guideline for copper uses the biotic ligand model (BLM) that accounts for site-specific water quality to calculate the FWAL guideline on a sample-by-sample basis. A detailed overview of the BLM is provided in *Federal environmental quality guidelines – Copper* (ECCC, 2021). Briefly, the copper FWAL for each sample is determined from the normalized species sensitivity distribution (SSD) of chronic toxicity results for a diverse range of aquatic species including primary producers (5 species), aquatic invertebrates (17 species), and fish (11 species). The 5th percentile of the SSD is equal to the FWAL guidelines for copper.

To illustrate the FWAL guideline derivation process, the SSD and corresponding FWAL guideline is shown in **Figure C1-1** for the water sample collected at MEL-01-06 in March 2022. The two most sensitive species used to derive the FWAL guideline of 0.76 µg/L are an air-breathing snail (*Lymnea stagnalis*) and Rainbow mussel (*Villosa iris*), neither of which are found in northern Canada. Including non-endemic species in derivation of the BLM guideline provides an added level of assurance that copper concentrations in Meliadine Lake do not pose risks to aquatic life.

Figure C1-1. Copper BLM guideline for sample MEL-01-06 collected in March 2022

Note: The copper BLM guideline is indicated by the blue dashed line (log-normal 5% = 0.76 µg/L).

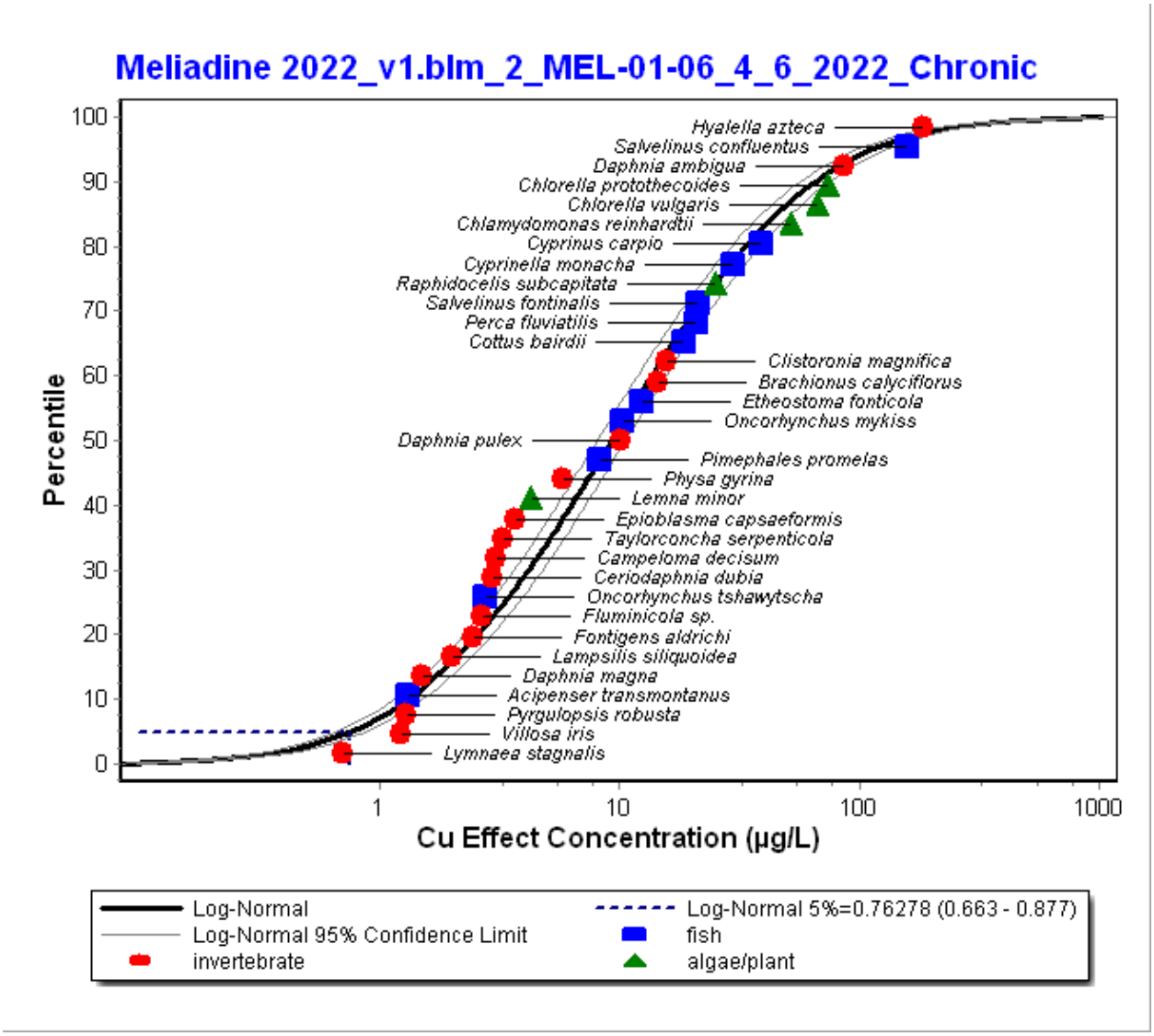

Table C1-1. Detection limits and screening values for the Meliadine Lake water quality program

Parameter	Units	DL (min | max)	Normal Range	FEIS[a]	FWAL[b] (min | max)	HH DW[c]	SSWQO[d]	Action Level[e] (min | max)	Benchmark[f] (min | max)
Field Measurements									
Temperature	C	-	-	-	-	-	-	-	-
Sp. Conductivity (field)	uS/cm	-	-	-	-	-	-	-	-
pH (field)	pH units	-	7.1 | 7.95	-	6.5 | 9	-	-	6.5 | 9.0	6.5 | 9.0
DO (mg/L)	mg/L	-	-	-	-	-	-	6.5	6.5
DO (%)	%	-	-	-	-	-	-	-	-
Conventional Parameters									
Conductivity (lab)	uS/cm	1	77.5	-	-	-	-	-	-
Hardness	mg/L	0.2	23.4	-	-	-	-	-	-
pH (lab)	pH units	0.1	-	-	6.5 | 9	-	-	6.5 | 9.0	6.5 | 9.0
Total Dissolved Solids	mg/L	13	54	68	500	-	1000	375	500
TDS (Calculated)	mg/L	1	39.6	68	500	-	1000	375	500
Total Suspended Solids	mg/L	1	1	3.1	-	-	-	-	-
Turbidity (lab)	NTU	0.1	-	-	-	-	-	-	-
Major Ions									
Alkalinity, Bicarbonate	mg/L	1.2	25	-	-	-	-	-	-
Alkalinity, Carbonate	mg/L	0.6	-	-	-	-	-	-	-
Alkalinity, Hydroxide	mg/L	0.34	-	-	-	-	-	-	-
Alkalinity, Total	mg/L	1	20.5	-	-	-	-	-	-
Bromide	mg/L	0.1	-	-	-	-	-	-	-
Calcium (D)	mg/L	0.01	-	-	-	-	-	-	-
Calcium (T)	mg/L	0.01	7.33	-	-	-	-	-	-
Chloride	mg/L	0.1	9.56	14	120	-	-	90	120
Fluoride	mg/L	0.02	0.028	0.0084	0.12	1.5	2.8	2.1	2.8
Magnesium (D)	mg/L	0.004	-	-	-	-	-	-	-
Magnesium (T)	mg/L	0.004	1.18	-	-	-	-	-	-
Potassium (D)	mg/L	0.02	-	-	-	-	-	-	-
Potassium (T)	mg/L	0.02	0.954	-	-	-	-	-	-
Reactive Silica (SiO2)	mg/L	0.01	0.268	-	-	-	-	-	-
Sodium (D)	mg/L	0.02	-	-	-	-	-	-	-
Sodium (T)	mg/L	0.02	4.85	5.3	-	-	-	-	-
Sulphate	mg/L	0.3	3.87	38	-	-	-	-	-
Nutrients									
Ammonia (as N)	mg/L	0.005	0.0174	0.54	1.27	-	-	0.95	1.27
Nitrate (as N)	mg/L	0.005	0.018	0.25	2.9	10	-	2.17	2.9
Nitrate + Nitrite (as N)	mg/L	0.0051	-	-	-	-	-	-	-
Nitrite (as N)	mg/L	0.001	0.001	0.051	0.06	1	-	0.045	0.06
Nitrogen	mg/L	0.0051 | 0.05	-	-	-	-	-	-	-
Orthophosphate (PO4-P)	mg/L	0.001	0.001	-	-	-	-	-	-
Total Diss Phosphorus	mg/L	0.001 | 0.003	0.00314	-	-	-	-	-	-
Total Dissolved Nitrogen	mg/L	0.05	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	mg/L	0.05	0.25	-	-	-	-	-	-
TKN (diss)	mg/L	0.05	-	-	-	-	-	-	-
Total Phosphorus	mg/L	0.001 | 0.003	0.006	0.0049	-	-	-	-	-
Organic/Inorganic Carbon									
Dissolved Organic Carbon	mg/L	0.5	2.72	-	-	-	-	-	-
Total Organic Carbon	mg/L	0.5	3	-	-	-	-	-	-
Total Metals									
Aluminum	ug/L	1	5.32	9.1	100	-	-	75	100
Antimony	ug/L	0.02	0.02	0.51	-	6	-	4.5	6
Arsenic	ug/L	0.02	0.275	3.8	5	10	25	18.8	25
Barium	ug/L	0.02	8.05	77	-	1000	-	750	1000
Beryllium	ug/L	0.005	0.005	-	-	-	-	-	-
Bismuth	ug/L	0.005	0.005	-	-	-	-	-	-
Boron	ug/L	5	6.52	23	1500	5000	-	1120	1500
Cadmium	ug/L	0.005	0.005	0.05	0.047 | 0.0649	5	-	0.0352 | 0.0487	0.047 | 0.0649
Cesium	ug/L	0.005	-	-	-	-	-	-	-
Chromium	ug/L	0.1	0.103	1.1	5	50	-	3.75	5
Cobalt	ug/L	0.005	0.016	-	0.78	-	-	0.585	0.78
Copper	ug/L	0.05	0.86	2	-	2000	-	1500	2000
Gallium	ug/L	0.05	-	-	-	-	-	-	-
Iron	ug/L	1	15	42	300	-	1060	795	1060
Lanthanum	ug/L	0.01	-	-	-	-	-	-	-
Lead	ug/L	0.01	0.0222	0.15	-	5	-	3.75	5
Lithium	ug/L	0.5	0.72	-	-	-	-	-	-
Manganese	ug/L	0.05	3.06	5.5	-	120	-	90	120
Mercury	ug/L	5e-04 | 0.005	8.00E-04	0.02	0.026	1	-	0.0195	0.026
Molybdenum	ug/L	0.05	0.107	5.2	73	-	-	54.8	73
Nickel	ug/L	0.05	0.441	2.7	25	-	-	18.8	25
Niobium	ug/L	0.1	-	-	-	-	-	-	-
Phosphorus	ug/L	50	-	-	-	-	-	-	-
Rhenium	ug/L	0.005	-	-	-	-	-	-	-
Rubidium	ug/L	0.005	-	-	-	-	-	-	-
Selenium	ug/L	0.04	0.049	0.16	1	50	-	0.75	1
Silicon	ug/L	50	-	-	-	-	-	-	-
Silver	ug/L	0.005	0.005	0.1	0.25	-	-	0.188	0.25
Strontium	ug/L	0.02	36.1	-	2500	7000	-	1880	2500
Sulfur	ug/L	500	-	-	-	-	-	-	-

Table C1-1. Detection limits and screening values for the Meliadine Lake water quality program

Parameter	Units	DL (min | max)	Normal Range	FEIS[a]	FWAL[b] (min | max)	HH DW[c]	SSWQO[d]	Action Level[e] (min | max)	Benchmark[f] (min | max)
Tantalum	ug/L	0.1	-	-	-	-	-	-	-
Tellurium	ug/L	0.02	-	-	-	-	-	-	-
Thallium	ug/L	0.005	0.005	0.1	0.8	-	-	0.6	0.8
Thorium	ug/L	0.005 | 0.01	-	-	-	-	-	-	-
Tin	ug/L	0.02	0.0384	-	-	-	-	-	-
Titanium	ug/L	0.05	0.17	-	-	-	-	-	-
Tungsten	ug/L	0.01	-	-	-	-	-	-	-
Uranium	ug/L	0.001	0.0164	1.5	15	20	-	11.2	15
Vanadium	ug/L	0.05	0.05	-	-	-	-	-	-
Yttrium	ug/L	0.005	-	-	-	-	-	-	-
Zinc	ug/L	0.5	1.7	6.7	-	-	-	-	-
Zirconium	ug/L	0.01	-	-	-	-	-	-	-
Dissolved Metals									
Aluminum	ug/L	1	-	-	-	-	-	-	-
Antimony	ug/L	0.02	-	-	-	-	-	-	-
Arsenic	ug/L	0.02	-	-	-	-	-	-	-
Barium	ug/L	0.02	-	-	-	-	-	-	-
Beryllium	ug/L	0.005	-	-	-	-	-	-	-
Bismuth	ug/L	0.005	-	-	-	-	-	-	-
Boron	ug/L	5	-	-	-	-	-	-	-
Cadmium	ug/L	0.005	-	-	-	-	-	-	-
Cesium	ug/L	0.005	-	-	-	-	-	-	-
Chromium	ug/L	0.1	-	-	-	-	-	-	-
Cobalt	ug/L	0.005	-	-	-	-	-	-	-
Copper	ug/L	0.05	0.861	-	1.14 | 5.85	-	-	0.858 | 4.39	1.14 | 5.85
Gallium	ug/L	0.05	-	-	-	-	-	-	-
Iron	ug/L	1	-	-	-	-	-	-	-
Lanthanum	ug/L	0.01	-	-	-	-	-	-	-
Lead	ug/L	0.01	0.0125	-	4.71 | 6.99	-	-	3.53 | 5.24	4.71 | 6.99
Lithium	ug/L	0.5	-	-	-	-	-	-	-
Manganese	ug/L	0.05	1.2	-	210 | 330	-	-	158 | 248	210 | 330
Mercury	ug/L	5e-04 | 0.005	-	-	-	-	-	-	-
Molybdenum	ug/L	0.05	-	-	-	-	-	-	-
Nickel	ug/L	0.05	-	-	-	-	-	-	-
Niobium	ug/L	0.1	-	-	-	-	-	-	-
Phosphorus	ug/L	50	-	-	-	-	-	-	-
Rhenium	ug/L	0.005	-	-	-	-	-	-	-
Rubidium	ug/L	0.005	-	-	-	-	-	-	-
Selenium	ug/L	0.04	-	-	-	-	-	-	-
Silicon	ug/L	50	-	-	-	-	-	-	-
Silver	ug/L	0.005	-	-	-	-	-	-	-
Strontium	ug/L	0.02	-	-	2500	-	-	1880	2500
Sulfur	ug/L	500	-	-	-	-	-	-	-
Tantalum	ug/L	0.1	-	-	-	-	-	-	-
Tellurium	ug/L	0.02	-	-	-	-	-	-	-
Thallium	ug/L	0.005	-	-	-	-	-	-	-
Thorium	ug/L	0.005	-	-	-	-	-	-	-
Tin	ug/L	0.02	-	-	-	-	-	-	-
Titanium	ug/L	0.05	-	-	-	-	-	-	-
Tungsten	ug/L	0.01	-	-	-	-	-	-	-
Uranium	ug/L	0.001	-	-	-	-	-	-	-
Vanadium	ug/L	0.05	-	-	-	-	-	90	120
Yttrium	ug/L	0.005	-	-	-	-	-	-	-
Zinc	ug/L	0.5	1.9	-	5.86 | 11.7	-	-	4.4 | 8.77	5.86 | 11.7
Zirconium	ug/L	0.01	-	-	-	-	-	-	-
Other									
Cyanide (free)	mg/L	0.001	-	0.00035	-	-	-	-	-
Cyanide (Total)	mg/L	0.001	0.001	0.009	0.005	0.2	-	0.00375	0.005
Cyanide (WAD)	mg/L	0.001	-	-	-	-	-	-	-

Notes

[a] FEIS predictions for the edge of the mixing zone as presented in Agnico Eagle (2014).

[b] The freshwater aquatic life guidelines (FWAL) for cadmium (T), copper (D), lead (D), manganese (D), and zinc (D) are variable depending on modifying factors such as pH, hardness, and DOC. Values shown represent the range of FWAL guidelines calculated for MEL-01 open-water samples in 2022.

[c] Health Canada drinking water guidelines (maximum acceptable concentrations)

[d Site-specific water quality objectives for fluoride, arsenic, and iron.

[e] The AEMP Action Level is 75% of the AEMP Benchmark.

[f] The AEMP Benchmark is the lowest of the FWAL or HH DW guidelines.

Table C1-2. MEL-01 summary statistics for the 2022 winter water sampling event

Parameter	Units	DL (min | max)	FEIS[a]	Action Level[b] (min | max)	AEMP Benchmark	MEL-01 (Near-field Exposure Area) Winter Sampling Event (March)										
						N	N<MDL	% <MDL	Mean	Median	SD	SE	Min	Max	%> FEIS	% > Act Lvl
Field Measurements																
Temperature	C	-	-	-	-	6	0	0	2.48	2.46	0.0251	0.0102	2.46	2.52	-	-
Sp. Conductivity (field)	uS/cm	-	-	-	-	6	0	0	151	151	0.534	0.218	151	152	-	-
pH (field)	pH units	-	-	6.5 | 9.0	6.5 | 9.0	6	0	0	6.54	6.54	0.0404	0.0165	6.5	6.62	-	0
DO (mg/L)	mg/L	-	-	6.5	6.5	6	0	0	15.5	15.3	0.465	0.19	15.1	16.2	-	0
DO (%)	%	-	-	-	-	6	0	0	116	115	3.5	1.43	113	122	-	-
Conventional Parameters																
Conductivity (lab)	uS/cm	1	-	-	-	6	0	0	158	158	3.56	1.45	155	164	-	-
Hardness	mg/L	0.2	-	-	-	6	0	0	44.6	44.6	0.95	0.388	43.5	45.8	-	-
pH (lab)	pH units	0.1	-	6.5 | 9.0	6.5 | 9.0	6	0	0	7.57	7.57	0.0225	0.00919	7.53	7.6	-	0
Total Dissolved Solids	mg/L	13	68	375	500	6	0	0	78.2	78	3.49	1.42	74	83	100	0
Total Dissolved Solids (Calculated)	mg/L	1	68	375	500	6	0	0	77.7	77.4	1.63	0.666	76.2	80.2	100	0
Total Suspended Solids	mg/L	1	3.1	-	-	6	6	100	-	-	-	-	-	1	0	-
Turbidity (lab)	NTU	0.1	-	-	-	6	0	0	0.385	0.365	0.0896	0.0366	0.3	0.55	-	-
Major Ions																
Alkalinity, Bicarbonate	mg/L	1.2	-	-	-	6	0	0	33.2	32.8	1.03	0.421	31.8	34.6	-	-
Alkalinity, Carbonate	mg/L	0.6	-	-	-	6	6	100	-	-	-	-	-	0.6	-	-
Alkalinity, Hydroxide	mg/L	0.34	-	-	-	6	6	100	-	-	-	-	-	0.34	-	-
Alkalinity, Total	mg/L	1	-	-	-	6	0	0	27.2	27	0.838	0.342	26.1	28.4	-	-
Bromide	mg/L	0.1	-	-	-	6	6	100	-	-	-	-	-	0.1	-	-
Calcium (D)	mg/L	0.01	-	-	-	6	0	0	13.7	13.6	0.426	0.174	13.2	14.3	-	-
Calcium (T)	mg/L	0.01	-	-	-	6	0	0	13.7	13.7	0.299	0.122	13.3	14	-	-
Chloride	mg/L	0.1	14	90	120	6	0	0	23	23	0.345	0.141	22.5	23.5	100	0
Fluoride	mg/L	0.02	0.0084	2.1	2.8	6	0	0	0.0348	0.0345	0.000983	0.000401	0.034	0.036	100	0
Magnesium (D)	mg/L	0.004	-	-	-	6	0	0	2.54	2.54	0.0576	0.0235	2.48	2.62	-	-
Magnesium (T)	mg/L	0.004	-	-	-	6	0	0	2.53	2.53	0.0513	0.0209	2.46	2.61	-	-
Potassium (D)	mg/L	0.02	-	-	-	6	0	0	1.77	1.76	0.0631	0.0258	1.7	1.86	-	-
Potassium (T)	mg/L	0.02	-	-	-	6	0	0	1.58	1.58	0.0431	0.0176	1.52	1.64	-	-
Reactive Silica (SiO2)	mg/L	0.01	-	-	-	6	0	0	0.557	0.564	0.0186	0.00758	0.525	0.574	-	-
Sodium (D)	mg/L	0.02	-	-	-	6	0	0	11.2	11.2	0.183	0.0749	11	11.4	-	-
Sodium (T)	mg/L	0.02	5.3	-	-	6	0	0	11	11	0.228	0.0931	10.8	11.4	100	-
Sulphate	mg/L	0.3	38	-	-	6	0	0	9.38	9.04	0.868	0.354	8.85	11.1	0	-
Nutrients																
Ammonia (as N)	mg/L	0.005	0.54	0.95	1.27	6	0	0	0.0982	0.102	0.0811	0.0331	0.0099	0.187	0	0
Nitrate (as N)	mg/L	0.005	0.25	2.17	2.9	6	0	0	0.0465	0.047	0.00289	0.00118	0.0418	0.0504	0	0
Nitrate + Nitrite (as N)	mg/L	0.0051	-	-	-	6	0	0	0.0465	0.047	0.00289	0.00118	0.0418	0.0504	-	-
Nitrite (as N)	mg/L	0.001	0.051	0.045	0.06	6	6	100	-	-	-	-	-	0.001	0	0
Nitrogen	mg/L	0.0051 | 0.05	-	-	-	6	0	0	0.466	0.473	0.0892	0.0364	0.359	0.557	-	-
Orthophosphate (PO4-P)	mg/L	0.001	-	-	-	6	6	100	-	-	-	-	-	0.001	-	-
Total Diss Phosphorus	mg/L	0.001 | 0.003	-	-	-	6	0	0	0.0041	0.00405	0.0013	0.000529	0.0024	0.0057	-	-
Total Dissolved Nitrogen	mg/L	0.05	-	-	-	6	0	0	0.384	0.378	0.0304	0.0124	0.355	0.434	-	-
Total Kjeldahl Nitrogen	mg/L	0.05	-	-	-	6	0	0	0.42	0.426	0.0917	0.0374	0.308	0.515	-	-
Total Kjeldahl Nitrogen (diss)	mg/L	0.05	-	-	-	6	0	0	0.338	0.332	0.0313	0.0128	0.308	0.389	-	-
Total Phosphorus	mg/L	0.001 | 0.003	0.0049	-	-	6	0	0	0.0071	0.00675	0.00154	0.00063	0.0055	0.0091	100	-

Table C1-2. MEL-01 summary statistics for the 2022 winter water sampling event

Parameter	Units	DL (min | max)	FEIS[a]	Action Level[b] (min | max)	AEMP Benchmark	MEL-01 (Near-field Exposure Area) Winter Sampling Event (March)										
						N	N<MDL	% <MDL	Mean	Median	SD	SE	Min	Max	%> FEIS	% > Act Lvl
Organic/Inorganic Carbon																
Dissolved Organic Carbon	mg/L	0.5	-	-	-	6	0	0	5.17	5.11	0.183	0.0746	4.99	5.4	-	-
Total Organic Carbon	mg/L	0.5	-	-	-	6	0	0	5.11	5.1	0.092	0.0376	4.99	5.25	-	-
Total Metals																
Aluminum	ug/L	1	9.1	75	100	6	1	17	2.82	2.65	1.86	0.758	1	5.3	0	0
Antimony	ug/L	0.02	0.51	4.5	6	6	0	0	0.0232	0.0225	0.00214	0.000872	0.021	0.027	0	0
Arsenic	ug/L	0.02	3.8	18.8	25	6	0	0	0.588	0.55	0.0804	0.0328	0.542	0.747	0	0
Barium	ug/L	0.02	77	750	1000	6	0	0	13	13	0.302	0.123	12.6	13.3	0	0
Beryllium	ug/L	0.005	-	-	-	6	6	100	-	-	-	-	-	0.005	-	-
Boron	ug/L	5	23	1120	1500	6	0	0	10.7	10.8	0.31	0.126	10.3	11	0	0
Cadmium	ug/L	0.005	0.05	0.0352 | 0.0487	0.047 | 0.0649	6	5	83	-	0.005	-	-	0.005	0.0254	0	0
Chromium	ug/L	0.1	1.1	3.75	5	6	6	100	-	-	-	-	-	0.1	0	0
Cobalt	ug/L	0.005	-	0.585	0.78	6	0	0	0.0273	0.0278	0.0027	0.0011	0.0241	0.0306	-	0
Copper	ug/L	0.05	2	1500	2000	6	0	0	1.32	1.33	0.0554	0.0226	1.26	1.4	0	0
Iron	ug/L	1	42	795	1060	6	0	0	12.3	12.6	6.88	2.81	4.9	23.3	0	0
Lead	ug/L	0.01	0.15	3.75	5	6	4	67	-	0.01	-	-	0.01	0.013	0	0
Lithium	ug/L	0.5	-	-	-	6	0	0	1.9	1.9	0.0463	0.0189	1.83	1.95	-	-
Manganese	ug/L	0.05	5.5	90	120	6	0	0	4.14	4.08	2.54	1.04	0.724	7.49	33	0
Mercury	ug/L	5e-04 | 0.005	0.02	0.0195	0.026	6	1	17	0.00102	0.000935	5.55E-04	2.27E-04	5.00E-04	0.00195	0	0
Molybdenum	ug/L	0.05	5.2	54.8	73	6	0	0	0.142	0.143	0.0145	0.00591	0.126	0.157	0	0
Nickel	ug/L	0.05	2.7	18.8	25	6	0	0	1.17	1.17	0.0344	0.0141	1.12	1.2	0	0
Selenium	ug/L	0.04	0.16	0.75	1	6	1	17	0.073	0.0765	0.0213	0.00869	0.04	0.104	0	0
Silver	ug/L	0.005	0.1	0.188	0.25	6	6	100	-	-	-	-	-	0.005	0	0
Strontium	ug/L	0.02	-	1880	2500	6	0	0	85.2	85.2	2.43	0.993	81.7	89	-	0
Thallium	ug/L	0.005	0.1	0.6	0.8	6	6	100	-	-	-	-	-	0.005	0	0
Tin	ug/L	0.02	-	-	-	6	6	100	-	-	-	-	-	0.02	-	-
Titanium	ug/L	0.05	-	-	-	6	5	83	-	0.0645	-	-	0.05	0.2	-	-
Uranium	ug/L	0.001	1.5	11.2	15	6	0	0	0.0312	0.0308	0.00133	0.000545	0.0296	0.0332	0	0
Vanadium	ug/L	0.05	-	-	-	6	6	100	-	-	-	-	-	0.05	-	0
Zinc	ug/L	0.5	6.7	-	-	6	0	0	3.57	3.01	3.33	1.36	0.52	8.55	17	-
Dissolved Metals																
Aluminum	ug/L	1	-	-	-	6	2	33	1.62	1.35	0.95	0.388	1	3.5	-	-
Antimony	ug/L	0.02	-	-	-	6	5	83	-	0.02	-	-	0.02	0.023	-	-
Arsenic	ug/L	0.02	-	-	-	6	0	0	0.564	0.562	0.0202	0.00825	0.538	0.594	-	-
Barium	ug/L	0.02	-	-	-	6	0	0	13.4	13.4	0.426	0.174	13	13.9	-	-
Beryllium	ug/L	0.005	-	-	-	6	6	100	-	-	-	-	-	0.005	-	-
Boron	ug/L	5	-	-	-	6	0	0	10.5	10.5	0.369	0.151	10.1	11	-	-
Cadmium	ug/L	0.005	-	-	-	6	6	100	-	-	-	-	-	0.005	-	-
Chromium	ug/L	0.1	-	-	-	6	6	100	-	-	-	-	-	0.1	-	-
Cobalt	ug/L	0.005	-	-	-	6	0	0	0.0256	0.0249	0.00359	0.00147	0.0221	0.0322	-	-
Copper	ug/L	0.05	-	0.858 | 4.39	1.14 | 5.85	6	0	0	1.36	1.38	0.0653	0.0267	1.27	1.42	-	100
Iron	ug/L	1	-	-	-	6	0	0	6.07	5.4	2.01	0.822	4.5	10	-	-
Lead	ug/L	0.01	-	3.53 | 5.24	4.71 | 6.99	6	6	100	-	-	-	-	-	0.01	-	0
Lithium	ug/L	0.5	-	-	-	6	0	0	1.75	1.75	0.0493	0.0201	1.68	1.81	-	-
Manganese	ug/L	0.05	-	158 | 248	210 | 330	6	0	0	1.39	1.3	0.835	0.341	0.445	2.46	-	0

Table C1-2. MEL-01 summary statistics for the 2022 winter water sampling event

Parameter	Units	DL (min | max)	FEIS[a]	Action Level[b] (min | max)	AEMP Benchmark	MEL-01 (Near-field Exposure Area) Winter Sampling Event (March)										
						N	N<MDL	% <MDL	Mean	Median	SD	SE	Min	Max	%> FEIS	% > Act Lvl
Mercury	ug/L	5e-04 | 0.005	-	-	-	6	1	17	0.00085	6.00E-04	0.000452	0.000184	5.00E-04	0.00156	-	-
Molybdenum	ug/L	0.05	-	-	-	6	0	0	0.139	0.141	0.00944	0.00386	0.126	0.151	-	-
Nickel	ug/L	0.05	-	-	-	6	0	0	1.16	1.17	0.0513	0.0209	1.07	1.22	-	-
Selenium	ug/L	0.04	-	-	-	6	0	0	0.056	0.0575	0.00829	0.00339	0.043	0.065	-	-
Silver	ug/L	0.005	-	-	-	6	6	100	-	-	-	-	-	0.005	-	-
Strontium	ug/L	0.02	-	1880	2500	6	0	0	83.4	83.6	2.36	0.962	80	86	-	0
Thallium	ug/L	0.005	-	-	-	6	6	100	-	-	-	-	-	0.005	-	-
Tin	ug/L	0.02	-	-	-	6	6	100	-	-	-	-	-	0.02	-	-
Titanium	ug/L	0.05	-	-	-	6	5	83	-	0.05	-	-	0.05	0.059	-	-
Uranium	ug/L	0.001	-	-	-	6	0	0	0.0294	0.0296	0.00159	0.000651	0.0269	0.0318	-	-
Vanadium	ug/L	0.05	-	-	-	6	6	100	-	-	-	-	-	0.05	-	-
Zinc	ug/L	0.5	-	4.4 | 8.77	5.86 | 11.7	6	0	0	2.31	1.49	2.4	0.982	0.73	7.13	-	0
Other																
Cyanide (free)	mg/L	0.001	0.00035	-	-	6	6	100	-	-	-	-	-	0.001	100	-
Cyanide (Total)	mg/L	0.001	0.009	0.00375	0.005	6	6	100	-	-	-	-	-	0.001	0	0
Cyanide (WAD)	mg/L	0.001	-	-	-	6	6	100	-	-	-	-	-	0.001	-	-

Notes

[a] FEIS predictions for the edge of the mixing zone as presented in Agnico Eagle (2014).

[b] The AEMP Action Level is 75% of the AEMP Benchmark.

Table C1-3. MEL-02 summary statistics for the 2022 winter water sampling event

Parameter	Units	DL (min | max)	FEIS[a]	Action Level[b] (min | max)	AEMP Benchmark	MEL-02 (Mid-field Exposure Area) Winter Sampling Event (March)										
						N	N<MDL	% <MDL	Mean	Median	SD	SE	Min	Max	%> FEIS	% > Act Lvl
Field Measurements																
Temperature	C	-	-	-	-	5	0	0	2.08	2.01	0.198	0.0887	1.83	2.31	-	-
Sp. Conductivity (field)	uS/cm	-	-	-	-	5	0	0	139	138	4.73	2.11	134	145	-	-
pH (field)	pH units	-	-	6.5 | 9.0	6.5 | 9.0	5	0	0	7.06	6.98	0.162	0.0726	6.93	7.3	-	0
DO (mg/L)	mg/L	-	-	6.5	6.5	5	0	0	15.4	15.4	0.543	0.243	14.9	16.3	-	0
DO (%)	%	-	-	-	-	5	0	0	114	115	4.27	1.91	110	120	-	-
Conventional Parameters																
Conductivity (lab)	uS/cm	1	-	-	-	5	0	0	147	148	2.97	1.33	143	150	-	-
Hardness	mg/L	0.2	-	-	-	5	0	0	42.7	43	0.876	0.392	41.4	43.5	-	-
pH (lab)	pH units	0.1	-	6.5 | 9.0	6.5 | 9.0	5	0	0	7.47	7.44	0.0947	0.0424	7.36	7.59	-	0
Total Dissolved Solids	mg/L	13	68	375	500	5	0	0	71.2	75	8.53	3.81	56	76	80	0
Total Dissolved Solids (Calculated)	mg/L	1	68	375	500	5	0	0	72.8	73.1	1.82	0.815	70.1	75	100	0
Total Suspended Solids	mg/L	1	3.1	-	-	5	5	100	-	-	-	-	-	1	0	-
Turbidity (lab)	NTU	0.1	-	-	-	5	0	0	0.27	0.29	0.102	0.0456	0.17	0.41	-	-
Major Ions																
Alkalinity, Bicarbonate	mg/L	1.2	-	-	-	5	0	0	33.6	33.7	0.888	0.397	32.3	34.8	-	-
Alkalinity, Carbonate	mg/L	0.6	-	-	-	5	5	100	-	-	-	-	-	0.6	-	-
Alkalinity, Hydroxide	mg/L	0.34	-	-	-	5	5	100	-	-	-	-	-	0.34	-	-
Alkalinity, Total	mg/L	1	-	-	-	5	0	0	27.6	27.6	0.709	0.317	26.5	28.5	-	-
Bromide	mg/L	0.1	-	-	-	5	5	100	-	-	-	-	-	0.1	-	-
Calcium (D)	mg/L	0.01	-	-	-	5	0	0	13.2	13.3	0.279	0.125	12.7	13.4	-	-
Calcium (T)	mg/L	0.01	-	-	-	5	0	0	13.1	13.2	0.421	0.188	12.5	13.5	-	-
Chloride	mg/L	0.1	14	90	120	5	0	0	20.7	20.6	0.573	0.256	19.9	21.4	100	0
Fluoride	mg/L	0.02	0.0084	2.1	2.8	5	0	0	0.0352	0.035	0.000447	0.0002	0.035	0.036	100	0
Magnesium (D)	mg/L	0.004	-	-	-	5	0	0	2.38	2.39	0.0548	0.0245	2.32	2.45	-	-
Magnesium (T)	mg/L	0.004	-	-	-	5	0	0	2.38	2.38	0.0683	0.0306	2.27	2.45	-	-
Potassium (D)	mg/L	0.02	-	-	-	5	0	0	1.74	1.74	0.0349	0.0156	1.68	1.77	-	-
Potassium (T)	mg/L	0.02	-	-	-	5	0	0	1.66	1.63	0.145	0.065	1.5	1.86	-	-
Reactive Silica (SiO2)	mg/L	0.01	-	-	-	5	0	0	0.419	0.428	0.03	0.0134	0.385	0.447	-	-
Sodium (D)	mg/L	0.02	-	-	-	5	0	0	10.2	10.4	0.238	0.106	9.88	10.4	-	-
Sodium (T)	mg/L	0.02	5.3	-	-	5	0	0	10.1	10.2	0.35	0.157	9.62	10.5	100	-
Sulphate	mg/L	0.3	38	-	-	5	0	0	8.17	8.18	0.227	0.102	7.94	8.46	0	-
Nutrients																
Ammonia (as N)	mg/L	0.005	0.54	0.95	1.27	5	0	0	0.0272	0.031	0.0103	0.00461	0.0138	0.0387	0	0
Nitrate (as N)	mg/L	0.005	0.25	2.17	2.9	5	0	0	0.0338	0.0338	0.0133	0.00594	0.0191	0.0549	0	0
Nitrate + Nitrite (as N)	mg/L	0.0051	-	-	-	5	0	0	0.0338	0.0338	0.0133	0.00594	0.0191	0.0549	-	-
Nitrite (as N)	mg/L	0.001	0.051	0.045	0.06	5	5	100	-	-	-	-	-	0.001	0	0
Nitrogen	mg/L	0.0051 | 0.05	-	-	-	5	0	0	0.38	0.38	0.033	0.0148	0.338	0.428	-	-
Orthophosphate (PO4-P)	mg/L	0.001	-	-	-	5	3	60	-	0.001	-	-	0.001	0.0015	-	-
Total Diss Phosphorus	mg/L	0.001 | 0.003	-	-	-	5	0	0	0.00286	0.0022	0.00139	0.000622	0.0017	0.0051	-	-
Total Dissolved Nitrogen	mg/L	0.05	-	-	-	5	0	0	0.397	0.39	0.0777	0.0347	0.31	0.498	-	-
Total Kjeldahl Nitrogen	mg/L	0.05	-	-	-	5	0	0	0.347	0.332	0.0385	0.0172	0.311	0.409	-	-
Total Kjeldahl Nitrogen (diss)	mg/L	0.05	-	-	-	5	0	0	0.363	0.335	0.0821	0.0367	0.283	0.479	-	-
Total Phosphorus	mg/L	0.001 | 0.003	0.0049	-	-	5	0	0	0.00622	0.006	0.00183	0.000819	0.0042	0.0089	80	-

Table C1-3. MEL-02 summary statistics for the 2022 winter water sampling event

Parameter	Units	DL (min | max)	FEIS[a]	Action Level[b] (min | max)	AEMP Benchmark	MEL-02 (Mid-field Exposure Area) Winter Sampling Event (March)										
						N	N<MDL	% <MDL	Mean	Median	SD	SE	Min	Max	%> FEIS	% > Act Lvl
Organic/Inorganic Carbon																
Dissolved Organic Carbon	mg/L	0.5	-	-	-	5	0	0	4.78	4.79	0.113	0.0503	4.62	4.93	-	-
Total Organic Carbon	mg/L	0.5	-	-	-	5	0	0	4.74	4.85	0.205	0.0918	4.49	4.92	-	-
Total Metals																
Aluminum	ug/L	1	9.1	75	100	5	1	20	2.12	2.1	0.826	0.369	1	3.3	0	0
Antimony	ug/L	0.02	0.51	4.5	6	5	2	40	0.0212	0.021	0.0013	0.000583	0.02	0.023	0	0
Arsenic	ug/L	0.02	3.8	18.8	25	5	0	0	0.728	0.745	0.0328	0.0147	0.69	0.762	0	0
Barium	ug/L	0.02	77	750	1000	5	0	0	13.7	13.4	0.527	0.236	13.1	14.4	0	0
Beryllium	ug/L	0.005	-	-	-	5	5	100	-	-	-	-	-	0.005	-	-
Boron	ug/L	5	23	1120	1500	5	0	0	10.1	10.1	0.416	0.186	9.6	10.6	0	0
Cadmium	ug/L	0.005	0.05	0.0352 | 0.0487	0.047 | 0.0649	5	5	100	-	-	-	-	-	0.005	0	0
Chromium	ug/L	0.1	1.1	3.75	5	5	5	100	-	-	-	-	-	0.1	0	0
Cobalt	ug/L	0.005	-	0.585	0.78	5	0	0	0.0251	0.0284	0.00567	0.00254	0.0161	0.0296	-	0
Copper	ug/L	0.05	2	1500	2000	5	0	0	1.24	1.28	0.113	0.0505	1.04	1.31	0	0
Iron	ug/L	1	42	795	1060	5	0	0	11.3	12.7	6.18	2.77	1.2	16.5	0	0
Lead	ug/L	0.01	0.15	3.75	5	5	3	60	-	0.01	-	-	0.01	0.028	0	0
Lithium	ug/L	0.5	-	-	-	5	0	0	1.73	1.73	0.0694	0.031	1.63	1.81	-	-
Manganese	ug/L	0.05	5.5	90	120	5	0	0	3.41	4.22	1.71	0.766	0.37	4.35	0	0
Mercury	ug/L	5e-04 | 0.005	0.02	0.0195	0.026	5	1	20	0.000894	0.00058	7.02E-04	3.14E-04	5.00E-04	0.00214	0	0
Molybdenum	ug/L	0.05	5.2	54.8	73	5	0	0	0.151	0.133	0.0472	0.0211	0.118	0.234	0	0
Nickel	ug/L	0.05	2.7	18.8	25	5	0	0	1.03	1.04	0.0731	0.0327	0.899	1.08	0	0
Selenium	ug/L	0.04	0.16	0.75	1	5	0	0	0.0818	0.076	0.036	0.0161	0.045	0.141	0	0
Silver	ug/L	0.005	0.1	0.188	0.25	5	5	100	-	-	-	-	-	0.005	0	0
Strontium	ug/L	0.02	-	1880	2500	5	0	0	77	77.7	3.17	1.42	72.6	80.1	-	0
Thallium	ug/L	0.005	0.1	0.6	0.8	5	5	100	-	-	-	-	-	0.005	0	0
Tin	ug/L	0.02	-	-	-	5	5	100	-	-	-	-	-	0.02	-	-
Titanium	ug/L	0.05	-	-	-	5	4	80	-	0.05	-	-	0.05	0.1	-	-
Uranium	ug/L	0.001	1.5	11.2	15	5	0	0	0.0254	0.0267	0.00539	0.00241	0.0164	0.0304	0	0
Vanadium	ug/L	0.05	-	-	-	5	5	100	-	-	-	-	-	0.05	-	0
Zinc	ug/L	0.5	6.7	-	-	5	1	20	2.49	1.78	1.67	0.748	0.5	4.3	0	-
Dissolved Metals																
Aluminum	ug/L	1	-	-	-	5	3	60	-	1	-	-	1	1.2	-	-
Antimony	ug/L	0.02	-	-	-	5	5	100	-	-	-	-	-	0.02	-	-
Arsenic	ug/L	0.02	-	-	-	5	0	0	0.686	0.688	0.0269	0.012	0.647	0.716	-	-
Barium	ug/L	0.02	-	-	-	5	0	0	13.8	13.9	0.367	0.164	13.2	14.2	-	-
Beryllium	ug/L	0.005	-	-	-	5	5	100	-	-	-	-	-	0.005	-	-
Boron	ug/L	5	-	-	-	5	0	0	9.9	9.9	0.394	0.176	9.3	10.3	-	-
Cadmium	ug/L	0.005	-	-	-	5	5	100	-	-	-	-	-	0.005	-	-
Chromium	ug/L	0.1	-	-	-	5	5	100	-	-	-	-	-	0.1	-	-
Cobalt	ug/L	0.005	-	-	-	5	0	0	0.0182	0.0171	0.00245	0.0011	0.0169	0.0226	-	-
Copper	ug/L	0.05	-	0.858 | 4.39	1.14 | 5.85	5	0	0	1.26	1.26	0.0707	0.0316	1.18	1.34	-	40
Iron	ug/L	1	-	-	-	5	0	0	3.8	3.9	0.616	0.276	2.9	4.4	-	-
Lead	ug/L	0.01	-	3.53 | 5.24	4.71 | 6.99	5	5	100	-	-	-	-	-	0.01	-	0
Lithium	ug/L	0.5	-	-	-	5	0	0	1.64	1.66	0.0358	0.016	1.58	1.66	-	-
Manganese	ug/L	0.05	-	158 | 248	210 | 330	5	0	0	0.715	0.608	0.28	0.125	0.396	1.09	-	0

Table C1-3. MEL-02 summary statistics for the 2022 winter water sampling event

Parameter	Units	DL (min | max)	FEIS[a]	Action Level[b] (min | max)	AEMP Benchmark	MEL-02 (Mid-field Exposure Area) Winter Sampling Event (March)										
						N	N<MDL	% <MDL	Mean	Median	SD	SE	Min	Max	%> FEIS	% > Act Lvl
Mercury	ug/L	5e-04 | 0.005	-	-	-	5	2	40	0.000774	5.60E-04	0.000525	0.000235	5.00E-04	0.00171	-	-
Molybdenum	ug/L	0.05	-	-	-	5	0	0	0.138	0.134	0.00688	0.00308	0.132	0.149	-	-
Nickel	ug/L	0.05	-	-	-	5	0	0	1.06	1.03	0.11	0.0493	0.957	1.24	-	-
Selenium	ug/L	0.04	-	-	-	5	1	20	0.0614	0.062	0.0134	0.006	0.04	0.075	-	-
Silver	ug/L	0.005	-	-	-	5	5	100	-	-	-	-	-	0.005	-	-
Strontium	ug/L	0.02	-	1880	2500	5	0	0	77	78.3	2.33	1.04	74.3	79.1	-	0
Thallium	ug/L	0.005	-	-	-	5	5	100	-	-	-	-	-	0.005	-	-
Tin	ug/L	0.02	-	-	-	5	5	100	-	-	-	-	-	0.02	-	-
Titanium	ug/L	0.05	-	-	-	5	5	100	-	-	-	-	-	0.05	-	-
Uranium	ug/L	0.001	-	-	-	5	0	0	0.0259	0.0262	0.00136	0.000609	0.0237	0.0272	-	-
Vanadium	ug/L	0.05	-	-	-	5	5	100	-	-	-	-	-	0.05	-	-
Zinc	ug/L	0.5	-	4.4 | 8.77	5.86 | 11.7	5	0	0	1.26	1.2	0.351	0.157	0.84	1.8	-	0
Other																
Cyanide (free)	mg/L	0.001	0.00035	-	-	5	4	80	-	0.001	-	-	0.001	0.0012	100	-
Cyanide (Total)	mg/L	0.001	0.009	0.00375	0.005	5	5	100	-	-	-	-	-	0.001	0	0
Cyanide (WAD)	mg/L	0.001	-	-	-	5	5	100	-	-	-	-	-	0.001	-	-

Notes

[a] FEIS predictions for the edge of the mixing zone as presented in Agnico Eagle (2014).

[b] The AEMP Action Level is 75% of the AEMP Benchmark.

Table C1-4. MEL-01 summary statistics for the 2022 open water sampling events

Parameter	Units	DL (min | max)	Normal Range (min | max)	FEIS[a]	Action Level[b] (min | max)	AEMP Benchmark	MEL-01 (Near-field Exposure Area) Open Water Sampling Events (July, August, September)											
							N	N<MDL	% <MDL	Mean	Median	SD	SE	Min	Max	% > NR	%> FEIS	% > Act Lvl
Field Measurements																		
Temperature	C	-	-	-	-	-	18	0	0	12.7	14.1	3.48	0.819	8	16	-	-	-
Sp. Conductivity (field)	uS/cm	-	-	-	-	-	18	0	0	115	111	7.48	1.76	110	131	-	-	-
pH (field)	pH units	-	7.1 | 7.95	-	6.5 | 9.0	6.5 | 9.0	18	0	0	7.34	7.3	0.297	0.07	6.78	7.79	11	-	0
DO (mg/L)	mg/L	-	-	-	6.5	6.5	18	0	0	10.7	10.9	1.03	0.244	9.1	12.6	-	-	0
DO (%)	%	-	-	-	-	-	18	0	0	101	101	7.55	1.78	80.3	109	-	-	-
Conventional Parameters																		
Conductivity (lab)	uS/cm	1	77.5	-	-	-	18	0	0	116	112	7.01	1.65	110	133	100	-	-
Hardness	mg/L	0.2	23.4	-	-	-	18	0	0	31.3	31.2	1.29	0.305	29.5	34.1	100	-	-
pH (lab)	pH units	0.1	-	-	6.5 | 9.0	6.5 | 9.0	18	0	0	7.51	7.54	0.103	0.0243	7.37	7.65	-	-	0
Total Dissolved Solids	mg/L	13	54	68	375	500	18	0	0	64.5	63	7.82	1.84	53	79	94	28	0
Total Dissolved Solids (Calculated)	mg/L	1	39.6	68	375	500	18	0	0	56.4	54.8	3.72	0.878	51.4	65.2	100	0	0
Total Suspended Solids	mg/L	1	1	3.1	-	-	18	7	39	1.17	1.1	0.259	0.061	1	2	61	0	-
Turbidity (lab)	NTU	0.1	-	-	-	-	18	0	0	0.422	0.405	0.0647	0.0152	0.33	0.56	-	-	-
Major Ions																		
Alkalinity, Bicarbonate	mg/L	1.2	25	-	-	-	18	0	0	26.5	26	1.41	0.333	24.6	29.3	89	-	-
Alkalinity, Carbonate	mg/L	0.6	-	-	-	-	18	18	100	-	-	-	-	-	0.6	-	-	-
Alkalinity, Hydroxide	mg/L	0.34	-	-	-	-	18	18	100	-	-	-	-	-	0.34	-	-	-
Alkalinity, Total	mg/L	1	20.5	-	-	-	18	0	0	21.7	21.3	1.16	0.273	20.2	24	89	-	-
Bromide	mg/L	0.1	-	-	-	-	18	18	100	-	-	-	-	-	0.1	-	-	-
Calcium (D)	mg/L	0.01	-	-	-	-	18	0	0	9.55	9.55	0.379	0.0894	8.96	10.3	-	-	-
Calcium (T)	mg/L	0.01	7.33	-	-	-	18	0	0	9.56	9.45	0.398	0.0939	9.03	10.4	100	-	-
Chloride	mg/L	0.1	9.56	14	90	120	18	0	0	16.2	15.8	1.8	0.425	11.9	19.9	100	94	0
Fluoride	mg/L	0.02	0.028	0.0084	2.1	2.8	18	1	6	0.0275	0.029	0.00238	0.000562	0.02	0.03	56	100	0
Magnesium (D)	mg/L	0.004	-	-	-	-	18	0	0	1.81	1.79	0.0987	0.0233	1.69	2.04	-	-	-
Magnesium (T)	mg/L	0.004	1.18	-	-	-	18	0	0	1.79	1.74	0.113	0.0266	1.69	2.05	100	-	-
Potassium (D)	mg/L	0.02	-	-	-	-	18	0	0	1.2	1.21	0.0798	0.0188	1.09	1.34	-	-	-
Potassium (T)	mg/L	0.02	0.954	-	-	-	18	0	0	1.19	1.21	0.0825	0.0194	1.08	1.34	100	-	-
Reactive Silica (SiO2)	mg/L	0.01	0.268	-	-	-	18	0	0	0.399	0.463	0.1	0.0236	0.259	0.478	67	-	-
Sodium (D)	mg/L	0.02	-	-	-	-	18	0	0	8.08	7.76	0.654	0.154	7.43	9.68	-	-	-
Sodium (T)	mg/L	0.02	4.85	5.3	-	-	18	0	0	8.01	7.72	0.7	0.165	7.3	9.64	100	100	-
Sulphate	mg/L	0.3	3.87	38	-	-	18	0	0	6.43	6.46	0.72	0.17	4.33	7.75	100	0	-
Nutrients																		
Ammonia (as N)	mg/L	0.005	0.0174	0.54	0.95	1.27	18	1	6	0.0141	0.0138	0.00743	0.00175	0.005	0.0368	28	0	0
Nitrate (as N)	mg/L	0.005	0.018	0.25	2.17	2.9	18	6	33	0.0176	0.0102	0.02	0.00472	0.005	0.0701	22	0	0
Nitrate + Nitrite (as N)	mg/L	0.0051	-	-	-	-	18	6	33	0.018	0.0102	0.0205	0.00483	0.0051	0.0717	-	-	-
Nitrite (as N)	mg/L	0.001	0.001	0.051	0.045	0.06	18	14	78	-	0.001	-	-	0.001	0.0016	22	0	0
Nitrogen	mg/L	0.0051 | 0.05	-	-	-	-	12	0	0	0.354	0.341	0.0678	0.0196	0.275	0.458	-	-	-
Orthophosphate (PO4-P)	mg/L	0.001	0.001	-	-	-	18	18	100	-	-	-	-	-	0.001	0	-	-
Total Diss Phosphorus	mg/L	0.001 | 0.003	0.00314	-	-	-	18	9	50	-	0.00145	-	-	0.001	0.0038	11	-	-
Total Dissolved Nitrogen	mg/L	0.05	-	-	-	-	18	0	0	0.29	0.278	0.0613	0.0145	0.227	0.476	-	-	-
Total Kjeldahl Nitrogen	mg/L	0.05	0.25	-	-	-	18	0	0	0.313	0.296	0.0513	0.0121	0.26	0.416	100	-	-
Total Kjeldahl Nitrogen (diss)	mg/L	0.05	-	-	-	-	18	0	0	0.274	0.27	0.046	0.0108	0.227	0.419	-	-	-
Total Phosphorus	mg/L	0.001 | 0.003	0.006	0.0049	-	-	18	0	0	0.00677	0.00655	0.0021	0.000495	0.005	0.0144	67	100	-

Table C1-4. MEL-01 summary statistics for the 2022 open water sampling events

Parameter	Units	DL (min | max)	Normal Range (min | max)	FEIS[a]	Action Level[b] (min | max)	AEMP Benchmark	MEL-01 (Near-field Exposure Area) Open Water Sampling Events (July, August, September)											
							N	N<MDL	% <MDL	Mean	Median	SD	SE	Min	Max	% > NR	%> FEIS	% > Act Lvl
Organic/Inorganic Carbon																		
Dissolved Organic Carbon	mg/L	0.5	2.72	-	-	-	18	0	0	4.19	4.2	0.336	0.0793	3.62	4.75	100	-	-
Total Organic Carbon	mg/L	0.5	3	-	-	-	18	0	0	3.92	3.89	0.208	0.049	3.66	4.28	100	-	-
Total Metals																		
Aluminum	ug/L	1	5.32	9.1	75	100	18	0	0	3.58	3.1	1.25	0.295	2	6.4	11	0	0
Antimony	ug/L	0.02	0.02	0.51	4.5	6	18	15	83	-	0.02	-	-	0.02	0.023	17	0	0
Arsenic	ug/L	0.02	0.275	3.8	18.8	25	18	0	0	0.576	0.606	0.0735	0.0173	0.454	0.671	100	0	0
Barium	ug/L	0.02	8.05	77	750	1000	18	0	0	8.62	8.67	0.202	0.0476	8.27	8.97	100	0	0
Beryllium	ug/L	0.005	0.005	-	-	-	18	18	100	-	-	-	-	-	0.005	0	-	-
Boron	ug/L	5	6.52	23	1120	1500	18	0	0	7.44	7.35	0.331	0.0781	7	8.1	100	0	0
Cadmium	ug/L	0.005	0.005	0.05	0.0352 | 0.0487	0.047 | 0.0649	18	18	100	-	-	-	-	-	0.005	0	0	0
Chromium	ug/L	0.1	0.103	1.1	3.75	5	18	18	100	-	-	-	-	-	0.1	0	0	0
Cobalt	ug/L	0.005	0.016	-	0.585	0.78	18	0	0	0.0269	0.0262	0.00278	0.000656	0.0231	0.0329	100	-	0
Copper	ug/L	0.05	0.86	2	1500	2000	18	0	0	0.949	0.945	0.0303	0.00713	0.911	1.05	100	0	0
Iron	ug/L	1	15	42	795	1060	18	0	0	23.2	22.8	2.42	0.57	17.6	27.2	100	0	0
Lead	ug/L	0.01	0.0222	0.15	3.75	5	18	16	89	-	0.01	-	-	0.01	0.013	0	0	0
Lithium	ug/L	0.5	0.72	-	-	-	18	0	0	1.18	1.17	0.0468	0.011	1.11	1.25	100	-	-
Manganese	ug/L	0.05	3.06	5.5	90	120	18	0	0	7.3	7.85	1.59	0.375	4.67	9.27	100	72	0
Mercury	ug/L	5e-04 | 0.005	0.0008	0.02	0.0195	0.026	18	18	100	-	-	-	-	-	0.005	100	0	0
Molybdenum	ug/L	0.05	0.107	5.2	54.8	73	18	0	0	0.138	0.134	0.0218	0.00513	0.11	0.179	100	0	0
Nickel	ug/L	0.05	0.441	2.7	18.8	25	18	0	0	0.795	0.802	0.0389	0.00918	0.697	0.855	100	0	0
Selenium	ug/L	0.04	0.049	0.16	0.75	1	18	11	61	-	0.04	-	-	0.04	0.067	28	0	0
Silver	ug/L	0.005	0.005	0.1	0.188	0.25	18	18	100	-	-	-	-	-	0.005	0	0	0
Strontium	ug/L	0.02	36.1	-	1880	2500	18	0	0	59.4	57.4	4.78	1.13	54.7	69.8	100	-	0
Thallium	ug/L	0.005	0.005	0.1	0.6	0.8	18	18	100	-	-	-	-	-	0.005	0	0	0
Tin	ug/L	0.02	0.0384	-	-	-	18	17	94	-	0.02	-	-	0.02	0.022	0	-	-
Titanium	ug/L	0.05	0.17	-	-	-	18	6	33	0.0836	0.063	0.0543	0.0128	0.05	0.27	6	-	-
Uranium	ug/L	0.001	0.0164	1.5	11.2	15	18	0	0	0.0265	0.025	0.00442	0.00104	0.0222	0.0361	100	0	0
Vanadium	ug/L	0.05	0.05	-	-	-	18	18	100	-	-	-	-	-	0.05	0	-	0
Zinc	ug/L	0.5	1.7	6.7	-	-	18	14	78	-	0.5	-	-	0.5	10.2	17	6	-
Dissolved Metals																		
Aluminum	ug/L	1	-	-	-	-	18	6	33	1.5	1.3	0.574	0.135	1	2.7	-	-	-
Antimony	ug/L	0.02	-	-	-	-	18	14	78	-	0.02	-	-	0.02	0.024	-	-	-
Arsenic	ug/L	0.02	-	-	-	-	18	0	0	0.534	0.552	0.0697	0.0164	0.418	0.633	-	-	-
Barium	ug/L	0.02	-	-	-	-	18	0	0	8.37	8.41	0.235	0.0554	7.97	8.86	-	-	-
Beryllium	ug/L	0.005	-	-	-	-	18	18	100	-	-	-	-	-	0.005	-	-	-
Boron	ug/L	5	-	-	-	-	18	0	0	7.56	7.45	0.443	0.105	7.1	8.7	-	-	-
Cadmium	ug/L	0.005	-	-	-	-	18	18	100	-	-	-	-	-	0.005	-	-	-
Chromium	ug/L	0.1	-	-	-	-	18	18	100	-	-	-	-	-	0.1	-	-	-
Cobalt	ug/L	0.005	-	-	-	-	18	0	0	0.0146	0.0142	0.00218	0.000513	0.0113	0.0196	-	-	-
Copper	ug/L	0.05	0.861	-	0.858 | 4.39	1.14 | 5.85	18	0	0	0.939	0.938	0.0322	0.00758	0.878	1.01	100	-	6
Iron	ug/L	1	-	-	-	-	18	0	0	5.71	5.05	2.39	0.563	2.9	9.2	-	-	-
Lead	ug/L	0.01	0.0125	-	3.53 | 5.24	4.71 | 6.99	18	18	100	-	-	-	-	-	0.01	0	-	0
Lithium	ug/L	0.5	-	-	-	-	18	0	0	1.15	1.15	0.0649	0.0153	1.06	1.26	-	-	-
Manganese	ug/L	0.05	1.2	-	158 | 248	210 | 330	18	0	0	0.648	0.468	0.482	0.114	0.174	1.36	28	-	0

Table C1-4. MEL-01 summary statistics for the 2022 open water sampling events

Parameter	Units	DL (min | max)	Normal Range (min | max)	FEIS[a]	Action Level[b] (min | max)	AEMP Benchmark	MEL-01 (Near-field Exposure Area) Open Water Sampling Events (July, August, September)											
							N	N<MDL	% <MDL	Mean	Median	SD	SE	Min	Max	% > NR	%> FEIS	% > Act Lvl
Mercury	ug/L	5e-04 | 0.005	-	-	-	-	18	18	100	-	-	-	-	-	0.005	-	-	-
Molybdenum	ug/L	0.05	-	-	-	-	18	0	0	0.133	0.13	0.0189	0.00445	0.107	0.166	-	-	-
Nickel	ug/L	0.05	-	-	-	-	18	0	0	0.763	0.744	0.0586	0.0138	0.7	0.932	-	-	-
Selenium	ug/L	0.04	-	-	-	-	18	8	44	0.0429	0.042	0.0041	0.000966	0.04	0.054	-	-	-
Silver	ug/L	0.005	-	-	-	-	18	18	100	-	-	-	-	-	0.005	-	-	-
Strontium	ug/L	0.02	-	-	1880	2500	18	0	0	59.3	59	4.35	1.03	53	67.7	-	-	0
Thallium	ug/L	0.005	-	-	-	-	18	18	100	-	-	-	-	-	0.005	-	-	-
Tin	ug/L	0.02	-	-	-	-	18	16	89	-	0.02	-	-	0.02	0.04	-	-	-
Titanium	ug/L	0.05	-	-	-	-	18	18	100	-	-	-	-	-	0.05	-	-	-
Uranium	ug/L	0.001	-	-	-	-	18	0	0	0.0246	0.0234	0.00402	0.000947	0.0203	0.0349	-	-	-
Vanadium	ug/L	0.05	-	-	-	-	18	18	100	-	-	-	-	-	0.05	-	-	-
Zinc	ug/L	0.5	1.9	-	4.4 | 8.77	5.86 | 11.7	18	14	78	-	0.5	-	-	0.5	6.59	17	-	0
Other																		
Cyanide (free)	mg/L	0.001	-	0.00035	-	-	18	14	78	-	0.001	-	-	0.001	0.0012	-	100	-
Cyanide (Total)	mg/L	0.001	0.001	0.009	0.00375	0.005	18	18	100	-	-	-	-	-	0.001	0	0	0
Cyanide (WAD)	mg/L	0.001	-	-	-	-	18	18	100	-	-	-	-	-	0.001	-	-	-

Notes

[a] FEIS predictions for the edge of the mixing zone as presented in Agnico Eagle (2014).

[b] The AEMP Action Level is 75% of the AEMP Benchmark.

Orange shaded values indicate parameters where at least 1 sample > Normal Range.

Table C1-5. MEL-02 summary statistics for the 2022 open water sampling events

Parameter	Units	DL (min | max)	Normal Range (min | max)	FEIS[a]	Action Level[b] (min | max)	AEMP Benchmark	MEL-02 (Mid-field Exposure Area) Open Water Sampling Events (July, August, September)											
							N	N<MDL	% <MDL	Mean	Median	SD	SE	Min	Max	% > NR	%> FEIS	% > Act Lvl
Field Measurements																		
Temperature	C	-	-	-	-	-	15	0	0	12.8	13.6	3.46	0.893	8.05	16.4	-	-	-
Sp. Conductivity (field)	uS/cm	-	-	-	-	-	15	0	0	93.3	93	1.66	0.428	91	95.7	-	-	-
pH (field)	pH units	-	7.1 | 7.95	-	6.5 | 9.0	6.5 | 9.0	15	0	0	7.39	7.33	0.212	0.0547	7.07	7.67	13	-	0
DO (mg/L)	mg/L	-	-	-	6.5	6.5	15	0	0	10.7	11	0.9	0.232	8.59	11.6	-	-	0
DO (%)	%	-	-	-	-	-	15	0	0	101	99.6	5.8	1.5	87.7	109	-	-	-
Conventional Parameters																		
Conductivity (lab)	uS/cm	1	77.5	-	-	-	15	0	0	93.6	93.5	0.936	0.242	92.1	95.6	100	-	-
Hardness	mg/L	0.2	23.4	-	-	-	15	0	0	26.5	26.3	0.361	0.0931	26.2	27.3	100	-	-
pH (lab)	pH units	0.1	-	-	6.5 | 9.0	6.5 | 9.0	15	0	0	7.49	7.48	0.0988	0.0255	7.36	7.63	-	-	0
Total Dissolved Solids	mg/L	13	54	68	375	500	15	0	0	54.1	54	5.41	1.4	44	63	47	0	0
Total Dissolved Solids (Calculated)	mg/L	1	39.6	68	375	500	15	0	0	45.5	45.5	1.56	0.403	41.1	47.1	100	0	0
Total Suspended Solids	mg/L	1	1	3.1	-	-	15	14	93	-	1	-	-	1	1.2	7	0	-
Turbidity (lab)	NTU	0.1	-	-	-	-	15	0	0	0.261	0.22	0.0876	0.0226	0.17	0.44	-	-	-
Major Ions																		
Alkalinity, Bicarbonate	mg/L	1.2	25	-	-	-	15	0	0	24.3	24.5	1.36	0.351	21	26	40	-	-
Alkalinity, Carbonate	mg/L	0.6	-	-	-	-	15	15	100	-	-	-	-	-	0.6	-	-	-
Alkalinity, Hydroxide	mg/L	0.34	-	-	-	-	15	15	100	-	-	-	-	-	0.34	-	-	-
Alkalinity, Total	mg/L	1	20.5	-	-	-	15	0	0	19.9	20.1	1.11	0.286	17.2	21.3	40	-	-
Bromide	mg/L	0.1	-	-	-	-	15	15	100	-	-	-	-	-	0.1	-	-	-
Calcium (D)	mg/L	0.01	-	-	-	-	15	0	0	8.25	8.19	0.166	0.0427	8.09	8.6	-	-	-
Calcium (T)	mg/L	0.01	7.33	-	-	-	15	0	0	8.28	8.22	0.158	0.0408	8.04	8.48	100	-	-
Chloride	mg/L	0.1	9.56	14	90	120	15	0	0	12	12.1	1.06	0.274	8.51	12.9	93	0	0
Fluoride	mg/L	0.02	0.028	0.0084	2.1	2.8	15	1	7	0.0259	0.027	0.00198	0.000511	0.02	0.028	0	100	0
Magnesium (D)	mg/L	0.004	-	-	-	-	15	0	0	1.43	1.43	0.0365	0.00943	1.36	1.5	-	-	-
Magnesium (T)	mg/L	0.004	1.18	-	-	-	15	0	0	1.41	1.41	0.032	0.00827	1.35	1.45	100	-	-
Potassium (D)	mg/L	0.02	-	-	-	-	15	0	0	1.06	1.07	0.034	0.00878	1.01	1.1	-	-	-
Potassium (T)	mg/L	0.02	0.954	-	-	-	15	0	0	1.06	1.07	0.0419	0.0108	0.991	1.1	100	-	-
Reactive Silica (SiO2)	mg/L	0.01	0.268	-	-	-	15	0	0	0.3	0.338	0.0796	0.0206	0.192	0.379	67	-	-
Sodium (D)	mg/L	0.02	-	-	-	-	15	0	0	6.15	6.07	0.177	0.0456	5.86	6.48	-	-	-
Sodium (T)	mg/L	0.02	4.85	5.3	-	-	15	0	0	6.07	6.1	0.119	0.0308	5.81	6.26	100	100	-
Sulphate	mg/L	0.3	3.87	38	-	-	15	0	0	4.64	4.59	0.525	0.136	2.99	5.13	93	0	-
Nutrients																		
Ammonia (as N)	mg/L	0.005	0.0174	0.54	0.95	1.27	15	9	60	-	0.005	-	-	0.005	0.0089	0	0	0
Nitrate (as N)	mg/L	0.005	0.018	0.25	2.17	2.9	15	13	87	-	0.005	-	-	0.005	0.0098	0	0	0
Nitrate + Nitrite (as N)	mg/L	0.0051	-	-	-	-	15	13	87	-	0.0051	-	-	0.0051	0.0098	-	-	-
Nitrite (as N)	mg/L	0.001	0.001	0.051	0.045	0.06	15	15	100	-	-	-	-	-	0.001	0	0	0
Nitrogen	mg/L	0.0051 | 0.05	-	-	-	-	10	0	0	0.229	0.224	0.0182	0.00575	0.207	0.26	-	-	-
Orthophosphate (PO4-P)	mg/L	0.001	0.001	-	-	-	15	15	100	-	-	-	-	-	0.001	0	-	-
Total Diss Phosphorus	mg/L	0.001 | 0.003	0.00314	-	-	-	15	7	47	0.00207	0.002	0.000831	0.000215	0.001	0.0035	7	-	-
Total Dissolved Nitrogen	mg/L	0.05	-	-	-	-	15	0	0	0.215	0.201	0.0393	0.0101	0.184	0.344	-	-	-
Total Kjeldahl Nitrogen	mg/L	0.05	0.25	-	-	-	15	0	0	0.221	0.217	0.0167	0.00432	0.203	0.26	13	-	-
Total Kjeldahl Nitrogen (diss)	mg/L	0.05	-	-	-	-	15	0	0	0.214	0.201	0.0375	0.00968	0.184	0.337	-	-	-
Total Phosphorus	mg/L	0.001 | 0.003	0.006	0.0049	-	-	14	0	0	0.00388	0.00395	0.00117	0.000312	0.0021	0.0054	0	29	-

Table C1-5. MEL-02 summary statistics for the 2022 open water sampling events

Parameter	Units	DL (min | max)	Normal Range (min | max)	FEIS[a]	Action Level[b] (min | max)	AEMP Benchmark	MEL-02 (Mid-field Exposure Area) Open Water Sampling Events (July, August, September)											
							N	N<MDL	% <MDL	Mean	Median	SD	SE	Min	Max	% > NR	%> FEIS	% > Act Lvl
Organic/Inorganic Carbon																		
Dissolved Organic Carbon	mg/L	0.5	2.72	-	-	-	15	0	0	3.82	3.86	0.231	0.0596	3.5	4.2	100	-	-
Total Organic Carbon	mg/L	0.5	3	-	-	-	15	0	0	3.56	3.5	0.202	0.0521	3.17	3.93	100	-	-
Total Metals																		
Aluminum	ug/L	1	5.32	9.1	75	100	15	0	0	1.95	1.8	0.666	0.172	1.3	4	0	0	0
Antimony	ug/L	0.02	0.02	0.51	4.5	6	15	14	93	-	0.02	-	-	0.02	0.028	7	0	0
Arsenic	ug/L	0.02	0.275	3.8	18.8	25	15	0	0	0.592	0.597	0.0648	0.0167	0.495	0.698	100	0	0
Barium	ug/L	0.02	8.05	77	750	1000	15	0	0	7.85	7.78	0.296	0.0765	7.46	8.26	33	0	0
Beryllium	ug/L	0.005	0.005	-	-	-	15	15	100	-	-	-	-	-	0.005	0	-	-
Boron	ug/L	5	6.52	23	1120	1500	15	5	33	5.47	5.6	0.359	0.0928	5	5.9	0	0	0
Cadmium	ug/L	0.005	0.005	0.05	0.0352 | 0.0487	0.047 | 0.0649	15	13	87	-	0.005	-	-	0.005	0.0058	13	0	0
Chromium	ug/L	0.1	0.103	1.1	3.75	5	15	15	100	-	-	-	-	-	0.1	0	0	0
Cobalt	ug/L	0.005	0.016	-	0.585	0.78	15	0	0	0.0136	0.0137	0.0017	0.000438	0.0105	0.0163	13	-	0
Copper	ug/L	0.05	0.86	2	1500	2000	15	0	0	0.807	0.817	0.0333	0.00859	0.753	0.858	0	0	0
Iron	ug/L	1	15	42	795	1060	15	0	0	11.1	11.3	1.69	0.438	8.5	13.6	0	0	0
Lead	ug/L	0.01	0.0222	0.15	3.75	5	15	12	80	-	0.01	-	-	0.01	0.042	7	0	0
Lithium	ug/L	0.5	0.72	-	-	-	15	0	0	0.937	0.94	0.06	0.0155	0.86	1.01	100	-	-
Manganese	ug/L	0.05	3.06	5.5	90	120	15	0	0	3.11	3.22	0.688	0.178	2.15	4.1	67	0	0
Mercury	ug/L	5e-04 | 0.005	0.0008	0.02	0.0195	0.026	15	15	100	-	-	-	-	-	0.005	100	0	0
Molybdenum	ug/L	0.05	0.107	5.2	54.8	73	15	0	0	0.125	0.101	0.078	0.0201	0.079	0.4	33	0	0
Nickel	ug/L	0.05	0.441	2.7	18.8	25	15	0	0	0.554	0.545	0.057	0.0147	0.478	0.646	100	0	0
Selenium	ug/L	0.04	0.049	0.16	0.75	1	15	8	53	-	0.04	-	-	0.04	0.051	7	0	0
Silver	ug/L	0.005	0.005	0.1	0.188	0.25	15	15	100	-	-	-	-	-	0.005	0	0	0
Strontium	ug/L	0.02	36.1	-	1880	2500	15	0	0	46.7	46.7	1.03	0.267	44.3	48.7	100	-	0
Thallium	ug/L	0.005	0.005	0.1	0.6	0.8	15	15	100	-	-	-	-	-	0.005	0	0	0
Tin	ug/L	0.02	0.0384	-	-	-	15	15	100	-	-	-	-	-	0.02	0	-	-
Titanium	ug/L	0.05	0.17	-	-	-	15	14	93	-	0.05	-	-	0.05	0.087	0	-	-
Uranium	ug/L	0.001	0.0164	1.5	11.2	15	15	0	0	0.0183	0.0183	0.001	0.000259	0.0167	0.0205	100	0	0
Vanadium	ug/L	0.05	0.05	-	-	-	15	14	93	-	0.05	-	-	0.05	0.054	7	-	0
Zinc	ug/L	0.5	1.7	6.7	-	-	15	14	93	-	0.5	-	-	0.5	0.78	0	0	-
Dissolved Metals																		
Aluminum	ug/L	1	-	-	-	-	15	9	60	-	1	-	-	1	1.2	-	-	-
Antimony	ug/L	0.02	-	-	-	-	15	15	100	-	-	-	-	-	0.02	-	-	-
Arsenic	ug/L	0.02	-	-	-	-	15	0	0	0.576	0.603	0.0692	0.0179	0.464	0.667	-	-	-
Barium	ug/L	0.02	-	-	-	-	15	0	0	7.84	7.77	0.222	0.0573	7.49	8.19	-	-	-
Beryllium	ug/L	0.005	-	-	-	-	15	15	100	-	-	-	-	-	0.005	-	-	-
Boron	ug/L	5	-	-	-	-	15	4	27	5.43	5.3	0.412	0.106	5	6.1	-	-	-
Cadmium	ug/L	0.005	-	-	-	-	15	15	100	-	-	-	-	-	0.005	-	-	-
Chromium	ug/L	0.1	-	-	-	-	15	15	100	-	-	-	-	-	0.1	-	-	-
Cobalt	ug/L	0.005	-	-	-	-	15	0	0	0.00831	0.0084	0.00157	0.000406	0.0062	0.0111	-	-	-
Copper	ug/L	0.05	0.861	-	0.858 | 4.39	1.14 | 5.85	15	0	0	0.809	0.812	0.0253	0.00653	0.765	0.848	0	-	0
Iron	ug/L	1	-	-	-	-	15	0	0	4.03	4.4	0.889	0.229	2.5	4.9	-	-	-
Lead	ug/L	0.01	0.0125	-	3.53 | 5.24	4.71 | 6.99	15	15	100	-	-	-	-	-	0.01	0	-	0
Lithium	ug/L	0.5	-	-	-	-	15	0	0	0.918	0.88	0.0667	0.0172	0.85	1.04	-	-	-
Manganese	ug/L	0.05	1.2	-	158 | 248	210 | 330	15	0	0	0.412	0.267	0.258	0.0667	0.199	0.878	0	-	0

Table C1-5. MEL-02 summary statistics for the 2022 open water sampling events

Parameter	Units	DL (min | max)	Normal Range (min | max)	FEIS[a]	Action Level[b] (min | max)	AEMP Benchmark	MEL-02 (Mid-field Exposure Area) Open Water Sampling Events (July, August, September)											
							N	N<MDL	% <MDL	Mean	Median	SD	SE	Min	Max	% > NR	%> FEIS	% > Act Lvl
Mercury	ug/L	5e-04 | 0.005	-	-	-	-	15	15	100	-	-	-	-	-	0.005	-	-	-
Molybdenum	ug/L	0.05	-	-	-	-	15	0	0	0.155	0.101	0.126	0.0325	0.081	0.471	-	-	-
Nickel	ug/L	0.05	-	-	-	-	15	0	0	0.536	0.498	0.0618	0.016	0.476	0.626	-	-	-
Selenium	ug/L	0.04	-	-	-	-	15	11	73	-	0.04	-	-	0.04	0.055	-	-	-
Silver	ug/L	0.005	-	-	-	-	15	15	100	-	-	-	-	-	0.005	-	-	-
Strontium	ug/L	0.02	-	-	1880	2500	15	0	0	46.8	47.1	1.15	0.297	45	48.6	-	-	0
Thallium	ug/L	0.005	-	-	-	-	15	15	100	-	-	-	-	-	0.005	-	-	-
Tin	ug/L	0.02	-	-	-	-	15	15	100	-	-	-	-	-	0.02	-	-	-
Titanium	ug/L	0.05	-	-	-	-	15	15	100	-	-	-	-	-	0.05	-	-	-
Uranium	ug/L	0.001	-	-	-	-	15	0	0	0.0175	0.0176	0.00096	0.000248	0.0155	0.0188	-	-	-
Vanadium	ug/L	0.05	-	-	-	-	15	15	100	-	-	-	-	-	0.05	-	-	-
Zinc	ug/L	0.5	1.9	-	4.4 | 8.77	5.86 | 11.7	15	12	80	-	0.5	-	-	0.5	4.18	7	-	0
Other																		
Cyanide (free)	mg/L	0.001	-	0.00035	-	-	15	11	73	-	0.001	-	-	0.001	0.0017	-	100	-
Cyanide (Total)	mg/L	0.001	0.001	0.009	0.00375	0.005	15	15	100	-	-	-	-	-	0.001	0	0	0
Cyanide (WAD)	mg/L	0.001	-	-	-	-	15	15	100	-	-	-	-	-	0.001	-	-	-

Notes

[a] FEIS predictions for the edge of the mixing zone as presented in Agnico Eagle (2014).

[b] The AEMP Action Level is 75% of the AEMP Benchmark.

Orange shaded values indicate parameters where at least 1 sample > Normal Range.

Table C1-6. MEL-03 summary statistics for the 2022 open water sampling events (July, August, September)

Parameter	Units	DL (min | max)	Normal Range (min | max)	FEIS[a]	Action Level[b] (min | max)	AEMP Benchmark	MEL-03 (Reference Area 1) Open Water Sampling Events (July, August, September)											
							N	N<MDL	% <MDL	Mean	Median	SD	SE	Min	Max	% > NR	%> FEIS	% > Act Lvl
Field Measurements																		
Temperature	C	-	-	-	-	-	15	0	0	12.9	14.3	3.53	0.91	7.9	16.2	-	-	-
Sp. Conductivity (field)	uS/cm	-	-	-	-	-	15	0	0	83.1	82.8	0.804	0.208	82	84.5	-	-	-
pH (field)	pH units	-	7.1 | 7.95	-	6.5 | 9.0	6.5 | 9.0	15	0	0	7.3	7.25	0.207	0.0533	6.9	7.61	7	-	0
DO (mg/L)	mg/L	-	-	-	6.5	6.5	15	0	0	10.6	10.4	0.813	0.21	9.52	11.7	-	-	0
DO (%)	%	-	-	-	-	-	15	0	0	100	99.1	2.8	0.722	97.2	104	-	-	-
Conventional Parameters																		
Conductivity (lab)	uS/cm	1	77.5	-	-	-	15	0	0	86.4	84.3	7.9	2.04	79.9	113	100	-	-
Hardness	mg/L	0.2	23.4	-	-	-	15	0	0	24.4	23.8	1.34	0.347	23.1	28.5	93	-	-
pH (lab)	pH units	0.1	-	-	6.5 | 9.0	6.5 | 9.0	15	0	0	7.47	7.45	0.112	0.0289	7.3	7.62	-	-	0
Total Dissolved Solids	mg/L	13	54	68	375	500	15	0	0	51.5	48	8.72	2.25	41	70	33	7	0
Total Dissolved Solids (Calculated)	mg/L	1	39.6	68	375	500	15	0	0	42.1	40.7	4.07	1.05	39.1	55.3	80	0	0
Total Suspended Solids	mg/L	1	1	3.1	-	-	15	9	60	-	1	-	-	1	24	33	13	-
Turbidity (lab)	NTU	0.1	-	-	-	-	15	2	13	0.239	0.21	0.128	0.033	0.1	0.63	-	-	-
Major Ions																		
Alkalinity, Bicarbonate	mg/L	1.2	25	-	-	-	15	0	0	23.4	23.8	1.41	0.365	21.1	25.4	7	-	-
Alkalinity, Carbonate	mg/L	0.6	-	-	-	-	15	15	100	-	-	-	-	-	0.6	-	-	-
Alkalinity, Hydroxide	mg/L	0.34	-	-	-	-	15	15	100	-	-	-	-	-	0.34	-	-	-
Alkalinity, Total	mg/L	1	20.5	-	-	-	15	0	0	19.2	19.5	1.16	0.299	17.3	20.8	7	-	-
Bromide	mg/L	0.1	-	-	-	-	15	15	100	-	-	-	-	-	0.1	-	-	-
Calcium (D)	mg/L	0.01	-	-	-	-	15	0	0	7.62	7.52	0.357	0.0923	7.24	8.61	-	-	-
Calcium (T)	mg/L	0.01	7.33	-	-	-	15	0	0	7.76	7.78	0.246	0.0635	7.39	8.41	100	-	-
Chloride	mg/L	0.1	9.56	14	90	120	15	0	0	10.9	10.2	2.08	0.536	9.88	17.9	100	7	0
Fluoride	mg/L	0.02	0.028	0.0084	2.1	2.8	15	0	0	0.0266	0.027	0.000828	0.000214	0.024	0.027	0	100	0
Magnesium (D)	mg/L	0.004	-	-	-	-	15	0	0	1.3	1.28	0.122	0.0316	1.2	1.7	-	-	-
Magnesium (T)	mg/L	0.004	1.18	-	-	-	15	0	0	1.3	1.25	0.121	0.0312	1.22	1.7	100	-	-
Potassium (D)	mg/L	0.02	-	-	-	-	15	0	0	1.02	1.02	0.0568	0.0147	0.953	1.19	-	-	-
Potassium (T)	mg/L	0.02	0.954	-	-	-	15	0	0	1.03	1.03	0.0497	0.0128	0.972	1.18	100	-	-
Reactive Silica (SiO2)	mg/L	0.01	0.268	-	-	-	15	0	0	0.26	0.287	0.0594	0.0153	0.176	0.326	67	-	-
Sodium (D)	mg/L	0.02	-	-	-	-	15	0	0	5.66	5.38	0.98	0.253	4.99	8.96	-	-	-
Sodium (T)	mg/L	0.02	4.85	5.3	-	-	15	0	0	5.6	5.24	0.953	0.246	5.11	8.83	100	47	-
Sulphate	mg/L	0.3	3.87	38	-	-	15	0	0	4.02	3.92	0.264	0.0682	3.82	4.77	60	0	-
Nutrients																		
Ammonia (as N)	mg/L	0.005	0.0174	0.54	0.95	1.27	15	6	40	0.0119	0.0066	0.0111	0.00287	0.005	0.0464	13	0	0
Nitrate (as N)	mg/L	0.005	0.018	0.25	2.17	2.9	15	11	73	-	0.005	-	-	0.005	0.0424	7	0	0
Nitrate + Nitrite (as N)	mg/L	0.0051	-	-	-	-	15	11	73	-	0.0051	-	-	0.0051	0.0424	-	-	-
Nitrite (as N)	mg/L	0.001	0.001	0.051	0.045	0.06	15	15	100	-	-	-	-	-	0.001	0	0	0
Nitrogen	mg/L	0.0051 | 0.05	-	-	-	-	15	3	20	0.187	0.203	0.103	0.0265	0.0051	0.335	-	-	-
Orthophosphate (PO4-P)	mg/L	0.001	0.001	-	-	-	15	13	87	-	0.001	-	-	0.001	0.0012	7	-	-
Total Diss Phosphorus	mg/L	0.001 | 0.003	0.00314	-	-	-	15	6	40	0.00229	0.002	0.00128	0.000331	0.001	0.0048	27	-	-
Total Dissolved Nitrogen	mg/L	0.05	-	-	-	-	15	0	0	0.204	0.192	0.0449	0.0116	0.159	0.343	-	-	-
Total Kjeldahl Nitrogen	mg/L	0.05	0.25	-	-	-	15	0	0	0.224	0.212	0.0351	0.00907	0.176	0.293	20	-	-
Total Kjeldahl Nitrogen (diss)	mg/L	0.05	-	-	-	-	15	0	0	0.199	0.192	0.0344	0.00889	0.159	0.3	-	-	-
Total Phosphorus	mg/L	0.001 | 0.003	0.006	0.0049	-	-	15	0	0	0.00317	0.0033	0.000694	0.000179	0.0017	0.0043	0	0	-

Table C1-6. MEL-03 summary statistics for the 2022 open water sampling events (July, August, September)

Parameter	Units	DL (min | max)	Normal Range (min | max)	FEIS[a]	Action Level[b] (min | max)	AEMP Benchmark	MEL-03 (Reference Area 1) Open Water Sampling Events (July, August, September)											
							N	N<MDL	% <MDL	Mean	Median	SD	SE	Min	Max	% > NR	%> FEIS	% > Act Lvl
Organic/Inorganic Carbon																		
Dissolved Organic Carbon	mg/L	0.5	2.72	-	-	-	15	0	0	3.17	3.25	0.478	0.123	2.44	4.03	73	-	-
Total Organic Carbon	mg/L	0.5	3	-	-	-	15	0	0	2.9	2.91	0.297	0.0766	2.45	3.28	40	-	-
Total Metals																		
Aluminum	ug/L	1	5.32	9.1	75	100	15	0	0	3.4	2.9	1.56	0.403	2.2	8.3	7	0	0
Antimony	ug/L	0.02	0.02	0.51	4.5	6	15	15	100	-	-	-	-	-	0.02	0	0	0
Arsenic	ug/L	0.02	0.275	3.8	18.8	25	15	0	0	0.333	0.323	0.0289	0.00747	0.298	0.387	100	0	0
Barium	ug/L	0.02	8.05	77	750	1000	15	0	0	7.79	7.62	0.375	0.0968	7.45	8.71	20	0	0
Beryllium	ug/L	0.005	0.005	-	-	-	15	15	100	-	-	-	-	-	0.005	0	-	-
Boron	ug/L	5	6.52	23	1120	1500	15	15	100	-	-	-	-	-	5	0	0	0
Cadmium	ug/L	0.005	0.005	0.05	0.0352 | 0.0487	0.047 | 0.0649	15	15	100	-	-	-	-	-	0.005	0	0	0
Chromium	ug/L	0.1	0.103	1.1	3.75	5	15	15	100	-	-	-	-	-	0.1	0	0	0
Cobalt	ug/L	0.005	0.016	-	0.585	0.78	15	0	0	0.0117	0.011	0.00211	0.000546	0.0096	0.0163	7	-	0
Copper	ug/L	0.05	0.86	2	1500	2000	15	0	0	0.747	0.761	0.034	0.00877	0.687	0.788	0	0	0
Iron	ug/L	1	15	42	795	1060	15	0	0	10	9.5	2.82	0.728	7.9	19.5	7	0	0
Lead	ug/L	0.01	0.0222	0.15	3.75	5	15	12	80	-	0.01	-	-	0.01	0.027	7	0	0
Lithium	ug/L	0.5	0.72	-	-	-	15	0	0	0.817	0.81	0.0358	0.00924	0.78	0.92	100	-	-
Manganese	ug/L	0.05	3.06	5.5	90	120	15	0	0	1.9	1.86	0.391	0.101	1.38	2.67	0	0	0
Mercury	ug/L	5e-04 | 0.005	0.0008	0.02	0.0195	0.026	15	14	93	-	0.005	-	-	0.0006	0.005	93	0	0
Molybdenum	ug/L	0.05	0.107	5.2	54.8	73	15	0	0	0.0874	0.084	0.0163	0.00421	0.073	0.142	7	0	0
Nickel	ug/L	0.05	0.441	2.7	18.8	25	15	0	0	0.429	0.425	0.0266	0.00687	0.393	0.482	27	0	0
Selenium	ug/L	0.04	0.049	0.16	0.75	1	15	12	80	-	0.04	-	-	0.04	0.049	0	0	0
Silver	ug/L	0.005	0.005	0.1	0.188	0.25	15	15	100	-	-	-	-	-	0.005	0	0	0
Strontium	ug/L	0.02	36.1	-	1880	2500	15	0	0	41.4	40.8	3.85	0.994	37.9	54.1	100	-	0
Thallium	ug/L	0.005	0.005	0.1	0.6	0.8	15	15	100	-	-	-	-	-	0.005	0	0	0
Tin	ug/L	0.02	0.0384	-	-	-	15	14	93	-	0.02	-	-	0.02	0.127	7	-	-
Titanium	ug/L	0.05	0.17	-	-	-	15	5	33	0.149	0.06	0.346	0.0894	0.05	1.4	7	-	-
Uranium	ug/L	0.001	0.0164	1.5	11.2	15	15	0	0	0.0178	0.0174	0.00192	0.000495	0.0151	0.0223	80	0	0
Vanadium	ug/L	0.05	0.05	-	-	-	15	15	100	-	-	-	-	-	0.05	0	-	0
Zinc	ug/L	0.5	1.7	6.7	-	-	15	9	60	-	0.5	-	-	0.5	4.98	20	0	-
Dissolved Metals																		
Aluminum	ug/L	1	-	-	-	-	15	1	7	1.43	1.5	0.258	0.0667	1	2	-	-	-
Antimony	ug/L	0.02	-	-	-	-	15	15	100	-	-	-	-	-	0.02	-	-	-
Arsenic	ug/L	0.02	-	-	-	-	15	0	0	0.326	0.329	0.0226	0.00584	0.286	0.357	-	-	-
Barium	ug/L	0.02	-	-	-	-	15	0	0	7.72	7.76	0.213	0.0551	7.37	8.15	-	-	-
Beryllium	ug/L	0.005	-	-	-	-	15	15	100	-	-	-	-	-	0.005	-	-	-
Boron	ug/L	5	-	-	-	-	15	15	100	-	-	-	-	-	5	-	-	-
Cadmium	ug/L	0.005	-	-	-	-	15	15	100	-	-	-	-	-	0.005	-	-	-
Chromium	ug/L	0.1	-	-	-	-	15	15	100	-	-	-	-	-	0.1	-	-	-
Cobalt	ug/L	0.005	-	-	-	-	15	2	13	0.00635	0.006	0.00145	0.000375	0.005	0.0106	-	-	-
Copper	ug/L	0.05	0.861	-	0.858 | 4.39	1.14 | 5.85	15	0	0	0.731	0.737	0.0497	0.0128	0.639	0.797	0	-	0
Iron	ug/L	1	-	-	-	-	15	0	0	2.89	2.6	1.14	0.295	1.5	4.6	-	-	-
Lead	ug/L	0.01	0.0125	-	3.53 | 5.24	4.71 | 6.99	15	15	100	-	-	-	-	-	0.01	0	-	0
Lithium	ug/L	0.5	-	-	-	-	15	0	0	0.777	0.77	0.0456	0.0118	0.74	0.93	-	-	-
Manganese	ug/L	0.05	1.2	-	158 | 248	210 | 330	15	0	0	0.356	0.393	0.106	0.0274	0.19	0.472	0	-	0

Table C1-6. MEL-03 summary statistics for the 2022 open water sampling events (July, August, September)

Parameter	Units	DL (min | max)	Normal Range (min | max)	FEIS[a]	Action Level[b] (min | max)	AEMP Benchmark	MEL-03 (Reference Area 1) Open Water Sampling Events (July, August, September)											
							N	N<MDL	% <MDL	Mean	Median	SD	SE	Min	Max	% > NR	%> FEIS	% > Act Lvl
Mercury	ug/L	5e-04 | 0.005	-	-	-	-	15	15	100	-	-	-	-	-	0.005	-	-	-
Molybdenum	ug/L	0.05	-	-	-	-	15	0	0	0.0939	0.085	0.0299	0.00772	0.073	0.195	-	-	-
Nickel	ug/L	0.05	-	-	-	-	15	0	0	0.395	0.39	0.0323	0.00833	0.35	0.454	-	-	-
Selenium	ug/L	0.04	-	-	-	-	15	12	80	-	0.04	-	-	0.04	0.047	-	-	-
Silver	ug/L	0.005	-	-	-	-	15	15	100	-	-	-	-	-	0.005	-	-	-
Strontium	ug/L	0.02	-	-	1880	2500	15	0	0	41.6	41.1	3.77	0.972	38.3	53.7	-	-	0
Thallium	ug/L	0.005	-	-	-	-	15	15	100	-	-	-	-	-	0.005	-	-	-
Tin	ug/L	0.02	-	-	-	-	15	13	87	-	0.02	-	-	0.02	0.054	-	-	-
Titanium	ug/L	0.05	-	-	-	-	15	15	100	-	-	-	-	-	0.05	-	-	-
Uranium	ug/L	0.001	-	-	-	-	15	0	0	0.0165	0.0165	0.0017	0.000439	0.0134	0.0209	-	-	-
Vanadium	ug/L	0.05	-	-	-	-	15	14	93	-	0.05	-	-	0.05	0.137	-	-	-
Zinc	ug/L	0.5	1.9	-	4.4 | 8.77	5.86 | 11.7	15	12	80	-	0.5	-	-	0.5	0.8	0	-	0
Other																		
Cyanide (free)	mg/L	0.001	-	0.00035	-	-	15	15	100	-	-	-	-	-	0.001	-	100	-
Cyanide (Total)	mg/L	0.001	0.001	0.009	0.00375	0.005	15	15	100	-	-	-	-	-	0.001	0	0	0
Cyanide (WAD)	mg/L	0.001	-	-	-	-	15	15	100	-	-	-	-	-	0.001	-	-	-

Notes

[a] FEIS predictions for the edge of the mixing zone as presented in Agnico Eagle (2014).

[b] The AEMP Action Level is 75% of the AEMP Benchmark.

Orange shaded values indicate parameters where at least 1 sample > Normal Range.

Table C1-7. MEL-04 summary statistics for the August 2022 sampling event

Parameter	Units	DL (min | max)	Normal Range (min | max)	FEIS[a]	Action Level[b] (min | max)	AEMP Benchmark	MEL-04 Reference Area 2 Open Water Sampling Event (August)											
							N	N<MDL	% <MDL	Mean	Median	SD	SE	Min	Max	% > NR	%> FEIS	% > Act Lvl
Field Measurements																		
Temperature	C	-	-	-	-	-	5	0	0	15.5	15.5	0.0548	0.0245	15.4	15.5	-	-	-
Sp. Conductivity (field)	uS/cm	-	-	-	-	-	5	0	0	83.7	83.7	0.0548	0.0245	83.6	83.7	-	-	-
pH (field)	pH units	-	7.1 | 7.95	-	6.5 | 9.0	6.5 | 9.0	5	0	0	7.26	7.26	0.117	0.0522	7.07	7.36	20	-	0
DO (mg/L)	mg/L	-	-	-	6.5	6.5	5	0	0	10	10	0.228	0.102	9.79	10.3	-	-	0
DO (%)	%	-	-	-	-	-	5	0	0	100	100	2.12	0.947	98.1	103	-	-	-
Conventional Parameters																		
Conductivity (lab)	uS/cm	1	77.5	-	-	-	5	0	0	83.4	83.4	0.207	0.0927	83.1	83.6	100	-	-
Hardness	mg/L	0.2	23.4	-	-	-	5	0	0	24.4	24.4	0.167	0.0748	24.2	24.6	100	-	-
pH (lab)	pH units	0.1	-	-	6.5 | 9.0	6.5 | 9.0	5	0	0	7.6	7.6	0.00837	0.00374	7.59	7.61	-	-	0
Total Dissolved Solids	mg/L	13	54	68	375	500	5	0	0	43.6	44	3.05	1.36	40	47	0	0	0
Total Dissolved Solids (Calculated)	mg/L	1	39.6	68	375	500	5	0	0	40.5	40.2	1.02	0.458	39.8	42.3	100	0	0
Total Suspended Solids	mg/L	1	1	3.1	-	-	5	5	100	-	-	-	-	-	1	0	0	-
Turbidity (lab)	NTU	0.1	-	-	-	-	5	0	0	0.158	0.17	0.0363	0.0162	0.11	0.19	-	-	-
Major Ions																		
Alkalinity, Bicarbonate	mg/L	1.2	25	-	-	-	5	0	0	23.6	22.6	1.94	0.869	22.4	27	20	-	-
Alkalinity, Carbonate	mg/L	0.6	-	-	-	-	5	5	100	-	-	-	-	-	0.6	-	-	-
Alkalinity, Hydroxide	mg/L	0.34	-	-	-	-	5	5	100	-	-	-	-	-	0.34	-	-	-
Alkalinity, Total	mg/L	1	20.5	-	-	-	5	0	0	19.3	18.5	1.58	0.706	18.4	22.1	20	-	-
Bromide	mg/L	0.1	-	-	-	-	5	5	100	-	-	-	-	-	0.1	-	-	-
Calcium (D)	mg/L	0.01	-	-	-	-	5	0	0	7.66	7.65	0.0585	0.0262	7.58	7.74	-	-	-
Calcium (T)	mg/L	0.01	7.33	-	-	-	5	0	0	7.81	7.84	0.0687	0.0307	7.72	7.88	100	-	-
Chloride	mg/L	0.1	9.56	14	90	120	5	0	0	9.83	9.74	0.193	0.0865	9.63	10.1	100	0	0
Fluoride	mg/L	0.02	0.028	0.0084	2.1	2.8	5	0	0	0.027	0.027	0	0	0.027	0.027	0	100	0
Magnesium (D)	mg/L	0.004	-	-	-	-	5	0	0	1.29	1.29	0.0122	0.00548	1.28	1.31	-	-	-
Magnesium (T)	mg/L	0.004	1.18	-	-	-	5	0	0	1.26	1.26	0.0114	0.0051	1.25	1.28	100	-	-
Potassium (D)	mg/L	0.02	-	-	-	-	5	0	0	1.03	1.03	0.013	0.00583	1.02	1.05	-	-	-
Potassium (T)	mg/L	0.02	0.954	-	-	-	5	0	0	1.03	1.04	0.00894	0.004	1.02	1.04	100	-	-
Reactive Silica (SiO2)	mg/L	0.01	0.268	-	-	-	5	0	0	0.272	0.271	0.00577	0.00258	0.265	0.28	60	-	-
Sodium (D)	mg/L	0.02	-	-	-	-	5	0	0	5.27	5.29	0.0838	0.0375	5.15	5.38	-	-	-
Sodium (T)	mg/L	0.02	4.85	5.3	-	-	5	0	0	5.23	5.23	0.0416	0.0186	5.18	5.28	100	0	-
Sulphate	mg/L	0.3	3.87	38	-	-	5	0	0	3.82	3.82	0.0297	0.0133	3.78	3.86	0	0	-
Nutrients																		
Ammonia (as N)	mg/L	0.005	0.0174	0.54	0.95	1.27	5	5	100	-	-	-	-	-	0.005	0	0	0
Nitrate (as N)	mg/L	0.005	0.018	0.25	2.17	2.9	5	5	100	-	-	-	-	-	0.005	0	0	0
Nitrate + Nitrite (as N)	mg/L	0.0051	-	-	-	-	5	5	100	-	-	-	-	-	0.0051	-	-	-
Nitrite (as N)	mg/L	0.001	0.001	0.051	0.045	0.06	5	5	100	-	-	-	-	-	0.001	0	0	0
Nitrogen	mg/L	0.0051 | 0.05	-	-	-	-	5	0	0	0.181	0.18	0.0068	0.00304	0.173	0.188	-	-	-
Orthophosphate (PO4-P)	mg/L	0.001	0.001	-	-	-	5	5	100	-	-	-	-	-	0.001	0	-	-
Total Diss Phosphorus	mg/L	0.001 | 0.003	0.00314	-	-	-	5	1	20	0.00148	0.0016	0.000342	0.000153	0.001	0.0019	0	-	-
Total Dissolved Nitrogen	mg/L	0.05	-	-	-	-	5	0	0	0.164	0.164	0.00688	0.00308	0.156	0.174	-	-	-
Total Kjeldahl Nitrogen	mg/L	0.05	0.25	-	-	-	5	0	0	0.181	0.18	0.0068	0.00304	0.173	0.188	0	-	-
Total Kjeldahl Nitrogen (diss)	mg/L	0.05	-	-	-	-	5	0	0	0.164	0.164	0.00688	0.00308	0.156	0.174	-	-	-
Total Phosphorus	mg/L	0.001 | 0.003	0.006	0.0049	-	-	5	0	0	0.00404	0.0039	0.000602	0.000269	0.0035	0.005	0	20	-

Table C1-7. MEL-04 summary statistics for the August 2022 sampling event

Parameter	Units	DL (min | max)	Normal Range (min | max)	FEIS[a]	Action Level[b] (min | max)	AEMP Benchmark	MEL-04 Reference Area 2 Open Water Sampling Event (August)											
							N	N<MDL	% <MDL	Mean	Median	SD	SE	Min	Max	% > NR	%> FEIS	% > Act Lvl
Organic/Inorganic Carbon																		
Dissolved Organic Carbon	mg/L	0.5	2.72	-	-	-	5	0	0	2.62	2.62	0.0943	0.0422	2.53	2.75	20	-	-
Total Organic Carbon	mg/L	0.5	3	-	-	-	5	0	0	2.59	2.55	0.143	0.0638	2.46	2.81	0	-	-
Total Metals																		
Aluminum	ug/L	1	5.32	9.1	75	100	5	0	0	2.3	2	0.579	0.259	1.9	3.3	0	0	0
Antimony	ug/L	0.02	0.02	0.51	4.5	6	5	5	100	-	-	-	-	-	0.02	0	0	0
Arsenic	ug/L	0.02	0.275	3.8	18.8	25	5	0	0	0.312	0.316	0.00887	0.00397	0.3	0.321	100	0	0
Barium	ug/L	0.02	8.05	77	750	1000	5	0	0	7.81	7.83	0.0691	0.0309	7.73	7.88	0	0	0
Beryllium	ug/L	0.005	0.005	-	-	-	5	5	100	-	-	-	-	-	0.005	0	-	-
Boron	ug/L	5	6.52	23	1120	1500	5	5	100	-	-	-	-	-	5	0	0	0
Cadmium	ug/L	0.005	0.005	0.05	0.0352 | 0.0487	0.047 | 0.0649	5	5	100	-	-	-	-	-	0.005	0	0	0
Chromium	ug/L	0.1	0.103	1.1	3.75	5	5	4	80	-	0.1	-	-	0.1	0.11	20	0	0
Cobalt	ug/L	0.005	0.016	-	0.585	0.78	5	0	0	0.0097	0.0097	0.00109	0.000487	0.0086	0.0113	0	-	0
Copper	ug/L	0.05	0.86	2	1500	2000	5	0	0	0.753	0.737	0.0475	0.0212	0.71	0.821	0	0	0
Iron	ug/L	1	15	42	795	1060	5	0	0	8.4	6.8	3.51	1.57	6.4	14.6	0	0	0
Lead	ug/L	0.01	0.0222	0.15	3.75	5	5	3	60	-	0.01	-	-	0.01	0.02	0	0	0
Lithium	ug/L	0.5	0.72	-	-	-	5	0	0	0.818	0.82	0.011	0.0049	0.8	0.83	100	-	-
Manganese	ug/L	0.05	3.06	5.5	90	120	5	0	0	2.2	2.17	0.074	0.0331	2.16	2.33	0	0	0
Mercury	ug/L	5e-04 | 0.005	0.0008	0.02	0.0195	0.026	5	5	100	-	-	-	-	-	0.005	100	0	0
Molybdenum	ug/L	0.05	0.107	5.2	54.8	73	5	0	0	0.141	0.158	0.063	0.0282	0.076	0.216	60	0	0
Nickel	ug/L	0.05	0.441	2.7	18.8	25	5	0	0	0.432	0.435	0.0125	0.00559	0.416	0.447	20	0	0
Selenium	ug/L	0.04	0.049	0.16	0.75	1	5	3	60	-	0.04	-	-	0.04	0.043	0	0	0
Silver	ug/L	0.005	0.005	0.1	0.188	0.25	5	5	100	-	-	-	-	-	0.005	0	0	0
Strontium	ug/L	0.02	36.1	-	1880	2500	5	0	0	39.4	39	0.656	0.293	38.9	40.3	100	-	0
Thallium	ug/L	0.005	0.005	0.1	0.6	0.8	5	5	100	-	-	-	-	-	0.005	0	0	0
Tin	ug/L	0.02	0.0384	-	-	-	5	5	100	-	-	-	-	-	0.02	0	-	-
Titanium	ug/L	0.05	0.17	-	-	-	5	4	80	-	0.05	-	-	0.05	0.066	0	-	-
Uranium	ug/L	0.001	0.0164	1.5	11.2	15	5	0	0	0.0161	0.016	0.000563	0.000252	0.0154	0.0167	40	0	0
Vanadium	ug/L	0.05	0.05	-	-	-	5	5	100	-	-	-	-	-	0.05	0	-	0
Zinc	ug/L	0.5	1.7	6.7	-	-	5	4	80	-	0.5	-	-	0.5	1.57	0	0	-
Dissolved Metals																		
Aluminum	ug/L	1	-	-	-	-	5	2	40	1.06	1	0.0894	0.04	1	1.2	-	-	-
Antimony	ug/L	0.02	-	-	-	-	5	5	100	-	-	-	-	-	0.02	-	-	-
Arsenic	ug/L	0.02	-	-	-	-	5	0	0	0.308	0.309	0.00476	0.00213	0.3	0.312	-	-	-
Barium	ug/L	0.02	-	-	-	-	5	0	0	7.54	7.53	0.0672	0.0301	7.47	7.65	-	-	-
Beryllium	ug/L	0.005	-	-	-	-	5	5	100	-	-	-	-	-	0.005	-	-	-
Boron	ug/L	5	-	-	-	-	5	5	100	-	-	-	-	-	5	-	-	-
Cadmium	ug/L	0.005	-	-	-	-	5	5	100	-	-	-	-	-	0.005	-	-	-
Chromium	ug/L	0.1	-	-	-	-	5	5	100	-	-	-	-	-	0.1	-	-	-
Cobalt	ug/L	0.005	-	-	-	-	5	2	40	0.00546	0.0055	0.000456	2.04E-04	0.005	0.006	-	-	-
Copper	ug/L	0.05	0.861	-	0.858 | 4.39	1.14 | 5.85	5	0	0	0.731	0.731	0.0167	0.00747	0.708	0.752	0	-	0
Iron	ug/L	1	-	-	-	-	5	0	0	2.4	2.4	0.141	0.0632	2.2	2.6	-	-	-
Lead	ug/L	0.01	0.0125	-	3.53 | 5.24	4.71 | 6.99	5	5	100	-	-	-	-	-	0.01	0	-	0
Lithium	ug/L	0.5	-	-	-	-	5	0	0	0.756	0.76	0.0114	0.0051	0.74	0.77	-	-	-
Manganese	ug/L	0.05	1.2	-	158 | 248	210 | 330	5	0	0	0.175	0.167	0.0171	0.00764	0.161	0.203	0	-	0

Table C1-7. MEL-04 summary statistics for the August 2022 sampling event

Parameter	Units	DL (min | max)	Normal Range (min | max)	FEIS[a]	Action Level[b] (min | max)	AEMP Benchmark	MEL-04 Reference Area 2 Open Water Sampling Event (August)										
							N	N<MDL	% <MDL	Mean	Median	SD	SE	Min	Max	% > NR	%> FEIS	% > Act Lvl
Mercury	ug/L	5e-04 | 0.005	-	-	-	-	5	5	100	-	-	-	-	-	0.005	-	-	-
Molybdenum	ug/L	0.05	-	-	-	-	5	0	0	0.117	0.091	0.0499	0.0223	0.083	0.201	-	-	-
Nickel	ug/L	0.05	-	-	-	-	5	0	0	0.374	0.374	0.00798	0.00357	0.364	0.385	-	-	-
Selenium	ug/L	0.04	-	-	-	-	5	4	80	-	0.04	-	-	0.04	0.045	-	-	-
Silver	ug/L	0.005	-	-	-	-	5	5	100	-	-	-	-	-	0.005	-	-	-
Strontium	ug/L	0.02	-	-	1880	2500	5	0	0	40.8	40.6	0.427	0.191	40.4	41.5	-	-	0
Thallium	ug/L	0.005	-	-	-	-	5	5	100	-	-	-	-	-	0.005	-	-	-
Tin	ug/L	0.02	-	-	-	-	5	5	100	-	-	-	-	-	0.02	-	-	-
Titanium	ug/L	0.05	-	-	-	-	5	5	100	-	-	-	-	-	0.05	-	-	-
Uranium	ug/L	0.001	-	-	-	-	5	0	0	0.0158	0.0158	0.000555	0.000248	0.0151	0.0163	-	-	-
Vanadium	ug/L	0.05	-	-	-	-	5	5	100	-	-	-	-	-	0.05	-	-	-
Zinc	ug/L	0.5	1.9	-	4.4 | 8.77	5.86 | 11.7	5	3	60	-	0.5	-	-	0.5	0.62	0	-	0
Other																		
Cyanide (free)	mg/L	0.001	-	0.00035	-	-	5	5	100	-	-	-	-	-	0.001	-	100	-
Cyanide (Total)	mg/L	0.001	0.001	0.009	0.00375	0.005	5	5	100	-	-	-	-	-	0.001	0	0	0
Cyanide (WAD)	mg/L	0.001	-	-	-	-	5	5	100	-	-	-	-	-	0.001	-	-	-

Notes

[a] FEIS predictions for the edge of the mixing zone as presented in Agnico Eagle (2014).

[b] The AEMP Action Level is 75% of the AEMP Benchmark.

Orange shaded values indicate parameters where at least 1 sample > Normal Range.

Table C1-8. MEL-05 summary statistics for the August 2022 sampling event

Parameter	Units	DL (min | max)	Normal Range (min | max)	FEIS[a]	Action Level[b] (min | max)	AEMP Benchmark	MEL-05 Reference Area 3 Open Water Sampling Event (August)											
							N	N<MDL	% <MDL	Mean	Median	SD	SE	Min	Max	% > NR	%> FEIS	% > Act Lvl
Field Measurements																		
Temperature	C	-	-	-	-	-	5	0	0	14.7	14.7	0.0559	0.025	14.6	14.7	-	-	-
Sp. Conductivity (field)	uS/cm	-	-	-	-	-	5	0	0	118	118	0.397	0.178	118	119	-	-	-
pH (field)	pH units	-	7.1 | 7.95	-	6.5 | 9.0	6.5 | 9.0	5	0	0	7.58	7.58	0.0217	0.0097	7.55	7.61	0	-	0
DO (mg/L)	mg/L	-	-	-	6.5	6.5	5	0	0	10.4	10.4	0.0888	0.0397	10.3	10.5	-	-	0
DO (%)	%	-	-	-	-	-	5	0	0	104	104	0.924	0.413	103	105	-	-	-
Conventional Parameters																		
Conductivity (lab)	uS/cm	1	77.5	-	-	-	5	0	0	85	86	1.59	0.713	82.8	86.2	100	-	-
Hardness	mg/L	0.2	23.4	-	-	-	5	0	0	25.5	25.6	0.303	0.136	25	25.8	100	-	-
pH (lab)	pH units	0.1	-	-	6.5 | 9.0	6.5 | 9.0	5	0	0	7.54	7.6	0.126	0.0564	7.38	7.65	-	-	0
Total Dissolved Solids	mg/L	13	54	68	375	500	5	0	0	48.8	50	4.09	1.83	42	53	0	0	0
Total Dissolved Solids (Calculated)	mg/L	1	39.6	68	375	500	5	0	0	41.8	41.4	0.792	0.354	41	42.9	100	0	0
Total Suspended Solids	mg/L	1	1	3.1	-	-	5	5	100	-	-	-	-	-	1	0	0	-
Turbidity (lab)	NTU	0.1	-	-	-	-	5	0	0	0.356	0.35	0.0709	0.0317	0.26	0.43	-	-	-
Major Ions																		
Alkalinity, Bicarbonate	mg/L	1.2	25	-	-	-	5	0	0	24.8	24.2	1.45	0.647	23.4	26.7	40	-	-
Alkalinity, Carbonate	mg/L	0.6	-	-	-	-	5	5	100	-	-	-	-	-	0.6	-	-	-
Alkalinity, Hydroxide	mg/L	0.34	-	-	-	-	5	5	100	-	-	-	-	-	0.34	-	-	-
Alkalinity, Total	mg/L	1	20.5	-	-	-	5	0	0	20.3	19.8	1.19	0.532	19.2	21.9	40	-	-
Bromide	mg/L	0.1	-	-	-	-	5	5	100	-	-	-	-	-	0.1	-	-	-
Calcium (D)	mg/L	0.01	-	-	-	-	5	0	0	8.04	8.08	0.119	0.0532	7.85	8.16	-	-	-
Calcium (T)	mg/L	0.01	7.33	-	-	-	5	0	0	8.28	8.28	0.0573	0.0256	8.21	8.37	100	-	-
Chloride	mg/L	0.1	9.56	14	90	120	5	0	0	10	10	0	0	10	10	100	0	0
Fluoride	mg/L	0.02	0.028	0.0084	2.1	2.8	5	0	0	0.0272	0.028	0.0011	0.00049	0.026	0.028	0	100	0
Magnesium (D)	mg/L	0.004	-	-	-	-	5	0	0	1.31	1.31	0.00837	0.00374	1.3	1.32	-	-	-
Magnesium (T)	mg/L	0.004	1.18	-	-	-	5	0	0	1.31	1.31	0.00837	0.00374	1.3	1.32	100	-	-
Potassium (D)	mg/L	0.02	-	-	-	-	5	0	0	0.985	0.987	0.00672	0.00301	0.974	0.991	-	-	-
Potassium (T)	mg/L	0.02	0.954	-	-	-	5	0	0	1	0.997	0.0111	0.00496	0.992	1.02	100	-	-
Reactive Silica (SiO2)	mg/L	0.01	0.268	-	-	-	5	0	0	0.338	0.34	0.00455	2.03E-03	0.332	0.343	100	-	-
Sodium (D)	mg/L	0.02	-	-	-	-	5	0	0	5.18	5.18	0.106	0.0474	5.04	5.31	-	-	-
Sodium (T)	mg/L	0.02	4.85	5.3	-	-	5	0	0	5.18	5.15	0.0554	0.0248	5.14	5.27	100	0	-
Sulphate	mg/L	0.3	3.87	38	-	-	5	0	0	4.03	4.03	0.00837	0.00374	4.02	4.04	100	0	-
Nutrients																		
Ammonia (as N)	mg/L	0.005	0.0174	0.54	0.95	1.27	5	4	80	-	0.005	-	-	0.005	0.005	0	0	0
Nitrate (as N)	mg/L	0.005	0.018	0.25	2.17	2.9	5	5	100	-	-	-	-	-	0.005	0	0	0
Nitrate + Nitrite (as N)	mg/L	0.0051	-	-	-	-	5	5	100	-	-	-	-	-	0.0051	-	-	-
Nitrite (as N)	mg/L	0.001	0.001	0.051	0.045	0.06	5	5	100	-	-	-	-	-	0.001	0	0	0
Nitrogen	mg/L	0.0051 | 0.05	-	-	-	-	5	0	0	0.199	0.193	0.0162	0.00723	0.187	0.226	-	-	-
Orthophosphate (PO4-P)	mg/L	0.001	0.001	-	-	-	5	5	100	-	-	-	-	-	0.001	0	-	-
Total Diss Phosphorus	mg/L	0.001 | 0.003	0.00314	-	-	-	5	3	60	-	0.001	-	-	0.001	0.0043	20	-	-
Total Dissolved Nitrogen	mg/L	0.05	-	-	-	-	5	0	0	0.183	0.19	0.0282	0.0126	0.141	0.216	-	-	-
Total Kjeldahl Nitrogen	mg/L	0.05	0.25	-	-	-	5	0	0	0.199	0.193	0.0162	0.00723	0.187	0.226	0	-	-
Total Kjeldahl Nitrogen (diss)	mg/L	0.05	-	-	-	-	5	0	0	0.183	0.19	0.0282	0.0126	0.141	0.216	-	-	-
Total Phosphorus	mg/L	0.001 | 0.003	0.006	0.0049	-	-	5	0	0	0.00306	0.0031	0.000586	0.000262	0.0022	0.0038	0	0	-

Table C1-8. MEL-05 summary statistics for the August 2022 sampling event

Parameter	Units	DL (min | max)	Normal Range (min | max)	FEIS[a]	Action Level[b] (min | max)	AEMP Benchmark	MEL-05 Reference Area 3 Open Water Sampling Event (August)											
							N	N<MDL	% <MDL	Mean	Median	SD	SE	Min	Max	% > NR	%> FEIS	% > Act Lvl
Organic/Inorganic Carbon																		
Dissolved Organic Carbon	mg/L	0.5	2.72	-	-	-	5	0	0	3.23	3.22	0.187	0.0836	2.97	3.46	100	-	-
Total Organic Carbon	mg/L	0.5	3	-	-	-	5	0	0	3.08	3.11	0.0817	0.0365	2.94	3.14	80	-	-
Total Metals																		
Aluminum	ug/L	1	5.32	9.1	75	100	5	0	0	2.12	2	0.268	0.12	1.9	2.5	0	0	0
Antimony	ug/L	0.02	0.02	0.51	4.5	6	5	5	100	-	-	-	-	-	0.02	0	0	0
Arsenic	ug/L	0.02	0.275	3.8	18.8	25	5	0	0	0.417	0.415	0.00572	0.00256	0.41	0.424	100	0	0
Barium	ug/L	0.02	8.05	77	750	1000	5	0	0	8.08	8.1	0.125	0.0558	7.93	8.23	60	0	0
Beryllium	ug/L	0.005	0.005	-	-	-	5	5	100	-	-	-	-	-	0.005	0	-	-
Boron	ug/L	5	6.52	23	1120	1500	5	0	0	5.08	5	0.11	0.049	5	5.2	0	0	0
Cadmium	ug/L	0.005	0.005	0.05	0.0352 | 0.0487	0.047 | 0.0649	5	5	100	-	-	-	-	-	0.005	0	0	0
Chromium	ug/L	0.1	0.103	1.1	3.75	5	5	5	100	-	-	-	-	-	0.1	0	0	0
Cobalt	ug/L	0.005	0.016	-	0.585	0.78	5	0	0	0.0111	0.0111	0.00128	5.73E-04	0.0099	0.0128	0	-	0
Copper	ug/L	0.05	0.86	2	1500	2000	5	0	0	0.778	0.781	0.00932	0.00417	0.763	0.786	0	0	0
Iron	ug/L	1	15	42	795	1060	5	0	0	10.3	10.5	0.404	0.181	9.7	10.7	0	0	0
Lead	ug/L	0.01	0.0222	0.15	3.75	5	5	5	100	-	-	-	-	-	0.01	0	0	0
Lithium	ug/L	0.5	0.72	-	-	-	5	0	0	0.916	0.91	0.0182	0.00812	0.9	0.94	100	-	-
Manganese	ug/L	0.05	3.06	5.5	90	120	5	0	0	2.89	2.89	0.0512	0.0229	2.82	2.95	0	0	0
Mercury	ug/L	5e-04 | 0.005	0.0008	0.02	0.0195	0.026	5	5	100	-	-	-	-	-	0.005	100	0	0
Molybdenum	ug/L	0.05	0.107	5.2	54.8	73	5	0	0	0.101	0.099	0.0091	0.00407	0.095	0.117	20	0	0
Nickel	ug/L	0.05	0.441	2.7	18.8	25	5	0	0	0.404	0.403	0.0135	0.00604	0.39	0.426	0	0	0
Selenium	ug/L	0.04	0.049	0.16	0.75	1	5	2	40	0.0468	0.046	0.0082	0.00367	0.04	0.06	20	0	0
Silver	ug/L	0.005	0.005	0.1	0.188	0.25	5	5	100	-	-	-	-	-	0.005	0	0	0
Strontium	ug/L	0.02	36.1	-	1880	2500	5	0	0	42.2	42	0.566	0.253	41.7	42.9	100	-	0
Thallium	ug/L	0.005	0.005	0.1	0.6	0.8	5	5	100	-	-	-	-	-	0.005	0	0	0
Tin	ug/L	0.02	0.0384	-	-	-	5	5	100	-	-	-	-	-	0.02	0	-	-
Titanium	ug/L	0.05	0.17	-	-	-	5	5	100	-	-	-	-	-	0.05	0	-	-
Uranium	ug/L	0.001	0.0164	1.5	11.2	15	5	0	0	0.0189	0.0188	0.0012	0.000539	0.0172	0.0201	100	0	0
Vanadium	ug/L	0.05	0.05	-	-	-	5	5	100	-	-	-	-	-	0.05	0	-	0
Zinc	ug/L	0.5	1.7	6.7	-	-	5	5	100	-	-	-	-	-	0.5	0	0	-
Dissolved Metals																		
Aluminum	ug/L	1	-	-	-	-	5	0	0	1.28	1.3	0.205	0.0917	1.1	1.6	-	-	-
Antimony	ug/L	0.02	-	-	-	-	5	5	100	-	-	-	-	-	0.02	-	-	-
Arsenic	ug/L	0.02	-	-	-	-	5	0	0	0.405	0.403	0.0177	0.00793	0.388	0.429	-	-	-
Barium	ug/L	0.02	-	-	-	-	5	0	0	7.91	7.88	0.0589	0.0263	7.86	7.99	-	-	-
Beryllium	ug/L	0.005	-	-	-	-	5	5	100	-	-	-	-	-	0.005	-	-	-
Boron	ug/L	5	-	-	-	-	5	4	80	-	5	-	-	5	5	-	-	-
Cadmium	ug/L	0.005	-	-	-	-	5	5	100	-	-	-	-	-	0.005	-	-	-
Chromium	ug/L	0.1	-	-	-	-	5	5	100	-	-	-	-	-	0.1	-	-	-
Cobalt	ug/L	0.005	-	-	-	-	5	0	0	0.0057	0.0056	0.000374	0.000167	0.0054	0.0063	-	-	-
Copper	ug/L	0.05	0.861	-	0.858 | 4.39	1.14 | 5.85	5	0	0	0.757	0.76	0.00497	0.00222	0.749	0.761	0	-	0
Iron	ug/L	1	-	-	-	-	5	0	0	3.94	4.1	0.23	0.103	3.6	4.1	-	-	-
Lead	ug/L	0.01	0.0125	-	3.53 | 5.24	4.71 | 6.99	5	5	100	-	-	-	-	-	0.01	0	-	0
Lithium	ug/L	0.5	-	-	-	-	5	0	0	0.88	0.88	0.00707	0.00316	0.87	0.89	-	-	-
Manganese	ug/L	0.05	1.2	-	158 | 248	210 | 330	5	0	0	0.371	0.368	0.0428	0.0192	0.322	0.437	0	-	0

Table C1-8. MEL-05 summary statistics for the August 2022 sampling event

Parameter	Units	DL (min | max)	Normal Range (min | max)	FEIS[a]	Action Level[b] (min | max)	AEMP Benchmark	MEL-05 Reference Area 3 Open Water Sampling Event (August)										
							N	N<MDL	% <MDL	Mean	Median	SD	SE	Min	Max	% > NR	%> FEIS	% > Act Lvl
Mercury	ug/L	5e-04 | 0.005	-	-	-	-	5	5	100	-	-	-	-	-	0.005	-	-	-
Molybdenum	ug/L	0.05	-	-	-	-	5	0	0	0.165	0.092	0.162	0.0723	0.088	0.454	-	-	-
Nickel	ug/L	0.05	-	-	-	-	5	0	0	0.379	0.378	0.00507	0.00227	0.375	0.388	-	-	-
Selenium	ug/L	0.04	-	-	-	-	5	3	60	-	0.04	-	-	0.04	0.046	-	-	-
Silver	ug/L	0.005	-	-	-	-	5	5	100	-	-	-	-	-	0.005	-	-	-
Strontium	ug/L	0.02	-	-	1880	2500	5	0	0	41.6	41.7	0.672	0.301	40.7	42.5	-	-	0
Thallium	ug/L	0.005	-	-	-	-	5	5	100	-	-	-	-	-	0.005	-	-	-
Tin	ug/L	0.02	-	-	-	-	5	5	100	-	-	-	-	-	0.02	-	-	-
Titanium	ug/L	0.05	-	-	-	-	5	5	100	-	-	-	-	-	0.05	-	-	-
Uranium	ug/L	0.001	-	-	-	-	5	0	0	0.018	0.0183	0.000518	0.000232	0.0173	0.0184	-	-	-
Vanadium	ug/L	0.05	-	-	-	-	5	5	100	-	-	-	-	-	0.05	-	-	-
Zinc	ug/L	0.5	1.9	-	4.4 | 8.77	5.86 | 11.7	5	2	40	0.574	0.54	0.0853	0.0382	0.5	0.68	0	-	0
Other																		
Cyanide (free)	mg/L	0.001	-	0.00035	-	-	5	5	100	-	-	-	-	-	0.001	-	100	-
Cyanide (Total)	mg/L	0.001	0.001	0.009	0.00375	0.005	5	5	100	-	-	-	-	-	0.001	0	0	0
Cyanide (WAD)	mg/L	0.001	-	-	-	-	5	5	100	-	-	-	-	-	0.001	-	-	-

Notes

[a] FEIS predictions for the edge of the mixing zone as presented in Agnico Eagle (2014).

[b] The AEMP Action Level is 75% of the AEMP Benchmark.

Orange shaded values indicate parameters where at least 1 sample > Normal Range.

Appendix C2
Meliadine Lake Water Quality – Supplemental Figures

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Figure C2-38. Total lead (µg/L) 38
Figure C2-39. Total lithium (µg/L) 39
Figure C2-40. Total manganese (µg/L) 40
Figure C2-41. Total mercury (µg/L) 41
Figure C2-42. Total molybdenum (µg/L) 42
Figure C2-43. Total nickel (µg/L) 43
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Figure C2-55. Dissolved manganese (µg/L) 55
Figure C2-56. Dissolved zinc (µg/L) 56

Figure C2-1. Specific conductivity (µS/cm)

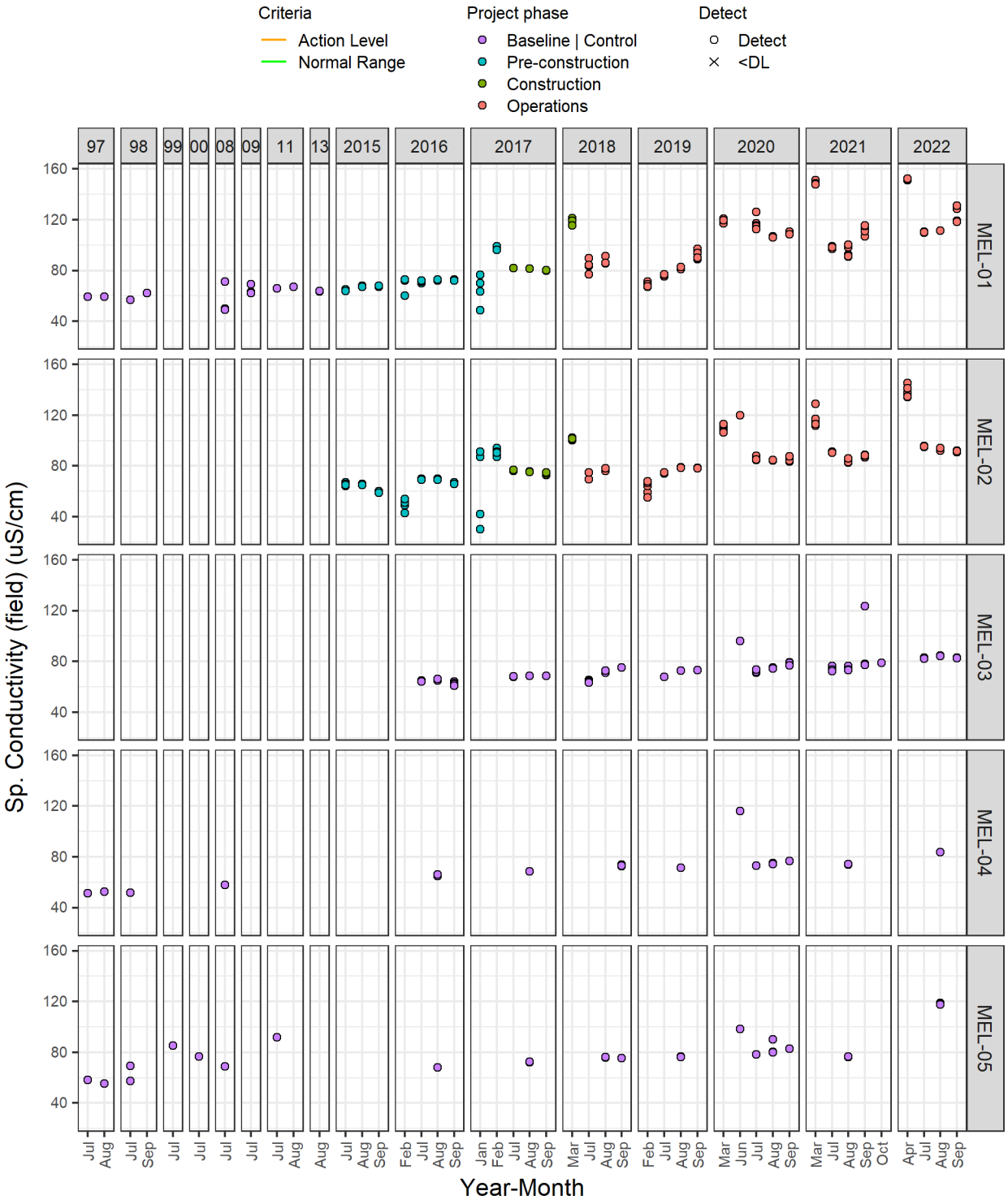


Figure C2-2. Lab-measured conductivity (µS/cm)

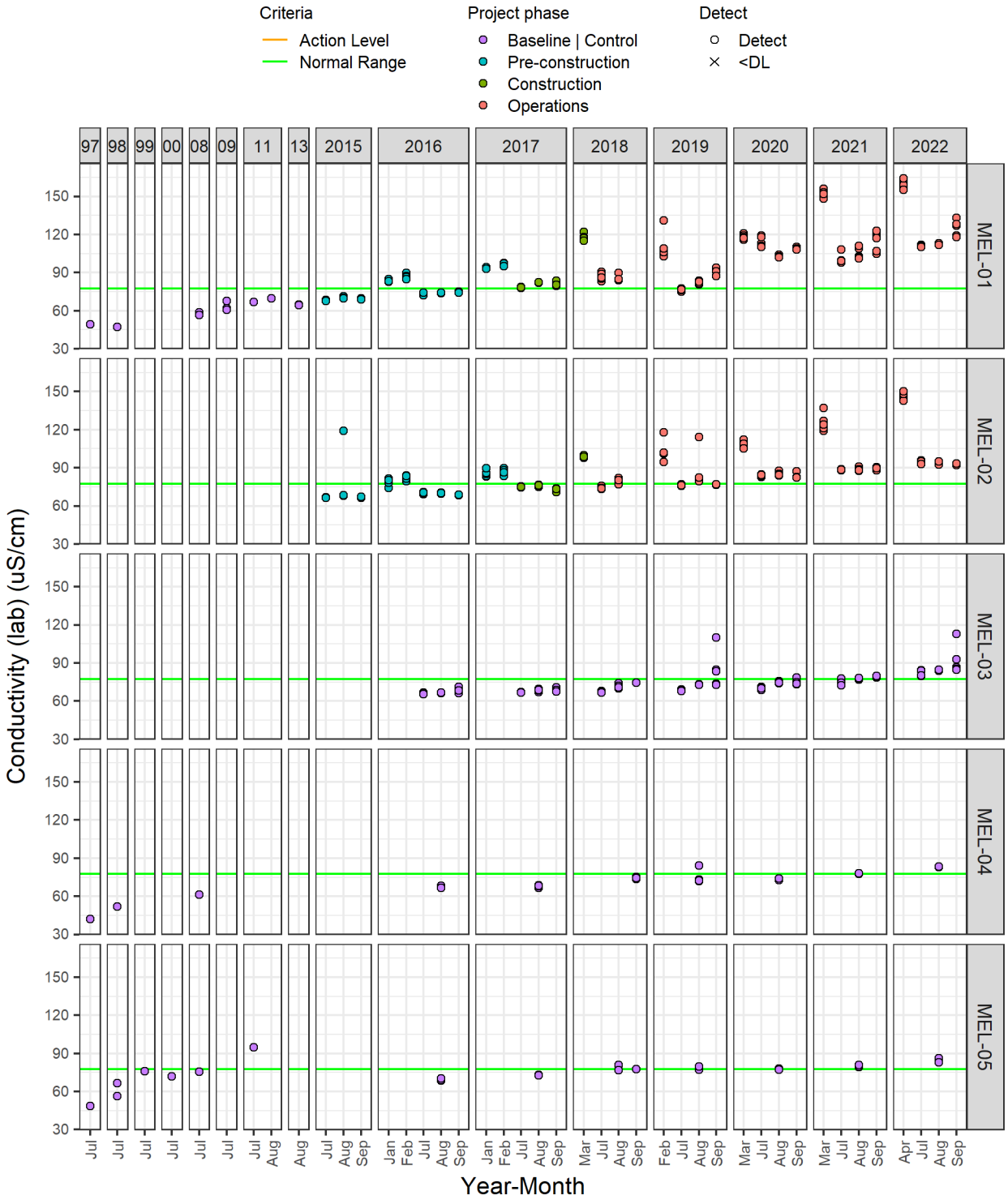


Figure C2-3. Field pH

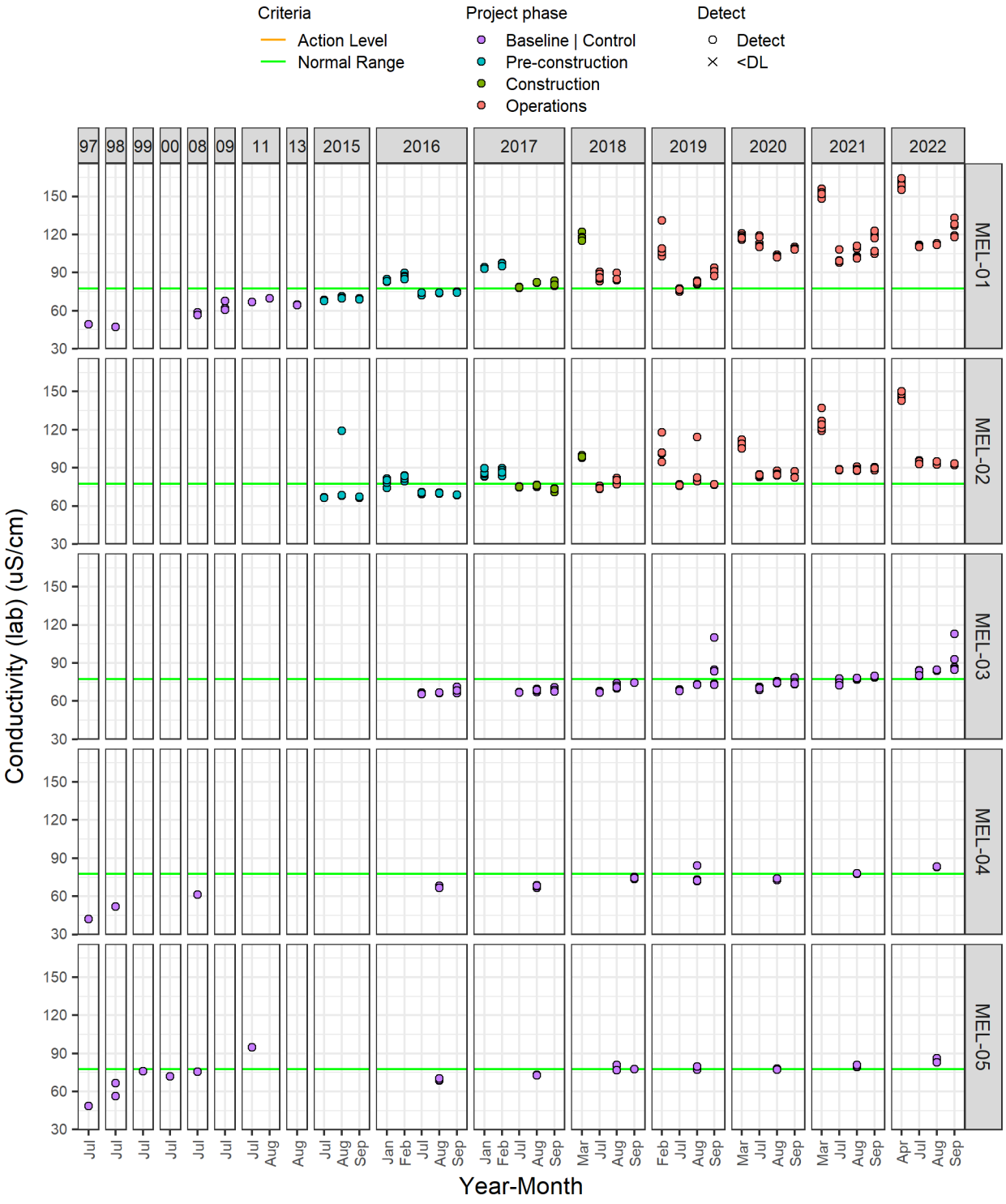


Figure C2-4. Lab measured pH

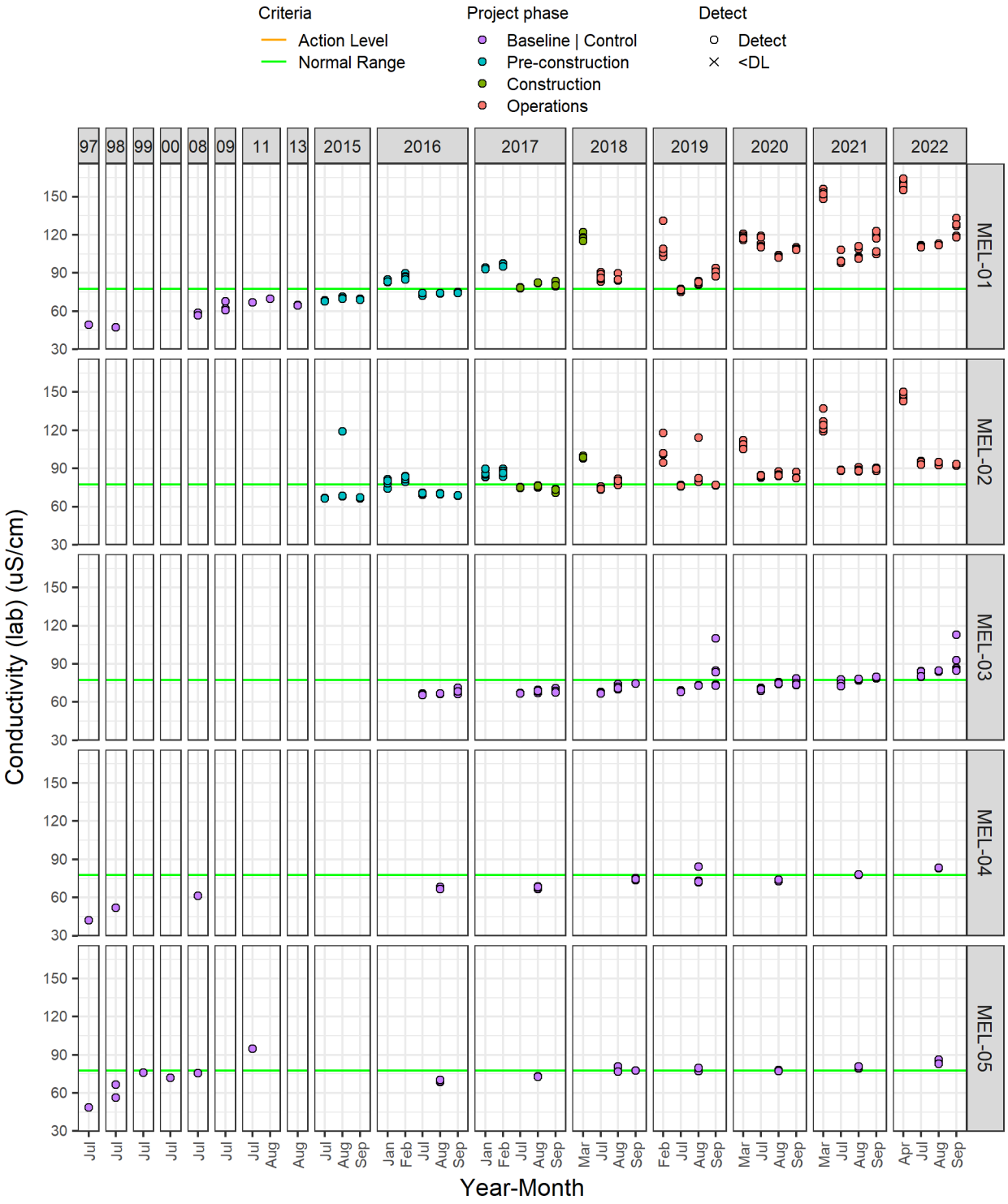


Figure C2-5. Hardness (mg/L)

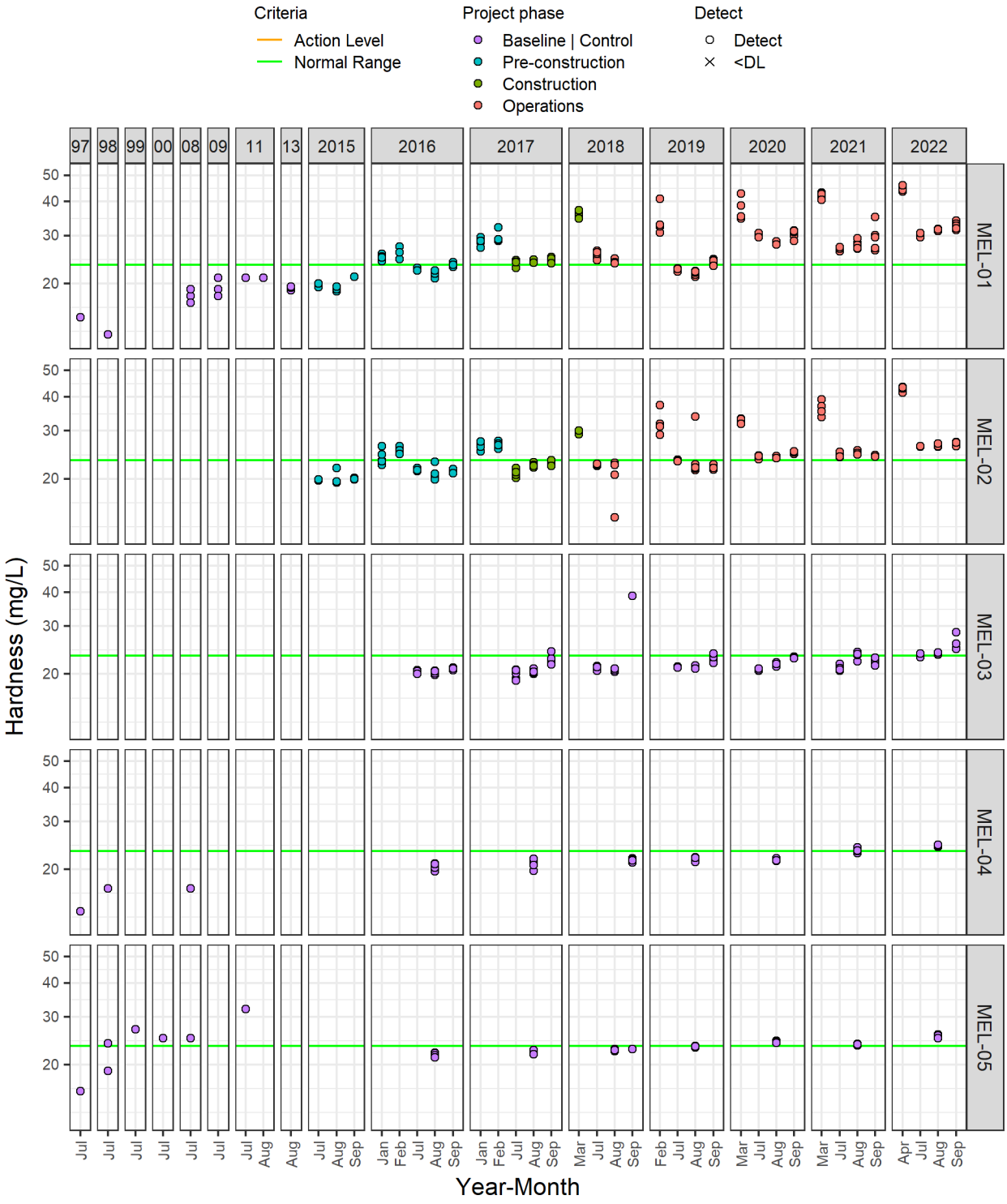


Figure C2-6. Total dissolved solids (measured; mg/L)

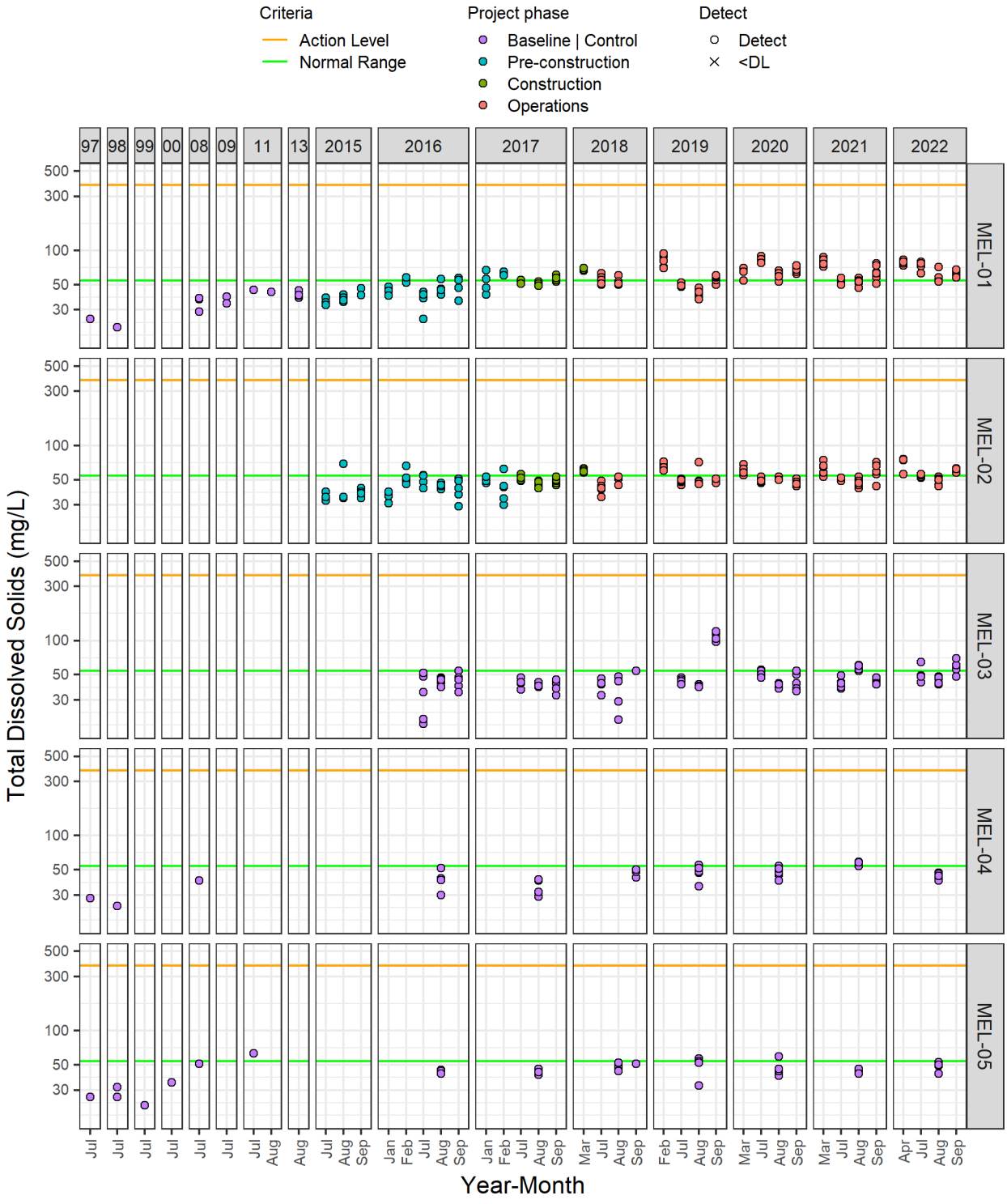


Figure C2-7. Total dissolved solids (calculated; mg/L)

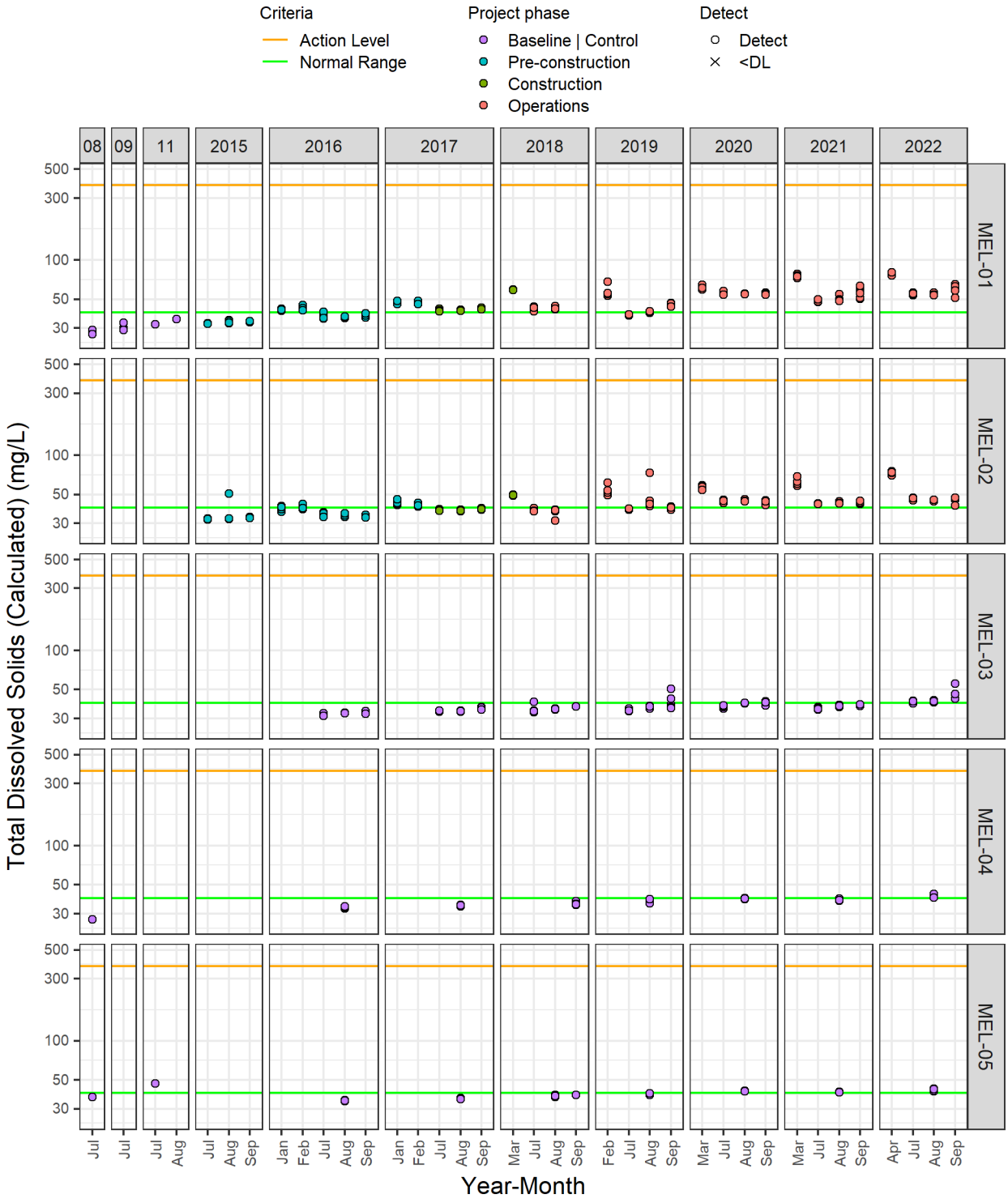


Figure C2-8. Total suspended solids (mg/L)

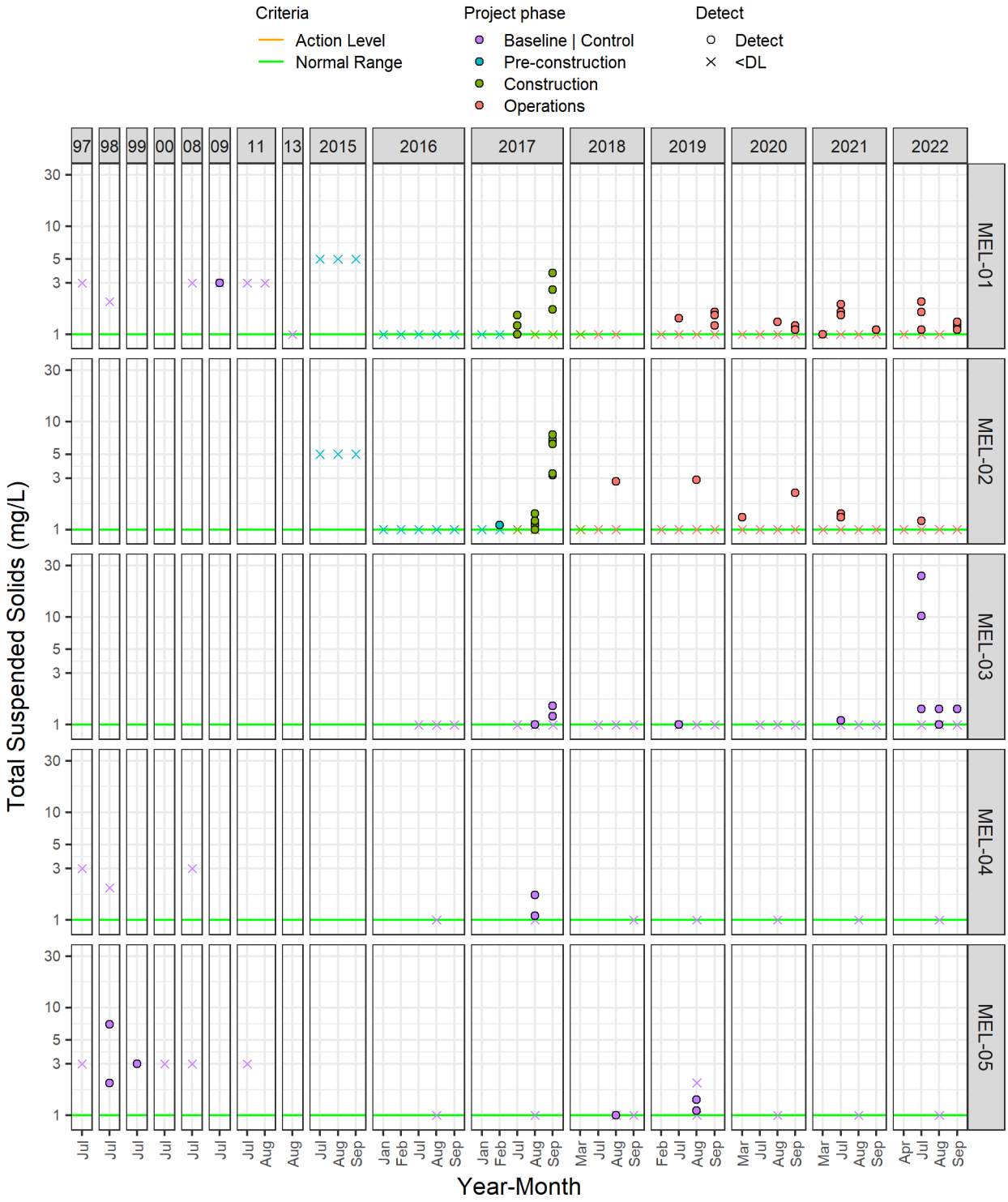


Figure C2-9. Lab measured turbidity (NTU)

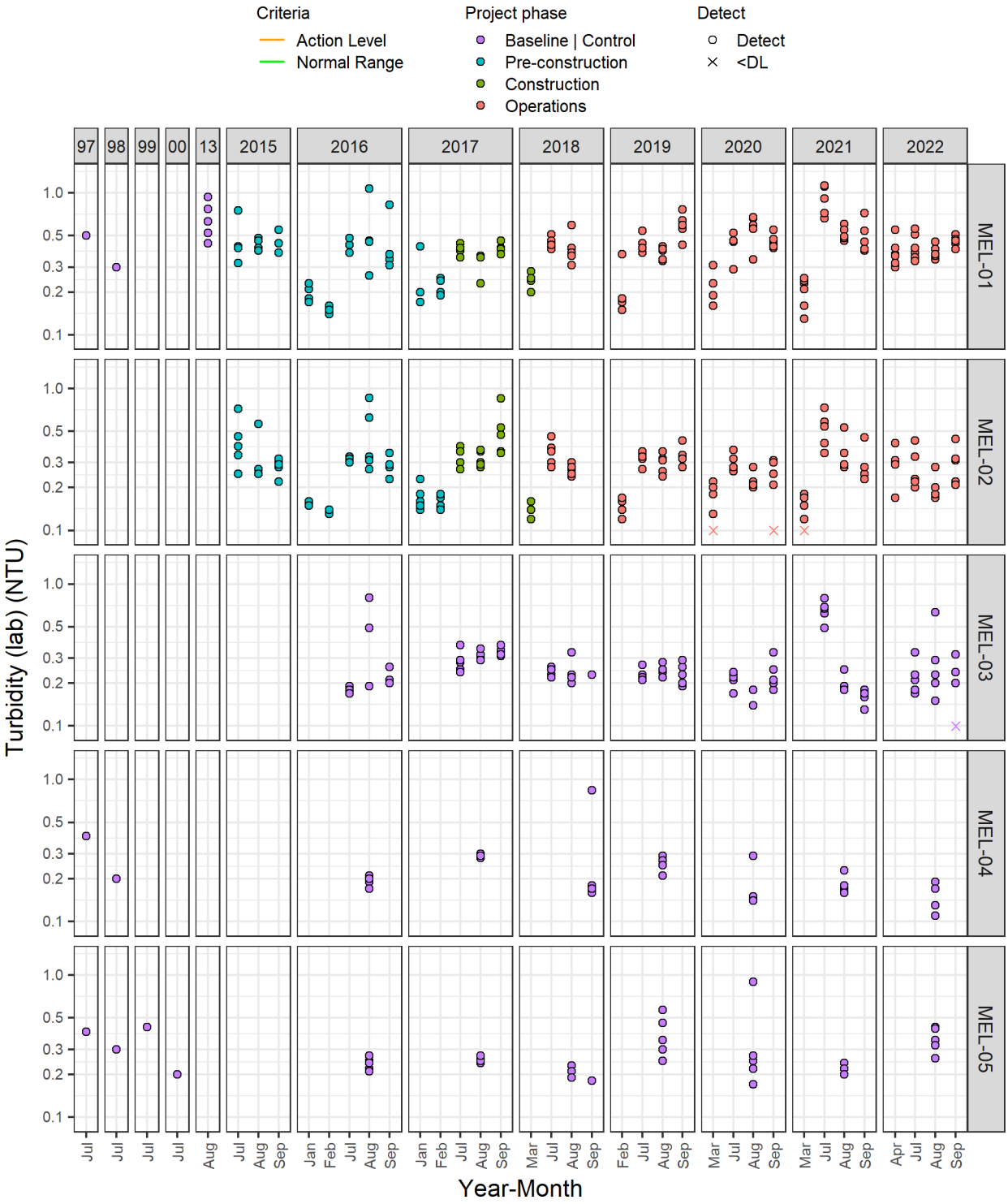


Figure C2-10. Bicarbonate alkalinity (mg/L)

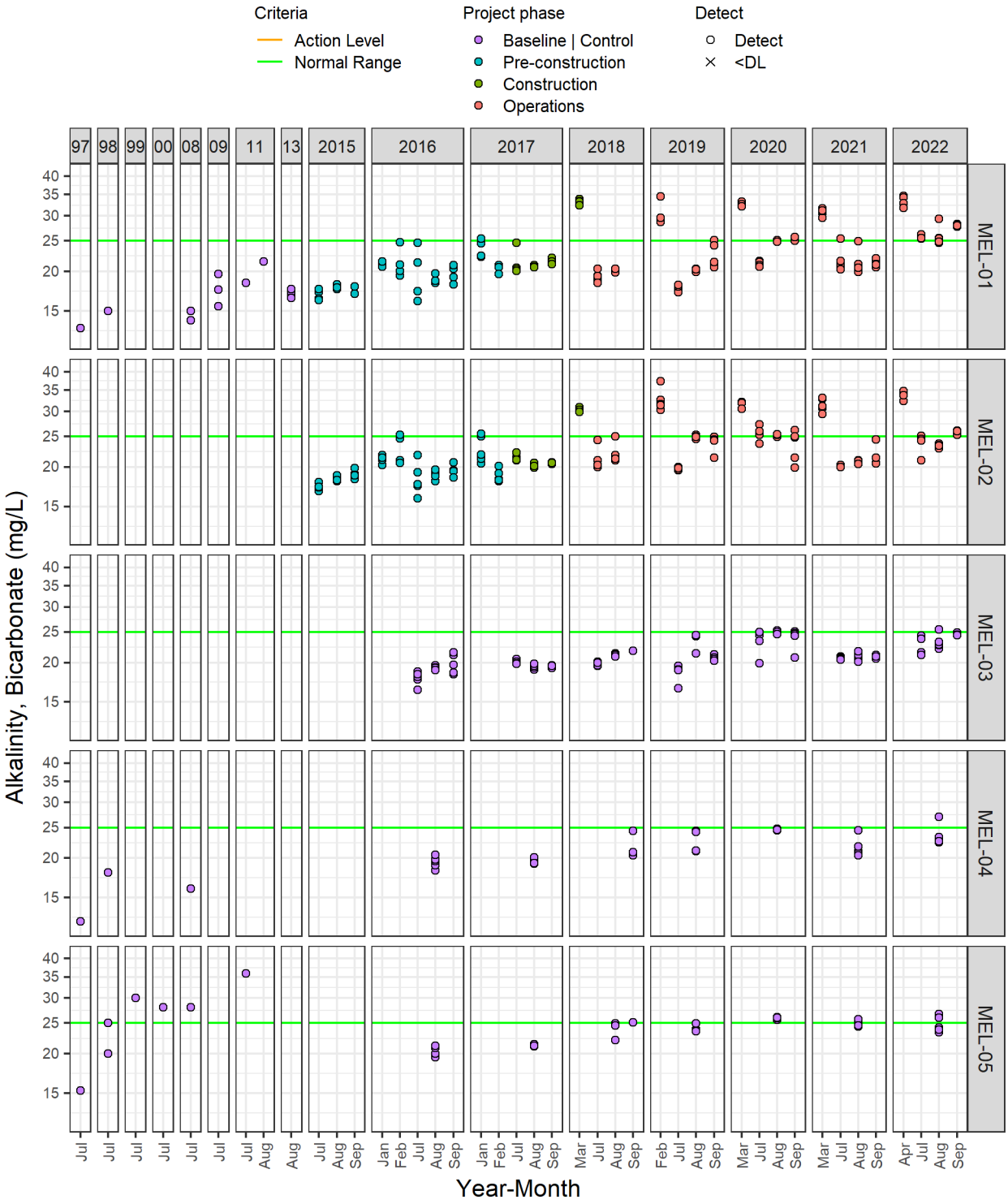


Figure C2-11. Total alkalinity (mg/L)

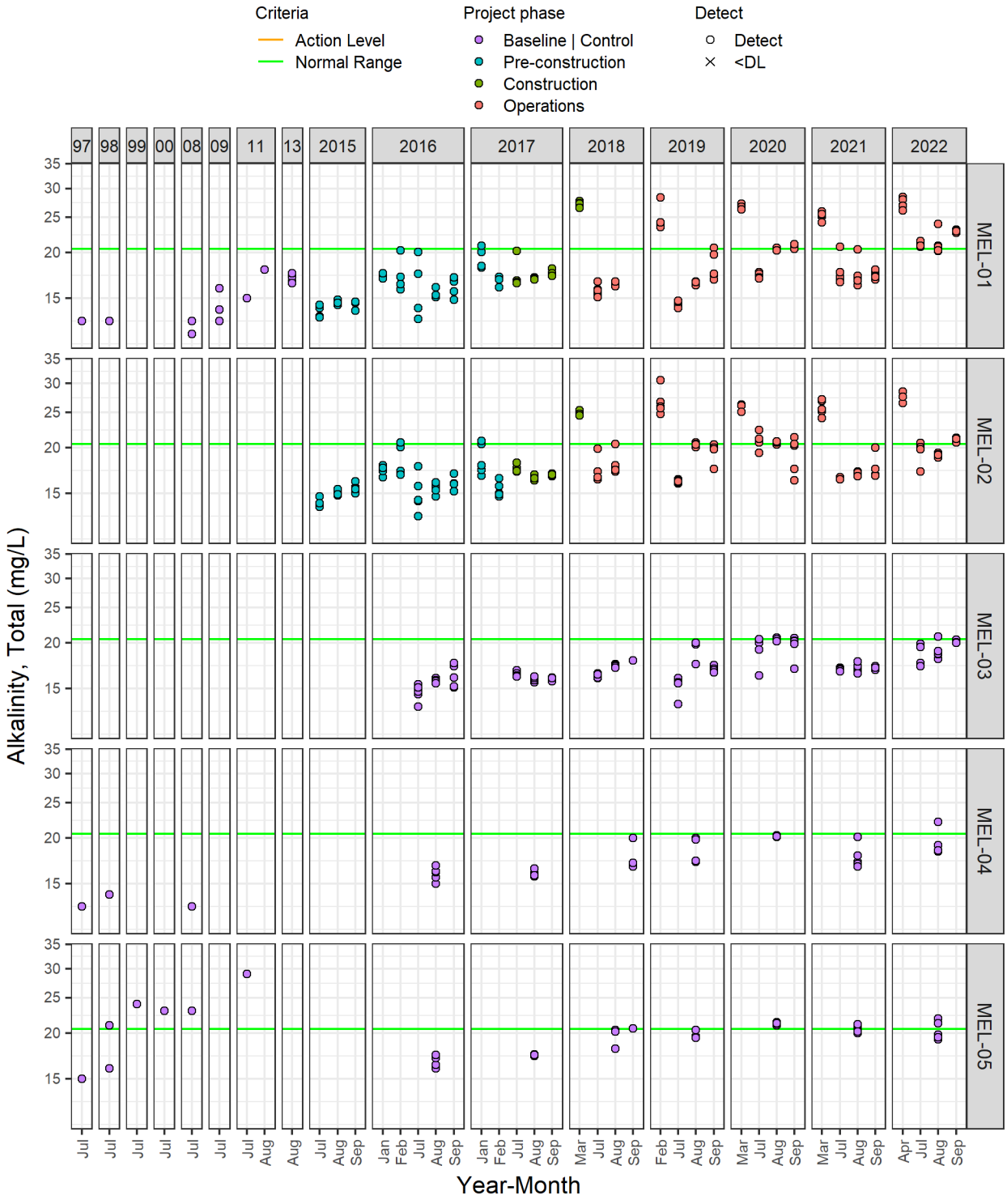


Figure C2-12. Total calcium (mg/L)

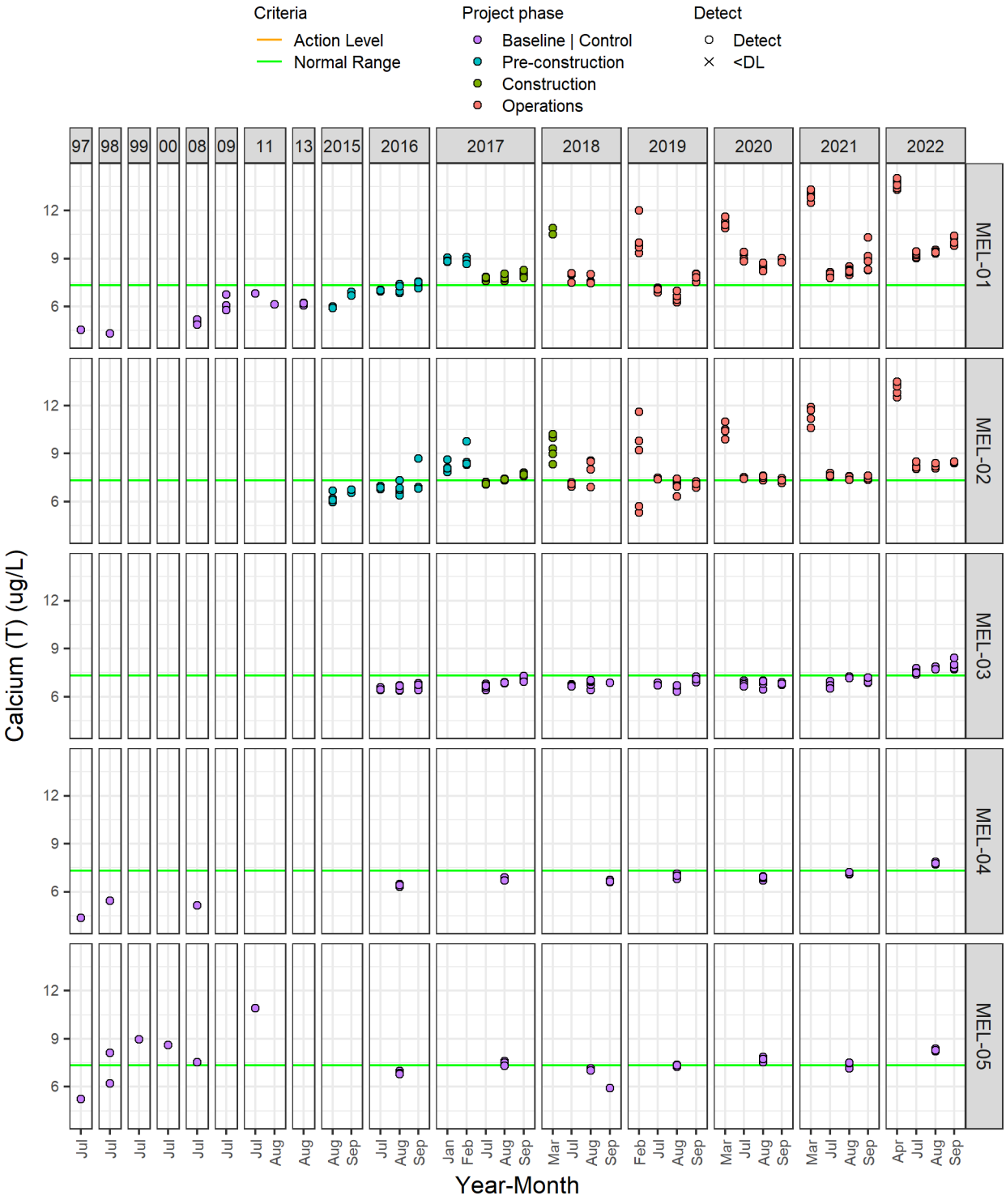


Figure C2-13. Total magnesium (mg/L)

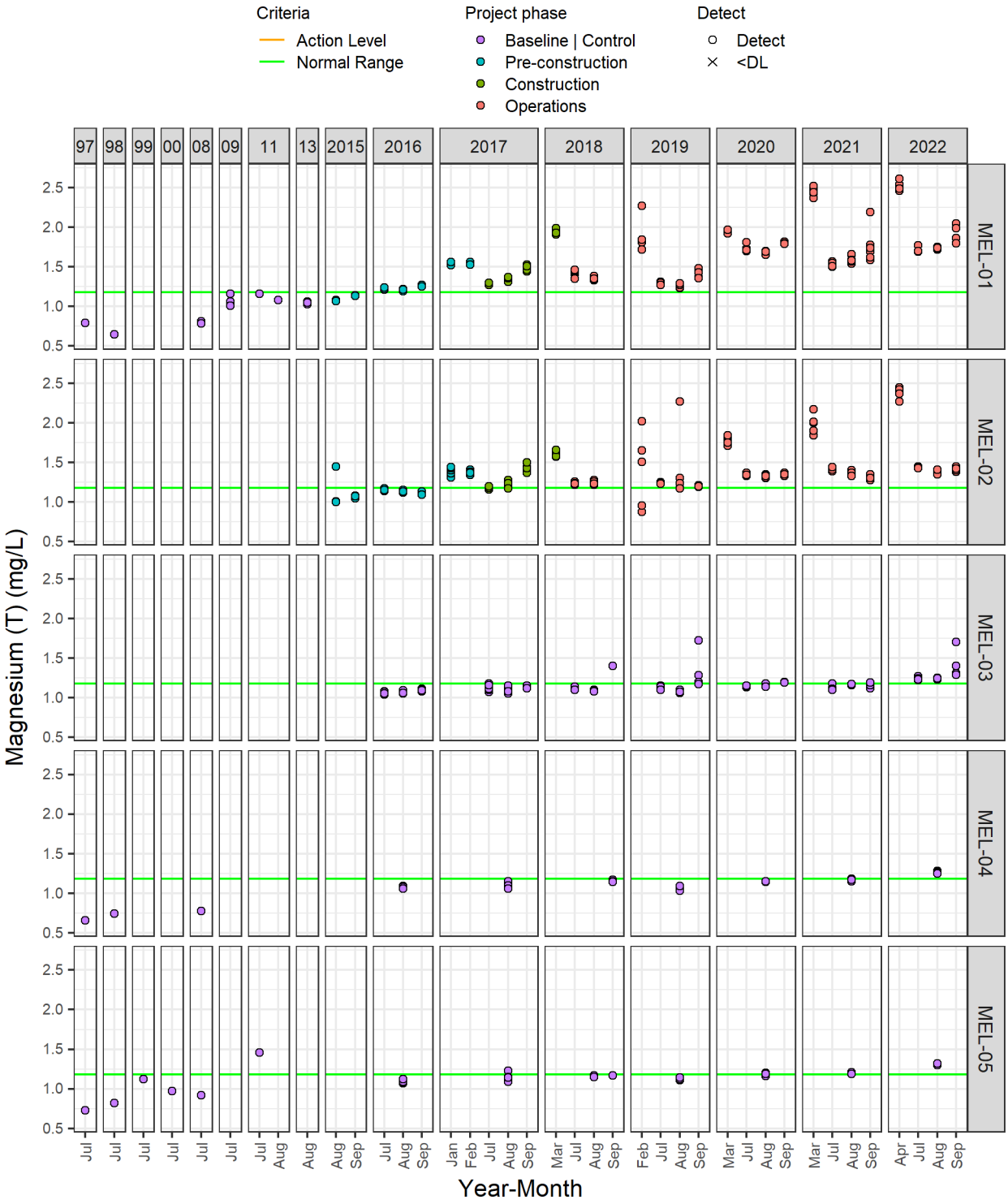


Figure C2-14. Total potassium (mg/L)

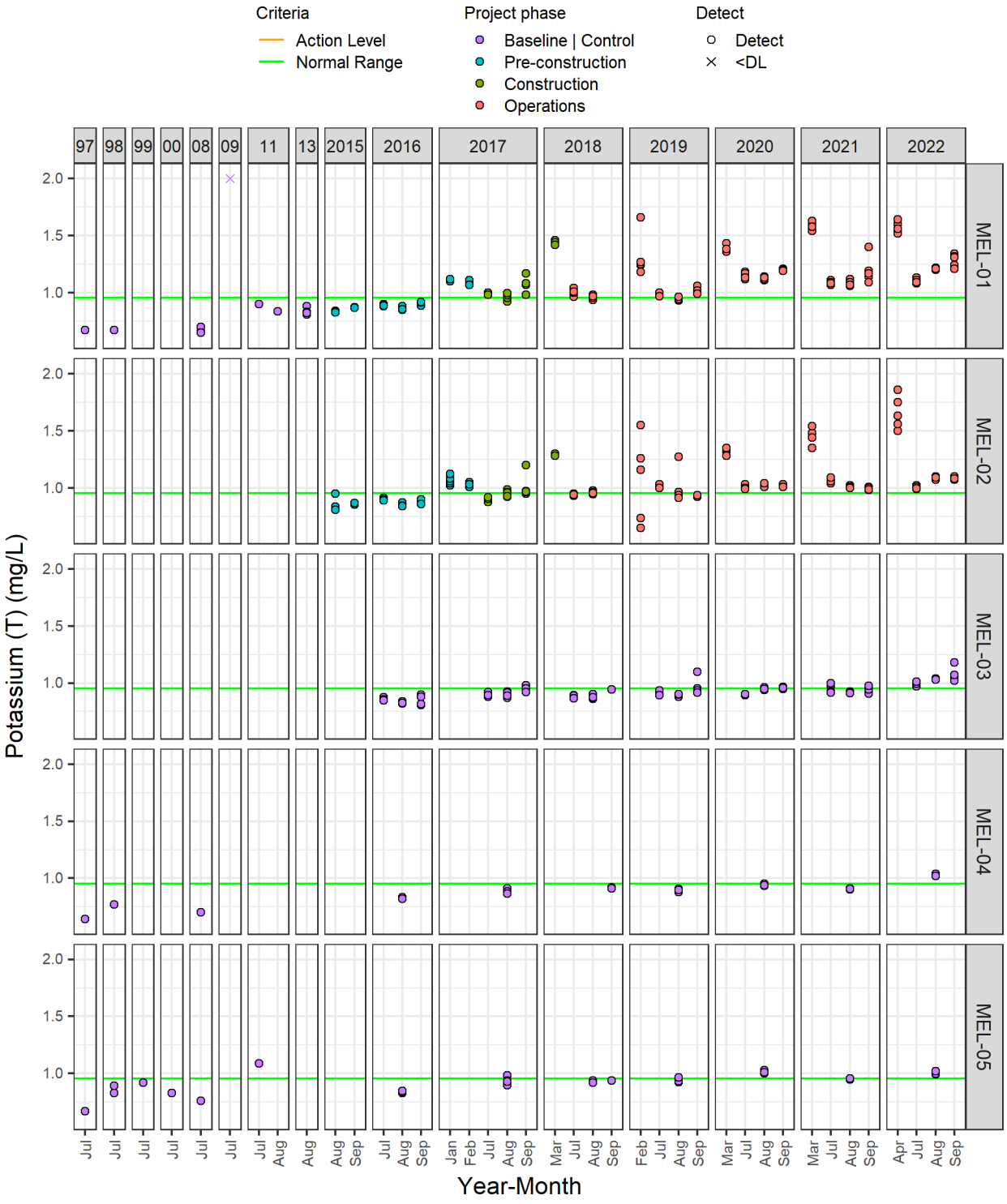


Figure C2-15. Total sodium (mg/L)

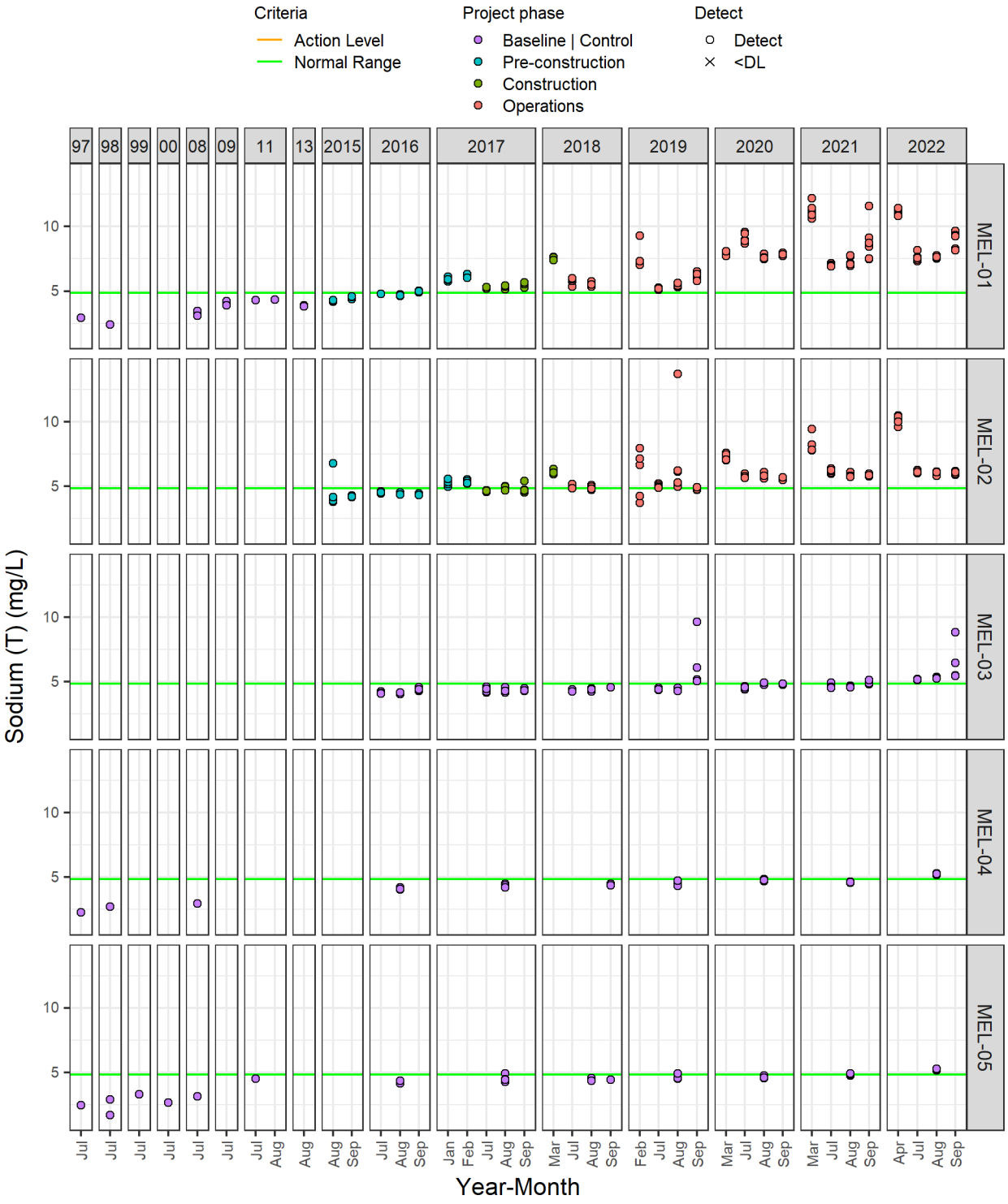


Figure C2-16. Chloride (mg/L)

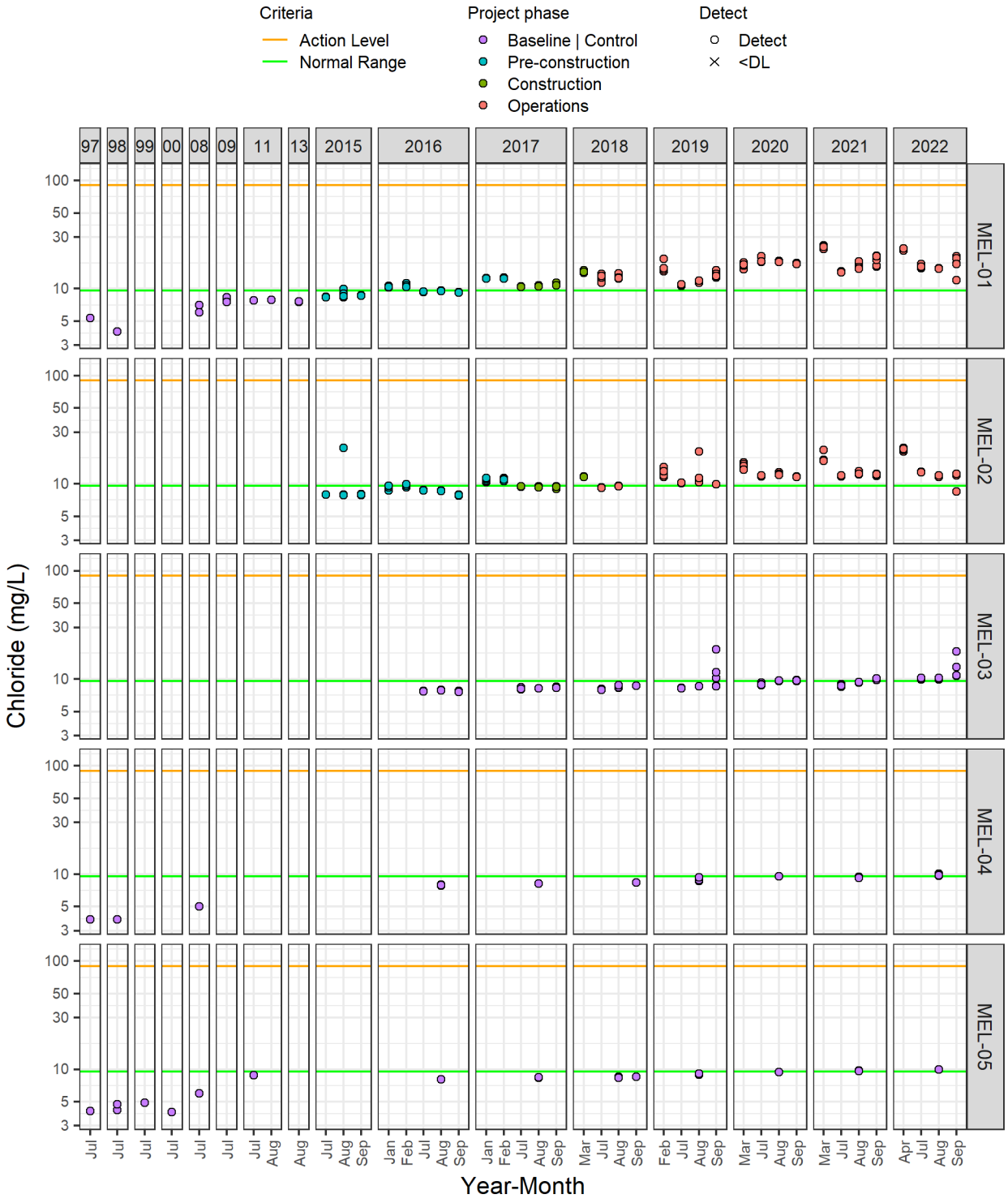


Figure C2-17. Fluoride (mg/L)

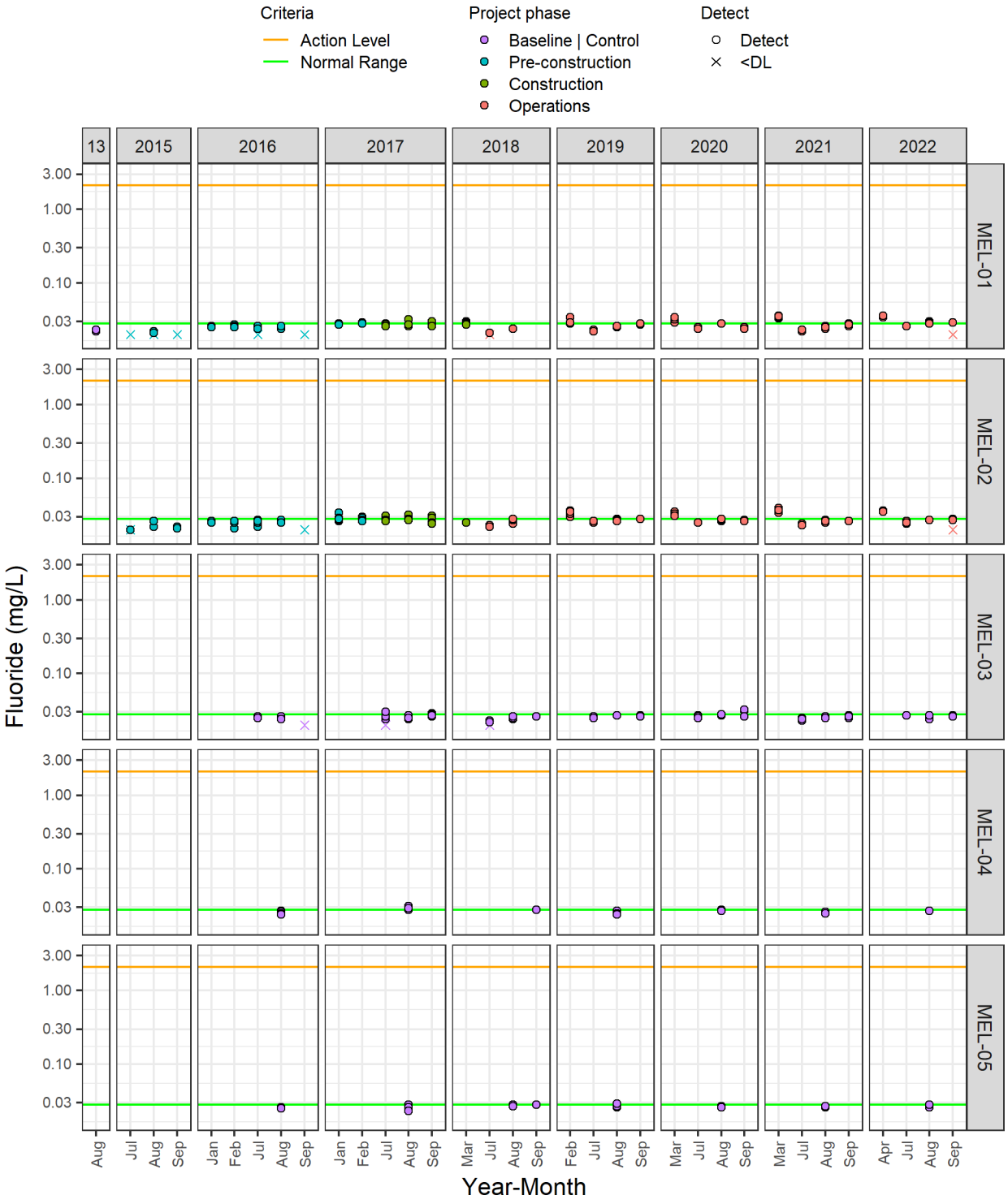


Figure C2-18. Ammonia (as nitrogen) (mg/L)

Notes: Ammonia data from August and September 2021 should be interpreted with caution because of higher detection limits reported by the laboratory.

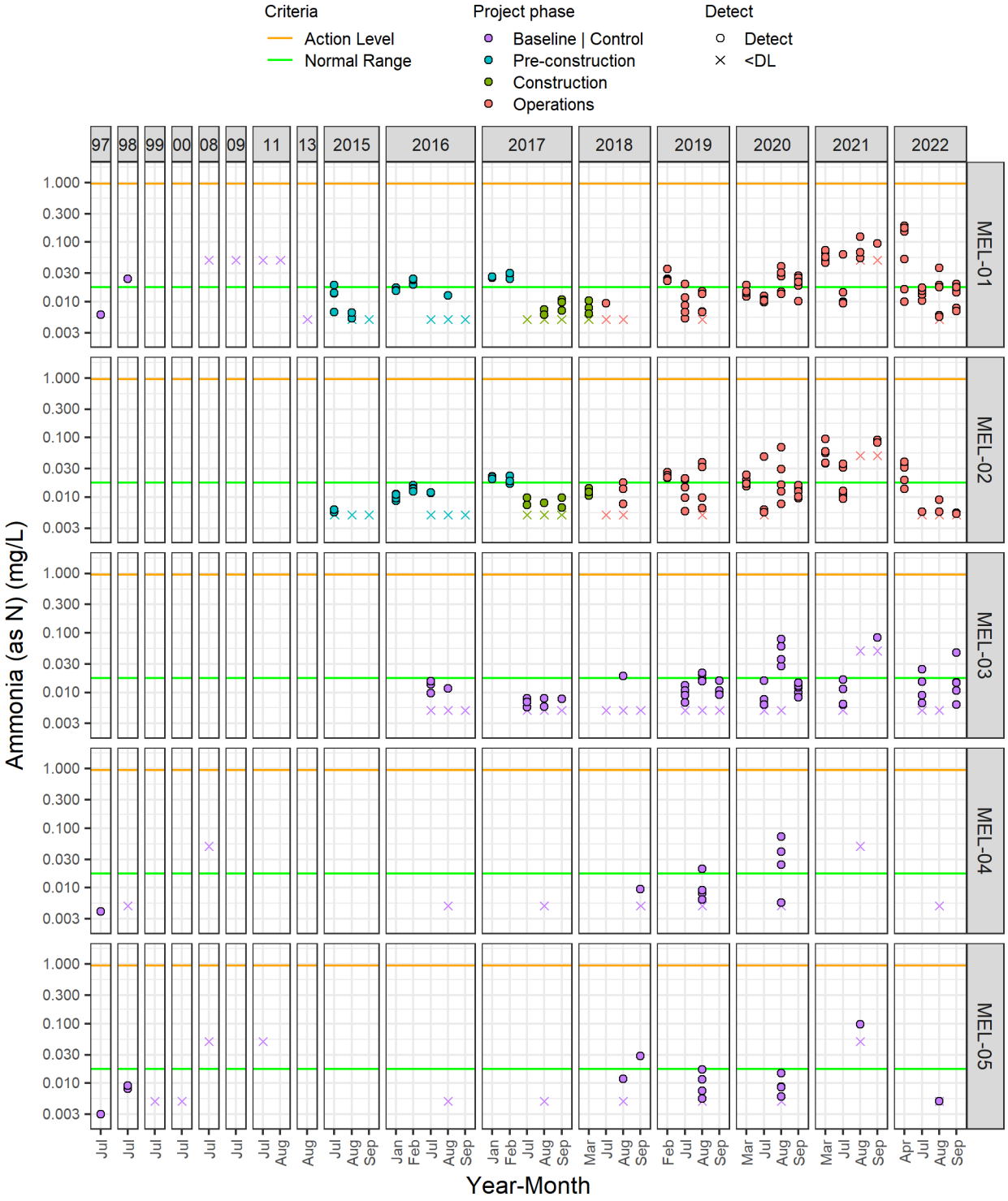


Figure C2-19. Nitrate (as N) (mg/L)

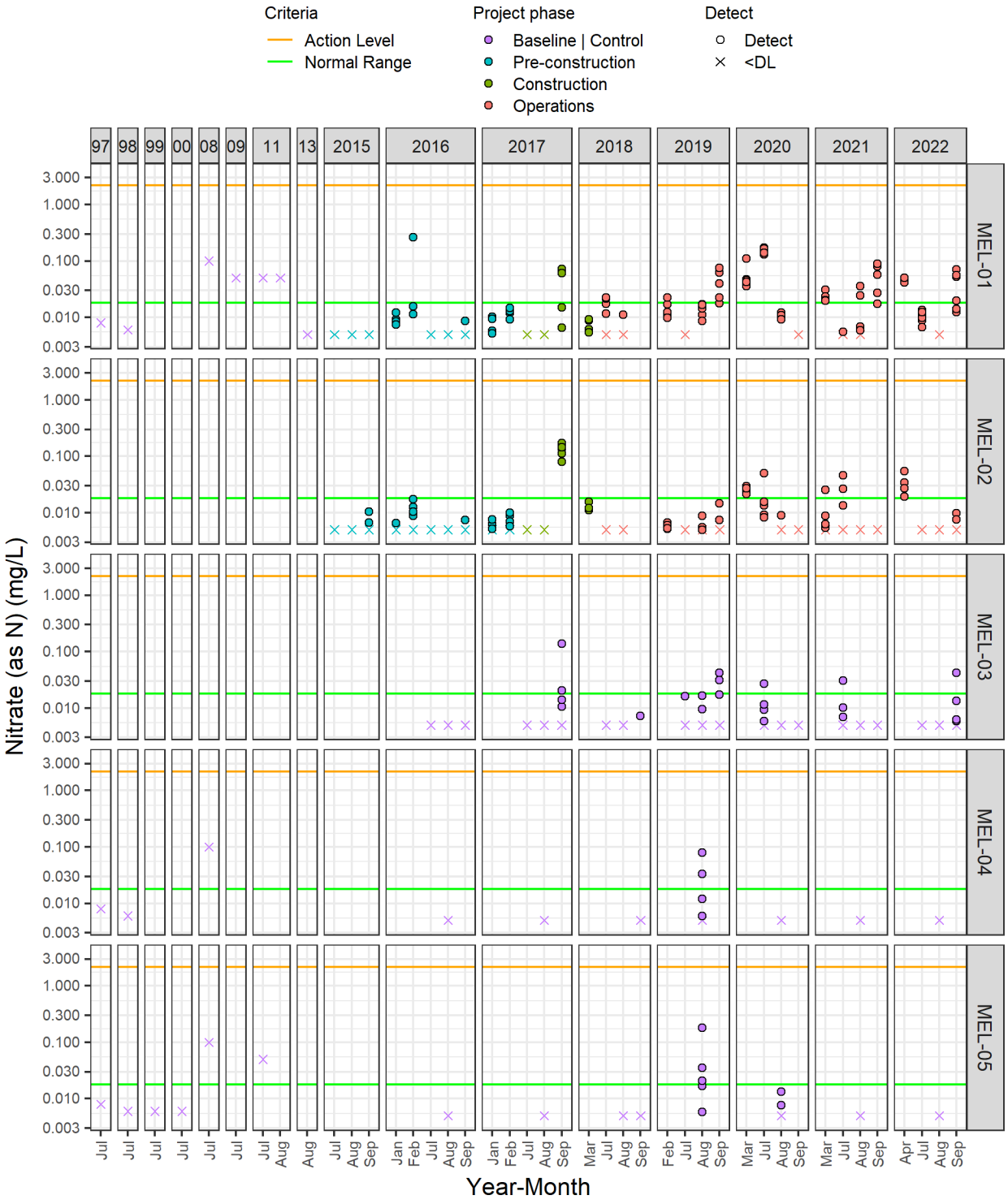


Figure C2-20. Nitrate and nitrite (as N) (mg/L)

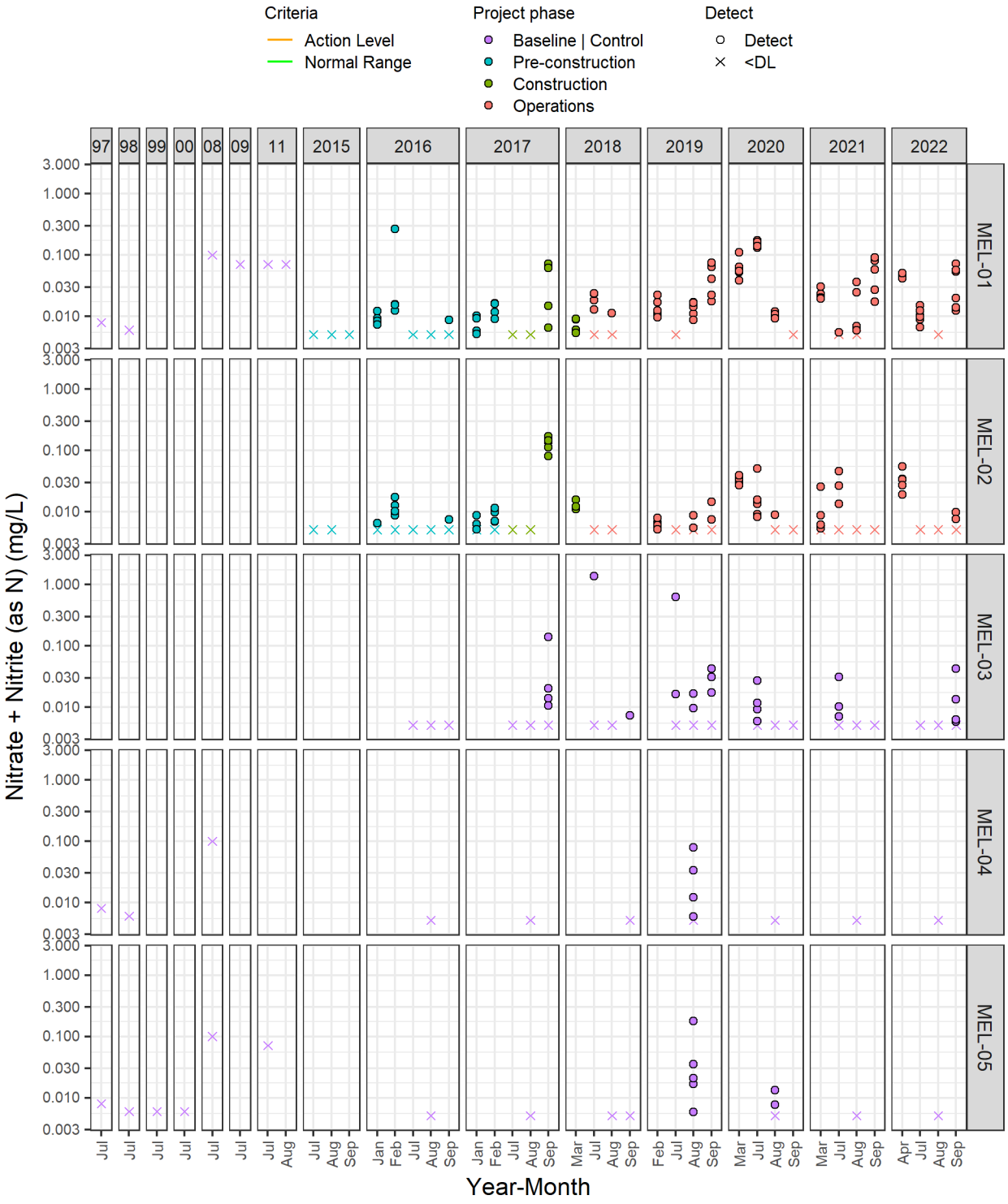


Figure C2-21. Total Kjeldahl nitrogen (TKN; mg/L)

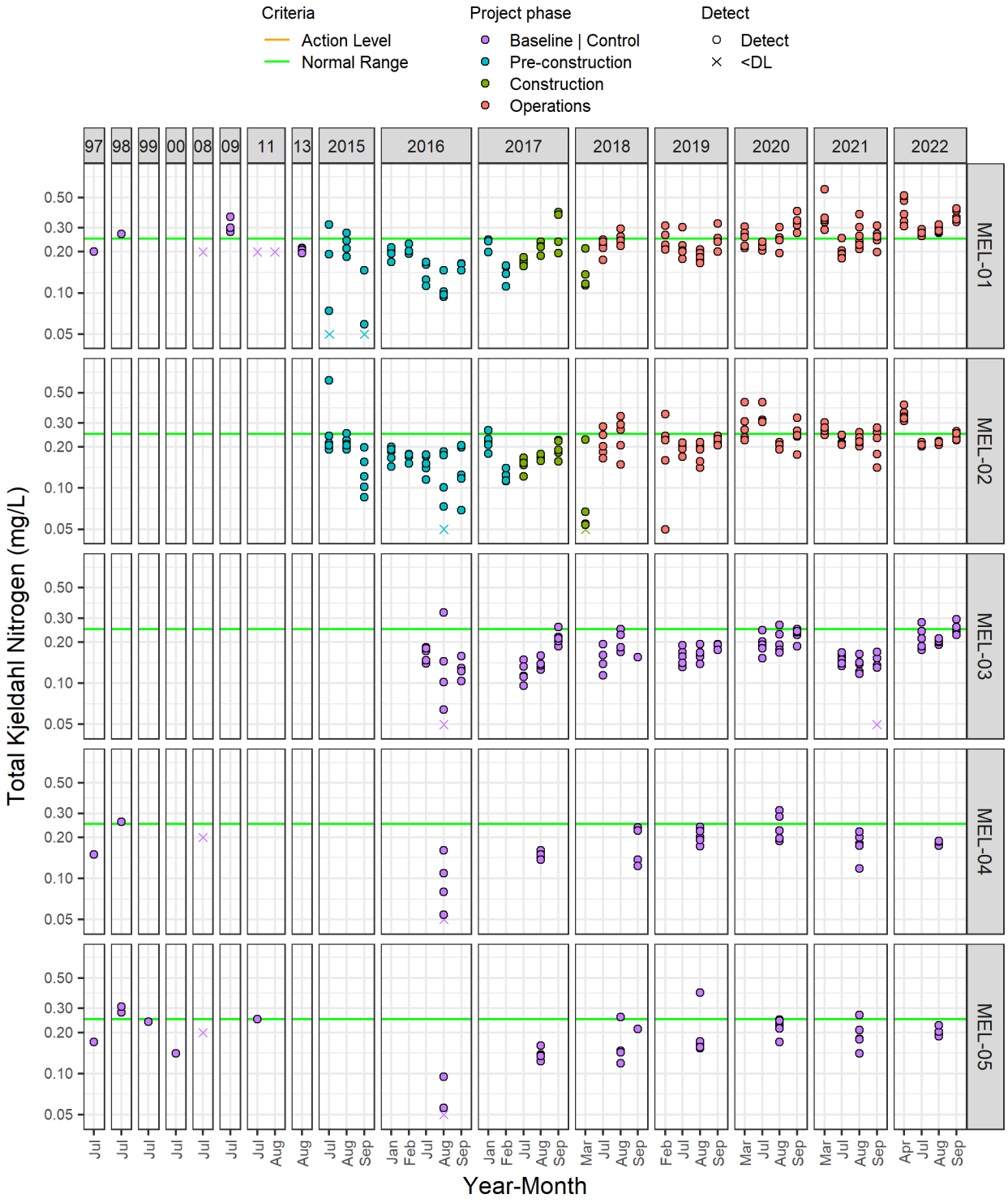


Figure C2-22. Sulphate (mg/L)

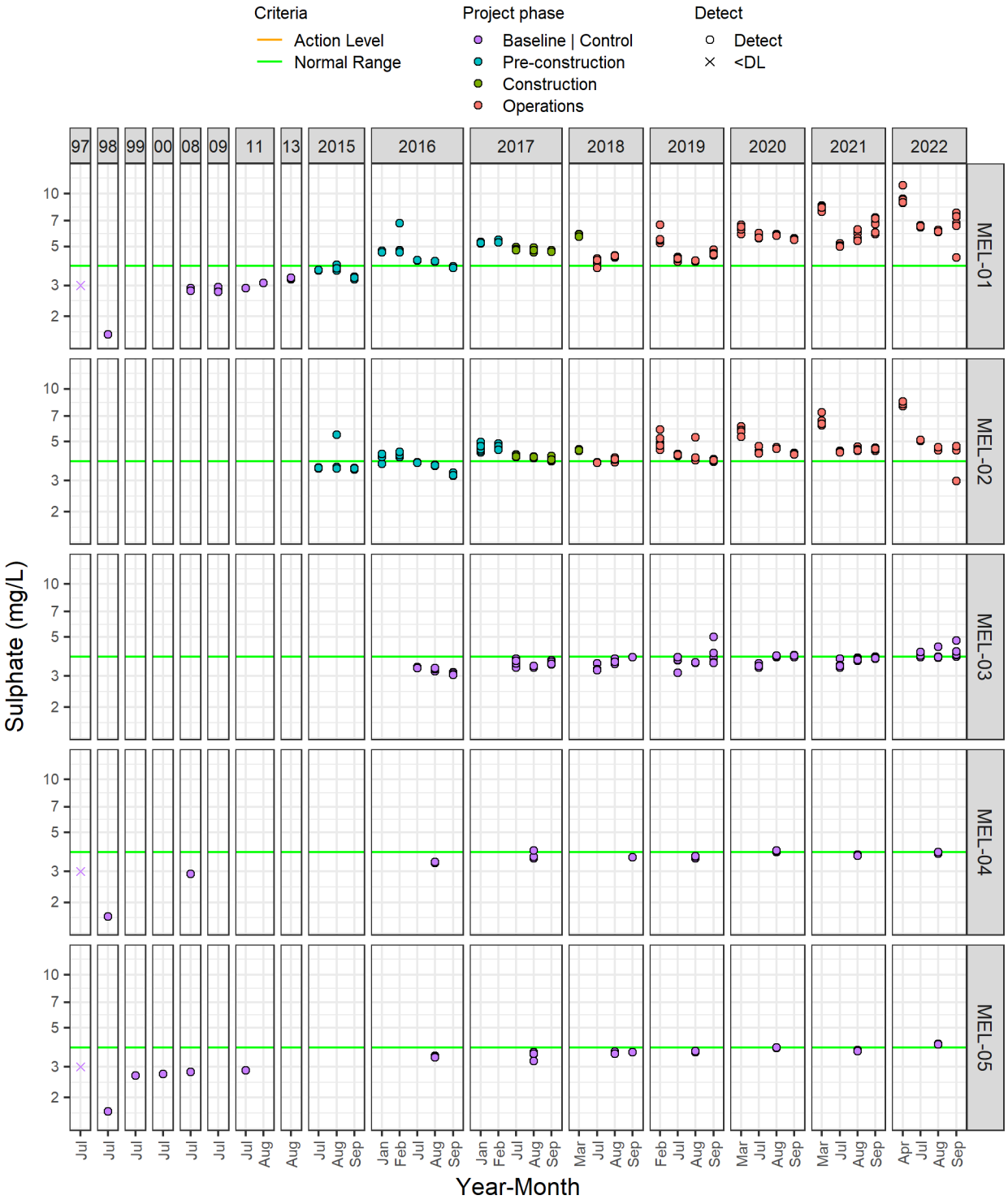


Figure C2-23. Total phosphorus (mg/L)

Notes: The AEMP Benchmark for total phosphorus of 0.01 mg/L is questionable given that baseline concentrations of total phosphorus exceeded this value on occasion. The Action Level (0.0075 mg/L) is not shown.

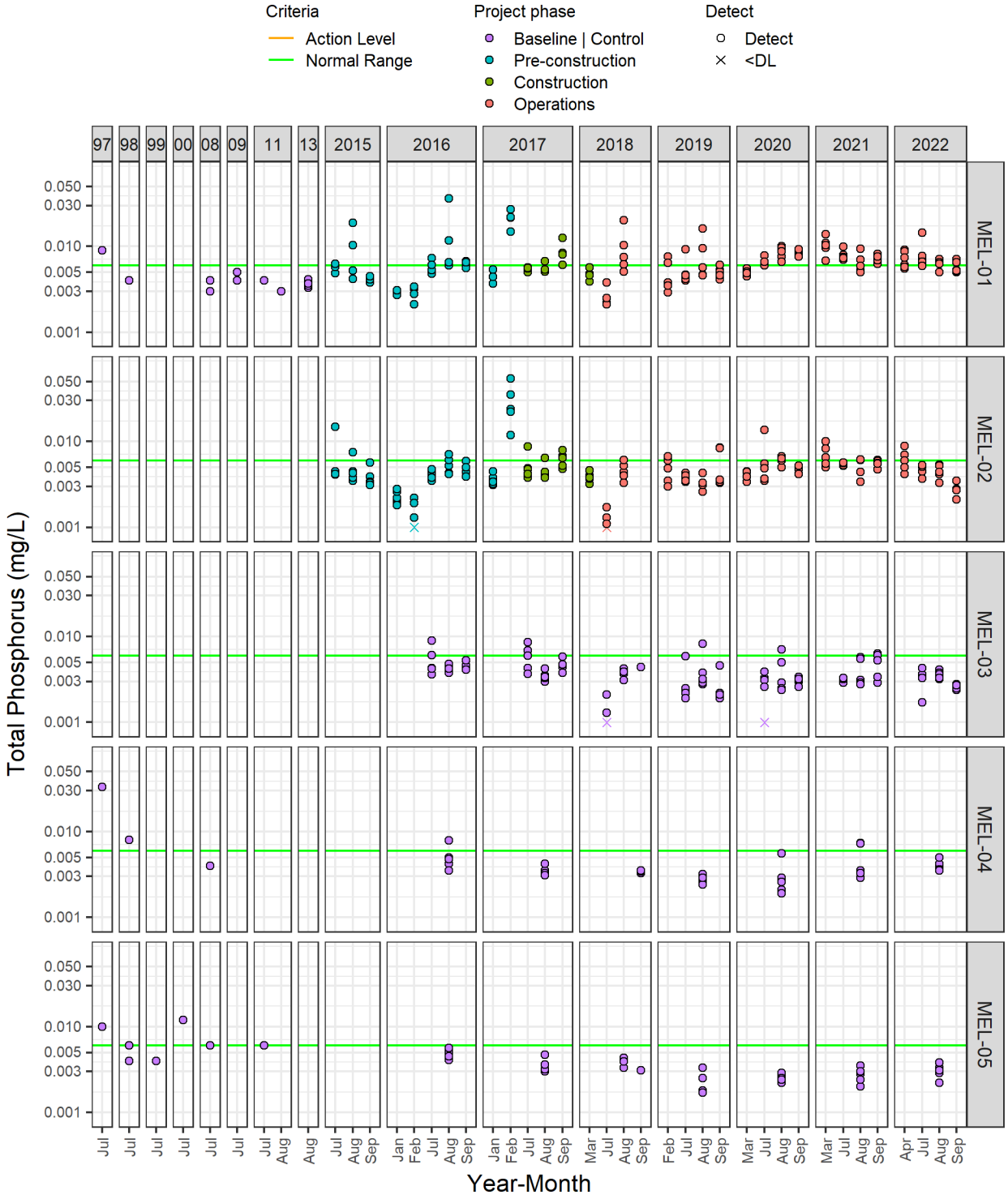


Figure C2-24. Dissolved organic carbon (mg/L)

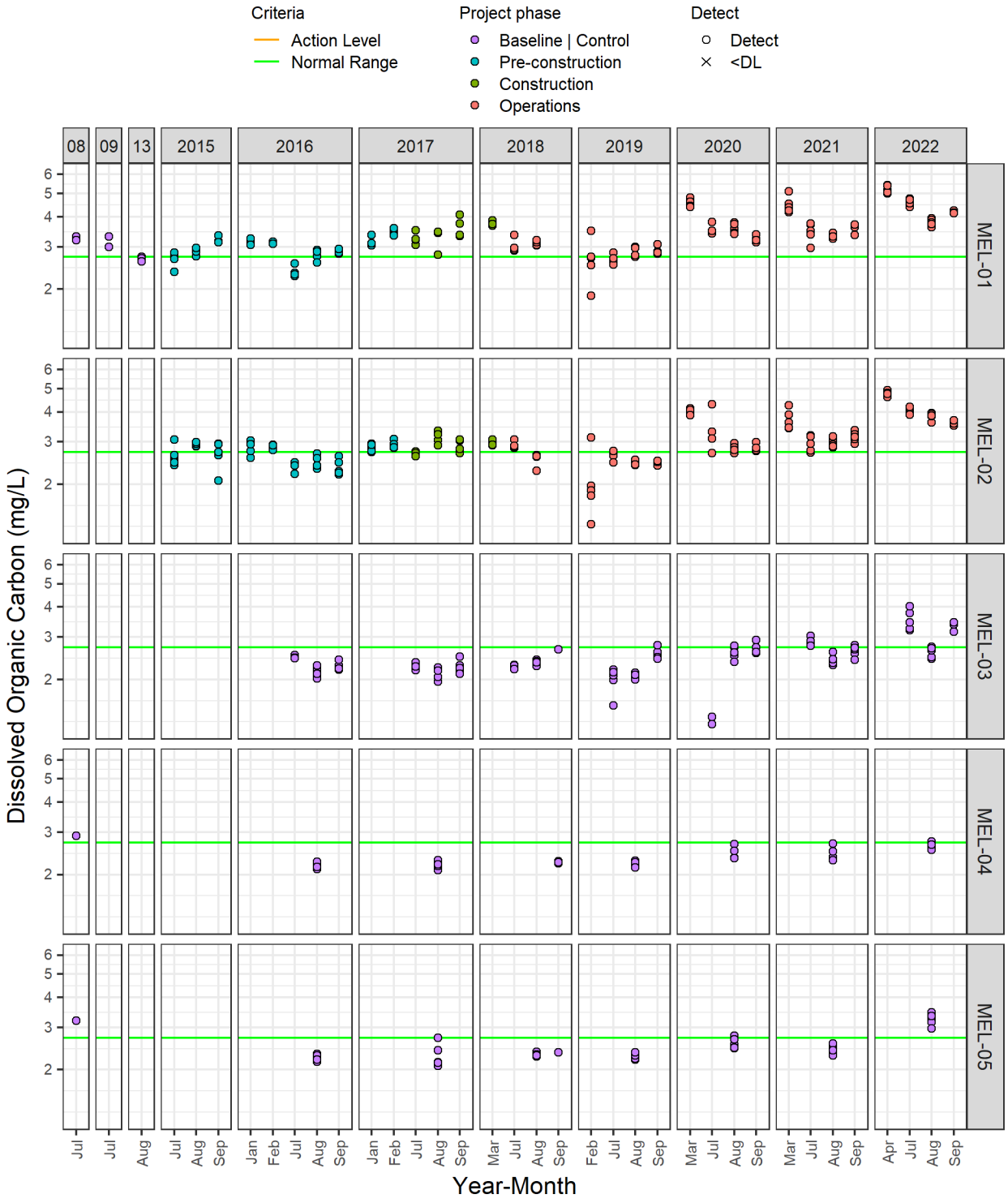


Figure C2-25. Total organic carbon (mg/L)

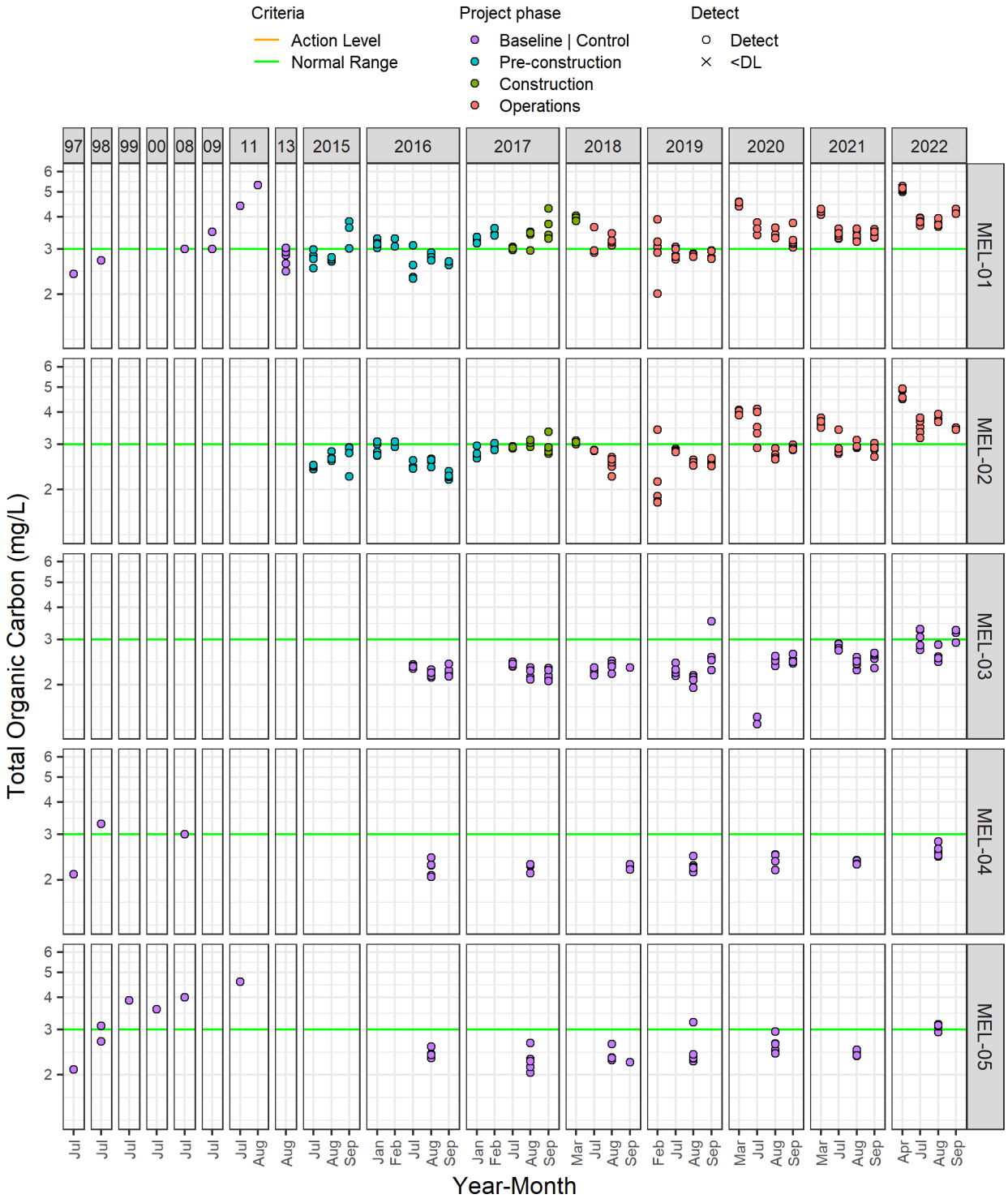


Figure C2-26. Total aluminum (µg/L)

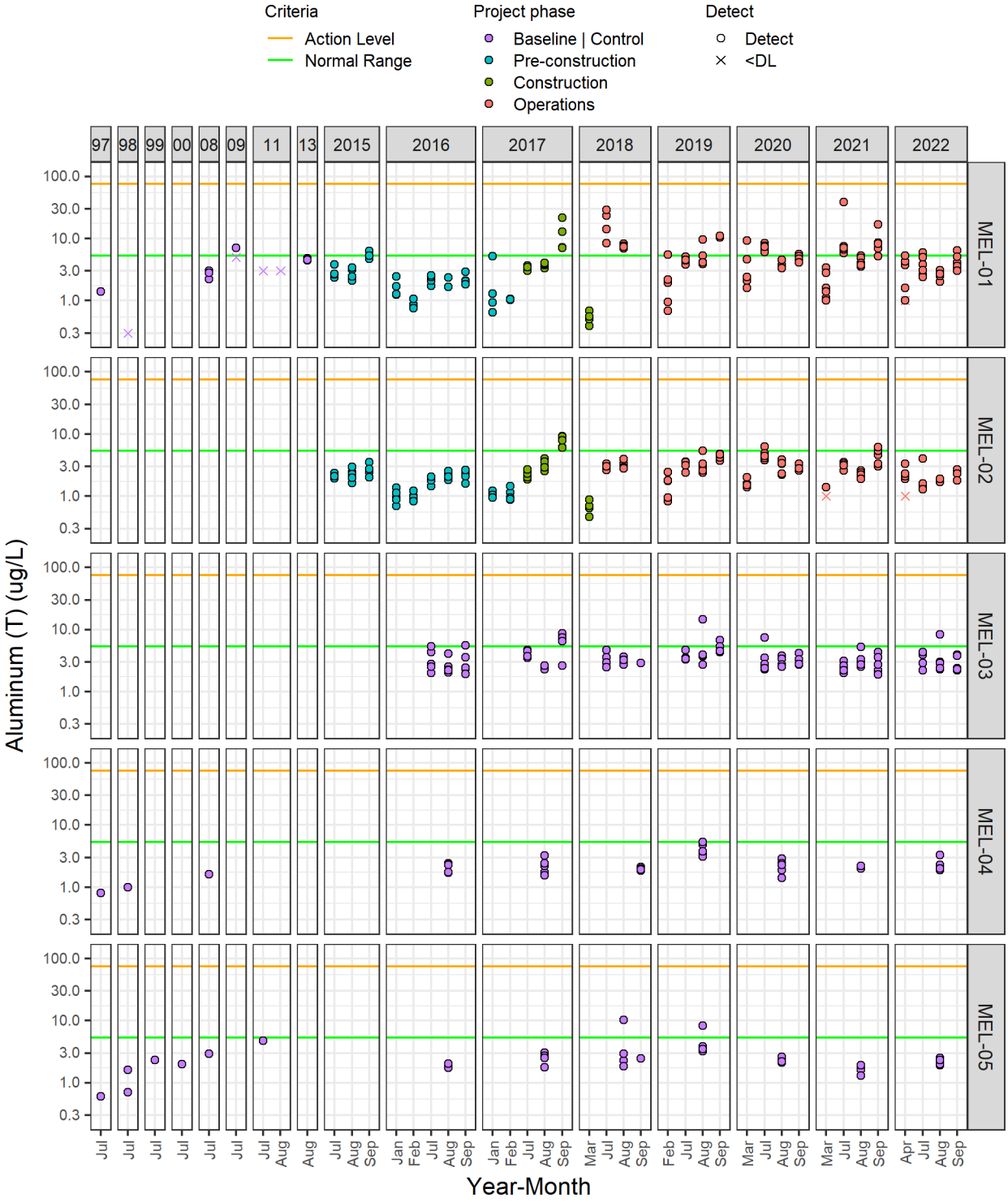


Figure C2-27. Total antimony (µg/L)

Notes: The normal range for antimony is equal to the current detection limit.

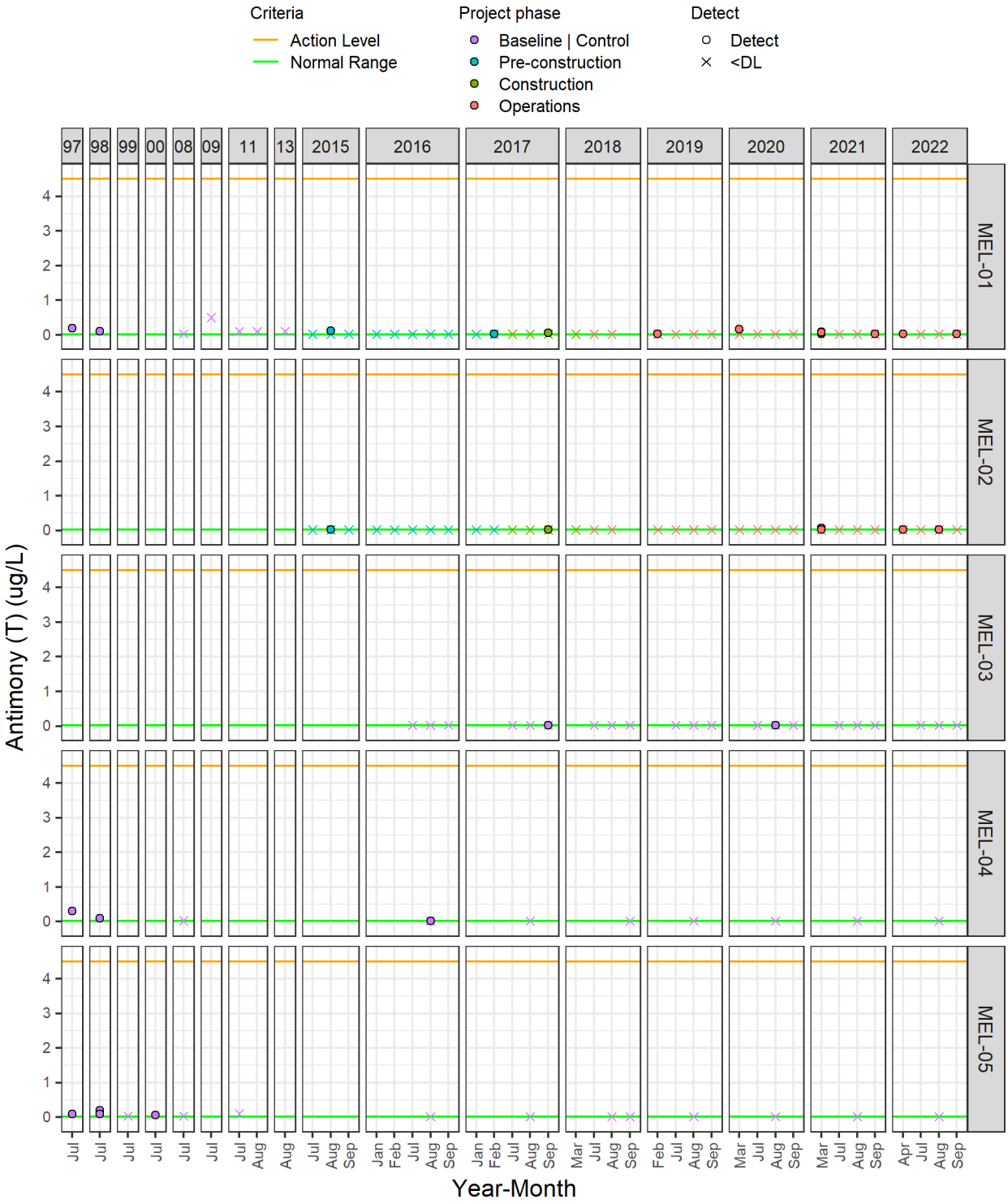


Figure C2-28. Total arsenic (µg/L)

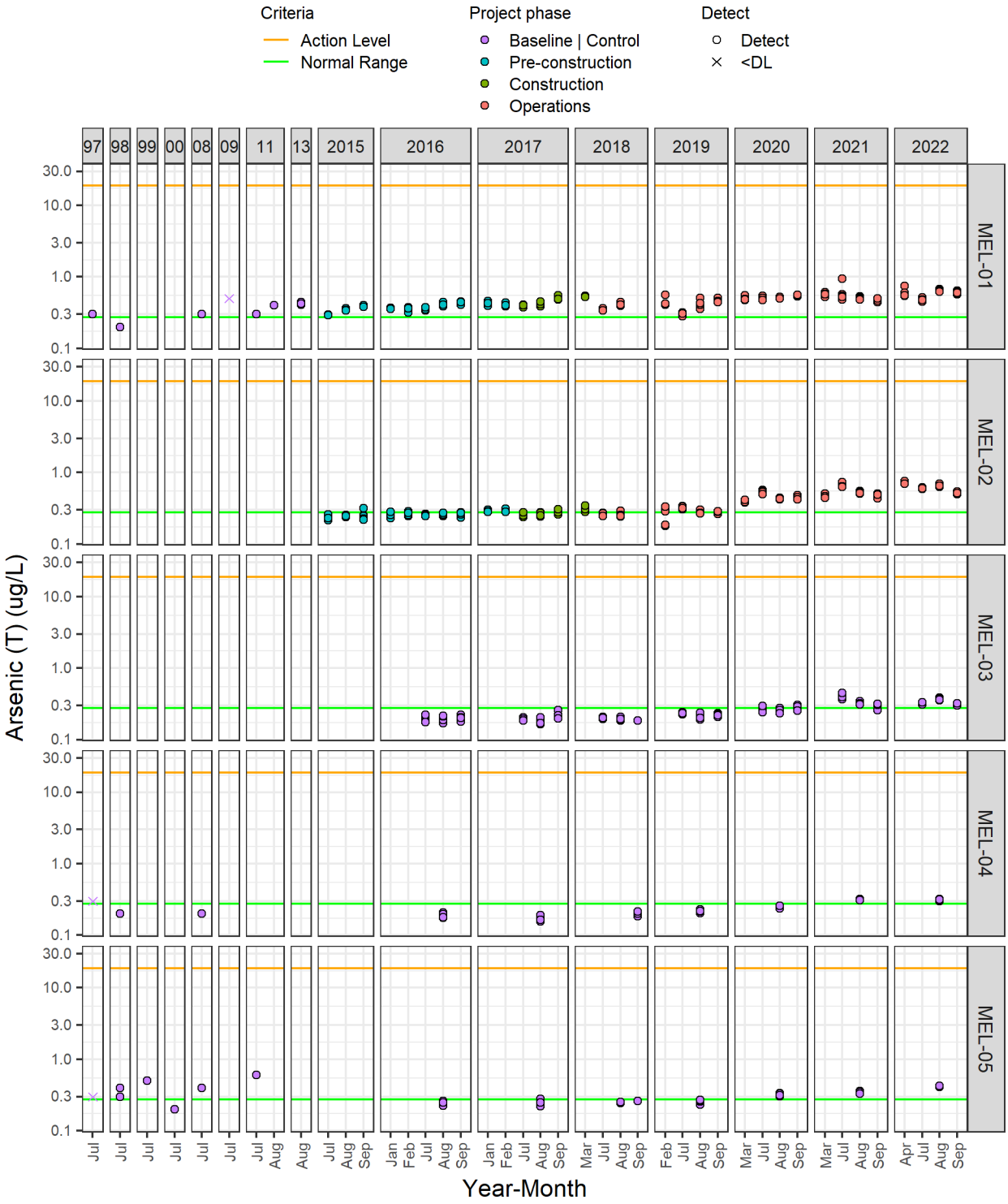


Figure C2-29. Total barium (µg/L)

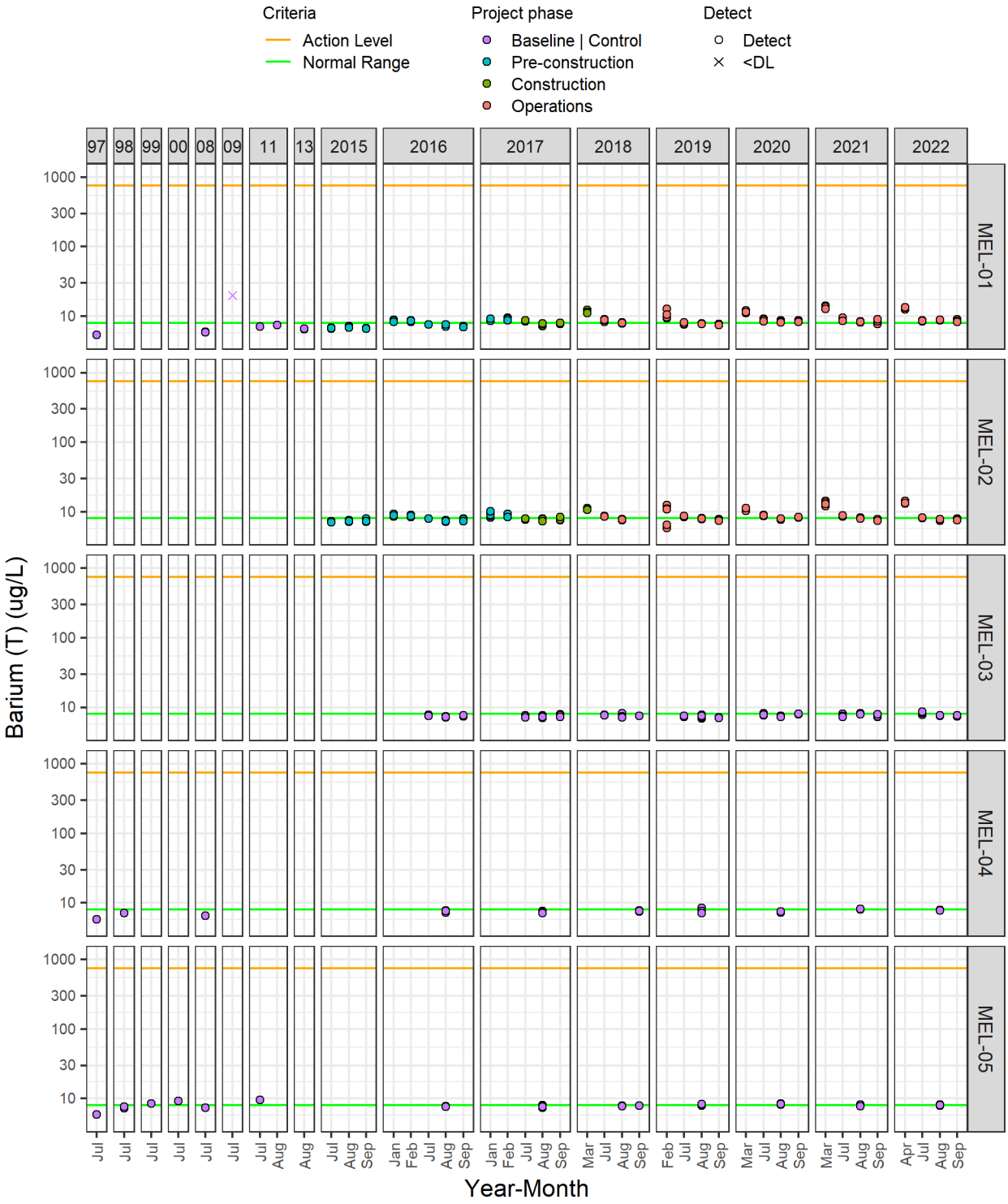


Figure C2-30. Total beryllium (µg/L)

Notes: The normal range for beryllium is equal to the current detection limit.

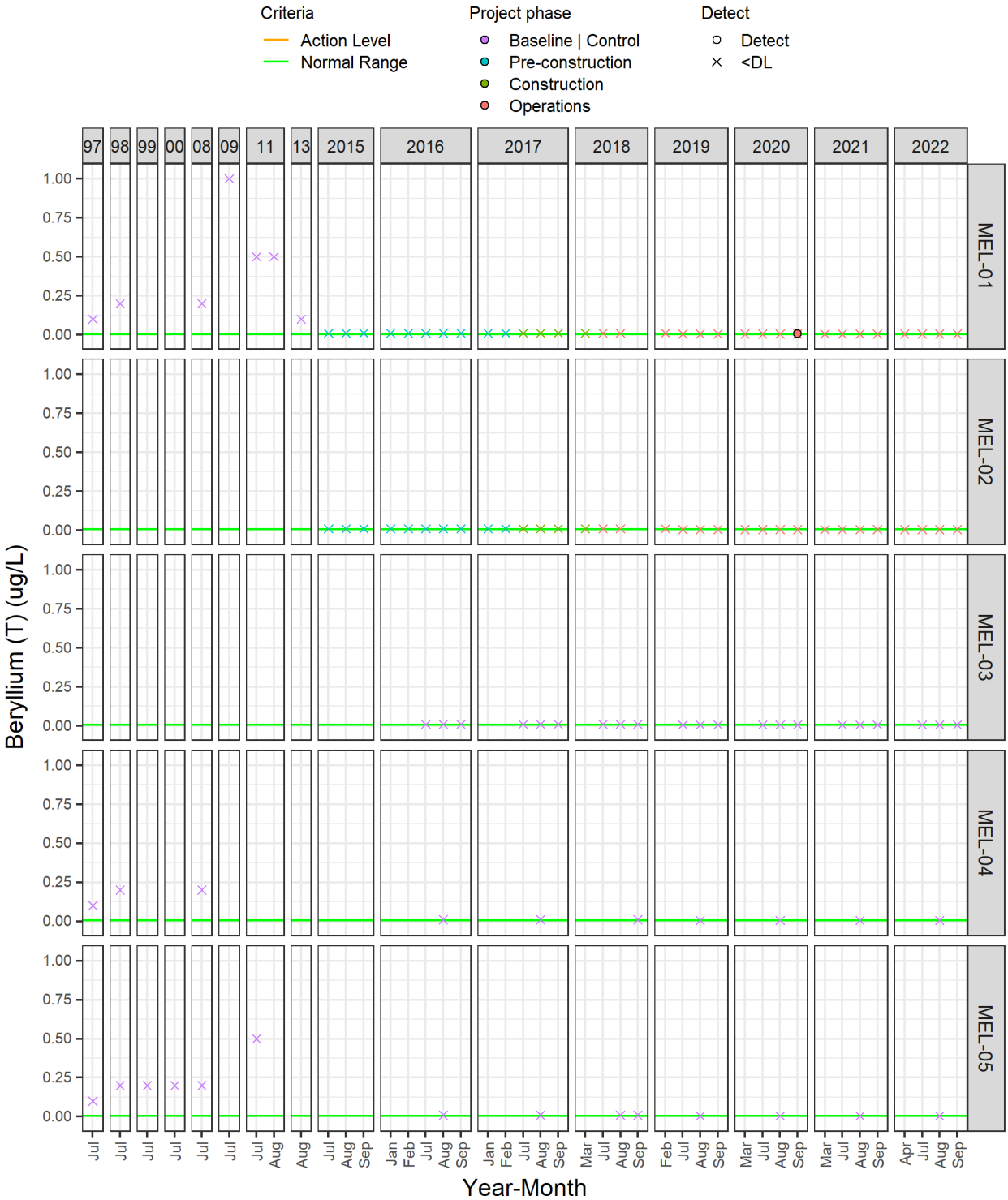


Figure C2-31. Total bismuth (µg/L)

Notes: The normal range for bismuth is equal to the current detection limit.

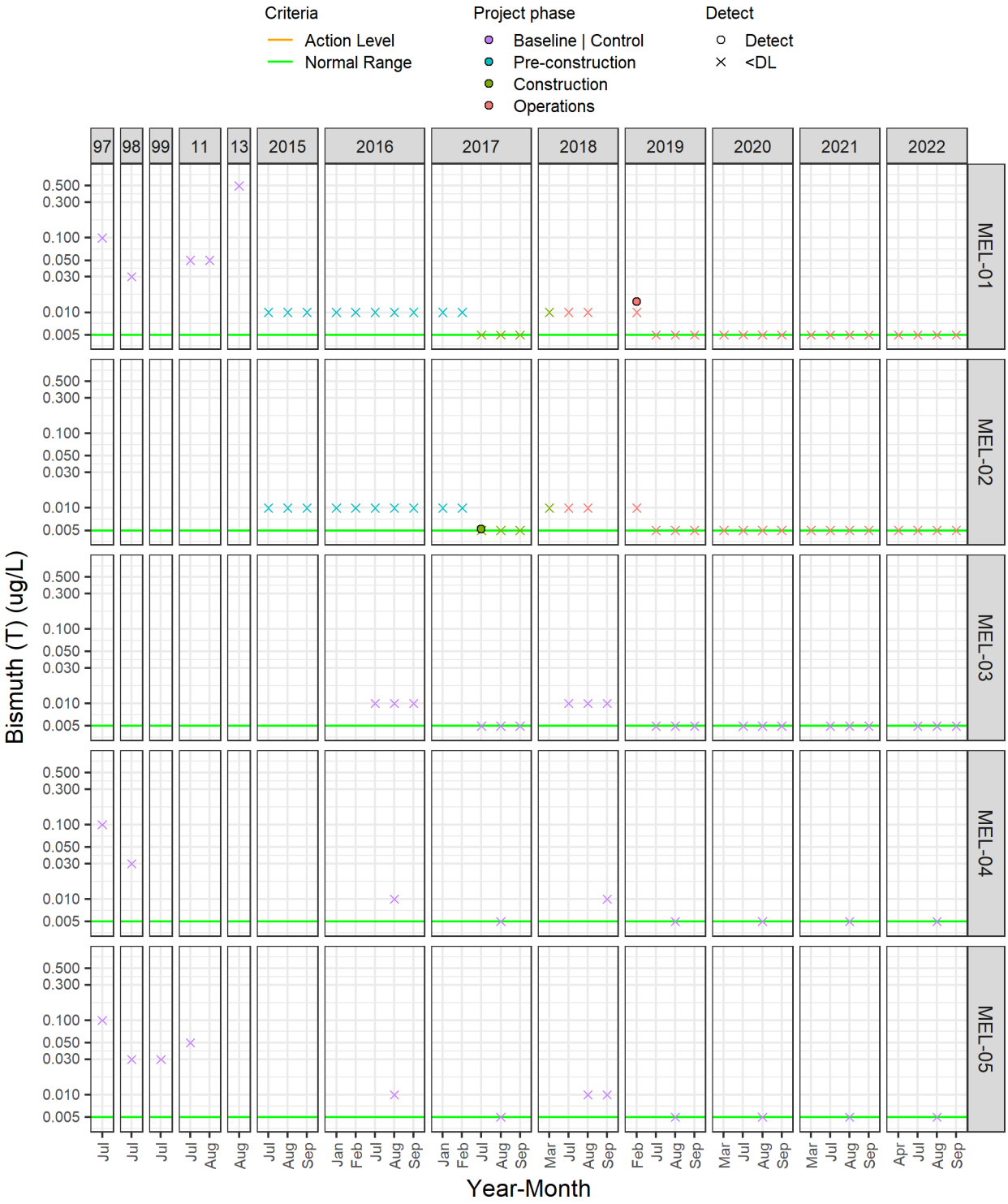


Figure C2-32. Total boron (µg/L)

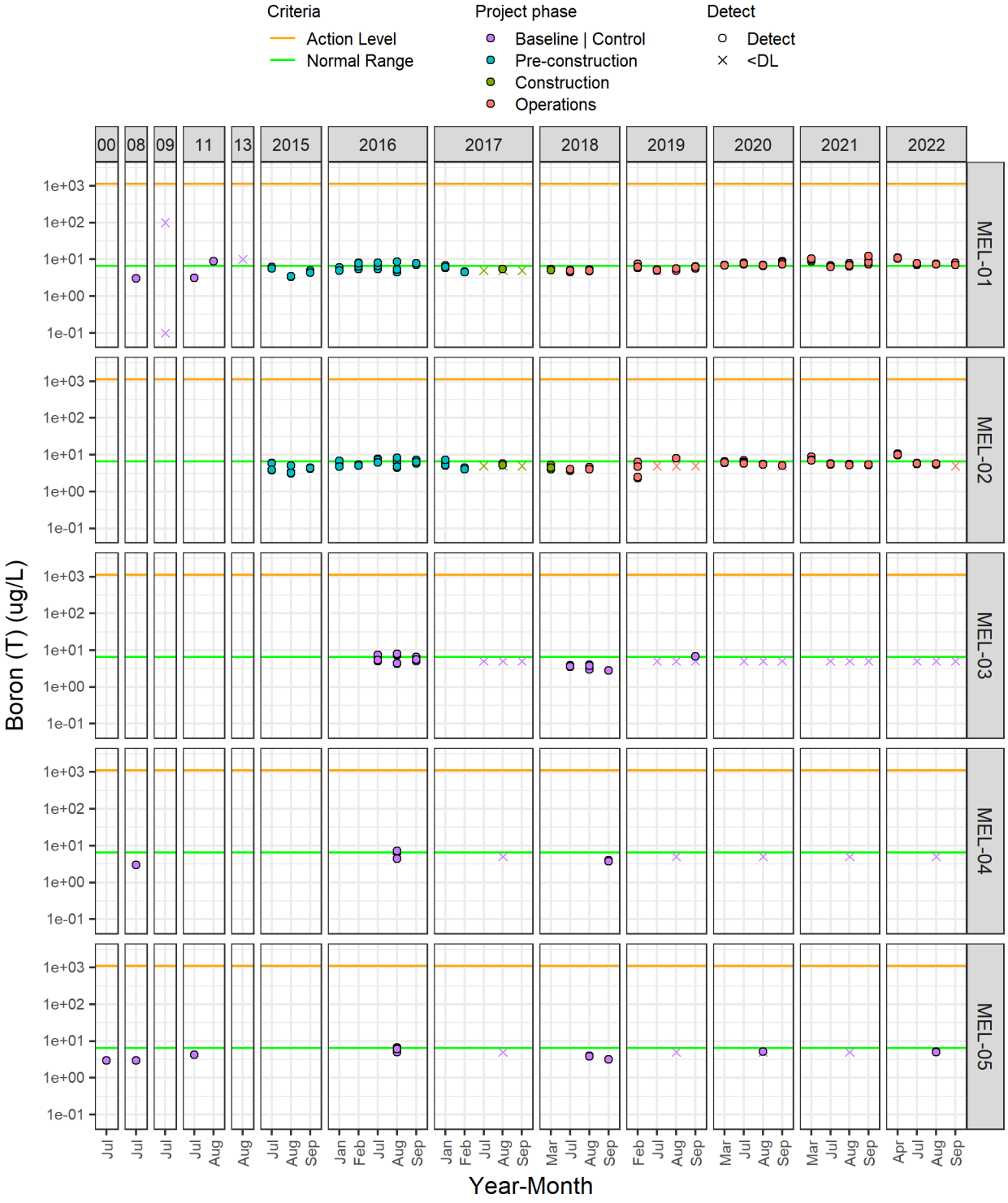


Figure C2-33. Total cadmium (µg/L)

Notes: The normal range for cadmium is equal to the current detection limit. The two lines for the Action Level represent the range in site-specific guidelines for protection of aquatic life for MEL-01 samples in 2021.

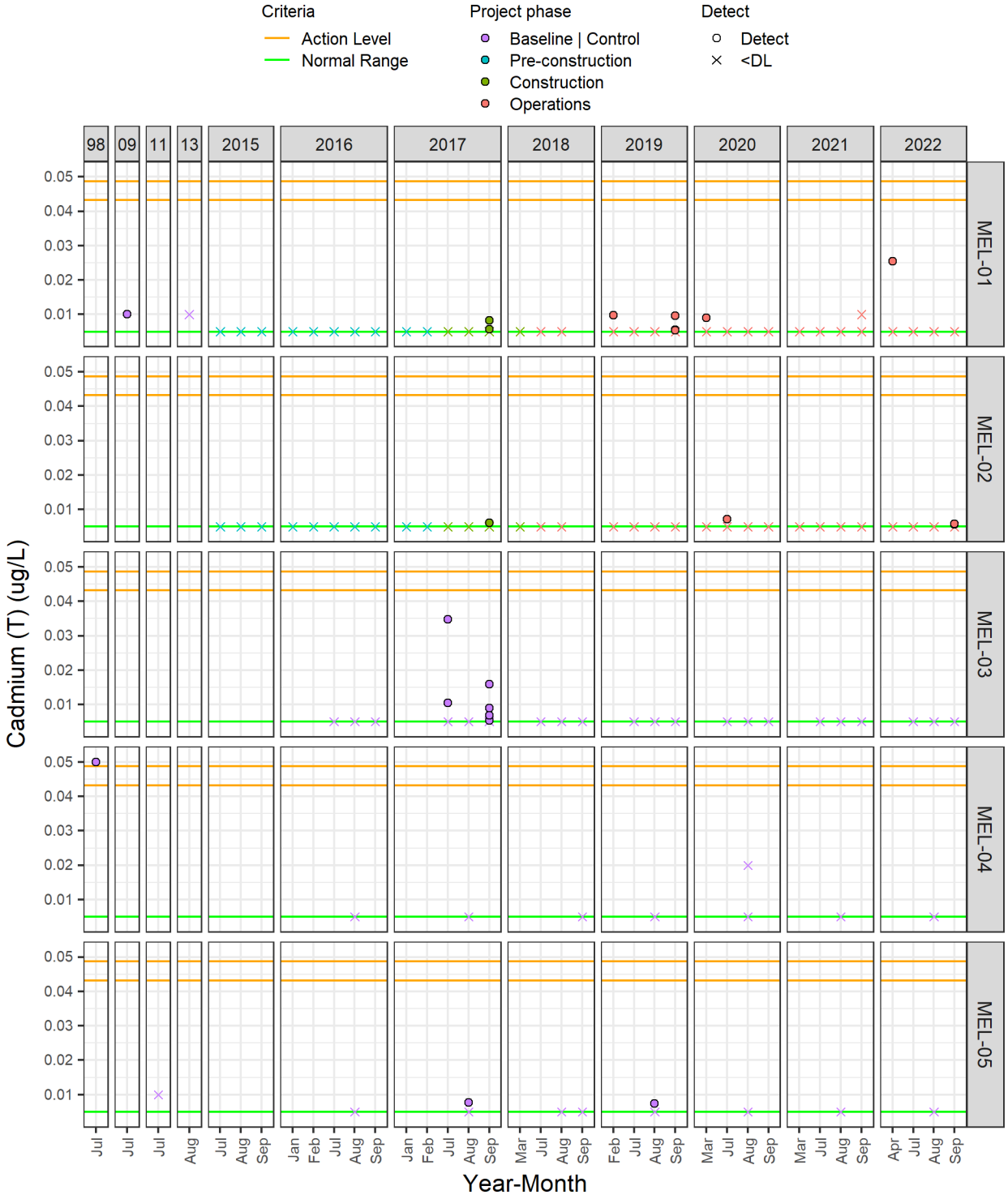


Figure C2-34. Total chromium (µg/L)

Notes: The normal range for chromium is equal to the current detection limit.

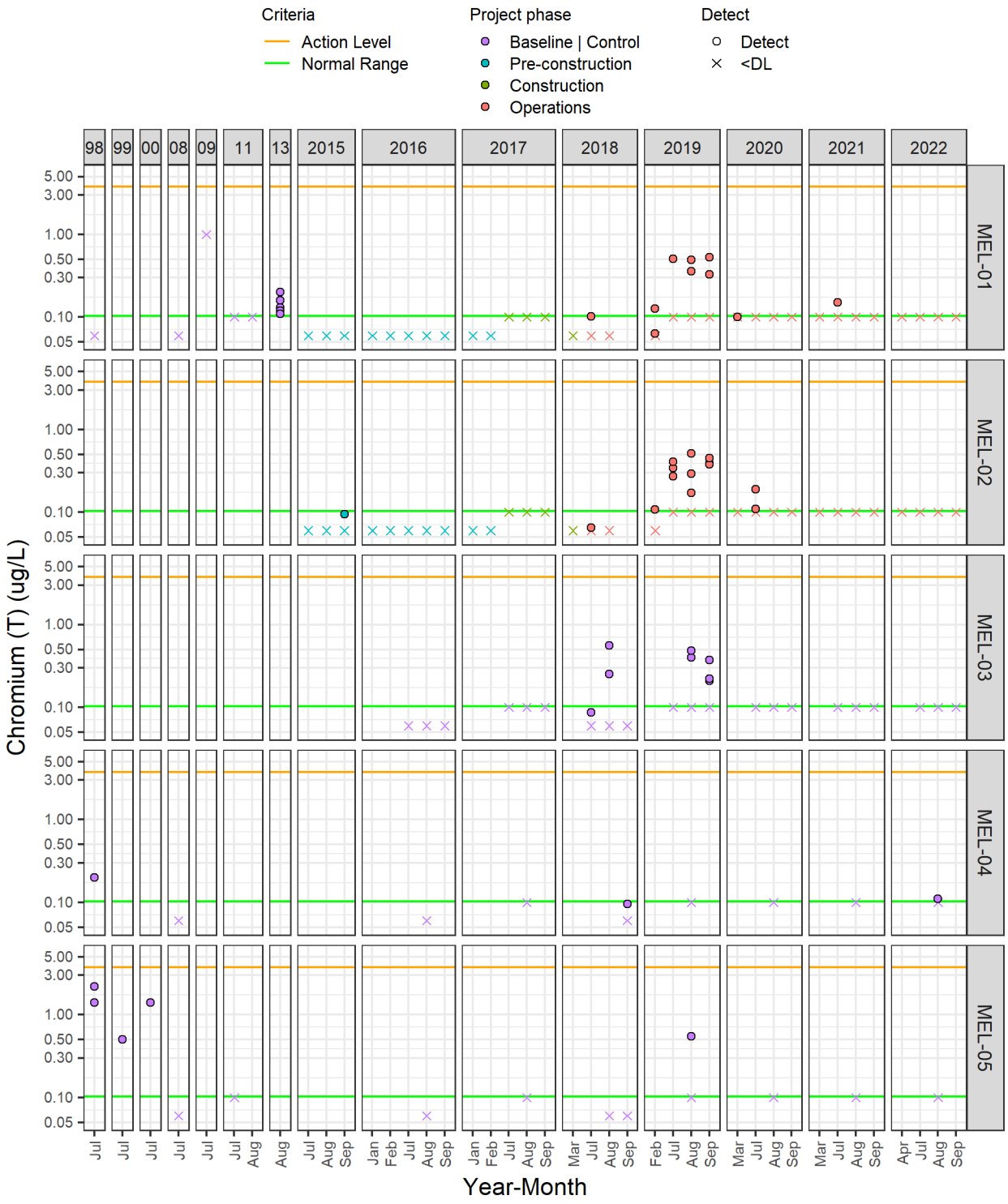


Figure C2-35. Total cobalt (µg/L)

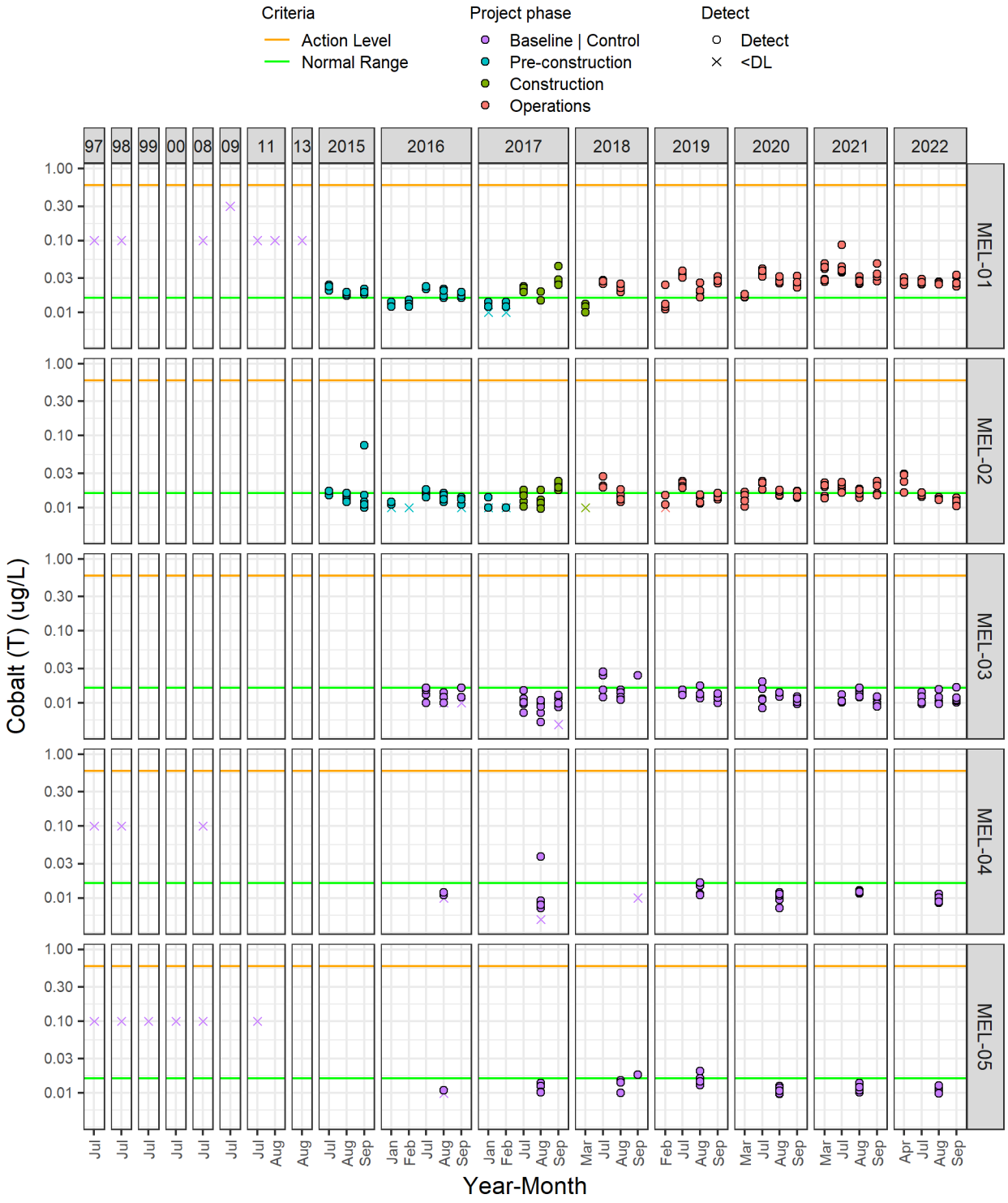


Figure C2-36. Total copper (µg/L)

Notes: The AEMP Benchmark for total copper is equal to 2 µg/L (CCME, 1987). As of 2021, the AEMP Action Level assessment for copper is based on the dissolved concentration. The new FEQG for dissolved copper is based on the biotic ligand model (ECCC, 2021). Refer to **Appendix C1** for information on the copper BLM.

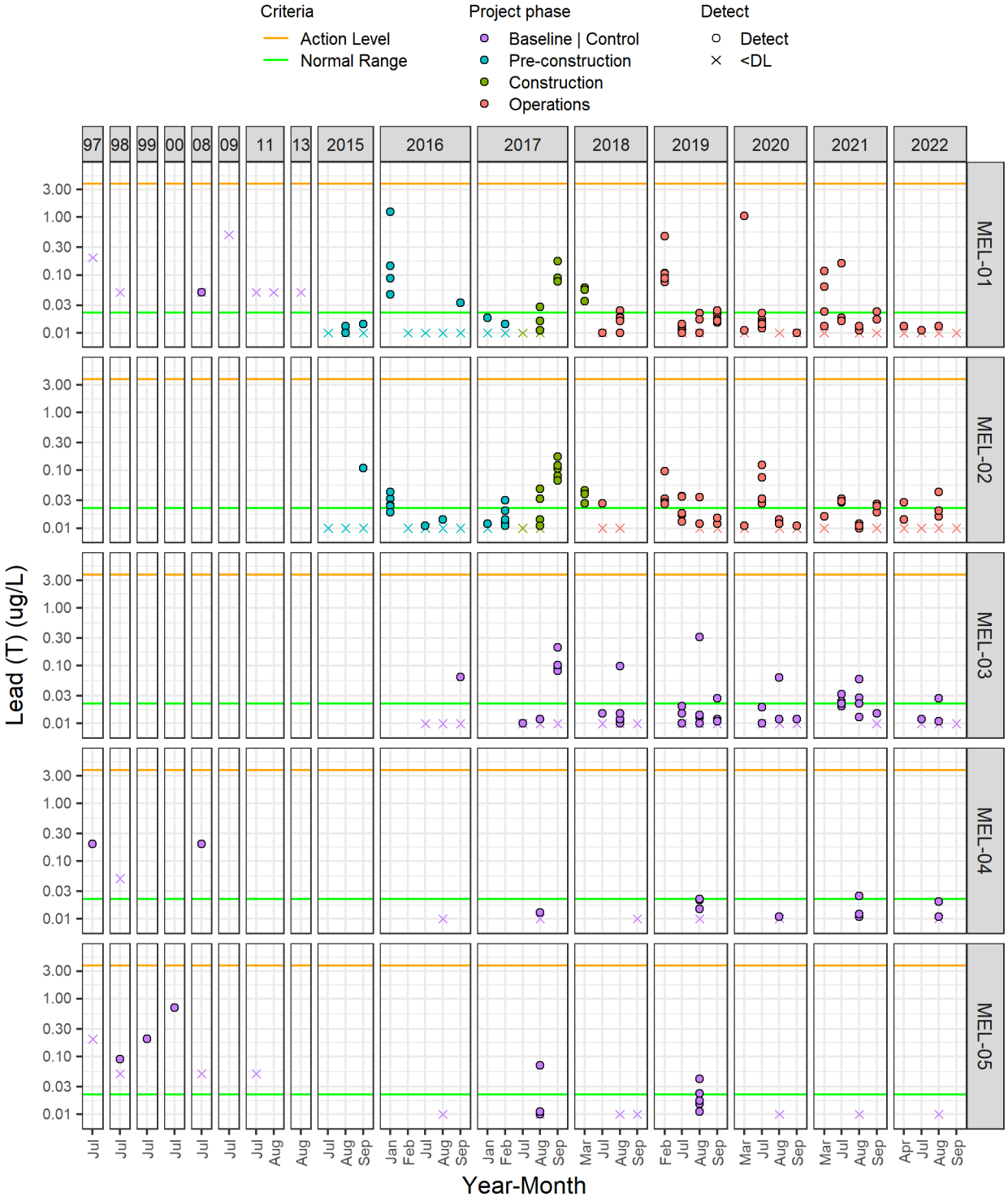


Figure C2-37. Total iron (µg/L)

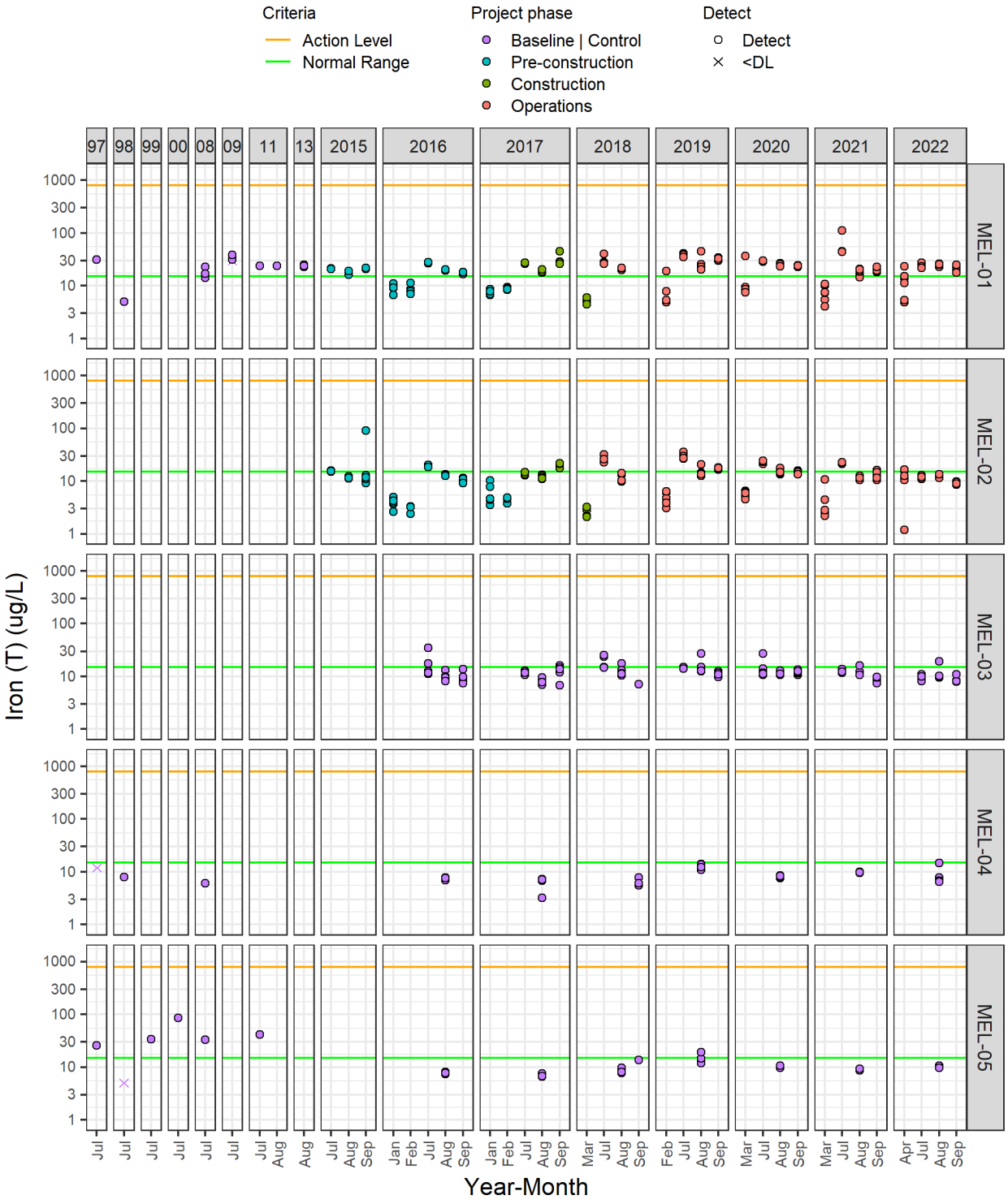


Figure C2-38. Total lead (µg/L)

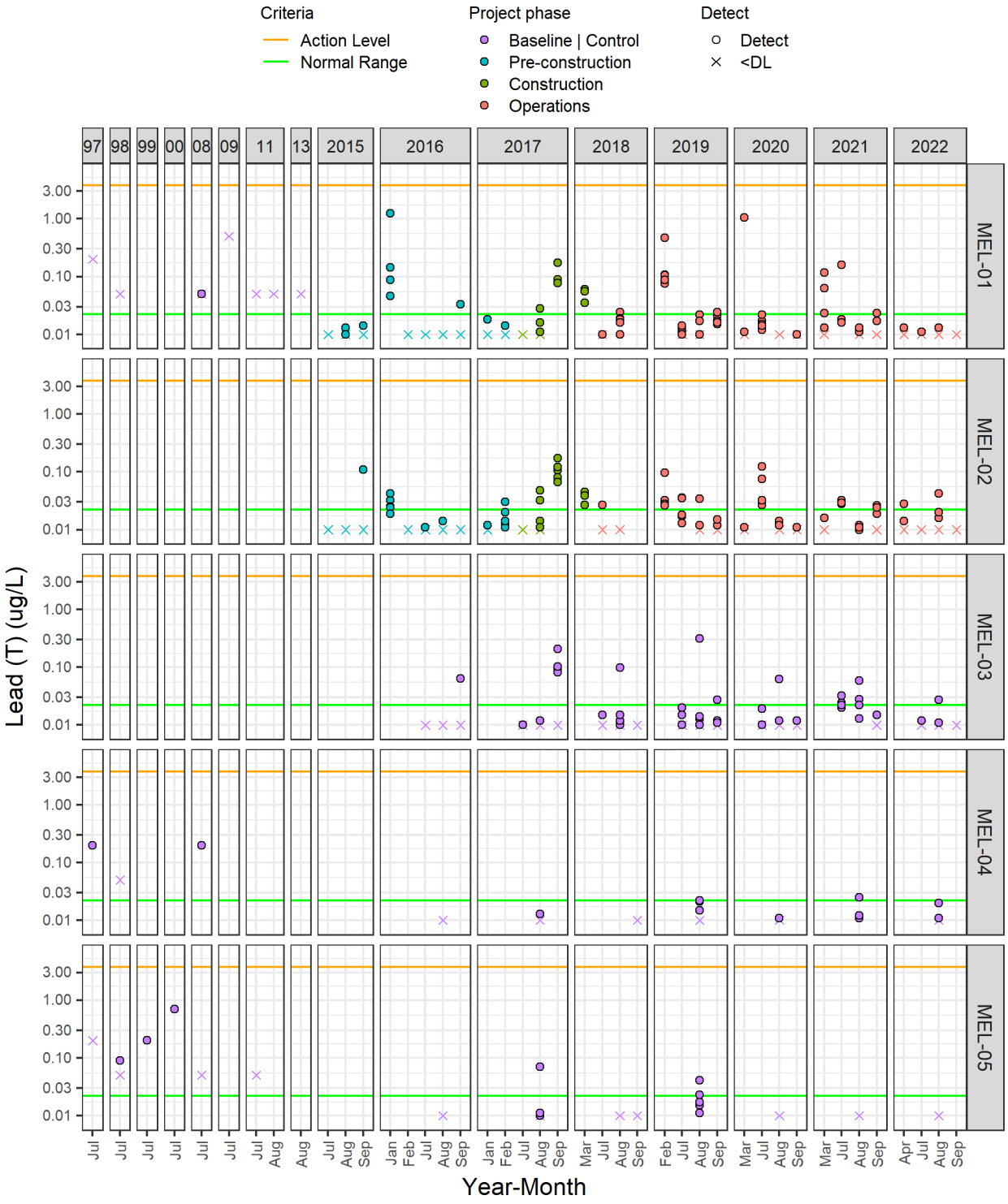


Figure C2-39. Total lithium (µg/L)

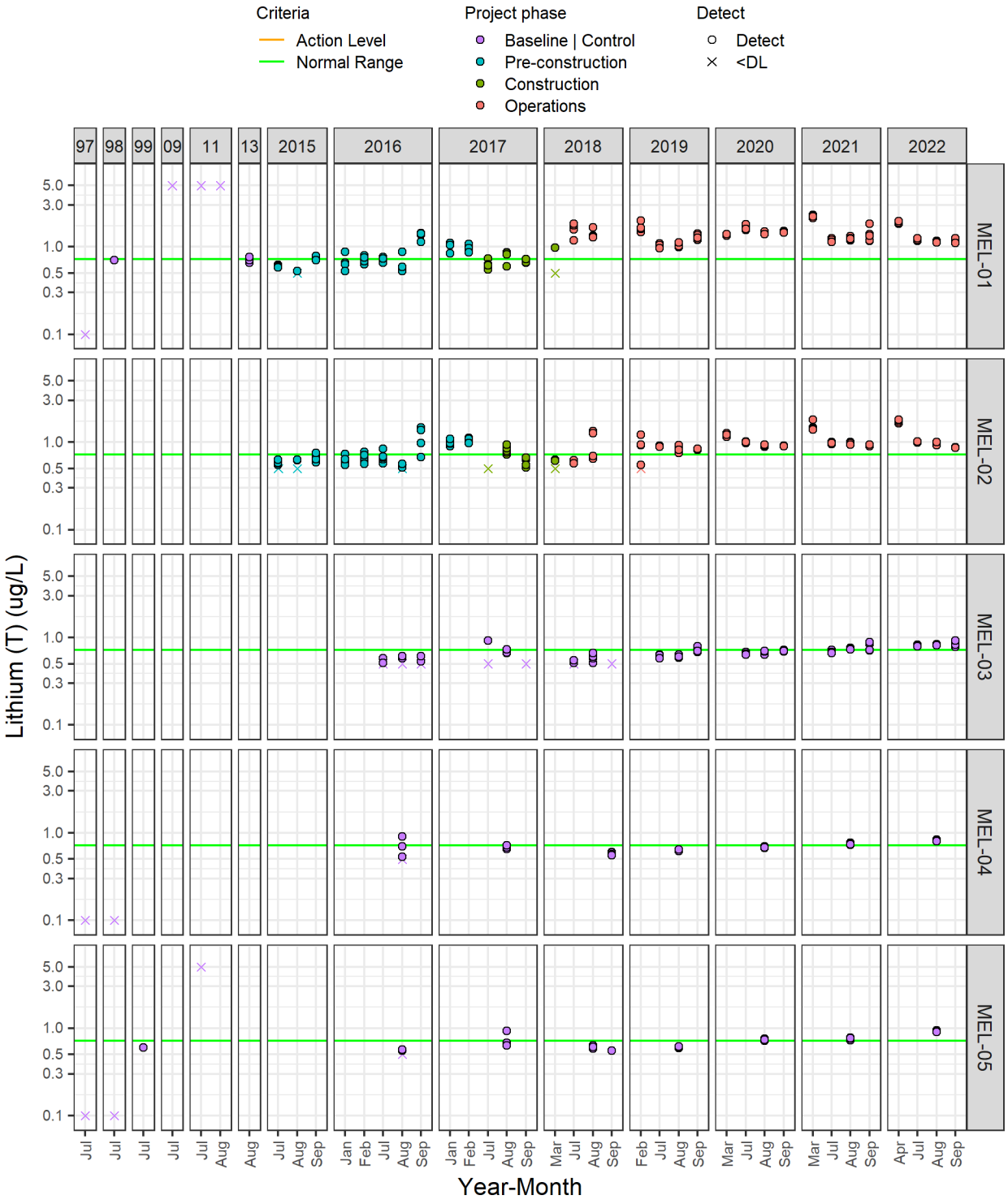


Figure C2-40. Total manganese (µg/L)

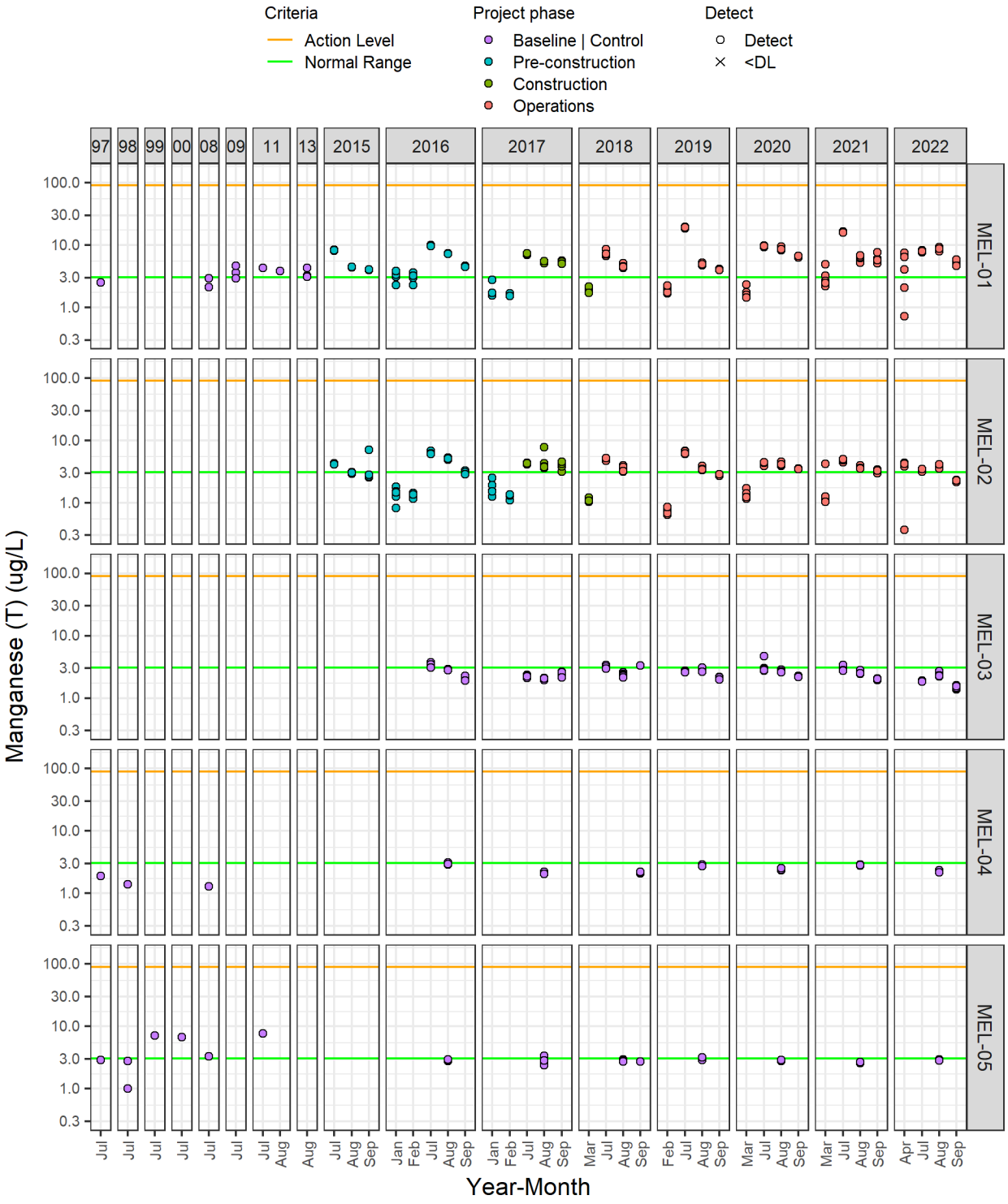


Figure C2-41. Total mercury (µg/L)

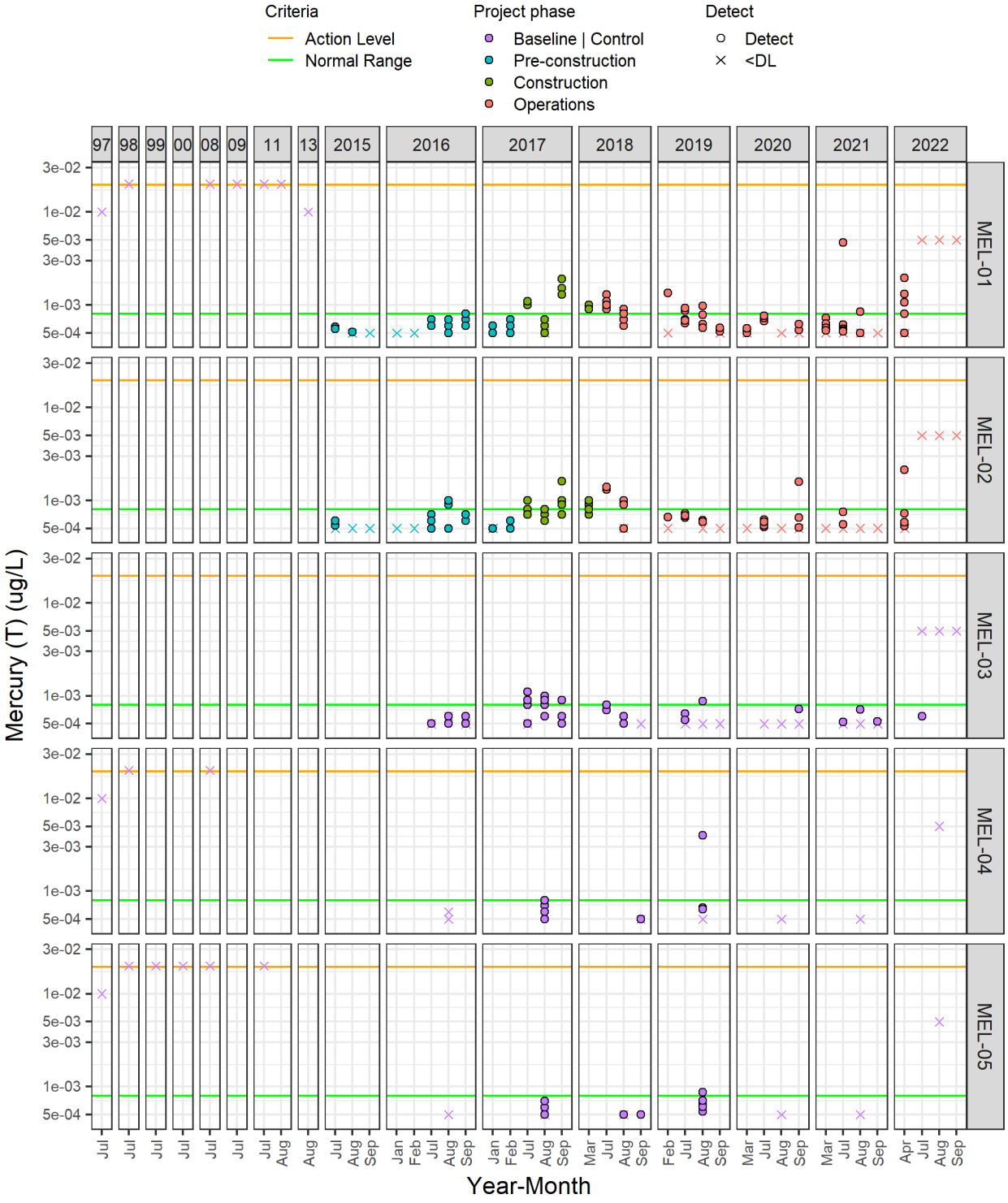


Figure C2-42. Total molybdenum (µg/L)

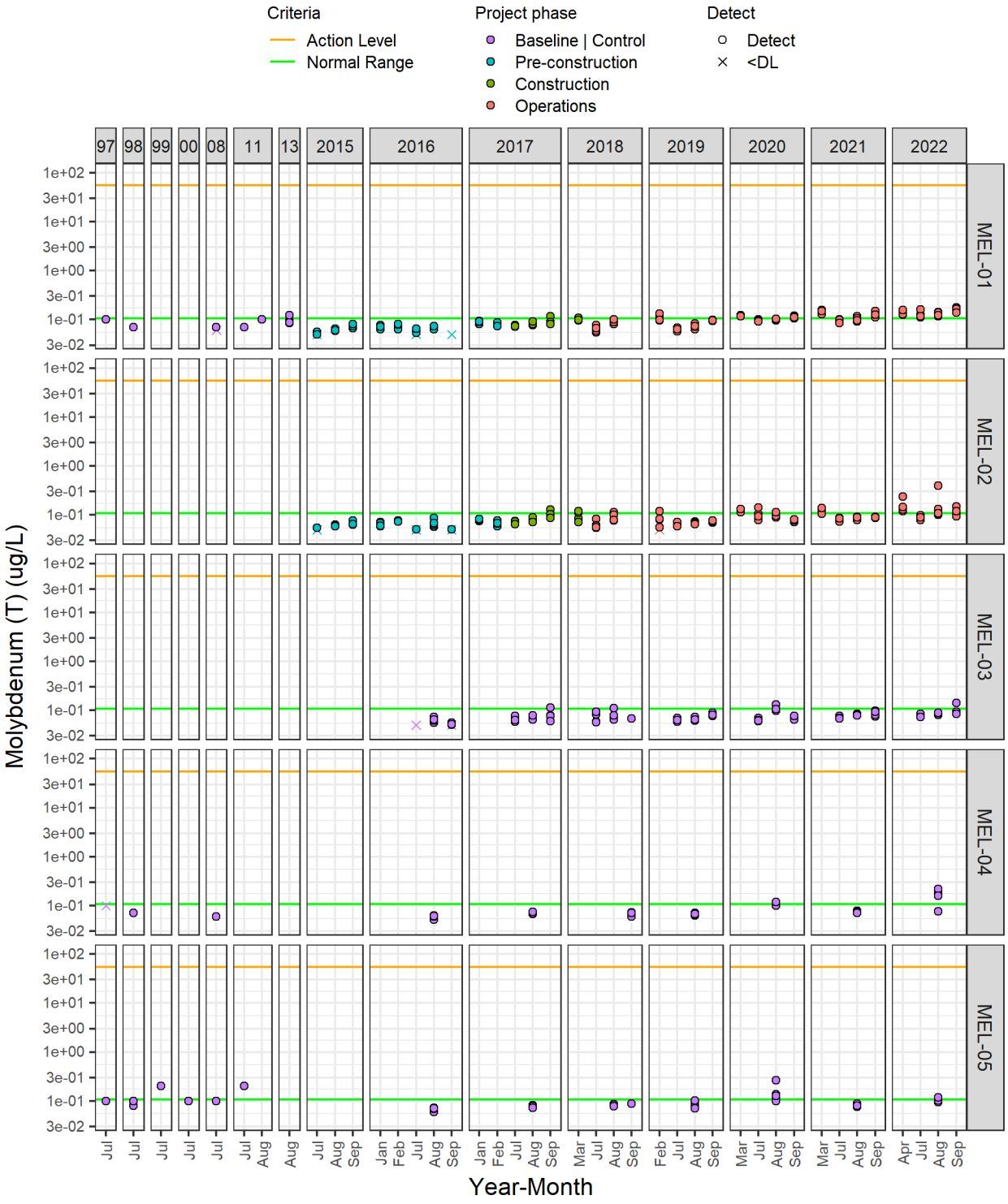


Figure C2-43. Total nickel (µg/L)

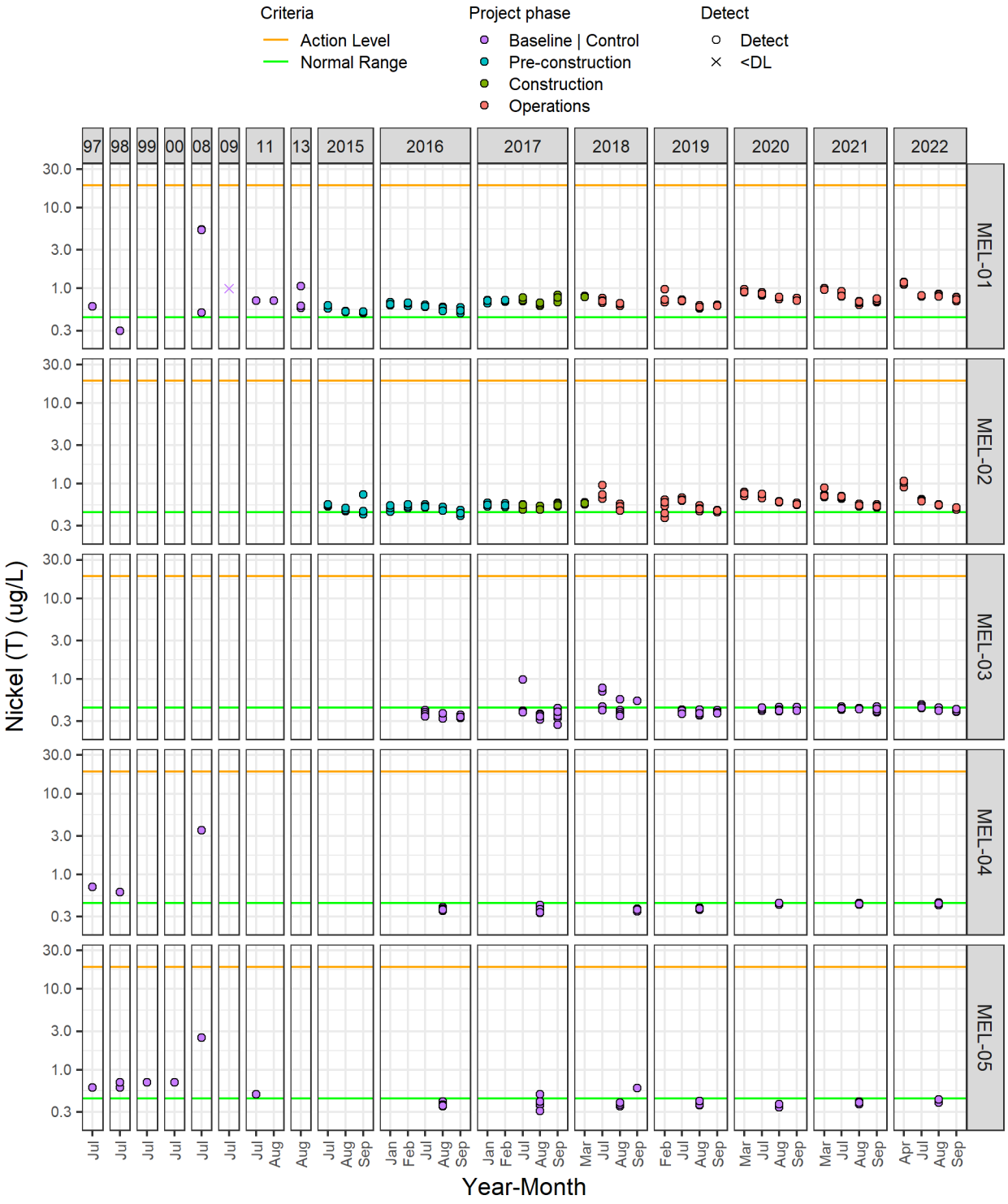


Figure C2-44. Total selenium (µg/L)

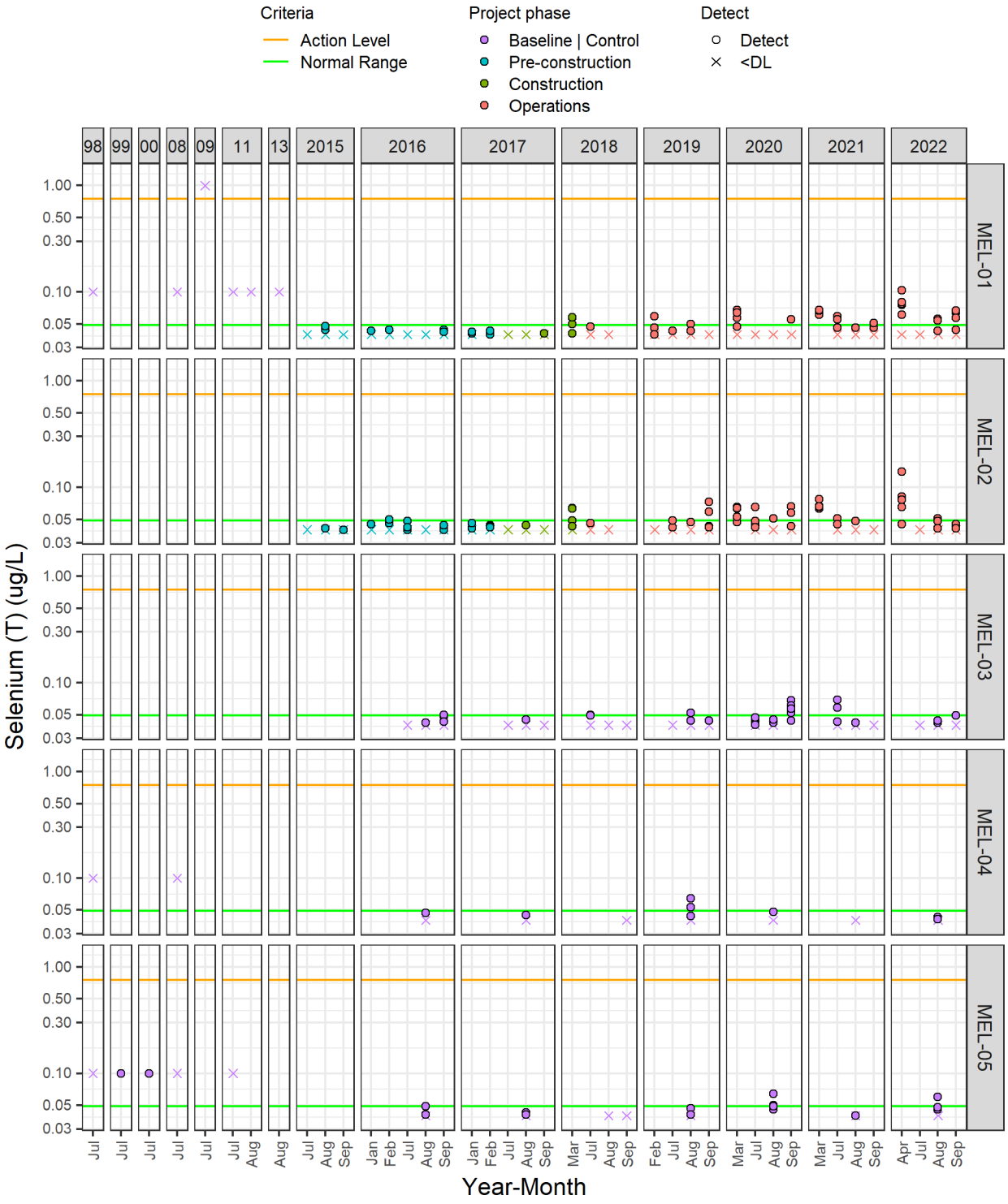


Figure C2-45. Total silver (µg/L)

Notes: The normal range for silver is equal to the current detection limit.

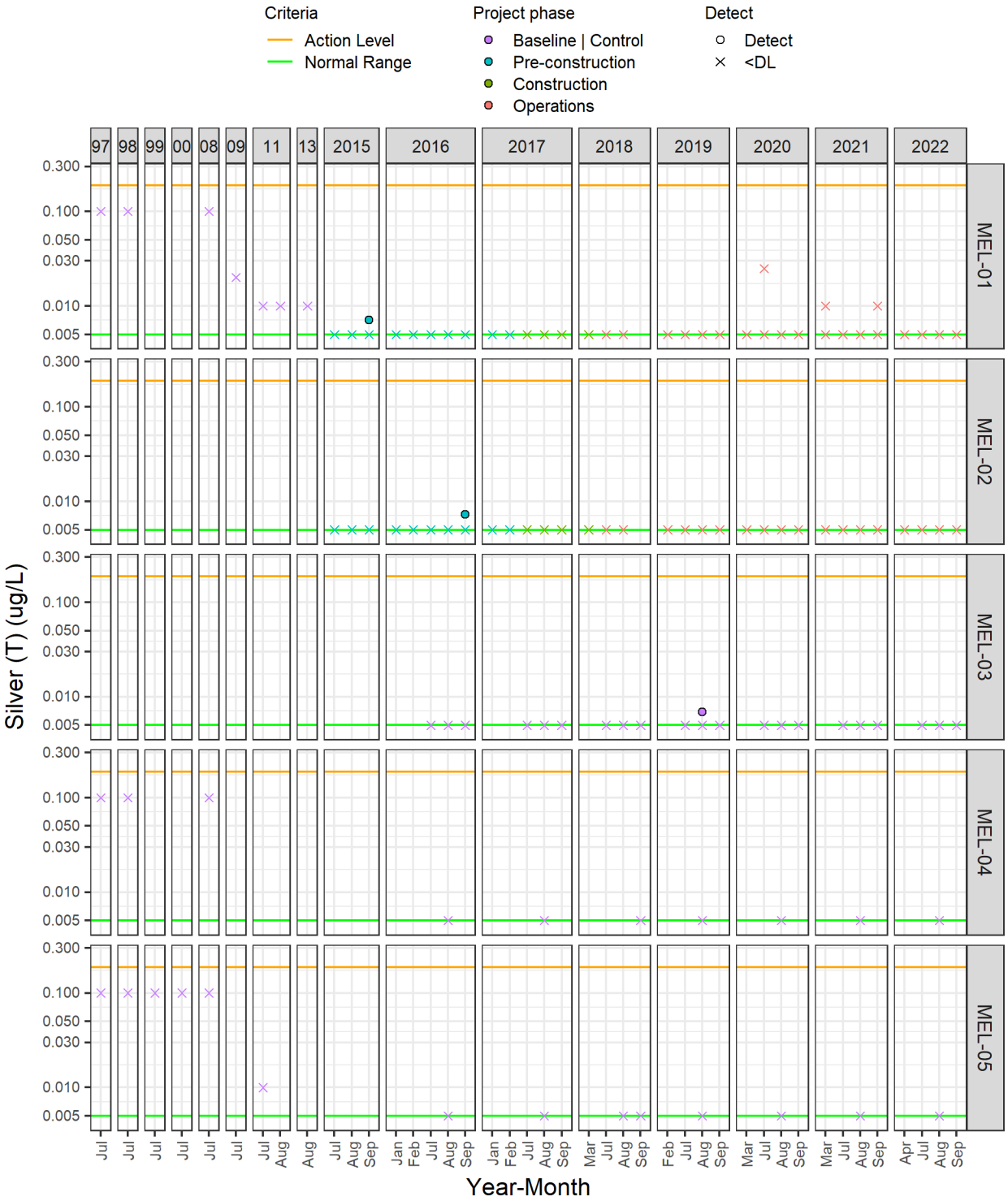


Figure C2-46. Total strontium (µg/L)

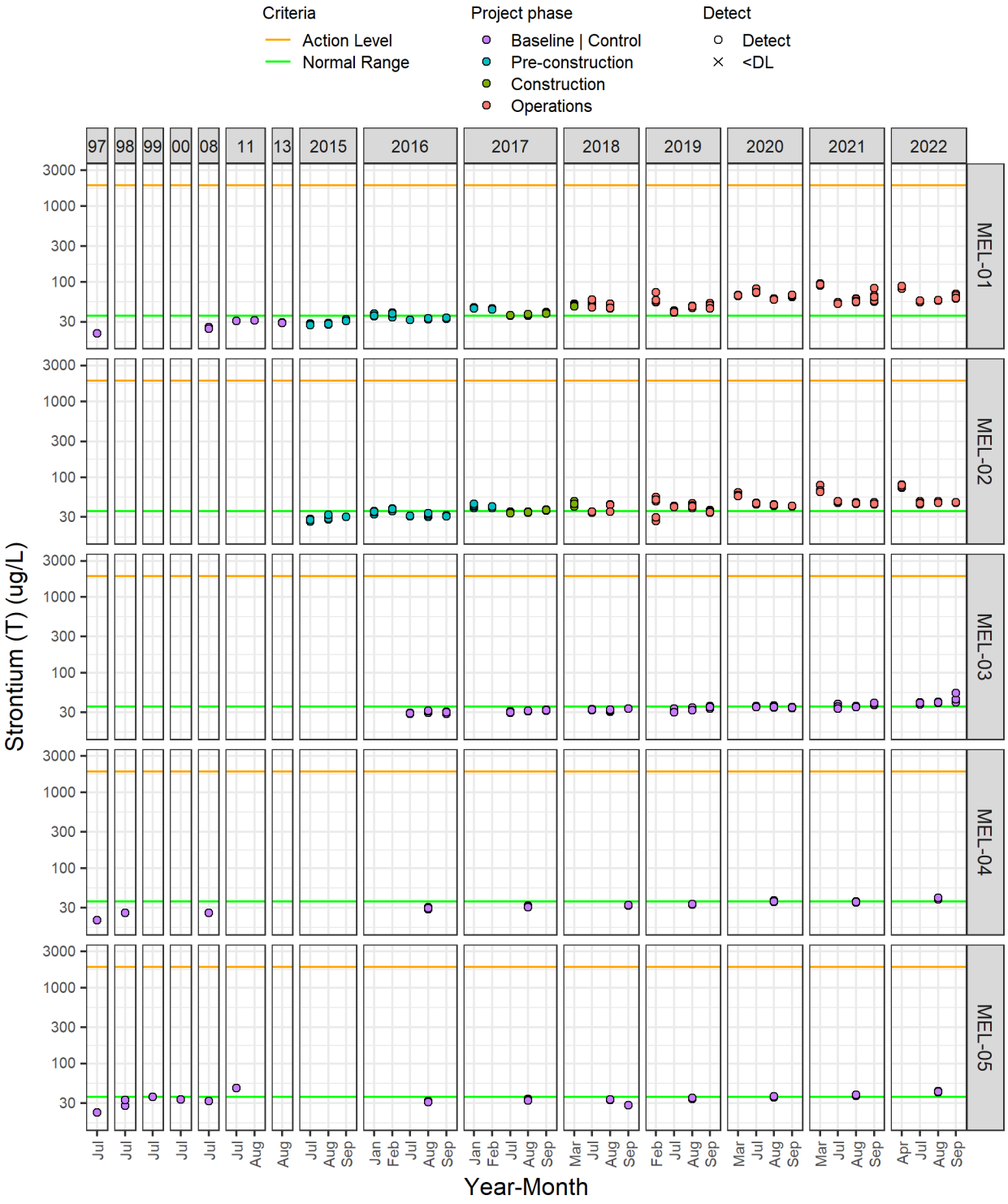


Figure C2-47. Total thallium (µg/L)

Notes: The normal range for thallium is equal to the current detection limit.

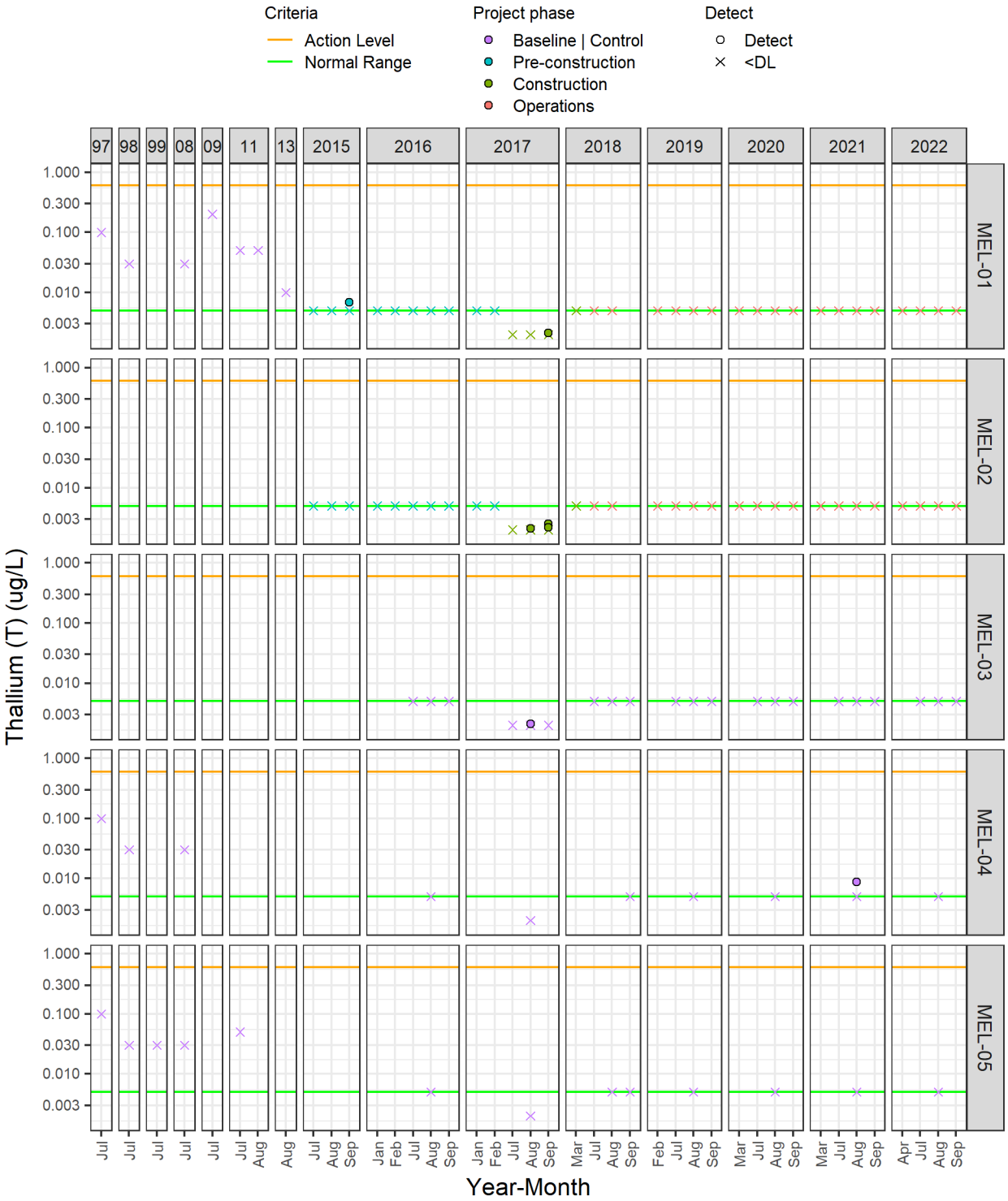


Figure C2-48. Total tin (µg/L)

Notes: The normal range for tin is equal to the current detection limit.

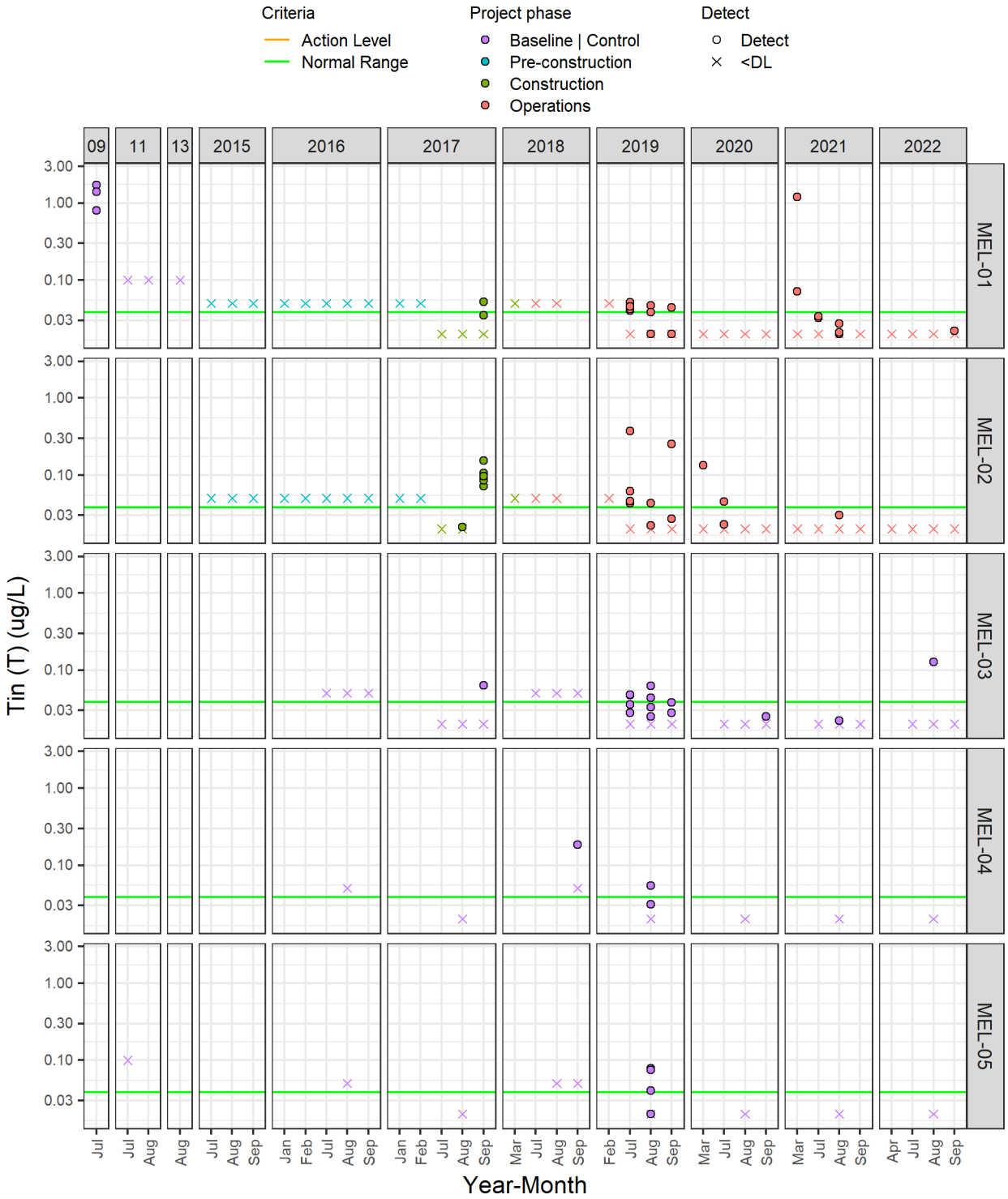


Figure C2-49. Total titanium (µg/L)

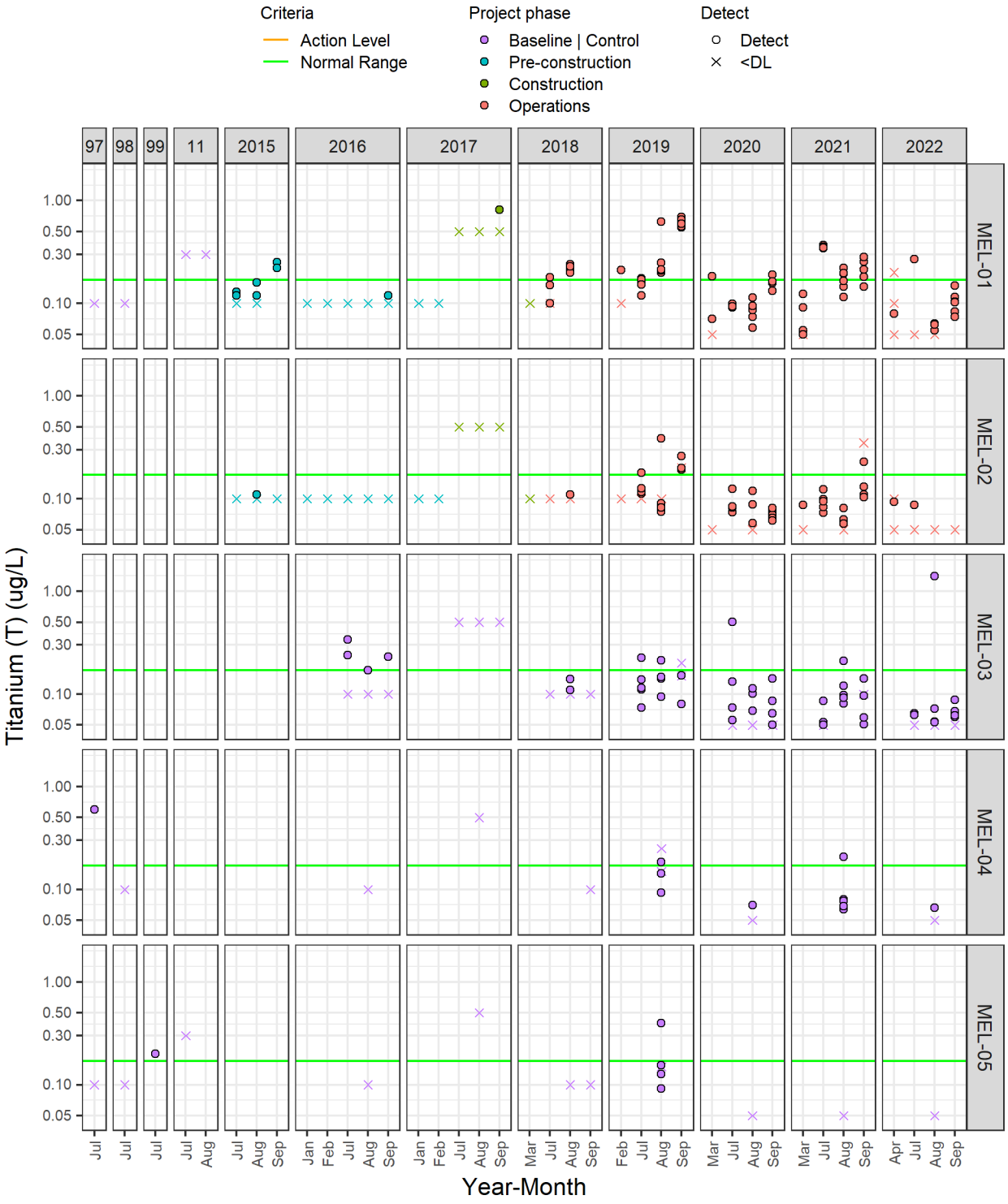


Figure C2-50. Total uranium (µg/L)

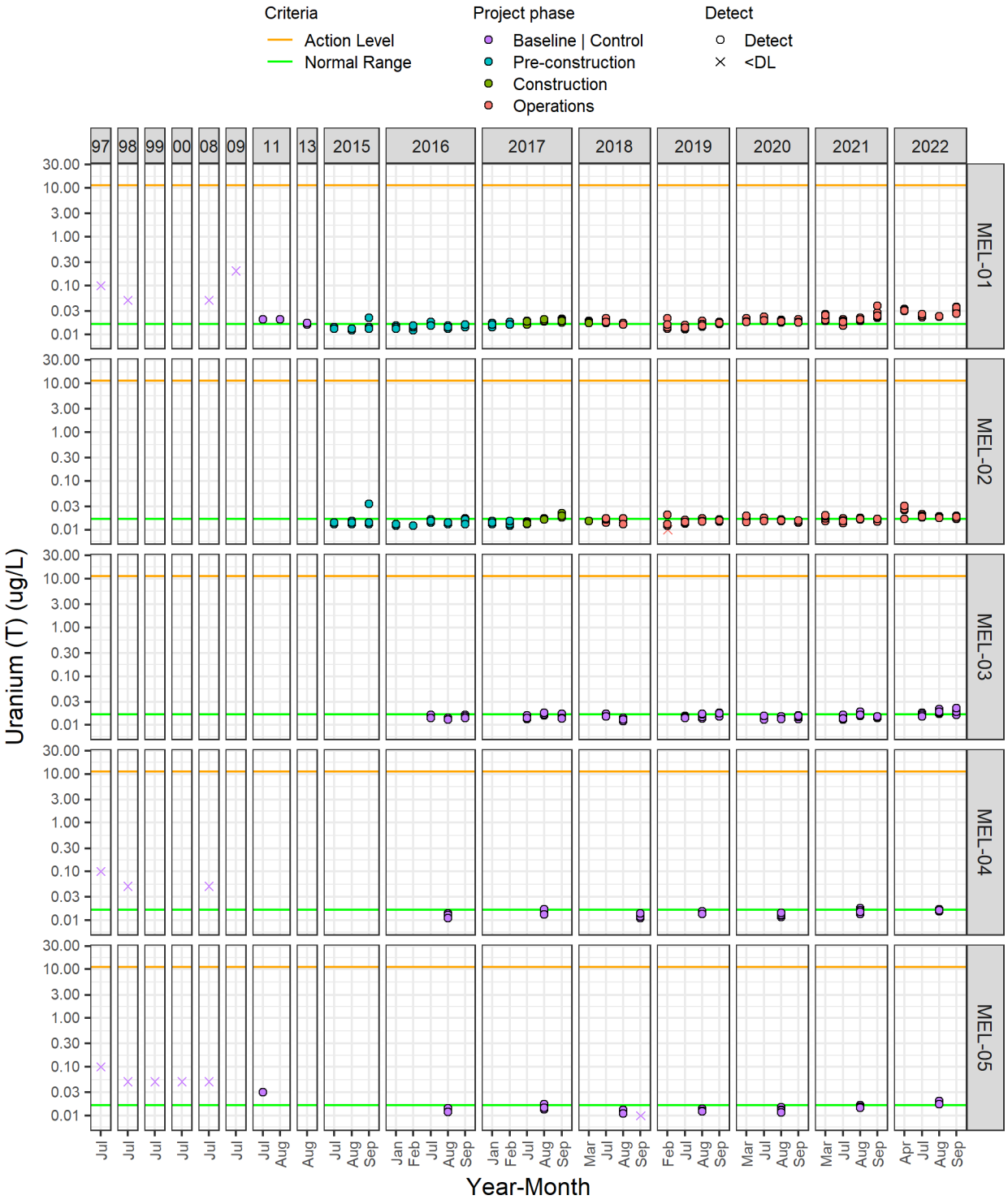


Figure C2-51. Total vanadium (µg/L)

Notes: The normal range for vanadium is equal to the current detection limit. The AEMP Action Level for Vanadium is 90 µg/L (not shown).

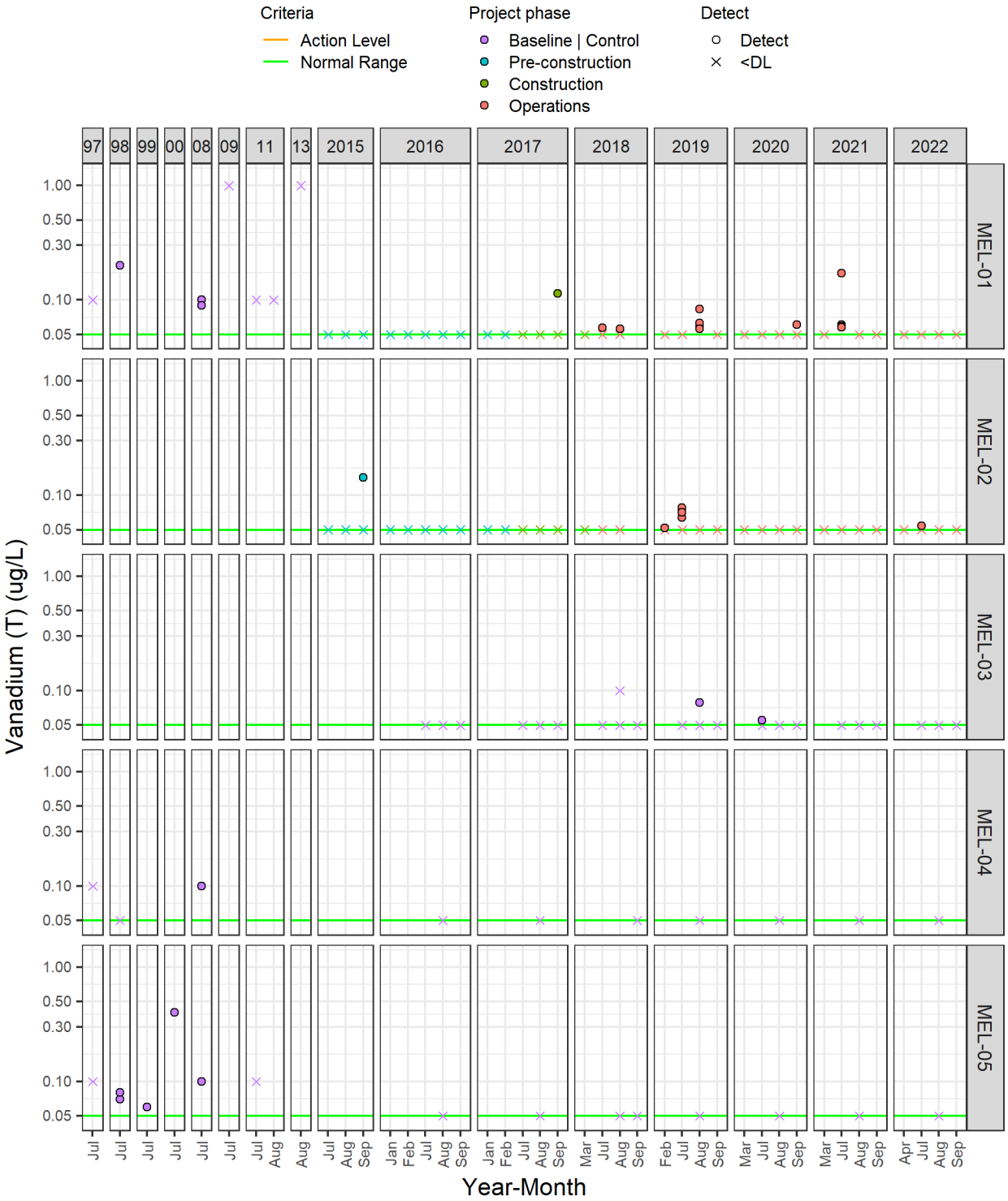


Figure C2-52. Total zinc (µg/L)

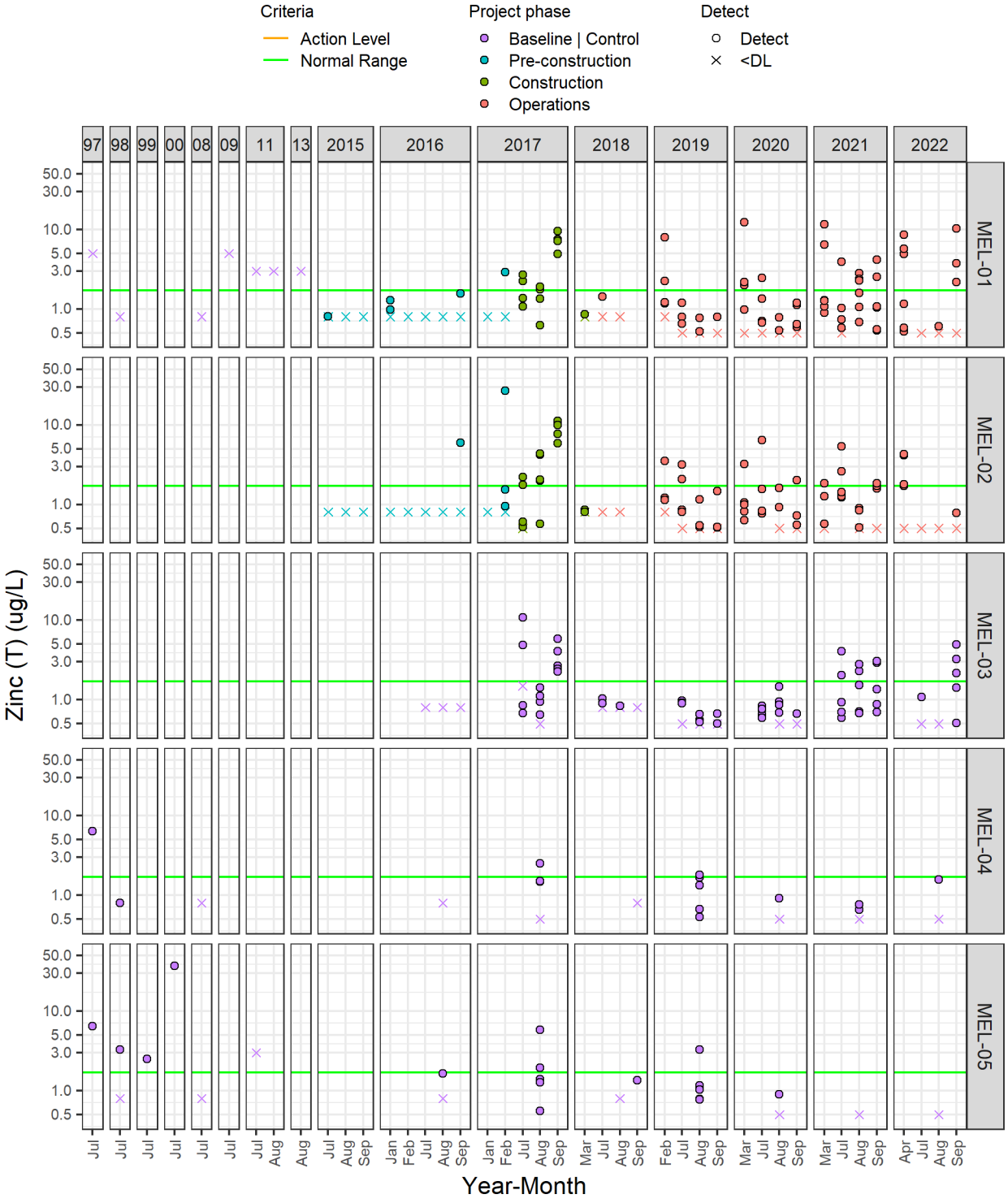


Figure C2-53. Dissolved copper (µg/L)

Notes: The AEMP Benchmark for dissolved copper is based on the copper BLM (ECCC, 2021). The Action Level shown in the figure is the highest sample-specific BLM guideline for samples from MEL-01 in 2022. Refer to **Section 3.4.2** for an in-depth discussion on the BLM water quality guideline and sample-by-sample screening results.

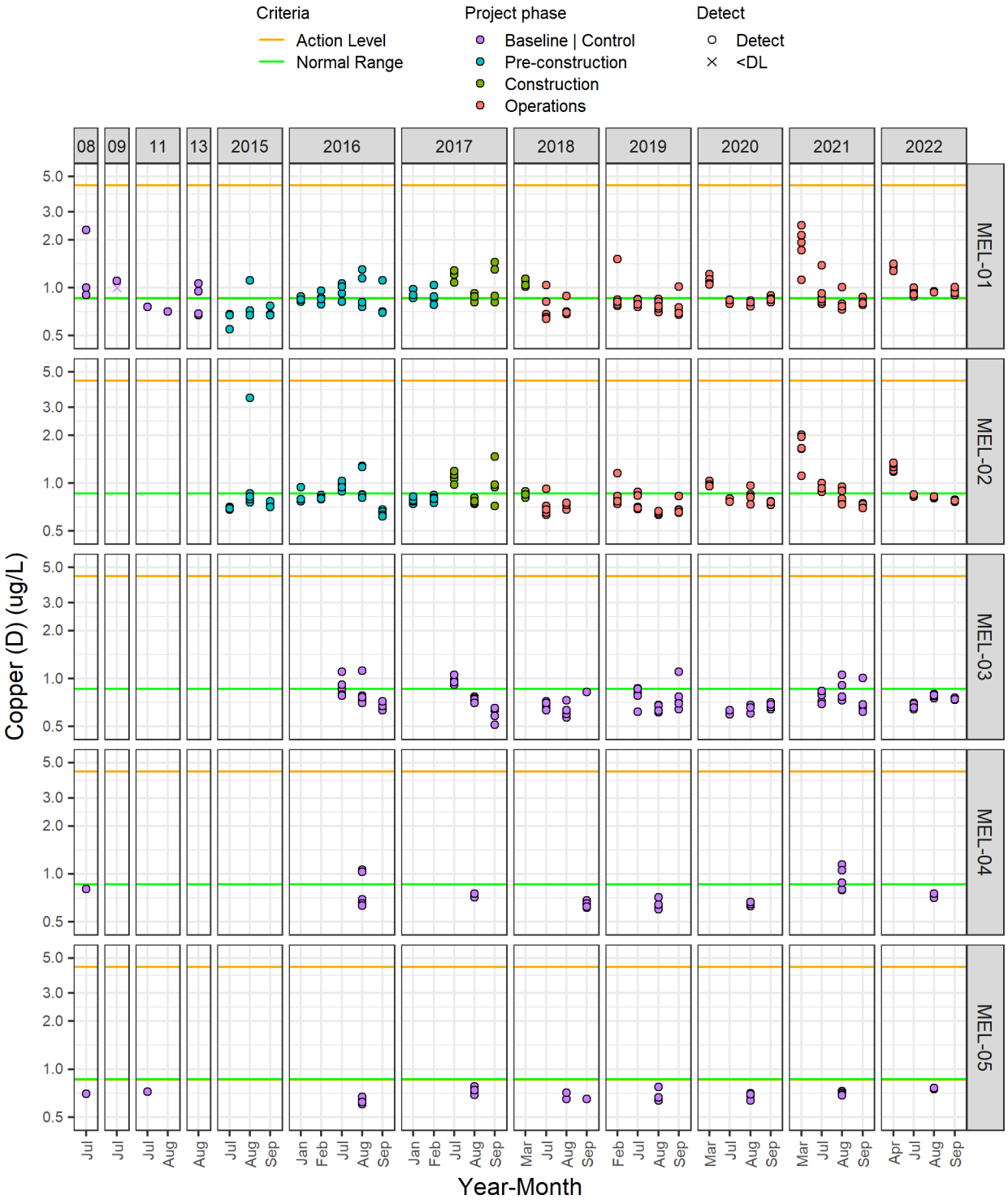


Figure C2-54. Dissolved lead (µg/L)

Notes: The two lines for the Action Level represent the range in site-specific guidelines for protection of aquatic life for open water samples at MEL-01 in 2022.

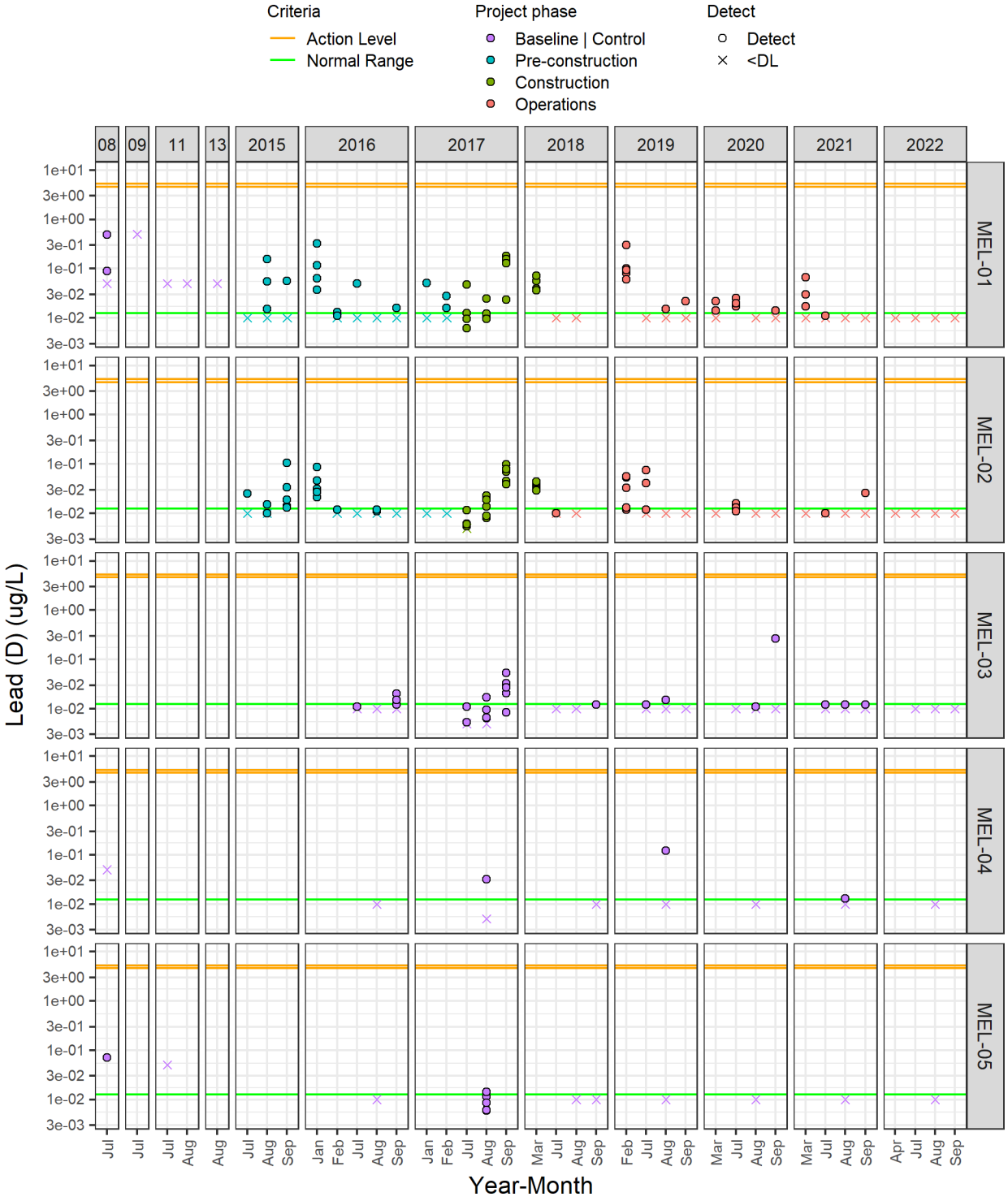


Figure C2-55. Dissolved manganese (µg/L)

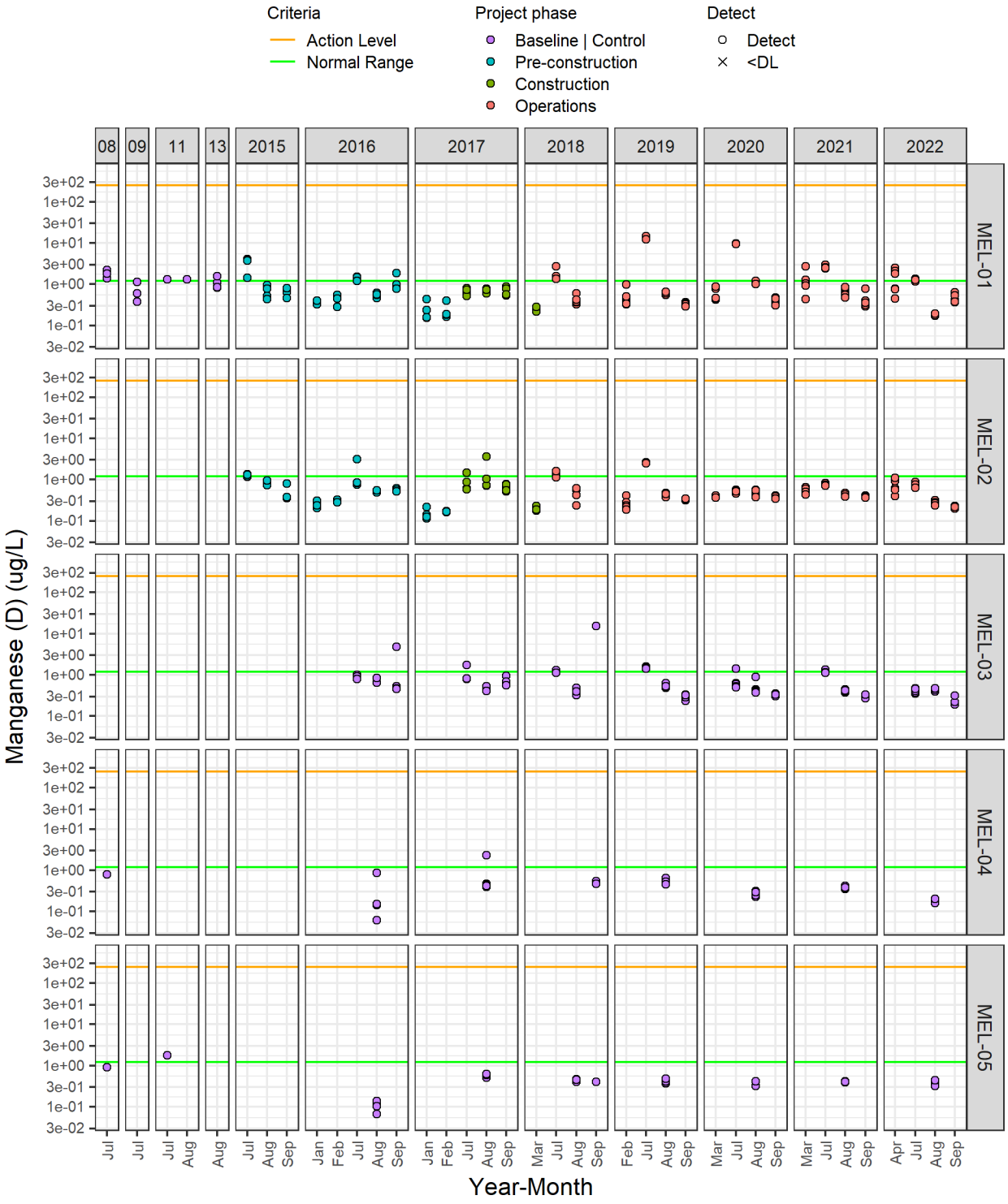
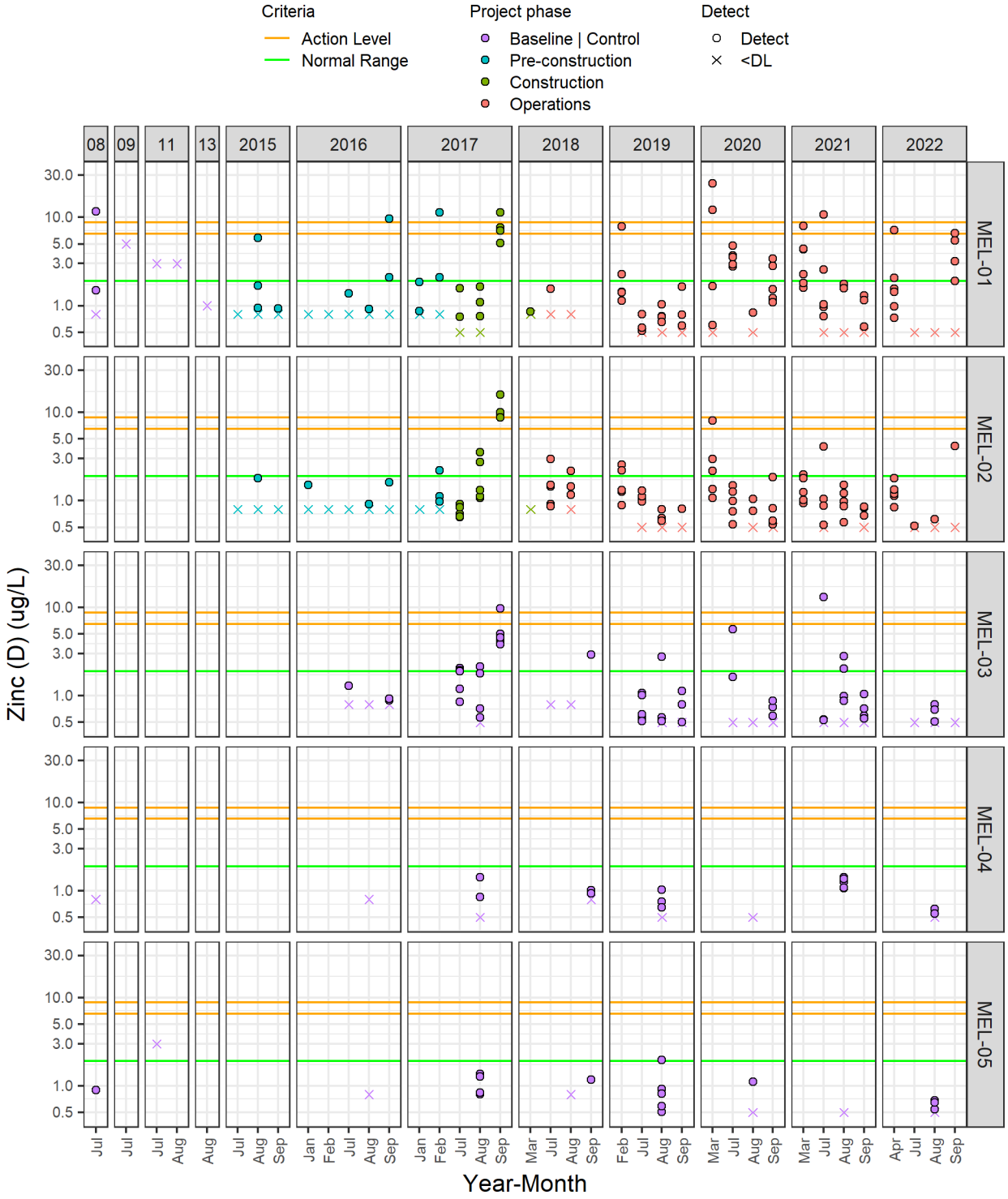


Figure C2-56. Dissolved zinc (µg/L)

Notes: The CCME guideline for dissolved zinc is hardness-dependent. The two lines for the Action Level represent the range in site-specific guidelines for protection of aquatic life for open water samples at MEL-01 in 2022.



Appendix C3
Meliadine Lake 2022 Surface Water Chemistry Results

Table C3-1. Water chemistry results from Meliadine Lake in 2022

Parameter	Units	DL (min | max)	Normal Range	FEIS[a]	FWAL[b] (min | max)	HH DW[c]	SSWQO[d]	Action Level[e] (min | max)	Benchmark[f] (min | max)	April MEL-01-01 4/6/2022	April MEL-01-06 4/6/2022	April MEL-01-07 4/6/2022	April MEL-01-08 4/6/2022	April MEL-01-09 4/6/2022	April MEL-01-10 4/6/2022	April MEL-02-02 4/7/2022	April MEL-02-03 4/7/2022
Field Measurements																	
Temperature	C	-	-	-	-	-	-	-	-	2.49	2.46	2.46	2.46	2.52	2.46	2.01	2.25
Sp. Conductivity (field)	uS/cm	-	-	-	-	-	-	-	-	151.1	152.2	151.2	151	150.9	151.9	137.7	134.5
pH (field)	pH units	-	7.1 | 7.95	-	6.5 | 9	-	-	6.5 | 9.0	6.5 | 9.0	6.55	6.5	6.53	6.62	6.53	6.54	7.16	6.98
DO (mg/L)	mg/L	-	-	-	-	-	-	6.5	6.5	16.24	15.08	15.92	15.18	15.47	15.22	16.28	15.38
DO (%)	%	-	-	-	-	-	-	-	-	121.5	112.7	118.9	113.5	115.8	113.7	120.2	114.7
Conventional Parameters																	
Conductivity (lab)	uS/cm	1	77.5	-	-	-	-	-	-	161	157	159	155	155	164	146	150
Hardness	mg/L	0.2	23.4	-	-	-	-	-	-	45.4	43.7	45	43.5	44.1	45.8	42.3	43.5
pH (lab)	pH units	0.1	-	-	6.5 | 9	-	-	6.5 | 9.0	6.5 | 9.0	7.6	7.57	7.57	7.56	7.57	7.53	7.54	7.59
Total Dissolved Solids	mg/L	13	54	68	500	-	1000	375	500	81	75	74	77	83	79	75	76
Total Dissolved Solids (Calc)	mg/L	1	39.6	68	500	-	1000	375	500	78.7	76.6	78.3	76.2	76.2	80.2	72.3	75
Total Suspended Solids	mg/L	1	1	3.1	-	-	-	-	-	*<1*	*<1*	*<1*	*<1*	*<1*	*<1*	*<1*	*<1*
Turbidity (lab)	NTU	0.1	-	-	-	-	-	-	-	0.3	0.37	0.36	0.41	0.55	0.32	0.17	0.17
Major Ions																	
Alkalinity, Bicarbonate	mg/L	1.2	25	-	-	-	-	-	-	34.6	32.9	34.2	32.8	32.8	31.8	33.7	34.8
Alkalinity, Carbonate	mg/L	0.6	-	-	-	-	-	-	-	*<0.6*	*<0.6*	*<0.6*	*<0.6*	*<0.6*	*<0.6*	*<0.6*	*<0.6*
Alkalinity, Hydroxide	mg/L	0.34	-	-	-	-	-	-	-	*<0.34*	*<0.34*	*<0.34*	*<0.34*	*<0.34*	*<0.34*	*<0.34*	*<0.34*
Alkalinity, Total	mg/L	1	20.5	-	-	-	-	-	-	28.4	27	28	26.9	26.9	26.1	27.6	28.5
Bromide	mg/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Calcium (D)	mg/L	0.01	-	-	-	-	-	-	-	14.3	13.2	13.8	13.5	13.4	14.1	13.1	13.4
Calcium (T)	mg/L	0.01	7.33	-	-	-	-	-	-	14	13.3	13.8	13.4	13.6	14	12.5	13.4
Chloride	mg/L	0.1	9.56	14	120	-	-	90	120	23.1	22.9	23	22.7	22.5	23.5	20.4	21.4
Fluoride	mg/L	0.02	0.028	0.0084	0.12	1.5	2.8	2.1	2.8	0.035	0.034	0.036	0.034	0.034	0.036	0.035	0.036
Magnesium (D)	mg/L	0.004	-	-	-	-	-	-	-	2.58	2.5	2.57	2.48	2.49	2.62	2.33	2.41
Magnesium (T)	mg/L	0.004	1.18	-	-	-	-	-	-	2.54	2.52	2.54	2.46	2.49	2.61	2.45	2.38
Potassium (D)	mg/L	0.02	-	-	-	-	-	-	-	1.86	1.74	1.77	1.7	1.71	1.82	1.74	1.77
Potassium (T)	mg/L	0.02	0.954	-	-	-	-	-	-	1.6	1.55	1.6	1.52	1.56	1.64	1.86	1.75
Reactive Silica (SiO2)	mg/L	0.01	0.268	-	-	-	-	-	-	0.57	0.574	0.566	0.545	0.525	0.561	0.385	0.445
Sodium (D)	mg/L	0.02	-	-	-	-	-	-	-	11.3	11	11.4	11.2	11	11.4	10.1	10.4
Sodium (T)	mg/L	0.02	4.85	5.3	-	-	-	-	-	10.8	11	11.1	10.9	10.8	11.4	10.5	10.2
Sulphate	mg/L	0.3	3.87	38	-	-	-	-	-	9.35	8.87	9.19	8.85	8.9	11.1	7.94	8.33
Nutrients																	
Ammonia (as N)	mg/L	0.005	0.0174	0.54	1.27	-	-	0.95	1.27	0.0099	0.0524	0.152	0.187	0.172	0.016	0.0333	0.031
Nitrate (as N)	mg/L	0.005	0.018	0.25	2.9	10	-	2.17	2.9	0.0472	0.0479	0.0468	0.0451	0.0418	0.0504	0.0191	0.034
Nitrate + Nitrite (as N)	mg/L	0.0051	-	-	-	-	-	-	-	0.0472	0.0479	0.0468	0.0451	0.0418	0.0504	0.0191	0.034
Nitrite (as N)	mg/L	0.001	0.001	0.051	0.06	1	-	0.045	0.06	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Nitrogen	mg/L	0.0051 | 0.05	-	-	-	-	-	-	-	0.381	0.425	0.521	0.556	0.557	0.359	0.428	0.39
Orthophosphate (PO4-P)	mg/L	0.001	0.001	-	-	-	-	-	-	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	0.0015
Total Diss Phosphorus	mg/L	0.001 | 0.003	0.00314	-	-	-	-	-	-	0.0024	0.0057	0.003	0.0039	0.0042	0.0054	0.002	0.0033
Total Dissolved Nitrogen	mg/L	0.05	-	-	-	-	-	-	-	0.355	0.404	0.356	0.434	0.382	0.374	0.498	0.449
Total Kjeldahl Nitrogen	mg/L	0.05	0.25	-	-	-	-	-	-	0.334	0.377	0.474	0.511	0.515	0.308	0.409	0.356
Total Kjeldahl Nitrogen (diss)	mg/L	0.05	-	-	-	-	-	-	-	0.308	0.356	0.309	0.389	0.341	0.323	0.479	0.415
Total Phosphorus	mg/L	0.001 | 0.003	0.006	0.0049	-	-	-	-	-	0.0055	0.0091	0.0061	0.0087	0.0074	0.0058	0.007	0.0089
Organic/Inorganic Carbon																	
Dissolved Organic Carbon	mg/L	0.5	2.72	-	-	-	-	-	-	5.4	5.01	5.16	4.99	5.06	5.38	4.79	4.93
Total Organic Carbon	mg/L	0.5	3	-	-	-	-	-	-	5.25	5.04	4.99	5.08	5.12	5.16	4.85	4.9
Total Metals																	
Aluminum (T)	ug/L	1	5.32	9.1	100	-	-	75	100	3.7	*<1*	1	4.3	5.3	1.6	*<1*	1.9
Antimony (T)	ug/L	0.02	0.02	0.51	-	6	-	4.5	6	0.027	0.022	0.024	0.021	0.023	0.022	*<0.02*	*<0.02*
Arsenic (T)	ug/L	0.02	0.275	3.8	5	10	25	18.8	25	0.747	0.545	0.552	0.542	0.598	0.547	0.695	0.746
Barium (T)	ug/L	0.02	8.05	77	-	1000	-	750	1000	13.1	12.6	12.9	12.6	13.2	13.3	13.4	14
Beryllium (T)	ug/L	0.005	0.005	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Bismuth (T)	ug/L	0.005	0.005	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Boron (T)	ug/L	5	6.52	23	1500	5000	-	1120	1500	11	10.3	11	10.4	10.6	10.9	9.6	10.6
Cadmium (T)	ug/L	0.005	0.005	0.05	0.047 | 0.0649	5	-	0.0352 | 0.0487	0.047 | 0.0649	*<0.005*	0.0254	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Cesium (T)	ug/L	0.005	-	-	-	-	-	-	-	0.011	0.0112	0.0117	0.0101	0.0114	0.0105	0.0102	0.0109
Chromium (T)	ug/L	0.1	0.103	1.1	5	50	-	3.75	5	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Cobalt (T)	ug/L	0.005	0.016	-	0.78	-	-	0.585	0.78	0.029	0.0244	0.0241	0.0292	0.0306	0.0266	0.0161	0.0229
Copper (T)	ug/L	0.05	0.86	2	-	2000	-	1500	2000	1.36	1.35	1.4	1.26	1.27	1.3	1.04	1.27
Gallium (T)	ug/L	0.05	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Iron (T)	ug/L	1	15	42	300	-	1060	795	1060	13.8	4.9	5.3	15.3	23.3	11.3	1.2	10.4
Lanthanum (T)	ug/L	0.01	-	-	-	-	-	-	-	0.038	0.027	0.028	0.034	0.041	0.036	0.017	0.038
Lead (T)	ug/L	0.01	0.0222	0.15	-	5	-	3.75	5	0.013	*<0.01*	*<0.01*	*<0.01*	0.013	*<0.01*	*<0.01*	*<0.01*
Lithium (T)	ug/L	0.5	0.72	-	-	-	-	-	-	1.95	1.83	1.92	1.88	1.89	1.95	1.63	1.73
Manganese (T)	ug/L	0.05	3.06	5.5	-	120	-	90	120	4.08	0.724	2.07	7.49	6.41	4.08	0.37	4.31
Mercury (T)	ug/L	5e-04 | 0.005	8.00E-04	0.02	0.026	1	-	0.0195	0.026	0.00107	0.0008	0.00195	0.0005	*<5e-04*	0.00131	0.00053	*<5e-04*
Molybdenum (T)	ug/L	0.05	0.107	5.2	73	-	-	54.8	73	0.153	0.133	0.157	0.126	0.129	0.156	0.234	0.118
Nickel (T)	ug/L	0.05	0.441	2.7	25	-	-	18.8	25	1.2	1.15	1.2	1.12	1.14	1.19	0.899	1.04
Niobium (T)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Phosphorus (T)	ug/L	50	-	-	-	-	-	-	-	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*
Rhenium (T)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Rubidium (T)	ug/L	0.005	-	-	-	-	-	-	-	2.07	2	2.06	1.93	1.99	2.13	2.25	2.13
Selenium (T)	ug/L	0.04	0.049	0.16	1	50	-	0.75	1	0.104	0.076	0.077	0.08	0.061	*<0.04*	0.082	0.045
Silicon (T)	ug/L	50	-	-	-	-	-	-	-	367	277	294	293	275	286	193	215
Silver (T)	ug/L	0.005	0.005	0.1	0.25	-	-	0.188	0.25	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Strontium (T)	ug/L	0.02	36.1	-	2500	7000	-	1880	2500	84.9	85.5	86.2	83.9	81.7	89	72.6	77.7
Sulfur (T)	ug/L	500	-	-	-	-	-	-	-	3350	3090	3290	2960	3330	3450	2970	3670
Tantalum (T)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Tellurium (T)	ug/L	0.02	-	-	-	-	-	-	-	0.02	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Thallium (T)	ug/L	0.005	0.005	0.1	0.8	-	-	0.6	0.8	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Thorium (T)	ug/L	0.005 | 0.01	-	-	-	-	-	-	-	0.0059	*<0.005*	*<0.005*	0.0067	0.0067	0.0055	0.0081	*<0.005*
Tin (T)	ug/L	0.02	0.0384	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Titanium (T)	ug/L	0.05	0.17	-	-	-	-	-	-	0.079	*<0.05*	*<0.05*	*<0.1*	*<0.2*	*<0.05*	*<0.05*	*<0.05*
Tungsten (T)	ug/L	0.01	-	-	-	-	-	-	-	*<0.01*	*<0.01*	*<0.01*	*<0.01*	0.016	*<0.01*	0.111	*<0.01*
Uranium (T)	ug/L	0.001	0.0164	1.5	15	20	-	11.2	15	0.0323	0.0296	0.0332	0.0312	0.0304	0.0305	0.0164	0.0252
Vanadium (T)	ug/L	0.05	0.05	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Yttrium (T)	ug/L	0.005	-	-	-	-	-	-	-	0.0138	0.0147	0.0146	0.0116	0.0142	0.0138	0.0057	0.0122
Zinc (T)	ug/L	0.5	1.7	6.7	-	-	-	-	-	4.88	1.15	5.74	0.52	8.55	0.58	*<0.5*	1.7
Zirconium (T)	ug/L	0.01	-	-	-	-	-	-	-	0.019	0.015	0.014	0.014	0.018	0.015	0.022	0.015
Dissolved Metals																	
Aluminum (D)	ug/L	1	-	-	-	-	-	-	-	1.5	*<1*	1.2	*<1*	3.5	1.5	*<1*	1.1
Antimony (D)	ug/L	0.02	-	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	0.023	*<0.02*	*<0.02*
Arsenic (D)	ug/L	0.02	-	-	-	-	-	-	-	0.58	0.562	0.55	0.538	0.561	0.594	0.647	0.716
Barium (D)	ug/L	0.02	-	-	-	-	-	-	-	13.9	13.1	13.7	13	13	13.8	13.8	13.9
Beryllium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Bismuth (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Boron (D)	ug/L	5	-	-	-	-	-	-	-	11	10.1	10.6	10.1	10.4	10.8	9.8	10.3
Cadmium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Cesium (D)	ug/L	0.005	-	-	-	-	-	-	-	0.0102	0.0113	0.0096	0.0111	0.0101	0.0109	0.0094	0.0107
Chromium (D)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Cobalt (D)	ug/L	0.005	-	-	-	-	-	-	-	0.0262	0.0233	0.0322	0.0221	0.0239	0.0259	0.0176	0.0171
Copper (D)	ug/L	0.05	0.861	-	1.14 | 5.85	-	-	0.858 | 4.39	1.14 | 5.85	1.38	1.38	1.42	1.28	1.27	1.41	1.18	1.2
Gallium (D)	ug/L	0.05	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Iron (D)	ug/L	1	-	-	-	-	-	-	-	5.6	4.9	5.2	4.5	10	6.2	2.9	3.5
Lanthanum (D)	ug/L	0.01	-	-	-	-	-	-	-	0.03	0.029	0.03	0.028	0.032	0.035	0.031	0.026
Lead (D)	ug/L	0.01	0.0125	-	4.71 | 6.99	-	-	3.53 | 5.24	4.71 | 6.99	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Lithium (D)	ug/L	0.5	-	-	-	-	-	-	-	1.8	1.68	1.77	1.73	1.73	1.81	1.62	1.66
Manganese (D)	ug/L	0.05	1.2	-	210 | 330	-	-	158 | 248	210 | 330	2.46	0.785	2.09	0.445	0.746	1.81	0.913	0.396
Mercury (D)	ug/L	5e-04 | 0.005	-	-	-	-	-	-	-	0.00056	0.00061	0.00156	*<5e-04*	0.00059	0.00128	0.0006	*<5e-04*
Molybdenum (D)	ug/L	0.05	-	-	-	-	-	-	-	0.151	0.143	0.145	0.126	0.13	0.139	0.132	0.149
Nickel (D)	ug/L	0.05	-	-	-	-	-	-	-	1.19	1.18	1.22	1.07	1.15	1.17	0.991	1.06
Niobium (D)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Phosphorus (D)	ug/L	50	-	-	-	-	-	-	-	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*
Rhenium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Rubidium (D)	ug/L	0.005	-	-	-	-	-	-	-	2.16	2.04	2.11	2.01	2.04	2.15	2.12	2.13
Selenium (D)	ug/L	0.04	-	-	-	-	-	-	-	0.05	0.056	0.043	0.059	0.063	0.065	*<0.04*	0.06
Silicon (D)	ug/L	50	-	-	-	-	-	-	-	274	278	276	277	269	287	178	205
Silver (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Strontium (D)	ug/L	0.02	-	-	2500	-	-	1880	2500	86	82	85.2	80	82.1	85	74.6	79.1
Sulfur (D)	ug/L	500	-	-	-	-	-	-	-	3480	3230	3310	3380	3280	3490	2990	3280
Tantalum (D)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Tellurium (D)	ug/L	0.02	-	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Thallium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Thorium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Tin (D)	ug/L	0.02	-	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Titanium (D)	ug/L	0.05	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	0.059	*<0.05*	*<0.05*	*<0.05*
Tungsten (D)	ug/L	0.01	-	-	-	-	-	-	-	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Uranium (D)	ug/L	0.001	-	-	-	-	-	-	-	0.0318	0.0298	0.0298	0.0288	0.0269	0.0293	0.0262	0.0267
Vanadium (D)	ug/L	0.05	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Yttrium (D)	ug/L	0.005	-	-	-	-	-	-	-	0.0134	0.0146	0.0127	0.0126	0.0153	0.0108	0.01	0.0095
Zinc (D)	ug/L	0.5	1.9	-	5.86 | 11.7	-	-	4.4 | 8.77	5.86 | 11.7	1.55	1.43	2.06	0.73	7.13	0.98	0.84	1.13
Zirconium (D)	ug/L	0.01	-	-	-	-	-	-	-	0.014	0.014	0.013	0.014	0.016	0.018	0.014	0.016
Cyanides																	
Cyanide (free)	mg/L	0.001	-	0.00035	-	-	-	-	-	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Cyanide (Total)	mg/L	0.001	0.001	0.009	0.005	0.2	-	0.00375	0.005	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Cyanide (WAD)	mg/L	0.001	-	-	-	-	-	-	-	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*

Notes

[a] FEIS predictions for the edge of the mixing zone as presented in Agnico Eagle (2014).

[b] The freshwater aquatic life guidelines (FWAL) for cadmium (T), copper (D), lead (D), manganese (D), and zinc (D) are variable depending on modifying factors such as pH, hardness, and DOC. Values shown represent the range of FWAL guidelines calculated for MEL-01 open-water samples in 2022.

[c] Health Canada drinking water guidelines (maximum acceptable concentrations)

[d] Site-specific water quality objectives for fluoride, arsenic, and iron.

[e] The AEMP Action Level is 75% of the AEMP Benchmark.

[f] The AEMP Benchmark is the lowest of the FWAL or HH DW guidelines.

Table C3-1. Water chemistry results from Meliadine Lake in 2022

Parameter	Units	DL (min | max)	Normal Range	FEIS[a]	FWAL[b] (min | max)	HH DW[c]	SSWQO[d]	Action Level[e] (min | max)	Benchmark[f] (min | max)	April MEL-02-05 4/7/2022	April MEL-02-06 4/7/2022	April MEL-02-08 4/7/2022	July MEL-01-01 7/10/2022	July MEL-01-06 7/10/2022	July MEL-01-07 7/10/2022	July MEL-01-08 7/10/2022	July MEL-01-09 7/10/2022
Field Measurements																	
Temperature	C	-	-	-	-	-	-	-	-	1.99	2.31	1.83	14.08	14.12	14.18	14.12	14.06
Sp. Conductivity (field)	uS/cm	-	-	-	-	-	-	-	-	141.4	134.4	145.4	110.4	110.6	110.2	110.6	110.1
pH (field)	pH units	-	7.1 | 7.95	-	6.5 | 9	-	-	6.5 | 9.0	6.5 | 9.0	6.94	7.3	6.93	7.79	7.7	7.74	7.73	7.65
DO (mg/L)	mg/L	-	-	-	-	-	-	6.5	6.5	15.02	15.63	14.93	10.96	10.97	10.94	10.98	10.95
DO (%)	%	-	-	-	-	-	-	-	-	110.7	116.5	109.8	108.7	108.9	108.8	109	108.5
Conventional Parameters																	
Conductivity (lab)	uS/cm	1	77.5	-	-	-	-	-	-	143	148	150	110	111	111	110	110
Hardness	mg/L	0.2	23.4	-	-	-	-	-	-	41.4	43	43.4	29.5	29.8	29.6	30.6	30
pH (lab)	pH units	0.1	-	-	6.5 | 9	-	-	6.5 | 9.0	6.5 | 9.0	7.36	7.41	7.44	7.39	7.4	7.37	7.39	7.37
Total Dissolved Solids	mg/L	13	54	68	500	-	1000	375	500	56	74	75	63	63	79	77	75
Total Dissolved Solids (Calc)	mg/L	1	39.6	68	500	-	1000	375	500	70.1	73.1	73.7	53.7	54.5	54.7	55	54.8
Total Suspended Solids	mg/L	1	1	3.1	-	-	-	-	-	*<1*	*<1*	*<1*	*<1*	1.6	1.1	1.1	2
Turbidity (lab)	NTU	0.1	-	-	-	-	-	-	-	0.31	0.29	0.41	0.41	0.56	0.35	0.33	0.51
Major Ions																	
Alkalinity, Bicarbonate	mg/L	1.2	25	-	-	-	-	-	-	32.3	33.7	33.7	25.4	26.1	26.2	25.5	25.9
Alkalinity, Carbonate	mg/L	0.6	-	-	-	-	-	-	-	*<0.6*	*<0.6*	*<0.6*	*<0.6*	*<0.6*	*<0.6*	*<0.6*	*<0.6*
Alkalinity, Hydroxide	mg/L	0.34	-	-	-	-	-	-	-	*<0.34*	*<0.34*	*<0.34*	*<0.34*	*<0.34*	*<0.34*	*<0.34*	*<0.34*
Alkalinity, Total	mg/L	1	20.5	-	-	-	-	-	-	26.5	27.6	27.6	20.8	21.4	21.5	20.9	21.2
Bromide	mg/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Calcium (D)	mg/L	0.01	-	-	-	-	-	-	-	12.7	13.3	13.3	9.02	9.14	9.06	9.41	9.14
Calcium (T)	mg/L	0.01	7.33	-	-	-	-	-	-	12.8	13.2	13.5	9.07	9.2	9.3	9.45	9.03
Chloride	mg/L	0.1	9.56	14	120	-	-	90	120	19.9	20.6	21	15.5	15.7	15.8	16	15.8
Fluoride	mg/L	0.02	0.028	0.0084	0.12	1.5	2.8	2.1	2.8	0.035	0.035	0.035	0.026	0.026	0.026	0.026	0.026
Magnesium (D)	mg/L	0.004	-	-	-	-	-	-	-	2.32	2.39	2.45	1.7	1.7	1.69	1.72	1.73
Magnesium (T)	mg/L	0.004	1.18	-	-	-	-	-	-	2.27	2.42	2.37	1.69	1.7	1.69	1.7	1.7
Potassium (D)	mg/L	0.02	-	-	-	-	-	-	-	1.68	1.74	1.76	1.09	1.1	1.09	1.1	1.1
Potassium (T)	mg/L	0.02	0.954	-	-	-	-	-	-	1.5	1.63	1.56	1.08	1.11	1.08	1.09	1.09
Reactive Silica (SiO2)	mg/L	0.01	0.268	-	-	-	-	-	-	0.428	0.389	0.447	0.259	0.261	0.261	0.261	0.261
Sodium (D)	mg/L	0.02	-	-	-	-	-	-	-	9.88	10.4	10.4	7.43	7.5	7.58	7.63	7.77
Sodium (T)	mg/L	0.02	4.85	5.3	-	-	-	-	-	9.62	10.4	10	7.3	7.65	7.44	7.54	7.44
Sulphate	mg/L	0.3	3.87	38	-	-	-	-	-	7.96	8.18	8.46	6.42	6.49	6.47	6.52	6.46
Nutrients																	
Ammonia (as N)	mg/L	0.005	0.0174	0.54	1.27	-	-	0.95	1.27	0.0194	0.0138	0.0387	0.0104	0.0131	0.0153	0.017	0.0134
Nitrate (as N)	mg/L	0.005	0.018	0.25	2.9	10	-	2.17	2.9	0.0338	0.0271	0.0549	0.0067	0.0105	0.0099	0.0124	0.0089
Nitrate + Nitrite (as N)	mg/L	0.0051	-	-	-	-	-	-	-	0.0338	0.0271	0.0549	0.0067	0.0105	0.0099	0.0124	0.0089
Nitrite (as N)	mg/L	0.001	0.001	0.051	0.06	1	-	0.045	0.06	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Nitrogen	mg/L	0.0051 | 0.05	-	-	-	-	-	-	-	0.366	0.338	0.38	-	-	-	-	-
Orthophosphate (PO4-P)	mg/L	0.001	0.001	-	-	-	-	-	-	0.001	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Total Diss Phosphorus	mg/L	0.001 | 0.003	0.00314	-	-	-	-	-	-	0.0051	0.0022	0.0017	0.0025	0.0035	0.0023	0.0025	0.0038
Total Dissolved Nitrogen	mg/L	0.05	-	-	-	-	-	-	-	0.337	0.31	0.39	0.247	0.244	0.245	0.261	0.258
Total Kjeldahl Nitrogen	mg/L	0.05	0.25	-	-	-	-	-	-	0.332	0.311	0.325	0.266	0.271	0.26	0.275	0.293
Total Kjeldahl Nitrogen (diss)	mg/L	0.05	-	-	-	-	-	-	-	0.303	0.283	0.335	0.241	0.234	0.235	0.249	0.249
Total Phosphorus	mg/L	0.001 | 0.003	0.006	0.0049	-	-	-	-	-	0.006	0.0042	0.005	0.0077	0.0066	0.0059	0.0144	0.0068
Organic/Inorganic Carbon																	
Dissolved Organic Carbon	mg/L	0.5	2.72	-	-	-	-	-	-	4.62	4.81	4.74	4.4	4.55	4.75	4.72	4.51
Total Organic Carbon	mg/L	0.5	3	-	-	-	-	-	-	4.49	4.55	4.92	3.96	3.95	3.84	3.82	3.78
Total Metals																	
Aluminum (T)	ug/L	1	5.32	9.1	100	-	-	75	100	3.3	2.1	2.3	2.6	5	2.4	3.1	3.8
Antimony (T)	ug/L	0.02	0.02	0.51	-	6	-	4.5	6	0.023	0.022	0.021	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Arsenic (T)	ug/L	0.02	0.275	3.8	5	10	25	18.8	25	0.745	0.762	0.69	0.464	0.486	0.454	0.473	0.501
Barium (T)	ug/L	0.02	8.05	77	-	1000	-	750	1000	13.1	14.4	13.4	8.61	8.76	8.47	8.52	8.39
Beryllium (T)	ug/L	0.005	0.005	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Bismuth (T)	ug/L	0.005	0.005	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Boron (T)	ug/L	5	6.52	23	1500	5000	-	1120	1500	9.9	10.5	10.1	7.1	7.2	7.3	7.7	7.2
Cadmium (T)	ug/L	0.005	0.005	0.05	0.047 | 0.0649	5	-	0.0352 | 0.0487	0.047 | 0.0649	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Cesium (T)	ug/L	0.005	-	-	-	-	-	-	-	0.0088	0.0114	0.0092	0.0071	0.0081	0.0061	0.0073	0.008
Chromium (T)	ug/L	0.1	0.103	1.1	5	50	-	3.75	5	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Cobalt (T)	ug/L	0.005	0.016	-	0.78	-	-	0.585	0.78	0.0296	0.0285	0.0284	0.0249	0.0292	0.0264	0.0263	0.027
Copper (T)	ug/L	0.05	0.86	2	-	2000	-	1500	2000	1.28	1.3	1.31	0.911	0.929	0.949	0.944	0.931
Gallium (T)	ug/L	0.05	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Iron (T)	ug/L	1	15	42	300	-	1060	795	1060	15.9	16.5	12.7	22.5	27.2	23.4	21.8	22.8
Lanthanum (T)	ug/L	0.01	-	-	-	-	-	-	-	0.036	0.034	0.036	0.023	0.034	0.023	0.025	0.023
Lead (T)	ug/L	0.01	0.0222	0.15	-	5	-	3.75	5	0.028	0.014	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Lithium (T)	ug/L	0.5	0.72	-	-	-	-	-	-	1.71	1.78	1.81	1.17	1.17	1.19	1.24	1.2
Manganese (T)	ug/L	0.05	3.06	5.5	-	120	-	90	120	4.35	3.8	4.22	7.76	8.25	7.82	7.88	7.58
Mercury (T)	ug/L	5e-04 | 0.005	8.00E-04	0.02	0.026	1	-	0.0195	0.026	0.00058	0.00214	0.00072	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Molybdenum (T)	ug/L	0.05	0.107	5.2	73	-	-	54.8	73	0.133	0.127	0.145	0.11	0.119	0.16	0.117	0.11
Nickel (T)	ug/L	0.05	0.441	2.7	25	-	-	18.8	25	1.07	1.04	1.08	0.818	0.806	0.815	0.814	0.799
Niobium (T)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Phosphorus (T)	ug/L	50	-	-	-	-	-	-	-	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*
Rhenium (T)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Rubidium (T)	ug/L	0.005	-	-	-	-	-	-	-	1.98	2.12	2.01	1.39	1.46	1.38	1.39	1.38
Selenium (T)	ug/L	0.04	0.049	0.16	1	50	-	0.75	1	0.141	0.076	0.065	*<0.04*	*<0.04*	*<0.04*	*<0.04*	*<0.04*
Silicon (T)	ug/L	50	-	-	-	-	-	-	-	237	214	239	*<50*	193	108	128	107
Silver (T)	ug/L	0.005	0.005	0.1	0.25	-	-	0.188	0.25	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Strontium (T)	ug/L	0.02	36.1	-	2500	7000	-	1880	2500	74.9	80.1	79.5	55.4	56.9	54.7	57.3	55.5
Sulfur (T)	ug/L	500	-	-	-	-	-	-	-	2890	3200	2790	2140	2450	2250	2290	2370
Tantalum (T)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Tellurium (T)	ug/L	0.02	-	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Thallium (T)	ug/L	0.005	0.005	0.1	0.8	-	-	0.6	0.8	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Thorium (T)	ug/L	0.005 | 0.01	-	-	-	-	-	-	-	*<0.005*	*<0.005*	0.0057	0.0064	0.0062	0.006	0.0061	0.0056
Tin (T)	ug/L	0.02	0.0384	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Titanium (T)	ug/L	0.05	0.17	-	-	-	-	-	-	0.093	*<0.05*	*<0.1*	*<0.05*	0.27	*<0.05*	*<0.05*	*<0.05*
Tungsten (T)	ug/L	0.01	-	-	-	-	-	-	-	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Uranium (T)	ug/L	0.001	0.0164	1.5	15	20	-	11.2	15	0.0283	0.0267	0.0304	0.0222	0.0243	0.0239	0.0256	0.0258
Vanadium (T)	ug/L	0.05	0.05	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Yttrium (T)	ug/L	0.005	-	-	-	-	-	-	-	0.0131	0.0147	0.0112	0.0105	0.0091	0.0082	0.0094	0.0059
Zinc (T)	ug/L	0.5	1.7	6.7	-	-	-	-	-	4.17	4.3	1.78	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*
Zirconium (T)	ug/L	0.01	-	-	-	-	-	-	-	0.014	0.012	0.016	*<0.01*	0.01	0.01	*<0.01*	*<0.01*
Dissolved Metals																	
Aluminum (D)	ug/L	1	-	-	-	-	-	-	-	1.2	*<1*	*<1*	1.1	1.7	1.3	2	1.5
Antimony (D)	ug/L	0.02	-	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Arsenic (D)	ug/L	0.02	-	-	-	-	-	-	-	0.688	0.704	0.674	0.418	0.45	0.452	0.46	0.466
Barium (D)	ug/L	0.02	-	-	-	-	-	-	-	13.2	13.9	14.2	8.44	8.54	8.86	8.52	8.51
Beryllium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Bismuth (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Boron (D)	ug/L	5	-	-	-	-	-	-	-	9.3	10.2	9.9	7.4	7.7	7.5	7.7	7.6
Cadmium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Cesium (D)	ug/L	0.005	-	-	-	-	-	-	-	0.0099	0.0098	0.0109	0.0069	0.007	0.0069	0.0068	0.0068
Chromium (D)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Cobalt (D)	ug/L	0.005	-	-	-	-	-	-	-	0.0169	0.0226	0.017	0.014	0.0138	0.0145	0.0131	0.0172
Copper (D)	ug/L	0.05	0.861	-	1.14 | 5.85	-	-	0.858 | 4.39	1.14 | 5.85	1.26	1.32	1.34	0.878	0.911	0.923	0.907	0.94
Gallium (D)	ug/L	0.05	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Iron (D)	ug/L	1	-	-	-	-	-	-	-	4.3	3.9	4.4	8.5	9	9	8.4	8.8
Lanthanum (D)	ug/L	0.01	-	-	-	-	-	-	-	0.031	0.03	0.032	*<0.01*	0.012	*<0.01*	0.01	0.012
Lead (D)	ug/L	0.01	0.0125	-	4.71 | 6.99	-	-	3.53 | 5.24	4.71 | 6.99	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Lithium (D)	ug/L	0.5	-	-	-	-	-	-	-	1.58	1.66	1.66	1.16	1.19	1.17	1.21	1.19
Manganese (D)	ug/L	0.05	1.2	-	210 | 330	-	-	158 | 248	210 | 330	0.608	1.09	0.569	1.29	1.36	1.27	1.28	1.18
Mercury (D)	ug/L	5e-04 | 0.005	-	-	-	-	-	-	-	*<5e-04*	0.00171	0.00056	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Molybdenum (D)	ug/L	0.05	-	-	-	-	-	-	-	0.139	0.134	0.134	0.109	0.107	0.119	0.109	0.113
Nickel (D)	ug/L	0.05	-	-	-	-	-	-	-	0.957	1.03	1.24	0.77	0.776	0.793	0.811	0.823
Niobium (D)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Phosphorus (D)	ug/L	50	-	-	-	-	-	-	-	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*
Rhenium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Rubidium (D)	ug/L	0.005	-	-	-	-	-	-	-	2.02	2.09	2.14	1.38	1.41	1.41	1.44	1.43
Selenium (D)	ug/L	0.04	-	-	-	-	-	-	-	0.07	0.075	0.062	*<0.04*	*<0.04*	0.045	*<0.04*	*<0.04*
Silicon (D)	ug/L	50	-	-	-	-	-	-	-	211	196	216	122	126	126	120	114
Silver (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Strontium (D)	ug/L	0.02	-	-	2500	-	-	1880	2500	74.3	78.3	78.6	54.7	55.6	55.6	53	53.8
Sulfur (D)	ug/L	500	-	-	-	-	-	-	-	3030	2990	3070	2170	2310	2350	2330	2300
Tantalum (D)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Tellurium (D)	ug/L	0.02	-	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Thallium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Thorium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	0.005	0.0055	*<0.005*	*<0.005*	0.0054
Tin (D)	ug/L	0.02	-	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Titanium (D)	ug/L	0.05	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Tungsten (D)	ug/L	0.01	-	-	-	-	-	-	-	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Uranium (D)	ug/L	0.001	-	-	-	-	-	-	-	0.0237	0.0255	0.0272	0.023	0.0243	0.0229	0.0234	0.0242
Vanadium (D)	ug/L	0.05	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Yttrium (D)	ug/L	0.005	-	-	-	-	-	-	-	0.0114	0.0074	0.0106	0.0069	0.0072	0.006	0.007	0.0099
Zinc (D)	ug/L	0.5	1.9	-	5.86 | 11.7	-	-	4.4 | 8.77	5.86 | 11.7	1.2	1.8	1.33	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*
Zirconium (D)	ug/L	0.01	-	-	-	-	-	-	-	0.011	0.011	0.011	0.01	0.01	*<0.01*	0.01	0.011
Cyanides																	
Cyanide (free)	mg/L	0.001	-	0.00035	-	-	-	-	-	0.0012	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Cyanide (Total)	mg/L	0.001	0.001	0.009	0.005	0.2	-	0.00375	0.005	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Cyanide (WAD)	mg/L	0.001	-	-	-	-	-	-	-	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*

Notes

[a] FEIS predictions for the edge of the mixing zone as presented in Agnico Eagle (2014).

[b] The freshwater aquatic life guidelines (FWAL) for cadmium (T), copper (D), lead (D), manganese (D), and zinc (D) are variable depending on modifying factors such as pH, hardness, and DOC. Values shown represent the range of FWAL guidelines calculated for MEL-01 open-water samples in 2022.

[c] Health Canada drinking water guidelines (maximum acceptable concentrations)

[d] Site-specific water quality objectives for fluoride, arsenic, and iron.

[e] The AEMP Action Level is 75% of the AEMP Benchmark.

[f] The AEMP Benchmark is the lowest of the FWAL or HH DW guidelines.

Table C3-1. Water chemistry results from Meliadine Lake in 2022

Parameter	Units	DL (min | max)	Normal Range	FEIS[a]	FWAL[b] (min | max)	HH DW[c]	SSWQO[d]	Action Level[e] (min | max)	Benchmark[f] (min | max)	July MEL-01-10 7/10/2022	July MEL-02-02 7/10/2022	July MEL-02-03 7/10/2022	July MEL-02-05 7/10/2022	July MEL-02-06 7/10/2022	July MEL-02-08 7/10/2022	July MEL-03-01 7/19/2022	July MEL-03-02 7/19/2022
Field Measurements																	
Temperature	C	-	-	-	-	-	-	-	-	14.08	13.63	13.6	14.15	14.28	13.33	14.37	14.26
Sp. Conductivity (field)	uS/cm	-	-	-	-	-	-	-	-	109.8	94.9	94.8	95.5	95.7	95.4	82.8	82
pH (field)	pH units	-	7.1 | 7.95	-	6.5 | 9	-	-	6.5 | 9.0	6.5 | 9.0	7.47	7.67	7.63	7.66	7.63	7.65	7.59	7.61
DO (mg/L)	mg/L	-	-	-	-	-	-	6.5	6.5	10.92	10.95	11.08	10.84	10.81	11.16	10.47	10.44
DO (%)	%	-	-	-	-	-	-	-	-	108.3	107.6	108.7	107.7	107.5	108.8	104.5	103.9
Conventional Parameters																	
Conductivity (lab)	uS/cm	1	77.5	-	-	-	-	-	-	112	93.7	93.5	95.6	95	93	83.7	79.9
Hardness	mg/L	0.2	23.4	-	-	-	-	-	-	29.7	26.4	26.2	26.3	26.2	26.3	23.1	23.8
pH (lab)	pH units	0.1	-	-	6.5 | 9	-	-	6.5 | 9.0	6.5 | 9.0	7.38	7.4	7.41	7.36	7.37	7.37	7.4	7.36
Total Dissolved Solids	mg/L	13	54	68	500	-	1000	375	500	73	52	53	54	55	56	49	49
Total Dissolved Solids (Calc)	mg/L	1	39.6	68	500	-	1000	375	500	56.3	46.9	45	47.1	47.1	46.5	39.1	40.9
Total Suspended Solids	mg/L	1	1	3.1	-	-	-	-	-	1.1	*<1*	*<1*	*<1*	*<1*	1.2	1.4	10.2
Turbidity (lab)	NTU	0.1	-	-	-	-	-	-	-	0.38	0.2	0.43	0.23	0.22	0.33	0.21	0.23
Major Ions																	
Alkalinity, Bicarbonate	mg/L	1.2	25	-	-	-	-	-	-	25.9	24.5	21	25.1	24.5	24.2	21.1	24.3
Alkalinity, Carbonate	mg/L	0.6	-	-	-	-	-	-	-	*<0.6*	*<0.6*	*<0.6*	*<0.6*	*<0.6*	*<0.6*	*<0.6*	*<0.6*
Alkalinity, Hydroxide	mg/L	0.34	-	-	-	-	-	-	-	*<0.34*	*<0.34*	*<0.34*	*<0.34*	*<0.34*	*<0.34*	*<0.34*	*<0.34*
Alkalinity, Total	mg/L	1	20.5	-	-	-	-	-	-	21.2	20.1	17.2	20.6	20.1	19.8	17.3	19.9
Bromide	mg/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Calcium (D)	mg/L	0.01	-	-	-	-	-	-	-	8.96	8.16	8.14	8.15	8.11	8.19	7.24	7.54
Calcium (T)	mg/L	0.01	7.33	-	-	-	-	-	-	9.27	8.04	8.15	8.21	8.14	8.48	7.78	7.53
Chloride	mg/L	0.1	9.56	14	120	-	-	90	120	16.8	12.8	12.7	12.8	12.9	12.8	10.1	10.1
Fluoride	mg/L	0.02	0.028	0.0084	0.12	1.5	2.8	2.1	2.8	0.026	0.025	0.025	0.024	0.026	0.025	0.027	0.027
Magnesium (D)	mg/L	0.004	-	-	-	-	-	-	-	1.77	1.46	1.43	1.44	1.45	1.42	1.22	1.2
Magnesium (T)	mg/L	0.004	1.18	-	-	-	-	-	-	1.77	1.43	1.45	1.44	1.44	1.43	1.24	1.22
Potassium (D)	mg/L	0.02	-	-	-	-	-	-	-	1.12	1.02	1.01	1.02	1.02	1.01	0.953	0.988
Potassium (T)	mg/L	0.02	0.954	-	-	-	-	-	-	1.13	0.991	1.02	0.995	1.01	0.995	0.972	0.994
Reactive Silica (SiO2)	mg/L	0.01	0.268	-	-	-	-	-	-	0.265	0.194	0.192	0.192	0.192	0.195	0.177	0.182
Sodium (D)	mg/L	0.02	-	-	-	-	-	-	-	8.23	6.3	6.28	6.18	6.4	6.05	5.23	5
Sodium (T)	mg/L	0.02	4.85	5.3	-	-	-	-	-	8.14	6.03	6.1	6.26	6.23	6.11	5.18	5.12
Sulphate	mg/L	0.3	3.87	38	-	-	-	-	-	6.58	5.07	5.05	5.13	5.11	5.11	3.91	4.11
Nutrients																	
Ammonia (as N)	mg/L	0.005	0.0174	0.54	1.27	-	-	0.95	1.27	0.0129	*<0.005*	*<0.005*	*<0.005*	*<0.005*	0.0057	*<0.005*	0.009
Nitrate (as N)	mg/L	0.005	0.018	0.25	2.9	10	-	2.17	2.9	0.0135	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Nitrate + Nitrite (as N)	mg/L	0.0051	-	-	-	-	-	-	-	0.0151	*<0.0051*	*<0.0051*	*<0.0051*	*<0.0051*	*<0.0051*	*<0.0051*	*<0.0051*
Nitrite (as N)	mg/L	0.001	0.001	0.051	0.06	1	-	0.045	0.06	0.0016	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Nitrogen	mg/L	0.0051 | 0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	*<0.0051*	0.186
Orthophosphate (PO4-P)	mg/L	0.001	0.001	-	-	-	-	-	-	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	0.001	*<0.001*
Total Diss Phosphorus	mg/L	0.001 | 0.003	0.00314	-	-	-	-	-	-	0.0024	0.0024	0.0022	0.0035	0.0018	0.003	0.0031	0.0048
Total Dissolved Nitrogen	mg/L	0.05	-	-	-	-	-	-	-	0.277	0.217	0.206	0.195	0.21	0.184	0.179	0.159
Total Kjeldahl Nitrogen	mg/L	0.05	0.25	-	-	-	-	-	-	0.261	0.216	0.203	0.204	0.207	0.207	0.176	0.186
Total Kjeldahl Nitrogen (diss)	mg/L	0.05	-	-	-	-	-	-	-	0.262	0.217	0.206	0.195	0.21	0.184	0.179	0.159
Total Phosphorus	mg/L	0.001 | 0.003	0.006	0.0049	-	-	-	-	-	0.0076	0.0051	0.0053	0.0045	0.0037	-	0.0036	0.0043
Organic/Inorganic Carbon																	
Dissolved Organic Carbon	mg/L	0.5	2.72	-	-	-	-	-	-	4.46	4.04	3.98	4.16	4.2	3.9	3.21	3.25
Total Organic Carbon	mg/L	0.5	3	-	-	-	-	-	-	3.7	3.34	3.67	3.5	3.8	3.17	2.85	3.28
Total Metals																	
Aluminum (T)	ug/L	1	5.32	9.1	100	-	-	75	100	5.9	1.5	1.6	4	1.3	1.3	2.2	3.9
Antimony (T)	ug/L	0.02	0.02	0.51	-	6	-	4.5	6	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Arsenic (T)	ug/L	0.02	0.275	3.8	5	10	25	18.8	25	0.516	0.588	0.597	0.605	0.616	0.595	0.315	0.308
Barium (T)	ug/L	0.02	8.05	77	-	1000	-	750	1000	8.55	8.25	8.26	8.21	8.15	8.26	8.2	8.42
Beryllium (T)	ug/L	0.005	0.005	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Bismuth (T)	ug/L	0.005	0.005	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Boron (T)	ug/L	5	6.52	23	1500	5000	-	1120	1500	7.7	5.6	5.7	5.6	5.9	5.8	*<5*	*<5*
Cadmium (T)	ug/L	0.005	0.005	0.05	0.047 | 0.0649	5	-	0.0352 | 0.0487	0.047 | 0.0649	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Cesium (T)	ug/L	0.005	-	-	-	-	-	-	-	0.0088	0.0067	0.0066	0.0077	0.0061	0.0073	0.0075	0.0084
Chromium (T)	ug/L	0.1	0.103	1.1	5	50	-	3.75	5	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Cobalt (T)	ug/L	0.005	0.016	-	0.78	-	-	0.585	0.78	0.0246	0.0161	0.0141	0.0155	0.015	0.0163	0.012	0.0121
Copper (T)	ug/L	0.05	0.86	2	-	2000	-	1500	2000	1.05	0.843	0.829	0.847	0.821	0.817	0.761	0.741
Gallium (T)	ug/L	0.05	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Iron (T)	ug/L	1	15	42	300	-	1060	795	1060	22.5	11.3	10.9	12.8	11.3	11.9	9.5	8.2
Lanthanum (T)	ug/L	0.01	-	-	-	-	-	-	-	0.025	0.021	0.019	0.027	0.019	0.02	0.019	0.016
Lead (T)	ug/L	0.01	0.0222	0.15	-	5	-	3.75	5	0.011	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Lithium (T)	ug/L	0.5	0.72	-	-	-	-	-	-	1.25	0.99	0.99	1.01	0.99	1.01	0.83	0.81
Manganese (T)	ug/L	0.05	3.06	5.5	-	120	-	90	120	7.94	3.22	3.12	3.37	3.17	3.45	1.92	1.82
Mercury (T)	ug/L	5e-04 | 0.005	8.00E-04	0.02	0.026	1	-	0.0195	0.026	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Molybdenum (T)	ug/L	0.05	0.107	5.2	73	-	-	54.8	73	0.125	0.079	0.095	0.095	0.098	0.09	0.081	0.084
Nickel (T)	ug/L	0.05	0.441	2.7	25	-	-	18.8	25	0.817	0.625	0.627	0.646	0.618	0.605	0.46	0.438
Niobium (T)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Phosphorus (T)	ug/L	50	-	-	-	-	-	-	-	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*
Rhenium (T)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Rubidium (T)	ug/L	0.005	-	-	-	-	-	-	-	1.44	1.41	1.37	1.38	1.37	1.38	1.41	1.38
Selenium (T)	ug/L	0.04	0.049	0.16	1	50	-	0.75	1	*<0.04*	*<0.04*	*<0.04*	*<0.04*	*<0.04*	*<0.04*	*<0.04*	*<0.04*
Silicon (T)	ug/L	50	-	-	-	-	-	-	-	80	59	62	61	70	62	94	84
Silver (T)	ug/L	0.005	0.005	0.1	0.25	-	-	0.188	0.25	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Strontium (T)	ug/L	0.02	36.1	-	2500	7000	-	1880	2500	55.1	44.3	46.2	48.3	46.4	45.5	38.1	40.8
Sulfur (T)	ug/L	500	-	-	-	-	-	-	-	2370	1950	1640	1760	1760	1880	1320	1220
Tantalum (T)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Tellurium (T)	ug/L	0.02	-	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Thallium (T)	ug/L	0.005	0.005	0.1	0.8	-	-	0.6	0.8	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Thorium (T)	ug/L	0.005 | 0.01	-	-	-	-	-	-	-	0.0053	0.0057	*<0.005*	0.0066	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Tin (T)	ug/L	0.02	0.0384	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Titanium (T)	ug/L	0.05	0.17	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	0.087	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Tungsten (T)	ug/L	0.01	-	-	-	-	-	-	-	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Uranium (T)	ug/L	0.001	0.0164	1.5	15	20	-	11.2	15	0.0257	0.019	0.0177	0.0205	0.0191	0.0183	0.0172	0.0161
Vanadium (T)	ug/L	0.05	0.05	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	0.054	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Yttrium (T)	ug/L	0.005	-	-	-	-	-	-	-	0.0088	0.0056	0.0077	0.0067	0.0073	0.0053	*<0.005*	*<0.005*
Zinc (T)	ug/L	0.5	1.7	6.7	-	-	-	-	-	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*
Zirconium (T)	ug/L	0.01	-	-	-	-	-	-	-	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Dissolved Metals																	
Aluminum (D)	ug/L	1	-	-	-	-	-	-	-	1.9	*<1*	*<1*	1.1	*<1*	*<1*	*<1*	1.5
Antimony (D)	ug/L	0.02	-	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Arsenic (D)	ug/L	0.02	-	-	-	-	-	-	-	0.432	0.643	0.603	0.607	0.574	0.585	0.329	0.326
Barium (D)	ug/L	0.02	-	-	-	-	-	-	-	8.55	8.07	8.14	8.11	8.03	8.19	7.81	7.86
Beryllium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Bismuth (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Boron (D)	ug/L	5	-	-	-	-	-	-	-	7.9	5.9	5.9	5.8	6.1	6	*<5*	*<5*
Cadmium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Cesium (D)	ug/L	0.005	-	-	-	-	-	-	-	0.0079	0.0064	0.0075	0.0076	0.0071	0.0064	0.0076	0.0076
Chromium (D)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Cobalt (D)	ug/L	0.005	-	-	-	-	-	-	-	0.0146	0.0104	0.0093	0.0098	0.0097	0.0111	*<0.005*	0.0063
Copper (D)	ug/L	0.05	0.861	-	1.14 | 5.85	-	-	0.858 | 4.39	1.14 | 5.85	1	0.839	0.828	0.825	0.831	0.848	0.69	0.639
Gallium (D)	ug/L	0.05	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Iron (D)	ug/L	1	-	-	-	-	-	-	-	9.2	4.8	3.9	4.7	4.9	4.4	1.7	1.5
Lanthanum (D)	ug/L	0.01	-	-	-	-	-	-	-	0.01	*<0.01*	*<0.01*	*<0.01*	*<0.01*	0.01	*<0.01*	*<0.01*
Lead (D)	ug/L	0.01	0.0125	-	4.71 | 6.99	-	-	3.53 | 5.24	4.71 | 6.99	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Lithium (D)	ug/L	0.5	-	-	-	-	-	-	-	1.24	1	1	0.99	1.04	1	0.75	0.78
Manganese (D)	ug/L	0.05	1.2	-	210 | 330	-	-	158 | 248	210 | 330	1.32	0.878	0.682	0.826	0.754	0.637	0.375	0.412
Mercury (D)	ug/L	5e-04 | 0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Molybdenum (D)	ug/L	0.05	-	-	-	-	-	-	-	0.117	0.092	0.091	0.081	0.084	0.086	0.081	0.075
Nickel (D)	ug/L	0.05	-	-	-	-	-	-	-	0.793	0.624	0.58	0.608	0.607	0.6	0.454	0.414
Niobium (D)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Phosphorus (D)	ug/L	50	-	-	-	-	-	-	-	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*
Rhenium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Rubidium (D)	ug/L	0.005	-	-	-	-	-	-	-	1.45	1.43	1.37	1.36	1.37	1.36	1.36	1.34
Selenium (D)	ug/L	0.04	-	-	-	-	-	-	-	0.043	*<0.04*	*<0.04*	*<0.04*	*<0.04*	0.042	*<0.04*	*<0.04*
Silicon (D)	ug/L	50	-	-	-	-	-	-	-	138	94	79	84	93	92	91	85
Silver (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Strontium (D)	ug/L	0.02	-	-	2500	-	-	1880	2500	56.2	45	45.3	45.3	47.6	45.5	38.3	38.4
Sulfur (D)	ug/L	500	-	-	-	-	-	-	-	2330	1850	1730	1820	1770	1810	1480	1290
Tantalum (D)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Tellurium (D)	ug/L	0.02	-	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Thallium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Thorium (D)	ug/L	0.005	-	-	-	-	-	-	-	0.0055	*<0.005*	*<0.005*	0.0055	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Tin (D)	ug/L	0.02	-	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Titanium (D)	ug/L	0.05	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Tungsten (D)	ug/L	0.01	-	-	-	-	-	-	-	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	0.011
Uranium (D)	ug/L	0.001	-	-	-	-	-	-	-	0.0243	0.0182	0.0176	0.0188	0.0183	0.0173	0.0165	0.0156
Vanadium (D)	ug/L	0.05	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Yttrium (D)	ug/L	0.005	-	-	-	-	-	-	-	0.0065	0.0055	*<0.005*	*<0.005*	0.0051	*<0.005*	*<0.005*	*<0.005*
Zinc (D)	ug/L	0.5	1.9	-	5.86 | 11.7	-	-	4.4 | 8.77	5.86 | 11.7	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	0.52	*<0.5*	*<0.5*
Zirconium (D)	ug/L	0.01	-	-	-	-	-	-	-	0.01	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Cyanides																	
Cyanide (free)	mg/L	0.001	-	0.00035	-	-	-	-	-	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Cyanide (Total)	mg/L	0.001	0.001	0.009	0.005	0.2	-	0.00375	0.005	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Cyanide (WAD)	mg/L	0.001	-	-	-	-	-	-	-	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*

Notes

[a] FEIS predictions for the edge of the mixing zone as presented in Agnico Eagle (2014).

[b] The freshwater aquatic life guidelines (FWAL) for cadmium (T), copper (D), lead (D), manganese (D), and zinc (D) are variable depending on modifying factors such as pH, hardness, and DOC. Values shown represent the range of FWAL guidelines calculated for MEL-01 open-water samples in 2022.

[c] Health Canada drinking water guidelines (maximum acceptable concentrations)

[d] Site-specific water quality objectives for fluoride, arsenic, and iron.

[e] The AEMP Action Level is 75% of the AEMP Benchmark.

[f] The AEMP Benchmark is the lowest of the FWAL or HH DW guidelines.

Table C3-1. Water chemistry results from Meliadine Lake in 2022

Parameter	Units	DL (min | max)	Normal Range	FEIS[a]	FWAL[b] (min | max)	HH DW[c]	SSWQO[d]	Action Level[e] (min | max)	Benchmark[f] (min | max)	July MEL-03-03 7/19/2022	July MEL-03-04 7/19/2022	July MEL-03-05 7/19/2022	August MEL-01-01 8/18/2022	August MEL-01-06 8/18/2022	August MEL-01-07 8/18/2022	August MEL-01-08 8/18/2022	August MEL-01-09 8/18/2022
Field Measurements																	
Temperature	C	-	-	-	-	-	-	-	-	14.15	14.22	14.54	15.9	16	15.9	16	15.8
Sp. Conductivity (field)	uS/cm	-	-	-	-	-	-	-	-	82.4	83	82.7	111.3	111.3	111.3	111.4	111.3
pH (field)	pH units	-	7.1 | 7.95	-	6.5 | 9	-	-	6.5 | 9.0	6.5 | 9.0	7.57	7.52	7.25	6.85	7.2	7.13	7.17	7.14
DO (mg/L)	mg/L	-	-	-	-	-	-	6.5	6.5	10.47	10.41	10.39	9.57	9.86	9.1	9.8	9.88
DO (%)	%	-	-	-	-	-	-	-	-	104.2	103.5	104.2	96.7	99.4	91.6	99.2	99.7
Conventional Parameters																	
Conductivity (lab)	uS/cm	1	77.5	-	-	-	-	-	-	80	83.9	84.2	113	112	112	112	112
Hardness	mg/L	0.2	23.4	-	-	-	-	-	-	23.8	23.8	23.6	31.3	31.7	31.1	31.2	31.2
pH (lab)	pH units	0.1	-	-	6.5 | 9	-	-	6.5 | 9.0	6.5 | 9.0	7.38	7.36	7.37	7.65	7.61	7.63	7.62	7.62
Total Dissolved Solids	mg/L	13	54	68	500	-	1000	375	500	48	43	65	58	57	58	58	53
Total Dissolved Solids (Calc)	mg/L	1	39.6	68	500	-	1000	375	500	40.7	39.3	39.6	54.6	54.3	56.2	54.1	54
Total Suspended Solids	mg/L	1	1	3.1	-	-	-	-	-	*<1*	*<1*	24	*<1*	*<1*	*<1*	*<1*	*<1*
Turbidity (lab)	NTU	0.1	-	-	-	-	-	-	-	0.33	0.17	0.18	0.34	0.36	0.45	0.4	0.4
Major Ions																	
Alkalinity, Bicarbonate	mg/L	1.2	25	-	-	-	-	-	-	23.8	21.2	21.5	25.5	24.6	29.3	25.1	25.4
Alkalinity, Carbonate	mg/L	0.6	-	-	-	-	-	-	-	*<0.6*	*<0.6*	*<0.6*	*<0.6*	*<0.6*	*<0.6*	*<0.6*	*<0.6*
Alkalinity, Hydroxide	mg/L	0.34	-	-	-	-	-	-	-	*<0.34*	*<0.34*	*<0.34*	*<0.34*	*<0.34*	*<0.34*	*<0.34*	*<0.34*
Alkalinity, Total	mg/L	1	20.5	-	-	-	-	-	-	19.5	17.4	17.6	20.9	20.2	24	20.6	20.8
Bromide	mg/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Calcium (D)	mg/L	0.01	-	-	-	-	-	-	-	7.53	7.52	7.39	9.58	9.68	9.55	9.55	9.54
Calcium (T)	mg/L	0.01	7.33	-	-	-	-	-	-	7.47	7.52	7.39	9.53	9.45	9.32	9.45	9.39
Chloride	mg/L	0.1	9.56	14	120	-	-	90	120	10.2	9.88	10	15.4	15.5	15.5	15.3	15.3
Fluoride	mg/L	0.02	0.028	0.0084	0.12	1.5	2.8	2.1	2.8	0.027	0.027	0.027	0.029	0.03	0.029	0.029	0.029
Magnesium (D)	mg/L	0.004	-	-	-	-	-	-	-	1.2	1.22	1.25	1.8	1.83	1.77	1.78	1.78
Magnesium (T)	mg/L	0.004	1.18	-	-	-	-	-	-	1.23	1.26	1.27	1.73	1.74	1.72	1.75	1.73
Potassium (D)	mg/L	0.02	-	-	-	-	-	-	-	0.975	0.96	0.979	1.21	1.23	1.2	1.2	1.21
Potassium (T)	mg/L	0.02	0.954	-	-	-	-	-	-	1.01	0.977	0.984	1.21	1.22	1.21	1.21	1.2
Reactive Silica (SiO2)	mg/L	0.01	0.268	-	-	-	-	-	-	0.176	0.182	0.185	0.467	0.474	0.477	0.472	0.478
Sodium (D)	mg/L	0.02	-	-	-	-	-	-	-	4.99	5.38	5.59	7.9	7.75	7.66	7.7	7.6
Sodium (T)	mg/L	0.02	4.85	5.3	-	-	-	-	-	5.17	5.11	5.22	7.74	7.7	7.5	7.74	7.59
Sulphate	mg/L	0.3	3.87	38	-	-	-	-	-	4.11	3.92	3.83	6.1	6.13	6.12	6.2	6.04
Nutrients																	
Ammonia (as N)	mg/L	0.005	0.0174	0.54	1.27	-	-	0.95	1.27	0.0066	0.0246	0.0151	0.0059	0.0368	0.0191	0.0176	*<0.005*
Nitrate (as N)	mg/L	0.005	0.018	0.25	2.9	10	-	2.17	2.9	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Nitrate + Nitrite (as N)	mg/L	0.0051	-	-	-	-	-	-	-	*<0.0051*	*<0.0051*	*<0.0051*	*<0.0051*	*<0.0051*	*<0.0051*	*<0.0051*	*<0.0051*
Nitrite (as N)	mg/L	0.001	0.001	0.051	0.06	1	-	0.045	0.06	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Nitrogen	mg/L	0.0051 | 0.05	-	-	-	-	-	-	-	0.28	*<0.0051*	*<0.0051*	0.275	0.307	0.28	0.298	0.316
Orthophosphate (PO4-P)	mg/L	0.001	0.001	-	-	-	-	-	-	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Total Diss Phosphorus	mg/L	0.001 | 0.003	0.00314	-	-	-	-	-	-	0.0016	0.0019	*<0.001*	0.0025	*<0.001*	0.0019	*<0.001*	*<0.001*
Total Dissolved Nitrogen	mg/L	0.05	-	-	-	-	-	-	-	0.159	0.176	0.183	0.227	0.297	0.295	0.279	0.241
Total Kjeldahl Nitrogen	mg/L	0.05	0.25	-	-	-	-	-	-	0.28	0.24	0.212	0.275	0.307	0.28	0.298	0.316
Total Kjeldahl Nitrogen (diss)	mg/L	0.05	-	-	-	-	-	-	-	0.159	0.176	0.183	0.227	0.297	0.295	0.279	0.241
Total Phosphorus	mg/L	0.001 | 0.003	0.006	0.0049	-	-	-	-	-	0.0033	0.0017	0.0035	0.0069	0.0069	0.005	0.0071	0.0065
Organic/Inorganic Carbon																	
Dissolved Organic Carbon	mg/L	0.5	2.72	-	-	-	-	-	-	3.46	3.78	4.03	3.62	3.93	3.88	3.87	3.79
Total Organic Carbon	mg/L	0.5	3	-	-	-	-	-	-	3.07	3.25	2.73	3.68	3.74	3.76	3.94	3.66
Total Metals																	
Aluminum (T)	ug/L	1	5.32	9.1	100	-	-	75	100	4.3	2.9	4.2	3.1	2	2.8	3.1	2.5
Antimony (T)	ug/L	0.02	0.02	0.51	-	6	-	4.5	6	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Arsenic (T)	ug/L	0.02	0.275	3.8	5	10	25	18.8	25	0.334	0.323	0.325	0.671	0.63	0.631	0.659	0.644
Barium (T)	ug/L	0.02	8.05	77	-	1000	-	750	1000	8.71	7.9	7.87	8.71	8.81	8.78	8.77	8.72
Beryllium (T)	ug/L	0.005	0.005	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Bismuth (T)	ug/L	0.005	0.005	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Boron (T)	ug/L	5	6.52	23	1500	5000	-	1120	1500	*<5*	*<5*	*<5*	7.4	7.5	7.5	7.3	7.6
Cadmium (T)	ug/L	0.005	0.005	0.05	0.047 | 0.0649	5	-	0.0352 | 0.0487	0.047 | 0.0649	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Cesium (T)	ug/L	0.005	-	-	-	-	-	-	-	0.0102	0.0075	0.0075	0.0077	0.0083	0.0079	0.0078	0.008
Chromium (T)	ug/L	0.1	0.103	1.1	5	50	-	3.75	5	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Cobalt (T)	ug/L	0.005	0.016	-	0.78	-	-	0.585	0.78	0.0102	0.0142	0.0096	0.0263	0.0262	0.0268	0.0251	0.0257
Copper (T)	ug/L	0.05	0.86	2	-	2000	-	1500	2000	0.778	0.765	0.784	0.989	0.931	0.942	0.946	0.956
Gallium (T)	ug/L	0.05	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Iron (T)	ug/L	1	15	42	300	-	1060	795	1060	10.1	9.1	11	26.3	22.8	25.4	25.1	24.7
Lanthanum (T)	ug/L	0.01	-	-	-	-	-	-	-	0.016	0.016	0.018	0.024	0.021	0.022	0.021	0.022
Lead (T)	ug/L	0.01	0.0222	0.15	-	5	-	3.75	5	0.012	*<0.01*	*<0.01*	0.013	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Lithium (T)	ug/L	0.5	0.72	-	-	-	-	-	-	0.79	0.79	0.79	1.14	1.16	1.15	1.14	1.14
Manganese (T)	ug/L	0.05	3.06	5.5	-	120	-	90	120	1.82	1.87	1.86	9.05	7.99	8.92	8.76	9.27
Mercury (T)	ug/L	5e-04 | 0.005	8.00E-04	0.02	0.026	1	-	0.0195	0.026	*<0.005*	*<0.005*	0.0006	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Molybdenum (T)	ug/L	0.05	0.107	5.2	73	-	-	54.8	73	0.073	0.078	0.073	0.141	0.125	0.128	0.118	0.139
Nickel (T)	ug/L	0.05	0.441	2.7	25	-	-	18.8	25	0.446	0.461	0.482	0.845	0.855	0.798	0.809	0.828
Niobium (T)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Phosphorus (T)	ug/L	50	-	-	-	-	-	-	-	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*
Rhenium (T)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Rubidium (T)	ug/L	0.005	-	-	-	-	-	-	-	1.38	1.42	1.43	1.52	1.54	1.49	1.54	1.53
Selenium (T)	ug/L	0.04	0.049	0.16	1	50	-	0.75	1	*<0.04*	*<0.04*	*<0.04*	*<0.04*	0.056	0.054	0.043	*<0.04*
Silicon (T)	ug/L	50	-	-	-	-	-	-	-	103	90	93	217	217	209	214	227
Silver (T)	ug/L	0.005	0.005	0.1	0.25	-	-	0.188	0.25	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Strontium (T)	ug/L	0.02	36.1	-	2500	7000	-	1880	2500	40.2	37.9	38.9	57.8	57.6	56.7	57	56.6
Sulfur (T)	ug/L	500	-	-	-	-	-	-	-	1350	1550	1360	2370	2180	2210	2200	2340
Tantalum (T)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Tellurium (T)	ug/L	0.02	-	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Thallium (T)	ug/L	0.005	0.005	0.1	0.8	-	-	0.6	0.8	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Thorium (T)	ug/L	0.005 | 0.01	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Tin (T)	ug/L	0.02	0.0384	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Titanium (T)	ug/L	0.05	0.17	-	-	-	-	-	-	0.063	*<0.05*	0.065	0.064	0.055	0.064	0.062	*<0.05*
Tungsten (T)	ug/L	0.01	-	-	-	-	-	-	-	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Uranium (T)	ug/L	0.001	0.0164	1.5	15	20	-	11.2	15	0.0151	0.0166	0.0178	0.0237	0.0232	0.0234	0.0233	0.0231
Vanadium (T)	ug/L	0.05	0.05	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Yttrium (T)	ug/L	0.005	-	-	-	-	-	-	-	0.0058	*<0.005*	*<0.005*	0.0064	0.0064	0.0075	0.0073	0.0055
Zinc (T)	ug/L	0.5	1.7	6.7	-	-	-	-	-	1.09	*<0.5*	*<0.5*	*<0.5*	*<0.5*	0.61	*<0.5*	*<0.5*
Zirconium (T)	ug/L	0.01	-	-	-	-	-	-	-	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Dissolved Metals																	
Aluminum (D)	ug/L	1	-	-	-	-	-	-	-	1.2	1.1	1.4	1.1	*<1*	1.3	*<1*	*<1*
Antimony (D)	ug/L	0.02	-	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Arsenic (D)	ug/L	0.02	-	-	-	-	-	-	-	0.313	0.355	0.336	0.586	0.633	0.6	0.602	0.571
Barium (D)	ug/L	0.02	-	-	-	-	-	-	-	8.15	7.85	7.89	8.22	8.27	8.04	8.02	8.13
Beryllium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Bismuth (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Boron (D)	ug/L	5	-	-	-	-	-	-	-	*<5*	*<5*	*<5*	7.3	7.2	7.1	7.1	7.1
Cadmium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Cesium (D)	ug/L	0.005	-	-	-	-	-	-	-	0.0083	0.0082	0.0065	0.0075	0.0071	0.0086	0.0073	0.0093
Chromium (D)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Cobalt (D)	ug/L	0.005	-	-	-	-	-	-	-	0.0052	0.0052	0.0058	0.0148	0.0129	0.0131	0.0131	0.0113
Copper (D)	ug/L	0.05	0.861	-	1.14 | 5.85	-	-	0.858 | 4.39	1.14 | 5.85	0.655	0.671	0.703	0.941	0.938	0.933	0.944	0.948
Gallium (D)	ug/L	0.05	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Iron (D)	ug/L	1	-	-	-	-	-	-	-	1.5	1.9	1.8	5.1	5	5.1	5	5
Lanthanum (D)	ug/L	0.01	-	-	-	-	-	-	-	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Lead (D)	ug/L	0.01	0.0125	-	4.71 | 6.99	-	-	3.53 | 5.24	4.71 | 6.99	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Lithium (D)	ug/L	0.5	-	-	-	-	-	-	-	0.76	0.74	0.75	1.09	1.08	1.06	1.07	1.06
Manganese (D)	ug/L	0.05	1.2	-	210 | 330	-	-	158 | 248	210 | 330	0.462	0.472	0.355	0.196	0.174	0.183	0.177	0.195
Mercury (D)	ug/L	5e-04 | 0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<5e-04*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Molybdenum (D)	ug/L	0.05	-	-	-	-	-	-	-	0.073	0.078	0.075	0.131	0.139	0.129	0.123	0.128
Nickel (D)	ug/L	0.05	-	-	-	-	-	-	-	0.436	0.438	0.424	0.727	0.723	0.702	0.932	0.817
Niobium (D)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Phosphorus (D)	ug/L	50	-	-	-	-	-	-	-	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*
Rhenium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Rubidium (D)	ug/L	0.005	-	-	-	-	-	-	-	1.35	1.38	1.38	1.53	1.53	1.52	1.5	1.51
Selenium (D)	ug/L	0.04	-	-	-	-	-	-	-	*<0.04*	0.041	*<0.04*	*<0.04*	0.042	0.042	0.042	*<0.04*
Silicon (D)	ug/L	50	-	-	-	-	-	-	-	74	89	90	218	233	223	227	240
Silver (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Strontium (D)	ug/L	0.02	-	-	2500	-	-	1880	2500	40.5	39.1	39.2	58.3	60.1	58.9	59.1	59.9
Sulfur (D)	ug/L	500	-	-	-	-	-	-	-	1340	1500	1350	2120	2110	2140	2220	2290
Tantalum (D)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Tellurium (D)	ug/L	0.02	-	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Thallium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Thorium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Tin (D)	ug/L	0.02	-	-	-	-	-	-	-	*<0.02*	0.054	*<0.02*	*<0.02*	*<0.02*	0.026	*<0.02*	*<0.02*
Titanium (D)	ug/L	0.05	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Tungsten (D)	ug/L	0.01	-	-	-	-	-	-	-	*<0.01*	0.012	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Uranium (D)	ug/L	0.001	-	-	-	-	-	-	-	0.0156	0.0166	0.014	0.0218	0.0218	0.0213	0.0212	0.0221
Vanadium (D)	ug/L	0.05	-	-	-	-	-	-	-	0.137	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Yttrium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	0.0052	0.006	0.0051	0.0052	*<0.005*	*<0.005*	*<0.005*
Zinc (D)	ug/L	0.5	1.9	-	5.86 | 11.7	-	-	4.4 | 8.77	5.86 | 11.7	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*
Zirconium (D)	ug/L	0.01	-	-	-	-	-	-	-	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Cyanides																	
Cyanide (free)	mg/L	0.001	-	0.00035	-	-	-	-	-	*<0.001*	*<0.001*	*<0.001*	0.0011	0.0011	*<0.001*	0.0011	0.0012
Cyanide (Total)	mg/L	0.001	0.001	0.009	0.005	0.2	-	0.00375	0.005	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Cyanide (WAD)	mg/L	0.001	-	-	-	-	-	-	-	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*

Notes

[a] FEIS predictions for the edge of the mixing zone as presented in Agnico Eagle (2014).

[b] The freshwater aquatic life guidelines (FWAL) for cadmium (T), copper (D), lead (D), manganese (D), and zinc (D) are variable depending on modifying factors such as pH, hardness, and DOC. Values shown represent the range of FWAL guidelines calculated for MEL-01 open-water samples in 2022.

[c] Health Canada drinking water guidelines (maximum acceptable concentrations)

[d] Site-specific water quality objectives for fluoride, arsenic, and iron.

[e] The AEMP Action Level is 75% of the AEMP Benchmark.

[f] The AEMP Benchmark is the lowest of the FWAL or HH DW guidelines.

Table C3-1. Water chemistry results from Meliadine Lake in 2022

Parameter	Units	DL (min | max)	Normal Range	FEIS[a]	FWAL[b] (min | max)	HH DW[c]	SSWQO[d]	Action Level[e] (min | max)	Benchmark[f] (min | max)	August MEL-01-10 8/18/2022	August MEL-02-02 8/18/2022	August MEL-02-03 8/18/2022	August MEL-02-05 8/18/2022	August MEL-02-06 8/18/2022	August MEL-02-08 8/18/2022	August MEL-03-01 8/20/2022	August MEL-03-02 8/20/2022
Field Measurements																	
Temperature	C	-	-	-	-	-	-	-	-	16	16.3	16.4	16.3	16.2	16.4	16.1	16.2
Sp. Conductivity (field)	uS/cm	-	-	-	-	-	-	-	-	111.4	92.8	93	93.2	91.9	93.9	84.1	84.1
pH (field)	pH units	-	7.1 | 7.95	-	6.5 | 9	-	-	6.5 | 9.0	6.5 | 9.0	7.17	7.34	7.37	7.33	7.32	7.09	7.25	7.2
DO (mg/L)	mg/L	-	-	-	-	-	-	6.5	6.5	9.7	9.84	9.65	9.86	9.72	8.59	9.75	9.52
DO (%)	%	-	-	-	-	-	-	-	-	99.9	100.7	99	100.4	98.4	87.7	99.1	97.2
Conventional Parameters																	
Conductivity (lab)	uS/cm	1	77.5	-	-	-	-	-	-	112	93.8	93.3	93.7	92.5	94.8	84.8	83.9
Hardness	mg/L	0.2	23.4	-	-	-	-	-	-	31.6	26.4	26.2	26.3	26.3	26.9	23.6	23.6
pH (lab)	pH units	0.1	-	-	6.5 | 9	-	-	6.5 | 9.0	6.5 | 9.0	7.62	7.63	7.6	7.62	7.61	7.6	7.57	7.62
Total Dissolved Solids	mg/L	13	54	68	500	-	1000	375	500	71	53	45	51	44	50	48	46
Total Dissolved Solids (Calc)	mg/L	1	39.6	68	500	-	1000	375	500	53.9	45.3	44.6	44.8	44.1	45.4	40.2	39.9
Total Suspended Solids	mg/L	1	1	3.1	-	-	-	-	-	*<1*	*<1*	*<1*	*<1*	*<1*	*<1*	1.4	1
Turbidity (lab)	NTU	0.1	-	-	-	-	-	-	-	0.37	0.18	0.28	0.17	0.18	0.2	0.29	0.23
Major Ions																	
Alkalinity, Bicarbonate	mg/L	1.2	25	-	-	-	-	-	-	24.8	23.7	23.3	23.4	22.9	23.3	22.1	22.7
Alkalinity, Carbonate	mg/L	0.6	-	-	-	-	-	-	-	*<0.6*	*<0.6*	*<0.6*	*<0.6*	*<0.6*	*<0.6*	*<0.6*	*<0.6*
Alkalinity, Hydroxide	mg/L	0.34	-	-	-	-	-	-	-	*<0.34*	*<0.34*	*<0.34*	*<0.34*	*<0.34*	*<0.34*	*<0.34*	*<0.34*
Alkalinity, Total	mg/L	1	20.5	-	-	-	-	-	-	20.3	19.4	19.1	19.2	18.8	19.1	18.1	18.6
Bromide	mg/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Calcium (D)	mg/L	0.01	-	-	-	-	-	-	-	9.7	8.11	8.09	8.11	8.2	8.37	7.32	7.33
Calcium (T)	mg/L	0.01	7.33	-	-	-	-	-	-	9.37	8.14	8.08	8.22	8.2	8.4	7.78	7.86
Chloride	mg/L	0.1	9.56	14	120	-	-	90	120	15.3	12	11.9	11.9	11.6	11.9	9.95	9.93
Fluoride	mg/L	0.02	0.028	0.0084	0.12	1.5	2.8	2.1	2.8	0.028	0.027	0.027	0.027	0.027	0.027	0.024	0.027
Magnesium (D)	mg/L	0.004	-	-	-	-	-	-	-	1.8	1.5	1.44	1.47	1.42	1.47	1.31	1.29
Magnesium (T)	mg/L	0.004	1.18	-	-	-	-	-	-	1.74	1.39	1.38	1.36	1.35	1.41	1.25	1.24
Potassium (D)	mg/L	0.02	-	-	-	-	-	-	-	1.21	1.09	1.08	1.1	1.08	1.09	1.04	1.02
Potassium (T)	mg/L	0.02	0.954	-	-	-	-	-	-	1.21	1.1	1.1	1.09	1.07	1.09	1.04	1.03
Reactive Silica (SiO2)	mg/L	0.01	0.268	-	-	-	-	-	-	0.461	0.338	0.337	0.335	0.34	0.343	0.326	0.291
Sodium (D)	mg/L	0.02	-	-	-	-	-	-	-	7.66	6.38	6.05	6.12	5.99	6.48	5.31	5.35
Sodium (T)	mg/L	0.02	4.85	5.3	-	-	-	-	-	7.65	6.02	6.1	6.13	5.81	6.12	5.36	5.24
Sulphate	mg/L	0.3	3.87	38	-	-	-	-	-	6.07	4.56	4.57	4.59	4.46	4.64	4.41	3.82
Nutrients																	
Ammonia (as N)	mg/L	0.005	0.0174	0.54	1.27	-	-	0.95	1.27	0.0056	0.0057	0.0089	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Nitrate (as N)	mg/L	0.005	0.018	0.25	2.9	10	-	2.17	2.9	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Nitrate + Nitrite (as N)	mg/L	0.0051	-	-	-	-	-	-	-	*<0.0051*	*<0.0051*	*<0.0051*	*<0.0051*	*<0.0051*	*<0.0051*	*<0.0051*	*<0.0051*
Nitrite (as N)	mg/L	0.001	0.001	0.051	0.06	1	-	0.045	0.06	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Nitrogen	mg/L	0.0051 | 0.05	-	-	-	-	-	-	-	0.285	0.212	0.221	0.22	0.207	0.217	0.192	0.191
Orthophosphate (PO4-P)	mg/L	0.001	0.001	-	-	-	-	-	-	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Total Diss Phosphorus	mg/L	0.001 | 0.003	0.00314	-	-	-	-	-	-	0.0025	0.0019	*<0.001*	*<0.001*	*<0.003*	0.0022	0.0032	0.0028
Total Dissolved Nitrogen	mg/L	0.05	-	-	-	-	-	-	-	0.232	0.196	0.196	0.191	0.192	0.196	0.196	0.188
Total Kjeldahl Nitrogen	mg/L	0.05	0.25	-	-	-	-	-	-	0.285	0.212	0.221	0.22	0.207	0.217	0.192	0.191
Total Kjeldahl Nitrogen (diss)	mg/L	0.05	-	-	-	-	-	-	-	0.232	0.196	0.196	0.191	0.192	0.196	0.196	0.188
Total Phosphorus	mg/L	0.001 | 0.003	0.006	0.0049	-	-	-	-	-	0.0063	0.0033	0.0054	0.0052	0.0042	0.0044	0.0032	0.0041
Organic/Inorganic Carbon																	
Dissolved Organic Carbon	mg/L	0.5	2.72	-	-	-	-	-	-	3.72	3.61	3.95	3.83	3.91	3.86	2.44	2.47
Total Organic Carbon	mg/L	0.5	3	-	-	-	-	-	-	3.72	3.73	3.68	3.74	3.65	3.93	2.86	2.51
Total Metals																	
Aluminum (T)	ug/L	1	5.32	9.1	100	-	-	75	100	2.7	1.9	1.9	1.8	1.7	1.9	8.3	3
Antimony (T)	ug/L	0.02	0.02	0.51	-	6	-	4.5	6	*<0.02*	*<0.02*	*<0.02*	*<0.02*	0.028	*<0.02*	*<0.02*	*<0.02*
Arsenic (T)	ug/L	0.02	0.275	3.8	5	10	25	18.8	25	0.615	0.682	0.698	0.649	0.627	0.647	0.387	0.353
Barium (T)	ug/L	0.02	8.05	77	-	1000	-	750	1000	8.83	7.71	7.73	7.46	7.53	7.8	7.62	7.48
Beryllium (T)	ug/L	0.005	0.005	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Bismuth (T)	ug/L	0.005	0.005	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Boron (T)	ug/L	5	6.52	23	1500	5000	-	1120	1500	7.3	5.7	5.5	5.8	5.7	5.8	*<5*	*<5*
Cadmium (T)	ug/L	0.005	0.005	0.05	0.047 | 0.0649	5	-	0.0352 | 0.0487	0.047 | 0.0649	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Cesium (T)	ug/L	0.005	-	-	-	-	-	-	-	0.0077	0.009	0.008	0.0085	0.0084	0.0082	0.0103	0.0106
Chromium (T)	ug/L	0.1	0.103	1.1	5	50	-	3.75	5	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Cobalt (T)	ug/L	0.005	0.016	-	0.78	-	-	0.585	0.78	0.0244	0.0139	0.0137	0.0139	0.013	0.0129	0.0154	0.0103
Copper (T)	ug/L	0.05	0.86	2	-	2000	-	1500	2000	0.941	0.808	0.817	0.858	0.795	0.818	0.788	0.773
Gallium (T)	ug/L	0.05	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Iron (T)	ug/L	1	15	42	300	-	1060	795	1060	25.8	13.1	12.6	12.6	11.6	13.6	19.5	9.9
Lanthanum (T)	ug/L	0.01	-	-	-	-	-	-	-	0.025	0.016	0.015	0.014	0.014	0.018	0.042	0.014
Lead (T)	ug/L	0.01	0.0222	0.15	-	5	-	3.75	5	*<0.01*	0.016	*<0.01*	0.02	0.042	*<0.01*	0.027	*<0.01*
Lithium (T)	ug/L	0.5	0.72	-	-	-	-	-	-	1.12	0.94	0.93	0.95	0.92	1	0.84	0.83
Manganese (T)	ug/L	0.05	3.06	5.5	-	120	-	90	120	8.8	3.88	3.8	3.75	3.54	4.1	2.67	2.22
Mercury (T)	ug/L	5e-04 | 0.005	8.00E-04	0.02	0.026	1	-	0.0195	0.026	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Molybdenum (T)	ug/L	0.05	0.107	5.2	73	-	-	54.8	73	0.123	0.132	0.101	0.103	0.4	0.107	0.08	0.08
Nickel (T)	ug/L	0.05	0.441	2.7	25	-	-	18.8	25	0.797	0.552	0.546	0.545	0.537	0.545	0.441	0.42
Niobium (T)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Phosphorus (T)	ug/L	50	-	-	-	-	-	-	-	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*
Rhenium (T)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Rubidium (T)	ug/L	0.005	-	-	-	-	-	-	-	1.56	1.44	1.5	1.48	1.46	1.41	1.42	1.4
Selenium (T)	ug/L	0.04	0.049	0.16	1	50	-	0.75	1	*<0.04*	0.041	0.051	*<0.04*	*<0.04*	0.048	0.042	*<0.04*
Silicon (T)	ug/L	50	-	-	-	-	-	-	-	216	149	143	160	149	165	129	124
Silver (T)	ug/L	0.005	0.005	0.1	0.25	-	-	0.188	0.25	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Strontium (T)	ug/L	0.02	36.1	-	2500	7000	-	1880	2500	58.3	46.9	47.1	48.7	46.3	46.5	40.5	40.2
Sulfur (T)	ug/L	500	-	-	-	-	-	-	-	2280	1500	1560	1530	1440	1740	1470	1490
Tantalum (T)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Tellurium (T)	ug/L	0.02	-	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Thallium (T)	ug/L	0.005	0.005	0.1	0.8	-	-	0.6	0.8	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Thorium (T)	ug/L	0.005 | 0.01	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Tin (T)	ug/L	0.02	0.0384	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Titanium (T)	ug/L	0.05	0.17	-	-	-	-	-	-	0.062	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	1.4	0.072
Tungsten (T)	ug/L	0.01	-	-	-	-	-	-	-	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Uranium (T)	ug/L	0.001	0.0164	1.5	15	20	-	11.2	15	0.0235	0.0188	0.0187	0.0184	0.0175	0.0172	0.0213	0.0174
Vanadium (T)	ug/L	0.05	0.05	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Yttrium (T)	ug/L	0.005	-	-	-	-	-	-	-	0.0082	*<0.005*	0.0062	0.0054	*<0.005*	*<0.005*	0.0111	*<0.005*
Zinc (T)	ug/L	0.5	1.7	6.7	-	-	-	-	-	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*
Zirconium (T)	ug/L	0.01	-	-	-	-	-	-	-	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Dissolved Metals																	
Aluminum (D)	ug/L	1	-	-	-	-	-	-	-	*<1*	1.1	*<1*	*<1*	*<1*	1.2	1.5	1.5
Antimony (D)	ug/L	0.02	-	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Arsenic (D)	ug/L	0.02	-	-	-	-	-	-	-	0.601	0.615	0.64	0.667	0.627	0.638	0.346	0.357
Barium (D)	ug/L	0.02	-	-	-	-	-	-	-	7.97	7.68	7.59	7.71	7.62	7.49	7.5	7.53
Beryllium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Bismuth (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Boron (D)	ug/L	5	-	-	-	-	-	-	-	7.3	5.3	5.3	5.3	5.3	5.6	*<5*	*<5*
Cadmium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Cesium (D)	ug/L	0.005	-	-	-	-	-	-	-	0.0082	0.0084	0.0091	0.0081	0.0085	0.0089	0.0101	0.0095
Chromium (D)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Cobalt (D)	ug/L	0.005	-	-	-	-	-	-	-	0.0154	0.0078	0.0062	0.0084	0.0085	0.008	0.0052	0.0073
Copper (D)	ug/L	0.05	0.861	-	1.14 | 5.85	-	-	0.858 | 4.39	1.14 | 5.85	0.938	0.817	0.807	0.81	0.812	0.823	0.797	0.792
Gallium (D)	ug/L	0.05	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Iron (D)	ug/L	1	-	-	-	-	-	-	-	5.1	4.7	4.6	4.8	4.4	4.8	4.3	4.3
Lanthanum (D)	ug/L	0.01	-	-	-	-	-	-	-	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Lead (D)	ug/L	0.01	0.0125	-	4.71 | 6.99	-	-	3.53 | 5.24	4.71 | 6.99	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Lithium (D)	ug/L	0.5	-	-	-	-	-	-	-	1.08	0.87	0.86	0.87	0.87	0.91	0.77	0.76
Manganese (D)	ug/L	0.05	1.2	-	210 | 330	-	-	158 | 248	210 | 330	0.194	0.311	0.277	0.241	0.267	0.235	0.449	0.414
Mercury (D)	ug/L	5e-04 | 0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Molybdenum (D)	ug/L	0.05	-	-	-	-	-	-	-	0.138	0.103	0.471	0.348	0.102	0.358	0.084	0.195
Nickel (D)	ug/L	0.05	-	-	-	-	-	-	-	0.702	0.626	0.485	0.514	0.486	0.494	0.386	0.384
Niobium (D)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Phosphorus (D)	ug/L	50	-	-	-	-	-	-	-	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*
Rhenium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Rubidium (D)	ug/L	0.005	-	-	-	-	-	-	-	1.54	1.45	1.44	1.47	1.44	1.46	1.42	1.41
Selenium (D)	ug/L	0.04	-	-	-	-	-	-	-	*<0.04*	*<0.04*	0.042	*<0.04*	*<0.04*	*<0.04*	0.047	*<0.04*
Silicon (D)	ug/L	50	-	-	-	-	-	-	-	216	160	153	162	150	161	131	134
Silver (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Strontium (D)	ug/L	0.02	-	-	2500	-	-	1880	2500	58.8	47.7	48.3	48.6	47.3	47.1	41.1	40.9
Sulfur (D)	ug/L	500	-	-	-	-	-	-	-	2300	1700	1590	1490	1660	1670	1390	1430
Tantalum (D)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Tellurium (D)	ug/L	0.02	-	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Thallium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Thorium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Tin (D)	ug/L	0.02	-	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Titanium (D)	ug/L	0.05	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Tungsten (D)	ug/L	0.01	-	-	-	-	-	-	-	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Uranium (D)	ug/L	0.001	-	-	-	-	-	-	-	0.0203	0.0175	0.0183	0.0188	0.0179	0.0172	0.0176	0.0167
Vanadium (D)	ug/L	0.05	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Yttrium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Zinc (D)	ug/L	0.5	1.9	-	5.86 | 11.7	-	-	4.4 | 8.77	5.86 | 11.7	*<0.5*	0.62	*<0.5*	*<0.5*	*<0.5*	*<0.5*	0.8	0.51
Zirconium (D)	ug/L	0.01	-	-	-	-	-	-	-	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Cyanides																	
Cyanide (free)	mg/L	0.001	-	0.00035	-	-	-	-	-	*<0.001*	0.0017	*<0.001*	0.0013	*<0.001*	0.0014	*<0.001*	*<0.001*
Cyanide (Total)	mg/L	0.001	0.001	0.009	0.005	0.2	-	0.00375	0.005	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Cyanide (WAD)	mg/L	0.001	-	-	-	-	-	-	-	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*

Notes

[a] FEIS predictions for the edge of the mixing zone as presented in Agnico Eagle (2014).

[b] The freshwater aquatic life guidelines (FWAL) for cadmium (T), copper (D), lead (D), manganese (D), and zinc (D) are variable depending on modifying factors such as pH, hardness, and DOC. Values shown represent the range of FWAL guidelines calculated for MEL-01 open-water samples in 2022.

[c] Health Canada drinking water guidelines (maximum acceptable concentrations)

[d] Site-specific water quality objectives for fluoride, arsenic, and iron.

[e] The AEMP Action Level is 75% of the AEMP Benchmark.

[f] The AEMP Benchmark is the lowest of the FWAL or HH DW guidelines.

Table C3-1. Water chemistry results from Meliadine Lake in 2022

Parameter	Units	DL (min | max)	Normal Range	FEIS[a]	FWAL[b] (min | max)	HH DW[c]	SSWQO[d]	Action Level[e] (min | max)	Benchmark[f] (min | max)	August MEL-03-03 8/20/2022	August MEL-03-04 8/20/2022	August MEL-03-05 8/20/2022	August MEL-04-01 8/20/2022	August MEL-04-02 8/20/2022	August MEL-04-03 8/20/2022	August MEL-04-04 8/20/2022	August MEL-04-05 8/20/2022
Field Measurements																	
Temperature	C	-	-	-	-	-	-	-	-	16.1	16.1	16.2	15.4	15.5	15.5	15.5	15.4
Sp. Conductivity (field)	uS/cm	-	-	-	-	-	-	-	-	84.5	84.1	84.1	83.7	83.7	83.7	83.6	83.6
pH (field)	pH units	-	7.1 | 7.95	-	6.5 | 9	-	-	6.5 | 9.0	6.5 | 9.0	7.41	7.4	7.14	7.07	7.36	7.35	7.24	7.26
DO (mg/L)	mg/L	-	-	-	-	-	-	6.5	6.5	9.9	9.61	9.64	10.24	9.79	9.82	10.28	10.01
DO (%)	%	-	-	-	-	-	-	-	-	97.5	99.9	98	102.3	98.6	98.1	102.8	100.2
Conventional Parameters																	
Conductivity (lab)	uS/cm	1	77.5	-	-	-	-	-	-	84.2	84.3	84.6	83.2	83.4	83.5	83.1	83.6
Hardness	mg/L	0.2	23.4	-	-	-	-	-	-	23.9	23.7	24	24.2	24.4	24.4	24.6	24.6
pH (lab)	pH units	0.1	-	-	6.5 | 9	-	-	6.5 | 9.0	6.5 | 9.0	7.59	7.62	7.62	7.59	7.6	7.6	7.61	7.61
Total Dissolved Solids	mg/L	13	54	68	500	-	1000	375	500	47	41	42	47	46	41	40	44
Total Dissolved Solids (Calc)	mg/L	1	39.6	68	500	-	1000	375	500	40.5	41.2	40.7	40.2	40.4	42.3	39.8	39.9
Total Suspended Solids	mg/L	1	1	3.1	-	-	-	-	-	*<1*	*<1*	*<1*	*<1*	*<1*	*<1*	*<1*	*<1*
Turbidity (lab)	NTU	0.1	-	-	-	-	-	-	-	0.2	0.15	0.63	0.19	0.13	0.19	0.17	0.11
Major Ions																	
Alkalinity, Bicarbonate	mg/L	1.2	25	-	-	-	-	-	-	22.8	25.4	23.2	22.4	23.3	27	22.6	22.6
Alkalinity, Carbonate	mg/L	0.6	-	-	-	-	-	-	-	*<0.6*	*<0.6*	*<0.6*	*<0.6*	*<0.6*	*<0.6*	*<0.6*	*<0.6*
Alkalinity, Hydroxide	mg/L	0.34	-	-	-	-	-	-	-	*<0.34*	*<0.34*	*<0.34*	*<0.34*	*<0.34*	*<0.34*	*<0.34*	*<0.34*
Alkalinity, Total	mg/L	1	20.5	-	-	-	-	-	-	18.7	20.8	19	18.4	19.1	22.1	18.5	18.5
Bromide	mg/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Calcium (D)	mg/L	0.01	-	-	-	-	-	-	-	7.47	7.36	7.47	7.58	7.64	7.65	7.68	7.74
Calcium (T)	mg/L	0.01	7.33	-	-	-	-	-	-	7.85	7.87	7.71	7.72	7.88	7.84	7.86	7.76
Chloride	mg/L	0.1	9.56	14	120	-	-	90	120	10.2	10	10.2	10.1	9.74	9.95	9.63	9.71
Fluoride	mg/L	0.02	0.028	0.0084	0.12	1.5	2.8	2.1	2.8	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027
Magnesium (D)	mg/L	0.004	-	-	-	-	-	-	-	1.28	1.29	1.31	1.28	1.28	1.29	1.31	1.29
Magnesium (T)	mg/L	0.004	1.18	-	-	-	-	-	-	1.23	1.25	1.24	1.26	1.28	1.27	1.26	1.25
Potassium (D)	mg/L	0.02	-	-	-	-	-	-	-	1.02	1.02	1.04	1.02	1.02	1.03	1.05	1.04
Potassium (T)	mg/L	0.02	0.954	-	-	-	-	-	-	1.03	1.04	1.03	1.04	1.04	1.03	1.04	1.02
Reactive Silica (SiO2)	mg/L	0.01	0.268	-	-	-	-	-	-	0.276	0.287	0.281	0.274	0.271	0.28	0.268	0.265
Sodium (D)	mg/L	0.02	-	-	-	-	-	-	-	5.38	5.2	5.41	5.3	5.38	5.29	5.25	5.15
Sodium (T)	mg/L	0.02	4.85	5.3	-	-	-	-	-	5.24	5.33	5.24	5.19	5.25	5.28	5.18	5.23
Sulphate	mg/L	0.3	3.87	38	-	-	-	-	-	3.86	3.82	3.83	3.82	3.82	3.8	3.78	3.86
Nutrients																	
Ammonia (as N)	mg/L	0.005	0.0174	0.54	1.27	-	-	0.95	1.27	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Nitrate (as N)	mg/L	0.005	0.018	0.25	2.9	10	-	2.17	2.9	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Nitrate + Nitrite (as N)	mg/L	0.0051	-	-	-	-	-	-	-	*<0.0051*	*<0.0051*	*<0.0051*	*<0.0051*	*<0.0051*	*<0.0051*	*<0.0051*	*<0.0051*
Nitrite (as N)	mg/L	0.001	0.001	0.051	0.06	1	-	0.045	0.06	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Nitrogen	mg/L	0.0051 | 0.05	-	-	-	-	-	-	-	0.2	0.203	0.212	0.175	0.18	0.173	0.187	0.188
Orthophosphate (PO4-P)	mg/L	0.001	0.001	-	-	-	-	-	-	0.0012	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Total Diss Phosphorus	mg/L	0.001 | 0.003	0.00314	-	-	-	-	-	-	0.0045	0.0021	0.0033	0.0016	*<0.001*	0.0016	0.0013	0.0019
Total Dissolved Nitrogen	mg/L	0.05	-	-	-	-	-	-	-	0.189	0.203	0.192	0.156	0.159	0.165	0.164	0.174
Total Kjeldahl Nitrogen	mg/L	0.05	0.25	-	-	-	-	-	-	0.2	0.203	0.212	0.175	0.18	0.173	0.187	0.188
Total Kjeldahl Nitrogen (diss)	mg/L	0.05	-	-	-	-	-	-	-	0.189	0.203	0.192	0.156	0.159	0.165	0.164	0.174
Total Phosphorus	mg/L	0.001 | 0.003	0.006	0.0049	-	-	-	-	-	0.0038	0.0036	0.0033	0.0039	0.0042	0.005	0.0036	0.0035
Organic/Inorganic Carbon																	
Dissolved Organic Carbon	mg/L	0.5	2.72	-	-	-	-	-	-	2.64	2.73	2.69	2.53	2.75	2.62	2.53	2.67
Total Organic Carbon	mg/L	0.5	3	-	-	-	-	-	-	2.57	2.45	2.53	2.81	2.46	2.55	2.48	2.64
Total Metals																	
Aluminum (T)	ug/L	1	5.32	9.1	100	-	-	75	100	2.9	2.3	2.4	3.3	1.9	2.3	2	2
Antimony (T)	ug/L	0.02	0.02	0.51	-	6	-	4.5	6	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Arsenic (T)	ug/L	0.02	0.275	3.8	5	10	25	18.8	25	0.379	0.371	0.358	0.317	0.321	0.3	0.305	0.316
Barium (T)	ug/L	0.02	8.05	77	-	1000	-	750	1000	7.74	7.5	7.63	7.86	7.88	7.83	7.73	7.74
Beryllium (T)	ug/L	0.005	0.005	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Bismuth (T)	ug/L	0.005	0.005	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Boron (T)	ug/L	5	6.52	23	1500	5000	-	1120	1500	*<5*	*<5*	*<5*	*<5*	*<5*	*<5*	*<5*	*<5*
Cadmium (T)	ug/L	0.005	0.005	0.05	0.047 | 0.0649	5	-	0.0352 | 0.0487	0.047 | 0.0649	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Cesium (T)	ug/L	0.005	-	-	-	-	-	-	-	0.009	0.0092	0.0082	0.0086	0.0081	0.0094	0.0088	0.009
Chromium (T)	ug/L	0.1	0.103	1.1	5	50	-	3.75	5	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	0.11	*<0.1*	*<0.1*
Cobalt (T)	ug/L	0.005	0.016	-	0.78	-	-	0.585	0.78	0.012	0.0097	0.0096	0.0113	0.0097	0.0086	0.0101	0.0088
Copper (T)	ug/L	0.05	0.86	2	-	2000	-	1500	2000	0.748	0.766	0.778	0.821	0.715	0.782	0.737	0.71
Gallium (T)	ug/L	0.05	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Iron (T)	ug/L	1	15	42	300	-	1060	795	1060	9.5	10.1	10.2	7.8	6.4	14.6	6.8	6.4
Lanthanum (T)	ug/L	0.01	-	-	-	-	-	-	-	0.015	0.014	0.014	0.012	0.012	0.013	0.013	0.011
Lead (T)	ug/L	0.01	0.0222	0.15	-	5	-	3.75	5	*<0.01*	*<0.01*	0.011	0.02	*<0.01*	0.011	*<0.01*	*<0.01*
Lithium (T)	ug/L	0.5	0.72	-	-	-	-	-	-	0.84	0.83	0.81	0.83	0.82	0.82	0.82	0.8
Manganese (T)	ug/L	0.05	3.06	5.5	-	120	-	90	120	2.32	2.33	2.28	2.16	2.17	2.33	2.17	2.16
Mercury (T)	ug/L	5e-04 | 0.005	8.00E-04	0.02	0.026	1	-	0.0195	0.026	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Molybdenum (T)	ug/L	0.05	0.107	5.2	73	-	-	54.8	73	0.086	0.088	0.088	0.18	0.076	0.076	0.216	0.158
Nickel (T)	ug/L	0.05	0.441	2.7	25	-	-	18.8	25	0.441	0.405	0.406	0.422	0.435	0.447	0.416	0.438
Niobium (T)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Phosphorus (T)	ug/L	50	-	-	-	-	-	-	-	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*
Rhenium (T)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Rubidium (T)	ug/L	0.005	-	-	-	-	-	-	-	1.41	1.43	1.42	1.43	1.41	1.39	1.42	1.42
Selenium (T)	ug/L	0.04	0.049	0.16	1	50	-	0.75	1	*<0.04*	*<0.04*	0.044	0.043	*<0.04*	0.041	*<0.04*	*<0.04*
Silicon (T)	ug/L	50	-	-	-	-	-	-	-	127	127	138	121	127	122	121	121
Silver (T)	ug/L	0.005	0.005	0.1	0.25	-	-	0.188	0.25	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Strontium (T)	ug/L	0.02	36.1	-	2500	7000	-	1880	2500	40.8	41.1	40.5	39	39.9	38.9	38.9	40.3
Sulfur (T)	ug/L	500	-	-	-	-	-	-	-	1350	1190	1190	1490	1340	1360	1400	1540
Tantalum (T)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Tellurium (T)	ug/L	0.02	-	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Thallium (T)	ug/L	0.005	0.005	0.1	0.8	-	-	0.6	0.8	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Thorium (T)	ug/L	0.005 | 0.01	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Tin (T)	ug/L	0.02	0.0384	-	-	-	-	-	-	*<0.02*	*<0.02*	0.127	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Titanium (T)	ug/L	0.05	0.17	-	-	-	-	-	-	*<0.05*	0.054	0.053	0.066	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Tungsten (T)	ug/L	0.01	-	-	-	-	-	-	-	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Uranium (T)	ug/L	0.001	0.0164	1.5	15	20	-	11.2	15	0.0171	0.0176	0.0187	0.0157	0.0154	0.0167	0.0166	0.016
Vanadium (T)	ug/L	0.05	0.05	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Yttrium (T)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Zinc (T)	ug/L	0.5	1.7	6.7	-	-	-	-	-	*<0.5*	*<0.5*	*<0.5*	1.57	*<0.5*	*<0.5*	*<0.5*	*<0.5*
Zirconium (T)	ug/L	0.01	-	-	-	-	-	-	-	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Dissolved Metals																	
Aluminum (D)	ug/L	1	-	-	-	-	-	-	-	1.4	1.4	2	*<1*	1	1.1	1.2	*<1*
Antimony (D)	ug/L	0.02	-	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Arsenic (D)	ug/L	0.02	-	-	-	-	-	-	-	0.337	0.319	0.35	0.3	0.312	0.307	0.309	0.311
Barium (D)	ug/L	0.02	-	-	-	-	-	-	-	7.37	7.42	7.57	7.51	7.47	7.53	7.53	7.65
Beryllium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Bismuth (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Boron (D)	ug/L	5	-	-	-	-	-	-	-	*<5*	*<5*	*<5*	*<5*	*<5*	*<5*	*<5*	*<5*
Cadmium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Cesium (D)	ug/L	0.005	-	-	-	-	-	-	-	0.0094	0.0109	0.0108	0.0092	0.0103	0.01	0.0092	0.0085
Chromium (D)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Cobalt (D)	ug/L	0.005	-	-	-	-	-	-	-	0.006	0.0057	0.0074	*<0.005*	0.0058	0.006	*<0.005*	0.0055
Copper (D)	ug/L	0.05	0.861	-	1.14 | 5.85	-	-	0.858 | 4.39	1.14 | 5.85	0.752	0.774	0.787	0.731	0.723	0.74	0.708	0.752
Gallium (D)	ug/L	0.05	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Iron (D)	ug/L	1	-	-	-	-	-	-	-	3.6	4.3	4.6	2.4	2.2	2.4	2.4	2.6
Lanthanum (D)	ug/L	0.01	-	-	-	-	-	-	-	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Lead (D)	ug/L	0.01	0.0125	-	4.71 | 6.99	-	-	3.53 | 5.24	4.71 | 6.99	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Lithium (D)	ug/L	0.5	-	-	-	-	-	-	-	0.76	0.75	0.77	0.75	0.76	0.76	0.74	0.77
Manganese (D)	ug/L	0.05	1.2	-	210 | 330	-	-	158 | 248	210 | 330	0.393	0.43	0.466	0.167	0.18	0.165	0.161	0.203
Mercury (D)	ug/L	5e-04 | 0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Molybdenum (D)	ug/L	0.05	-	-	-	-	-	-	-	0.09	0.089	0.098	0.091	0.201	0.083	0.085	0.123
Nickel (D)	ug/L	0.05	-	-	-	-	-	-	-	0.35	0.367	0.36	0.377	0.369	0.374	0.385	0.364
Niobium (D)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Phosphorus (D)	ug/L	50	-	-	-	-	-	-	-	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*
Rhenium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Rubidium (D)	ug/L	0.005	-	-	-	-	-	-	-	1.36	1.42	1.4	1.39	1.38	1.4	1.41	1.4
Selenium (D)	ug/L	0.04	-	-	-	-	-	-	-	*<0.04*	*<0.04*	*<0.04*	*<0.04*	*<0.04*	*<0.04*	*<0.04*	0.045
Silicon (D)	ug/L	50	-	-	-	-	-	-	-	130	138	126	128	122	130	128	124
Silver (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Strontium (D)	ug/L	0.02	-	-	2500	-	-	1880	2500	41.3	41.1	42.1	40.4	41.5	40.6	40.6	40.8
Sulfur (D)	ug/L	500	-	-	-	-	-	-	-	1380	1450	1400	1390	1410	1410	1340	1410
Tantalum (D)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Tellurium (D)	ug/L	0.02	-	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Thallium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Thorium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Tin (D)	ug/L	0.02	-	-	-	-	-	-	-	*<0.02*	*<0.02*	0.035	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Titanium (D)	ug/L	0.05	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Tungsten (D)	ug/L	0.01	-	-	-	-	-	-	-	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Uranium (D)	ug/L	0.001	-	-	-	-	-	-	-	0.0174	0.0168	0.0176	0.0158	0.0153	0.0151	0.0163	0.0163
Vanadium (D)	ug/L	0.05	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Yttrium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Zinc (D)	ug/L	0.5	1.9	-	5.86 | 11.7	-	-	4.4 | 8.77	5.86 | 11.7	*<0.5*	*<0.5*	0.7	0.62	*<0.5*	0.55	*<0.5*	*<0.5*
Zirconium (D)	ug/L	0.01	-	-	-	-	-	-	-	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Cyanides																	
Cyanide (free)	mg/L	0.001	-	0.00035	-	-	-	-	-	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Cyanide (Total)	mg/L	0.001	0.001	0.009	0.005	0.2	-	0.00375	0.005	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Cyanide (WAD)	mg/L	0.001	-	-	-	-	-	-	-	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*

Notes

[a] FEIS predictions for the edge of the mixing zone as presented in Agnico Eagle (2014).

[b] The freshwater aquatic life guidelines (FWAL) for cadmium (T), copper (D), lead (D), manganese (D), and zinc (D) are variable depending on modifying factors such as pH, hardness, and DOC. Values shown represent the range of FWAL guidelines calculated for MEL-01 open-water samples in 2022.

[c] Health Canada drinking water guidelines (maximum acceptable concentrations)

[d] Site-specific water quality objectives for fluoride, arsenic, and iron.

[e] The AEMP Action Level is 75% of the AEMP Benchmark.

[f] The AEMP Benchmark is the lowest of the FWAL or HH DW guidelines.

Table C3-1. Water chemistry results from Meliadine Lake in 2022

Parameter	Units	DL (min | max)	Normal Range	FEIS[a]	FWAL[b] (min | max)	HH DW[c]	SSWQO[d]	Action Level[e] (min | max)	Benchmark[f] (min | max)	August	August	August	August	August	September	September	September
										MEL-05-01	MEL-05-02	MEL-05-03	MEL-05-04	MEL-05-05	MEL-01-01	MEL-01-06	MEL-01-07
										8/14/2022	8/14/2022	8/14/2022	8/14/2022	8/14/2022	9/16/2022	9/16/2022	9/16/2022
Field Measurements																	
Temperature	C	-	-	-	-	-	-	-	-	14.59	14.7	14.69	14.72	14.73	8	8	8.1
Sp. Conductivity (field)	uS/cm	-	-	-	-	-	-	-	-	118.7	118.6	118.5	118.3	117.7	131.1	118.5	130.9
pH (field)	pH units	-	7.1 | 7.95	-	6.5 | 9	-	-	6.5 | 9.0	6.5 | 9.0	7.55	7.58	7.58	7.61	7.59	7.24	7.23	7.37
DO (mg/L)	mg/L	-	-	-	-	-	-	6.5	6.5	10.33	10.39	10.27	10.51	10.38	9.47	12.56	12.09
DO (%)	%	-	-	-	-	-	-	-	-	103.4	104.3	103	105.4	104.1	80.3	101.4	102.7
Conventional Parameters																	
Conductivity (lab)	uS/cm	1	77.5	-	-	-	-	-	-	83.8	86.2	86	86.2	82.8	133	119	127
Hardness	mg/L	0.2	23.4	-	-	-	-	-	-	25.8	25.6	25.4	25.6	25	34.1	32.7	33.1
pH (lab)	pH units	0.1	-	-	6.5 | 9	-	-	6.5 | 9.0	6.5 | 9.0	7.38	7.6	7.63	7.65	7.42	7.53	7.53	7.52
Total Dissolved Solids	mg/L	13	54	68	500	-	1000	375	500	49	53	42	50	50	64	60	68
Total Dissolved Solids (Calc)	mg/L	1	39.6	68	500	-	1000	375	500	42.9	41.4	41	41.3	42.3	65.2	51.4	62.8
Total Suspended Solids	mg/L	1	1	3.1	-	-	-	-	-	*<1*	*<1*	*<1*	*<1*	*<1*	1.3	1.1	1.1
Turbidity (lab)	NTU	0.1	-	-	-	-	-	-	-	0.43	0.42	0.35	0.26	0.32	0.51	0.47	0.44
Major Ions																	
Alkalinity, Bicarbonate	mg/L	1.2	25	-	-	-	-	-	-	26.7	24.2	23.4	23.8	26	28.2	27.7	28.1
Alkalinity, Carbonate	mg/L	0.6	-	-	-	-	-	-	-	*<0.6*	*<0.6*	*<0.6*	*<0.6*	*<0.6*	*<0.6*	*<0.6*	*<0.6*
Alkalinity, Hydroxide	mg/L	0.34	-	-	-	-	-	-	-	*<0.34*	*<0.34*	*<0.34*	*<0.34*	*<0.34*	*<0.34*	*<0.34*	*<0.34*
Alkalinity, Total	mg/L	1	20.5	-	-	-	-	-	-	21.9	19.8	19.2	19.5	21.3	23.1	22.7	23
Bromide	mg/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Calcium (D)	mg/L	0.01	-	-	-	-	-	-	-	8.16	8.1	8.01	8.08	7.85	10.3	10.1	10
Calcium (T)	mg/L	0.01	7.33	-	-	-	-	-	-	8.21	8.27	8.37	8.28	8.29	9.82	9.98	10.3
Chloride	mg/L	0.1	9.56	14	120	-	-	90	120	10	10	10	10	10	19.9	11.9	19
Fluoride	mg/L	0.02	0.028	0.0084	0.12	1.5	2.8	2.1	2.8	0.028	0.026	0.026	0.028	0.028	0.029	*<0.02*	0.029
Magnesium (D)	mg/L	0.004	-	-	-	-	-	-	-	1.32	1.3	1.31	1.31	1.32	2.04	1.84	1.96
Magnesium (T)	mg/L	0.004	1.18	-	-	-	-	-	-	1.31	1.31	1.3	1.3	1.32	2.05	1.8	1.99
Potassium (D)	mg/L	0.02	-	-	-	-	-	-	-	0.987	0.974	0.983	0.991	0.989	1.34	1.24	1.3
Potassium (T)	mg/L	0.02	0.954	-	-	-	-	-	-	0.996	0.992	0.997	0.998	1.02	1.34	1.24	1.32
Reactive Silica (SiO2)	mg/L	0.01	0.268	-	-	-	-	-	-	0.332	0.341	0.34	0.343	0.335	0.461	0.464	0.466
Sodium (D)	mg/L	0.02	-	-	-	-	-	-	-	5.25	5.04	5.12	5.18	5.31	9.68	8.34	9.09
Sodium (T)	mg/L	0.02	4.85	5.3	-	-	-	-	-	5.14	5.15	5.14	5.19	5.27	9.64	8.17	9.31
Sulphate	mg/L	0.3	3.87	38	-	-	-	-	-	4.02	4.03	4.03	4.04	4.02	7.75	4.33	7.37
Nutrients																	
Ammonia (as N)	mg/L	0.005	0.0174	0.54	1.27	-	-	0.95	1.27	*<0.005*	*<0.005*	*<0.005*	*<0.005*	0.005	0.0162	0.0078	0.0069
Nitrate (as N)	mg/L	0.005	0.018	0.25	2.9	10	-	2.17	2.9	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	0.0701	0.0124	0.0528
Nitrate + Nitrite (as N)	mg/L	0.0051	-	-	-	-	-	-	-	*<0.0051*	*<0.0051*	*<0.0051*	*<0.0051*	*<0.0051*	0.0717	0.0124	0.0539
Nitrite (as N)	mg/L	0.001	0.001	0.051	0.06	1	-	0.045	0.06	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	0.0016	*<0.001*	0.0011
Nitrogen	mg/L	0.0051 | 0.05	-	-	-	-	-	-	-	0.193	0.188	0.187	0.203	0.226	0.431	0.414	0.385
Orthophosphate (PO4-P)	mg/L	0.001	0.001	-	-	-	-	-	-	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Total Diss Phosphorus	mg/L	0.001 | 0.003	0.00314	-	-	-	-	-	-	*<0.001*	0.0029	*<0.001*	*<0.001*	0.0043	*<0.001*	*<0.001*	*<0.001*
Total Dissolved Nitrogen	mg/L	0.05	-	-	-	-	-	-	-	0.171	0.195	0.216	0.141	0.19	0.354	0.291	0.359
Total Kjeldahl Nitrogen	mg/L	0.05	0.25	-	-	-	-	-	-	0.193	0.188	0.187	0.203	0.226	0.359	0.402	0.331
Total Kjeldahl Nitrogen (diss)	mg/L	0.05	-	-	-	-	-	-	-	0.171	0.195	0.216	0.141	0.19	0.282	0.279	0.305
Total Phosphorus	mg/L	0.001 | 0.003	0.006	0.0049	-	-	-	-	-	0.0029	0.0033	0.0022	0.0031	0.0038	0.005	0.0053	0.0051
Organic/Inorganic Carbon																	
Dissolved Organic Carbon	mg/L	0.5	2.72	-	-	-	-	-	-	3.46	3.22	3.16	3.35	2.97	4.23	4.2	4.21
Total Organic Carbon	mg/L	0.5	3	-	-	-	-	-	-	3.13	2.94	3.09	3.14	3.11	4.13	4.22	4.21
Total Metals																	
Aluminum (T)	ug/L	1	5.32	9.1	100	-	-	75	100	1.9	1.9	2.5	2	2.3	6.4	3.2	4.1
Antimony (T)	ug/L	0.02	0.02	0.51	-	6	-	4.5	6	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	0.023	*<0.02*	0.021
Arsenic (T)	ug/L	0.02	0.275	3.8	5	10	25	18.8	25	0.422	0.41	0.415	0.415	0.424	0.645	0.574	0.614
Barium (T)	ug/L	0.02	8.05	77	-	1000	-	750	1000	8.23	8.15	7.97	7.93	8.1	8.73	8.27	8.97
Beryllium (T)	ug/L	0.005	0.005	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Bismuth (T)	ug/L	0.005	0.005	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Boron (T)	ug/L	5	6.52	23	1500	5000	-	1120	1500	5.2	5.2	5	5	5	8	7.2	7.9
Cadmium (T)	ug/L	0.005	0.005	0.05	0.047 | 0.0649	5	-	0.0352 | 0.0487	0.047 | 0.0649	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Cesium (T)	ug/L	0.005	-	-	-	-	-	-	-	0.009	0.0087	0.0088	0.0084	0.0088	0.0088	0.0076	0.0088
Chromium (T)	ug/L	0.1	0.103	1.1	5	50	-	3.75	5	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Cobalt (T)	ug/L	0.005	0.016	-	0.78	-	-	0.585	0.78	0.0099	0.012	0.0111	0.0128	0.0099	0.0321	0.0231	0.0318
Copper (T)	ug/L	0.05	0.86	2	-	2000	-	1500	2000	0.777	0.785	0.781	0.786	0.763	0.958	0.954	0.95
Gallium (T)	ug/L	0.05	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Iron (T)	ug/L	1	15	42	300	-	1060	795	1060	10.2	10.6	10.7	10.5	9.7	20.8	21.6	20.1
Lanthanum (T)	ug/L	0.01	-	-	-	-	-	-	-	0.013	0.011	0.013	0.011	0.012	0.024	0.021	0.024
Lead (T)	ug/L	0.01	0.0222	0.15	-	5	-	3.75	5	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Lithium (T)	ug/L	0.5	0.72	-	-	-	-	-	-	0.94	0.93	0.9	0.91	0.9	1.24	1.17	1.23
Manganese (T)	ug/L	0.05	3.06	5.5	-	120	-	90	120	2.87	2.89	2.93	2.95	2.82	5.29	5.08	5.1
Mercury (T)	ug/L	5e-04 | 0.005	8.00E-04	0.02	0.026	1	-	0.0195	0.026	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Molybdenum (T)	ug/L	0.05	0.107	5.2	73	-	-	54.8	73	0.099	0.095	0.095	0.101	0.117	0.164	0.179	0.167
Nickel (T)	ug/L	0.05	0.441	2.7	25	-	-	18.8	25	0.403	0.404	0.397	0.39	0.426	0.781	0.697	0.766
Niobium (T)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Phosphorus (T)	ug/L	50	-	-	-	-	-	-	-	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*
Rhenium (T)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Rubidium (T)	ug/L	0.005	-	-	-	-	-	-	-	1.42	1.37	1.39	1.37	1.43	1.62	1.56	1.63
Selenium (T)	ug/L	0.04	0.049	0.16	1	50	-	0.75	1	0.06	0.046	*<0.04*	*<0.04*	0.048	0.064	*<0.04*	*<0.04*
Silicon (T)	ug/L	50	-	-	-	-	-	-	-	168	161	168	153	161	253	250	240
Silver (T)	ug/L	0.005	0.005	0.1	0.25	-	-	0.188	0.25	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Strontium (T)	ug/L	0.02	36.1	-	2500	7000	-	1880	2500	42.9	42	41.7	41.7	42.7	69.8	60.9	69.7
Sulfur (T)	ug/L	500	-	-	-	-	-	-	-	1560	1480	1700	1610	1750	3010	2540	2730
Tantalum (T)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Tellurium (T)	ug/L	0.02	-	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Thallium (T)	ug/L	0.005	0.005	0.1	0.8	-	-	0.6	0.8	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Thorium (T)	ug/L	0.005 | 0.01	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.01*	*<0.01*	*<0.01*
Tin (T)	ug/L	0.02	0.0384	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Titanium (T)	ug/L	0.05	0.17	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	0.115	0.104	0.083
Tungsten (T)	ug/L	0.01	-	-	-	-	-	-	-	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Uranium (T)	ug/L	0.001	0.0164	1.5	15	20	-	11.2	15	0.0188	0.0201	0.0184	0.02	0.0172	0.0361	0.0281	0.0343
Vanadium (T)	ug/L	0.05	0.05	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Yttrium (T)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	0.0072	0.0059	0.0054
Zinc (T)	ug/L	0.5	1.7	6.7	-	-	-	-	-	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	10.2	*<0.5*	*<0.5*
Zirconium (T)	ug/L	0.01	-	-	-	-	-	-	-	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Dissolved Metals																	
Aluminum (D)	ug/L	1	-	-	-	-	-	-	-	1.6	1.1	1.3	1.3	1.1	2.7	*<1*	1.5
Antimony (D)	ug/L	0.02	-	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	0.024	0.02	0.021
Arsenic (D)	ug/L	0.02	-	-	-	-	-	-	-	0.388	0.388	0.429	0.415	0.403	0.61	0.542	0.531
Barium (D)	ug/L	0.02	-	-	-	-	-	-	-	7.87	7.99	7.88	7.86	7.96	8.68	8.41	8.4
Beryllium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Bismuth (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Boron (D)	ug/L	5	-	-	-	-	-	-	-	*<5*	5	*<5*	*<5*	*<5*	8.7	7.3	8.2
Cadmium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Cesium (D)	ug/L	0.005	-	-	-	-	-	-	-	0.0092	0.0092	0.0092	0.0088	0.0095	0.009	0.0075	0.008
Chromium (D)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Cobalt (D)	ug/L	0.005	-	-	-	-	-	-	-	0.0063	0.0056	0.0058	0.0054	0.0054	0.0165	0.0162	0.0174
Copper (D)	ug/L	0.05	0.861	-	1.14 | 5.85	-	-	0.858 | 4.39	1.14 | 5.85	0.76	0.749	0.761	0.756	0.76	0.953	0.974	0.936
Gallium (D)	ug/L	0.05	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Iron (D)	ug/L	1	-	-	-	-	-	-	-	3.8	4.1	4.1	4.1	3.6	3.3	3.4	3.2
Lanthanum (D)	ug/L	0.01	-	-	-	-	-	-	-	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Lead (D)	ug/L	0.01	0.0125	-	4.71 | 6.99	-	-	3.53 | 5.24	4.71 | 6.99	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Lithium (D)	ug/L	0.5	-	-	-	-	-	-	-	0.88	0.89	0.88	0.88	0.87	1.26	1.12	1.2
Manganese (D)	ug/L	0.05	1.2	-	210 | 330	-	-	158 | 248	210 | 330	0.368	0.348	0.378	0.322	0.437	0.629	0.407	0.528
Mercury (D)	ug/L	5e-04 | 0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Molybdenum (D)	ug/L	0.05	-	-	-	-	-	-	-	0.454	0.101	0.088	0.09	0.092	0.163	0.148	0.153
Nickel (D)	ug/L	0.05	-	-	-	-	-	-	-	0.377	0.375	0.388	0.378	0.378	0.75	0.721	0.738
Niobium (D)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Phosphorus (D)	ug/L	50	-	-	-	-	-	-	-	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*
Rhenium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Rubidium (D)	ug/L	0.005	-	-	-	-	-	-	-	1.36	1.35	1.37	1.38	1.38	1.58	1.54	1.59
Selenium (D)	ug/L	0.04	-	-	-	-	-	-	-	0.044	0.046	*<0.04*	*<0.04*	*<0.04*	0.054	0.042	0.049
Silicon (D)	ug/L	50	-	-	-	-	-	-	-	173	177	151	165	154	247	261	239
Silver (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Strontium (D)	ug/L	0.02	-	-	2500	-	-	1880	2500	40.7	42.5	41.3	41.9	41.7	67.7	62	66.3
Sulfur (D)	ug/L	500	-	-	-	-	-	-	-	1460	1590	1540	1530	1740	2970	2630	2580
Tantalum (D)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Tellurium (D)	ug/L	0.02	-	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Thallium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Thorium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Tin (D)	ug/L	0.02	-	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Titanium (D)	ug/L	0.05	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Tungsten (D)	ug/L	0.01	-	-	-	-	-	-	-	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Uranium (D)	ug/L	0.001	-	-	-	-	-	-	-	0.0173	0.0183	0.0183	0.0184	0.0175	0.0349	0.0251	0.032
Vanadium (D)	ug/L	0.05	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Yttrium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	0.0057	*<0.005*
Zinc (D)	ug/L	0.5	1.9	-	5.86 | 11.7	-	-	4.4 | 8.77	5.86 | 11.7	0.68	*<0.5*	*<0.5*	0.54	0.65	6.59	1.89	*<0.5*
Zirconium (D)	ug/L	0.01	-	-	-	-	-	-	-	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Cyanides																	
Cyanide (free)	mg/L	0.001	-	0.00035	-	-	-	-	-	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Cyanide (Total)	mg/L	0.001	0.001	0.009	0.005	0.2	-	0.00375	0.005	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Cyanide (WAD)	mg/L	0.001	-	-	-	-	-	-	-	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*

Notes

[a] FEIS predictions for the edge of the mixing zone as presented in Agnico Eagle (2014).

[b] The freshwater aquatic life guidelines (FWAL) for cadmium (T), copper (D), lead (D), manganese (D), and zinc (D) are variable depending on modifying factors such as pH, hardness, and DOC. Values shown represent the range of FWAL guidelines calculated for MEL-01 open-water samples in 2022.

[c] Health Canada drinking water guidelines (maximum acceptable concentrations)

[d] Site-specific water quality objectives for fluoride, arsenic, and iron.

[e] The AEMP Action Level is 75% of the AEMP Benchmark.

[f] The AEMP Benchmark is the lowest of the FWAL or HH DW guidelines.

Table C3-1. Water chemistry results from Meliadine Lake in 2022

Parameter	Units	DL (min | max)	Normal Range	FEIS[a]	FWAL[b] (min | max)	HH DW[c]	SSWQO[d]	Action Level[e] (min | max)	Benchmark[f] (min | max)	September MEL-01-08 9/16/2022	September MEL-01-09 9/16/2022	September MEL-01-10 9/16/2022	September MEL-02-02 9/14/2022	September MEL-02-03 9/14/2022	September MEL-02-05 9/14/2022	September MEL-02-06 9/14/2022	September MEL-02-08 9/14/2022
Field Measurements																	
Temperature	C	-	-	-	-	-	-	-	-	8	8.1	8	8.05	8.4	8.4	8.4	8.4
Sp. Conductivity (field)	uS/cm	-	-	-	-	-	-	-	-	119.3	128.6	118.2	91.8	91.5	91	91.3	92.2
pH (field)	pH units	-	7.1 | 7.95	-	6.5 | 9	-	-	6.5 | 9.0	6.5 | 9.0	6.78	7.39	7.38	7.14	7.28	7.28	7.07	7.33
DO (mg/L)	mg/L	-	-	-	-	-	-	6.5	6.5	11.3	11.41	12.44	11.28	11.54	11.45	11.48	11.56
DO (%)	%	-	-	-	-	-	-	-	-	95.5	96.5	104.9	97.4	99.6	98.5	98	99.2
Conventional Parameters																	
Conductivity (lab)	uS/cm	1	77.5	-	-	-	-	-	-	119	128	118	93.3	92.8	92.1	93.2	93.5
Hardness	mg/L	0.2	23.4	-	-	-	-	-	-	31.4	32.6	31.8	26.5	26.7	26.3	27.3	27.2
pH (lab)	pH units	0.1	-	-	6.5 | 9	-	-	6.5 | 9.0	6.5 | 9.0	7.54	7.55	7.54	7.48	7.5	7.48	7.46	7.51
Total Dissolved Solids	mg/L	13	54	68	500	-	1000	375	500	58	68	58	63	58	58	58	62
Total Dissolved Solids (Calc)	mg/L	1	39.6	68	500	-	1000	375	500	58.7	62.7	58.4	46.1	46.4	45.5	41.1	46.9
Total Suspended Solids	mg/L	1	1	3.1	-	-	-	-	-	1.2	1.3	1.1	*<1*	*<1*	*<1*	*<1*	*<1*
Turbidity (lab)	NTU	0.1	-	-	-	-	-	-	-	0.46	0.46	0.4	0.22	0.31	0.21	0.32	0.44
Major Ions																	
Alkalinity, Bicarbonate	mg/L	1.2	25	-	-	-	-	-	-	27.9	27.7	27.9	25.4	26	25.5	25.3	25.9
Alkalinity, Carbonate	mg/L	0.6	-	-	-	-	-	-	-	*<0.6*	*<0.6*	*<0.6*	*<0.6*	*<0.6*	*<0.6*	*<0.6*	*<0.6*
Alkalinity, Hydroxide	mg/L	0.34	-	-	-	-	-	-	-	*<0.34*	*<0.34*	*<0.34*	*<0.34*	*<0.34*	*<0.34*	*<0.34*	*<0.34*
Alkalinity, Total	mg/L	1	20.5	-	-	-	-	-	-	22.9	22.7	22.9	20.8	21.3	20.9	20.7	21.2
Bromide	mg/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Calcium (D)	mg/L	0.01	-	-	-	-	-	-	-	9.52	9.8	9.77	8.31	8.41	8.28	8.6	8.56
Calcium (T)	mg/L	0.01	7.33	-	-	-	-	-	-	9.81	10.4	9.98	8.38	8.48	8.41	8.42	8.48
Chloride	mg/L	0.1	9.56	14	120	-	-	90	120	17.1	19.1	16.9	12.2	12.1	11.9	8.51	12.3
Fluoride	mg/L	0.02	0.028	0.0084	0.12	1.5	2.8	2.1	2.8	0.029	0.029	0.029	0.027	0.027	0.028	*<0.02*	0.027
Magnesium (D)	mg/L	0.004	-	-	-	-	-	-	-	1.85	1.98	1.81	1.39	1.39	1.36	1.41	1.41
Magnesium (T)	mg/L	0.004	1.18	-	-	-	-	-	-	1.86	1.99	1.8	1.4	1.45	1.38	1.4	1.42
Potassium (D)	mg/L	0.02	-	-	-	-	-	-	-	1.25	1.31	1.23	1.07	1.07	1.06	1.08	1.1
Potassium (T)	mg/L	0.02	0.954	-	-	-	-	-	-	1.24	1.31	1.21	1.07	1.1	1.07	1.07	1.08
Reactive Silica (SiO2)	mg/L	0.01	0.268	-	-	-	-	-	-	0.465	0.463	0.463	0.372	0.369	0.366	0.359	0.379
Sodium (D)	mg/L	0.02	-	-	-	-	-	-	-	8.33	9.23	8.3	6.02	6.05	5.86	6.07	6.06
Sodium (T)	mg/L	0.02	4.85	5.3	-	-	-	-	-	8.29	9.24	8.17	6.03	6.17	5.88	5.98	6.09
Sulphate	mg/L	0.3	3.87	38	-	-	-	-	-	6.78	7.42	6.56	4.55	4.53	4.47	2.99	4.71
Nutrients																	
Ammonia (as N)	mg/L	0.005	0.0174	0.54	1.27	-	-	0.95	1.27	0.0196	0.0142	0.0175	0.0053	0.0054	*<0.005*	*<0.005*	0.0052
Nitrate (as N)	mg/L	0.005	0.018	0.25	2.9	10	-	2.17	2.9	0.0199	0.0559	0.0141	0.0098	*<0.005*	*<0.005*	*<0.005*	0.0076
Nitrate + Nitrite (as N)	mg/L	0.0051	-	-	-	-	-	-	-	0.0199	0.0572	0.0141	0.0098	*<0.0051*	*<0.0051*	*<0.0051*	0.0076
Nitrite (as N)	mg/L	0.001	0.001	0.051	0.06	1	-	0.045	0.06	*<0.001*	0.0013	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Nitrogen	mg/L	0.0051 | 0.05	-	-	-	-	-	-	-	0.366	0.458	0.43	0.234	0.26	0.233	0.226	0.259
Orthophosphate (PO4-P)	mg/L	0.001	0.001	-	-	-	-	-	-	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Total Diss Phosphorus	mg/L	0.001 | 0.003	0.00314	-	-	-	-	-	-	*<0.001*	*<0.001*	*<0.001*	*<0.002*	*<0.001*	*<0.001*	*<0.002*	0.0031
Total Dissolved Nitrogen	mg/L	0.05	-	-	-	-	-	-	-	0.34	0.476	0.298	0.226	0.201	0.226	0.244	0.344
Total Kjeldahl Nitrogen	mg/L	0.05	0.25	-	-	-	-	-	-	0.346	0.401	0.416	0.224	0.26	0.233	0.226	0.251
Total Kjeldahl Nitrogen (diss)	mg/L	0.05	-	-	-	-	-	-	-	0.32	0.419	0.284	0.216	0.201	0.226	0.244	0.337
Total Phosphorus	mg/L	0.001 | 0.003	0.006	0.0049	-	-	-	-	-	0.0052	0.0071	0.0065	0.0021	0.0028	0.0027	0.0021	0.0035
Organic/Inorganic Carbon																	
Dissolved Organic Carbon	mg/L	0.5	2.72	-	-	-	-	-	-	4.24	4.15	4.14	3.59	3.5	3.5	3.58	3.68
Total Organic Carbon	mg/L	0.5	3	-	-	-	-	-	-	4.28	4.12	4.11	3.42	3.48	3.42	3.48	3.41
Total Metals																	
Aluminum (T)	ug/L	1	5.32	9.1	100	-	-	75	100	3.6	5.1	3	1.8	2.7	1.8	2.3	1.8
Antimony (T)	ug/L	0.02	0.02	0.51	-	6	-	4.5	6	*<0.02*	0.021	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Arsenic (T)	ug/L	0.02	0.275	3.8	5	10	25	18.8	25	0.578	0.619	0.598	0.52	0.54	0.506	0.495	0.512
Barium (T)	ug/L	0.02	8.05	77	-	1000	-	750	1000	8.34	8.63	8.3	7.59	7.91	7.56	7.78	7.6
Beryllium (T)	ug/L	0.005	0.005	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Bismuth (T)	ug/L	0.005	0.005	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Boron (T)	ug/L	5	6.52	23	1500	5000	-	1120	1500	7	8.1	7	*<5*	*<5*	*<5*	*<5*	*<5*
Cadmium (T)	ug/L	0.005	0.005	0.05	0.047 | 0.0649	5	-	0.0352 | 0.0487	0.047 | 0.0649	*<0.005*	*<0.005*	*<0.005*	0.0056	*<0.005*	*<0.005*	0.0058	*<0.005*
Cesium (T)	ug/L	0.005	-	-	-	-	-	-	-	0.0072	0.0093	0.0065	0.0101	0.0088	0.0086	0.0089	0.0072
Chromium (T)	ug/L	0.1	0.103	1.1	5	50	-	3.75	5	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Cobalt (T)	ug/L	0.005	0.016	-	0.78	-	-	0.585	0.78	0.026	0.0329	0.0253	0.0113	0.0117	0.0136	0.0124	0.0105
Copper (T)	ug/L	0.05	0.86	2	-	2000	-	1500	2000	0.929	0.947	0.925	0.777	0.802	0.754	0.76	0.753
Gallium (T)	ug/L	0.05	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Iron (T)	ug/L	1	15	42	300	-	1060	795	1060	21.9	24.7	17.6	8.7	9.7	8.5	9.6	8.9
Lanthanum (T)	ug/L	0.01	-	-	-	-	-	-	-	0.025	0.027	0.024	0.016	0.014	0.016	0.017	0.015
Lead (T)	ug/L	0.01	0.0222	0.15	-	5	-	3.75	5	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Lithium (T)	ug/L	0.5	0.72	-	-	-	-	-	-	1.13	1.25	1.11	0.87	0.86	0.86	0.87	0.86
Manganese (T)	ug/L	0.05	3.06	5.5	-	120	-	90	120	5.42	5.83	4.67	2.2	2.33	2.15	2.26	2.27
Mercury (T)	ug/L	5e-04 | 0.005	8.00E-04	0.02	0.026	1	-	0.0195	0.026	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Molybdenum (T)	ug/L	0.05	0.107	5.2	73	-	-	54.8	73	0.152	0.165	0.14	0.113	0.1	0.093	0.147	0.119
Nickel (T)	ug/L	0.05	0.441	2.7	25	-	-	18.8	25	0.765	0.774	0.728	0.482	0.497	0.497	0.478	0.509
Niobium (T)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Phosphorus (T)	ug/L	50	-	-	-	-	-	-	-	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*
Rhenium (T)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Rubidium (T)	ug/L	0.005	-	-	-	-	-	-	-	1.55	1.58	1.5	1.43	1.49	1.44	1.45	1.48
Selenium (T)	ug/L	0.04	0.049	0.16	1	50	-	0.75	1	0.057	0.044	0.067	0.043	0.043	0.045	*<0.04*	0.041
Silicon (T)	ug/L	50	-	-	-	-	-	-	-	242	249	237	201	189	194	194	197
Silver (T)	ug/L	0.005	0.005	0.1	0.25	-	-	0.188	0.25	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Strontium (T)	ug/L	0.02	36.1	-	2500	7000	-	1880	2500	62.1	66.5	61.2	46.7	47.2	46.3	46.8	46.9
Sulfur (T)	ug/L	500	-	-	-	-	-	-	-	2770	2770	2570	1860	1840	1750	1720	1860
Tantalum (T)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Tellurium (T)	ug/L	0.02	-	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Thallium (T)	ug/L	0.005	0.005	0.1	0.8	-	-	0.6	0.8	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Thorium (T)	ug/L	0.005 | 0.01	-	-	-	-	-	-	-	*<0.005*	*<0.01*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Tin (T)	ug/L	0.02	0.0384	-	-	-	-	-	-	*<0.02*	0.022	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Titanium (T)	ug/L	0.05	0.17	-	-	-	-	-	-	0.102	0.149	0.074	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Tungsten (T)	ug/L	0.01	-	-	-	-	-	-	-	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Uranium (T)	ug/L	0.001	0.0164	1.5	15	20	-	11.2	15	0.0283	0.0356	0.0265	0.0191	0.0167	0.0175	0.017	0.0183
Vanadium (T)	ug/L	0.05	0.05	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Yttrium (T)	ug/L	0.005	-	-	-	-	-	-	-	0.0062	0.0083	0.0057	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Zinc (T)	ug/L	0.5	1.7	6.7	-	-	-	-	-	2.17	3.77	*<0.5*	*<0.5*	0.78	*<0.5*	*<0.5*	*<0.5*
Zirconium (T)	ug/L	0.01	-	-	-	-	-	-	-	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Dissolved Metals																	
Aluminum (D)	ug/L	1	-	-	-	-	-	-	-	2.5	2.4	*<1*	1.1	*<1*	1.1	*<1*	1.2
Antimony (D)	ug/L	0.02	-	-	-	-	-	-	-	*<0.02*	0.021	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Arsenic (D)	ug/L	0.02	-	-	-	-	-	-	-	0.563	0.544	0.559	0.49	0.499	0.473	0.513	0.464
Barium (D)	ug/L	0.02	-	-	-	-	-	-	-	8.45	8.37	8.31	7.77	7.87	7.72	7.71	7.88
Beryllium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Bismuth (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Boron (D)	ug/L	5	-	-	-	-	-	-	-	7.3	8.2	7.5	*<5*	*<5*	*<5*	5	*<5*
Cadmium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Cesium (D)	ug/L	0.005	-	-	-	-	-	-	-	0.0081	0.0092	0.0071	0.0078	0.0092	0.008	0.0089	0.0077
Chromium (D)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Cobalt (D)	ug/L	0.005	-	-	-	-	-	-	-	0.0131	0.0196	0.0114	0.0087	0.0079	0.0062	0.0063	0.0064
Copper (D)	ug/L	0.05	0.861	-	1.14 | 5.85	-	-	0.858 | 4.39	1.14 | 5.85	0.903	0.926	1.01	0.789	0.765	0.785	0.774	0.777
Gallium (D)	ug/L	0.05	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Iron (D)	ug/L	1	-	-	-	-	-	-	-	3.5	3.3	2.9	2.6	2.5	2.9	3.5	3
Lanthanum (D)	ug/L	0.01	-	-	-	-	-	-	-	*<0.01*	*<0.01*	*<0.01*	0.011	*<0.01*	*<0.01*	0.01	0.01
Lead (D)	ug/L	0.01	0.0125	-	4.71 | 6.99	-	-	3.53 | 5.24	4.71 | 6.99	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Lithium (D)	ug/L	0.5	-	-	-	-	-	-	-	1.1	1.2	1.14	0.85	0.88	0.86	0.89	0.88
Manganese (D)	ug/L	0.05	1.2	-	210 | 330	-	-	158 | 248	210 | 330	0.367	0.541	0.374	0.229	0.211	0.222	0.199	0.213
Mercury (D)	ug/L	5e-04 | 0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Molybdenum (D)	ug/L	0.05	-	-	-	-	-	-	-	0.139	0.166	0.156	0.096	0.109	0.101	0.098	0.102
Nickel (D)	ug/L	0.05	-	-	-	-	-	-	-	0.729	0.733	0.7	0.489	0.477	0.476	0.498	0.478
Niobium (D)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Phosphorus (D)	ug/L	50	-	-	-	-	-	-	-	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*
Rhenium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Rubidium (D)	ug/L	0.005	-	-	-	-	-	-	-	1.56	1.57	1.57	1.44	1.43	1.43	1.45	1.43
Selenium (D)	ug/L	0.04	-	-	-	-	-	-	-	0.05	0.043	*<0.04*	0.055	*<0.04*	0.048	*<0.04*	*<0.04*
Silicon (D)	ug/L	50	-	-	-	-	-	-	-	239	243	240	195	195	180	195	183
Silver (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Strontium (D)	ug/L	0.02	-	-	2500	-	-	1880	2500	60.1	67.2	60.7	46.7	47.2	45.7	46.8	47.5
Sulfur (D)	ug/L	500	-	-	-	-	-	-	-	2550	2930	2490	1770	1810	1730	1880	1850
Tantalum (D)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Tellurium (D)	ug/L	0.02	-	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Thallium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Thorium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Tin (D)	ug/L	0.02	-	-	-	-	-	-	-	0.04	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Titanium (D)	ug/L	0.05	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Tungsten (D)	ug/L	0.01	-	-	-	-	-	-	-	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Uranium (D)	ug/L	0.001	-	-	-	-	-	-	-	0.0261	0.0309	0.0235	0.0163	0.0173	0.0176	0.0155	0.0161
Vanadium (D)	ug/L	0.05	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Yttrium (D)	ug/L	0.005	-	-	-	-	-	-	-	0.005	0.0071	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Zinc (D)	ug/L	0.5	1.9	-	5.86 | 11.7	-	-	4.4 | 8.77	5.86 | 11.7	5.47	3.17	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	4.18
Zirconium (D)	ug/L	0.01	-	-	-	-	-	-	-	0.012	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Cyanides																	
Cyanide (free)	mg/L	0.001	-	0.00035	-	-	-	-	-	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	0.001	*<0.001*	*<0.001*
Cyanide (Total)	mg/L	0.001	0.001	0.009	0.005	0.2	-	0.00375	0.005	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Cyanide (WAD)	mg/L	0.001	-	-	-	-	-	-	-	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*

Notes

[a] FEIS predictions for the edge of the mixing zone as presented in Agnico Eagle (2014).

[b] The freshwater aquatic life guidelines (FWAL) for cadmium (T), copper (D), lead (D), manganese (D), and zinc (D) are variable depending on modifying factors such as pH, hardness, and DOC. Values shown represent the range of FWAL guidelines calculated for MEL-01 open-water samples in 2022.

[c] Health Canada drinking water guidelines (maximum acceptable concentrations)

[d] Site-specific water quality objectives for fluoride, arsenic, and iron.

[e] The AEMP Action Level is 75% of the AEMP Benchmark.

[f] The AEMP Benchmark is the lowest of the FWAL or HH DW guidelines.

Table C3-1. Water chemistry results from Meliadine Lake in 2022

Parameter	Units	DL (min | max)	Normal Range	FEIS[a]	FWAL[b] (min | max)	HH DW[c]	SSWQO[d]	Action Level[e] (min | max)	Benchmark[f] (min | max)	September MEL-03-01 9/14/2022	September MEL-03-02 9/14/2022	September MEL-03-03 9/14/2022	September MEL-03-04 9/14/2022	September MEL-03-05 9/14/2022
Field Measurements														
Temperature	C	-	-	-	-	-	-	-	-	8.2	8.2	8.4	8.2	7.9
Sp. Conductivity (field)	uS/cm	-	-	-	-	-	-	-	-	82.6	82.6	82.6	82.5	82.9
pH (field)	pH units	-	7.1 | 7.95	-	6.5 | 9	-	-	6.5 | 9.0	6.5 | 9.0	7.12	7.24	7.26	7.11	6.9
DO (mg/L)	mg/L	-	-	-	-	-	-	6.5	6.5	11.46	11.62	11.52	11.63	11.68
DO (%)	%	-	-	-	-	-	-	-	-	98.1	99	98.4	98.6	99.4
Conventional Parameters														
Conductivity (lab)	uS/cm	1	77.5	-	-	-	-	-	-	86.7	85.5	84.6	92.7	113
Hardness	mg/L	0.2	23.4	-	-	-	-	-	-	24.9	24.9	24.7	25.9	28.5
pH (lab)	pH units	0.1	-	-	6.5 | 9	-	-	6.5 | 9.0	6.5 | 9.0	7.4	7.51	7.47	7.3	7.45
Total Dissolved Solids	mg/L	13	54	68	500	-	1000	375	500	59	48	56	61	70
Total Dissolved Solids (Calc)	mg/L	1	39.6	68	500	-	1000	375	500	42.4	42.7	42.4	46.2	55.3
Total Suspended Solids	mg/L	1	1	3.1	-	-	-	-	-	1.4	*<1*	*<1*	*<1*	*<1*
Turbidity (lab)	NTU	0.1	-	-	-	-	-	-	-	*<0.1*	0.24	*<0.1*	0.2	0.32
Major Ions														
Alkalinity, Bicarbonate	mg/L	1.2	25	-	-	-	-	-	-	24.5	24.9	24.5	24.4	24.4
Alkalinity, Carbonate	mg/L	0.6	-	-	-	-	-	-	-	*<0.6*	*<0.6*	*<0.6*	*<0.6*	*<0.6*
Alkalinity, Hydroxide	mg/L	0.34	-	-	-	-	-	-	-	*<0.34*	*<0.34*	*<0.34*	*<0.34*	*<0.34*
Alkalinity, Total	mg/L	1	20.5	-	-	-	-	-	-	20.1	20.4	20.1	20	20
Bromide	mg/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Calcium (D)	mg/L	0.01	-	-	-	-	-	-	-	7.83	7.86	7.79	8.03	8.61
Calcium (T)	mg/L	0.01	7.33	-	-	-	-	-	-	7.79	7.72	7.77	8	8.41
Chloride	mg/L	0.1	9.56	14	120	-	-	90	120	10.8	10.7	10.8	12.9	17.9
Fluoride	mg/L	0.02	0.028	0.0084	0.12	1.5	2.8	2.1	2.8	0.026	0.027	0.027	0.026	0.026
Magnesium (D)	mg/L	0.004	-	-	-	-	-	-	-	1.29	1.28	1.28	1.41	1.7
Magnesium (T)	mg/L	0.004	1.18	-	-	-	-	-	-	1.3	1.31	1.29	1.4	1.7
Potassium (D)	mg/L	0.02	-	-	-	-	-	-	-	1.03	1.03	1.02	1.07	1.19
Potassium (T)	mg/L	0.02	0.954	-	-	-	-	-	-	1.02	1.04	1.02	1.07	1.18
Reactive Silica (SiO2)	mg/L	0.01	0.268	-	-	-	-	-	-	0.304	0.302	0.321	0.299	0.304
Sodium (D)	mg/L	0.02	-	-	-	-	-	-	-	5.52	5.59	5.49	6.55	8.96
Sodium (T)	mg/L	0.02	4.85	5.3	-	-	-	-	-	5.51	5.49	5.44	6.46	8.83
Sulphate	mg/L	0.3	3.87	38	-	-	-	-	-	3.86	3.95	3.98	4.14	4.77
Nutrients														
Ammonia (as N)	mg/L	0.005	0.0174	0.54	1.27	-	-	0.95	1.27	0.0107	0.0149	0.0063	0.0146	0.0464
Nitrate (as N)	mg/L	0.005	0.018	0.25	2.9	10	-	2.17	2.9	0.0058	0.0063	*<0.005*	0.0134	0.0424
Nitrate + Nitrite (as N)	mg/L	0.0051	-	-	-	-	-	-	-	0.0058	0.0063	*<0.0051*	0.0134	0.0424
Nitrite (as N)	mg/L	0.001	0.001	0.051	0.06	1	-	0.045	0.06	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Nitrogen	mg/L	0.0051 | 0.05	-	-	-	-	-	-	-	0.246	0.252	0.227	0.272	0.335
Orthophosphate (PO4-P)	mg/L	0.001	0.001	-	-	-	-	-	-	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Total Diss Phosphorus	mg/L	0.001 | 0.003	0.00314	-	-	-	-	-	-	*<0.001*	*<0.002*	*<0.001*	*<0.001*	*<0.001*
Total Dissolved Nitrogen	mg/L	0.05	-	-	-	-	-	-	-	0.235	0.219	0.202	0.237	0.343
Total Kjeldahl Nitrogen	mg/L	0.05	0.25	-	-	-	-	-	-	0.24	0.246	0.227	0.259	0.293
Total Kjeldahl Nitrogen (diss)	mg/L	0.05	-	-	-	-	-	-	-	0.229	0.213	0.202	0.224	0.3
Total Phosphorus	mg/L	0.001 | 0.003	0.006	0.0049	-	-	-	-	-	0.0024	0.0028	0.0028	0.0025	0.0027
Organic/Inorganic Carbon														
Dissolved Organic Carbon	mg/L	0.5	2.72	-	-	-	-	-	-	3.41	3.39	3.45	3.46	3.15
Total Organic Carbon	mg/L	0.5	3	-	-	-	-	-	-	3.22	3.18	3.25	2.91	2.91
Total Metals														
Aluminum (T)	ug/L	1	5.32	9.1	100	-	-	75	100	2.2	2.4	3.9	2.3	3.8
Antimony (T)	ug/L	0.02	0.02	0.51	-	6	-	4.5	6	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Arsenic (T)	ug/L	0.02	0.275	3.8	5	10	25	18.8	25	0.311	0.314	0.304	0.298	0.319
Barium (T)	ug/L	0.02	8.05	77	-	1000	-	750	1000	7.45	7.59	7.55	7.55	7.62
Beryllium (T)	ug/L	0.005	0.005	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Bismuth (T)	ug/L	0.005	0.005	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Boron (T)	ug/L	5	6.52	23	1500	5000	-	1120	1500	*<5*	*<5*	*<5*	*<5*	*<5*
Cadmium (T)	ug/L	0.005	0.005	0.05	0.047 | 0.0649	5	-	0.0352 | 0.0487	0.047 | 0.0649	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Cesium (T)	ug/L	0.005	-	-	-	-	-	-	-	0.0083	0.0105	0.0095	0.0118	0.0165
Chromium (T)	ug/L	0.1	0.103	1.1	5	50	-	3.75	5	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Cobalt (T)	ug/L	0.005	0.016	-	0.78	-	-	0.585	0.78	0.0101	0.0107	0.011	0.0117	0.0163
Copper (T)	ug/L	0.05	0.86	2	-	2000	-	1500	2000	0.699	0.72	0.696	0.687	0.728
Gallium (T)	ug/L	0.05	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Iron (T)	ug/L	1	15	42	300	-	1060	795	1060	7.9	8.1	8.3	8.1	10.9
Lanthanum (T)	ug/L	0.01	-	-	-	-	-	-	-	0.018	0.016	0.016	0.016	0.021
Lead (T)	ug/L	0.01	0.0222	0.15	-	5	-	3.75	5	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Lithium (T)	ug/L	0.5	0.72	-	-	-	-	-	-	0.78	0.79	0.78	0.82	0.92
Manganese (T)	ug/L	0.05	3.06	5.5	-	120	-	90	120	1.38	1.41	1.61	1.45	1.54
Mercury (T)	ug/L	5e-04 | 0.005	8.00E-04	0.02	0.026	1	-	0.0195	0.026	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Molybdenum (T)	ug/L	0.05	0.107	5.2	73	-	-	54.8	73	0.092	0.089	0.093	0.084	0.142
Nickel (T)	ug/L	0.05	0.441	2.7	25	-	-	18.8	25	0.393	0.399	0.419	0.398	0.425
Niobium (T)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Phosphorus (T)	ug/L	50	-	-	-	-	-	-	-	*<50*	*<50*	*<50*	*<50*	*<50*
Rhenium (T)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Rubidium (T)	ug/L	0.005	-	-	-	-	-	-	-	1.43	1.42	1.41	1.46	1.53
Selenium (T)	ug/L	0.04	0.049	0.16	1	50	-	0.75	1	*<0.04*	0.049	*<0.04*	*<0.04*	*<0.04*
Silicon (T)	ug/L	50	-	-	-	-	-	-	-	159	149	160	162	149
Silver (T)	ug/L	0.005	0.005	0.1	0.25	-	-	0.188	0.25	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Strontium (T)	ug/L	0.02	36.1	-	2500	7000	-	1880	2500	41.2	41	40.8	44.7	54.1
Sulfur (T)	ug/L	500	-	-	-	-	-	-	-	1540	1450	1620	1530	1820
Tantalum (T)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Tellurium (T)	ug/L	0.02	-	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Thallium (T)	ug/L	0.005	0.005	0.1	0.8	-	-	0.6	0.8	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Thorium (T)	ug/L	0.005 | 0.01	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Tin (T)	ug/L	0.02	0.0384	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Titanium (T)	ug/L	0.05	0.17	-	-	-	-	-	-	*<0.05*	0.06	0.068	0.062	0.088
Tungsten (T)	ug/L	0.01	-	-	-	-	-	-	-	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Uranium (T)	ug/L	0.001	0.0164	1.5	15	20	-	11.2	15	0.0167	0.0186	0.0161	0.0186	0.0223
Vanadium (T)	ug/L	0.05	0.05	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Yttrium (T)	ug/L	0.005	-	-	-	-	-	-	-	0.0055	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Zinc (T)	ug/L	0.5	1.7	6.7	-	-	-	-	-	1.42	3.24	4.98	0.51	2.16
Zirconium (T)	ug/L	0.01	-	-	-	-	-	-	-	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Dissolved Metals														
Aluminum (D)	ug/L	1	-	-	-	-	-	-	-	1.6	1.7	1.1	1.5	1.6
Antimony (D)	ug/L	0.02	-	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Arsenic (D)	ug/L	0.02	-	-	-	-	-	-	-	0.286	0.291	0.336	0.298	0.311
Barium (D)	ug/L	0.02	-	-	-	-	-	-	-	7.76	7.8	7.66	7.73	7.94
Beryllium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Bismuth (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Boron (D)	ug/L	5	-	-	-	-	-	-	-	*<5*	*<5*	*<5*	*<5*	*<5*
Cadmium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Cesium (D)	ug/L	0.005	-	-	-	-	-	-	-	0.0088	0.0101	0.011	0.0124	0.0186
Chromium (D)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Cobalt (D)	ug/L	0.005	-	-	-	-	-	-	-	0.0068	0.0066	*<0.005*	0.0072	0.0106
Copper (D)	ug/L	0.05	0.861	-	1.14 | 5.85	-	-	0.858 | 4.39	1.14 | 5.85	0.732	0.742	0.732	0.756	0.737
Gallium (D)	ug/L	0.05	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Iron (D)	ug/L	1	-	-	-	-	-	-	-	2.8	2.5	2.2	2.6	3.7
Lanthanum (D)	ug/L	0.01	-	-	-	-	-	-	-	0.011	0.011	*<0.01*	*<0.01*	0.012
Lead (D)	ug/L	0.01	0.0125	-	4.71 | 6.99	-	-	3.53 | 5.24	4.71 | 6.99	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Lithium (D)	ug/L	0.5	-	-	-	-	-	-	-	0.78	0.77	0.77	0.81	0.93
Manganese (D)	ug/L	0.05	1.2	-	210 | 330	-	-	158 | 248	210 | 330	0.197	0.195	0.19	0.221	0.312
Mercury (D)	ug/L	5e-04 | 0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Molybdenum (D)	ug/L	0.05	-	-	-	-	-	-	-	0.082	0.085	0.091	0.101	0.111
Nickel (D)	ug/L	0.05	-	-	-	-	-	-	-	0.356	0.372	0.397	0.39	0.402
Niobium (D)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Phosphorus (D)	ug/L	50	-	-	-	-	-	-	-	*<50*	*<50*	*<50*	*<50*	*<50*
Rhenium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Rubidium (D)	ug/L	0.005	-	-	-	-	-	-	-	1.42	1.42	1.39	1.46	1.56
Selenium (D)	ug/L	0.04	-	-	-	-	-	-	-	*<0.04*	*<0.04*	*<0.04*	*<0.04*	0.045
Silicon (D)	ug/L	50	-	-	-	-	-	-	-	158	164	151	160	158
Silver (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Strontium (D)	ug/L	0.02	-	-	2500	-	-	1880	2500	40.6	41.5	41.1	45.5	53.7
Sulfur (D)	ug/L	500	-	-	-	-	-	-	-	1570	1530	1610	1690	1890
Tantalum (D)	ug/L	0.1	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Tellurium (D)	ug/L	0.02	-	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Thallium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Thorium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Tin (D)	ug/L	0.02	-	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Titanium (D)	ug/L	0.05	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Tungsten (D)	ug/L	0.01	-	-	-	-	-	-	-	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Uranium (D)	ug/L	0.001	-	-	-	-	-	-	-	0.0162	0.0164	0.0134	0.0161	0.0209
Vanadium (D)	ug/L	0.05	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Yttrium (D)	ug/L	0.005	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Zinc (D)	ug/L	0.5	1.9	-	5.86 | 11.7	-	-	4.4 | 8.77	5.86 | 11.7	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*
Zirconium (D)	ug/L	0.01	-	-	-	-	-	-	-	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Cyanides														
Cyanide (free)	mg/L	0.001	-	0.00035	-	-	-	-	-	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Cyanide (Total)	mg/L	0.001	0.001	0.009	0.005	0.2	-	0.00375	0.005	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Cyanide (WAD)	mg/L	0.001	-	-	-	-	-	-	-	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*

Notes

[a] FEIS predictions for the edge of the mixing zone as presented in Agnico Eagle (2014).

[b] The freshwater aquatic life guidelines (FWAL) for cadmium (T), copper (D), lead (D), manganese (D), and zinc (D) are variable depending on modifying factors such as pH, hardness, and DOC. Values shown represent the range of FWAL guidelines calculated for MEL-01 open-water samples in 2022.

[c] Health Canada drinking water guidelines (maximum acceptable concentrations)

[d] Site-specific water quality objectives for fluoride, arsenic, and iron.

[e] The AEMP Action Level is 75% of the AEMP Benchmark.

[f] The AEMP Benchmark is the lowest of the FWAL or HH DW guidelines.

APPENDIX D
PENINSULA LAKES WATER QUALITY – SUPPORTING INFORMATION

Appendix D1
Peninsula Lakes Water Quality –Summary Statistics

APPENDIX D1 – TABLES

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Peninsula Lakes Normal Range Derivation

The approach to calculating the normal range in the Peninsula Lakes followed the methods in Barrett et al. (2015). The approach takes into consideration underlying distribution of the baseline/reference data (i.e., are the baseline data normally distributed) when determining which method to use to estimate the limits of the normal range. Three methods were proposed in the *AEMP Design Document* (Golder 2016) for calculating the normal range for a given variable (e.g., water quality parameters). A brief description of each method is provided below as per the methods described in the 2018 Interpretive report (Golder 2019):

- **Prediction Interval (PI)** – If the baseline/reference data are normally distributed, the normal range is calculated using the 80% prediction interval. Normality [of the raw data] is assessed using the Shapiro-Wilk test, using $\alpha = 0.05$ to indicate a significant departure from normality.
- **PI Method (Box-Cox Transformation; PI [λ])** – When the baseline/reference data are not normally distributed, but normality could be achieved after Box-Cox transformation (Box and Cox 1964), the normal range is calculated on the Box-Cox transformed data and the upper and lower bound of the normal ranges are back-transformed.
- **Percentile** – If neither the untransformed data nor Box-Cox transformed datasets are normally distributed, the normal range boundaries are defined as the 10^{th} and 90^{th} percentile of the baseline data. In cases where the percentile method is used, a dataset of 1,000 samples is randomly generated from the normal range dataset and the 10^{th} and 90^{th} percentile are calculated from the distribution of 1,000 samples to estimate the normal range.

Normal range estimates were calculated separately for Lake A8, Lake B7, and Lake D7 using samples collected during the open-water sampling events[1]. The baseline period for the Peninsula Lakes ended in 2017; meaning no new data are included in normal range calculations for Lake A8, Lake B7, and Lake D7.

Normal range values derived for each of the three Peninsula Lakes are provided in **Table D1-1**.

[1] Normal ranges were not derived for the ice-covered sampling events due to insufficient reference and baseline data for the winter months.

Table D1-1. Normal range values for the Peninsula Lakes water quality program.

Parameter	Units	Detection Limit	Lake A8					Lake B7					Lake D7				
			N	Outliers	Method	Normal Range		N	Outliers	Method	Normal Range		N	Outliers	Method	Normal Range	
						Lower	Upper				Lower	Upper				Lower	Upper
Conventional Parameters																	
pH (field)	pH units	0.1	21	1	PI	7.7	8.3	25	0	PI(λ)	7	8.2	21	0	PI(λ)	7.6	8.3
Sp. Conductivity (field)	uS/cm	1	20	0	Percentile	100	334	24	1	Percentile	101	302	20	1	Percentile	111	159
Hardness	mg/L	0.2	20	0	Percentile	37	123	24	1	Percentile	42	118	20	1	Percentile	41	56
Alkalinity, Total	mg/L	1	15	0	PI(λ)	29	83.6	24	0	Percentile	29	110	20	1	Percentile	38	55
Total Dissolved Solids	mg/L		17	0	Percentile	57	152	19	0	Percentile	77	171	19	1	Percentile	57	81
Total Suspended Solids	mg/L	1	19	1	Percentile	0	4	24	0	PI(λ)	0	3	20	0	Percentile	0	2
Turbidity (lab)	NTU	0.1	17	0	PI(λ)	0.37	0.87	21	0	PI(λ)	0.34	0.69	18	0	PI	0.51	1.1
Alkalinity, Bicarbonate	mg/L	1.2	20	0	PI(λ)	36	91	24	0	Percentile	32	135	19	1	Percentile	46	68
Major Ions																	
Calcium (T)	mg/L	0.02	20	0	Percentile	12	40	24	1	Percentile	14	39	20	1	Percentile	13	17
Chloride	mg/L	0.1	20	0	Percentile	7	61	24	1	Percentile	5	25	20	0	Percentile	8	25
Fluoride	mg/L	0.02	13	0	PI	0.03	0.04	16	0	PI(λ)	0.02	0.04	16	0	Percentile	0.03	0.05
Magnesium (T)	mg/L	0.004	20	0	Percentile	1.7	5.6	24	0	Percentile	1.4	5.3	20	1	Percentile	2.2	3.3
Potassium (T)	mg/L	0.02	20	0	Percentile	0.7	2.5	24	0	Percentile	0.9	2.8	20	1	PI(λ)	1	1.8
Reactive Silica (SiO2)	mg/L	0.01	17	1	PI	0.18	1.3	21	0	Percentile	0.34	2.3	17	1	Percentile	0.14	0.28
Sodium (T)	mg/L	0.005	20	0	Percentile	1.9	8.4	24	0	Percentile	2.1	7.5	20	0	Percentile	5.2	17
Sulphate	mg/L	0.3	20	0	PI	2.7	9.3	24	0	Percentile	3.8	6	20	0	Percentile	2.5	10
Nutrients																	
Nitrate (as N)	mg/L	0.005	13	0	Percentile	0	0.015	16	1	Percentile	0	0.005	15	0	DL	0	0.005
Nitrite (as N)	mg/L	0.005	13	0	DL	0	0.0005	16	0	DL	0	0.005	15	0	DL	0	0.0005
Ammonia (as N)	mg/L	0.005	13	0	Percentile	0	0.011	16	0	Percentile	0	0.025	15	0	PI	0	0.009
Total Kjeldahl Nitrogen	mg/L	0.05	19	0	PI(λ)	0.22	0.63	23	0	PI(λ)	0.27	0.73	19	1	PI(λ)	0.26	0.52
Total Nitrogen	mg/L	0.05	10	0	PI	0.25	0.37	12	0	PI	0.28	0.42	12	0	PI	0.25	0.43
Total Phosphorus	mg/L	0.001	19	0	PI	0.004	0.009	23	1	PI(λ)	0.006	0.01	20	1	Percentile	0.01	0.02
Total Diss Phosphorus	mg/L	0.001	19	0	PI(λ)	0.002	0.006	24	0	PI(λ)	0.002	0.008	19	1	PI(λ)	0.003	0.008
Orthophosphate (PO4-P)	mg/L	0.001	19	0	Percentile	0	0.0023	24	1	DL	0	0.001	19	0	Percentile	0	0.003
Organic/Inorganic Carbon																	
Total Organic Carbon	mg/L	0.5	17	1	PI	3.5	4.7	23	1	PI(λ)	4.6	7.6	19	0	Percentile	3.5	14
Dissolved Organic Carbon	mg/L	0.5	14	1	PI	3.5	4.9	17	1	PI	4.8	5.5	15	0	PI(λ)	3.4	5.1
Metals																	
Aluminum (T)	ug/L	0.3	13	0	PI(λ)	1.1	3	16	0	PI(λ)	1.4	6.6	15	0	PI	3.8	6.7
Antimony (T)	ug/L	0.02	13	0	Percentile	0	0.4	16	0	DL	0	0.02	15	0	Percentile	0	0.03
Arsenic (T)	ug/L	0.02	13	0	PI	1.7	2.4	16	0	PI(λ)	1.3	1.8	15	0	PI	0.9	1.2
Barium (T)	ug/L	0.05	13	0	PI	23	32	16	0	Percentile	18	20	15	0	PI	15	17
Beryllium (T)	ug/L	0.01	13	0	DL	0	0.01	16	0	DL	0	0.01	15	0	DL	0	0.01
Bismuth (T)	ug/L	0.01	13	0	DL	0	0.01	16	0	DL	0	0.01	15	0	DL	0	0.01
Boron (T)	ug/L	1	13	0	Percentile	2.5	5	16	0	Percentile	2.5	8	15	0	PI	9.4	17
Cadmium (T)	ug/L	0.005	13	0	DL	0	0.005	16	1	Percentile	0	0.007	15	1	DL	0	0.005
Chromium (T)	ug/L	0.06	13	0	DL	0	0.06	16	0	DL	0	0.06	15	0	DL	0	0.06
Cobalt (T)	ug/L	0.01	13	0	PI	0.02	0.05	16	1	PI	0.03	0.05	15	0	Percentile	0.04	0.05

Table D1-1. Normal range values for the Peninsula Lakes water quality program.

Parameter	Units	Detection Limit	Lake A8					Lake B7					Lake D7				
			N	Outliers	Method	Normal Range		N	Outliers	Method	Normal Range		N	Outliers	Method	Normal Range	
						Lower	Upper				Lower	Upper				Lower	Upper
Copper (T)	ug/L	0.1	13	0	PI	0.54	0.89	16	0	Percentile	0.6	1.13	15	0	PI	0.55	1
Iron (T)	ug/L	1	13	0	PI	18	67	16	0	PI	51	103	15	0	PI(λ)	41	112
Lead (T)	ug/L	0.01	13	0	Percentile	0.01	0.03	16	0	Percentile	0.01	0.08	15	0	Percentile	0.01	0.02
Lithium (T)	ug/L	0.5	13	0	Percentile	7.5	10	16	0	PI(λ)	4.1	7.5	15	0	PI	1.2	1.9
Manganese (T)	ug/L	0.05	13	0	PI	3	13	16	0	Percentile	4.2	8.6	15	0	PI	8.6	13
Mercury (T)	ug/L	0.0005	13	0	PI	0	0.0012	16	0	PI(λ)	0	0.004	15	0	PI	0	0.001
Molybdenum (T)	ug/L	0.05	13	0	Percentile	0.17	0.22	16	0	PI(λ)	0.14	0.24	15	0	PI(λ)	0.28	0.48
Nickel (T)	ug/L	0.06	13	0	PI	0.75	0.92	16	0	PI(λ)	0.81	1.4	15	0	PI	0.55	0.75
Selenium (T)	ug/L	0.02	13	0	DL	0	0.02	16	0	Percentile	0.02	0.04	15	0	Percentile	0.02	0.06
Silver (T)	ug/L	0.005	13	0	DL	0	0.005	16	1	DL	0	0.005	15	0	DL	0	0.005
Strontium (T)	ug/L	0.05	13	0	PI(λ)	203	273	16	0	PI	136	155	15	0	PI(λ)	63	83
Thallium (T)	ug/L	0.005	13	0	DL	0	0.005	16	0	Percentile	0	0.005	15	0	DL	0	0.005
Tin (T)	ug/L	0.05	13	0	DL	0	0.05	16	0	DL	0	0.05	15	0	DL	0	0.05
Titanium (T)	ug/L	0.1	13	0	Percentile	0.05	0.25	16	0	Percentile	0	0.25	15	0	PI(λ)	0.16	0.34
Uranium (T)	ug/L	0.01	13	0	PI(λ)	0.027	0.054	16	0	PI	0.023	0.03	15	0	PI	0.06	0.1
Vanadium (T)	ug/L	0.01	13	0	DL	0	0.01	16	1	DL	0	0.01	15	0	PI(λ)	0.04	0.07
Zinc (T)	ug/L	0.8	13	0	Percentile	0.4	1.2	16	1	Percentile	0	1.9	15	0	Percentile	0	2
Zinc (D)	ug/L	0.8	13	0	Percentile	0	8.5	16	0	Percentile	0	2.2	15	0	Percentile	0	1.4
Other																	
Cyanide (Total)	mg/L	0.001	17	0	DL	0	0.001	23	0	DL	0	0.001	18	0	DL	0	0.001

Table D1-2. Lake A8 – Summary statistics and screening results for the July and August 2022 sampling events.

Parameter	Units	DL (min | max)	Normal Range (min | max)	FEIS[a]	Action Level[b] (min | max)	Lake A8 July and August 2022 Sampling										
						N	N<DL	% <DL	Mean	Median	SD	SE	Min	Max	% > NR	% > Act Lvl
Field Measurements																
Temperature	C	-	-	-	-	6	0	0	18.3	18.2	0.403	0.165	17.9	18.9	-	-
Sp. Conductivity (field)	uS/cm	-	334	-	-	6	0	0	278	281	19.6	8.01	254	298	-	-
pH (field)	pH units	-	7.7 | 8.3	-	6.5 | 9	6	0	0	7.96	8.03	0.529	0.216	7.06	8.52	-	0
DO (mg/L)	mg/L	-	-	-	6.5	6	0	0	9.5	9.36	0.313	0.128	9.2	10	-	0
DO (%)	%	-	-	-	-	6	0	0	101	100	2.96	1.21	97.7	106	-	-
Conventional Parameters																
Conductivity (lab)	uS/cm	1	-	-	-	6	0	0	280	282	19.3	7.86	248	301	-	-
Hardness	mg/L	0.2	-	-	-	6	0	0	102	102	3.88	1.58	97.6	109	-	-
pH (lab)	pH units	0.1	-	-	6.5 | 9	6	0	0	7.96	7.96	0.0868	0.0354	7.84	8.06	-	0
Total Dissolved Solids	mg/L	13 | 20	-	162	500	6	0	0	182	182	25	10.2	147	214	-	0
TDS (Calculated)	mg/L	1	152	-	500	6	0	0	139	140	7.59	3.1	126	146	0	0
Total Suspended Solids	mg/L	1	4	2.9	-	6	6	100	-	1	-	-	1	1	0	-
Turbidity (lab)	NTU	0.1	0.87	-	-	6	0	0	0.353	0.33	0.0909	0.0371	0.25	0.51	0	-
Major Ions																
Alkalinity, Bicarbonate	mg/L	1.2	91	-	-	6	0	0	70.8	69.8	5.1	2.08	65.6	79.5	0	-
Alkalinity, Carbonate	mg/L	0.6	-	-	-	6	6	100	-	0.6	-	-	0.6	0.6	0	-
Alkalinity, Hydroxide	mg/L	0.34	-	-	-	6	6	100	-	0.34	-	-	0.34	0.34	0	-
Alkalinity, Total	mg/L	1	83.6	51	-	6	0	0	58	57.2	4.19	1.71	53.8	65.2	0	-
Bromide	mg/L	0.1	-	-	-	6	0	0	0.232	0.245	0.0248	0.0101	0.2	0.25	-	-
Calcium (D)	mg/L	0.01	-	-	-	6	0	0	33.3	33.4	1.17	0.478	31.8	35.2	-	-
Calcium (T)	mg/L	0.01	40	47	-	6	0	0	33.8	34.4	1.58	0.644	31.4	35	0	-
Chloride	mg/L	0.1	61	74	120	6	0	0	43.5	45.6	5.07	2.07	35.3	47.7	0	0
Fluoride	mg/L	0.02	0.04	0.038	2.8	6	0	0	0.0385	0.0385	0.00207	0.000847	0.036	0.042	1	0
Magnesium (D)	mg/L	0.004	-	-	-	6	0	0	4.68	4.59	0.27	0.11	4.44	5.06	-	-
Magnesium (T)	mg/L	0.004	5.6	6.9	-	6	0	0	4.64	4.67	0.214	0.0872	4.29	4.88	0	-
Potassium (D)	mg/L	0.02	-	-	-	6	0	0	2.13	2.1	0.212	0.0867	1.82	2.39	-	-
Potassium (T)	mg/L	0.02	2.5	2.3	-	6	0	0	2.14	2.12	0.19	0.0776	1.84	2.36	0	-
Reactive Silica (SiO2)	mg/L	0.5	1.3	-	-	6	0	0	1.03	1.08	0.298	0.122	0.7	1.51	1	-
Sodium (D)	mg/L	0.02	-	-	-	6	0	0	9.99	10.4	1.27	0.518	7.97	11.2	-	-
Sodium (T)	mg/L	0.02	8.4	8.3	-	6	0	0	9.99	10.4	1.2	0.489	7.9	11.2	5	-
Sulphate	mg/L	0.3	9.3	11.6	218	6	0	0	10.5	11	1.44	0.589	8.45	11.8	4	0
Nutrients																
Ammonia (as N)	mg/L	0.005	0.011	0.118	0.141	6	0	0	0.0105	0.011	0.00257	0.00105	0.0072	0.0135	3	0
Nitrate (as N)	mg/L	0.005	0.015	0.2	2.9	6	3	50	-	0.0104	-	-	0.005	0.0291	3	0
Nitrate + Nitrite (as N)	mg/L	0.0051	-	-	-	6	3	50	-	0.0105	-	-	0.0051	0.0291	-	-
Nitrite (as N)	mg/L	0.001	0.0005	-	0.06	6	6	100	-	0.001	-	-	0.001	0.001	0	0
Nitrogen	mg/L	0.0051 | 0.05	-	-	-	6	2	33	0.265	0.371	0.205	0.0839	0.0051	0.445	-	-
Orthophosphate (PO4-P)	mg/L	0.001	0.0023	0.00215	-	6	5	83	-	0.001	-	-	0.001	0.0012	0	-

Table D1-2. Lake A8 – Summary statistics and screening results for the July and August 2022 sampling events.

Parameter	Units	DL (min | max)	Normal Range (min | max)	FEIS[a]	Action Level[b] (min | max)	Lake A8 July and August 2022 Sampling										
						N	N<DL	% <DL	Mean	Median	SD	SE	Min	Max	% > NR	% > Act Lvl
Total Diss Phosphorus	mg/L	0.001	0.006	0.006	-	6	2	33	0.00173	0.00165	0.0012	0.000489	0.001	0.0032	0	-
Total Dissolved Nitrogen	mg/L	0.05	-	-	-	6	0	0	0.351	0.352	0.0524	0.0214	0.287	0.425	-	-
Total Kjeldahl Nitrogen	mg/L	0.05	0.63	0.58	-	6	0	0	0.363	0.349	0.0374	0.0153	0.318	0.417	0	-
Total Kjeldahl Nitrogen (diss)	mg/L	0.05	-	-	-	6	0	0	0.339	0.329	0.0463	0.0189	0.287	0.397	-	-
Total Phosphorus	mg/L	0.001 | 0.003	0.009	-	0.01	6	0	0	0.00483	0.0048	0.00134	0.000548	0.0034	0.0069	0	0
Organic/Inorganic Carbon																
Dissolved Organic Carbon	mg/L	0.5	4.9	-	-	6	0	0	4.72	4.6	0.694	0.283	4.04	5.77	2	-
Total Organic Carbon	mg/L	0.5	4.7	-	-	6	0	0	4.57	4.48	0.561	0.229	3.93	5.46	2	-
Total Metals																
Aluminum	ug/L	1	3	4.6	100	6	0	0	3.2	3.15	0.576	0.235	2.4	4	3	0
Antimony	ug/L	0.02	0.4	0.2	6	6	0	0	0.0392	0.041	0.00728	0.00297	0.029	0.048	0	0
Arsenic	ug/L	0.02	2.4	1.7	25	6	0	0	9.26	11.2	3.36	1.37	4.83	11.6	6	0
Barium	ug/L	0.02	32	23	1000	6	0	0	24.6	24.7	0.597	0.244	23.8	25.3	0	0
Beryllium	ug/L	0.005	0.01	0.47	-	6	6	100	-	0.005	-	-	0.005	0.005	0	-
Boron	ug/L	5	5	27	1500	6	2	33	6.03	7.55	2.75	1.12	5	8.3	4	0
Cadmium	ug/L	0.005	0.005	0.083	0.155	6	6	100	-	0.005	-	-	0.005	0.005	0	0
Chromium	ug/L	0.1	0.06	1.87	5	6	6	100	-	0.1	-	-	0.1	0.1	0	0
Cobalt	ug/L	0.005	0.05	0.24	1.01	6	0	0	0.034	0.0333	0.00748	0.00306	0.025	0.0459	0	0
Copper	ug/L	0.05	0.89	2.7	2.32	6	0	0	0.837	0.826	0.03	0.0123	0.803	0.889	0	0
Iron	ug/L	1	67	96	1060	6	0	0	53.1	54	12.8	5.22	38	73.1	1	0
Lead	ug/L	0.01	0.03	2	5	6	0	0	0.0237	0.0255	0.00737	0.00301	0.013	0.033	1	0
Lithium	ug/L	0.5	10	5.3	-	6	0	0	8.66	9.14	1.24	0.507	6.7	9.74	0	-
Manganese	ug/L	0.05	13	30	120	6	0	0	9.25	8.93	2.92	1.19	5.62	13.9	1	0
Mercury	ug/L	0.005 | 5e-04	0.0012	0.04	0.026	6	3	50	-	0.004	-	-	0.001	0.005	0	0
Molybdenum	ug/L	0.05	0.22	0.59	73	6	0	0	0.356	0.351	0.0644	0.0263	0.282	0.466	6	0
Nickel	ug/L	0.05	0.92	2.3	93.8	6	0	0	0.695	0.652	0.0801	0.0327	0.632	0.813	0	0
Selenium	ug/L	0.04	0.02	0.16	1	6	6	100	-	0.04	-	-	0.04	0.04	0	0
Silver	ug/L	0.005	0.005	0.068	0.25	6	6	100	-	0.005	-	-	0.005	0.005	0	0
Strontium	ug/L	0.02	273	101	2500	6	0	0	218	215	19.5	7.97	188	243	0	0
Thallium	ug/L	0.005	0.005	0.047	0.8	6	6	100	-	0.005	-	-	0.005	0.005	0	0
Tin	ug/L	0.02	0.05	0.26	-	6	6	100	-	0.02	-	-	0.02	0.02	0	-
Titanium	ug/L	0.05	0.25	1.25	-	6	4	67	-	0.05	-	-	0.05	0.06	0	-
Uranium	ug/L	0.001	0.054	0.061	15	6	0	0	0.064	0.0648	0.00417	0.0017	0.0575	0.0689	6	0
Vanadium	ug/L	0.05	0.01	0.35	-	6	5	83	-	0.05	-	-	0.05	0.052	6	-
Zinc	ug/L	0.5	1.2	5.1	-	6	4	67	-	0.5	-	-	0.5	0.82	0	-

Table D1-2. Lake A8 – Summary statistics and screening results for the July and August 2022 sampling events.

Parameter	Units	DL (min | max)	Normal Range (min | max)	FEIS[a]	Action Level[b] (min | max)	Lake A8 July and August 2022 Sampling										
						N	N<DL	% <DL	Mean	Median	SD	SE	Min	Max	% > NR	% > Act Lvl
Dissolved Metals																
Aluminum	ug/L	1	-	-	-	6	0	0	1.93	1.95	0.48	0.196	1.4	2.4	-	-
Antimony	ug/L	0.02	-	-	-	6	0	0	0.0407	0.0435	0.00686	0.0028	0.032	0.047	-	-
Arsenic	ug/L	0.02	-	-	-	6	0	0	7.97	9.65	2.85	1.16	4.1	10	-	-
Barium	ug/L	0.02	-	-	-	6	0	0	23.4	23.2	0.745	0.304	22.4	24.5	-	-
Beryllium	ug/L	0.005	-	-	-	6	6	100	-	0.005	-	-	0.005	0.005	0	-
Boron	ug/L	5	-	-	-	6	2	33	5.68	6.95	2.49	1.02	5	7.7	-	-
Cadmium	ug/L	0.005	-	-	-	6	6	100	-	0.005	-	-	0.005	0.005	0	-
Chromium	ug/L	0.1	-	-	-	6	5	83	-	0.1	-	-	0.1	0.17	-	-
Cobalt	ug/L	0.005	-	-	-	6	0	0	0.0199	0.0195	0.0057	0.00233	0.0144	0.027	-	-
Copper	ug/L	0.05	-	-	-	6	0	0	0.814	0.818	0.0208	0.00848	0.778	0.833	-	-
Iron	ug/L	1	-	-	-	6	0	0	18.4	19.4	5.36	2.19	11.3	26	-	-
Lead	ug/L	0.01	-	-	8.39	6	4	67	-	0.01	-	-	0.01	0.011	-	0
Lithium	ug/L	0.5	-	-	-	6	0	0	8.09	8.6	1.02	0.417	6.65	8.95	-	-
Manganese	ug/L	0.05	-	-	350	6	0	0	0.74	0.722	0.21	0.0858	0.47	1.09	-	0
Mercury	ug/L	0.005 | 5e-04	-	-	-	6	4	67	-	2.90E-03	-	-	5.00E-04	0.005	0	-
Molybdenum	ug/L	0.05	-	-	-	6	0	0	0.366	0.345	0.0759	0.031	0.278	0.505	-	-
Nickel	ug/L	0.05	-	-	-	6	0	0	0.667	0.645	0.0765	0.0312	0.591	0.78	-	-
Selenium	ug/L	0.04	-	-	-	6	6	100	-	0.04	-	-	0.04	0.04	0	-
Silver	ug/L	0.005	-	-	-	6	6	100	-	0.005	-	-	0.005	0.005	0	-
Strontium	ug/L	0.02	-	-	2500	6	0	0	221	218	21.2	8.67	187	245	-	0
Thallium	ug/L	0.005	-	-	-	6	6	100	-	0.005	-	-	0.005	0.005	0	-
Tin	ug/L	0.02	-	-	-	6	6	100	-	0.02	-	-	0.02	0.02	0	-
Titanium	ug/L	0.05	-	-	-	6	6	100	-	0.05	-	-	0.05	0.05	0	-
Uranium	ug/L	0.001	-	-	-	6	0	0	0.0671	0.0668	0.00548	0.00224	0.0587	0.0738	-	-
Vanadium	ug/L	0.05	-	-	-	6	6	100	-	0.05	-	-	0.05	0.05	0	-
Zinc	ug/L	0.5	8.5	-	21	6	4	67	-	0.5	-	-	0.5	0.56	0	0
Other																
Cyanide (free)	mg/L	0.001	-	-	-	6	4	67	-	0.001	-	-	0.001	0.0015	-	-
Cyanide (Total)	mg/L	0.001	0.001	-	0.005	6	6	100	-	0.001	-	-	0.001	0.001	0	0
Cyanide (WAD)	mg/L	0.001	-	-	-	6	6	100	-	0.001	-	-	0.001	0.001	0	-

Notes

[a] FEIS predictions for the edge of the mixing zone as presented in Agnico Eagle (2014).

[b] The AEMP Action Level is 75% of the AEMP Benchmark.

Grey shading indicates an exceedance of normal range or action level thresholds.

Abbreviations: DL = detection limit, NR = normal range, Act Lvl = action level.

Table D1-3. Lake B7 – Summary statistics and screening results for the July and August 2022 sampling events.

Parameter	Units	DL (min | max)	Normal Range (min | max)	FEIS[a]	Action Level[b] (min | max)	Lake B7 July and August 2022 Sampling										
						N	N<DL	% <DL	Mean	Median	SD	SE	Min	Max	% > NR	% > Act Lvl
Field Measurements																
Temperature	C	-	-	-	-	5	0	0	17.9	18.2	0.485	0.217	17.2	18.2	-	-
Sp. Conductivity (field)	uS/cm	-	302	-	-	5	0	0	287	281	10.4	4.63	276	298	-	-
pH (field)	pH units	-	7.7 | 8.3	-	6.5 | 9	5	0	0	7.72	7.81	0.186	0.083	7.51	7.89	-	0
DO (mg/L)	mg/L	-	-	-	6.5	5	0	0	9.64	9.6	0.434	0.194	9.08	10.1	-	0
DO (%)	%	-	-	-	-	5	0	0	103	99.1	5.98	2.68	97.7	109	-	-
Conventional Parameters																
Conductivity (lab)	uS/cm	1	-	-	-	6	0	0	279	280	8.56	3.49	269	287	-	-
Hardness	mg/L	0.2	-	-	-	6	0	0	102	102	0.816	0.333	101	103	-	-
pH (lab)	pH units	0.1	-	-	6.5 | 9	6	0	0	7.94	7.95	0.0894	0.0365	7.84	8.03	-	0
Total Dissolved Solids	mg/L	20	-	-	500	6	0	0	191	192	16.1	6.58	173	210	-	0
TDS (Calculated)	mg/L	1	171	-	500	6	0	0	138	138	1.47	0.601	136	140	0	0
Total Suspended Solids	mg/L	1	3	-	-	6	2	33	1.03	1.25	0.418	0.171	1	1.4	0	-
Turbidity (lab)	NTU	0.1	0.69	-	-	6	0	0	0.41	0.42	0.0632	0.0258	0.3	0.49	0	-
Major Ions																
Alkalinity, Bicarbonate	mg/L	1.2	135	-	-	6	0	0	66.9	67	1.34	0.547	65.1	68.3	0	-
Alkalinity, Carbonate	mg/L	0.6	-	-	-	6	6	100	-	0.6	-	-	0.6	0.6	0	-
Alkalinity, Hydroxide	mg/L	0.34	-	-	-	6	6	100	-	0.34	-	-	0.34	0.34	0	-
Alkalinity, Total	mg/L	1	110	-	-	6	0	0	54.8	54.9	1.09	0.445	53.4	56	0	-
Bromide	mg/L	0.1	-	-	-	6	0	0	0.188	0.19	0.00408	0.00167	0.18	0.19	-	-
Calcium (D)	mg/L	0.01	-	-	-	6	0	0	34.8	34.9	0.378	0.154	34.3	35.3	-	-
Calcium (T)	mg/L	0.01	39	-	-	6	0	0	36	36	0.675	0.276	35.1	36.9	0	-
Chloride	mg/L	0.1	25	-	120	6	0	0	44.3	44.5	0.993	0.405	43.1	45.4	6	0
Fluoride	mg/L	0.02	0.04	-	2.8	6	0	0	0.0367	0.037	0.00301	0.00123	0.033	0.04	0	0
Magnesium (D)	mg/L	0.004	-	-	-	6	0	0	3.75	3.76	0.0924	0.0377	3.64	3.85	-	-
Magnesium (T)	mg/L	0.004	5.3	-	-	6	0	0	3.66	3.65	0.0863	0.0352	3.55	3.79	0	-
Potassium (D)	mg/L	0.02	-	-	-	6	0	0	2.2	2.17	0.166	0.068	2.05	2.4	-	-
Potassium (T)	mg/L	0.02	2.8	-	-	6	0	0	2.22	2.23	0.14	0.0571	2.07	2.36	0	-
Reactive Silica (SiO2)	mg/L	0.5	2.3	-	-	6	0	0	1.64	1.68	0.261	0.107	1.36	1.9	0	-
Sodium (D)	mg/L	0.02	-	-	-	6	0	0	9.41	9.37	0.268	0.109	9.08	9.73	-	-
Sodium (T)	mg/L	0.02	7.5	-	-	6	0	0	9.29	9.3	0.308	0.126	8.98	9.64	6	-
Sulphate	mg/L	0.3	6	-	218	6	0	0	10.6	10.6	0.765	0.312	9.84	11.4	6	0
Nutrients																
Ammonia (as N)	mg/L	0.005	0.025	-	0.141	6	0	0	0.0152	0.0132	0.00671	0.00274	0.0093	0.0283	1	0
Nitrate (as N)	mg/L	0.005	0.005	-	2.9	6	5	83	-	0.005	-	-	0.005	0.0054	1	0
Nitrate + Nitrite (as N)	mg/L	0.0051	-	-	-	6	5	83	-	0.0051	-	-	0.0051	0.0054	-	-
Nitrite (as N)	mg/L	0.001	0.005	-	0.06	6	6	100	-	0.001	-	-	0.001	0.001	0	0
Nitrogen	mg/L	0.05	-	-	-	3	0	0	0.45	0.455	0.0161	0.00929	0.432	0.463	-	-
Orthophosphate (PO4-P)	mg/L	0.001	0.001	-	-	6	3	50	-	0.00105	-	-	0.001	0.0015	3	-

Table D1-3. Lake B7 – Summary statistics and screening results for the July and August 2022 sampling events.

Parameter	Units	DL (min | max)	Normal Range (min | max)	FEIS[a]	Action Level[b] (min | max)	Lake B7 July and August 2022 Sampling										
						N	N<DL	% <DL	Mean	Median	SD	SE	Min	Max	% > NR	% > Act Lvl
Total Diss Phosphorus	mg/L	0.001	0.008	-	-	6	4	67	-	0.001	-	-	0.001	0.0036	0	-
Total Dissolved Nitrogen	mg/L	0.05	-	-	-	6	0	0	0.4	0.411	0.0258	0.0105	0.366	0.425	-	-
Total Kjeldahl Nitrogen	mg/L	0.05	0.73	-	-	6	0	0	0.442	0.442	0.0169	0.00692	0.416	0.463	0	-
Total Kjeldahl Nitrogen (diss)	mg/L	0.05	-	-	-	6	0	0	0.4	0.408	0.0251	0.0102	0.366	0.425	-	-
Total Phosphorus	mg/L	0.001 | 0.003	0.01	-	0.01	6	0	0	0.00548	0.00585	0.00134	0.000547	0.0029	0.0066	0	0
Organic/Inorganic Carbon																
Dissolved Organic Carbon	mg/L	0.5	5.5	-	-	6	0	0	5.66	5.71	0.384	0.157	5.13	6.03	3	-
Total Organic Carbon	mg/L	0.5	7.6	-	-	6	0	0	5.43	5.44	0.14	0.057	5.24	5.6	0	-
Total Metals																
Aluminum	ug/L	1	6.6	-	100	6	0	0	2.87	2.75	0.579	0.236	2.2	3.6	0	0
Antimony	ug/L	0.02	0.02	-	6	6	0	0	0.0358	0.0355	0.00371	0.00151	0.032	0.04	6	0
Arsenic	ug/L	0.02	1.8	-	25	6	0	0	14.2	13.4	2.07	0.844	12.2	17.7	6	0
Barium	ug/L	0.02	20	-	1000	6	0	0	28.1	28.2	0.662	0.27	27.3	28.9	6	0
Beryllium	ug/L	0.005	0.01	-	-	6	6	100	-	0.005	-	-	0.005	0.005	0	-
Boron	ug/L	5	8	-	1500	6	0	0	17.3	17.4	0.816	0.333	16.2	18.3	0	0
Cadmium	ug/L	0.005	0.007	-	0.16	6	6	100	-	0.005	-	-	0.005	0.005	0	0
Chromium	ug/L	0.1	0.06	-	5	6	6	100	-	0.1	-	-	0.1	0.1	0	0
Cobalt	ug/L	0.005	0.05	-	1.02	6	0	0	0.051	0.0524	0.00676	0.00276	0.0397	0.0584	4	0
Copper	ug/L	0.05	1.13	-	2.38	6	0	0	0.868	0.879	0.084	0.0343	0.766	0.961	0	0
Iron	ug/L	1	103	-	1060	6	0	0	85.9	85.8	15.2	6.2	67	102	0	0
Lead	ug/L	0.01	0.08	-	5	6	0	0	0.0482	0.05	0.0104	0.00426	0.035	0.061	0	0
Lithium	ug/L	0.5	7.5	-	-	6	0	0	20.2	20	1.1	0.45	19.1	21.5	6	-
Manganese	ug/L	0.05	8.6	-	120	6	0	0	9.69	9.67	1.09	0.445	8.51	11.2	5	0
Mercury	ug/L	0.005 | 5e-04	0.004	-	0.026	6	3	50	-	0.0034	-	-	0.00122	0.005	0	0
Molybdenum	ug/L	0.05	0.24	-	73	6	0	0	0.315	0.318	0.0117	0.00476	0.301	0.328	6	0
Nickel	ug/L	0.05	1.4	-	96.3	6	0	0	0.854	0.852	0.0198	0.00808	0.827	0.887	0	0
Selenium	ug/L	0.04	0.04	-	1	6	3	50	-	0.042	-	-	0.04	0.053	3	0
Silver	ug/L	0.005	0.005	-	0.25	6	6	100	-	0.005	-	-	0.005	0.005	0	0
Strontium	ug/L	0.02	155	-	2500	6	0	0	314	311	14.6	5.96	300	335	6	0
Thallium	ug/L	0.005	0.005	-	0.8	6	3	50	-	0.0052	-	-	0.005	0.0062	3	0
Tin	ug/L	0.02	0.05	-	-	6	6	100	-	0.02	-	-	0.02	0.02	0	-
Titanium	ug/L	0.05	0.25	-	-	6	3	50	-	0.051	-	-	0.05	0.066	0	-
Uranium	ug/L	0.001	0.03	-	15	6	0	0	0.0675	0.0673	0.00166	0.000678	0.0656	0.0699	6	0
Vanadium	ug/L	0.05	0.01	-	-	6	0	0	0.0665	0.0665	0.00266	0.00109	0.063	0.071	6	-
Zinc	ug/L	0.5	1.9	-	-	6	2	33	0.537	0.635	0.228	0.0932	0.5	0.78	0	-
Dissolved Metals																
Aluminum	ug/L	1	-	-	-	6	0	0	1.65	1.85	0.437	0.178	1.1	2.1	-	-
Antimony	ug/L	0.02	-	-	-	6	0	0	0.0362	0.0345	0.00458	0.00187	0.033	0.045	-	-
Arsenic	ug/L	0.02	-	-	-	6	0	0	12	11.6	1.72	0.702	9.99	14.3	-	-

Table D1-3. Lake B7 – Summary statistics and screening results for the July and August 2022 sampling events.

Parameter	Units	DL (min | max)	Normal Range (min | max)	FEIS[a]	Action Level[b] (min | max)	Lake B7 July and August 2022 Sampling										
						N	N<DL	% <DL	Mean	Median	SD	SE	Min	Max	% > NR	% > Act Lvl
Barium	ug/L	0.02	-	-	-	6	0	0	27	27	0.885	0.361	25.9	28.1	-	-
Beryllium	ug/L	0.005	-	-	-	6	6	100	-	0.005	-	-	0.005	0.005	0	-
Boron	ug/L	5	-	-	-	6	0	0	16.6	16.6	0.207	0.0843	16.3	16.8	0	-
Cadmium	ug/L	0.005	-	-	-	6	6	100	-	0.005	-	-	0.005	0.005	0	-
Chromium	ug/L	0.1	-	-	-	6	6	100	-	0.1	-	-	0.1	0.1	0	-
Cobalt	ug/L	0.005	-	-	-	6	0	0	0.0346	0.0366	0.00873	0.00356	0.0235	0.0442	-	-
Copper	ug/L	0.05	-	-	-	6	0	0	0.841	0.847	0.0658	0.0269	0.744	0.931	-	-
Iron	ug/L	1	-	-	-	6	0	0	32	31.8	4.26	1.74	27	38.1	-	-
Lead	ug/L	0.01	-	-	9.44	6	0	0	0.0162	0.0145	0.00508	0.00207	0.011	0.025	-	0
Lithium	ug/L	0.5	-	-	-	6	0	0	18.5	18.5	0.197	0.0803	18.2	18.7	-	-
Manganese	ug/L	0.05	-	-	370	6	0	0	0.921	0.874	0.261	0.106	0.58	1.27	-	0
Mercury	ug/L	0.005 | 5e-04	-	-	-	6	3	50	-	3.14E-03	-	-	8.70E-04	0.005	0	-
Molybdenum	ug/L	0.05	-	-	-	6	0	0	0.326	0.324	0.0266	0.0109	0.289	0.371	-	-
Nickel	ug/L	0.05	-	-	-	6	0	0	0.806	0.82	0.0547	0.0223	0.72	0.859	-	-
Selenium	ug/L	0.04	-	-	-	6	4	67	-	0.04	-	-	0.04	0.049	-	-
Silver	ug/L	0.005	-	-	-	6	6	100	-	0.005	-	-	0.005	0.005	0	-
Strontium	ug/L	0.02	-	-	2500	6	0	0	318	320	21.8	8.91	293	343	-	0
Thallium	ug/L	0.005	-	-	-	6	0	0	0.00562	0.0055	0.000454	0.000185	0.0051	0.0063	-	-
Tin	ug/L	0.02	-	-	-	6	6	100	-	0.02	-	-	0.02	0.02	0	-
Titanium	ug/L	0.05	-	-	-	6	6	100	-	0.05	-	-	0.05	0.05	0	-
Uranium	ug/L	0.001	-	-	-	6	0	0	0.0699	0.0697	0.00191	0.00078	0.0667	0.072	-	-
Vanadium	ug/L	0.05	-	-	-	6	0	0	0.0588	0.06	0.00407	0.00166	0.054	0.064	-	-
Zinc	ug/L	0.5	2.2	-	22.6	6	5	83	-	0.5	-	-	0.5	0.56	0	0
Other																
Cyanide (free)	mg/L	0.001	-	-	-	6	4	67	-	0.001	-	-	0.001	0.0017	-	-
Cyanide (Total)	mg/L	0.001	0.001	-	0.005	6	6	100	-	0.001	-	-	0.001	0.001	0	0
Cyanide (WAD)	mg/L	0.001	-	-	-	6	6	100	-	0.001	-	-	0.001	0.001	0	-

Notes

[a] FEIS predictions for the edge of the mixing zone as presented in Agnico Eagle (2014).

[b] The AEMP Action Level is 75% of the AEMP Benchmark.

Grey shading indicates an exceedance of normal range or action level thresholds.

Abbreviations: DL = detection limit, NR = normal range, Act Lvl = action level.

Table D1-4. Lake D7 – Summary statistics and screening results for the July and August 2022 sampling events.

Parameter	Units	DL (min | max)	Normal Range (min | max)	FEIS[a]	Action Level[b] (min | max)	Lake D7 July and August 2022 Sampling										
						N	N<DL	% <DL	Mean	Median	SD	SE	Min	Max	% > NR	% > Act Lvl
Field Measurements																
Temperature	C	-	-	-	-	6	0	0	19.1	19.2	0.163	0.0667	18.9	19.3	-	-
Sp. Conductivity (field)	uS/cm	-	159	-	-	6	0	0	139	138	4.32	1.76	135	143	-	-
pH (field)	pH units	-	7.7 | 8.3	-	6.5 | 9	6	0	0	7.79	7.85	0.186	0.0761	7.56	7.97	-	0
DO (mg/L)	mg/L	-	-	-	6.5	6	0	0	8.63	8.87	1.29	0.525	7.07	9.85	-	0
DO (%)	%	-	-	-	-	6	0	0	93.6	96.8	14.1	5.75	76	107	-	-
Conventional Parameters																
Conductivity (lab)	uS/cm	1	-	-	-	6	0	0	139	140	6.4	2.61	133	145	-	-
Hardness	mg/L	0.2	-	-	-	6	0	0	48.9	48.6	1.35	0.552	47.4	51.1	-	-
pH (lab)	pH units	0.1	-	-	6.5 | 9	6	0	0	7.9	7.92	0.117	0.0479	7.75	8.02	-	0
Total Dissolved Solids	mg/L	13	-	136	500	6	0	0	79	80	4.43	1.81	71	84	-	0
TDS (Calculated)	mg/L	1	81	-	500	6	0	0	70	69.9	1.74	0.712	68.4	71.9	0	0
Total Suspended Solids	mg/L	1	2	5.1	-	6	2	33	1.03	1.15	0.437	0.178	1	1.5	0	-
Turbidity (lab)	NTU	0.1	1.1	-	-	6	0	0	0.51	0.535	0.12	0.0489	0.3	0.63	0	-
Major Ions																
Alkalinity, Bicarbonate	mg/L	1.2	68	-	-	6	0	0	62.2	62	1.71	0.697	60.5	64.4	0	-
Alkalinity, Carbonate	mg/L	0.6	-	-	-	6	6	100	-	0.6	-	-	0.6	0.6	0	-
Alkalinity, Hydroxide	mg/L	0.34	-	-	-	6	6	100	-	0.34	-	-	0.34	0.34	0	-
Alkalinity, Total	mg/L	1	55	83	-	6	0	0	51	50.8	1.39	0.567	49.6	52.8	0	-
Bromide	mg/L	0.1	-	-	-	6	6	100	-	0.1	-	-	0.1	0.1	0	-
Calcium (D)	mg/L	0.01	-	-	-	6	0	0	14.8	14.8	0.339	0.138	14.4	15.4	-	-
Calcium (T)	mg/L	0.01	17	36	-	6	0	0	15.2	15.3	0.533	0.218	14.6	15.7	0	-
Chloride	mg/L	0.1	25	15	120	6	0	0	9.14	9.1	0.15	0.0612	9	9.33	0	0
Fluoride	mg/L	0.02	0.05	0.036	2.8	6	0	0	0.0433	0.043	0.00197	0.000803	0.041	0.046	0	0
Magnesium (D)	mg/L	0.004	-	-	-	6	0	0	2.86	2.84	0.132	0.0538	2.71	3.07	-	-
Magnesium (T)	mg/L	0.004	3.3	5.2	-	6	0	0	2.83	2.84	0.0659	0.0269	2.76	2.91	0	-
Potassium (D)	mg/L	0.02	-	-	-	6	0	0	1.4	1.39	0.108	0.0442	1.29	1.51	-	-
Potassium (T)	mg/L	0.02	1.8	2.3	-	6	0	0	1.42	1.42	0.0997	0.0407	1.31	1.52	0	-
Reactive Silica (SiO2)	mg/L	0.02 | 0.5	0.28	-	-	6	0	0	0.566	0.57	0.0114	0.00465	0.547	0.58	6	-
Sodium (D)	mg/L	0.02	-	-	-	6	0	0	7.31	7.3	0.406	0.166	6.88	7.8	-	-
Sodium (T)	mg/L	0.02	17	8.1	-	6	0	0	7.25	7.26	0.362	0.148	6.88	7.59	0	-
Sulphate	mg/L	0.3	10	5.5	218	6	0	0	3.82	3.82	0.0864	0.0353	3.72	3.9	0	0
Nutrients																
Ammonia (as N)	mg/L	0.005	0.009	0.086	0.14	6	0	0	0.0102	0.0099	0.00394	0.00161	0.006	0.0149	3	0
Nitrate (as N)	mg/L	0.005	0.005	1.2	2.9	6	6	100	-	0.005	-	-	0.005	0.005	0	0
Nitrate + Nitrite (as N)	mg/L	0.0051	-	-	-	6	6	100	-	0.0051	-	-	0.0051	0.0051	0	-
Nitrite (as N)	mg/L	0.001	0.0005	-	0.06	6	6	100	-	0.001	-	-	0.001	0.001	0	0
Nitrogen	mg/L	0.05	-	-	-	6	0	0	0.375	0.366	0.0216	0.00882	0.356	0.406	-	-
Orthophosphate (PO4-P)	mg/L	0.001	0.003	0.00072	-	6	5	83	-	0.001	-	-	0.001	0.0012	0	-

Table D1-4. Lake D7 – Summary statistics and screening results for the July and August 2022 sampling events.

Parameter	Units	DL (min | max)	Normal Range (min | max)	FEIS[a]	Action Level[b] (min | max)	Lake D7 July and August 2022 Sampling										
						N	N<DL	% <DL	Mean	Median	SD	SE	Min	Max	% > NR	% > Act Lvl
Total Diss Phosphorus	mg/L	0.001	0.008	0.0071	-	6	0	0	0.00438	0.00465	0.00119	0.000485	0.0024	0.0058	0	-
Total Dissolved Nitrogen	mg/L	0.05	-	-	-	6	0	0	0.324	0.324	0.0215	0.00877	0.291	0.349	-	-
Total Kjeldahl Nitrogen	mg/L	0.05	0.52	0.88	-	6	0	0	0.375	0.366	0.0216	0.00882	0.356	0.406	0	-
Total Kjeldahl Nitrogen (diss)	mg/L	0.05	-	-	-	6	0	0	0.324	0.324	0.0215	0.00877	0.291	0.349	-	-
Total Phosphorus	mg/L	0.003	0.02	-	0.01	6	0	0	0.0122	0.0122	0.00298	0.00122	0.009	0.0155	0	6
Organic/Inorganic Carbon																
Dissolved Organic Carbon	mg/L	0.5	5.1	-	-	6	0	0	4.5	4.46	0.23	0.0941	4.26	4.78	0	-
Total Organic Carbon	mg/L	0.5	14	-	-	6	0	0	4.53	4.56	0.252	0.103	4.22	4.84	0	-
Total Metals																
Aluminum	ug/L	1	6.7	37	100	6	0	0	5.38	5.3	0.483	0.197	4.6	5.9	0	0
Antimony	ug/L	0.02	0.03	0.13	6	6	5	83	-	0.02	-	-	0.02	0.02	0	0
Arsenic	ug/L	0.02	1.2	1.3	25	6	0	0	1.44	1.43	0.0404	0.0165	1.39	1.5	6	0
Barium	ug/L	0.02	17	34	1000	6	0	0	14.7	14.5	0.371	0.151	14.4	15.2	0	0
Beryllium	ug/L	0.005	0.01	0.26	-	6	6	100	-	0.005	-	-	0.005	0.005	0	-
Boron	ug/L	5	17	10	1500	6	0	0	13.8	13.8	0.905	0.369	12.7	14.6	0	0
Cadmium	ug/L	0.005	0.005	0.071	0.0853	6	6	100	-	0.005	-	-	0.005	0.005	0	0
Chromium	ug/L	0.1	0.06	1.6	5	6	6	100	-	0.1	-	-	0.1	0.1	0	0
Cobalt	ug/L	0.005	0.05	0.33	0.78	6	0	0	0.0354	0.0353	0.00221	0.000904	0.0325	0.0381	0	0
Copper	ug/L	0.05	1	2.1	2	6	0	0	0.927	0.917	0.0255	0.0104	0.9	0.967	0	0
Iron	ug/L	1	112	175	1060	6	0	0	44.2	45.3	4.99	2.04	37.2	50.1	0	0
Lead	ug/L	0.01	0.02	0.14	5	6	1	17	0.0117	0.013	0.00333	0.00136	0.01	0.014	0	0
Lithium	ug/L	0.5	1.9	4.9	-	6	0	0	1.5	1.5	0.0864	0.0353	1.39	1.59	0	-
Manganese	ug/L	0.05	13	67	120	6	0	0	8.75	9.05	0.858	0.35	7.47	9.58	0	0
Mercury	ug/L	0.005 | 5e-04	0.001	0.012	0.026	6	3	50	-	0.00284	-	-	0.00055	0.005	0	0
Molybdenum	ug/L	0.05	0.48	0.61	73	6	0	0	0.538	0.542	0.0285	0.0116	0.498	0.575	6	0
Nickel	ug/L	0.05	0.75	2.3	25	6	0	0	0.637	0.635	0.00831	0.00339	0.63	0.651	0	0
Selenium	ug/L	0.04	0.06	0.48	1	6	3	50	-	0.045	-	-	0.04	0.056	0	0
Silver	ug/L	0.005	0.005	0.025	0.25	6	6	100	-	0.005	-	-	0.005	0.005	0	0
Strontium	ug/L	0.02	83	162	2500	6	0	0	75.1	75.2	3.71	1.51	70.6	79.3	0	0
Thallium	ug/L	0.005	0.005	0.039	0.8	6	6	100	-	0.005	-	-	0.005	0.005	0	0
Tin	ug/L	0.02	0.05	0.21	-	6	6	100	-	0.02	-	-	0.02	0.02	0	-
Titanium	ug/L	0.05	0.34	2.38	-	6	0	0	0.168	0.159	0.0406	0.0166	0.125	0.245	0	-
Uranium	ug/L	0.001	0.1	0.13	15	6	0	0	0.0847	0.0846	0.00613	0.0025	0.0776	0.0937	0	0
Vanadium	ug/L	0.05	0.07	0.71	-	6	0	0	0.0817	0.084	0.00824	0.00336	0.071	0.089	6	-
Zinc	ug/L	0.5	2	5.8	-	6	3	50	-	0.51	-	-	0.5	1.1	0	-

Table D1-4. Lake D7 – Summary statistics and screening results for the July and August 2022 sampling events.

Parameter	Units	DL (min | max)	Normal Range (min | max)	FEIS[a]	Action Level[b] (min | max)	Lake D7 July and August 2022 Sampling										
						N	N<DL	% <DL	Mean	Median	SD	SE	Min	Max	% > NR	% > Act Lvl
Dissolved Metals																
Aluminum	ug/L	1	-	-	-	6	0	0	2.75	2.65	0.259	0.106	2.5	3.2	-	-
Antimony	ug/L	0.02	-	-	-	6	5	83	-	0.02	-	-	0.02	0.021	-	-
Arsenic	ug/L	0.02	-	-	-	6	0	0	1.23	1.23	0.0366	0.0149	1.17	1.27	-	-
Barium	ug/L	0.02	-	-	-	6	0	0	13.9	13.8	0.366	0.149	13.5	14.3	-	-
Beryllium	ug/L	0.005	-	-	-	6	6	100	-	0.005	-	-	0.005	0.005	0	-
Boron	ug/L	5	-	-	-	6	0	0	13	13.3	0.468	0.191	12.4	13.4	0	-
Cadmium	ug/L	0.005	-	-	-	6	6	100	-	0.005	-	-	0.005	0.005	0	-
Chromium	ug/L	0.1	-	-	-	6	6	100	-	0.1	-	-	0.1	0.1	0	-
Cobalt	ug/L	0.005	-	-	-	6	0	0	0.0146	0.0153	0.00192	0.000784	0.0111	0.016	-	-
Copper	ug/L	0.05	-	-	-	6	0	0	0.89	0.892	0.0306	0.0125	0.851	0.927	-	-
Iron	ug/L	1	-	-	-	6	0	0	12.2	13.8	4.68	1.91	3.1	16	-	-
Lead	ug/L	0.01	-	-	7.39	6	5	83	-	0.01	-	-	0.01	0.012	-	0
Lithium	ug/L	0.5	-	-	-	6	0	0	1.39	1.39	0.0407	0.0166	1.33	1.44	-	-
Manganese	ug/L	0.05	-	-	270	6	1	17	0.299	0.276	0.179	0.0732	0.05	0.535	-	0
Mercury	ug/L	0.005 | 5e-04	-	-	-	6	5	83	-	2.75E-03	-	-	5.00E-04	0.005	0	-
Molybdenum	ug/L	0.05	-	-	-	6	0	0	0.556	0.558	0.0424	0.0173	0.502	0.606	-	-
Nickel	ug/L	0.05	-	-	-	6	0	0	0.587	0.582	0.0196	0.008	0.568	0.624	-	-
Selenium	ug/L	0.04	-	-	-	6	4	67	-	0.04	-	-	0.04	0.042	-	-
Silver	ug/L	0.005	-	-	-	6	6	100	-	0.005	-	-	0.005	0.005	0	-
Strontium	ug/L	0.02	-	-	2500	6	0	0	76.4	76	4.71	1.92	72	81.7	-	0
Thallium	ug/L	0.005	-	-	-	6	6	100	-	0.005	-	-	0.005	0.005	0	-
Tin	ug/L	0.02	-	-	-	6	6	100	-	0.02	-	-	0.02	0.02	0	-
Titanium	ug/L	0.05	-	-	-	6	6	100	-	0.05	-	-	0.05	0.05	0	-
Uranium	ug/L	0.001	-	-	-	6	0	0	0.0848	0.0844	0.00602	0.00246	0.0777	0.0926	-	-
Vanadium	ug/L	0.05	-	-	-	6	0	0	0.0672	0.0665	0.00618	0.00252	0.061	0.078	-	-
Zinc	ug/L	0.5	1.4	-	10.7	6	6	100	-	0.5	-	-	0.5	0.5	0	0
Other																
Cyanide (free)	mg/L	0.001	-	-	-	6	4	67	-	0.001	-	-	0.001	0.0012	-	-
Cyanide (Total)	mg/L	0.001	0.001	-	0.005	6	6	100	-	0.001	-	-	0.001	0.001	0	0
Cyanide (WAD)	mg/L	0.001	-	-	-	6	6	100	-	0.001	-	-	0.001	0.001	0	-

Notes

[a] FEIS predictions for the edge of the mixing zone as presented in Agnico Eagle (2014).

[b] The AEMP Action Level is 75% of the AEMP Benchmark.

Grey shading indicates an exceedance of normal range or action level thresholds.

Abbreviations: DL = detection limit, NR = normal range, Act Lvl = action level.

Appendix D2
Peninsula Lakes Water Quality –Supplemental Figures

APPENDIX D2 – FIGURES

Figure D2-1. Total dissolved solids and constituent major Ions in surface water samples from the Peninsula Lakes since 2015. 1
Figure D2-2. Conductivity and concentrations of selected nutrients in surface water samples from the Peninsula Lakes since 2015. 2
Figure D2-3. Concentrations of aluminum, arsenic, barium, and boron in surface water samples from the Peninsula Lakes since 2015. 3
Figure D2-4. Concentrations of cobalt, copper, iron, and lead in surface water samples from the Peninsula Lakes since 2015. 4
Figure D2-5. Concentrations of lithium, manganese, molybdenum, and nickel in surface water samples from the Peninsula Lakes since 2015. 5
Figure D2-6. Concentrations of strontium, titanium, uranium, and zinc in surface water samples from the Peninsula Lakes since 2015. 6

Figure D2-1. Total dissolved solids and constituent major Ions in surface water samples from the Peninsula Lakes since 2015.

Notes: Normal range = the upper 90th prediction interval or percentile of baseline concentrations (pre-2018). Action Level = 75% of the AEMP Benchmark. The second sampling event in 2018 spanned late August (Lake A8 and Lake B7) and early September (Lake D7).

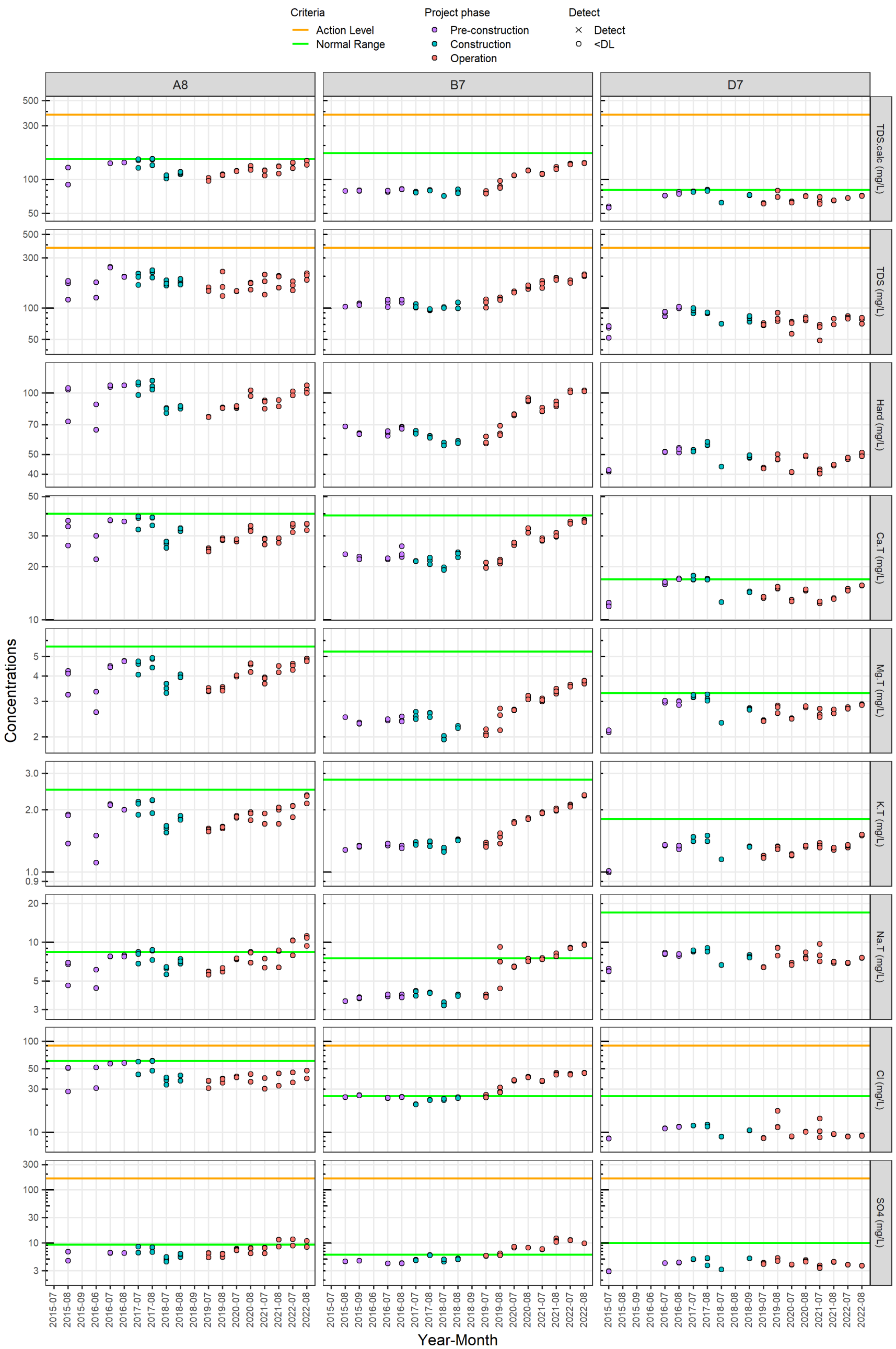


Figure D2-2. Conductivity and concentrations of selected nutrients in surface water samples from the Peninsula Lakes since 2015.

Notes: Normal range = the upper limit of baseline concentrations (pre-2018). Action Level = 75% of the AEMP Benchmark. The second sampling event in 2018 spanned late August (Lake A8 and Lake B7) and early September (Lake D7).

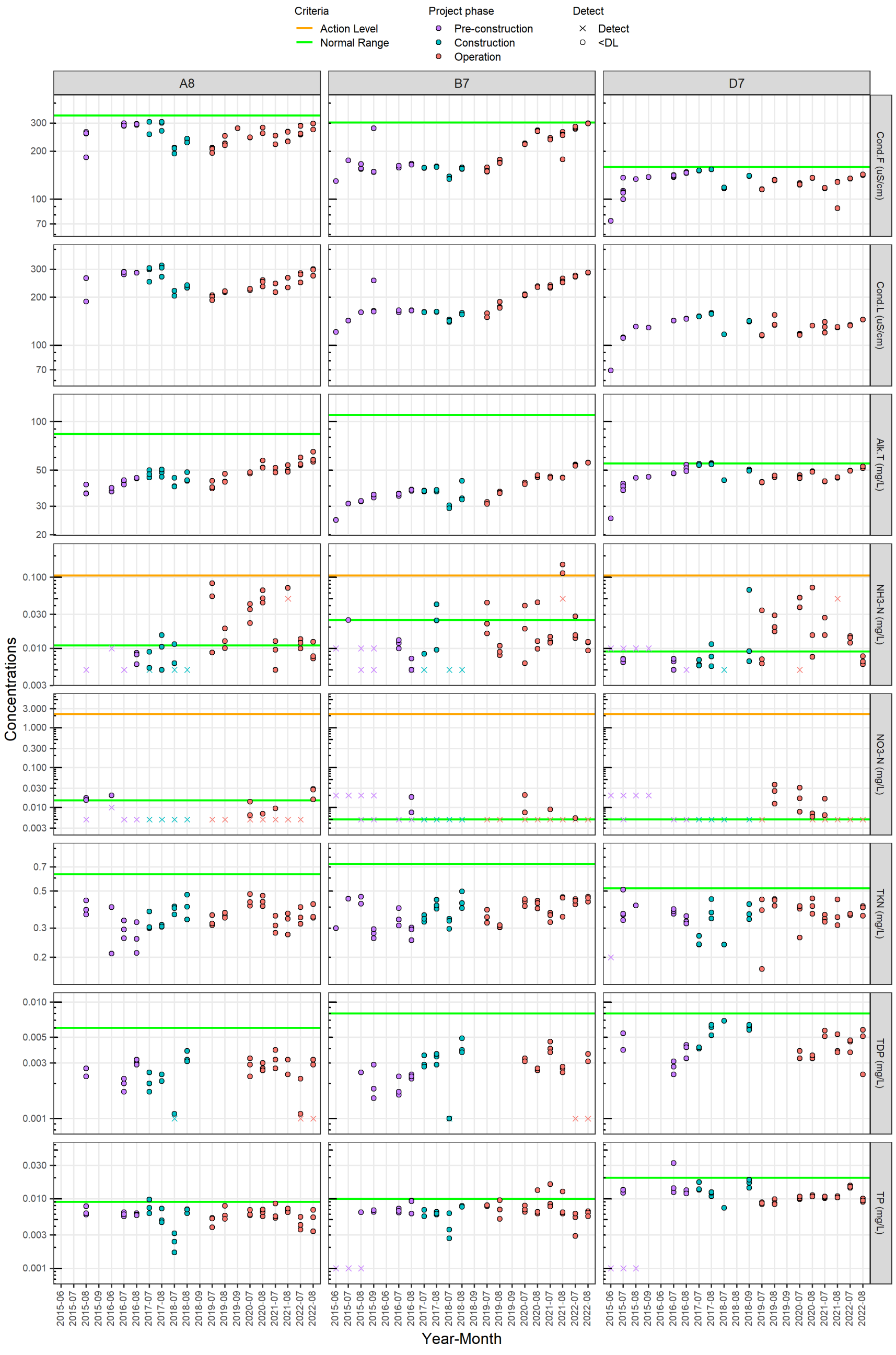


Figure D2-3. Concentrations of aluminum, arsenic, barium, and boron in surface water samples from the Peninsula Lakes since 2015.

Notes: Normal range = the upper limit of baseline concentrations (pre-2018). Action Level = 75% of the AEMP Benchmark. The second sampling event in 2018 spanned late August (Lake A8 and Lake B7) and early September (Lake D7).

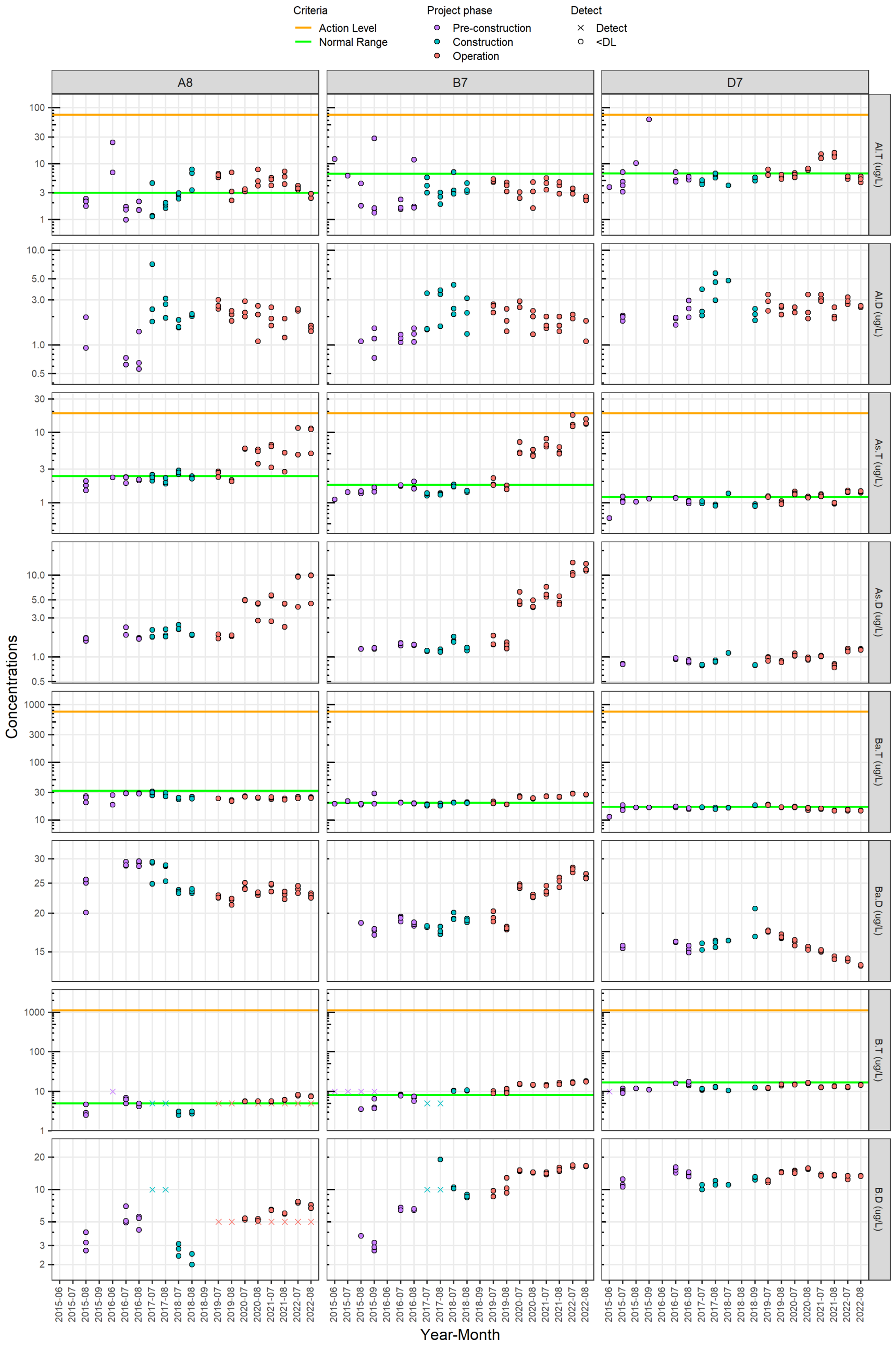


Figure D2-4. Concentrations of cobalt, copper, iron, and lead in surface water samples from the Peninsula Lakes since 2015.

Notes: Normal range = the upper limit of baseline concentrations (pre-2018). Action Level = 75% of the AEMP Benchmark. The second sampling event in 2018 spanned late August (Lake A8 and Lake B7) and early September (Lake D7).

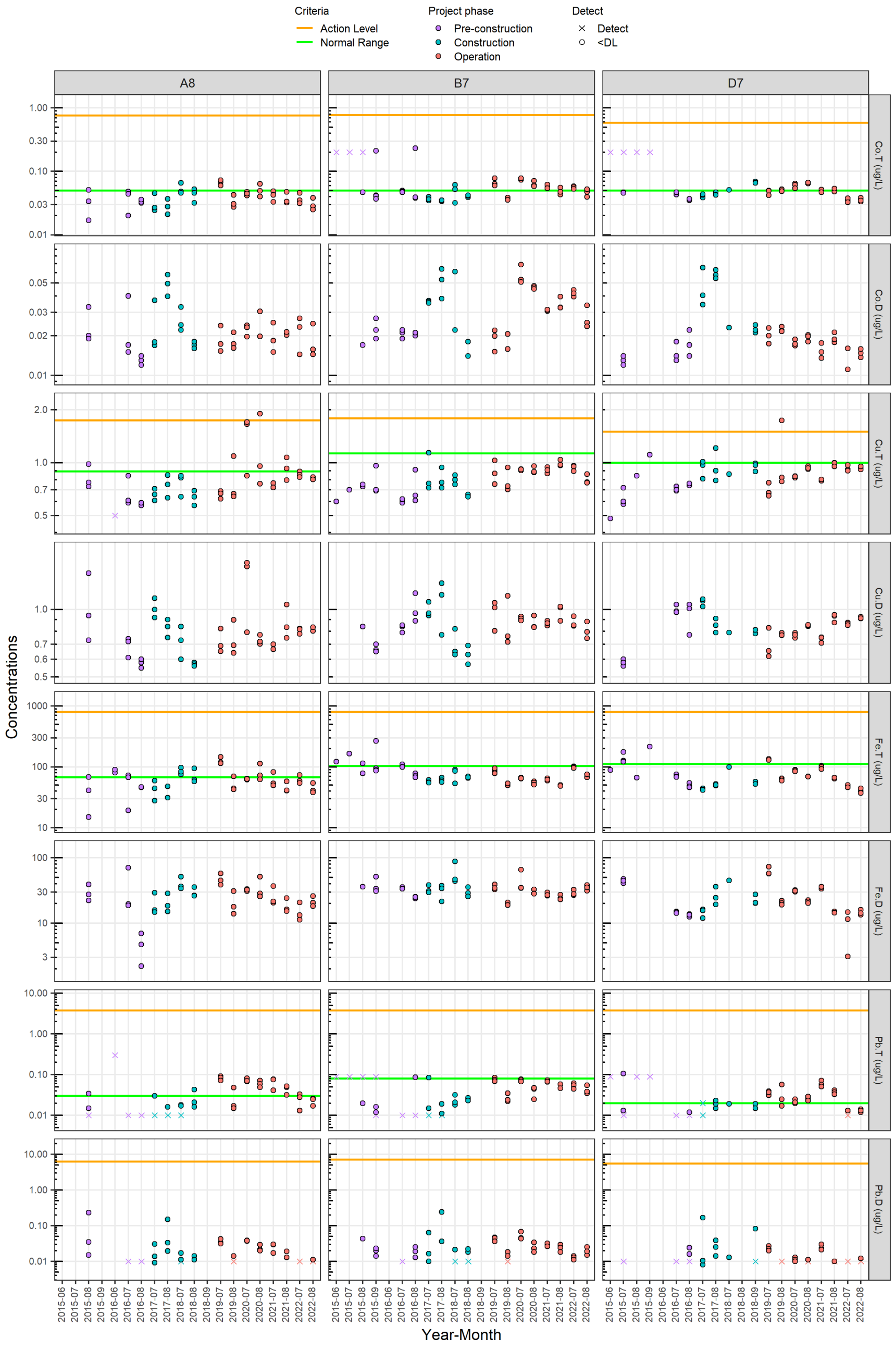


Figure D2-5. Concentrations of lithium, manganese, molybdenum, and nickel in surface water samples from the Peninsula Lakes since 2015.

Notes: Normal range = the upper limit of baseline concentrations (pre-2018). Action Level = 75% of the AEMP Benchmark. The second sampling event in 2018 spanned late August (Lake A8 and Lake B7) and early September (Lake D7).

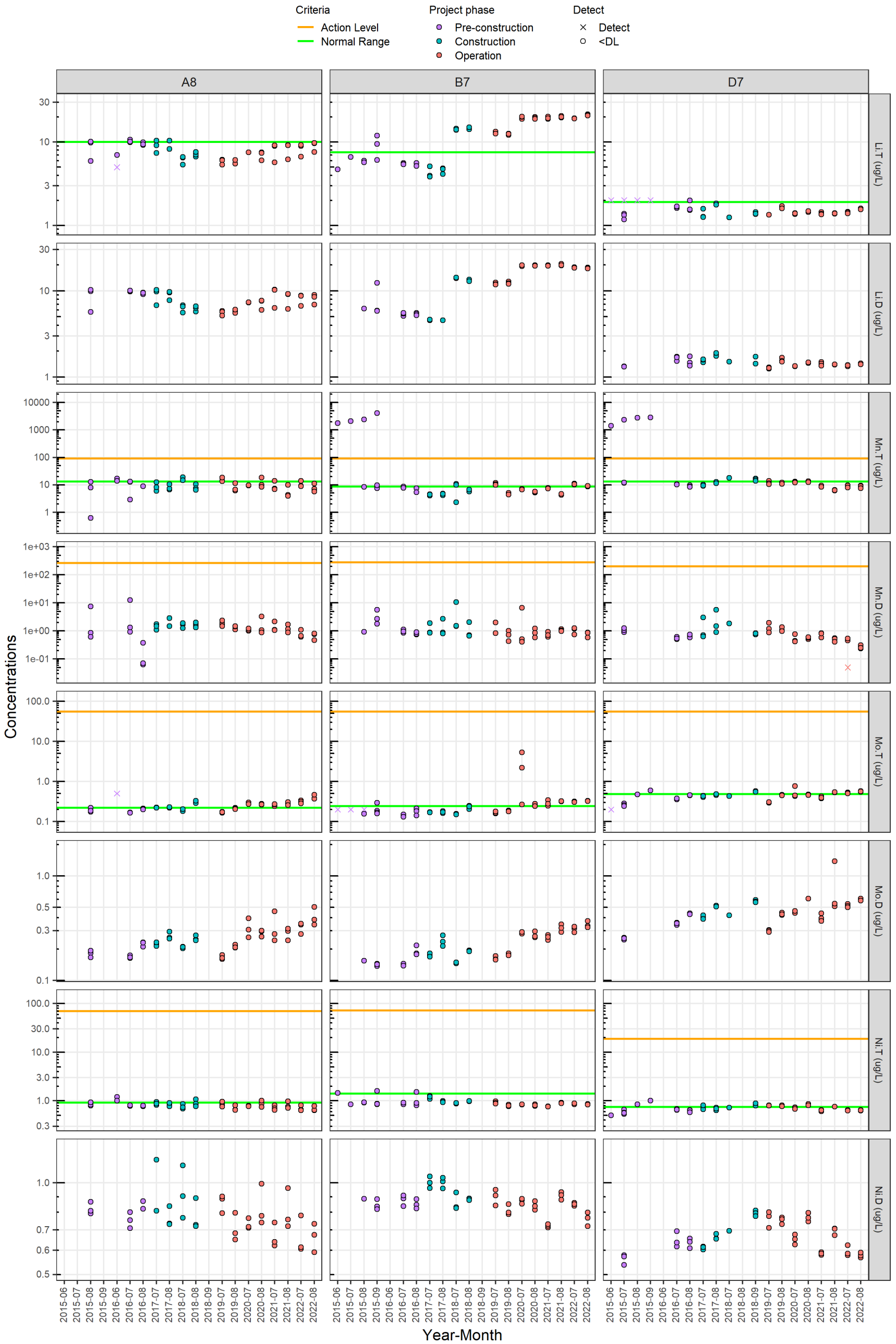
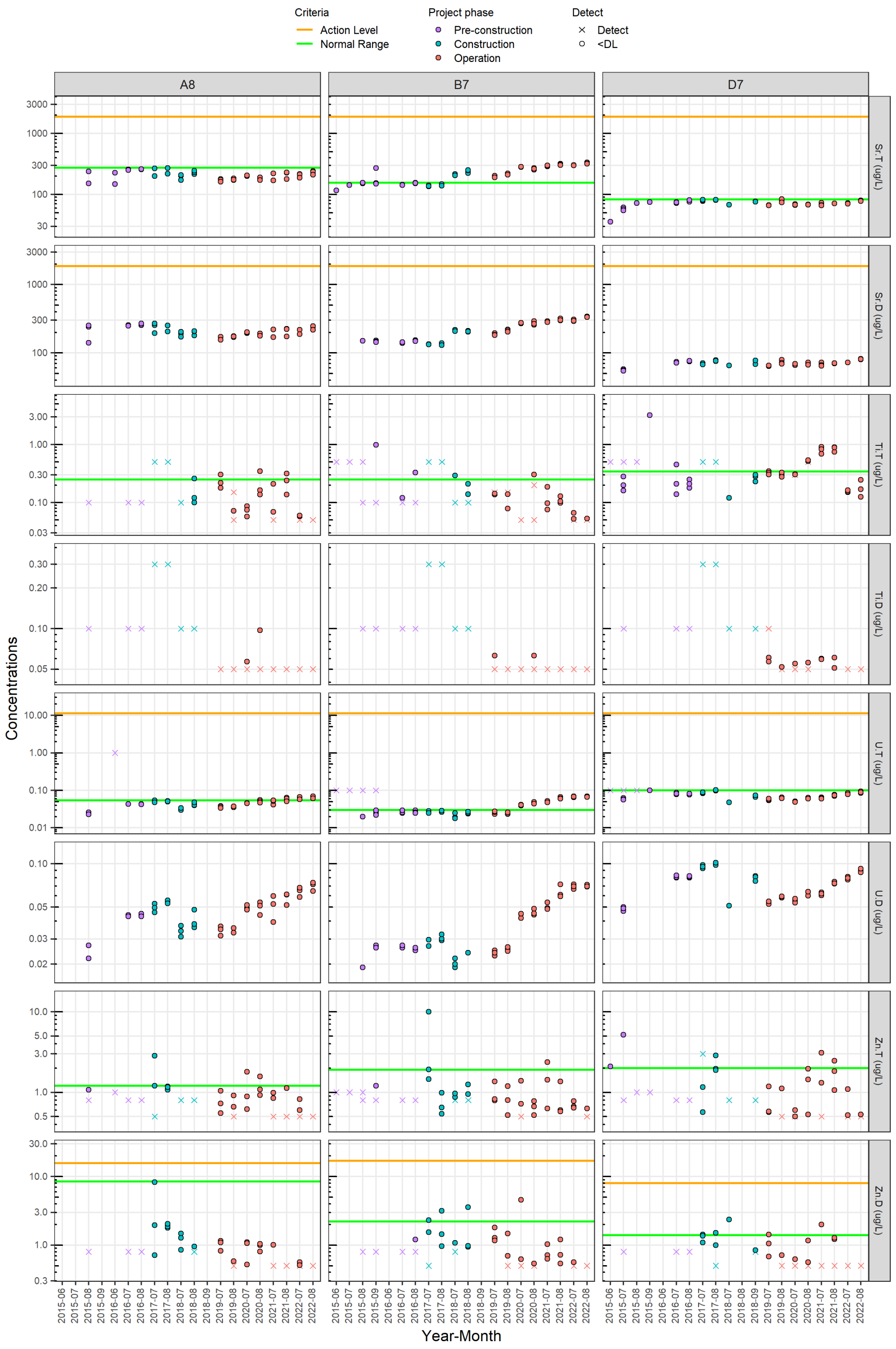


Figure D2-6. Concentrations of strontium, titanium, uranium, and zinc in surface water samples from the Peninsula Lakes since 2015.

Notes: Normal range = the upper limit of baseline concentrations (pre-2018). Action Level = 75% of the AEMP Benchmark. The second sampling event in 2018 spanned late August (Lake A8 and Lake B7) and early September (Lake D7).



Appendix D3
Peninsula Lakes 2022 Surface Water Chemistry Results

Table D3-1. Lake D7 water chemistry results in 2022

Parameter	Units	DL (min | max)	Normal Range	FEIS	FWAL (min | max)	HH DW	SSWQO	Benchmark (min | max)	Action Level (min | max)	July 7/27/2022			August 8/17/2022		
										D7-01	D7-02	D7-03	D7-01	D7-02	D7-03
Conventional Parameters															
Conductivity (lab)	uS/cm	-	-	-	-	-	-	-	-	134	133	133	145	145	145
Hardness	mg/L	-	-	-	-	-	-	-	-	47.8	47.4	48.3	49.6	51.1	49
pH (lab)	pH units	-	-	-	6.5 | 9.0	-	-	6.5 | 9	6.5 | 9	7.75	7.79	7.84	8.02	7.99	7.99
Total Dissolved Solids	mg/L	-	136	-	500	-	-	500	375	84	81	79	78	71	81
TDS (Calculated)	mg/L	81	-	-	500	-	-	500	375	68.4	68.4	68.4	71.4	71.9	71.4
Total Suspended Solids	mg/L	2	5.1	-	-	-	-	-	-	1.2	1.5	1.4	*<1*	1.1	*<1*
Turbidity (lab)	NTU	1.1	-	-	-	-	-	-	-	0.6	0.56	0.63	0.46	0.51	0.3
Major Ions															
Alkalinity, Bicarbonate	mg/L	68	-	-	-	-	-	-	-	60.6	60.9	60.5	63.6	63	64.4
Alkalinity, Carbonate	mg/L	-	-	-	-	-	-	-	-	*<0.6*	*<0.6*	*<0.6*	*<0.6*	*<0.6*	*<0.6*
Alkalinity, Hydroxide	mg/L	-	-	-	-	-	-	-	-	*<0.34*	*<0.34*	*<0.34*	*<0.34*	*<0.34*	*<0.34*
Alkalinity, Total	mg/L	55	83	-	-	-	-	-	-	49.7	49.9	49.6	52.1	51.6	52.8
Bromide	mg/L	-	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Calcium (D)	mg/L	-	-	-	-	-	-	-	-	14.7	14.4	14.7	15	15.4	14.8
Calcium (T)	mg/L	17	36	-	-	-	-	-	-	15	14.6	14.6	15.7	15.6	15.7
Chloride	mg/L	25	15	640	120	-	-	120	90	9.04	9	9.01	9.31	9.33	9.17
Fluoride	mg/L	0.05	0.036	-	0.12	1.5	2.8	2.8	2.1	0.045	0.046	0.044	0.041	0.042	0.042
Magnesium (D)	mg/L	-	-	-	-	-	-	-	-	2.71	2.78	2.78	2.93	3.07	2.91
Magnesium (T)	mg/L	3.3	5.2	-	-	-	-	-	-	2.81	2.76	2.76	2.91	2.89	2.87
Potassium (D)	mg/L	-	-	-	-	-	-	-	-	1.3	1.29	1.3	1.49	1.51	1.48
Potassium (T)	mg/L	1.8	2.3	-	-	-	-	-	-	1.31	1.34	1.35	1.52	1.5	1.52
Reactive Silica (SiO2)	mg/L	0.28	-	-	-	-	-	-	-	0.571	0.56	0.547	0.57	0.57	0.58
Sodium (D)	mg/L	-	-	-	-	-	-	-	-	6.93	7.04	6.88	7.65	7.8	7.57
Sodium (T)	mg/L	17	8.1	-	-	-	-	-	-	6.95	6.88	6.94	7.57	7.59	7.59
Sulphate	mg/L	10	5.5	-	218	-	-	218	164	3.89	3.89	3.9	3.72	3.75	3.74
Nutrients															
Ammonia (as N)	mg/L	0.009	0.086	-	0.141 | 0.41	-	-	0.141	0.106	0.012	0.0149	0.0141	0.006	0.0078	0.0065
Nitrate (as N)	mg/L	0.005	1.2	124	2.9	10	-	2.9	2.17	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Nitrate + Nitrite (as N)	mg/L	-	-	-	-	-	-	-	-	*<0.0051*	*<0.0051*	*<0.0051*	*<0.0051*	*<0.0051*	*<0.0051*
Nitrite (as N)	mg/L	0.0005	-	-	0.06	1	-	0.06	0.045	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Nitrogen	mg/L	-	-	-	-	-	-	-	-	0.365	0.359	0.366	0.406	0.399	0.356
Orthophosphate (PO4-P)	mg/L	0.003	0.00072	-	-	-	-	-	-	*<0.001*	0.0012	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Total Diss Phosphorus	mg/L	0.008	0.0071	-	-	-	-	-	-	0.0046	0.0037	0.0047	0.0051	0.0058	0.0024
Total Dissolved Nitrogen	mg/L	-	-	-	-	-	-	-	-	0.316	0.291	0.312	0.349	0.332	0.342
Total Kjeldahl Nitrogen	mg/L	0.52	0.88	-	-	-	-	-	-	0.365	0.359	0.366	0.406	0.399	0.356
Total Kjeldahl Nitrogen (diss)	mg/L	-	-	-	-	-	-	-	-	0.316	0.291	0.312	0.349	0.332	0.342
Total Phosphorus	mg/L	0.02	-	-	0.01	-	-	0.01	0.0075	0.0155	0.0143	0.0148	0.0101	0.009	0.0094
Organic/Inorganic Carbon															
Dissolved Organic Carbon	mg/L	5.1	-	-	-	-	-	-	-	4.58	4.74	4.78	4.3	4.26	4.34
Total Organic Carbon	mg/L	14	-	-	-	-	-	-	-	4.7	4.7	4.84	4.41	4.3	4.22
Total Metals															
Aluminum (T)	ug/L	6.7	37	-	100	-	-	100	75	5.3	5.3	5.9	4.6	5.9	5.3
Antimony (T)	ug/L	0.03	0.13	-	9	6	-	6	4.5	*<0.02*	*<0.02*	*<0.02*	0.02	*<0.02*	*<0.02*
Arsenic (T)	ug/L	1.2	1.3	-	5	10	25	25	18.8	1.5	1.4	1.43	1.39	1.43	1.46
Barium (T)	ug/L	17	34	-	1000	2000	-	1000	750	14.4	15.2	15.1	14.4	14.6	14.4
Beryllium (T)	ug/L	0.01	0.26	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Bismuth (T)	ug/L	0.01	0.037	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Boron (T)	ug/L	17	10	29000	1500	5000	-	1500	1120	12.7	13.1	13	14.6	14.6	14.5
Cadmium (T)	ug/L	0.005	0.071	0.983 | 1.06	0.0853 | 0.0908	7	-	0.0853	0.064	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Cesium (T)	ug/L	-	-	-	-	-	-	-	-	0.009	0.0085	0.0075	0.0071	0.0079	0.0082
Chromium (T)	ug/L	0.06	1.6	-	5	50	-	5	3.75	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Cobalt (T)	ug/L	0.05	0.33	-	0.78	-	-	0.78	0.585	0.036	0.0375	0.0325	0.0336	0.0381	0.0345
Copper (T)	ug/L	1	2.1	-	2	2000	-	2	1.5	0.915	0.967	0.9	0.918	0.914	0.95
Gallium (T)	ug/L	-	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Iron (T)	ug/L	112	175	-	300	-	1060	1060	795	47.8	50.1	46.1	39.3	44.5	37.2
Lanthanum (T)	ug/L	-	-	-	-	-	-	-	-	0.019	0.018	0.02	0.017	0.025	0.017
Lead (T)	ug/L	0.02	0.14	-	-	5	-	5	3.75	*<0.01*	0.013	0.013	0.012	0.014	0.013
Lithium (T)	ug/L	1.9	4.9	-	-	-	-	-	-	1.46	1.43	1.39	1.59	1.59	1.55
Manganese (T)	ug/L	13	67	-	-	120	-	120	90	9.58	9.36	7.97	9.36	8.74	7.47
Mercury (T)	ug/L	0.001	0.012	-	0.026	1	-	0.026	0.0195	0.00062	0.00067	0.00055	*<0.005*	*<0.005*	*<0.005*
Molybdenum (T)	ug/L	0.48	0.61	-	73	-	-	73	54.8	0.529	0.518	0.498	0.555	0.575	0.556
Nickel (T)	ug/L	0.75	2.3	-	25	-	-	25	18.8	0.631	0.651	0.63	0.642	0.631	0.639
Niobium (T)	ug/L	-	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Phosphorus (T)	ug/L	-	-	-	-	-	-	-	-	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*
Rhenium (T)	ug/L	-	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Rubidium (T)	ug/L	-	-	-	-	-	-	-	-	1.2	1.23	1.25	1.32	1.29	1.33
Selenium (T)	ug/L	0.06	0.48	-	1	50	-	1	0.75	*<0.04*	*<0.04*	0.054	*<0.04*	0.05	0.056
Silicon (T)	ug/L	-	-	-	-	-	-	-	-	290	287	280	277	273	273
Silver (T)	ug/L	0.005	0.025	-	0.25	-	-	0.25	0.188	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Strontium (T)	ug/L	83	162	-	2500	7000	-	2500	1880	72.5	72.2	70.6	79.3	77.8	78
Sulfur (T)	ug/L	-	-	-	-	-	-	-	-	1450	1380	1570	1340	1490	1650
Tantalum (T)	ug/L	-	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Tellurium (T)	ug/L	-	-	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Thallium (T)	ug/L	0.005	0.039	-	0.8	-	-	0.8	0.6	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Thorium (T)	ug/L	-	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Tin (T)	ug/L	0.05	0.21	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Titanium (T)	ug/L	0.34	2.38	-	-	-	-	-	-	0.151	0.155	0.163	0.125	0.245	0.169
Tungsten (T)	ug/L	-	13	-	-	-	-	-	-	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Uranium (T)	ug/L	0.1	0.13	33	15	20	-	15	11.2	0.0844	0.0776	0.0787	0.0848	0.0937	0.0892
Vanadium (T)	ug/L	0.07	0.71	-	-	-	-	-	-	0.088	0.089	0.089	0.071	0.08	0.073
Yttrium (T)	ug/L	-	-	-	-	-	-	-	-	0.005	0.0058	*<0.005*	0.0051	*<0.005*	0.0055
Zinc (T)	ug/L	2	5.8	-	-	-	-	-	-	*<0.5*	0.52	1.1	0.53	*<0.5*	*<0.5*
Zirconium (T)	ug/L	-	-	-	-	-	-	-	-	*<0.01*	*<0.01*	0.01	*<0.01*	*<0.01*	*<0.01*
Dissolved Metals															
Aluminum (D)	ug/L	-	-	-	-	-	-	-	-	3.2	2.7	2.9	2.5	2.6	2.6
Antimony (D)	ug/L	-	-	-	-	-	-	-	-	*<0.02*	*<0.02*	0.021	*<0.02*	*<0.02*	*<0.02*
Arsenic (D)	ug/L	-	-	-	-	-	-	-	-	1.27	1.21	1.17	1.24	1.26	1.22
Barium (D)	ug/L	-	-	-	-	-	-	-	-	14	14.3	14.3	13.6	13.5	13.6
Beryllium (D)	ug/L	-	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Bismuth (D)	ug/L	-	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Boron (D)	ug/L	-	-	-	-	-	-	-	-	12.5	12.4	13.4	13.3	13.4	13.3
Cadmium (D)	ug/L	-	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Cesium (D)	ug/L	-	-	-	-	-	-	-	-	0.0069	0.0071	0.0074	0.0085	0.0077	0.0078
Chromium (D)	ug/L	-	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Cobalt (D)	ug/L	-	-	-	-	-	-	-	-	0.016	0.016	0.0111	0.0137	0.0148	0.0158
Copper (D)	ug/L	-	-	-	-	-	-	-	-	0.875	0.866	0.851	0.927	0.909	0.915
Gallium (D)	ug/L	-	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Iron (D)	ug/L	-	-	-	-	-	-	-	-	14.7	11.5	3.1	16	13.5	14.2
Lanthanum (D)	ug/L	-	-	-	-	-	-	-	-	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Lead (D)	ug/L	-	-	-	7.39 | 7.76	-	-	7.39	5.54	*<0.01*	*<0.01*	*<0.01*	0.012	*<0.01*	*<0.01*
Lithium (D)	ug/L	-	-	-	-	-	-	-	-	1.38	1.33	1.37	1.43	1.44	1.4
Manganese (D)	ug/L	-	-	3460 | 3690	270 | 320	-	-	270	202	0.45	0.535	*<0.05*	0.306	0.233	0.246
Mercury (D)	ug/L	-	-	-	-	-	-	-	-	0.0005	*<5e-04*	*<5e-04*	*<0.005*	*<0.005*	*<0.005*
Molybdenum (D)	ug/L	-	-	-	-	-	-	-	-	0.538	0.518	0.502	0.592	0.606	0.579
Nickel (D)	ug/L	-	-	-	-	-	-	-	-	0.624	0.578	0.586	0.568	0.577	0.59
Niobium (D)	ug/L	-	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Phosphorus (D)	ug/L	-	-	-	-	-	-	-	-	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*
Rhenium (D)	ug/L	-	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Rubidium (D)	ug/L	-	-	-	-	-	-	-	-	1.18	1.16	1.19	1.27	1.3	1.3
Selenium (D)	ug/L	-	-	-	-	-	-	-	-	*<0.04*	0.042	0.041	*<0.04*	*<0.04*	*<0.04*
Silicon (D)	ug/L	-	-	-	-	-	-	-	-	296	284	280	297	291	291
Silver (D)	ug/L	-	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Strontium (D)	ug/L	-	-	-	2500	-	-	2500	1880	72.3	72	72.1	81.7	79.8	80.5
Sulfur (D)	ug/L	-	-	-	-	-	-	-	-	1570	1380	1440	1490	1660	1410
Tantalum (D)	ug/L	-	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Tellurium (D)	ug/L	-	-	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Thallium (D)	ug/L	-	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Thorium (D)	ug/L	-	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*

Table D3-1. Lake D7 water chemistry results in 2022

Parameter	Units	DL (min | max)	Normal Range	FEIS	FWAL (min | max)	HH DW	SSWQO	Benchmark (min | max)	Action Level (min | max)	July 7/27/2022			August 8/17/2022		
										D7-01	D7-02	D7-03	D7-01	D7-02	D7-03
Tin (D)	ug/L	-	-	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Titanium (D)	ug/L	-	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Tungsten (D)	ug/L	-	-	-	-	-	-	-	-	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Uranium (D)	ug/L	-	-	-	-	-	-	-	-	0.0815	0.0777	0.0798	0.0901	0.0872	0.0926
Vanadium (D)	ug/L	-	-	-	-	-	-	-	-	0.078	0.068	0.069	0.061	0.062	0.065
Yttrium (D)	ug/L	-	-	-	-	-	-	-	-	0.0055	0.0053	0.0072	*<0.005*	*<0.005*	*<0.005*
Zinc (D)	ug/L	1.4	-	61.1 | 63.5	10.7 | 13.2	-	-	10.7	8.02	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*
Zirconium (D)	ug/L	-	-	-	-	-	-	-	-	0.012	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Other															
Cyanide (free)	mg/L	-	-	-	-	-	-	-	-	*<0.001*	*<0.001*	*<0.001*	0.001	*<0.001*	0.0012
Cyanide (Total)	mg/L	0.001	-	-	0.005	0.2	-	0.005	0.00375	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Cyanide (WAD)	mg/L	-	-	-	-	-	-	-	-	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Ion Ratio (+/-)	%	-	-	-	-	-	-	-	-	97	96.4	97.5	98.3	102	96.5

Notes

DL = 2022 detection limits

FWAL = freshwater aquatic life guideline

HH DW = Health Canada drinking water quality guideline

SSWQO = site-specific water quality objective

FEIS = predicted concentrations for Lake D7 (Agnico Eagle, 2014).

Table D3-2. Lake A8 water chemistry results in 2022

Parameter	Units	DL (min | max)	Normal Range	FEIS	FWAL (min | max)	HH DW	SSWQO	Benchmark (min | max)	Action Level (min | max)	July 7/24/2022 A8-01	July 7/24/2022 A8-02	July 7/24/2022 A8-03	August 8/17/2022 A8-01	August 8/17/2022 A8-02	August 8/17/2022 A8-03
Conventional Parameters															
Conductivity (lab)	uS/cm	-	-	-	-	-	-	-	-	284	279	248	301	298	273
Hardness	mg/L	-	-	-	-	-	-	-	-	102	102	97.6	109	104	100
pH (lab)	pH units	-	-	-	6.5 | 9.0	-	-	6.5 | 9	6.5 | 9	7.9	7.84	7.91	8.02	8.02	8.06
Total Dissolved Solids	mg/L	-	162	-	500	-	-	500	375	180	164	147	214	205	185
TDS (Calculated)	mg/L	152	-	-	500	-	-	500	375	140	141	126	146	146	135
Total Suspended Solids	mg/L	4	2.9	-	-	-	-	-	-	*<1*	*<1*	*<1*	*<1*	*<1*	*<1*
Turbidity (lab)	NTU	0.87	-	-	-	-	-	-	-	0.33	0.3	0.51	0.25	0.33	0.4
Major Ions															
Alkalinity, Bicarbonate	mg/L	91	-	-	-	-	-	-	-	65.6	66.6	73.2	68.8	70.9	79.5
Alkalinity, Carbonate	mg/L	-	-	-	-	-	-	-	-	*<0.6*	*<0.6*	*<0.6*	*<0.6*	*<0.6*	*<0.6*
Alkalinity, Hydroxide	mg/L	-	-	-	-	-	-	-	-	*<0.34*	*<0.34*	*<0.34*	*<0.34*	*<0.34*	*<0.34*
Alkalinity, Total	mg/L	83.6	51	-	-	-	-	-	-	53.8	54.6	60	56.4	58.1	65.2
Bromide	mg/L	-	-	-	-	-	-	-	-	0.25	0.25	0.2	0.24	0.25	0.2
Calcium (D)	mg/L	-	-	-	-	-	-	-	-	33.4	33.7	31.8	35.2	33.4	32.4
Calcium (T)	mg/L	40	47	-	-	-	-	-	-	34	35	31.4	34.9	35	32.2
Chloride	mg/L	61	74	640	120	-	-	120	90	45.6	45.5	35.3	47.7	47.7	39.3
Fluoride	mg/L	0.04	0.038	-	0.12	1.5	2.8	2.8	2.1	0.038	0.037	0.042	0.039	0.039	0.036
Magnesium (D)	mg/L	-	-	-	-	-	-	-	-	4.47	4.47	4.44	5.06	4.95	4.71
Magnesium (T)	mg/L	5.6	6.9	-	-	-	-	-	-	4.61	4.51	4.29	4.88	4.79	4.73
Potassium (D)	mg/L	-	-	-	-	-	-	-	-	2.04	2.04	1.82	2.34	2.39	2.17
Potassium (T)	mg/L	2.5	2.3	-	-	-	-	-	-	2.09	2.08	1.84	2.36	2.33	2.15
Reactive Silica (SiO2)	mg/L	1.3	-	-	-	-	-	-	-	0.72	0.7	1.07	1.09	1.1	1.51
Sodium (D)	mg/L	-	-	-	-	-	-	-	-	10.4	10.3	7.97	11.2	11.1	8.98
Sodium (T)	mg/L	8.4	8.3	-	-	-	-	-	-	10.4	10.3	7.9	11.2	10.8	9.34
Sulphate	mg/L	9.3	11.6	-	218	-	-	218	164	11.8	11.8	8.98	11	11	8.45
Nutrients															
Ammonia (as N)	mg/L	0.011	0.118	-	0.141 | 0.41	-	-	0.141	0.106	0.01	0.0135	0.012	0.0072	0.0123	0.0078
Nitrate (as N)	mg/L	0.015	0.2	124	2.9	10	-	2.9	2.17	*<0.005*	*<0.005*	*<0.005*	0.0158	0.0291	0.0278
Nitrate + Nitrite (as N)	mg/L	-	-	-	-	-	-	-	-	*<0.0051*	*<0.0051*	*<0.0051*	0.0158	0.0291	0.0278
Nitrite (as N)	mg/L	0.0005	-	-	0.06	1	-	0.06	0.045	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Nitrogen	mg/L	-	-	-	-	-	-	-	-	*<0.0051*	*<0.0051*	0.4	0.362	0.38	0.445
Orthophosphate (PO4-P)	mg/L	0.0023	0.00215	-	-	-	-	-	-	0.0012	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Total Diss Phosphorus	mg/L	0.006	0.006	-	-	-	-	-	-	0.0011	*<0.001*	0.0022	0.0032	0.0029	*<0.001*
Total Dissolved Nitrogen	mg/L	-	-	-	-	-	-	-	-	0.287	0.301	0.39	0.359	0.344	0.425
Total Kjeldahl Nitrogen	mg/L	0.63	0.58	-	-	-	-	-	-	0.318	0.347	0.4	0.346	0.351	0.417
Total Kjeldahl Nitrogen (diss)	mg/L	-	-	-	-	-	-	-	-	0.287	0.301	0.39	0.343	0.315	0.397
Total Phosphorus	mg/L	0.009	-	-	0.01	-	-	0.01	0.0075	0.0042	0.0036	0.0055	0.0054	0.0034	0.0069
Organic/Inorganic Carbon															
Dissolved Organic Carbon	mg/L	4.9	-	-	-	-	-	-	-	4.7	4.49	5.77	4.04	4.04	5.29
Total Organic Carbon	mg/L	4.7	-	-	-	-	-	-	-	4.5	4.46	5.46	3.93	4.1	4.94
Total Metals															
Aluminum (T)	ug/L	3	4.6	-	100	-	-	100	75	4	3.4	3.6	2.9	2.4	2.9
Antimony (T)	ug/L	0.4	0.2	-	9	6	-	6	4.5	0.042	0.04	0.029	0.044	0.048	0.032
Arsenic (T)	ug/L	2.4	1.7	-	5	10	25	25	18.8	11.6	11.6	4.83	11.4	11.1	5.02
Barium (T)	ug/L	32	23	-	1000	2000	-	1000	750	25.3	25.1	23.8	24.8	24.6	24
Beryllium (T)	ug/L	0.01	0.47	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Bismuth (T)	ug/L	0.01	0.076	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Boron (T)	ug/L	5	27	29000	1500	5000	-	1500	1120	7.8	8.3	*<5*	7.6	7.5	*<5*
Cadmium (T)	ug/L	0.005	0.083	2.05 | 2.29	0.155 | 0.17	7	-	0.155	0.116	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Cesium (T)	ug/L	-	-	-	-	-	-	-	-	0.0241	0.0209	0.0139	0.0242	0.024	0.0177
Chromium (T)	ug/L	0.06	1.87	-	5	50	-	5	3.75	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Cobalt (T)	ug/L	0.05	0.24	-	1.01 | 1.06	-	-	1.01	0.758	0.0352	0.0314	0.0459	0.0283	0.025	0.0381
Copper (T)	ug/L	0.89	2.7	-	2.32 | 2.55	2000	-	2.32	1.74	0.889	0.853	0.826	0.825	0.826	0.803
Gallium (T)	ug/L	-	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Iron (T)	ug/L	67	96	-	300	-	1060	1060	795	58.7	54.1	73.1	40.6	38	54
Lanthanum (T)	ug/L	-	-	-	-	-	-	-	-	0.011	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Lead (T)	ug/L	0.03	2	-	-	5	-	5	3.75	0.033	0.028	0.013	0.026	0.025	0.017
Lithium (T)	ug/L	10	5.3	-	-	-	-	-	-	9.01	9.27	6.7	9.68	9.74	7.58
Manganese (T)	ug/L	13	30	-	-	120	-	120	90	9.03	8.82	13.9	7.14	5.62	11
Mercury (T)	ug/L	0.0012	0.04	-	0.026	1	-	0.026	0.0195	0.001	0.00299	0.00166	*<0.005*	*<0.005*	*<0.005*
Molybdenum (T)	ug/L	0.22	0.59	-	73	-	-	73	54.8	0.336	0.309	0.282	0.377	0.365	0.466
Nickel (T)	ug/L	0.92	2.3	-	93.8 | 102	-	-	93.8	70.4	0.662	0.64	0.813	0.632	0.642	0.78
Niobium (T)	ug/L	-	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Phosphorus (T)	ug/L	-	-	-	-	-	-	-	-	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*
Rhenium (T)	ug/L	-	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Rubidium (T)	ug/L	-	-	-	-	-	-	-	-	2.17	2.17	1.92	2.31	2.29	2.11
Selenium (T)	ug/L	0.02	0.16	-	1	50	-	1	0.75	*<0.04*	*<0.04*	*<0.04*	*<0.04*	*<0.04*	*<0.04*
Silicon (T)	ug/L	-	-	-	-	-	-	-	-	387	372	522	524	531	688
Silver (T)	ug/L	0.005	0.068	-	0.25	-	-	0.25	0.188	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Strontium (T)	ug/L	273	101	-	2500	7000	-	2500	1880	217	213	188	243	235	210
Sulfur (T)	ug/L	-	-	-	-	-	-	-	-	4050	4020	2940	3960	4110	3100
Tantalum (T)	ug/L	-	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Tellurium (T)	ug/L	-	-	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Thallium (T)	ug/L	0.005	0.047	-	0.8	-	-	0.8	0.6	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Thorium (T)	ug/L	-	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Tin (T)	ug/L	0.05	0.26	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Titanium (T)	ug/L	0.25	1.25	-	-	-	-	-	-	0.058	*<0.05*	0.06	*<0.05*	*<0.05*	*<0.05*
Tungsten (T)	ug/L	-	29	-	-	-	-	-	-	0.161	0.164	0.03	0.122	0.13	0.027
Uranium (T)	ug/L	0.054	0.061	33	15	20	-	15	11.2	0.0642	0.067	0.0575	0.0654	0.0689	0.0609
Vanadium (T)	ug/L	0.01	0.35	-	-	-	-	-	-	*<0.05*	*<0.05*	0.052	*<0.05*	*<0.05*	*<0.05*
Yttrium (T)	ug/L	-	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Zinc (T)	ug/L	1.2	5.1	-	-	-	-	-	-	0.6	*<0.5*	0.82	*<0.5*	*<0.5*	*<0.5*
Zirconium (T)	ug/L	-	-	-	-	-	-	-	-	*<0.01*	*<0.01*	0.028	*<0.01*	*<0.01*	*<0.01*
Dissolved Metals															
Aluminum (D)	ug/L	-	-	-	-	-	-	-	-	2.3	2.4	2.4	1.6	1.5	1.4
Antimony (D)	ug/L	-	-	-	-	-	-	-	-	0.047	0.046	0.032	0.043	0.044	0.032
Arsenic (D)	ug/L	-	-	-	-	-	-	-	-	9.72	9.58	4.1	10	9.94	4.5
Barium (D)	ug/L	-	-	-	-	-	-	-	-	23.9	24.5	23.2	23.2	22.9	22.4
Beryllium (D)	ug/L	-	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Bismuth (D)	ug/L	-	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Boron (D)	ug/L	-	-	-	-	-	-	-	-	7.5	7.7	*<5*	7.2	6.7	*<5*
Cadmium (D)	ug/L	-	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Cesium (D)	ug/L	-	-	-	-	-	-	-	-	0.0225	0.0231	0.0148	0.0236	0.0244	0.016
Chromium (D)	ug/L	-	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	0.17	*<0.1*	*<0.1*
Cobalt (D)	ug/L	-	-	-	-	-	-	-	-	0.0233	0.0144	0.027	0.0157	0.0144	0.0246
Copper (D)	ug/L	-	-	-	-	-	-	-	-	0.821	0.816	0.778	0.803	0.832	0.833
Gallium (D)	ug/L	-	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Iron (D)	ug/L	-	-	-	-	-	-	-	-	13.3	11.3	20.7	20.5	18.3	26
Lanthanum (D)	ug/L	-	-	-	-	-	-	-	-	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Lead (D)	ug/L	-	-	-	8.39 | 9.94	-	-	8.39	6.29	*<0.01*	*<0.01*	*<0.01*	0.011	0.011	*<0.01*
Lithium (D)	ug/L	-	-	-	-	-	-	-	-	8.82	8.74	6.65	8.95	8.46	6.94
Manganese (D)	ug/L	-	-	6520 | 7180	350 | 370	-	-	350	262	1.09	0.621	0.674	0.77	0.47	0.818
Mercury (D)	ug/L	-	-	-	-	-	-	-	-	0.00081	0.0008	*<5e-04*	*<0.005*	*<0.005*	*<0.005*
Molybdenum (D)	ug/L	-	-	-	-	-	-	-	-	0.341	0.349	0.278	0.505	0.381	0.341
Nickel (D)	ug/L	-	-	-	-	-	-	-	-	0.607	0.615	0.78	0.591	0.674	0.733
Niobium (D)	ug/L	-	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Phosphorus (D)	ug/L	-	-	-	-	-	-	-	-	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*
Rhenium (D)	ug/L	-	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Rubidium (D)	ug/L	-	-	-	-	-	-	-	-	2.1	2.1	1.89	2.22	2.29	2.1
Selenium (D)	ug/L	-	-	-	-	-	-	-	-	*<0.04*	*<0.04*	*<0.04*	*<0.04*	*<0.04*	*<0.04*
Silicon (D)	ug/L	-	-	-	-	-	-	-	-	388	375	547	554	540	747
Silver (D)	ug/L	-	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Strontium (D)	ug/L	-	-	-	2500	-	-	2500	1880	217	217	187	243	245	218
Sulfur (D)	ug/L	-	-	-	-	-	-	-	-	3920	4020	3180	4200	4050	3480
Tantalum (D)	ug/L	-	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Tellurium (D)	ug/L	-	-	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Thallium (D)	ug/L	-	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Thorium (D)	ug/L	-	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*

Table D3-2. Lake A8 water chemistry results in 2022

Parameter	Units	DL (min | max)	Normal Range	FEIS	FWAL (min | max)	HH DW	SSWQO	Benchmark (min | max)	Action Level (min | max)	July			August		
										7/24/2022			8/17/2022		
										A8-01	A8-02	A8-03	A8-01	A8-02	A8-03
Tin (D)	ug/L	-	-	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Titanium (D)	ug/L	-	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Tungsten (D)	ug/L	-	-	-	-	-	-	-	-	0.15	0.157	0.027	0.123	0.13	0.026
Uranium (D)	ug/L	-	-	-	-	-	-	-	-	0.0653	0.0683	0.0587	0.072	0.0738	0.0646
Vanadium (D)	ug/L	-	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Yttrium (D)	ug/L	-	-	-	-	-	-	-	-	0.0073	*<0.005*	0.0055	*<0.005*	*<0.005*	*<0.005*
Zinc (D)	ug/L	8.5	-	113 | 118	21 | 24.9	-	-	21	15.8	0.56	*<0.5*	0.51	*<0.5*	*<0.5*	*<0.5*
Zirconium (D)	ug/L	-	-	-	-	-	-	-	-	*<0.01*	*<0.01*	*<0.01*	*<0.01*	0.058	*<0.01*
Other															
Cyanide (free)	mg/L	-	-	-	-	-	-	-	-	*<0.001*	*<0.001*	0.0015	*<0.001*	0.0011	*<0.001*
Cyanide (Total)	mg/L	0.001	-	-	0.005	0.2	-	0.005	0.00375	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Cyanide (WAD)	mg/L	-	-	-	-	-	-	-	-	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Ion Ratio (+/-)	%	-	-	-	-	-	-	-	-	97.3	97.3	98.4	101	95.6	94.6

Notes

DL = 2022 detection limits

FWAL = freshwater aquatic life guideline

HH DW = Health Canada drinking water quality guideline

SSWQO = site-specific water quality objective

FEIS = predicted concentrations for Lake A8 (Agnico Eagle, 2014).

Table D3-3. Lake B7 water chemistry results in 2022

Parameter	Units	DL (min | max)	Normal Range	FWAL (min | max)	HH DW	SSWQO	Benchmark (min | max)	Action Level (min | max)	July 7/24/2022			August 8/16/2022		
									B7-01	B7-02	B7-03	B7-01	B7-02	B7-03
Conventional Parameters														
Conductivity (lab)	uS/cm	-	-	-	-	-	-	-	274	269	271	287	286	287
Hardness	mg/L	-	-	-	-	-	-	-	102	103	101	103	103	102
pH (lab)	pH units	-	-	6.5 | 9.0	-	-	6.5 | 9	6.5 | 9	7.89	7.84	7.85	8.01	8.03	8.02
Total Dissolved Solids	mg/L	-	-	500	-	-	500	375	174	184	173	210	200	205
TDS (Calculated)	mg/L	171	-	500	-	-	500	375	138	137	136	140	139	139
Total Suspended Solids	mg/L	3	-	-	-	-	-	-	1.3	1.4	1.2	1.3	*<1*	*<1*
Turbidity (lab)	NTU	0.69	-	-	-	-	-	-	0.39	0.44	0.42	0.42	0.3	0.49
Major Ions														
Alkalinity, Bicarbonate	mg/L	135	-	-	-	-	-	-	66.2	65.8	65.1	68.3	68.1	67.7
Alkalinity, Carbonate	mg/L	-	-	-	-	-	-	-	*<0.6*	*<0.6*	*<0.6*	*<0.6*	*<0.6*	*<0.6*
Alkalinity, Hydroxide	mg/L	-	-	-	-	-	-	-	*<0.34*	*<0.34*	*<0.34*	*<0.34*	*<0.34*	*<0.34*
Alkalinity, Total	mg/L	110	-	-	-	-	-	-	54.3	53.9	53.4	56	55.8	55.5
Bromide	mg/L	-	-	-	-	-	-	-	0.19	0.19	0.19	0.19	0.19	0.18
Calcium (D)	mg/L	-	-	-	-	-	-	-	34.8	35.3	34.3	35.1	35	34.5
Calcium (T)	mg/L	39	-	-	-	-	-	-	35.5	36.1	35.1	36.9	36.6	35.8
Chloride	mg/L	25	-	120	-	-	120	90	44	43.2	43.1	45.4	45	45
Fluoride	mg/L	0.04	-	0.12	1.5	2.8	2.8	2.1	0.04	0.039	0.039	0.035	0.033	0.034
Magnesium (D)	mg/L	-	-	-	-	-	-	-	3.66	3.64	3.7	3.85	3.81	3.83
Magnesium (T)	mg/L	5.3	-	-	-	-	-	-	3.6	3.63	3.55	3.72	3.67	3.79
Potassium (D)	mg/L	-	-	-	-	-	-	-	2.06	2.06	2.05	2.4	2.29	2.37
Potassium (T)	mg/L	2.8	-	-	-	-	-	-	2.12	2.1	2.07	2.35	2.34	2.36
Reactive Silica (SiO2)	mg/L	2.3	-	-	-	-	-	-	1.5	1.36	1.36	1.86	1.9	1.86
Sodium (D)	mg/L	-	-	-	-	-	-	-	9.2	9.3	9.08	9.71	9.44	9.73
Sodium (T)	mg/L	7.5	-	-	-	-	-	-	9.07	8.98	8.98	9.64	9.52	9.53
Sulphate	mg/L	6	-	218	-	-	218	164	11.4	11.2	11.2	9.93	9.86	9.84
Nutrients														
Ammonia (as N)	mg/L	0.025	-	0.141 | 0.41	-	-	0.141	0.106	0.014	0.0283	0.0153	0.0121	0.0093	0.0124
Nitrate (as N)	mg/L	0.005	-	2.9	10	-	2.9	2.17	0.0054	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Nitrate + Nitrite (as N)	mg/L	-	-	-	-	-	-	-	0.0054	*<0.0051*	*<0.0051*	*<0.0051*	*<0.0051*	*<0.0051*
Nitrite (as N)	mg/L	0.005	-	0.06	1	-	0.06	0.045	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Nitrogen	mg/L	-	-	-	-	-	-	-	-	-	-	0.463	0.432	0.455
Orthophosphate (PO4-P)	mg/L	0.001	-	-	-	-	-	-	0.0015	0.0013	*<0.001*	0.0011	*<0.001*	*<0.001*
Total Diss Phosphorus	mg/L	0.008	-	-	-	-	-	-	*<0.001*	*<0.001*	*<0.001*	0.0036	*<0.001*	0.0031
Total Dissolved Nitrogen	mg/L	-	-	-	-	-	-	-	0.418	0.366	0.371	0.425	0.419	0.404
Total Kjeldahl Nitrogen	mg/L	0.73	-	-	-	-	-	-	0.447	0.416	0.437	0.463	0.432	0.455
Total Kjeldahl Nitrogen (diss)	mg/L	-	-	-	-	-	-	-	0.412	0.366	0.371	0.425	0.419	0.404
Total Phosphorus	mg/L	0.01	-	0.01	-	-	0.01	0.0075	0.0054	0.0029	0.0061	0.0066	0.0063	0.0056
Organic/Inorganic Carbon														
Dissolved Organic Carbon	mg/L	5.5	-	-	-	-	-	-	6.02	5.93	6.03	5.49	5.36	5.13
Total Organic Carbon	mg/L	7.6	-	-	-	-	-	-	5.52	5.6	5.53	5.35	5.24	5.34
Total Metals														
Aluminum (T)	ug/L	6.6	-	100	-	-	100	75	2.9	3.5	3.6	2.4	2.2	2.6
Antimony (T)	ug/L	0.02	-	9	6	-	6	4.5	0.04	0.037	0.04	0.034	0.032	0.032
Arsenic (T)	ug/L	1.8	-	5	10	25	25	18.8	17.7	12.9	12.2	15.6	13.2	13.5
Barium (T)	ug/L	20	-	1000	2000	-	1000	750	28.9	28.6	28.6	27.3	27.6	27.7
Beryllium (T)	ug/L	0.01	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Bismuth (T)	ug/L	0.01	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Boron (T)	ug/L	8	-	1500	5000	-	1500	1120	16.2	17.1	16.7	18.3	18.1	17.6
Cadmium (T)	ug/L	0.007	-	0.16 | 0.162	7	-	0.16	0.12	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Cesium (T)	ug/L	-	-	-	-	-	-	-	0.0322	0.0323	0.0305	0.0327	0.0316	0.0318
Chromium (T)	ug/L	0.06	-	5	50	-	5	3.75	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Cobalt (T)	ug/L	0.05	-	1.02 | 1.03	-	-	1.02	0.765	0.0584	0.0563	0.0526	0.0472	0.0397	0.0521
Copper (T)	ug/L	1.13	-	2.38 | 2.43	2000	-	2.38	1.78	0.961	0.95	0.896	0.861	0.775	0.766
Gallium (T)	ug/L	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Iron (T)	ug/L	103	-	300	-	1060	1060	795	102	100	96.3	75.1	67	75.2
Lanthanum (T)	ug/L	-	-	-	-	-	-	-	0.017	0.017	0.018	0.015	0.016	0.016
Lead (T)	ug/L	0.08	-	-	5	-	5	3.75	0.061	0.055	0.045	0.055	0.035	0.038
Lithium (T)	ug/L	7.5	-	-	-	-	-	-	19.1	19.3	19.1	21.5	21.1	20.8
Manganese (T)	ug/L	8.6	-	-	120	-	120	90	11.2	10.3	10.4	8.51	8.71	9.04
Mercury (T)	ug/L	0.004	-	0.026	1	-	0.026	0.0195	0.00181	0.00122	0.00139	*<0.005*	*<0.005*	*<0.005*
Molybdenum (T)	ug/L	0.24	-	73	-	-	73	54.8	0.302	0.314	0.301	0.328	0.323	0.324
Nickel (T)	ug/L	1.4	-	96.3 | 97.7	-	-	96.3	72.2	0.856	0.848	0.887	0.86	0.846	0.827
Niobium (T)	ug/L	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Phosphorus (T)	ug/L	-	-	-	-	-	-	-	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*
Rhenium (T)	ug/L	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Rubidium (T)	ug/L	-	-	-	-	-	-	-	2.16	2.15	2.11	2.24	2.22	2.25
Selenium (T)	ug/L	0.04	-	1	50	-	1	0.75	0.053	*<0.04*	*<0.04*	0.044	*<0.04*	0.053
Silicon (T)	ug/L	-	-	-	-	-	-	-	745	695	690	896	875	869
Silver (T)	ug/L	0.005	-	0.25	-	-	0.25	0.188	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Strontium (T)	ug/L	155	-	2500	7000	-	2500	1880	302	300	301	335	323	320
Sulfur (T)	ug/L	-	-	-	-	-	-	-	3990	4060	4030	3660	3350	3500
Tantalum (T)	ug/L	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Tellurium (T)	ug/L	-	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Thallium (T)	ug/L	0.005	-	0.8	-	-	0.8	0.6	0.0061	0.0062	0.0054	*<0.005*	*<0.005*	*<0.005*
Thorium (T)	ug/L	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Tin (T)	ug/L	0.05	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Titanium (T)	ug/L	0.25	-	-	-	-	-	-	*<0.05*	0.052	0.066	*<0.05*	*<0.05*	0.053
Tungsten (T)	ug/L	-	-	-	-	-	-	-	0.036	0.033	0.035	0.043	0.04	0.039
Uranium (T)	ug/L	0.03	-	15	20	-	15	11.2	0.0699	0.0656	0.0676	0.0688	0.0659	0.0671
Vanadium (T)	ug/L	0.01	-	-	-	-	-	-	0.071	0.067	0.067	0.063	0.066	0.065
Yttrium (T)	ug/L	-	-	-	-	-	-	-	0.0063	0.0083	0.0068	0.008	0.0055	0.0076
Zinc (T)	ug/L	1.9	-	-	-	-	-	-	0.67	0.78	0.64	0.63	*<0.5*	*<0.5*
Zirconium (T)	ug/L	-	-	-	-	-	-	-	*<0.01*	0.01	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Dissolved Metals														
Aluminum (D)	ug/L	-	-	-	-	-	-	-	2.1	1.9	1.9	1.8	1.1	1.1
Antimony (D)	ug/L	-	-	-	-	-	-	-	0.034	0.033	0.045	0.037	0.033	0.035
Arsenic (D)	ug/L	-	-	-	-	-	-	-	14.3	10.7	9.99	13.8	11.3	11.8
Barium (D)	ug/L	-	-	-	-	-	-	-	27.1	28.1	27.8	26.8	26.1	25.9
Beryllium (D)	ug/L	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Bismuth (D)	ug/L	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Boron (D)	ug/L	-	-	-	-	-	-	-	16.3	16.8	16.8	16.5	16.4	16.6
Cadmium (D)	ug/L	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Cesium (D)	ug/L	-	-	-	-	-	-	-	0.0319	0.0308	0.0284	0.034	0.034	0.0332
Chromium (D)	ug/L	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Cobalt (D)	ug/L	-	-	-	-	-	-	-	0.0442	0.0394	0.0418	0.0339	0.0251	0.0235
Copper (D)	ug/L	-	-	-	-	-	-	-	0.931	0.845	0.849	0.884	0.744	0.794
Gallium (D)	ug/L	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Iron (D)	ug/L	-	-	-	-	-	-	-	27	32.3	27.8	38.1	31.3	35.2
Lanthanum (D)	ug/L	-	-	-	-	-	-	-	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Lead (D)	ug/L	-	-	9.44 | 10.3	-	-	9.44	7.08	0.014	0.013	0.011	0.025	0.015	0.019
Lithium (D)	ug/L	-	-	-	-	-	-	-	18.6	18.7	18.4	18.6	18.3	18.2
Manganese (D)	ug/L	-	-	370	-	-	370	278	0.748	1.18	1.27	0.888	0.58	0.859
Mercury (D)	ug/L	-	-	-	-	-	-	-	0.00129	0.00087	0.00088	*<0.005*	*<0.005*	*<0.005*
Molybdenum (D)	ug/L	-	-	-	-	-	-	-	0.316	0.327	0.289	0.371	0.332	0.322
Nickel (D)	ug/L	-	-	-	-	-	-	-	0.859	0.841	0.85	0.799	0.72	0.767
Niobium (D)	ug/L	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Phosphorus (D)	ug/L	-	-	-	-	-	-	-	*<50*	*<50*	*<50*	*<50*	*<50*	*<50*
Rhenium (D)	ug/L	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Rubidium (D)	ug/L	-	-	-	-	-	-	-	2.09	2.09	2.08	2.27	2.21	2.26
Selenium (D)	ug/L	-	-	-	-	-	-	-	*<0.04*	0.048	0.049	*<0.04*	*<0.04*	*<0.04*
Silicon (D)	ug/L	-	-	-	-	-	-	-	720	691	708	897	914	907
Silver (D)	ug/L	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Strontium (D)	ug/L	-	-	2500	-	-	2500	1880	307	293	295	343	333	334
Sulfur (D)	ug/L	-	-	-	-	-	-	-	3860	3830	3780	3570	3640	3660
Tantalum (D)	ug/L	-	-	-	-	-	-	-	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Tellurium (D)	ug/L	-	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Thallium (D)	ug/L	-	-	-	-	-	-	-	0.0063	0.006	0.0056	0.0051	0.0054	0.0053
Thorium (D)	ug/L	-	-	-	-	-	-	-	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*

Table D3-3. Lake B7 water chemistry results in 2022

Parameter	Units	DL (min | max)	Normal Range	FWAL (min | max)	HH DW	SSWQO	Benchmark (min | max)	Action Level (min | max)	July 7/24/2022			August 8/16/2022		
									B7-01	B7-02	B7-03	B7-01	B7-02	B7-03
Tin (D)	ug/L	-	-	-	-	-	-	-	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*
Titanium (D)	ug/L	-	-	-	-	-	-	-	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Tungsten (D)	ug/L	-	-	-	-	-	-	-	0.042	0.033	0.036	0.04	0.038	0.039
Uranium (D)	ug/L	-	-	-	-	-	-	-	0.072	0.0667	0.0698	0.0694	0.0717	0.0696
Vanadium (D)	ug/L	-	-	-	-	-	-	-	0.059	0.054	0.054	0.061	0.064	0.061
Yttrium (D)	ug/L	-	-	-	-	-	-	-	0.0072	*<0.005*	0.0064	*<0.005*	*<0.005*	*<0.005*
Zinc (D)	ug/L	2.2	-	22.6 | 28	-	-	22.6	17	*<0.5*	0.56	*<0.5*	*<0.5*	*<0.5*	*<0.5*
Zirconium (D)	ug/L	-	-	-	-	-	-	-	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Other														
Cyanide (free)	mg/L	-	-	-	-	-	-	-	*<0.001*	*<0.001*	*<0.001*	0.0017	*<0.001*	0.0011
Cyanide (Total)	mg/L	0.001	-	0.005	0.2	-	0.005	0.00375	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Cyanide (WAD)	mg/L	-	-	-	-	-	-	-	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Ion Ratio (+/-)	%	-	-	-	-	-	-	-	97.1	99.5	97.9	97.9	97.6	97.5

Notes

DL = 2021 detection limits

FWAL = freshwater aquatic life guideline

HH DW = Health Canada drinking water quality guideline

SSWQO = site-specific water quality objective

APPENDIX E
PHYTOPLANKTON – SUPPORTING INFORMATION

Appendix E1
Phytoplankton Summary Statistics

APPENDIX E1 – TABLES

Table E1-1. Phytoplankton richness, biomass, and density by major taxa group for individual samples, 2013 to 2022. 1

Table E1-2. Phytoplankton biomass (mg/m^3) for the dominant taxa in 2022. 8

Table E1-1. Phytoplankton richness, biomass, and density by major taxa group for individual samples, 2013 to 2022.

					Richness							Biomass							Density						
Year	Area	Sample ID	Year - Month	Phase	Chlorophyte	Chrysophyte	Diatoms	Cryptophyte	Dinoflagellates	Cyanophyte	Euglenophyte	Chlorophyte	Chrysophyte	Diatoms	Cryptophyte	Dinoflagellates	Cyanophyte	Euglenophyte	Chlorophyte	Chrysophyte	Diatoms	Cryptophyte	Dinoflagellates	Cyanophyte	Euglenophyte
2013	MEL-01	DP01-P-1D	2013-8	Baseline	9	14	7	4	2	2	0	6.83	78.25	16.36	31.15	27.47	4.73	0.00	256040	1365760	121576	310328	2000	7800	0
2013	MEL-01	DP01-P-1S	2013-8	Baseline	9	11	6	5	2	4	0	6.57	78.58	16.01	21.44	15.05	7.94	0.00	404104	1524208	103608	199768	1200	153864	0
2013	MEL-01	DP01-P-2D	2013-8	Baseline	5	13	5	5	3	3	0	7.71	74.36	13.28	25.00	23.04	2.47	0.00	316896	834544	133544	266224	2200	24152	0
2013	MEL-01	DP01-P-2S	2013-8	Baseline	11	12	5	5	3	3	0	5.30	72.89	18.11	38.60	9.53	4.19	0.00	289360	1415248	88640	387352	800	89408	0
2013	MEL-01	DP01-P-3S	2013-8	Baseline	11	12	5	5	2	2	0	5.47	104.99	16.01	22.94	5.02	2.92	0.00	302928	1654920	153680	249456	400	17768	0
2013	MEL-01	DP01-P-4S	2013-8	Baseline	7	13	6	3	2	2	0	7.65	70.69	21.56	28.24	34.75	2.31	0.00	346032	1022728	125776	252456	2200	3600	0
2013	MEL-01	DP01-P-5S	2013-8	Baseline	7	12	5	5	2	3	0	4.26	85.77	15.39	27.47	13.99	2.30	0.00	316896	1459352	96624	327880	1200	10984	0
2015	MEL-01	MEL-0101	2015-7	Pre-construction	2	17	7	5	5	0	0	1.69	479.84	35.95	20.93	95.64	0.00	0.00	36120	4336168	455272	101792	7000	0	0
2015	MEL-01	MEL-0102	2015-7	Pre-construction	6	18	8	5	4	1	0	2.90	486.05	48.58	22.23	95.72	1.11	0.00	36320	4615944	643872	97808	6600	28736	0
2015	MEL-01	MEL-0103	2015-7	Pre-construction	6	18	9	5	5	2	0	17.43	503.30	60.32	17.59	63.14	1.31	0.00	61072	4599776	702512	92608	5400	28936	0
2015	MEL-01	MEL-0104	2015-7	Pre-construction	6	17	8	5	4	1	0	3.08	440.67	51.77	30.56	105.27	0.22	0.00	57872	3795568	579984	127544	8600	200	0
2015	MEL-01	MEL-0105	2015-7	Pre-construction	3	19	9	5	5	0	1	0.75	411.28	39.02	18.92	77.79	0.00	2.74	21752	3586632	431536	81640	6800	0	400
2015	MEL-01	MEL-0101	2015-8	Pre-construction	12	14	6	6	4	0	0	9.30	182.30	18.60	13.92	65.44	0.00	0.00	166832	1890792	271624	68056	5800	0	0
2015	MEL-01	MEL-0102	2015-8	Pre-construction	13	18	9	5	2	1	1	31.80	239.20	30.97	19.62	27.41	1.61	1.69	331264	2425608	345480	86424	5600	28736	200
2015	MEL-01	MEL-0103	2015-8	Pre-construction	10	20	9	5	3	1	0	16.86	206.38	78.63	19.62	41.13	1.11	0.00	216720	2088560	317528	126128	6600	28736	0
2015	MEL-01	MEL-0104	2015-8	Pre-construction	8	21	8	5	3	0	0	34.21	240.80	22.63	18.44	33.97	0.00	0.00	287960	2337200	175864	85824	5000	0	0
2015	MEL-01	MEL-0105	2015-8	Pre-construction	10	18	8	5	4	0	0	24.97	184.63	17.33	16.34	83.53	0.00	0.00	152864	1726160	191600	64672	9200	0	0
2015	MEL-01	MEL-0101	2015-9	Pre-construction	9	15	10	6	3	0	0	8.02	132.53	41.28	44.24	22.81	0.00	0.00	302328	1885808	298160	305728	3600	0	0
2015	MEL-01	MEL-0102	2015-9	Pre-construction	9	17	8	5	4	1	1	8.37	155.93	43.00	35.89	39.28	0.47	1.87	181800	2065408	281344	194184	3200	200	200
2015	MEL-01	MEL-0104	2015-9	Pre-construction	10	14	8	5	4	0	0	12.58	182.25	33.29	29.32	43.81	0.00	0.00	139896	2509616	307912	184800	4400	0	0
2015	MEL-01	MEL-0105	2015-9	Pre-construction	9	12	7	5	4	1	0	8.56	194.41	35.70	45.10	59.26	0.21	0.00	111960	2236824	301216	272208	12384	400	0
2015	MEL-02	MEL-0201	2015-7	Pre-construction	6	19	9	6	5	1	0	8.49	426.11	55.82	17.73	76.39	0.28	0.00	58272	3540544	557232	59488	12184	400	0
2015	MEL-02	MEL-0202	2015-7	Pre-construction	5	21	9	5	5	0	1	5.81	470.98	55.85	13.62	64.93	0.00	1.52	37320	4101696	695512	76840	19168	0	200
2015	MEL-02	MEL-0203	2015-7	Pre-construction	6	20	9	5	4	1	0	11.10	534.01	54.59	18.28	56.42	0.15	0.00	37720	4031456	708712	78640	6200	200	0
2015	MEL-02	MEL-0204	2015-7	Pre-construction	4	20	7	6	5	0	0	4.15	440.62	30.65	29.54	42.21	0.00	0.00	29336	3546928	494344	145896	3400	0	0
2015	MEL-02	MEL-0205	2015-7	Pre-construction	6	20	8	6	5	0	0	3.24	512.29	39.52	21.40	34.98	0.00	0.00	57672	4225424	517928	81640	3200	0	0
2015	MEL-02	MEL-0201	2015-8	Pre-construction	11	16	9	4	3	0	0	19.32	116.86	14.92	16.53	33.08	0.00	0.00	155264	1236048	125944	76840	9784	0	0
2015	MEL-02	MEL-0202	2015-8	Pre-construction	9	18	8	5	4	1	0	15.05	151.86	26.22	40.10	28.49	0.15	0.00	232888	1639152	156880	236688	9584	200	0
2015	MEL-02	MEL-0203	2015-8	Pre-construction	9	19	9	4	3	0	0	18.16	149.61	18.38	42.49	22.60	0.00	0.00	202552	1638952	194600	220336	5400	0	0
2015	MEL-02	MEL-0204	2015-8	Pre-construction	13	16	7	4	3	1	0	14.76	101.81	14.99	35.17	10.72	0.40	0.00	168432	1244432	69488	250456	1800	400	0
2015	MEL-02	MEL-0205	2015-8	Pre-construction	13	15	8	5	4	2	0	22.01	110.66	27.82	30.27	14.93	2.06	0.00	221720	1308488	217568	184400	2600	1600	0
2015	MEL-02	MEL-0201	2015-9	Pre-construction	8	17	7	5	4	1	1	26.97	150.92	16.57	32.13	40.40	3.18	1.29	159648	1784032	132344	190584	10584	200	200
2015	MEL-02	MEL-0202	2015-9	Pre-construction	9	17	7	4	3	2	0	17.87	162.93	19.56	18.68	13.89	0.62	0.00	137296	1742728	98024	118544	8984	7384	0
2015	MEL-02	MEL-0203	2015-9	Pre-construction	8	15	7	3	3	0	0	21.34	112.19	12.74	18.01	18.17	0.00	0.00	188584	1445384	148712	109560	22752	0	0
2015	MEL-02	MEL-0204	2015-9	Pre-construction	7	18	5	4	3	0	0	20.29	133.77	19.37	19.21	15.27	0.00	0.00	152864	1496872	159696	111360	16168	0	0
2015	MEL-02	MEL-0205	2015-9	Pre-construction	10	17	8	4	3	1	0	34.37	145.63	32.07	30.92	16.85	0.66	0.00	246656	1591664	130776	176816	1800	600	0
2016	MEL-01	MEL-0101	2016-7	Pre-construction	7	16	8	5	4	0	0	4.63	243.97	69.97	14.70	31.09	0.00	0.00	58672	2444760	753800	37536	5800	0	0
2016	MEL-01	MEL-0102	2016-7	Pre-construction	7	18	7	6	4	0	0	18.53	388.14	72.89	15.43	55.96	0.00	0.00	187584	3718944	848592	98792	8400	0	0
2016	MEL-01	MEL-0103	2016-7	Pre-construction	7	19	7	6	4	0	1	9.13	310.80	83.75	12.29	75.59	0.00	1.85	158648	3154792	993656	96792	10400	0	200
2016	MEL-01	MEL-0104	2016-7	Pre-construction	5	19	10	5	5	0	0	8.55	336.85	100.86	18.12	46.50	0.00	0.00	79624	3354544	965952	59688	5800	0	0
2016	MEL-01	MEL-0105	2016-7	Pre-construction	6	21	11	6	5	1	0	8.55	331.28	109.23	32.37	47.48	0.30	0.00	79824	3387880	1300832	129744	5000	200	0
2016	MEL-01	MEL-0101	2016-8	Pre-construction	9	19	6	5	2	1	0	22.59	228.83	14.54	24.20	24.63	0.15	0.00	246856	2122280	95824	150880	5800	200	0
2016	MEL-01	MEL-0102	2016-8	Pre-construction	10	19	6	5	3	1	0	17.91	231.04	12.61	24.96	28.55	13.00	0.00	245856	2746688	140112	163048	11384	114944	0

Table E1-1. Phytoplankton richness, biomass, and density by major taxa group for individual samples, 2013 to 2022.

					Richness							Biomass							Density						
Year	Area	Sample ID	Year - Month	Phase	Chlorophyte	Chrysophyte	Diatoms	Cryptophyte	Dinoflagellates	Cyanophyte	Euglenophyte	Chlorophyte	Chrysophyte	Diatoms	Cryptophyte	Dinoflagellates	Cyanophyte	Euglenophyte	Chlorophyte	Chrysophyte	Diatoms	Cryptophyte	Dinoflagellates	Cyanophyte	Euglenophyte
2016	MEL-01	MEL-0103	2016-8	Pre-construction	10	18	4	5	3	2	0	25.78	227.14	5.81	27.53	51.94	0.65	0.00	325080	1987484	93208	150480	12984	3000	0
2016	MEL-01	MEL-0104	2016-8	Pre-construction	11	18	7	4	3	1	0	23.71	300.98	27.68	35.79	57.89	0.20	0.00	239472	2452344	136344	201568	15184	400	0
2016	MEL-01	MEL-0105	2016-8	Pre-construction	11	21	6	4	3	0	0	16.32	226.88	12.75	18.12	50.33	0.00	0.00	231088	2430592	130944	85624	7400	0	0
2016	MEL-01	MEL-0101	2016-9	Pre-construction	8	18	7	4	4	0	1	4.98	393.42	16.23	24.84	72.45	0.00	0.41	80424	2372120	111640	138312	8400	0	200
2016	MEL-01	MEL-0102	2016-9	Pre-construction	13	18	6	3	5	0	0	7.61	404.82	15.86	33.69	40.27	0.00	0.00	97792	2458128	161712	173432	5400	0	0
2016	MEL-01	MEL-0103	2016-9	Pre-construction	10	16	7	4	4	1	1	6.74	367.45	19.24	22.36	39.03	0.40	0.41	73840	1814168	223016	155264	4800	400	200
2016	MEL-01	MEL-0104	2016-9	Pre-construction	11	16	7	4	5	1	0	11.26	388.71	18.68	30.81	70.73	0.51	0.00	195768	2221656	224784	159464	23568	200	0
2016	MEL-01	MEL-0105	2016-9	Pre-construction	14	16	7	5	5	0	0	12.30	350.18	26.31	26.68	106.33	0.00	0.00	277392	2343784	222184	109376	34552	0	0
2016	MEL-02	MEL-0201	2016-7	Pre-construction	9	18	6	6	3	1	0	9.25	357.42	48.62	27.33	19.67	2.46	0.00	101976	3529960	485376	116360	5200	12600	0
2016	MEL-02	MEL-0202	2016-7	Pre-construction	4	11	6	2	1	0	0	1.41	48.96	10.78	4.03	1.26	0.00	0.00	32736	668112	58688	72040	400	0	0
2016	MEL-02	MEL-0203	2016-7	Pre-construction	9	20	6	5	4	1	0	12.78	289.26	32.41	20.37	26.70	12.36	0.00	144680	2948656	461392	112360	2600	114944	0
2016	MEL-02	MEL-0204	2016-7	Pre-construction	9	18	8	5	4	1	0	8.66	347.18	47.93	23.12	24.68	1.26	0.00	73840	3064000	364416	92808	4400	7184	0
2016	MEL-02	MEL-0205	2016-7	Pre-construction	9	21	8	6	2	2	0	6.22	397.95	39.18	27.50	18.69	5.45	0.00	101376	3250184	340664	107976	2800	43704	0
2016	MEL-02	MEL-0201	2016-8	Pre-construction	8	17	9	5	3	0	0	16.05	102.29	30.74	28.90	14.03	0.00	0.00	238472	1530792	81456	172232	9584	0	0
2016	MEL-02	MEL-0202	2016-8	Pre-construction	8	16	8	5	3	2	0	11.22	126.98	54.19	31.24	19.34	0.29	0.00	152464	1537976	101208	185400	4600	7384	0
2016	MEL-02	MEL-0203	2016-8	Pre-construction	11	20	6	5	3	2	0	11.26	172.62	21.86	31.54	65.97	1.03	0.00	174016	1855672	41136	181816	18800	14968	0
2016	MEL-02	MEL-0204	2016-8	Pre-construction	10	19	7	5	2	0	0	16.83	120.75	23.76	47.89	27.99	0.00	0.00	239872	1596048	69472	288976	6000	0	0
2016	MEL-02	MEL-0205	2016-8	Pre-construction	10	16	7	5	3	0	0	12.56	170.76	29.07	42.26	29.98	0.00	0.00	187784	1847688	125344	235904	18368	0	0
2016	MEL-02	MEL-0201	2016-9	Pre-construction	7	18	6	4	5	2	0	6.07	181.99	36.15	27.39	41.10	2.77	0.00	58472	1753312	92472	134512	6200	400	0
2016	MEL-02	MEL-0202	2016-9	Pre-construction	7	20	7	4	3	2	0	10.41	194.52	26.10	27.64	25.47	0.62	0.00	88808	1771264	149912	136712	3400	400	0
2016	MEL-02	MEL-0203	2016-9	Pre-construction	4	16	5	4	5	1	0	8.74	196.61	28.78	21.50	45.53	5.02	0.00	86808	1714992	141360	112760	7400	129312	0
2016	MEL-02	MEL-0204	2016-9	Pre-construction	8	16	6	5	5	0	0	8.45	245.31	18.62	28.59	32.53	0.00	0.00	108760	1874240	112592	164048	3600	0	0
2016	MEL-02	MEL-0205	2016-9	Pre-construction	7	17	6	4	4	0	0	5.48	177.19	22.18	28.63	34.17	0.00	0.00	65656	1685056	54920	170432	4600	0	0
2016	MEL-03	MEL-0301	2016-7	Pre-construction	7	18	9	5	3	1	0	2.88	206.97	10.11	18.54	32.62	5.54	0.00	101976	1639768	87824	105376	10784	200	0
2016	MEL-03	MEL-0302	2016-7	Pre-construction	8	15	8	4	3	1	0	11.45	210.97	33.95	17.80	27.18	0.73	0.00	296144	1740544	102408	118544	3200	14368	0
2016	MEL-03	MEL-0303	2016-7	Pre-construction	8	16	8	4	3	2	0	4.46	279.52	21.04	27.57	25.94	1.40	0.00	101176	2547152	112176	197168	10184	14768	0
2016	MEL-03	MEL-0304	2016-7	Pre-construction	6	18	6	4	4	0	0	4.66	282.09	10.53	16.17	24.43	0.00	0.00	158248	2263576	99992	96792	4000	0	0
2016	MEL-03	MEL-0305	2016-7	Pre-construction	10	18	7	5	4	1	0	7.06	214.87	23.17	23.81	46.50	2.12	0.00	133912	1826152	74256	162648	4600	35920	0
2016	MEL-03	MEL-0301	2016-8	Pre-construction	7	17	5	4	3	0	0	7.68	160.11	13.41	16.61	9.78	0.00	0.00	100976	1632168	15384	110160	1000	0	0
2016	MEL-03	MEL-0302	2016-8	Pre-construction	8	18	6	4	2	1	0	10.56	165.78	15.85	16.37	9.25	0.37	0.00	191184	1575696	86024	103776	2000	7184	0
2016	MEL-03	MEL-0303	2016-8	Pre-construction	8	18	7	4	2	0	0	12.92	175.55	8.76	39.21	12.49	0.00	0.00	213736	1625584	105176	296544	2600	0	0
2016	MEL-03	MEL-0304	2016-8	Pre-construction	11	18	6	4	3	1	0	14.41	163.31	5.89	24.87	27.75	0.28	0.00	303128	1525008	53288	191184	4600	7184	0
2016	MEL-03	MEL-0305	2016-8	Pre-construction	10	19	4	4	3	0	0	12.95	157.28	7.62	32.06	31.58	0.00	0.00	181000	1798800	96592	187600	20968	0	0
2016	MEL-03	MEL-0301	2016-9	Pre-construction	11	17	5	4	4	0	0	11.43	183.44	36.71	30.55	24.55	0.00	0.00	137696	1699424	328496	217920	16568	0	0
2016	MEL-03	MEL-0302	2016-9	Pre-construction	6	19	9	2	3	0	0	6.55	184.14	26.02	14.65	10.39	0.00	0.00	66056	1850488	81272	88608	2400	0	0
2016	MEL-03	MEL-0303	2016-9	Pre-construction	9	18	7	3	4	0	0	6.32	130.71	14.98	16.28	12.07	0.00	0.00	123528	1403680	68672	109960	1800	0	0
2016	MEL-03	MEL-0304	2016-9	Pre-construction	8	17	7	3	4	0	0	3.07	256.79	18.40	11.81	15.43	0.00	0.00	43904	2466512	189632	87608	2000	0	0
2016	MEL-03	MEL-0306	2016-9	Pre-construction	5	20	8	2	3	0	0	1.82	154.57	21.56	21.76	17.61	0.00	0.00	22352	1618400	144928	139296	3200	0	0
2016	MEL-04	MEL-0401	2016-8	Pre-construction	10	17	4	3	3	2	0	8.74	101.14	6.46	28.44	13.57	0.88	0.00	216920	949488	32336	181200	2400	14568	0
2016	MEL-04	MEL-0402	2016-8	Pre-construction	13	17	5	4	2	1	0	13.68	124.26	11.86	31.99	10.32	0.25	0.00	288760	1438800	91608	213736	8184	7184	0
2016	MEL-04	MEL-0403	2016-8	Pre-construction	7	11	5	2	0	0	0	4.61	27.20	9.40	1.26	0.00	0.00	0.00	188143.3	634951.9	96052.5	24922.7	0	0	0
2016	MEL-04	MEL-0404	2016-8	Pre-construction	9	19	6	3	2	1	0	11.60	145.49	11.72	30.95	3.60	0.25	0.00	208736	1346208	71856	212736	400	7184	0
2016	MEL-04	MEL-0405	2016-8	Pre-construction	10	18	6	3	2	1	0	7.72	117.14	19.11	27.69	8.30	0.75	0.00	253640	1366360	62072	203352	7984	21552	0

Table E1-1. Phytoplankton richness, biomass, and density by major taxa group for individual samples, 2013 to 2022.

					Richness							Biomass							Density						
Year	Area	Sample ID	Year - Month	Phase	Chlorophyte	Chrysophyte	Diatoms	Cryptophyte	Dinoflagellates	Cyanophyte	Euglenophyte	Chlorophyte	Chrysophyte	Diatoms	Cryptophyte	Dinoflagellates	Cyanophyte	Euglenophyte	Chlorophyte	Chrysophyte	Diatoms	Cryptophyte	Dinoflagellates	Cyanophyte	Euglenophyte
2016	MEL-05	MEL-0501	2016-8	Pre-construction	11	18	5	4	4	0	0	11.64	195.31	25.00	82.16	37.87	0.00	0.00	153864	2158000	100992	498928	5800	0	0
2016	MEL-05	MEL-0502	2016-8	Pre-construction	8	13	5	3	3	1	0	6.34	102.93	9.54	41.28	29.49	0.25	0.00	129912	1350792	56088	260440	10584	7184	0
2016	MEL-05	MEL-0503	2016-8	Pre-construction	6	18	6	4	2	1	0	7.08	137.17	6.82	35.83	3.35	1.83	0.00	165932	1495672	48304	248856	1800	35920	0
2016	MEL-05	MEL-0504	2016-8	Pre-construction	9	18	5	5	2	0	0	10.27	114.56	17.65	34.54	9.12	0.00	0.00	123928	1243432	41720	192384	3000	0	0
2016	MEL-05	MEL-0505	2016-8	Pre-construction	9	18	6	4	2	1	0	20.42	118.42	14.53	44.42	15.33	1.08	0.00	266608	1165608	62072	281992	3200	21552	0
2017	MEL-01	MEL-0101	2017-7	Construction	9	19	6	5	5	2	0	11.55	439.00	26.31	23.25	99.58	0.80	0.00	72840	4195272	283824	165648	63936	28936	0
2017	MEL-01	MEL-0102	2017-7	Construction	7	19	6	5	5	0	0	20.83	319.40	38.69	22.68	58.49	0.00	0.00	158848	3415016	401016	206952	7400	0	0
2017	MEL-01	MEL-0103	2017-7	Construction	8	19	9	5	3	0	0	10.96	368.70	32.31	22.94	51.52	0.00	0.00	80624	3560896	293224	220720	23368	0	0
2017	MEL-01	MEL-0104	2017-7	Construction	6	17	9	6	5	1	0	21.52	399.65	35.56	21.84	55.04	0.10	0.00	187384	3730712	315792	144896	8800	200	0
2017	MEL-01	MEL-0105	2017-7	Construction	4	18	8	5	5	2	0	16.00	358.71	32.37	14.26	57.23	0.54	0.00	144080	3662856	352080	119344	7200	600	0
2017	MEL-01	MEL-0101	2017-8	Construction	10	19	7	4	3	1	0	23.84	164.28	20.51	29.55	55.07	0.11	0.00	259824	1905560	108824	196768	8200	200	0
2017	MEL-01	MEL-0102	2017-8	Construction	10	17	6	5	2	1	0	22.39	171.09	8.67	36.56	19.23	0.77	0.00	210936	2027688	55536	239272	25552	1400	0
2017	MEL-01	MEL-0103	2017-8	Construction	9	16	8	5	4	1	0	9.49	199.59	28.84	44.37	60.04	0.11	0.00	131512	1913344	105656	270608	9200	200	0
2017	MEL-01	MEL-0104	2017-8	Construction	12	19	6	5	4	1	0	9.72	195.38	9.21	52.56	82.34	0.11	0.00	138096	2108912	85256	348832	19984	200	0
2017	MEL-01	MEL-0105	2017-8	Construction	10	16	7	5	4	1	0	31.01	212.00	15.64	27.14	50.31	0.66	0.00	339848	2357552	137560	162248	15584	1200	0
2017	MEL-01	MEL-0101	2017-9	Construction	7	12	9	3	4	0	1	7.82	102.97	46.24	23.15	16.63	0.00	1.19	130712	1315672	237824	173016	8784	0	200
2017	MEL-01	MEL-0102	2017-9	Construction	7	15	9	4	5	0	0	13.94	105.12	28.09	12.17	30.59	0.00	0.00	223104	1466936	228624	80424	5200	0	0
2017	MEL-01	MEL-0103	2017-9	Construction	5	12	9	4	4	1	0	7.83	75.62	34.91	11.85	38.80	0.15	0.00	151664	1279552	197520	86608	5400	200	0
2017	MEL-01	MEL-0104	2017-9	Construction	7	13	8	3	5	0	0	9.48	111.38	32.08	15.94	34.40	0.00	0.00	245056	1509240	248656	115544	10184	0	0
2017	MEL-01	MEL-0105	2017-9	Construction	10	10	8	4	2	0	0	21.43	64.15	28.65	7.46	35.87	0.00	0.00	332664	798024	183936	44704	11784	0	0
2017	MEL-02	MEL-0201	2017-7	Construction	9	18	8	4	3	0	0	11.33	196.20	8.34	18.25	27.38	0.00	0.00	66656	1821352	150680	196368	5400	0	0
2017	MEL-02	MEL-0202	2017-7	Construction	7	20	8	5	2	0	0	14.57	254.37	5.47	11.87	9.92	0.00	0.00	73640	2505232	56688	110960	9384	0	0
2017	MEL-02	MEL-0203	2017-7	Construction	7	17	7	5	4	1	0	3.30	332.93	7.56	14.73	41.16	5.42	0.00	137496	3015696	71656	160448	8000	21552	0
2017	MEL-02	MEL-0204	2017-7	Construction	7	21	8	5	2	0	0	9.19	243.76	8.97	10.79	15.76	0.00	0.00	66456	2503032	65672	109960	3400	0	0
2017	MEL-02	MEL-0205	2017-7	Construction	9	18	9	4	2	0	0	12.80	221.88	13.28	9.35	15.03	0.00	0.00	81624	2237224	125544	81024	2400	0	0
2017	MEL-02	MEL-0201	2017-8	Construction	12	18	7	5	2	1	0	14.83	120.70	19.40	32.52	21.34	0.20	0.00	274992	1465736	156664	197568	16568	200	0
2017	MEL-02	MEL-0202	2017-8	Construction	13	15	8	4	2	1	0	16.20	115.81	21.97	35.57	18.06	0.30	0.00	324280	1523408	88624	224904	17568	600	0
2017	MEL-02	MEL-0203	2017-8	Construction	12	17	4	5	2	1	0	24.49	127.33	9.69	33.91	13.30	10.59	0.00	389536	1466536	27352	217920	2400	28736	0
2017	MEL-02	MEL-0204	2017-8	Construction	11	18	7	4	3	1	0	58.55	146.96	17.50	40.39	28.22	0.10	0.00	353816	1553544	101192	254640	11784	200	0
2017	MEL-02	MEL-0205	2017-8	Construction	12	17	7	4	2	0	0	13.65	100.67	7.99	36.51	21.91	0.00	0.00	153064	1394496	61872	219520	5200	0	0
2017	MEL-02	MEL-0201	2017-9	Construction	7	13	8	2	3	1	0	8.74	71.74	27.12	8.78	17.38	0.05	0.00	80624	776672	129776	51688	3600	200	0
2017	MEL-02	MEL-0202	2017-9	Construction	3	12	7	2	2	0	0	12.05	76.49	16.99	5.02	9.39	0.00	0.00	64856	784856	205784	29536	2600	0	0
2017	MEL-02	MEL-0203	2017-9	Construction	7	16	8	2	3	1	0	11.96	87.06	25.50	9.56	22.27	0.14	0.00	81824	922952	134760	52288	18368	200	0
2017	MEL-02	MEL-0204	2017-9	Construction	7	14	8	3	2	1	0	7.45	66.61	24.75	5.79	12.60	0.02	0.00	51488	763704	174696	37120	4600	200	0
2017	MEL-02	MEL-0205	2017-9	Construction	7	16	8	3	3	0	0	14.85	91.14	24.08	11.19	15.32	0.00	0.00	152464	979624	125424	66256	3400	0	0
2017	MEL-03	MEL-0301	2017-7	Construction	6	19	7	5	2	0	0	6.08	184.87	7.80	10.77	6.69	0.00	0.00	36720	1934296	96192	88608	1400	0	0
2017	MEL-03	MEL-0302	2017-7	Construction	7	14	8	4	4	0	0	4.91	158.46	9.92	15.62	20.66	0.00	0.00	50888	1783632	95008	152464	3800	0	0
2017	MEL-03	MEL-0303	2017-7	Construction	6	16	7	5	3	2	0	3.79	200.89	8.18	16.26	15.01	0.34	0.00	36520	2207288	132112	139296	2600	600	0
2017	MEL-03	MEL-0304	2017-7	Construction	7	17	6	5	4	0	0	5.18	183.52	4.65	8.00	22.23	0.00	0.00	52088	2307664	67656	60072	11184	0	0
2017	MEL-03	MEL-0305	2017-7	Construction	4	15	6	5	2	1	0	1.84	208.01	8.12	10.65	8.89	0.04	0.00	22352	2157800	145480	109360	3000	200	0
2017	MEL-03	MEL-0301	2017-8	Construction	9	17	5	5	2	0	0	5.29	137.19	4.18	28.49	27.50	0.00	0.00	137696	1310288	26352	189184	18768	0	0
2017	MEL-03	MEL-0302	2017-8	Construction	13	17	6	4	2	0	0	9.19	120.25	6.47	36.24	30.31	0.00	0.00	131312	1396296	54088	252640	4600	0	0
2017	MEL-03	MEL-0303	2017-8	Construction	8	18	6	4	2	0	1	8.16	122.46	5.28	22.85	20.62	0.00	2.08	166032	1480504	66656	146080	3600	0	200

Table E1-1. Phytoplankton richness, biomass, and density by major taxa group for individual samples, 2013 to 2022.

					Richness							Biomass							Density						
Year	Area	Sample ID	Year - Month	Phase	Chlorophyte	Chrysophyte	Diatoms	Cryptophyte	Dinoflagellates	Cyanophyte	Euglenophyte	Chlorophyte	Chrysophyte	Diatoms	Cryptophyte	Dinoflagellates	Cyanophyte	Euglenophyte	Chlorophyte	Chrysophyte	Diatoms	Cryptophyte	Dinoflagellates	Cyanophyte	Euglenophyte
2017	MEL-03	MEL-0304	2017-8	Construction	10	20	6	4	2	1	0	5.25	150.69	7.26	19.66	12.03	0.10	0.00	102176	1684056	54688	124128	10984	200	0
2017	MEL-03	MEL-0305	2017-8	Construction	7	18	8	4	3	1	0	13.10	149.83	13.45	34.05	36.89	0.93	0.00	109360	1950464	67072	217920	5400	200	0
2017	MEL-03	MEL-0301	2017-9	Construction	6	14	8	2	2	0	0	7.01	109.21	19.73	19.65	11.72	0.00	0.00	86808	1243632	99608	137096	2200	0	0
2017	MEL-03	MEL-0302	2017-9	Construction	3	12	8	3	2	0	0	2.77	72.03	10.82	5.63	4.05	0.00	0.00	36120	970240	70456	80024	1000	0	0
2017	MEL-03	MEL-0303	2017-9	Construction	6	13	7	2	2	1	0	8.39	98.21	10.14	6.74	12.99	0.15	0.00	73840	1100352	50504	43704	4600	200	0
2017	MEL-03	MEL-0304	2017-9	Construction	6	12	7	2	2	0	0	8.85	103.97	11.59	5.28	20.46	0.00	0.00	95192	814192	84824	29736	3200	0	0
2017	MEL-03	MEL-0305	2017-9	Construction	5	12	8	3	3	0	0	7.61	95.04	13.36	10.39	19.73	0.00	0.00	87208	1043680	114760	66056	3200	0	0
2017	MEL-04	MEL-0401	2017-8	Construction	12	17	8	3	2	0	0	7.31	102.45	8.13	48.87	5.88	0.00	0.00	146280	1351392	47504	318696	1000	0	0
2017	MEL-04	MEL-0402	2017-8	Construction	9	17	6	3	2	1	0	8.17	119.35	11.36	37.34	6.39	19.26	0.00	131112	1523408	53888	231688	1000	57472	0
2017	MEL-04	MEL-0403	2017-8	Construction	9	16	6	5	3	0	0	5.22	110.86	10.43	55.08	10.34	0.00	0.00	116344	1523608	76040	368984	2000	0	0
2017	MEL-04	MEL-0404	2017-8	Construction	11	16	6	3	2	1	0	10.48	129.98	10.22	32.06	12.06	38.52	0.00	231688	1667888	69456	210136	7784	114944	0
2017	MEL-04	MEL-0405	2017-8	Construction	8	18	5	4	2	1	0	8.63	141.68	3.95	35.43	14.13	0.43	0.00	181000	1761680	38720	231888	2200	200	0
2017	MEL-05	MEL-0501	2017-8	Construction	13	18	6	5	2	1	0	9.49	155.79	13.01	57.09	19.35	0.20	0.00	196368	2012720	119944	364200	10384	400	0
2017	MEL-05	MEL-0502	2017-8	Construction	12	20	5	5	2	0	0	13.85	155.89	14.78	28.16	13.11	0.00	0.00	319096	1776048	126128	183600	2200	0	0
2017	MEL-05	MEL-0503	2017-8	Construction	13	19	7	5	2	0	0	10.75	127.80	9.72	37.79	10.70	0.00	0.00	102776	1444584	46104	240872	3200	0	0
2017	MEL-05	MEL-0504	2017-8	Construction	11	17	7	5	2	0	0	8.23	124.32	10.31	35.04	19.01	0.00	0.00	159448	1660304	48904	225904	9984	0	0
2017	MEL-05	MEL-0505	2017-8	Construction	7	18	5	4	2	0	0	4.34	129.90	7.34	51.93	10.13	0.00	0.00	108760	1329840	67456	321496	1800	0	0
2018	MEL-01	MEL-0101	2018-8	Construction	14	14	9	5	2	2	0	28.44	165.45	60.69	42.39	40.64	1.49	0.00	683680	2321032	448784	179032	4800	29336	0
2018	MEL-01	MEL-0106	2018-8	Construction	10	16	8	5	3	1	0	23.50	179.60	55.59	58.81	38.28	0.60	0.00	690864	2450744	343792	267640	4400	800	0
2018	MEL-01	MEL-0107	2018-8	Construction	16	16	8	5	4	2	0	25.13	138.71	60.90	46.35	57.97	7.29	0.00	698848	2227440	367712	147312	5800	1000	0
2018	MEL-01	MEL-0108	2018-8	Construction	11	17	6	5	3	1	0	21.22	141.24	70.02	45.19	18.84	0.45	0.00	339448	2163384	319904	168064	2600	600	0
2018	MEL-01	MEL-0109	2018-8	Construction	11	17	9	5	3	1	0	40.28	166.15	63.10	58.14	38.34	0.75	0.00	620424	2385488	424448	213568	4200	1000	0
2018	MEL-02	MEL-0202	2018-8	Construction	9	9	6	1	3	0	0	8.35	35.77	35.09	5.47	20.64	0.00	0.00	252240	538800	366032	3200	2600	0	0
2018	MEL-02	MEL-0203	2018-8	Construction	11	18	10	4	4	0	0	33.67	155.85	29.13	50.64	59.61	0.00	0.00	598272	1998352	215352	229320	7200	0	0
2018	MEL-02	MEL-0205	2018-8	Construction	8	16	7	4	3	1	0	26.63	120.03	31.12	31.53	37.59	0.15	0.00	367584	2004336	272024	164248	11384	200	0
2018	MEL-02	MEL-0206	2018-8	Construction	8	12	8	3	2	1	0	17.49	56.95	40.05	15.14	11.76	1.28	0.00	260624	820576	279456	88008	1800	28736	0
2018	MEL-02	MEL-0208	2018-8	Construction	11	14	8	3	2	0	0	12.87	108.82	37.82	27.25	21.93	0.00	0.00	196168	1401480	261088	134712	3600	0	0
2018	MEL-03	MEL-0301	2018-8	Construction	7	17	9	3	4	0	0	28.48	192.95	17.99	32.91	33.22	0.00	0.00	195368	2746488	153080	184800	3400	0	0
2018	MEL-03	MEL-0302	2018-8	Construction	9	17	9	5	2	1	0	16.46	144.33	17.16	44.37	31.63	0.15	0.00	239272	1933696	139912	251656	4000	200	0
2018	MEL-03	MEL-0303	2018-8	Construction	10	17	8	5	4	0	0	9.58	186.73	17.90	31.75	54.74	0.00	0.00	138696	3313424	118760	191384	5600	0	0
2018	MEL-03	MEL-0304	2018-8	Construction	8	15	7	5	1	1	0	13.59	172.96	15.17	59.99	5.84	0.89	0.00	159648	2150416	73856	359416	1600	28736	0
2018	MEL-03	MEL-0305	2018-8	Construction	10	18	9	4	2	1	0	22.33	157.57	21.19	35.45	14.65	0.44	0.00	175616	2364536	129128	205952	2600	200	0
2018	MEL-04	MEL-0401	2018-8	Construction	10	18	8	3	3	0	0	31.81	119.58	20.87	31.60	24.59	0.00	0.00	143096	1904960	130328	203552	2000	0	0
2018	MEL-04	MEL-0402	2018-8	Construction	7	16	8	5	3	0	0	30.93	130.57	26.62	48.58	13.47	0.00	0.00	260424	1811168	81640	326080	1200	0	0
2018	MEL-04	MEL-0403	2018-8	Construction	7	17	5	4	3	1	0	7.77	125.05	14.83	63.04	11.70	4.92	0.00	181400	1810768	162648	426456	800	1400	0
2018	MEL-04	MEL-0405	2018-8	Construction	9	16	7	5	3	0	0	20.70	132.29	18.20	57.23	27.95	0.00	0.00	296144	2054824	135312	390336	2600	0	0
2018	MEL-05	MEL-0501	2018-8	Construction	8	18	7	3	2	0	0	16.69	130.86	16.26	26.68	18.85	0.00	0.00	145280	2400056	108376	174016	1200	0	0
2018	MEL-05	MEL-0502	2018-8	Construction	6	11	7	2	1	0	0	11.11	69.91	35.87	15.77	22.58	0.00	0.00	118744	1078800	206768	75240	1200	0	0
2018	MEL-05	MEL-0503	2018-8	Construction	8	14	5	2	2	0	0	18.52	84.50	21.97	29.43	7.91	0.00	0.00	176216	1056248	229704	182200	800	0	0
2018	MEL-05	MEL-0504	2018-8	Construction	6	13	9	2	1	1	0	24.85	67.78	24.85	13.63	8.48	0.60	0.00	232088	1070816	167448	74040	600	800	0
2018	MEL-05	MEL-0505	2018-8	Construction	6	13	6	2	1	2	0	9.14	72.44	25.40	16.18	6.24	2.31	0.00	159848	1020128	232504	88608	400	15168	0
2019	MEL-01	MEL-0101	2019-8	Operation	12	20	8	4	4	1	0	29.82	295.02	28.42	28.21	63.23	0.30	0.00	304528	2363952	149712	38952	7800	600	0
2019	MEL-01	MEL-0106	2019-8	Operation	8	19	7	4	4	1	0	14.07	254.38	20.62	35.32	61.85	0.30	0.00	144680	2181752	110592	40952	8400	600	0

Table E1-1. Phytoplankton richness, biomass, and density by major taxa group for individual samples, 2013 to 2022.

					Richness							Biomass							Density						
Year	Area	Sample ID	Year - Month	Phase	Chlorophyte	Chrysophyte	Diatoms	Cryptophyte	Dinoflagellates	Cyanophyte	Euglenophyte	Chlorophyte	Chrysophyte	Diatoms	Cryptophyte	Dinoflagellates	Cyanophyte	Euglenophyte	Chlorophyte	Chrysophyte	Diatoms	Cryptophyte	Dinoflagellates	Cyanophyte	Euglenophyte
2019	MEL-01	MEL-0107	2019-8	Operation	9	19	9	4	5	1	0	26.43	241.98	35.13	37.86	79.20	0.40	0.00	231488	2334416	164864	91040	10200	800	0
2019	MEL-01	MEL-0108	2019-8	Operation	8	20	8	4	4	1	0	19.31	319.74	30.11	27.70	40.19	0.30	0.00	239472	2715368	176464	69672	5600	600	0
2019	MEL-01	MEL-0109	2019-8	Operation	8	18	8	4	3	1	0	24.40	279.36	42.54	42.90	49.16	0.30	0.00	339248	2267160	268256	145312	8000	600	0
2019	MEL-02	MEL-0201	2019-8	Operation	8	16	8	3	4	0	0	12.06	195.63	30.82	6.75	21.25	0.00	0.00	117144	1553944	129328	52288	2600	0	0
2019	MEL-02	MEL-0202	2019-8	Operation	9	16	9	5	2	0	0	10.29	124.11	19.58	7.44	20.14	0.00	0.00	173816	1286936	108576	67256	2600	0	0
2019	MEL-02	MEL-0203	2019-8	Operation	11	16	10	5	2	0	0	8.91	173.61	35.21	10.66	16.75	0.00	0.00	140096	1683256	111192	68056	2400	0	0
2019	MEL-02	MEL-0204	2019-8	Operation	9	16	9	5	3	0	0	19.23	168.46	19.95	118.76	17.34	0.00	0.00	166632	1535192	75056	1331240	2200	0	0
2019	MEL-02	MEL-0205	2019-8	Operation	11	17	9	4	3	1	0	13.79	187.13	29.17	10.31	23.35	0.10	0.00	155064	1935896	117960	75240	9384	200	0
2019	MEL-03	MEL-0301	2019-8	Operation	6	16	9	4	3	0	0	3.24	154.16	19.91	6.67	25.31	0.00	0.00	122728	1281952	105176	37720	3000	0	0
2019	MEL-03	MEL-0302	2019-8	Operation	7	19	6	5	4	0	0	7.94	201.93	13.27	5.45	14.86	0.00	0.00	65456	1749312	159248	24352	2000	0	0
2019	MEL-03	MEL-0303	2019-8	Operation	8	18	7	3	3	1	0	13.02	205.61	11.36	3.95	11.00	0.10	0.00	102176	1455568	138496	29736	1600	200	0
2019	MEL-03	MEL-0304	2019-8	Operation	9	16	6	3	1	1	0	12.46	184.94	5.01	7.68	1.38	0.14	0.00	74040	1705208	53688	53088	200	200	0
2019	MEL-03	MEL-0305	2019-8	Operation	7	16	8	5	3	1	0	7.59	181.35	27.13	8.20	11.63	1.47	0.00	87408	1719976	154264	32936	1400	28736	0
2019	MEL-04	MEL-0401	2019-8	Operation	7	18	6	5	3	1	0	11.30	199.61	11.08	15.66	6.55	0.10	0.00	137296	1626384	89408	152664	1000	200	0
2019	MEL-04	MEL-0402	2019-8	Operation	8	19	8	4	2	0	0	5.02	182.91	13.18	11.41	4.74	0.00	0.00	166232	1906960	67872	82024	800	0	0
2019	MEL-04	MEL-0403	2019-8	Operation	6	15	8	4	2	0	0	2.20	176.72	15.16	9.64	11.98	0.00	0.00	52288	1804984	70256	88408	600	0	0
2019	MEL-04	MEL-0404	2019-8	Operation	8	16	7	4	1	1	0	4.95	143.61	9.09	6.50	3.65	0.57	0.00	67056	1337424	110360	65856	1000	57472	0
2019	MEL-04	MEL-0405	2019-8	Operation	6	17	8	4	2	0	0	10.68	187.32	13.56	7.80	6.57	0.00	0.00	88008	1661904	98992	80024	800	0	0
2019	MEL-05	MEL-0501	2019-8	Operation	8	17	8	4	3	0	0	6.50	133.42	10.04	7.93	24.38	0.00	0.00	123528	1101152	61072	80424	3400	0	0
2019	MEL-05	MEL-0502	2019-8	Operation	9	16	10	3	3	0	0	5.41	171.56	18.85	20.88	32.66	0.00	0.00	87608	1676872	93008	197368	2400	0	0
2019	MEL-05	MEL-0503	2019-8	Operation	11	17	6	4	2	1	0	6.33	114.26	19.95	8.30	6.17	3.54	0.00	104176	921752	132512	80024	600	57472	0
2019	MEL-05	MEL-0504	2019-8	Operation	6	15	6	4	2	1	0	21.45	163.95	14.61	13.52	11.88	0.60	0.00	109760	1352392	48104	117344	1800	1200	0
2019	MEL-05	MEL-0505	2019-8	Operation	5	18	9	4	3	2	0	1.61	162.76	17.52	8.85	13.58	1.87	0.00	29936	1676472	107176	87408	2400	28936	0
2020	MEL-01	MEL-0101	2020-8	Operation	9	10	7	5	2	1	0	7.12	50.54	51.13	84.33	11.75	1.30	0.00	100192	714416	328904	187296	2400	2600	0
2020	MEL-01	MEL-0106	2020-8	Operation	6	11	6	5	2	1	0	23.29	68.68	26.96	79.03	17.70	1.50	0.00	970840	1066432	341160	206848	23952	3000	0
2020	MEL-01	MEL-0107	2020-8	Operation	11	11	7	5	3	3	0	14.25	102.31	35.55	66.91	18.43	8.62	0.00	444624	1970616	425816	301808	3200	75440	0
2020	MEL-01	MEL-0108	2020-8	Operation	8	12	6	4	3	1	0	15.52	34.95	34.12	72.07	16.65	1.50	0.00	460976	441224	330024	229784	10384	3000	0
2020	MEL-01	MEL-0109	2020-8	Operation	9	11	6	4	1	1	0	18.84	78.98	24.77	80.04	8.13	1.50	0.00	540000	1094168	252952	413568	2000	3000	0
2020	MEL-02	MEL-0201	2020-8	Operation	8	13	7	4	1	1	0	27.48	78.06	35.03	37.30	3.25	0.40	0.00	500296	1078400	258088	368600	800	800	0
2020	MEL-02	MEL-0202	2020-8	Operation	7	12	7	4	2	1	0	4.59	60.55	79.15	36.21	7.75	0.40	0.00	348232	1200128	275000	278008	1400	800	0
2020	MEL-02	MEL-0203	2020-8	Operation	6	13	7	5	1	1	0	3.62	66.31	22.11	25.47	4.88	0.50	0.00	65456	977824	230920	147696	1200	1000	0
2020	MEL-02	MEL-0204	2020-8	Operation	7	8	8	4	2	1	0	5.72	100.58	31.97	43.39	6.53	0.50	0.00	130712	1487088	158512	352048	600	1000	0
2020	MEL-02	MEL-0205	2020-8	Operation	4	9	7	5	2	1	0	27.47	77.82	20.84	34.78	7.53	0.10	0.00	567736	1221880	261856	265240	1600	200	0
2020	MEL-03	MEL-0301	2020-8	Operation	9	13	5	4	3	1	0	5.76	151.61	9.62	19.71	14.02	0.10	0.00	135512	2040656	51888	233488	2400	200	0
2020	MEL-03	MEL-0302	2020-8	Operation	4	9	4	3	2	0	0	8.20	176.42	10.16	24.58	7.33	0.00	0.00	97392	1559128	145680	305528	1400	0	0
2020	MEL-03	MEL-0303	2020-8	Operation	11	14	5	3	2	0	0	22.75	195.84	5.79	26.53	4.03	0.00	0.00	604656	1883608	108760	348032	800	0	0
2020	MEL-03	MEL-0304	2020-8	Operation	8	11	5	4	3	0	0	6.16	126.44	11.30	18.05	18.47	0.00	0.00	131712	1817752	132312	224704	2400	0	0
2020	MEL-03	MEL-0305	2020-8	Operation	4	12	7	4	1	1	0	1.70	103.21	23.46	18.68	8.03	0.10	0.00	14968	1587664	95592	232088	2200	200	0
2020	MEL-04	MEL-0401	2020-8	Operation	4	14	5	4	1	1	0	2.07	103.41	8.58	21.43	1.84	0.20	0.00	8784	1107336	88208	192784	200	400	0
2020	MEL-04	MEL-0402	2020-8	Operation	3	11	5	5	1	0	0	0.77	141.29	6.68	14.25	0.81	0.00	0.00	29136	1731744	182600	98392	200	0	0
2020	MEL-04	MEL-0403	2020-8	Operation	7	13	7	4	3	1	0	11.09	101.90	11.90	18.09	8.35	0.40	0.00	132712	1351192	80040	184000	600	800	0
2020	MEL-04	MEL-0404	2020-8	Operation	7	14	5	4	1	0	0	7.17	115.49	10.73	19.84	2.44	0.00	0.00	59272	1228864	158648	178016	600	0	0
2020	MEL-04	MEL-0405	2020-8	Operation	6	11	6	4	1	1	0	3.39	62.00	6.94	17.59	1.63	0.10	0.00	152464	1106736	66056	183400	400	200	0

Table E1-1. Phytoplankton richness, biomass, and density by major taxa group for individual samples, 2013 to 2022.

					Richness							Biomass							Density						
Year	Area	Sample ID	Year - Month	Phase	Chlorophyte	Chrysophyte	Diatoms	Cryptophyte	Dinoflagellates	Cyanophyte	Euglenophyte	Chlorophyte	Chrysophyte	Diatoms	Cryptophyte	Dinoflagellates	Cyanophyte	Euglenophyte	Chlorophyte	Chrysophyte	Diatoms	Cryptophyte	Dinoflagellates	Cyanophyte	Euglenophyte
2020	MEL-05	MEL-0501	2020-8	Operation	5	10	6	4	3	2	0	3.65	128.94	14.17	15.47	4.38	2.80	0.00	31536	1501856	69656	140896	600	29336	0
2020	MEL-05	MEL-0502	2020-8	Operation	9	11	5	3	3	1	0	4.71	93.24	8.64	15.96	12.04	0.30	0.00	123528	1221880	103376	189184	1600	600	0
2020	MEL-05	MEL-0503	2020-8	Operation	5	14	5	5	3	1	0	2.56	103.51	11.60	13.48	15.19	3.59	0.00	252440	1243432	175216	146480	1000	28736	0
2020	MEL-05	MEL-0504	2020-8	Operation	9	10	5	4	2	0	0	5.41	101.85	16.98	16.76	16.15	0.00	0.00	138296	1544560	103776	175616	2600	0	0
2020	MEL-05	MEL-0505	2020-8	Operation	3	11	5	3	2	1	0	1.92	90.52	10.38	9.07	11.71	0.50	0.00	29936	1623584	68856	75440	2600	1000	0
2021	MEL-01	MEL-0101	2021-8	Operation	14	14	9	5	5	2	0	21.98	219.39	41.23	9.45	77.09	4.55	0.00	456792	1994368	394968	33336	10400	64656	0
2021	MEL-01	MEL-0106	2021-8	Operation	12	15	10	6	3	1	0	22.14	227.18	39.50	21.31	75.13	0.80	0.00	325680	1999352	437088	79840	12000	1600	0
2021	MEL-01	MEL-0107	2021-8	Operation	9	18	11	4	3	1	0	29.15	223.56	93.48	16.97	66.15	0.60	0.00	256040	1972016	951984	16784	10400	1200	0
2021	MEL-01	MEL-0108	2021-8	Operation	8	13	9	4	5	1	0	13.58	209.63	52.95	17.55	60.24	0.30	0.00	234288	1814168	382400	15584	9000	600	0
2021	MEL-01	MEL-0109	2021-8	Operation	12	18	11	4	3	1	0	42.52	201.04	45.84	16.23	50.88	0.40	0.00	714416	1885208	449872	63872	7200	800	0
2021	MEL-01	MEL-0110	2021-8	Operation	11	15	10	6	5	1	0	51.11	268.75	84.07	12.70	52.58	0.50	0.00	1029912	2460328	880712	20568	7000	1000	0
2021	MEL-02	MEL-0202	2021-8	Operation	10	14	10	4	3	2	0	10.99	77.66	38.00	6.76	13.63	0.48	0.00	268208	1006560	176448	24952	2200	800	0
2021	MEL-02	MEL-0203	2021-8	Operation	14	17	9	5	3	2	0	18.79	93.45	31.19	8.90	15.28	0.62	0.00	397720	1230064	212768	46904	3200	7384	0
2021	MEL-02	MEL-0205	2021-8	Operation	10	14	10	4	4	2	1	23.49	148.50	54.66	13.74	22.45	1.14	0.95	210736	1459352	221784	63672	3200	28936	200
2021	MEL-02	MEL-0206	2021-8	Operation	10	17	11	5	3	1	0	10.93	111.85	65.02	12.23	13.69	0.18	0.00	181400	1300904	344480	90008	2200	200	0
2021	MEL-02	MEL-0208	2021-8	Operation	11	13	10	6	5	0	0	11.94	96.01	69.63	13.07	38.14	0.00	0.00	367984	1050264	475608	69456	4600	0	0
2021	MEL-03	MEL-0301	2021-8	Operation	8	18	9	3	4	0	0	26.95	106.93	14.21	4.20	52.66	0.00	0.00	195368	1294520	184000	2600	3000	0	0
2021	MEL-03	MEL-0302	2021-8	Operation	10	12	8	5	3	1	0	16.56	174.41	42.34	18.86	7.00	2.84	0.00	208936	1991368	278408	203552	1000	35920	0
2021	MEL-03	MEL-0303	2021-8	Operation	7	12	7	5	4	0	0	2.75	66.96	15.04	7.64	23.50	0.00	0.00	73840	886432	136712	52688	2600	0	0
2021	MEL-03	MEL-0304	2021-8	Operation	8	11	7	3	4	0	0	6.88	87.79	11.43	12.81	23.50	0.00	0.00	31536	971840	119744	130912	2600	0	0
2021	MEL-03	MEL-0305	2021-8	Operation	10	10	9	3	4	0	0	8.87	109.94	30.10	7.67	45.63	0.00	0.00	68056	960272	184016	59472	2000	0	0
2021	MEL-04	MEL-0401	2021-8	Operation	6	9	6	4	3	1	0	4.28	116.15	14.76	7.30	13.27	0.20	0.00	116744	1028912	100592	23952	1800	400	0
2021	MEL-04	MEL-0402	2021-8	Operation	5	15	9	6	2	0	0	4.30	93.03	16.23	7.66	12.82	0.00	0.00	324880	814592	201968	38520	1400	0	0
2021	MEL-04	MEL-0403	2021-8	Operation	11	14	9	3	3	1	0	7.58	105.81	26.19	3.17	21.72	2.31	0.00	203752	1662904	182616	8584	2600	200	0
2021	MEL-04	MEL-0404	2021-8	Operation	12	16	7	3	4	1	0	29.31	124.09	12.65	7.55	15.36	0.52	0.00	311112	1340824	177616	24552	1600	7184	0
2021	MEL-04	MEL-0405	2021-8	Operation	7	14	5	4	3	1	0	6.69	86.41	15.28	9.84	19.85	0.10	0.00	267608	993592	127728	33536	2400	200	0
2021	MEL-05	MEL-0501	2021-8	Operation	7	17	9	4	3	0	0	7.30	90.38	55.15	4.45	24.71	0.00	0.00	316696	822176	187000	23952	3200	0	0
2021	MEL-05	MEL-0502	2021-8	Operation	8	13	6	4	3	1	0	5.93	83.96	32.59	5.10	22.39	0.52	0.00	152664	864080	300744	10584	2600	7184	0
2021	MEL-05	MEL-0503	2021-8	Operation	9	13	8	5	2	1	0	6.35	94.72	18.18	16.63	11.80	0.10	0.00	226104	935920	96408	78840	1400	200	0
2021	MEL-05	MEL-0504	2021-8	Operation	8	12	6	3	3	1	0	11.91	89.93	14.09	8.49	7.41	0.52	0.00	173616	713216	118144	54288	1400	7184	0
2021	MEL-05	MEL-0505	2021-8	Operation	5	11	10	4	4	3	0	6.38	107.02	17.87	13.39	15.00	5.29	0.00	231888	1309688	131528	83624	1800	57872	0
2021	MEL-06	MEL-0601	2021-8	Operation	14	13	11	5	4	1	0	47.27	209.28	59.85	15.56	46.77	0.40	0.00	650760	1460752	558848	15784	6800	800	0
2021	MEL-06	MEL-0602	2021-8	Operation	11	13	9	6	4	1	0	20.35	203.15	43.50	33.41	81.68	0.40	0.00	392936	2021104	486992	184216	17584	800	0
2022	MEL-01	MEL-01-01	2022-8	Operation	10	13	8	2	3	2	0	7.67	50.09	32.59	19.87	48.00	0.57	0.00	313112	908784	197776	77240	7600	14968	0
2022	MEL-01	MEL-01-06	2022-8	Operation	6	14	8	3	4	1	0	10.80	83.00	43.34	9.04	53.72	0.30	0.00	108560	1067232	271648	18568	9400	400	0
2022	MEL-01	MEL-01-07	2022-8	Operation	9	14	8	2	3	1	0	7.18	109.54	51.56	14.68	78.78	0.45	0.00	145480	1707408	318552	54488	12800	600	0
2022	MEL-01	MEL-01-08	2022-8	Operation	8	13	8	2	4	1	0	13.50	99.05	51.74	24.72	72.93	0.75	0.00	169032	1492288	306736	119744	10000	1000	0
2022	MEL-01	MEL-01-09	2022-8	Operation	10	12	10	3	4	1	1	15.16	128.17	79.36	30.55	87.34	0.15	0.41	418472	1993768	388344	129528	12600	200	200
2022	MEL-01	MEL-01-10	2022-8	Operation	9	12	8	3	4	1	0	10.19	91.34	58.87	8.10	94.79	0.60	0.00	253240	1468336	280800	10984	12800	800	0
2022	MEL-02	MEL-02-02	2022-8	Operation	3	11	7	2	3	1	0	0.66	159.89	14.56	8.45	21.53	0.15	0.00	7584	1143872	77472	73240	4200	200	0
2022	MEL-02	MEL-02-03	2022-8	Operation	6	15	5	2	2	1	0	5.40	190.56	9.07	8.33	21.96	0.15	0.00	173416	1438432	74272	80024	4400	200	0
2022	MEL-02	MEL-02-05	2022-8	Operation	9	11	6	2	3	1	0	7.32	126.88	14.12	4.16	35.31	0.15	0.00	84624	866896	101008	29736	6600	200	0
2022	MEL-02	MEL-02-06	2022-8	Operation	9	11	6	2	3	1	0	7.44	86.38	10.12	4.15	42.94	0.15	0.00	195368	613256	143896	9184	8200	200	0

Table E1-1. Phytoplankton richness, biomass, and density by major taxa group for individual samples, 2013 to 2022.

					Richness							Biomass							Density						
Year	Area	Sample ID	Year - Month	Phase	Chlorophyte	Chrysophyte	Diatoms	Cryptophyte	Dinoflagellates	Cyanophyte	Euglenophyte	Chlorophyte	Chrysophyte	Diatoms	Cryptophyte	Dinoflagellates	Cyanophyte	Euglenophyte	Chlorophyte	Chrysophyte	Diatoms	Cryptophyte	Dinoflagellates	Cyanophyte	Euglenophyte
2022	MEL-02	MEL-02-08	2022-8	Operation	9	10	6	3	3	1	0	15.45	103.81	12.00	8.52	39.15	0.20	0.00	510864	910000	28968	52888	8000	400	0
2022	MEL-03	MEL-03-01	2022-8	Operation	11	11	4	2	4	0	0	4.24	94.71	2.85	7.38	23.64	0.00	0.00	75440	1008360	45104	72640	4000	0	0
2022	MEL-03	MEL-03-02	2022-8	Operation	5	10	6	1	3	0	0	1.56	104.11	9.21	3.57	23.96	0.00	0.00	50688	944304	112360	43104	4400	0	0
2022	MEL-03	MEL-03-03	2022-8	Operation	7	14	4	2	3	1	0	6.73	86.24	5.76	4.76	28.20	0.10	0.00	93592	1038696	10984	36920	5000	200	0
2022	MEL-03	MEL-03-04	2022-8	Operation	5	9	4	2	3	0	0	4.14	103.35	11.11	9.04	19.94	0.00	0.00	79424	1017144	51688	80424	3600	0	0
2022	MEL-03	MEL-03-05	2022-8	Operation	4	11	3	1	4	1	0	1.26	66.20	3.21	1.07	30.42	0.10	0.00	29136	756120	8984	600	5200	200	0
2022	MEL-04	MEL-04-01	2022-8	Operation	8	10	5	2	4	1	0	5.20	52.59	4.20	3.58	14.37	1.47	0.00	158648	662328	67056	22552	2000	28736	0
2022	MEL-04	MEL-04-02	2022-8	Operation	9	9	4	2	4	0	0	10.77	82.59	3.09	4.79	14.59	0.00	0.00	317296	944104	31136	36920	1600	0	0
2022	MEL-04	MEL-04-03	2022-8	Operation	7	10	4	2	3	0	0	5.18	64.90	3.28	6.57	43.00	0.00	0.00	72640	705632	75840	37920	6800	0	0
2022	MEL-04	MEL-04-04	2022-8	Operation	11	10	5	2	3	1	0	14.43	82.85	9.36	10.27	16.63	5.29	0.00	176016	1037096	126328	88008	2800	57472	0
2022	MEL-04	MEL-04-05	2022-8	Operation	7	7	5	1	2	1	1	4.49	27.65	3.59	1.42	15.71	0.10	1.51	130712	511264	39720	800	2600	200	200
2022	MEL-05	MEL-05-01	2022-8	Operation	7	12	6	2	3	0	0	4.82	80.37	10.72	8.42	17.50	0.00	0.00	145080	727184	87424	87008	3400	0	0
2022	MEL-05	MEL-05-02	2022-8	Operation	5	8	5	2	4	0	0	2.07	98.47	3.16	4.50	24.69	0.00	0.00	23152	634992	52688	9384	4200	0	0
2022	MEL-05	MEL-05-03	2022-8	Operation	5	9	4	2	3	0	0	1.60	42.45	2.83	4.30	16.26	0.00	0.00	94192	319896	66856	22952	3400	0	0
2022	MEL-05	MEL-05-04	2022-8	Operation	4	8	6	2	4	0	0	1.02	84.87	6.86	3.88	30.72	0.00	0.00	7984	585704	37136	22752	5000	0	0
2022	MEL-05	MEL-05-05	2022-8	Operation	5	7	4	2	2	0	0	3.17	63.43	5.50	2.36	12.80	0.00	0.00	100976	428656	52688	8184	2800	0	0

Table E1-2. Phytoplankton biomass (mg/m^3) for the dominant taxa in 2022.

				Dominant Taxa 1			Dominant Taxa 2			Dominant Taxa 3			Dominant Taxa 4			Dominant Taxa 5		
Area	Sample ID	Date	Total Biomass	Species	MTG	Biomass	Species	MTG	Biomass	Species	MTG	Biomass	Species	MTG	Biomass	Species	MTG	Biomass
MEL-01	MEL-0101	18-Aug-2022	158.8	Peridinium pusillum (Penard) Lemmermann	Dinoflagellates	22.3	Gymnodinium helveticum Penard	Dinoflagellates	14.1	Dinobryon sociale Ehrenberg	Chrysophytes	13.0	Cyclotella stelligera Cleve and Grunow	Diatoms	11.9	Gymnodinium sp.	Dinoflagellates	11.6
	MEL-0106	18-Aug-2022	200.2	Peridinium pusillum (Penard) Lemmermann	Dinoflagellates	24.8	Gymnodinium sp.	Dinoflagellates	18.8	Cyclotella stelligera Cleve and Grunow	Diatoms	18.6	Chrysococcus sp.	Chrysophytes	17.9	Synura sphagnicola Korschikow	Chrysophytes	11.3
	MEL-0107	18-Aug-2022	262.2	Dinobryon sociale Ehrenberg	Chrysophytes	30.9	Peridinium aciculiferum Lemmermann	Dinoflagellates	27.1	Gymnodinium sp.	Dinoflagellates	26.1	Peridinium pusillum (Penard) Lemmermann	Dinoflagellates	25.6	Chrysococcus sp.	Chrysophytes	23.5
	MEL-0108	18-Aug-2022	262.7	Peridinium aciculiferum Lemmermann	Dinoflagellates	36.2	Dinobryon sociale Ehrenberg	Chrysophytes	24.4	Cyclotella pseudostelligera	Diatoms	19.4	Gymnodinium sp.	Dinoflagellates	18.8	Chrysococcus sp.	Chrysophytes	18.3
	MEL-0109	18-Aug-2022	341.1	Chrysococcus sp.	Chrysophytes	41.3	Cyclotella pseudostelligera	Diatoms	41.2	Dinobryon sociale Ehrenberg	Chrysophytes	34.1	Peridinium aciculiferum Lemmermann	Dinoflagellates	29.0	Gymnodinium sp.	Dinoflagellates	27.5
	MEL-0110	18-Aug-2022	263.9	Peridinium aciculiferum Lemmermann	Dinoflagellates	43.4	Chrysococcus sp.	Chrysophytes	32.9	Gymnodinium sp.	Dinoflagellates	24.6	Dinobryon sociale Ehrenberg	Chrysophytes	24.4	Peridinium pusillum (Penard) Lemmermann	Dinoflagellates	17.3
MEL-02	MEL-0202	18-Aug-2022	205.2	Dinobryon sociale Ehrenberg	Chrysophytes	50.4	Dinobryon sertularia Ehrenberg	Chrysophytes	26.4	Chrysococcus sp.	Chrysophytes	24.9	Dinobryon sertularia Ehrenberg	Chrysophytes	13.0	Chrysochromulina laurentiana Kling	Chrysophytes	11.3
	MEL-0203	18-Aug-2022	235.5	Dinobryon sociale Ehrenberg	Chrysophytes	58.5	Dinobryon sertularia Ehrenberg	Chrysophytes	40.7	Chrysococcus sp.	Chrysophytes	23.5	Dinobryon sociale Ehrenberg	Chrysophytes	15.1	Peridinium pusillum (Penard) Lemmermann	Dinoflagellates	11.8
	MEL-0205	18-Aug-2022	187.9	Dinobryon sertularia Ehrenberg	Chrysophytes	32.5	Dinobryon sociale Ehrenberg	Chrysophytes	29.3	Chrysococcus sp.	Chrysophytes	24.0	Chrysochromulina laurentiana Kling	Chrysophytes	19.8	Gymnodinium sp.	Dinoflagellates	15.9
	MEL-0206	18-Aug-2022	151.2	Chrysochromulina laurentiana Kling	Chrysophytes	28.3	Dinobryon sertularia Ehrenberg	Chrysophytes	24.4	Peridinium pusillum (Penard) Lemmermann	Dinoflagellates	20.5	Gymnodinium sp.	Dinoflagellates	18.8	Chrysococcus sp.	Chrysophytes	17.4
	MEL-0208	18-Aug-2022	179.1	Dinobryon sertularia Ehrenberg	Chrysophytes	30.5	Chrysococcus sp.	Chrysophytes	25.4	Peridinium pusillum (Penard) Lemmermann	Dinoflagellates	22.9	Gymnodinium sp.	Dinoflagellates	14.5	Chrysochromulina laurentiana Kling	Chrysophytes	14.2
MEL-03	MEL-0301	20-Aug-2022	132.8	Dinobryon sociale Ehrenberg	Chrysophytes	24.4	Chrysochromulina laurentiana Kling	Chrysophytes	22.7	Chrysococcus sp.	Chrysophytes	16.0	Large chrysophyceae	Chrysophytes	14.2	Peridinium pusillum (Penard) Lemmermann	Dinoflagellates	11.6
	MEL-0302	20-Aug-2022	142.4	Dinobryon sociale Ehrenberg	Chrysophytes	40.6	Chrysococcus sp.	Chrysophytes	15.5	Peridinium pusillum (Penard) Lemmermann	Dinoflagellates	12.4	Dinobryon sertularia Ehrenberg	Chrysophytes	11.4	Chrysochromulina laurentiana Kling	Chrysophytes	11.3
	MEL-0303	20-Aug-2022	131.8	Dinobryon sociale Ehrenberg	Chrysophytes	35.8	Chrysococcus sp.	Chrysophytes	26.8	Gymnodinium sp.	Dinoflagellates	13.0	Peridinium pusillum (Penard) Lemmermann	Dinoflagellates	11.6	Planctonema lauterbornii Schmidle	Chlorophytes	5.1
	MEL-0304	20-Aug-2022	147.6	Dinobryon sociale Ehrenberg	Chrysophytes	45.5	Chrysochromulina laurentiana Kling	Chrysophytes	22.7	Cyclotella pseudostelligera	Diatoms	9.5	Peridinium pusillum (Penard) Lemmermann	Dinoflagellates	9.1	Large chrysophyceae	Chrysophytes	9.0
	MEL-0305	20-Aug-2022	102.3	Chrysococcus sp.	Chrysophytes	23.5	Chrysochromulina laurentiana Kling	Chrysophytes	17.0	Peridinium pusillum (Penard) Lemmermann	Dinoflagellates	14.9	Gymnodinium sp.	Dinoflagellates	7.2	Dinobryon mucronatum Nygaard	Chrysophytes	5.6
MEL-04	MEL-0401	20-Aug-2022	81.4	Dinobryon sociale Ehrenberg	Chrysophytes	27.6	Chrysochromulina laurentiana Kling	Chrysophytes	8.5	Chrysococcus sp.	Chrysophytes	5.2	Dinobryon sertularia Ehrenberg	Chrysophytes	5.1	Peridinium pusillum (Penard) Lemmermann	Dinoflagellates	5.0
	MEL-0402	20-Aug-2022	115.8	Dinobryon sociale Ehrenberg	Chrysophytes	37.4	Chrysococcus sp.	Chrysophytes	19.7	Gymnodinium sp.	Dinoflagellates	7.2	Dinobryon sertularia Ehrenberg	Chrysophytes	7.1	Oocystis lacustris Chodat	Chlorophytes	6.5
	MEL-0403	20-Aug-2022	122.9	Dinobryon sociale Ehrenberg	Chrysophytes	27.6	Peridinium aciculiferum Lemmermann	Dinoflagellates	24.6	Chrysochromulina laurentiana Kling	Chrysophytes	17.0	Gymnodinium sp.	Dinoflagellates	10.1	Peridinium pusillum (Penard) Lemmermann	Dinoflagellates	8.3
	MEL-0404	20-Aug-2022	138.8	Chrysococcus sp.	Chrysophytes	20.7	Chrysochromulina laurentiana Kling	Chrysophytes	19.8	Dinobryon sociale Ehrenberg	Chrysophytes	17.9	Dinobryon sertularia Ehrenberg	Chrysophytes	10.2	Planctonema lauterbornii Schmidle	Chlorophytes	7.6
	MEL-0405	20-Aug-2022	54.5	Gymnodinium sp.	Dinoflagellates	11.6	Chrysococcus sp.	Chrysophytes	10.3	Dinobryon sociale Ehrenberg	Chrysophytes	6.5	Dinobryon sertularia Ehrenberg	Chrysophytes	5.1	Peridinium pusillum (Penard) Lemmermann	Dinoflagellates	4.1
MEL-05	MEL-0501	14-Aug-2022	121.8	Dinobryon sociale Ehrenberg	Chrysophytes	45.5	Chrysococcus sp.	Chrysophytes	10.8	Large chrysophyceae	Chrysophytes	10.3	Peridinium pusillum (Penard) Lemmermann	Dinoflagellates	9.9	Rhodomonas minuta Skuja	Cryptophytes	7.0
	MEL-0502	14-Aug-2022	132.9	Dinobryon sociale Ehrenberg	Chrysophytes	66.6	Peridinium pusillum (Penard) Lemmermann	Dinoflagellates	12.4	Chrysococcus sp.	Chrysophytes	8.5	Gymnodinium sp.	Dinoflagellates	5.8	Dinobryon sertularia Ehrenberg	Chrysophytes	4.9
	MEL-0503	14-Aug-2022	67.4	Dinobryon sociale Ehrenberg	Chrysophytes	22.8	Peridinium pusillum (Penard) Lemmermann	Dinoflagellates	11.6	Chrysococcus sp.	Chrysophytes	6.6	Dinobryon sertularia Ehrenberg	Chrysophytes	4.1	Dinobryon sociale Ehrenberg	Chrysophytes	3.3
	MEL-0504	14-Aug-2022	127.4	Dinobryon sociale Ehrenberg	Chrysophytes	40.6	Chrysochromulina laurentiana Kling	Chrysophytes	17.0	Peridinium pusillum (Penard) Lemmermann	Dinoflagellates	13.2	Dinobryon sertularia Ehrenberg	Chrysophytes	8.1	Peridinium aciculiferum Lemmermann	Dinoflagellates	7.2
	MEL-0505	14-Aug-2022	87.3	Dinobryon sociale Ehrenberg	Chrysophytes	32.5	Peridinium pusillum (Penard) Lemmermann	Dinoflagellates	9.9	Chrysococcus sp.	Chrysophytes	9.4	Chrysochromulina laurentiana Kling	Chrysophytes	8.5	Dinobryon sertularia Ehrenberg	Chrysophytes	7.5

Notes

MTG = major taxa group

Appendix E2
2022 Chlorophyll-a Results

Area	Station	Sample ID	Year	Month	Replicate	Chlorophyll-a (µg/L)	QA Sample
MEL-01	1	MEL-01-01-PC	2022	August	1	2.94	
MEL-01	1	MEL-01-01-PC	2022	August	2	3.75	
MEL-01	1	MEL-01-01-PC	2022	August	3	3.00	
MEL-01	6	MEL-01-06-PC	2022	August	1	3.03	
MEL-01	6	MEL-01-06-PC	2022	August	2	3.35	
MEL-01	6	MEL-01-06-PC	2022	August	3	3.03	
MEL-01	7	MEL-01-07-PC	2022	August	1	3.41	
MEL-01	7	MEL-01-07-PC	2022	August	2	3.18	
MEL-01	7	MEL-01-07-PC	2022	August	3	2.91	
MEL-01	8	MEL-01-08-PC	2022	August	1	3.45	
MEL-01	8	MEL-01-08-PC	2022	August	2	3.12	
MEL-01	8	MEL-01-08-PC	2022	August	3	3.35	
MEL-01	9	MEL-01-09-PC	2022	August	1	3.17	
MEL-01	9	MEL-01-09-PC	2022	August	2	3.71	
MEL-01	9	MEL-01-09-PC	2022	August	3	3.26	
MEL-01	10	MEL-01-10-PC	2022	August	1	3.19	
MEL-01	10	MEL-01-10-PC	2022	August	2	3.70	
MEL-01	10	MEL-01-10-PC	2022	August	3	3.67	
MEL-02	2	MEL-02-02-PC	2022	August	1	1.25	
MEL-02	2	MEL-02-02-PC	2022	August	2	1.62	
MEL-02	2	MEL-02-02-PC	2022	August	3	1.45	
MEL-02	3	MEL-02-03-PC	2022	August	1	1.27	
MEL-02	3	MEL-02-03-PC	2022	August	2	1.47	
MEL-02	3	MEL-02-03-PC	2022	August	3	1.27	
MEL-02	5	MEL-02-05-PC	2022	August	1	1.60	
MEL-02	5	MEL-02-05-PC	2022	August	2	1.49	
MEL-02	5	MEL-02-05-PC	2022	August	3	1.48	
MEL-02	6	MEL-02-06-PC	2022	August	1	1.38	
MEL-02	6	MEL-02-06-PC	2022	August	2	1.65	
MEL-02	6	MEL-02-06-PC	2022	August	3	1.49	
MEL-02	8	MEL-02-08-PC	2022	August	1	1.45	
MEL-02	8	MEL-02-08-PC	2022	August	2	1.67	
MEL-02	8	MEL-02-08-PC	2022	August	3	1.24	
MEL-03	1	MEL-03-01-PC	2022	August	1	0.76	
MEL-03	1	MEL-03-01-PC	2022	August	2	0.99	
MEL-03	1	MEL-03-01-PC	2022	August	3	0.80	
MEL-03	2	MEL-03-02-PC	2022	August	1	0.84	
MEL-03	2	MEL-03-02-PC	2022	August	2	0.87	
MEL-03	2	MEL-03-02-PC	2022	August	3	0.85	
MEL-03	3	MEL-03-03-PC	2022	August	1	0.90	
MEL-03	3	MEL-03-03-PC	2022	August	2	0.90	
MEL-03	3	MEL-03-03-PC	2022	August	3	0.73	
MEL-03	4	MEL-03-04-PC	2022	August	1	1.02	
MEL-03	4	MEL-03-04-PC	2022	August	2	0.96	
MEL-03	4	MEL-03-04-PC	2022	August	3	0.90	
MEL-03	5	MEL-03-05-PC	2022	August	1	0.90	
MEL-03	5	MEL-03-05-PC	2022	August	2	0.88	
MEL-03	5	MEL-03-05-PC	2022	August	3	0.95	
MEL-04	1	MEL-04-01-PC	2022	August	1	0.48	
MEL-04	1	MEL-04-01-PC	2022	August	2	0.74	
MEL-04	1	MEL-04-01-PC	2022	August	3	0.62	
MEL-04	2	MEL-04-02-PC	2022	August	1	0.58	
MEL-04	2	MEL-04-02-PC	2022	August	2	0.85	
MEL-04	2	MEL-04-02-PC	2022	August	3	0.68	
MEL-04	3	MEL-04-03-PC	2022	August	1	0.74	
MEL-04	3	MEL-04-03-PC	2022	August	2	0.76	
MEL-04	3	MEL-04-03-PC	2022	August	3	0.71	
MEL-04	4	MEL-04-04-PC	2022	August	1	0.61	
MEL-04	4	MEL-04-04-PC	2022	August	2	0.78	
MEL-04	4	MEL-04-04-PC	2022	August	3	0.65	
MEL-04	5	MEL-04-05-PC	2022	August	1	0.40	
MEL-04	5	MEL-04-05-PC	2022	August	2	0.69	
MEL-04	5	MEL-04-05-PC	2022	August	3	0.59	
MEL-05	1	MEL-05-01-PC	2022	August	1	0.37	
MEL-05	1	MEL-05-01-PC	2022	August	2	0.62	
MEL-05	1	MEL-05-01-PC	2022	August	3	0.50	
MEL-05	2	MEL-05-02-PC	2022	August	1	0.48	
MEL-05	2	MEL-05-02-PC	2022	August	2	0.57	
MEL-05	2	MEL-05-02-PC	2022	August	3	0.55	
MEL-05	3	MEL-05-03-PC	2022	August	1	0.46	
MEL-05	3	MEL-05-03-PC	2022	August	2	0.47	
MEL-05	3	MEL-05-03-PC	2022	August	3	0.49	
MEL-05	4	MEL-05-04-PC	2022	August	1	0.37	
MEL-05	4	MEL-05-04-PC	2022	August	2	0.41	
MEL-05	4	MEL-05-04-PC	2022	August	3	0.71	
MEL-05	5	MEL-05-05-PC	2022	August	1	0.54	
MEL-05	5	MEL-05-05-PC	2022	August	2	0.47	
MEL-05	5	MEL-05-05-PC	2022	August	3	0.52	
MEL-03	1	DUP-MEL-AUG-01-PC	2022	August	1	1.10	DUP
MEL-01	1	DUP-MEL-AUG-02-PC	2022	August	2	2.72	DUP
MEL-05	3	DUP-MEL-AUG-03-PC	2022	August	3	0.38	DUP
		MEL-BLANK-01	2022	August	1	<0.04	BLANK
		MEL-BLANK-02	2022	August	2	<0.04	BLANK
		MEL-BLANK-03	2022	August	3	<0.04	BLANK

Appendix E3
2022 Phytoplankton Taxonomy Results

Phytoplankton species data for Meliadine 2022 (Azimuth Consulting Group)

** 1st number in **species code** = group 1=cyanophyte 2=chlorophyte
3= Euglenophyte 4=chrysophyte 5=diatoms 6=Cryptophyte 7=Dinoflagellates

***RECOUNT = QA\QC sample

** total daily biomass is sum of all species on a date.

Station	Sample	QA Sample ID	Date	Species Code	Species Name	Density cells/L	Biomass mg/m^3	Length µm	Width µm	Cell Volume µm^3
MEL - 0101	MEL - 0101-PC		18-Aug-2022	1014	Chroococcus limneticus Lemmermann	14368	0.48	4.00	4.00	33.50
MEL - 0101	MEL - 0101-PC		18-Aug-2022	1054	Planktolyngbya limnetica	600	0.08	125.00	1.20	141.40
MEL - 0101	MEL - 0101-PC		18-Aug-2022	2105	Chlamydomonas spp.	7184	0.42	6.90	4.00	57.80
MEL - 0101	MEL - 0101-PC		18-Aug-2022	2112	Sphaerocystis schroeteri Chodat	43104	0.67	3.10	3.10	15.60
MEL - 0101	MEL - 0101-PC		18-Aug-2022	2113	Pediastrum duplex Meyen	2400	0.22	9.10	6.20	89.60
MEL - 0101	MEL - 0101-PC		18-Aug-2022	2121	Oocystis lacustris Chodat	71840	1.90	5.60	3.00	26.40
MEL - 0101	MEL - 0101-PC		18-Aug-2022	2133	Scenedesmus brevispina (G.M Smith) Chodat	14368	0.32	7.00	3.00	22.00
MEL - 0101	MEL - 0101-PC		18-Aug-2022	2137	Dictyosphaerium simplex Sukja	114944	0.48	2.00	2.00	4.20
MEL - 0101	MEL - 0101-PC		18-Aug-2022	2199	Spondylosium planum (Wolle) W. and G.S. West	50288	1.90	6.00	6.00	37.70
MEL - 0101	MEL - 0101-PC		18-Aug-2022	2205	Mougeotia sp.	200	0.30	40.00	6.90	1495.70
MEL - 0101	MEL - 0101-PC		18-Aug-2022	2206	Botryococcus braunii Kutzing	1600	1.45	12.00	12.00	904.80
MEL - 0101	MEL - 0101-PC		18-Aug-2022	2215	Tetraedron caudatum (Corda) Hansgrig	7184	0.03	3.00	3.00	4.70
MEL - 0101	MEL - 0101-PC		18-Aug-2022	4351	Small chrysophyceae	387936	2.48	2.30	2.30	6.40
MEL - 0101	MEL - 0101-PC		18-Aug-2022	4352	Large chrysophyceae	7184	1.29	7.00	7.00	179.60
MEL - 0101	MEL - 0101-PC		18-Aug-2022	4357	Chrysococcus sp.	100576	6.58	5.00	5.00	65.40
MEL - 0101	MEL - 0101-PC		18-Aug-2022	4362	Kephyrion sp.	100576	1.29	2.90	2.90	12.80
MEL - 0101	MEL - 0101-PC		18-Aug-2022	4364	Mallomonas caudata Ivanov	200	1.07	40.00	16.00	5361.70
MEL - 0101	MEL - 0101-PC		18-Aug-2022	4368	Mallomonas crassisquama (Asmund) Fott	200	0.21	20.00	10.00	1047.20
MEL - 0101	MEL - 0101-PC		18-Aug-2022	4383	Dinobryon bavaricum Imhof	28736	6.50	12.00	6.00	226.20
MEL - 0101	MEL - 0101-PC		18-Aug-2022	4383	Dinobryon bavaricum Imhof	800	1.59	0.00	0.00	1991.00
MEL - 0101	MEL - 0101-PC		18-Aug-2022	4388	Dinobryon sertularia Ehrenberg	600	2.03	0.00	0.00	3390.00
MEL - 0101	MEL - 0101-PC		18-Aug-2022	4390	Dinobryon sociale Ehrenberg	57472	13.00	12.00	6.00	226.20
MEL - 0101	MEL - 0101-PC		18-Aug-2022	4390	Dinobryon sociale Ehrenberg	200	0.40	0.00	0.00	1991.00
MEL - 0101	MEL - 0101-PC		18-Aug-2022	4413	Chrysochromulina laurentiana Kling	7184	2.83	9.10	9.10	394.60
MEL - 0101	MEL - 0101-PC		18-Aug-2022	4414	Stichogloea spp.	57472	2.89	6.00	4.00	50.30
MEL - 0101	MEL - 0101-PC		18-Aug-2022	4418	Salpingoeca frequentissima (Zach.) Lemmermann	158048	5.09	6.00	3.20	32.20
MEL - 0101	MEL - 0101-PC		18-Aug-2022	4448	Rhizochrysis scherffelii Pascher	1600	2.83	15.00	15.00	1767.10
MEL - 0101	MEL - 0101-PC		18-Aug-2022	5507	Cyclotella stelligera Cleve and Grunow	5000	11.95	11.50	23.00	2389.00
MEL - 0101	MEL - 0101-PC		18-Aug-2022	5509	Cyclotella ocellata Pant.	7184	0.72	4.00	8.00	100.50
MEL - 0101	MEL - 0101-PC		18-Aug-2022	5511	Rhizosolenia eriense H.L. Smith	7184	0.61	12.00	3.00	84.80
MEL - 0101	MEL - 0101-PC		18-Aug-2022	5513	Tabellaria fenestrata (Lyngbye) Kutzing	8800	5.81	70.00	6.00	659.70
MEL - 0101	MEL - 0101-PC		18-Aug-2022	5518	Synedra acus Kutzing	4400	0.51	110.00	2.00	115.20
MEL - 0101	MEL - 0101-PC		18-Aug-2022	5523	Synedra ulna (Nitzsch) Ehrenberg	1200	3.28	290.00	6.00	2733.20
MEL - 0101	MEL - 0101-PC		18-Aug-2022	5524	Asterionella formosa Hassall	77800	8.56	105.00	2.00	110.00
MEL - 0101	MEL - 0101-PC		18-Aug-2022	5551	Cyclotella michiganiana Skvortzow	86208	1.16	2.05	4.10	13.50
MEL - 0101	MEL - 0101-PC		18-Aug-2022	6554	Rhodomonas minuta Skuja	71840	9.93	11.00	6.00	138.20
MEL - 0101	MEL - 0101-PC		18-Aug-2022	6558	Cryptomonas erosa Ehrenberg	5400	9.94	26.90	14.00	1840.40
MEL - 0101	MEL - 0101-PC		18-Aug-2022	7631	Gymnodinium helveticum Penard	600	14.14	50.00	30.00	23561.90
MEL - 0101	MEL - 0101-PC		18-Aug-2022	7632	Gymnodinium sp.	1600	11.58	24.00	24.00	7238.20
MEL - 0101	MEL - 0101-PC		18-Aug-2022	7639	Peridinium pusillum (Penard) Lemmermann	5400	22.28	19.90	19.90	4126.30
MEL - 0106	MEL - 0106-PC		18-Aug-2022	1073	Snowella sp	400	0.30	0.00	0.00	750.00
MEL - 0106	MEL - 0106-PC		18-Aug-2022	2112	Sphaerocystis schroeteri Chodat	43104	1.14	3.70	3.70	26.50
MEL - 0106	MEL - 0106-PC		18-Aug-2022	2121	Oocystis lacustris Chodat	21552	0.61	6.00	3.00	28.30
MEL - 0106	MEL - 0106-PC		18-Aug-2022	2169	Planctonema lauterbornii Schmidle	21552	7.62	18.00	5.00	353.40
MEL - 0106	MEL - 0106-PC		18-Aug-2022	2187	Staurodesmus extensus (Andersson) Teiling	200	0.08	13.60	12.00	387.40
MEL - 0106	MEL - 0106-PC		18-Aug-2022	2199	Spondylosium planum (Wolle) W. and G.S. West	21552	0.81	6.00	6.00	37.70
MEL - 0106	MEL - 0106-PC		18-Aug-2022	2206	Botryococcus braunii Kutzing	600	0.54	12.00	12.00	904.80
MEL - 0106	MEL - 0106-PC		18-Aug-2022	4351	Small chrysophyceae	287360	1.84	2.30	2.30	6.40
MEL - 0106	MEL - 0106-PC		18-Aug-2022	4352	Large chrysophyceae	28736	5.16	7.00	7.00	179.60
MEL - 0106	MEL - 0106-PC		18-Aug-2022	4355	Chrysochromulina parva Lackey	7184	0.47	5.00	5.00	65.40
MEL - 0106	MEL - 0106-PC		18-Aug-2022	4357	Chrysococcus sp.	272992	17.85	5.00	5.00	65.40
MEL - 0106	MEL - 0106-PC		18-Aug-2022	4358	Chrysostephanosphaera globulifera Scherffel	28736	10.61	8.90	8.90	369.10
MEL - 0106	MEL - 0106-PC		18-Aug-2022	4361	Kephyrion boreale Skuja	7184	0.85	6.10	6.10	118.80
MEL - 0106	MEL - 0106-PC		18-Aug-2022	4362	Kephyrion sp.	86208	1.10	2.90	2.90	12.80
MEL - 0106	MEL - 0106-PC		18-Aug-2022	4368	Mallomonas crassisquama (Asmund) Fott	800	0.84	20.00	10.00	1047.20
MEL - 0106	MEL - 0106-PC		18-Aug-2022	4375	Synura sphagnicola Korschikow	21552	11.28	10.00	10.00	523.60
MEL - 0106	MEL - 0106-PC		18-Aug-2022	4383	Dinobryon bavaricum Imhof	800	1.59	0.00	0.00	1991.00
MEL - 0106	MEL - 0106-PC		18-Aug-2022	4388	Dinobryon sertularia Ehrenberg	35920	8.13	12.00	6.00	226.20
MEL - 0106	MEL - 0106-PC		18-Aug-2022	4388	Dinobryon sertularia Ehrenberg	400	2.03	0.00	0.00	5085.00
MEL - 0106	MEL - 0106-PC		18-Aug-2022	4390	Dinobryon sociale Ehrenberg	43104	9.75	12.00	6.00	226.20
MEL - 0106	MEL - 0106-PC		18-Aug-2022	4390	Dinobryon sociale Ehrenberg	400	0.80	0.00	0.00	1991.00
MEL - 0106	MEL - 0106-PC		18-Aug-2022	4418	Salpingoeca frequentissima (Zach.) Lemmermann	244256	7.87	6.00	3.20	32.20
MEL - 0106	MEL - 0106-PC		18-Aug-2022	4448	Rhizochrysis scherffelii Pascher	1600	2.83	15.00	15.00	1767.10
MEL - 0106	MEL - 0106-PC		18-Aug-2022	5507	Cyclotella stelligera Cleve and Grunow	7800	18.63	11.50	23.00	2389.00
MEL - 0106	MEL - 0106-PC		18-Aug-2022	5509	Cyclotella ocellata Pant.	7184	0.72	4.00	8.00	100.50
MEL - 0106	MEL - 0106-PC		18-Aug-2022	5513	Tabellaria fenestrata (Lyngbye) Kutzing	10200	6.73	70.00	6.00	659.70
MEL - 0106	MEL - 0106-PC		18-Aug-2022	5514	Tabellaria flocculosa (Roth) Kutzing	2000	2.67	26.00	14.00	1334.10
MEL - 0106	MEL - 0106-PC		18-Aug-2022	5518	Synedra acus Kutzing	5000	0.58	110.00	2.00	115.20
MEL - 0106	MEL - 0106-PC		18-Aug-2022	5523	Synedra ulna (Nitzsch) Ehrenberg	800	1.81	240.00	6.00	2261.90
MEL - 0106	MEL - 0106-PC		18-Aug-2022	5524	Asterionella formosa Hassall	87800	10.02	109.00	2.00	114.10
MEL - 0106	MEL - 0106-PC		18-Aug-2022	5551	Cyclotella michiganiana Skvortzow	150864	2.19	2.10	4.20	14.50
MEL - 0106	MEL - 0106-PC		18-Aug-2022	6554	Rhodomonas minuta Skuja	7184	0.99	11.00	6.00	138.20
MEL - 0106	MEL - 0106-PC		18-Aug-2022	6558	Cryptomonas erosa Ehrenberg	4200	7.73	26.90	14.00	1840.40
MEL - 0106	MEL - 0106-PC		18-Aug-2022	6568	Katablepharis ovalis Skuja	7184	0.32	8.00	4.00	44.70
MEL - 0106	MEL - 0106-PC		18-Aug-2022	7631	Gymnodinium helveticum Penard	200	4.71	50.00	30.00	23561.90
MEL - 0106	MEL - 0106-PC		18-Aug-2022	7632	Gymnodinium sp.	2600	18.82	24.00	24.00	7238.20
MEL - 0106	MEL - 0106-PC		18-Aug-2022	7639	Peridinium pusillum (Penard) Lemmermann	6000	24.76	19.90	19.90	4126.30
MEL - 0106	MEL - 0106-PC		18-Aug-2022	7641	Peridinium aciculiferum Lemmermann	600	5.43	30.00	24.00	9047.80
MEL - 0107	MEL - 0107-PC		18-Aug-2022	1073	Snowella sp	600	0.45	0.00	0.00	750.00
MEL - 0107	MEL - 0107-PC		18-Aug-2022	2101	Carteria spp.	200	0.23	13.00	13.00	1150.30
MEL - 0107	MEL - 0107-PC		18-Aug-2022	2112	Sphaerocystis schroeteri Chodat	21552	0.57	3.70	3.70	26.50
MEL - 0107	MEL - 0107-PC		18-Aug-2022	2121	Oocystis lacustris Chodat	43104	1.22	6.00	3.00	28.30
MEL - 0107	MEL - 0107-PC		18-Aug-2022	2178	Cosmarium sp.	800	1.12	20.00	20.00	1396.30
MEL - 0107	MEL - 0107-PC		18-Aug-2022	2187	Staurodesmus extensus (Andersson) Teiling	200	0.08	13.60	12.00	387.40
MEL - 0107	MEL - 0107-PC		18-Aug-2022	2195	Staurodesmus bullardii G.M. Smith	200	0.50	25.00	23.00	2508.90
MEL - 0107	MEL - 0107-PC		18-Aug-2022	2199	Spondylosium planum (Wolle) W. and G.S. West	71840	2.71	6.00	6.00	37.70

Station	Sample	QA Sample ID	Date	Species Code	Species Name	Density cells/L	Biomass mg/m^3	Length µm	Width µm	Cell Volume $µm^3$
MEL - 0107	MEL - 0107-PC		18-Aug-2022	2206	Botryococcus braunii Kutzing	400	0.36	12.00	12.00	904.80
MEL - 0107	MEL - 0107-PC		18-Aug-2022	2235	Ankistrodesmus spiralis Lemmermann	7184	0.40	35.00	2.00	55.00
MEL - 0107	MEL - 0107-PC		18-Aug-2022	4351	Small chrysophyceae	337648	2.16	2.30	2.30	6.40
MEL - 0107	MEL - 0107-PC		18-Aug-2022	4352	Large chrysophyceae	21552	3.87	7.00	7.00	179.60
MEL - 0107	MEL - 0107-PC		18-Aug-2022	4355	Chrysochromulina parva Lackey	21552	1.41	5.00	5.00	65.40
MEL - 0107	MEL - 0107-PC		18-Aug-2022	4357	Chrysococcus sp.	359200	23.49	5.00	5.00	65.40
MEL - 0107	MEL - 0107-PC		18-Aug-2022	4358	Chrysostephanosphaera globulifera Scherffel	35920	13.26	8.90	8.90	369.10
MEL - 0107	MEL - 0107-PC		18-Aug-2022	4362	Kephyrion sp.	359200	4.60	2.90	2.90	12.80
MEL - 0107	MEL - 0107-PC		18-Aug-2022	4363	Spiniferomonas serrata	7184	0.66	5.60	5.60	92.00
MEL - 0107	MEL - 0107-PC		18-Aug-2022	4383	Dinobryon bavaricum Imhof	7184	1.63	12.00	6.00	226.20
MEL - 0107	MEL - 0107-PC		18-Aug-2022	4383	Dinobryon bavaricum Imhof	400	0.80	0.00	0.00	1991.00
MEL - 0107	MEL - 0107-PC		18-Aug-2022	4388	Dinobryon sertularia Ehrenberg	7184	1.63	12.00	6.00	226.20
MEL - 0107	MEL - 0107-PC		18-Aug-2022	4388	Dinobryon sertularia Ehrenberg	400	2.03	0.00	0.00	5085.00
MEL - 0107	MEL - 0107-PC		18-Aug-2022	4390	Dinobryon sociale Ehrenberg	136496	30.88	12.00	6.00	226.20
MEL - 0107	MEL - 0107-PC		18-Aug-2022	4390	Dinobryon sociale Ehrenberg	1400	2.79	0.00	0.00	1991.00
MEL - 0107	MEL - 0107-PC		18-Aug-2022	4396	Chrysolykos skuja (Nauwerck) Willen	7184	0.20	5.80	3.00	27.30
MEL - 0107	MEL - 0107-PC		18-Aug-2022	4413	Chrysochromulina laurentiana Kling	7184	2.83	9.10	9.10	394.60
MEL - 0107	MEL - 0107-PC		18-Aug-2022	4418	Salpingoeca frequentissima (Zach.) Lemmermann	395120	12.72	6.00	3.20	32.20
MEL - 0107	MEL - 0107-PC		18-Aug-2022	4448	Rhizochrysis scherffelii Pascher	2600	4.59	15.00	15.00	1767.10
MEL - 0107	MEL - 0107-PC		18-Aug-2022	5507	Cyclotella stelligera Cleve and Grunow	6200	14.81	11.50	23.00	2389.00
MEL - 0107	MEL - 0107-PC		18-Aug-2022	5509	Cyclotella ocellata Pant.	129312	13.00	4.00	8.00	100.50
MEL - 0107	MEL - 0107-PC		18-Aug-2022	5513	Tabellaria fenestrata (Lyngbye) Kutzing	9400	6.20	70.00	6.00	659.70
MEL - 0107	MEL - 0107-PC		18-Aug-2022	5514	Tabellaria flocculosa (Roth) Kutzing	2600	3.47	26.00	14.00	1334.10
MEL - 0107	MEL - 0107-PC		18-Aug-2022	5518	Synedra acus Kutzing	2400	0.28	110.00	2.00	115.20
MEL - 0107	MEL - 0107-PC		18-Aug-2022	5523	Synedra ulna (Nitzsch) Ehrenberg	600	1.36	240.00	6.00	2261.90
MEL - 0107	MEL - 0107-PC		18-Aug-2022	5524	Asterionella formosa Hassall	96200	10.58	105.00	2.00	110.00
MEL - 0107	MEL - 0107-PC		18-Aug-2022	5551	Cyclotella michiganiana Skvortzow	71840	1.87	2.55	5.10	26.00
MEL - 0107	MEL - 0107-PC		18-Aug-2022	6554	Rhodomonas minuta Skuja	50288	6.95	11.00	6.00	138.20
MEL - 0107	MEL - 0107-PC		18-Aug-2022	6558	Cryptomonas erosa Ehrenberg	4200	7.73	26.90	14.00	1840.40
MEL - 0107	MEL - 0107-PC		18-Aug-2022	7632	Gymnodinium sp.	3600	26.06	24.00	24.00	7238.20
MEL - 0107	MEL - 0107-PC		18-Aug-2022	7639	Peridinium pusillum (Penard) Lemmermann	6200	25.58	19.90	19.90	4126.30
MEL - 0107	MEL - 0107-PC		18-Aug-2022	7641	Peridinium aciculiferum Lemmermann	3000	27.14	30.00	24.00	9047.80
MEL - 0107	MEL - 0107R-PC	Lab Duplicate	18-Aug-2022	1073	Snowella sp	600	0.45	0.00	0.00	750.00
MEL - 0107	MEL - 0107R-PC	Lab Duplicate	18-Aug-2022	2121	Oocystis lacustris Chodat	21552	0.61	6.00	3.00	28.30
MEL - 0107	MEL - 0107R-PC	Lab Duplicate	18-Aug-2022	2167	Elakatothrix gelatinosa Willen	21552	0.41	12.00	2.00	18.80
MEL - 0107	MEL - 0107R-PC	Lab Duplicate	18-Aug-2022	2178	Cosmarium sp.	800	1.12	20.00	20.00	1396.30
MEL - 0107	MEL - 0107R-PC	Lab Duplicate	18-Aug-2022	2193	Staurodesmus paradoxum Meyen	200	0.57	26.00	24.00	2831.60
MEL - 0107	MEL - 0107R-PC	Lab Duplicate	18-Aug-2022	2199	Spondylosium planum (Wolle) W. and G.S. West	57472	2.17	6.00	6.00	37.70
MEL - 0107	MEL - 0107R-PC	Lab Duplicate	18-Aug-2022	2206	Botryococcus braunii Kutzing	400	0.36	12.00	12.00	904.80
MEL - 0107	MEL - 0107R-PC	Lab Duplicate	18-Aug-2022	4351	Small chrysophyceae	395120	2.53	2.30	2.30	6.40
MEL - 0107	MEL - 0107R-PC	Lab Duplicate	18-Aug-2022	4352	Large chrysophyceae	14368	2.58	7.00	7.00	179.60
MEL - 0107	MEL - 0107R-PC	Lab Duplicate	18-Aug-2022	4355	Chrysochromulina parva Lackey	64656	4.23	5.00	5.00	65.40
MEL - 0107	MEL - 0107R-PC	Lab Duplicate	18-Aug-2022	4357	Chrysococcus sp.	373568	24.43	5.00	5.00	65.40
MEL - 0107	MEL - 0107R-PC	Lab Duplicate	18-Aug-2022	4358	Chrysostephanosphaera globulifera Scherffel	28736	10.61	8.90	8.90	369.10
MEL - 0107	MEL - 0107R-PC	Lab Duplicate	18-Aug-2022	4362	Kephyrion sp.	409488	5.24	2.90	2.90	12.80
MEL - 0107	MEL - 0107R-PC	Lab Duplicate	18-Aug-2022	4368	Mallomonas crassisquama (Asmund) Fott	400	0.42	20.00	10.00	1047.20
MEL - 0107	MEL - 0107R-PC	Lab Duplicate	18-Aug-2022	4383	Dinobryon bavaricum Imhof	1400	2.79	0.00	0.00	1991.00
MEL - 0107	MEL - 0107R-PC	Lab Duplicate	18-Aug-2022	4388	Dinobryon sertularia Ehrenberg	7184	1.63	12.00	6.00	226.20
MEL - 0107	MEL - 0107R-PC	Lab Duplicate	18-Aug-2022	4388	Dinobryon sertularia Ehrenberg	200	1.02	0.00	0.00	5085.00
MEL - 0107	MEL - 0107R-PC	Lab Duplicate	18-Aug-2022	4390	Dinobryon sociale Ehrenberg	114944	26.00	12.00	6.00	226.20
MEL - 0107	MEL - 0107R-PC	Lab Duplicate	18-Aug-2022	4390	Dinobryon sociale Ehrenberg	1000	1.99	0.00	0.00	1991.00
MEL - 0107	MEL - 0107R-PC	Lab Duplicate	18-Aug-2022	4396	Chrysolykos skuja (Nauwerck) Willen	14368	0.39	5.80	3.00	27.30
MEL - 0107	MEL - 0107R-PC	Lab Duplicate	18-Aug-2022	4413	Chrysochromulina laurentiana Kling	28736	11.34	9.10	9.10	394.60
MEL - 0107	MEL - 0107R-PC	Lab Duplicate	18-Aug-2022	4418	Salpingoeca frequentissima (Zach.) Lemmermann	452592	14.57	6.00	3.20	32.20
MEL - 0107	MEL - 0107R-PC	Lab Duplicate	18-Aug-2022	4437	Pteridomonas sp.	21552	4.78	8.60	8.60	222.00
MEL - 0107	MEL - 0107R-PC	Lab Duplicate	18-Aug-2022	4448	Rhizochrysis scherffelii Pascher	3200	5.65	15.00	15.00	1767.10
MEL - 0107	MEL - 0107R-PC	Lab Duplicate	18-Aug-2022	5507	Cyclotella stelligera Cleve and Grunow	7000	16.72	11.50	23.00	2389.00
MEL - 0107	MEL - 0107R-PC	Lab Duplicate	18-Aug-2022	5509	Cyclotella ocellata Pant.	107760	10.83	4.00	8.00	100.50
MEL - 0107	MEL - 0107R-PC	Lab Duplicate	18-Aug-2022	5513	Tabellaria fenestrata (Lyngbye) Kutzing	8000	5.28	70.00	6.00	659.70
MEL - 0107	MEL - 0107R-PC	Lab Duplicate	18-Aug-2022	5514	Tabellaria flocculosa (Roth) Kutzing	3200	4.27	26.00	14.00	1334.10
MEL - 0107	MEL - 0107R-PC	Lab Duplicate	18-Aug-2022	5518	Synedra acus Kutzing	1800	0.21	110.00	2.00	115.20
MEL - 0107	MEL - 0107R-PC	Lab Duplicate	18-Aug-2022	5523	Synedra ulna (Nitzsch) Ehrenberg	200	0.45	240.00	6.00	2261.90
MEL - 0107	MEL - 0107R-PC	Lab Duplicate	18-Aug-2022	5524	Asterionella formosa Hassall	93800	10.32	105.00	2.00	110.00
MEL - 0107	MEL - 0107R-PC	Lab Duplicate	18-Aug-2022	5551	Cyclotella michiganiana Skvortzow	64656	1.68	2.55	5.10	26.00
MEL - 0107	MEL - 0107R-PC	Lab Duplicate	18-Aug-2022	6554	Rhodomonas minuta Skuja	64656	8.94	11.00	6.00	138.20
MEL - 0107	MEL - 0107R-PC	Lab Duplicate	18-Aug-2022	6558	Cryptomonas erosa Ehrenberg	4400	8.10	26.90	14.00	1840.40
MEL - 0107	MEL - 0107R-PC	Lab Duplicate	18-Aug-2022	6565	Cryptomonas rostratiformis Skuja	800	1.70	31.00	14.00	2120.90
MEL - 0107	MEL - 0107R-PC	Lab Duplicate	18-Aug-2022	7632	Gymnodinium sp.	3200	23.16	24.00	24.00	7238.20
MEL - 0107	MEL - 0107R-PC	Lab Duplicate	18-Aug-2022	7639	Peridinium pusillum (Penard) Lemmermann	7000	28.88	19.90	19.90	4126.30
MEL - 0107	MEL - 0107R-PC	Lab Duplicate	18-Aug-2022	7641	Peridinium aciculiferum Lemmermann	4000	36.19	30.00	24.00	9047.80
MEL - 0108	MEL - 0108-PC		18-Aug-2022	1073	Snowella sp	1000	0.75	0.00	0.00	750.00
MEL - 0108	MEL - 0108-PC		18-Aug-2022	2112	Sphaerocystis schroeteri Chodat	43104	1.05	3.60	3.60	24.40
MEL - 0108	MEL - 0108-PC		18-Aug-2022	2113	Pediastrum duplex Meyen	2400	0.22	9.10	6.20	89.60
MEL - 0108	MEL - 0108-PC		18-Aug-2022	2121	Oocystis lacustris Chodat	21552	0.61	6.00	3.00	28.30
MEL - 0108	MEL - 0108-PC		18-Aug-2022	2169	Planctonema lauterbornii Schmidle	21552	7.62	18.00	5.00	353.40
MEL - 0108	MEL - 0108-PC		18-Aug-2022	2187	Staurodesmus extensus (Andersson) Teiling	200	0.08	13.60	12.00	387.40
MEL - 0108	MEL - 0108-PC		18-Aug-2022	2199	Spondylosium planum (Wolle) W. and G.S. West	71840	2.71	6.00	6.00	37.70
MEL - 0108	MEL - 0108-PC		18-Aug-2022	2206	Botryococcus braunii Kutzing	1200	1.09	12.00	12.00	904.80
MEL - 0108	MEL - 0108-PC		18-Aug-2022	2260	Monomastix minuta Skuja	7184	0.14	6.20	3.00	19.50
MEL - 0108	MEL - 0108-PC		18-Aug-2022	4351	Small chrysophyceae	330464	2.11	2.30	2.30	6.40
MEL - 0108	MEL - 0108-PC		18-Aug-2022	4352	Large chrysophyceae	7184	1.29	7.00	7.00	179.60
MEL - 0108	MEL - 0108-PC		18-Aug-2022	4357	Chrysococcus sp.	280176	18.32	5.00	5.00	65.40
MEL - 0108	MEL - 0108-PC		18-Aug-2022	4361	Kephyrion boreale Skuja	7184	0.85	6.10	6.10	118.80
MEL - 0108	MEL - 0108-PC		18-Aug-2022	4362	Kephyrion sp.	179600	2.30	2.90	2.90	12.80
MEL - 0108	MEL - 0108-PC		18-Aug-2022	4375	Synura sphagnicola Korschikow	200	3.73	0.00	0.00	18650.00
MEL - 0108	MEL - 0108-PC		18-Aug-2022	4383	Dinobryon bavaricum Imhof	800	1.59	0.00	0.00	1991.00
MEL - 0108	MEL - 0108-PC		18-Aug-2022	4388	Dinobryon sertularia Ehrenberg	2000	10.17	0.00	0.00	5085.00
MEL - 0108	MEL - 0108-PC		18-Aug-2022	4390	Dinobryon sociale Ehrenberg	107760	24.38	12.00	6.00	226.20
MEL - 0108	MEL - 0108-PC		18-Aug-2022	4390	Dinobryon sociale Ehrenberg	600	1.19	0.00	0.00	1991.00
MEL - 0108	MEL - 0108-PC		18-Aug-2022	4413	Chrysochromulina laurentiana Kling	28736	11.34	9.10	9.10	394.60
MEL - 0108	MEL - 0108-PC		18-Aug-2022	4418	Salpingoeca frequentissima (Zach.) Lemmermann	538800	17.35	6.00	3.20	32.20
MEL - 0108	MEL - 0108-PC		18-Aug-2022	4437	Pteridomonas sp.	7184	1.59	8.60	8.60	222.00
MEL - 0108	MEL - 0108-PC		18-Aug-2022	4448	Rhizochrysis scherffelii Pascher	1600	2.83	15.00	15.00	1767.10
MEL - 0108	MEL - 0108-PC		18-Aug-2022	5507	Cyclotella stelligera Cleve and Grunow	4600	10.99	11.50	23.00	2389.00
MEL - 0108	MEL - 0108-PC		18-Aug-2022	5508	Cyclotella pseudostelligera	35920	19.35	7.00	14.00	538.80

Station	Sample	QA Sample ID	Date	Species Code	Species Name	Density cells/L	Biomass mg/m^3	Length µm	Width µm	Cell Volume $µm^3$
MEL - 0108	MEL - 0108-PC		18-Aug-2022	5509	Cyclotella ocellata Pant.	21552	2.17	4.00	8.00	100.50
MEL - 0108	MEL - 0108-PC		18-Aug-2022	5513	Tabellaria fenestrata (Lyngbye) Kutzing	6200	4.09	70.00	6.00	659.70
MEL - 0108	MEL - 0108-PC		18-Aug-2022	5518	Synedra acus Kutzing	4800	0.55	110.00	2.00	115.20
MEL - 0108	MEL - 0108-PC		18-Aug-2022	5523	Synedra ulna (Nitzsch) Ehrenberg	1600	3.62	240.00	6.00	2261.90
MEL - 0108	MEL - 0108-PC		18-Aug-2022	5524	Asterionella formosa Hassall	81200	8.93	105.00	2.00	110.00
MEL - 0108	MEL - 0108-PC		18-Aug-2022	5551	Cyclotella michiganiana Skvortzow	150864	2.04	2.05	4.10	13.50
MEL - 0108	MEL - 0108-PC		18-Aug-2022	6554	Rhodomonas minuta Skuja	114944	15.89	11.00	6.00	138.20
MEL - 0108	MEL - 0108-PC		18-Aug-2022	6558	Cryptomonas erosa Ehrenberg	4800	8.83	26.90	14.00	1840.40
MEL - 0108	MEL - 0108-PC		18-Aug-2022	7631	Gymnodinium helveticum Penard	200	4.71	50.00	30.00	23561.90
MEL - 0108	MEL - 0108-PC		18-Aug-2022	7632	Gymnodinium sp.	2600	18.82	24.00	24.00	7238.20
MEL - 0108	MEL - 0108-PC		18-Aug-2022	7639	Peridinium pusillum (Penard) Lemmermann	3200	13.20	19.90	19.90	4126.30
MEL - 0108	MEL - 0108-PC		18-Aug-2022	7641	Peridinium aciculiferum Lemmermann	4000	36.19	30.00	24.00	9047.80
MEL - 0109	MEL - 0109-PC		18-Aug-2022	1073	Snowella sp	200	0.15	0.00	0.00	750.00
MEL - 0109	MEL - 0109-PC		18-Aug-2022	2112	Sphaerocystis schroeteri Chodat	251440	6.14	3.60	3.60	24.40
MEL - 0109	MEL - 0109-PC		18-Aug-2022	2121	Oocystis lacustris Chodat	50288	1.42	6.00	3.00	28.30
MEL - 0109	MEL - 0109-PC		18-Aug-2022	2167	Elakatothrix gelatinosa Willen	57472	1.08	12.00	2.00	18.80
MEL - 0109	MEL - 0109-PC		18-Aug-2022	2169	Planctonema lauterbornii Schmidle	7184	2.54	18.00	5.00	353.40
MEL - 0109	MEL - 0109-PC		18-Aug-2022	2178	Cosmarium sp.	400	0.56	20.00	20.00	1396.30
MEL - 0109	MEL - 0109-PC		18-Aug-2022	2187	Staurodesmus extensus (Andersson) Teiling	200	0.08	13.60	12.00	387.40
MEL - 0109	MEL - 0109-PC		18-Aug-2022	2191	Staurodesmus cuspidatus (Brebisson and Ralfs) Teiling	200	0.42	24.00	21.00	2111.20
MEL - 0109	MEL - 0109-PC		18-Aug-2022	2199	Spondylosium planum (Wolle) W. and G.S. West	43104	1.63	6.00	6.00	37.70
MEL - 0109	MEL - 0109-PC		18-Aug-2022	2206	Botryococcus braunii Kutzing	1000	0.90	12.00	12.00	904.80
MEL - 0109	MEL - 0109-PC		18-Aug-2022	2235	Ankistrodesmus spiralis Lemmermann	7184	0.40	35.00	2.00	55.00
MEL - 0109	MEL - 0109-PC		18-Aug-2022	3305	Trachelomonas volvocina Ehrenberg	200	0.41	18.00	18.00	2035.80
MEL - 0109	MEL - 0109-PC		18-Aug-2022	4351	Small chrysophyceae	459776	2.94	2.30	2.30	6.40
MEL - 0109	MEL - 0109-PC		18-Aug-2022	4352	Large chrysophyceae	7184	1.29	7.00	7.00	179.60
MEL - 0109	MEL - 0109-PC		18-Aug-2022	4355	Chrysochromulina parva Lackey	50288	3.29	5.00	5.00	65.40
MEL - 0109	MEL - 0109-PC		18-Aug-2022	4357	Chrysococcus sp.	632192	41.35	5.00	5.00	65.40
MEL - 0109	MEL - 0109-PC		18-Aug-2022	4362	Kephyrion sp.	100576	1.29	2.90	2.90	12.80
MEL - 0109	MEL - 0109-PC		18-Aug-2022	4378	Dinobryon borgei Lemmermann	7184	0.31	9.10	3.00	42.90
MEL - 0109	MEL - 0109-PC		18-Aug-2022	4383	Dinobryon bavaricum Imhof	7184	1.63	12.00	6.00	226.20
MEL - 0109	MEL - 0109-PC		18-Aug-2022	4383	Dinobryon bavaricum Imhof	1200	2.39	0.00	0.00	1991.00
MEL - 0109	MEL - 0109-PC		18-Aug-2022	4388	Dinobryon sertularia Ehrenberg	1000	5.09	0.00	0.00	5085.00
MEL - 0109	MEL - 0109-PC		18-Aug-2022	4390	Dinobryon sociale Ehrenberg	150864	34.13	12.00	6.00	226.20
MEL - 0109	MEL - 0109-PC		18-Aug-2022	4390	Dinobryon sociale Ehrenberg	600	1.19	0.00	0.00	1991.00
MEL - 0109	MEL - 0109-PC		18-Aug-2022	4413	Chrysochromulina laurentiana Kling	35920	14.17	9.10	9.10	394.60
MEL - 0109	MEL - 0109-PC		18-Aug-2022	4418	Salpingoeca frequentissima (Zach.) Lemmermann	538800	17.35	6.00	3.20	32.20
MEL - 0109	MEL - 0109-PC		18-Aug-2022	4448	Rhizochrysis scherffelii Pascher	1000	1.77	15.00	15.00	1767.10
MEL - 0109	MEL - 0109-PC		18-Aug-2022	5507	Cyclotella stelligera Cleve and Grunow	4600	10.99	11.50	23.00	2389.00
MEL - 0109	MEL - 0109-PC		18-Aug-2022	5508	Cyclotella pseudostelligera	93392	41.22	6.55	13.10	441.40
MEL - 0109	MEL - 0109-PC		18-Aug-2022	5509	Cyclotella ocellata Pant.	71840	7.22	4.00	8.00	100.50
MEL - 0109	MEL - 0109-PC		18-Aug-2022	5511	Rhizosolenia eriense H.L. Smith	21552	1.83	12.00	3.00	84.80
MEL - 0109	MEL - 0109-PC		18-Aug-2022	5513	Tabellaria fenestrata (Lyngbye) Kutzing	8400	5.54	70.00	6.00	659.70
MEL - 0109	MEL - 0109-PC		18-Aug-2022	5515	Fragilaria crotonensis Kitton	2400	0.69	69.00	4.00	289.00
MEL - 0109	MEL - 0109-PC		18-Aug-2022	5518	Synedra acus Kutzing	1000	0.12	110.00	2.00	115.20
MEL - 0109	MEL - 0109-PC		18-Aug-2022	5523	Synedra ulna (Nitzsch) Ehrenberg	200	0.45	240.00	6.00	2261.90
MEL - 0109	MEL - 0109-PC		18-Aug-2022	5524	Asterionella formosa Hassall	77200	8.49	105.00	2.00	110.00
MEL - 0109	MEL - 0109-PC		18-Aug-2022	5551	Cyclotella michiganiana Skvortzow	107760	2.80	2.55	5.10	26.00
MEL - 0109	MEL - 0109-PC		18-Aug-2022	6554	Rhodomonas minuta Skuja	122128	16.88	11.00	6.00	138.20
MEL - 0109	MEL - 0109-PC		18-Aug-2022	6558	Cryptomonas erosa Ehrenberg	7200	13.25	26.90	14.00	1840.40
MEL - 0109	MEL - 0109-PC		18-Aug-2022	6565	Cryptomonas rostratiformis Skuja	200	0.42	31.00	14.00	2120.90
MEL - 0109	MEL - 0109-PC		18-Aug-2022	7631	Gymnodinium helveticum Penard	400	9.42	50.00	30.00	23561.90
MEL - 0109	MEL - 0109-PC		18-Aug-2022	7632	Gymnodinium sp.	3800	27.51	24.00	24.00	7238.20
MEL - 0109	MEL - 0109-PC		18-Aug-2022	7639	Peridinium pusillum (Penard) Lemmermann	5200	21.46	19.90	19.90	4126.30
MEL - 0109	MEL - 0109-PC		18-Aug-2022	7641	Peridinium aciculiferum Lemmermann	3200	28.95	30.00	24.00	9047.80
MEL - 0110	MEL - 0110-PC		18-Aug-2022	1073	Snowella sp	800	0.60	0.00	0.00	750.00
MEL - 0110	MEL - 0110-PC		18-Aug-2022	2101	Carteria spp.	200	0.23	13.00	13.00	1150.30
MEL - 0110	MEL - 0110-PC		18-Aug-2022	2112	Sphaerocystis schroeteri Chodat	129312	3.16	3.60	3.60	24.40
MEL - 0110	MEL - 0110-PC		18-Aug-2022	2121	Oocystis lacustris Chodat	7184	0.20	6.00	3.00	28.30
MEL - 0110	MEL - 0110-PC		18-Aug-2022	2127	Tetraedron minimum (Brunow) Hansgrig	7184	1.25	10.00	10.00	174.50
MEL - 0110	MEL - 0110-PC		18-Aug-2022	2143	Monoraphidium minutum (Nag.) Komarkova-Legnerova	28736	1.62	9.00	4.00	56.50
MEL - 0110	MEL - 0110-PC		18-Aug-2022	2145	Crucigenia quadrata Morr.	28736	0.04	2.00	2.00	1.40
MEL - 0110	MEL - 0110-PC		18-Aug-2022	2193	Staurodesmus paradoxum Meyen	200	0.52	26.00	22.00	2595.70
MEL - 0110	MEL - 0110-PC		18-Aug-2022	2199	Spondylosium planum (Wolle) W. and G.S. West	50288	1.90	6.00	6.00	37.70
MEL - 0110	MEL - 0110-PC		18-Aug-2022	2206	Botryococcus braunii Kutzing	1400	1.27	12.00	12.00	904.80
MEL - 0110	MEL - 0110-PC		18-Aug-2022	4351	Small chrysophyceae	316096	2.02	2.30	2.30	6.40
MEL - 0110	MEL - 0110-PC		18-Aug-2022	4352	Large chrysophyceae	7184	1.29	7.00	7.00	179.60
MEL - 0110	MEL - 0110-PC		18-Aug-2022	4357	Chrysococcus sp.	502880	32.89	5.00	5.00	65.40
MEL - 0110	MEL - 0110-PC		18-Aug-2022	4358	Chrysostephanosphaera globulifera Scherffel	7184	2.65	8.90	8.90	369.10
MEL - 0110	MEL - 0110-PC		18-Aug-2022	4361	Kephyrion boreale Skuja	7184	0.85	6.10	6.10	118.80
MEL - 0110	MEL - 0110-PC		18-Aug-2022	4362	Kephyrion sp.	114944	1.98	3.20	3.20	17.20
MEL - 0110	MEL - 0110-PC		18-Aug-2022	4375	Synura sphagnicola Korschikow	7184	3.76	10.00	10.00	523.60
MEL - 0110	MEL - 0110-PC		18-Aug-2022	4383	Dinobryon bavaricum Imhof	1000	1.99	0.00	0.00	1991.00
MEL - 0110	MEL - 0110-PC		18-Aug-2022	4388	Dinobryon sertularia Ehrenberg	200	1.02	0.00	0.00	5085.00
MEL - 0110	MEL - 0110-PC		18-Aug-2022	4390	Dinobryon sociale Ehrenberg	107760	24.38	12.00	6.00	226.20
MEL - 0110	MEL - 0110-PC		18-Aug-2022	4390	Dinobryon sociale Ehrenberg	1600	3.19	0.00	0.00	1991.00
MEL - 0110	MEL - 0110-PC		18-Aug-2022	4413	Chrysochromulina laurentiana Kling	7184	2.83	9.10	9.10	394.60
MEL - 0110	MEL - 0110-PC		18-Aug-2022	4418	Salpingoeca frequentissima (Zach.) Lemmermann	387936	12.49	6.00	3.20	32.20
MEL - 0110	MEL - 0110-PC		18-Aug-2022	5507	Cyclotella stelligera Cleve and Grunow	7200	17.20	11.50	23.00	2389.00
MEL - 0110	MEL - 0110-PC		18-Aug-2022	5508	Cyclotella pseudostelligera	35920	15.50	6.50	13.00	431.40
MEL - 0110	MEL - 0110-PC		18-Aug-2022	5509	Cyclotella ocellata Pant.	71840	7.49	4.05	8.10	104.30
MEL - 0110	MEL - 0110-PC		18-Aug-2022	5513	Tabellaria fenestrata (Lyngbye) Kutzing	9400	6.20	70.00	6.00	659.70
MEL - 0110	MEL - 0110-PC		18-Aug-2022	5518	Synedra acus Kutzing	2200	0.25	110.00	2.00	115.20
MEL - 0110	MEL - 0110-PC		18-Aug-2022	5523	Synedra ulna (Nitzsch) Ehrenberg	600	1.36	240.00	6.00	2261.90
MEL - 0110	MEL - 0110-PC		18-Aug-2022	5524	Asterionella formosa Hassall	81800	9.00	105.00	2.00	110.00
MEL - 0110	MEL - 0110-PC		18-Aug-2022	5551	Cyclotella michiganiana Skvortzow	71840	1.87	2.55	5.10	26.00
MEL - 0110	MEL - 0110-PC		18-Aug-2022	6554	Rhodomonas minuta Skuja	7184	0.99	11.00	6.00	138.20
MEL - 0110	MEL - 0110-PC		18-Aug-2022	6558	Cryptomonas erosa Ehrenberg	3600	6.63	26.90	14.00	1840.40
MEL - 0110	MEL - 0110-PC		18-Aug-2022	6565	Cryptomonas rostratiformis Skuja	200	0.48	35.00	14.00	2394.60
MEL - 0110	MEL - 0110-PC		18-Aug-2022	7631	Gymnodinium helveticum Penard	400	9.42	50.00	30.00	23561.90
MEL - 0110	MEL - 0110-PC		18-Aug-2022	7632	Gymnodinium sp.	3400	24.61	24.00	24.00	7238.20
MEL - 0110	MEL - 0110-PC		18-Aug-2022	7639	Peridinium pusillum (Penard) Lemmermann	4200	17.33	19.90	19.90	4126.30
MEL - 0110	MEL - 0110-PC		18-Aug-2022	7641	Peridinium aciculiferum Lemmermann	4800	43.43	30.00	24.00	9047.80
MEL - 0202	MEL - 0202-PC		18-Aug-2022	1073	Snowella sp	200	0.15	0.00	0.00	750.00
MEL - 0202	MEL - 0202-PC		18-Aug-2022	2143	Monoraphidium minutum (Nag.) Komarkova-Legnerova	7184	0.41	9.00	4.00	56.50

Station	Sample	QA Sample ID	Date	Species Code	Species Name	Density cells/L	Biomass mg/m^3	Length µm	Width µm	Cell Volume $µm^3$
MEL - 0202	MEL - 0202-PC		18-Aug-2022	2187	Staurodesmus extensus (Andersson) Teiling	200	0.08	13.60	12.00	387.40
MEL - 0202	MEL - 0202-PC		18-Aug-2022	2206	Botryococcus braunii Kutzing	200	0.18	12.00	12.00	904.80
MEL - 0202	MEL - 0202-PC		18-Aug-2022	4351	Small chrysophyceae	215520	1.38	2.30	2.30	6.40
MEL - 0202	MEL - 0202-PC		18-Aug-2022	4352	Large chrysophyceae	21552	3.87	7.00	7.00	179.60
MEL - 0202	MEL - 0202-PC		18-Aug-2022	4355	Chrysochromulina parva Lackey	71840	4.70	5.00	5.00	65.40
MEL - 0202	MEL - 0202-PC		18-Aug-2022	4357	Chrysococcus sp.	380752	24.90	5.00	5.00	65.40
MEL - 0202	MEL - 0202-PC		18-Aug-2022	4362	Kephyrion sp.	79024	1.01	2.90	2.90	12.80
MEL - 0202	MEL - 0202-PC		18-Aug-2022	4381	Dinobryon mucronatom Nygaard	21552	2.82	10.00	5.00	130.90
MEL - 0202	MEL - 0202-PC		18-Aug-2022	4383	Dinobryon bavaricum Imhof	600	6.10	0.00	0.00	10170.00
MEL - 0202	MEL - 0202-PC		18-Aug-2022	4388	Dinobryon sertularia Ehrenberg	57472	13.00	12.00	6.00	226.20
MEL - 0202	MEL - 0202-PC		18-Aug-2022	4388	Dinobryon sertularia Ehrenberg	5200	26.44	0.00	0.00	5085.00
MEL - 0202	MEL - 0202-PC		18-Aug-2022	4390	Dinobryon sociale Ehrenberg	222704	50.38	12.00	6.00	226.20
MEL - 0202	MEL - 0202-PC		18-Aug-2022	4390	Dinobryon sociale Ehrenberg	3000	5.97	0.00	0.00	1991.00
MEL - 0202	MEL - 0202-PC		18-Aug-2022	4413	Chrysochromulina laurentiana Kling	28736	11.34	9.10	9.10	394.60
MEL - 0202	MEL - 0202-PC		18-Aug-2022	4437	Pteridomonas sp.	35920	7.97	8.60	8.60	222.00
MEL - 0202	MEL - 0202-PC		18-Aug-2022	5507	Cyclotella stelligera Cleve and Grunow	2000	4.18	11.00	22.00	2090.70
MEL - 0202	MEL - 0202-PC		18-Aug-2022	5508	Cyclotella pseudostelligera	7184	2.96	6.40	12.80	411.80
MEL - 0202	MEL - 0202-PC		18-Aug-2022	5513	Tabellaria fenestrata (Lyngbye) Kutzing	2400	1.61	71.00	6.00	669.20
MEL - 0202	MEL - 0202-PC		18-Aug-2022	5514	Tabellaria flocculosa (Roth) Kutzing	2600	3.47	26.00	14.00	1334.10
MEL - 0202	MEL - 0202-PC		18-Aug-2022	5518	Synedra acus Kutzing	1400	0.13	88.00	2.00	92.20
MEL - 0202	MEL - 0202-PC		18-Aug-2022	5524	Asterionella formosa Hassall	11600	1.25	103.00	2.00	107.90
MEL - 0202	MEL - 0202-PC		18-Aug-2022	5551	Cyclotella michiganiana Skvortzow	50288	0.96	2.30	4.60	19.10
MEL - 0202	MEL - 0202-PC		18-Aug-2022	6554	Rhodomonas minuta Skuja	71840	5.96	9.50	5.00	82.90
MEL - 0202	MEL - 0202-PC		18-Aug-2022	6558	Cryptomonas erosa Ehrenberg	1400	2.49	26.00	14.00	1778.80
MEL - 0202	MEL - 0202-PC		18-Aug-2022	7632	Gymnodinium sp.	1200	8.69	24.00	24.00	7238.20
MEL - 0202	MEL - 0202-PC		18-Aug-2022	7639	Peridinium pusillum (Penard) Lemmermann	2800	11.04	19.60	19.60	3942.50
MEL - 0202	MEL - 0202-PC		18-Aug-2022	7641	Peridinium aciculiferum Lemmermann	200	1.81	30.00	24.00	9047.80
MEL - 0202	MEL - 0202R-PC	Lab Duplicate	18-Aug-2022	1073	Snowella sp	600	0.45	0.00	0.00	750.00
MEL - 0202	MEL - 0202R-PC	Lab Duplicate	18-Aug-2022	2206	Botryococcus braunii Kutzing	200	0.18	12.00	12.00	904.80
MEL - 0202	MEL - 0202R-PC	Lab Duplicate	18-Aug-2022	2235	Ankistrodesmus spiralis Lemmermann	7184	0.40	35.00	2.00	55.00
MEL - 0202	MEL - 0202R-PC	Lab Duplicate	18-Aug-2022	4351	Small chrysophyceae	172416	1.10	2.30	2.30	6.40
MEL - 0202	MEL - 0202R-PC	Lab Duplicate	18-Aug-2022	4352	Large chrysophyceae	14368	2.58	7.00	7.00	179.60
MEL - 0202	MEL - 0202R-PC	Lab Duplicate	18-Aug-2022	4355	Chrysochromulina parva Lackey	100576	6.58	5.00	5.00	65.40
MEL - 0202	MEL - 0202R-PC	Lab Duplicate	18-Aug-2022	4357	Chrysococcus sp.	438224	28.66	5.00	5.00	65.40
MEL - 0202	MEL - 0202R-PC	Lab Duplicate	18-Aug-2022	4362	Kephyrion sp.	50288	0.64	2.90	2.90	12.80
MEL - 0202	MEL - 0202R-PC	Lab Duplicate	18-Aug-2022	4381	Dinobryon mucronatom Nygaard	21552	2.82	10.00	5.00	130.90
MEL - 0202	MEL - 0202R-PC	Lab Duplicate	18-Aug-2022	4383	Dinobryon bavaricum Imhof	200	2.03	0.00	0.00	10170.00
MEL - 0202	MEL - 0202R-PC	Lab Duplicate	18-Aug-2022	4388	Dinobryon sertularia Ehrenberg	64656	14.63	12.00	6.00	226.20
MEL - 0202	MEL - 0202R-PC	Lab Duplicate	18-Aug-2022	4388	Dinobryon sertularia Ehrenberg	6000	30.51	0.00	0.00	5085.00
MEL - 0202	MEL - 0202R-PC	Lab Duplicate	18-Aug-2022	4390	Dinobryon sociale Ehrenberg	237072	53.63	12.00	6.00	226.20
MEL - 0202	MEL - 0202R-PC	Lab Duplicate	18-Aug-2022	4390	Dinobryon sociale Ehrenberg	4200	8.36	0.00	0.00	1991.00
MEL - 0202	MEL - 0202R-PC	Lab Duplicate	18-Aug-2022	4396	Chrysolykos skuja (Nauwerck) Willen	7184	0.20	5.90	3.00	27.80
MEL - 0202	MEL - 0202R-PC	Lab Duplicate	18-Aug-2022	4411	Bitrichia chodatii (Reverdin) Chodat	14368	0.72	6.00	4.00	50.30
MEL - 0202	MEL - 0202R-PC	Lab Duplicate	18-Aug-2022	4413	Chrysochromulina laurentiana Kling	14368	5.67	9.10	9.10	394.60
MEL - 0202	MEL - 0202R-PC	Lab Duplicate	18-Aug-2022	4437	Pteridomonas sp.	21552	4.78	8.60	8.60	222.00
MEL - 0202	MEL - 0202R-PC	Lab Duplicate	18-Aug-2022	5507	Cyclotella stelligera Cleve and Grunow	2400	5.02	11.00	22.00	2090.70
MEL - 0202	MEL - 0202R-PC	Lab Duplicate	18-Aug-2022	5513	Tabellaria fenestrata (Lyngbye) Kutzing	1800	1.20	71.00	6.00	669.20
MEL - 0202	MEL - 0202R-PC	Lab Duplicate	18-Aug-2022	5514	Tabellaria flocculosa (Roth) Kutzing	1200	1.60	26.00	14.00	1334.10
MEL - 0202	MEL - 0202R-PC	Lab Duplicate	18-Aug-2022	5518	Synedra acus Kutzing	1200	0.11	88.00	2.00	92.20
MEL - 0202	MEL - 0202R-PC	Lab Duplicate	18-Aug-2022	5524	Asterionella formosa Hassall	14200	1.53	103.00	2.00	107.90
MEL - 0202	MEL - 0202R-PC	Lab Duplicate	18-Aug-2022	5551	Cyclotella michiganiana Skvortzow	100576	1.92	2.30	4.60	19.10
MEL - 0202	MEL - 0202R-PC	Lab Duplicate	18-Aug-2022	6554	Rhodomonas minuta Skuja	50288	4.17	9.50	5.00	82.90
MEL - 0202	MEL - 0202R-PC	Lab Duplicate	18-Aug-2022	6558	Cryptomonas erosa Ehrenberg	2000	3.56	26.00	14.00	1778.80
MEL - 0202	MEL - 0202R-PC	Lab Duplicate	18-Aug-2022	6565	Cryptomonas rostratiformis Skuja	400	0.90	33.00	14.00	2257.80
MEL - 0202	MEL - 0202R-PC	Lab Duplicate	18-Aug-2022	7632	Gymnodinium sp.	600	4.34	24.00	24.00	7238.20
MEL - 0202	MEL - 0202R-PC	Lab Duplicate	18-Aug-2022	7639	Peridinium pusillum (Penard) Lemmermann	2200	8.67	19.60	19.60	3942.50
MEL - 0203	MEL - 0203-PC		18-Aug-2022	1073	Snowella sp	200	0.15	0.00	0.00	750.00
MEL - 0203	MEL - 0203-PC		18-Aug-2022	2112	Sphaerocystis schroeteri Chodat	71840	1.35	3.30	3.30	18.80
MEL - 0203	MEL - 0203-PC		18-Aug-2022	2143	Monoraphidium minutum (Nag.) Komarkova-Legnerova	21552	1.22	9.00	4.00	56.50
MEL - 0203	MEL - 0203-PC		18-Aug-2022	2167	Elakatothrix gelatinosa Willen	71840	1.35	12.00	2.00	18.80
MEL - 0203	MEL - 0203-PC		18-Aug-2022	2199	Spondylosium planum (Wolle) W. and G.S. West	7184	0.27	6.00	6.00	37.70
MEL - 0203	MEL - 0203-PC		18-Aug-2022	2206	Botryococcus braunii Kutzing	800	0.72	12.00	12.00	904.80
MEL - 0203	MEL - 0203-PC		18-Aug-2022	2247	Oocystis gigas Archer	200	0.48	18.00	16.00	2412.70
MEL - 0203	MEL - 0203-PC		18-Aug-2022	4351	Small chrysophyceae	359200	2.30	2.30	2.30	6.40
MEL - 0203	MEL - 0203-PC		18-Aug-2022	4352	Large chrysophyceae	35920	6.45	7.00	7.00	179.60
MEL - 0203	MEL - 0203-PC		18-Aug-2022	4355	Chrysochromulina parva Lackey	100576	6.58	5.00	5.00	65.40
MEL - 0203	MEL - 0203-PC		18-Aug-2022	4357	Chrysococcus sp.	359200	23.49	5.00	5.00	65.40
MEL - 0203	MEL - 0203-PC		18-Aug-2022	4358	Chrysostephanosphaera globulifera Scherffel	21552	7.95	8.90	8.90	369.10
MEL - 0203	MEL - 0203-PC		18-Aug-2022	4362	Kephyrion sp.	136496	1.75	2.90	2.90	12.80
MEL - 0203	MEL - 0203-PC		18-Aug-2022	4363	Spiniferomonas serrata	35920	3.13	5.50	5.50	87.10
MEL - 0203	MEL - 0203-PC		18-Aug-2022	4378	Dinobryon borgei Lemmermann	28736	1.22	9.00	3.00	42.40
MEL - 0203	MEL - 0203-PC		18-Aug-2022	4381	Dinobryon mucronatom Nygaard	7184	0.94	10.00	5.00	130.90
MEL - 0203	MEL - 0203-PC		18-Aug-2022	4383	Dinobryon bavaricum Imhof	400	4.07	0.00	0.00	10170.00
MEL - 0203	MEL - 0203-PC		18-Aug-2022	4388	Dinobryon sertularia Ehrenberg	21552	4.88	12.00	6.00	226.20
MEL - 0203	MEL - 0203-PC		18-Aug-2022	4388	Dinobryon sertularia Ehrenberg	8000	40.68	0.00	0.00	5085.00
MEL - 0203	MEL - 0203-PC		18-Aug-2022	4390	Dinobryon sociale Ehrenberg	258624	58.50	12.00	6.00	226.20
MEL - 0203	MEL - 0203-PC		18-Aug-2022	4390	Dinobryon sociale Ehrenberg	7600	15.13	0.00	0.00	1991.00
MEL - 0203	MEL - 0203-PC		18-Aug-2022	4413	Chrysochromulina laurentiana Kling	28736	11.34	9.10	9.10	394.60
MEL - 0203	MEL - 0203-PC		18-Aug-2022	4418	Salpingoeca frequentissima (Zach.) Lemmermann	21552	0.56	5.50	3.00	25.90
MEL - 0203	MEL - 0203-PC		18-Aug-2022	4437	Pteridomonas sp.	7184	1.59	8.60	8.60	222.00
MEL - 0203	MEL - 0203-PC		18-Aug-2022	5507	Cyclotella stelligera Cleve and Grunow	2800	5.85	11.00	22.00	2090.70
MEL - 0203	MEL - 0203-PC		18-Aug-2022	5509	Cyclotella ocellata Pant.	7184	0.75	4.05	8.10	104.30
MEL - 0203	MEL - 0203-PC		18-Aug-2022	5518	Synedra acus Kutzing	400	0.04	88.00	2.00	92.20
MEL - 0203	MEL - 0203-PC		18-Aug-2022	5524	Asterionella formosa Hassall	13600	1.47	103.00	2.00	107.90
MEL - 0203	MEL - 0203-PC		18-Aug-2022	5551	Cyclotella michiganiana Skvortzow	50288	0.96	2.30	4.60	19.10
MEL - 0203	MEL - 0203-PC		18-Aug-2022	6554	Rhodomonas minuta Skuja	79024	6.55	9.50	5.00	82.90
MEL - 0203	MEL - 0203-PC		18-Aug-2022	6558	Cryptomonas erosa Ehrenberg	1000	1.78	26.00	14.00	1778.80
MEL - 0203	MEL - 0203-PC		18-Aug-2022	7632	Gymnodinium sp.	1400	10.13	24.00	24.00	7238.20
MEL - 0203	MEL - 0203-PC		18-Aug-2022	7639	Peridinium pusillum (Penard) Lemmermann	3000	11.83	19.60	19.60	3942.50
MEL - 0205	MEL - 0205-PC		18-Aug-2022	1073	Snowella sp	200	0.15	0.00	0.00	750.00
MEL - 0205	MEL - 0205-PC		18-Aug-2022	2113	Pediastrum duplex Meyen	3200	0.26	9.00	5.70	80.60
MEL - 0205	MEL - 0205-PC		18-Aug-2022	2121	Oocystis lacustris Chodat	57472	1.63	6.00	3.00	28.30
MEL - 0205	MEL - 0205-PC		18-Aug-2022	2143	Monoraphidium minutum (Nag.) Komarkova-Legnerova	7184	0.41	9.00	4.00	56.50
MEL - 0205	MEL - 0205-PC		18-Aug-2022	2169	Planctonema lauterbornii Schmidle	7184	2.54	18.00	5.00	353.40
MEL - 0205	MEL - 0205-PC		18-Aug-2022	2178	Cosmarium sp.	200	0.28	20.00	20.00	1396.30

Station	Sample	QA Sample ID	Date	Species Code	Species Name	Density cells/L	Biomass mg/m^3	Length µm	Width µm	Cell Volume $µm^3$
MEL - 0205	MEL - 0205-PC		18-Aug-2022	2187	Staurodesmus extensus (Andersson) Teiling	800	0.31	13.60	12.00	387.40
MEL - 0205	MEL - 0205-PC		18-Aug-2022	2206	Botryococcus braunii Kutzing	1000	0.90	12.00	12.00	904.80
MEL - 0205	MEL - 0205-PC		18-Aug-2022	2215	Tetraedron caudatum (Corda) Hansgrig	7184	0.03	3.00	3.00	4.70
MEL - 0205	MEL - 0205-PC		18-Aug-2022	2247	Oocystis gigas Archer	400	0.97	18.00	16.00	2412.70
MEL - 0205	MEL - 0205-PC		18-Aug-2022	4351	Small chrysophyceae	229888	1.47	2.30	2.30	6.40
MEL - 0205	MEL - 0205-PC		18-Aug-2022	4352	Large chrysophyceae	7184	1.29	7.00	7.00	179.60
MEL - 0205	MEL - 0205-PC		18-Aug-2022	4357	Chrysococcus sp.	366384	23.96	5.00	5.00	65.40
MEL - 0205	MEL - 0205-PC		18-Aug-2022	4362	Kephyrion sp.	7184	0.09	2.90	2.90	12.80
MEL - 0205	MEL - 0205-PC		18-Aug-2022	4369	Mallomonas pseudocoronata Prescott	200	0.23	22.00	10.00	1151.90
MEL - 0205	MEL - 0205-PC		18-Aug-2022	4381	Dinobryon mucronatom Nygaard	7184	0.94	10.00	5.00	130.90
MEL - 0205	MEL - 0205-PC		18-Aug-2022	4388	Dinobryon sertularia Ehrenberg	21552	4.88	12.00	6.00	226.20
MEL - 0205	MEL - 0205-PC		18-Aug-2022	4388	Dinobryon sertularia Ehrenberg	6400	32.54	0.00	0.00	5085.00
MEL - 0205	MEL - 0205-PC		18-Aug-2022	4390	Dinobryon sociale Ehrenberg	129312	29.25	12.00	6.00	226.20
MEL - 0205	MEL - 0205-PC		18-Aug-2022	4390	Dinobryon sociale Ehrenberg	5400	10.75	0.00	0.00	1991.00
MEL - 0205	MEL - 0205-PC		18-Aug-2022	4413	Chrysochromulina laurentiana Kling	50288	19.84	9.10	9.10	394.60
MEL - 0205	MEL - 0205-PC		18-Aug-2022	4414	Stichogloea spp.	28736	1.45	6.00	4.00	50.30
MEL - 0205	MEL - 0205-PC		18-Aug-2022	4418	Salpingoeca frequentissima (Zach.) Lemmermann	7184	0.19	5.50	3.00	25.90
MEL - 0205	MEL - 0205-PC		18-Aug-2022	5507	Cyclotella stelligera Cleve and Grunow	3200	6.69	11.00	22.00	2090.70
MEL - 0205	MEL - 0205-PC		18-Aug-2022	5509	Cyclotella ocellata Pant.	43104	4.50	4.05	8.10	104.30
MEL - 0205	MEL - 0205-PC		18-Aug-2022	5518	Synedra acus Kutzing	400	0.04	88.00	2.00	92.20
MEL - 0205	MEL - 0205-PC		18-Aug-2022	5523	Synedra ulna (Nitzsch) Ehrenberg	400	0.90	240.00	6.00	2261.90
MEL - 0205	MEL - 0205-PC		18-Aug-2022	5524	Asterionella formosa Hassall	10800	1.17	103.00	2.00	107.90
MEL - 0205	MEL - 0205-PC		18-Aug-2022	5551	Cyclotella michiganiana Skvortzow	43104	0.82	2.30	4.60	19.10
MEL - 0205	MEL - 0205-PC		18-Aug-2022	6554	Rhodomonas minuta Skuja	28736	2.38	9.50	5.00	82.90
MEL - 0205	MEL - 0205-PC		18-Aug-2022	6558	Cryptomonas erosa Ehrenberg	1000	1.78	26.00	14.00	1778.80
MEL - 0205	MEL - 0205-PC		18-Aug-2022	7632	Gymnodinium sp.	2200	15.92	24.00	24.00	7238.20
MEL - 0205	MEL - 0205-PC		18-Aug-2022	7639	Peridinium pusillum (Penard) Lemmermann	4000	15.77	19.60	19.60	3942.50
MEL - 0205	MEL - 0205-PC		18-Aug-2022	7641	Peridinium aciculiferum Lemmermann	400	3.62	30.00	24.00	9047.80
MEL - 0206	MEL - 0206-PC		18-Aug-2022	1073	Snowella sp	200	0.15	0.00	0.00	750.00
MEL - 0206	MEL - 0206-PC		18-Aug-2022	2112	Sphaerocystis schroeteri Chodat	71840	1.75	3.60	3.60	24.40
MEL - 0206	MEL - 0206-PC		18-Aug-2022	2121	Oocystis lacustris Chodat	7184	0.20	6.00	3.00	28.30
MEL - 0206	MEL - 0206-PC		18-Aug-2022	2137	Dictyosphaerium simplex Sukja	57472	0.24	2.00	2.00	4.20
MEL - 0206	MEL - 0206-PC		18-Aug-2022	2143	Monoraphidium minutum (Nag.) Komarkova-Legnerova	7184	0.41	9.00	4.00	56.50
MEL - 0206	MEL - 0206-PC		18-Aug-2022	2182	Euastrum spp.	400	0.74	22.00	22.00	1858.40
MEL - 0206	MEL - 0206-PC		18-Aug-2022	2193	Staurodesmus paradoxum Meyen	200	0.57	26.00	24.00	2831.60
MEL - 0206	MEL - 0206-PC		18-Aug-2022	2199	Spondylosium planum (Wolle) W. and G.S. West	50288	1.90	6.00	6.00	37.70
MEL - 0206	MEL - 0206-PC		18-Aug-2022	2206	Botryococcus braunii Kutzing	200	0.18	12.00	12.00	904.80
MEL - 0206	MEL - 0206-PC		18-Aug-2022	2247	Oocystis gigas Archer	600	1.45	18.00	16.00	2412.70
MEL - 0206	MEL - 0206-PC		18-Aug-2022	4351	Small chrysophyceae	172416	1.10	2.30	2.30	6.40
MEL - 0206	MEL - 0206-PC		18-Aug-2022	4352	Large chrysophyceae	7184	1.29	7.00	7.00	179.60
MEL - 0206	MEL - 0206-PC		18-Aug-2022	4355	Chrysochromulina parva Lackey	7184	0.47	5.00	5.00	65.40
MEL - 0206	MEL - 0206-PC		18-Aug-2022	4357	Chrysococcus sp.	265808	17.38	5.00	5.00	65.40
MEL - 0206	MEL - 0206-PC		18-Aug-2022	4361	Kephyrion boreale Skuja	7184	0.77	5.90	5.90	107.50
MEL - 0206	MEL - 0206-PC		18-Aug-2022	4362	Kephyrion sp.	50288	0.64	2.90	2.90	12.80
MEL - 0206	MEL - 0206-PC		18-Aug-2022	4388	Dinobryon sertularia Ehrenberg	4800	24.41	0.00	0.00	5085.00
MEL - 0206	MEL - 0206-PC		18-Aug-2022	4390	Dinobryon sociale Ehrenberg	7184	1.63	12.00	6.00	226.20
MEL - 0206	MEL - 0206-PC		18-Aug-2022	4390	Dinobryon sociale Ehrenberg	5000	9.96	0.00	0.00	1991.00
MEL - 0206	MEL - 0206-PC		18-Aug-2022	4396	Chrysolykos skuja (Nauwerck) Willen	7184	0.20	5.80	3.00	27.30
MEL - 0206	MEL - 0206-PC		18-Aug-2022	4413	Chrysochromulina laurentiana Kling	71840	28.35	9.10	9.10	394.60
MEL - 0206	MEL - 0206-PC		18-Aug-2022	4418	Salpingoeca frequentissima (Zach.) Lemmermann	7184	0.19	5.50	3.00	25.90
MEL - 0206	MEL - 0206-PC		18-Aug-2022	5507	Cyclotella stelligera Cleve and Grunow	800	1.67	11.00	22.00	2090.70
MEL - 0206	MEL - 0206-PC		18-Aug-2022	5509	Cyclotella ocellata Pant.	50288	5.25	4.05	8.10	104.30
MEL - 0206	MEL - 0206-PC		18-Aug-2022	5518	Synedra acus Kutzing	1000	0.09	88.00	2.00	92.20
MEL - 0206	MEL - 0206-PC		18-Aug-2022	5523	Synedra ulna (Nitzsch) Ehrenberg	400	0.90	240.00	6.00	2261.90
MEL - 0206	MEL - 0206-PC		18-Aug-2022	5524	Asterionella formosa Hassall	5200	0.56	103.00	2.00	107.90
MEL - 0206	MEL - 0206-PC		18-Aug-2022	5551	Cyclotella michiganiana Skvortzow	86208	1.65	2.30	4.60	19.10
MEL - 0206	MEL - 0206-PC		18-Aug-2022	6554	Rhodomonas minuta Skuja	7184	0.60	9.50	5.00	82.90
MEL - 0206	MEL - 0206-PC		18-Aug-2022	6558	Cryptomonas erosa Ehrenberg	2000	3.56	26.00	14.00	1778.80
MEL - 0206	MEL - 0206-PC		18-Aug-2022	7632	Gymnodinium sp.	2600	18.82	24.00	24.00	7238.20
MEL - 0206	MEL - 0206-PC		18-Aug-2022	7639	Peridinium pusillum (Penard) Lemmermann	5200	20.50	19.60	19.60	3942.50
MEL - 0206	MEL - 0206-PC		18-Aug-2022	7641	Peridinium aciculiferum Lemmermann	400	3.62	30.00	24.00	9047.80
MEL - 0208	MEL - 0208-PC		18-Aug-2022	1073	Snowella sp	400	0.20	0.00	0.00	500.00
MEL - 0208	MEL - 0208-PC		18-Aug-2022	2112	Sphaerocystis schroeteri Chodat	43104	1.05	3.60	3.60	24.40
MEL - 0208	MEL - 0208-PC		18-Aug-2022	2121	Oocystis lacustris Chodat	330464	9.35	6.00	3.00	28.30
MEL - 0208	MEL - 0208-PC		18-Aug-2022	2137	Dictyosphaerium simplex Sukja	114944	0.48	2.00	2.00	4.20
MEL - 0208	MEL - 0208-PC		18-Aug-2022	2143	Monoraphidium minutum (Nag.) Komarkova-Legnerova	7184	0.41	9.00	4.00	56.50
MEL - 0208	MEL - 0208-PC		18-Aug-2022	2169	Planctonema lauterbornii Schmidle	7184	2.54	18.00	5.00	353.40
MEL - 0208	MEL - 0208-PC		18-Aug-2022	2178	Cosmarium sp.	200	0.28	20.00	20.00	1396.30
MEL - 0208	MEL - 0208-PC		18-Aug-2022	2193	Staurodesmus paradoxum Meyen	400	0.88	24.00	22.00	2211.70
MEL - 0208	MEL - 0208-PC		18-Aug-2022	2199	Spondylosium planum (Wolle) W. and G.S. West	7184	0.27	6.00	6.00	37.70
MEL - 0208	MEL - 0208-PC		18-Aug-2022	2206	Botryococcus braunii Kutzing	200	0.18	12.00	12.00	904.80
MEL - 0208	MEL - 0208-PC		18-Aug-2022	4351	Small chrysophyceae	272992	1.75	2.30	2.30	6.40
MEL - 0208	MEL - 0208-PC		18-Aug-2022	4352	Large chrysophyceae	35920	6.45	7.00	7.00	179.60
MEL - 0208	MEL - 0208-PC		18-Aug-2022	4355	Chrysochromulina parva Lackey	71840	4.70	5.00	5.00	65.40
MEL - 0208	MEL - 0208-PC		18-Aug-2022	4357	Chrysococcus sp.	387936	25.37	5.00	5.00	65.40
MEL - 0208	MEL - 0208-PC		18-Aug-2022	4362	Kephyrion sp.	50288	0.64	2.90	2.90	12.80
MEL - 0208	MEL - 0208-PC		18-Aug-2022	4388	Dinobryon sertularia Ehrenberg	6000	30.51	0.00	0.00	5085.00
MEL - 0208	MEL - 0208-PC		18-Aug-2022	4390	Dinobryon sociale Ehrenberg	35920	8.13	12.00	6.00	226.20
MEL - 0208	MEL - 0208-PC		18-Aug-2022	4390	Dinobryon sociale Ehrenberg	5800	11.55	0.00	0.00	1991.00
MEL - 0208	MEL - 0208-PC		18-Aug-2022	4413	Chrysochromulina laurentiana Kling	35920	14.17	9.10	9.10	394.60
MEL - 0208	MEL - 0208-PC		18-Aug-2022	4418	Salpingoeca frequentissima (Zach.) Lemmermann	7184	0.19	5.50	3.00	25.90
MEL - 0208	MEL - 0208-PC		18-Aug-2022	4448	Rhizochrysis scherffelii Pascher	200	0.35	15.00	15.00	1767.10
MEL - 0208	MEL - 0208-PC		18-Aug-2022	5507	Cyclotella stelligera Cleve and Grunow	4600	9.62	11.00	22.00	2090.70
MEL - 0208	MEL - 0208-PC		18-Aug-2022	5509	Cyclotella ocellata Pant.	7184	0.75	4.05	8.10	104.30
MEL - 0208	MEL - 0208-PC		18-Aug-2022	5518	Synedra acus Kutzing	600	0.06	88.00	2.00	92.20
MEL - 0208	MEL - 0208-PC		18-Aug-2022	5523	Synedra ulna (Nitzsch) Ehrenberg	200	0.45	240.00	6.00	2261.90
MEL - 0208	MEL - 0208-PC		18-Aug-2022	5524	Asterionella formosa Hassall	9200	0.99	103.00	2.00	107.90
MEL - 0208	MEL - 0208-PC		18-Aug-2022	5551	Cyclotella michiganiana Skvortzow	7184	0.14	2.30	4.60	19.10
MEL - 0208	MEL - 0208-PC		18-Aug-2022	6554	Rhodomonas minuta Skuja	43104	3.57	9.50	5.00	82.90
MEL - 0208	MEL - 0208-PC		18-Aug-2022	6558	Cryptomonas erosa Ehrenberg	2600	4.62	26.00	14.00	1778.80
MEL - 0208	MEL - 0208-PC		18-Aug-2022	6568	Katablepharis ovalis Skuja	7184	0.32	8.00	4.00	44.70
MEL - 0208	MEL - 0208-PC		18-Aug-2022	7632	Gymnodinium sp.	2000	14.48	24.00	24.00	7238.20
MEL - 0208	MEL - 0208-PC		18-Aug-2022	7639	Peridinium pusillum (Penard) Lemmermann	5800	22.87	19.60	19.60	3942.50
MEL - 0208	MEL - 0208-PC		18-Aug-2022	7641	Peridinium aciculiferum Lemmermann	200	1.81	30.00	24.00	9047.80
MEL - 0301	MEL - 0301-PC		20-Aug-2022	2112	Sphaerocystis schroeteri Chodat	7184	0.12	3.20	3.20	17.20

Station	Sample	QA Sample ID	Date	Species Code	Species Name	Density cells/L	Biomass mg/m^3	Length µm	Width µm	Cell Volume $µm^3$
MEL - 0301	MEL - 0301-PC		20-Aug-2022	2113	Pediastrum duplex Meyen	2400	0.18	8.50	6.00	75.70
MEL - 0301	MEL - 0301-PC		20-Aug-2022	2121	Oocystis lacustris Chodat	21552	0.61	6.00	3.00	28.30
MEL - 0301	MEL - 0301-PC		20-Aug-2022	2137	Dictyosphaerium simplex Sukja	7184	0.03	2.00	2.00	4.20
MEL - 0301	MEL - 0301-PC		20-Aug-2022	2143	Monoraphidium minutum (Nag.) Komarkova-Legnerova	7184	0.41	9.00	4.00	56.50
MEL - 0301	MEL - 0301-PC		20-Aug-2022	2167	Elakatothrix gelatinosa Willen	7184	0.14	12.00	2.00	18.80
MEL - 0301	MEL - 0301-PC		20-Aug-2022	2182	Euastrum spp.	200	0.37	22.00	22.00	1858.40
MEL - 0301	MEL - 0301-PC		20-Aug-2022	2187	Staurodesmus extensus (Andersson) Teiling	200	0.08	13.60	12.00	387.40
MEL - 0301	MEL - 0301-PC		20-Aug-2022	2193	Staurodesmus paradoxum Meyen	400	1.13	26.00	24.00	2831.60
MEL - 0301	MEL - 0301-PC		20-Aug-2022	2199	Spondylosium planum (Wolle) W. and G.S. West	21552	0.81	6.00	6.00	37.70
MEL - 0301	MEL - 0301-PC		20-Aug-2022	2206	Botryococcus braunii Kutzing	400	0.36	12.00	12.00	904.80
MEL - 0301	MEL - 0301-PC		20-Aug-2022	4351	Small chrysophyceae	337648	2.16	2.30	2.30	6.40
MEL - 0301	MEL - 0301-PC		20-Aug-2022	4352	Large chrysophyceae	79024	14.19	7.00	7.00	179.60
MEL - 0301	MEL - 0301-PC		20-Aug-2022	4357	Chrysococcus sp.	244256	15.97	5.00	5.00	65.40
MEL - 0301	MEL - 0301-PC		20-Aug-2022	4362	Kephyrion sp.	136496	1.92	3.00	3.00	14.10
MEL - 0301	MEL - 0301-PC		20-Aug-2022	4363	Spiniferomonas serrata	14368	1.25	5.50	5.50	87.10
MEL - 0301	MEL - 0301-PC		20-Aug-2022	4378	Dinobryon borgei Lemmermann	7184	0.30	9.00	3.00	42.40
MEL - 0301	MEL - 0301-PC		20-Aug-2022	4383	Dinobryon bavaricum Imhof	7184	1.63	12.00	6.00	226.20
MEL - 0301	MEL - 0301-PC		20-Aug-2022	4383	Dinobryon bavaricum Imhof	400	0.80	0.00	0.00	1991.00
MEL - 0301	MEL - 0301-PC		20-Aug-2022	4388	Dinobryon sertularia Ehrenberg	600	3.05	0.00	0.00	5085.00
MEL - 0301	MEL - 0301-PC		20-Aug-2022	4390	Dinobryon sociale Ehrenberg	107760	24.38	12.00	6.00	226.20
MEL - 0301	MEL - 0301-PC		20-Aug-2022	4390	Dinobryon sociale Ehrenberg	1600	3.19	0.00	0.00	1991.00
MEL - 0301	MEL - 0301-PC		20-Aug-2022	4413	Chrysochromulina laurentiana Kling	57472	22.68	9.10	9.10	394.60
MEL - 0301	MEL - 0301-PC		20-Aug-2022	4437	Pteridomonas sp.	14368	3.19	8.60	8.60	222.00
MEL - 0301	MEL - 0301-PC		20-Aug-2022	5507	Cyclotella stelligera Cleve and Grunow	800	1.91	11.50	23.00	2389.00
MEL - 0301	MEL - 0301-PC		20-Aug-2022	5518	Synedra acus Kutzing	1000	0.09	90.00	2.00	94.20
MEL - 0301	MEL - 0301-PC		20-Aug-2022	5524	Asterionella formosa Hassall	200	0.02	103.00	2.00	107.90
MEL - 0301	MEL - 0301-PC		20-Aug-2022	5551	Cyclotella michiganiana Skvortzow	43104	0.82	2.30	4.60	19.10
MEL - 0301	MEL - 0301-PC		20-Aug-2022	6554	Rhodomonas minuta Skuja	71840	5.96	9.50	5.00	82.90
MEL - 0301	MEL - 0301-PC		20-Aug-2022	6558	Cryptomonas erosa Ehrenberg	800	1.42	26.00	14.00	1778.80
MEL - 0301	MEL - 0301-PC		20-Aug-2022	7632	Gymnodinium sp.	800	5.79	24.00	24.00	7238.20
MEL - 0301	MEL - 0301-PC		20-Aug-2022	7635	Peridinium willei Huitfeldt-Kaas	200	4.49	35.00	35.00	22449.30
MEL - 0301	MEL - 0301-PC		20-Aug-2022	7639	Peridinium pusillum (Penard) Lemmermann	2800	11.55	19.90	19.90	4126.30
MEL - 0301	MEL - 0301-PC		20-Aug-2022	7641	Peridinium aciculiferum Lemmermann	200	1.81	30.00	24.00	9047.80
MEL - 0302	MEL - 0302-PC		20-Aug-2022	2121	Oocystis lacustris Chodat	21552	0.61	6.00	3.00	28.30
MEL - 0302	MEL - 0302-PC		20-Aug-2022	2137	Dictyosphaerium simplex Sukja	21552	0.09	2.00	2.00	4.20
MEL - 0302	MEL - 0302-PC		20-Aug-2022	2167	Elakatothrix gelatinosa Willen	7184	0.14	12.00	2.00	18.80
MEL - 0302	MEL - 0302-PC		20-Aug-2022	2205	Mougeotia sp.	200	0.24	31.00	7.00	1193.00
MEL - 0302	MEL - 0302-PC		20-Aug-2022	2247	Oocystis gigas Archer	200	0.48	18.00	16.00	2412.70
MEL - 0302	MEL - 0302-PC		20-Aug-2022	4351	Small chrysophyceae	186784	1.20	2.30	2.30	6.40
MEL - 0302	MEL - 0302-PC		20-Aug-2022	4352	Large chrysophyceae	7184	1.29	7.00	7.00	179.60
MEL - 0302	MEL - 0302-PC		20-Aug-2022	4357	Chrysococcus sp.	237072	15.50	5.00	5.00	65.40
MEL - 0302	MEL - 0302-PC		20-Aug-2022	4362	Kephyrion sp.	165232	2.33	3.00	3.00	14.10
MEL - 0302	MEL - 0302-PC		20-Aug-2022	4383	Dinobryon bavaricum Imhof	7184	1.63	12.00	6.00	226.20
MEL - 0302	MEL - 0302-PC		20-Aug-2022	4383	Dinobryon bavaricum Imhof	200	0.40	0.00	0.00	1991.00
MEL - 0302	MEL - 0302-PC		20-Aug-2022	4388	Dinobryon sertularia Ehrenberg	50288	11.38	12.00	6.00	226.20
MEL - 0302	MEL - 0302-PC		20-Aug-2022	4388	Dinobryon sertularia Ehrenberg	1000	5.09	0.00	0.00	5085.00
MEL - 0302	MEL - 0302-PC		20-Aug-2022	4390	Dinobryon sociale Ehrenberg	179600	40.63	12.00	6.00	226.20
MEL - 0302	MEL - 0302-PC		20-Aug-2022	4390	Dinobryon sociale Ehrenberg	2000	3.98	0.00	0.00	1991.00
MEL - 0302	MEL - 0302-PC		20-Aug-2022	4413	Chrysochromulina laurentiana Kling	28736	11.34	9.10	9.10	394.60
MEL - 0302	MEL - 0302-PC		20-Aug-2022	4418	Salpingoeca frequentissima (Zach.) Lemmermann	43104	1.39	6.00	3.20	32.20
MEL - 0302	MEL - 0302-PC		20-Aug-2022	4437	Pteridomonas sp.	35920	7.97	8.60	8.60	222.00
MEL - 0302	MEL - 0302-PC		20-Aug-2022	5507	Cyclotella stelligera Cleve and Grunow	800	1.91	11.50	23.00	2389.00
MEL - 0302	MEL - 0302-PC		20-Aug-2022	5508	Cyclotella pseudostelligera	7184	3.87	7.00	14.00	538.80
MEL - 0302	MEL - 0302-PC		20-Aug-2022	5513	Tabellaria fenestrata (Lyngbye) Kutzing	2000	1.32	70.00	6.00	659.70
MEL - 0302	MEL - 0302-PC		20-Aug-2022	5518	Synedra acus Kutzing	200	0.02	90.00	2.00	94.20
MEL - 0302	MEL - 0302-PC		20-Aug-2022	5524	Asterionella formosa Hassall	1600	0.17	103.00	2.00	107.90
MEL - 0302	MEL - 0302-PC		20-Aug-2022	5551	Cyclotella michiganiana Skvortzow	100576	1.92	2.30	4.60	19.10
MEL - 0302	MEL - 0302-PC		20-Aug-2022	6554	Rhodomonas minuta Skuja	43104	3.57	9.50	5.00	82.90
MEL - 0302	MEL - 0302-PC		20-Aug-2022	7632	Gymnodinium sp.	600	4.34	24.00	24.00	7238.20
MEL - 0302	MEL - 0302-PC		20-Aug-2022	7639	Peridinium pusillum (Penard) Lemmermann	3000	12.38	19.90	19.90	4126.30
MEL - 0302	MEL - 0302-PC		20-Aug-2022	7641	Peridinium aciculiferum Lemmermann	800	7.24	30.00	24.00	9047.80
MEL - 0303	MEL - 0303-PC		20-Aug-2022	1073	Snowella sp	200	0.10	0.00	0.00	500.00
MEL - 0303	MEL - 0303-PC		20-Aug-2022	2112	Sphaerocystis schroeteri Chodat	35920	0.74	3.40	3.40	20.60
MEL - 0303	MEL - 0303-PC		20-Aug-2022	2121	Oocystis lacustris Chodat	7184	0.20	6.00	3.00	28.30
MEL - 0303	MEL - 0303-PC		20-Aug-2022	2137	Dictyosphaerium simplex Sukja	21552	0.09	2.00	2.00	4.20
MEL - 0303	MEL - 0303-PC		20-Aug-2022	2143	Monoraphidium minutum (Nag.) Komarkova-Legnerova	7184	0.41	9.00	4.00	56.50
MEL - 0303	MEL - 0303-PC		20-Aug-2022	2167	Elakatothrix gelatinosa Willen	7184	0.14	12.00	2.00	18.80
MEL - 0303	MEL - 0303-PC		20-Aug-2022	2169	Planctonema lauterbornii Schmidle	14368	5.08	18.00	5.00	353.40
MEL - 0303	MEL - 0303-PC		20-Aug-2022	2187	Staurodesmus extensus (Andersson) Teiling	200	0.08	13.60	12.00	387.40
MEL - 0303	MEL - 0303-PC		20-Aug-2022	4351	Small chrysophyceae	186784	1.20	2.30	2.30	6.40
MEL - 0303	MEL - 0303-PC		20-Aug-2022	4352	Large chrysophyceae	7184	1.29	7.00	7.00	179.60
MEL - 0303	MEL - 0303-PC		20-Aug-2022	4357	Chrysococcus sp.	409488	26.78	5.00	5.00	65.40
MEL - 0303	MEL - 0303-PC		20-Aug-2022	4362	Kephyrion sp.	158048	2.23	3.00	3.00	14.10
MEL - 0303	MEL - 0303-PC		20-Aug-2022	4363	Spiniferomonas serrata	28736	2.50	5.50	5.50	87.10
MEL - 0303	MEL - 0303-PC		20-Aug-2022	4378	Dinobryon borgei Lemmermann	7184	0.30	9.00	3.00	42.40
MEL - 0303	MEL - 0303-PC		20-Aug-2022	4381	Dinobryon mucronatom Nygaard	7184	0.94	10.00	5.00	130.90
MEL - 0303	MEL - 0303-PC		20-Aug-2022	4383	Dinobryon bavaricum Imhof	200	0.40	0.00	0.00	1991.00
MEL - 0303	MEL - 0303-PC		20-Aug-2022	4388	Dinobryon sertularia Ehrenberg	7184	1.63	12.00	6.00	226.20
MEL - 0303	MEL - 0303-PC		20-Aug-2022	4388	Dinobryon sertularia Ehrenberg	800	4.07	0.00	0.00	5085.00
MEL - 0303	MEL - 0303-PC		20-Aug-2022	4390	Dinobryon sociale Ehrenberg	158048	35.75	12.00	6.00	226.20
MEL - 0303	MEL - 0303-PC		20-Aug-2022	4390	Dinobryon sociale Ehrenberg	3200	4.00	0.00	0.00	1250.00
MEL - 0303	MEL - 0303-PC		20-Aug-2022	4396	Chrysolykos skuja (Nauwerck) Willen	7184	0.19	5.50	3.00	25.90
MEL - 0303	MEL - 0303-PC		20-Aug-2022	4413	Chrysochromulina laurentiana Kling	7184	2.83	9.10	9.10	394.60
MEL - 0303	MEL - 0303-PC		20-Aug-2022	4414	Stichogloea spp.	28736	1.45	6.00	4.00	50.30
MEL - 0303	MEL - 0303-PC		20-Aug-2022	4418	Salpingoeca frequentissima (Zach.) Lemmermann	21552	0.69	6.00	3.20	32.20
MEL - 0303	MEL - 0303-PC		20-Aug-2022	5507	Cyclotella stelligera Cleve and Grunow	1800	4.30	11.50	23.00	2389.00
MEL - 0303	MEL - 0303-PC		20-Aug-2022	5509	Cyclotella ocellata Pant.	7184	1.25	4.80	9.60	173.70
MEL - 0303	MEL - 0303-PC		20-Aug-2022	5518	Synedra acus Kutzing	400	0.04	90.00	2.00	94.20
MEL - 0303	MEL - 0303-PC		20-Aug-2022	5524	Asterionella formosa Hassall	1600	0.17	103.00	2.00	107.90
MEL - 0303	MEL - 0303-PC		20-Aug-2022	6554	Rhodomonas minuta Skuja	35920	2.98	9.50	5.00	82.90
MEL - 0303	MEL - 0303-PC		20-Aug-2022	6558	Cryptomonas erosa Ehrenberg	1000	1.78	26.00	14.00	1778.80
MEL - 0303	MEL - 0303-PC		20-Aug-2022	7632	Gymnodinium sp.	1800	13.03	24.00	24.00	7238.20
MEL - 0303	MEL - 0303-PC		20-Aug-2022	7639	Peridinium pusillum (Penard) Lemmermann	2800	11.55	19.90	19.90	4126.30
MEL - 0303	MEL - 0303-PC		20-Aug-2022	7641	Peridinium aciculiferum Lemmermann	400	3.62	30.00	24.00	9047.80
MEL - 0304	MEL - 0304-PC		20-Aug-2022	2105	Chlamydomonas spp.	7184	0.14	4.20	3.00	19.80

Station	Sample	QA Sample ID	Date	Species Code	Species Name	Density cells/L	Biomass mg/m^3	Length µm	Width µm	Cell Volume $µm^3$
MEL - 0304	MEL - 0304-PC		20-Aug-2022	2112	Sphaerocystis schroeteri Chodat	43104	0.74	3.20	3.20	17.20
MEL - 0304	MEL - 0304-PC		20-Aug-2022	2121	Oocystis lacustris Chodat	21552	0.56	5.50	3.00	25.90
MEL - 0304	MEL - 0304-PC		20-Aug-2022	2169	Planctonema lauterbornii Schmidle	7184	2.54	18.00	5.00	353.40
MEL - 0304	MEL - 0304-PC		20-Aug-2022	2187	Staurodesmus extensus (Andersson) Teiling	400	0.15	13.60	12.00	387.40
MEL - 0304	MEL - 0304-PC		20-Aug-2022	4351	Small chrysophyceae	344832	2.21	2.30	2.30	6.40
MEL - 0304	MEL - 0304-PC		20-Aug-2022	4352	Large chrysophyceae	50288	9.03	7.00	7.00	179.60
MEL - 0304	MEL - 0304-PC		20-Aug-2022	4357	Chrysococcus sp.	129312	8.46	5.00	5.00	65.40
MEL - 0304	MEL - 0304-PC		20-Aug-2022	4362	Kephyrion sp.	215520	3.04	3.00	3.00	14.10
MEL - 0304	MEL - 0304-PC		20-Aug-2022	4368	Mallomonas crassisquama (Asmund) Fott	200	0.21	20.00	10.00	1047.20
MEL - 0304	MEL - 0304-PC		20-Aug-2022	4388	Dinobryon sertularia Ehrenberg	7184	1.63	12.00	6.00	226.20
MEL - 0304	MEL - 0304-PC		20-Aug-2022	4388	Dinobryon sertularia Ehrenberg	1400	7.12	0.00	0.00	5085.00
MEL - 0304	MEL - 0304-PC		20-Aug-2022	4390	Dinobryon sociale Ehrenberg	201152	45.50	12.00	6.00	226.20
MEL - 0304	MEL - 0304-PC		20-Aug-2022	4390	Dinobryon sociale Ehrenberg	2600	3.25	0.00	0.00	1250.00
MEL - 0304	MEL - 0304-PC		20-Aug-2022	4413	Chrysochromulina laurentiana Kling	57472	22.68	9.10	9.10	394.60
MEL - 0304	MEL - 0304-PC		20-Aug-2022	4418	Salpingoeca frequentissima (Zach.) Lemmermann	7184	0.23	6.00	3.20	32.20
MEL - 0304	MEL - 0304-PC		20-Aug-2022	5507	Cyclotella stelligera Cleve and Grunow	400	0.96	11.50	23.00	2389.00
MEL - 0304	MEL - 0304-PC		20-Aug-2022	5508	Cyclotella pseudostelligera	21552	9.51	6.55	13.10	441.40
MEL - 0304	MEL - 0304-PC		20-Aug-2022	5518	Synedra acus Kutzing	1000	0.09	90.00	2.00	94.20
MEL - 0304	MEL - 0304-PC		20-Aug-2022	5551	Cyclotella michiganiana Skvortzow	28736	0.55	2.30	4.60	19.10
MEL - 0304	MEL - 0304-PC		20-Aug-2022	6554	Rhodomonas minuta Skuja	79024	6.55	9.50	5.00	82.90
MEL - 0304	MEL - 0304-PC		20-Aug-2022	6558	Cryptomonas erosa Ehrenberg	1400	2.49	26.00	14.00	1778.80
MEL - 0304	MEL - 0304-PC		20-Aug-2022	7632	Gymnodinium sp.	1000	7.24	24.00	24.00	7238.20
MEL - 0304	MEL - 0304-PC		20-Aug-2022	7639	Peridinium pusillum (Penard) Lemmermann	2200	9.08	19.90	19.90	4126.30
MEL - 0304	MEL - 0304-PC		20-Aug-2022	7641	Peridinium aciculiferum Lemmermann	400	3.62	30.00	24.00	9047.80
MEL - 0305	MEL - 0305-PC		20-Aug-2022	1073	Snowella sp	200	0.10	0.00	0.00	500.00
MEL - 0305	MEL - 0305-PC		20-Aug-2022	2137	Dictyosphaerium simplex Sukja	21552	0.09	2.00	2.00	4.20
MEL - 0305	MEL - 0305-PC		20-Aug-2022	2143	Monoraphidium minutum (Nag.) Komarkova-Legnerova	7184	0.41	9.00	4.00	56.50
MEL - 0305	MEL - 0305-PC		20-Aug-2022	2178	Cosmarium sp.	200	0.28	20.00	20.00	1396.30
MEL - 0305	MEL - 0305-PC		20-Aug-2022	2247	Oocystis gigas Archer	200	0.48	18.00	16.00	2412.70
MEL - 0305	MEL - 0305-PC		20-Aug-2022	4351	Small chrysophyceae	129312	0.83	2.30	2.30	6.40
MEL - 0305	MEL - 0305-PC		20-Aug-2022	4352	Large chrysophyceae	21552	3.87	7.00	7.00	179.60
MEL - 0305	MEL - 0305-PC		20-Aug-2022	4355	Chrysochromulina parva Lackey	7184	0.47	5.00	5.00	65.40
MEL - 0305	MEL - 0305-PC		20-Aug-2022	4357	Chrysococcus sp.	359200	23.49	5.00	5.00	65.40
MEL - 0305	MEL - 0305-PC		20-Aug-2022	4358	Chrysostephanosphaera globulifera Scherffel	7184	2.65	8.90	8.90	369.10
MEL - 0305	MEL - 0305-PC		20-Aug-2022	4362	Kephyrion sp.	114944	1.62	3.00	3.00	14.10
MEL - 0305	MEL - 0305-PC		20-Aug-2022	4378	Dinobryon borgei Lemmermann	7184	0.30	9.00	3.00	42.40
MEL - 0305	MEL - 0305-PC		20-Aug-2022	4381	Dinobryon mucronatom Nygaard	43104	5.64	10.00	5.00	130.90
MEL - 0305	MEL - 0305-PC		20-Aug-2022	4388	Dinobryon sertularia Ehrenberg	600	3.05	0.00	0.00	5085.00
MEL - 0305	MEL - 0305-PC		20-Aug-2022	4390	Dinobryon sociale Ehrenberg	21552	4.88	12.00	6.00	226.20
MEL - 0305	MEL - 0305-PC		20-Aug-2022	4390	Dinobryon sociale Ehrenberg	1200	2.39	0.00	0.00	1991.00
MEL - 0305	MEL - 0305-PC		20-Aug-2022	4413	Chrysochromulina laurentiana Kling	43104	17.01	9.10	9.10	394.60
MEL - 0305	MEL - 0305-PC		20-Aug-2022	5507	Cyclotella stelligera Cleve and Grunow	1000	2.39	11.50	23.00	2389.00
MEL - 0305	MEL - 0305-PC		20-Aug-2022	5509	Cyclotella ocellata Pant.	7184	0.75	4.05	8.10	104.30
MEL - 0305	MEL - 0305-PC		20-Aug-2022	5518	Synedra acus Kutzing	800	0.08	90.00	2.00	94.20
MEL - 0305	MEL - 0305-PC		20-Aug-2022	6558	Cryptomonas erosa Ehrenberg	600	1.07	26.00	14.00	1778.80
MEL - 0305	MEL - 0305-PC		20-Aug-2022	7631	Gymnodinium helveticum Penard	200	4.71	50.00	30.00	23561.90
MEL - 0305	MEL - 0305-PC		20-Aug-2022	7632	Gymnodinium sp.	1000	7.24	24.00	24.00	7238.20
MEL - 0305	MEL - 0305-PC		20-Aug-2022	7639	Peridinium pusillum (Penard) Lemmermann	3600	14.85	19.90	19.90	4126.30
MEL - 0305	MEL - 0305-PC		20-Aug-2022	7641	Peridinium aciculiferum Lemmermann	400	3.62	30.00	24.00	9047.80
MEL - 0401	MEL - 0401-PC		20-Aug-2022	1014	Chroococcus limneticus Lemmermann	28736	1.47	4.60	4.60	51.00
MEL - 0401	MEL - 0401-PC		20-Aug-2022	2112	Sphaerocystis schroeteri Chodat	71840	1.24	3.20	3.20	17.20
MEL - 0401	MEL - 0401-PC		20-Aug-2022	2121	Oocystis lacustris Chodat	21552	0.61	6.00	3.00	28.30
MEL - 0401	MEL - 0401-PC		20-Aug-2022	2137	Dictyosphaerium simplex Sukja	35920	0.15	2.00	2.00	4.20
MEL - 0401	MEL - 0401-PC		20-Aug-2022	2167	Elakatothrix gelatinosa Willen	21552	0.41	12.00	2.00	18.80
MEL - 0401	MEL - 0401-PC		20-Aug-2022	2169	Planctonema lauterbornii Schmidle	7184	2.26	16.00	5.00	314.20
MEL - 0401	MEL - 0401-PC		20-Aug-2022	2178	Cosmarium sp.	200	0.28	20.00	20.00	1396.30
MEL - 0401	MEL - 0401-PC		20-Aug-2022	2187	Staurodesmus extensus (Andersson) Teiling	200	0.08	13.60	12.00	387.40
MEL - 0401	MEL - 0401-PC		20-Aug-2022	2206	Botryococcus braunii Kutzing	200	0.18	12.00	12.00	904.80
MEL - 0401	MEL - 0401-PC		20-Aug-2022	4351	Small chrysophyceae	287360	1.84	2.30	2.30	6.40
MEL - 0401	MEL - 0401-PC		20-Aug-2022	4357	Chrysococcus sp.	79024	5.17	5.00	5.00	65.40
MEL - 0401	MEL - 0401-PC		20-Aug-2022	4362	Kephyrion sp.	100576	1.42	3.00	3.00	14.10
MEL - 0401	MEL - 0401-PC		20-Aug-2022	4363	Spiniferomonas serrata	7184	0.81	6.00	6.00	113.10
MEL - 0401	MEL - 0401-PC		20-Aug-2022	4378	Dinobryon borgei Lemmermann	28736	1.22	9.00	3.00	42.40
MEL - 0401	MEL - 0401-PC		20-Aug-2022	4388	Dinobryon sertularia Ehrenberg	1000	5.09	0.00	0.00	5085.00
MEL - 0401	MEL - 0401-PC		20-Aug-2022	4390	Dinobryon sociale Ehrenberg	122128	27.63	12.00	6.00	226.20
MEL - 0401	MEL - 0401-PC		20-Aug-2022	4390	Dinobryon sociale Ehrenberg	400	0.50	0.00	0.00	1250.00
MEL - 0401	MEL - 0401-PC		20-Aug-2022	4396	Chrysolykos skuja (Nauwerck) Willen	7184	0.19	5.60	3.00	26.40
MEL - 0401	MEL - 0401-PC		20-Aug-2022	4413	Chrysochromulina laurentiana Kling	21552	8.50	9.10	9.10	394.60
MEL - 0401	MEL - 0401-PC		20-Aug-2022	4418	Salpingoeca frequentissima (Zach.) Lemmermann	7184	0.23	6.00	3.20	32.20
MEL - 0401	MEL - 0401-PC		20-Aug-2022	5507	Cyclotella stelligera Cleve and Grunow	1000	2.09	11.00	22.00	2090.70
MEL - 0401	MEL - 0401-PC		20-Aug-2022	5509	Cyclotella ocellata Pant.	7184	0.62	3.80	7.60	86.20
MEL - 0401	MEL - 0401-PC		20-Aug-2022	5513	Tabellaria fenestrata (Lyngbye) Kutzing	200	0.13	71.00	6.00	669.20
MEL - 0401	MEL - 0401-PC		20-Aug-2022	5518	Synedra acus Kutzing	1200	0.11	88.00	2.00	92.20
MEL - 0401	MEL - 0401-PC		20-Aug-2022	5551	Cyclotella michiganiana Skvortzow	57472	1.25	2.40	4.80	21.70
MEL - 0401	MEL - 0401-PC		20-Aug-2022	6554	Rhodomonas minuta Skuja	21552	1.81	9.60	5.00	83.80
MEL - 0401	MEL - 0401-PC		20-Aug-2022	6558	Cryptomonas erosa Ehrenberg	1000	1.78	26.00	14.00	1778.80
MEL - 0401	MEL - 0401-PC		20-Aug-2022	7631	Gymnodinium helveticum Penard	200	4.71	50.00	30.00	23561.90
MEL - 0401	MEL - 0401-PC		20-Aug-2022	7632	Gymnodinium sp.	400	2.90	24.00	24.00	7238.20
MEL - 0401	MEL - 0401-PC		20-Aug-2022	7639	Peridinium pusillum (Penard) Lemmermann	1200	4.95	19.90	19.90	4126.30
MEL - 0401	MEL - 0401-PC		20-Aug-2022	7641	Peridinium aciculiferum Lemmermann	200	1.81	30.00	24.00	9047.80
MEL - 0402	MEL - 0402-PC		20-Aug-2022	2112	Sphaerocystis schroeteri Chodat	7184	0.12	3.20	3.20	17.20
MEL - 0402	MEL - 0402-PC		20-Aug-2022	2121	Oocystis lacustris Chodat	229888	6.51	6.00	3.00	28.30
MEL - 0402	MEL - 0402-PC		20-Aug-2022	2137	Dictyosphaerium simplex Sukja	57472	0.24	2.00	2.00	4.20
MEL - 0402	MEL - 0402-PC		20-Aug-2022	2169	Planctonema lauterbornii Schmidle	14368	2.53	14.00	4.00	175.90
MEL - 0402	MEL - 0402-PC		20-Aug-2022	2171	Closterium kuetzingii Brebisson	200	0.31	111.00	6.00	1569.20
MEL - 0402	MEL - 0402-PC		20-Aug-2022	2182	Euastrum spp.	200	0.37	22.00	22.00	1858.40
MEL - 0402	MEL - 0402-PC		20-Aug-2022	2187	Staurodesmus extensus (Andersson) Teiling	600	0.23	13.60	12.00	387.40
MEL - 0402	MEL - 0402-PC		20-Aug-2022	2199	Spondylosium planum (Wolle) W. and G.S. West	7184	0.27	6.00	6.00	37.70
MEL - 0402	MEL - 0402-PC		20-Aug-2022	2206	Botryococcus braunii Kutzing	200	0.18	12.00	12.00	904.80
MEL - 0402	MEL - 0402-PC		20-Aug-2022	4351	Small chrysophyceae	316096	2.02	2.30	2.30	6.40
MEL - 0402	MEL - 0402-PC		20-Aug-2022	4352	Large chrysophyceae	21552	3.87	7.00	7.00	179.60
MEL - 0402	MEL - 0402-PC		20-Aug-2022	4357	Chrysococcus sp.	301728	19.73	5.00	5.00	65.40
MEL - 0402	MEL - 0402-PC		20-Aug-2022	4362	Kephyrion sp.	93392	1.32	3.00	3.00	14.10
MEL - 0402	MEL - 0402-PC		20-Aug-2022	4364	Mallomonas caudata Ivanov	200	1.07	40.00	16.00	5361.70
MEL - 0402	MEL - 0402-PC		20-Aug-2022	4388	Dinobryon sertularia Ehrenberg	28736	6.50	12.00	6.00	226.20

Station	Sample	QA Sample ID	Date	Species Code	Species Name	Density cells/L	Biomass mg/m^3	Length µm	Width µm	Cell Volume $µm^3$
MEL - 0402	MEL - 0402-PC		20-Aug-2022	4388	Dinobryon sertularia Ehrenberg	1400	7.12	0.00	0.00	5085.00
MEL - 0402	MEL - 0402-PC		20-Aug-2022	4390	Dinobryon sociale Ehrenberg	165232	37.38	12.00	6.00	226.20
MEL - 0402	MEL - 0402-PC		20-Aug-2022	4390	Dinobryon sociale Ehrenberg	1400	1.75	0.00	0.00	1250.00
MEL - 0402	MEL - 0402-PC		20-Aug-2022	4418	Salpingoeca frequentissima (Zach.) Lemmermann	7184	0.23	6.00	3.20	32.20
MEL - 0402	MEL - 0402-PC		20-Aug-2022	4437	Pteridomonas sp.	7184	1.59	8.60	8.60	222.00
MEL - 0402	MEL - 0402-PC		20-Aug-2022	5507	Cyclotella stelligera Cleve and Grunow	1000	2.09	11.00	22.00	2090.70
MEL - 0402	MEL - 0402-PC		20-Aug-2022	5514	Tabellaria flocculosa (Roth) Kutzing	200	0.27	26.00	14.00	1334.10
MEL - 0402	MEL - 0402-PC		20-Aug-2022	5518	Synedra acus Kutzing	1200	0.11	88.00	2.00	92.20
MEL - 0402	MEL - 0402-PC		20-Aug-2022	5551	Cyclotella michiganiana Skvortzow	28736	0.62	2.40	4.80	21.70
MEL - 0402	MEL - 0402-PC		20-Aug-2022	6554	Rhodomonas minuta Skuja	35920	3.01	9.60	5.00	83.80
MEL - 0402	MEL - 0402-PC		20-Aug-2022	6558	Cryptomonas erosa Ehrenberg	1000	1.78	26.00	14.00	1778.80
MEL - 0402	MEL - 0402-PC		20-Aug-2022	7631	Gymnodinium helveticum Penard	200	4.71	50.00	30.00	23561.90
MEL - 0402	MEL - 0402-PC		20-Aug-2022	7632	Gymnodinium sp.	1000	7.24	24.00	24.00	7238.20
MEL - 0402	MEL - 0402-PC		20-Aug-2022	7639	Peridinium pusillum (Penard) Lemmermann	200	0.83	19.90	19.90	4126.30
MEL - 0402	MEL - 0402-PC		20-Aug-2022	7641	Peridinium aciculiferum Lemmermann	200	1.81	30.00	24.00	9047.80
MEL - 0403	MEL - 0403-PC		20-Aug-2022	2112	Sphaerocystis schroeteri Chodat	28736	0.49	3.20	3.20	17.20
MEL - 0403	MEL - 0403-PC		20-Aug-2022	2121	Oocystis lacustris Chodat	21552	0.61	6.00	3.00	28.30
MEL - 0403	MEL - 0403-PC		20-Aug-2022	2143	Monoraphidium minutum (Nag.) Komarkova-Legnerova	14368	0.81	9.00	4.00	56.50
MEL - 0403	MEL - 0403-PC		20-Aug-2022	2169	Planctonema lauterbornii Schmidle	7184	2.26	16.00	5.00	314.20
MEL - 0403	MEL - 0403-PC		20-Aug-2022	2187	Staurodesmus extensus (Andersson) Teiling	200	0.08	13.60	12.00	387.40
MEL - 0403	MEL - 0403-PC		20-Aug-2022	2193	Staurodesmus paradoxum Meyen	200	0.57	26.00	24.00	2831.60
MEL - 0403	MEL - 0403-PC		20-Aug-2022	2206	Botryococcus braunii Kutzing	400	0.36	12.00	12.00	904.80
MEL - 0403	MEL - 0403-PC		20-Aug-2022	4351	Small chrysophyceae	201152	1.29	2.30	2.30	6.40
MEL - 0403	MEL - 0403-PC		20-Aug-2022	4352	Large chrysophyceae	7184	1.29	7.00	7.00	179.60
MEL - 0403	MEL - 0403-PC		20-Aug-2022	4357	Chrysococcus sp.	93392	6.11	5.00	5.00	65.40
MEL - 0403	MEL - 0403-PC		20-Aug-2022	4362	Kephyrion sp.	186784	2.63	3.00	3.00	14.10
MEL - 0403	MEL - 0403-PC		20-Aug-2022	4363	Spiniferomonas serrata	14368	1.25	5.50	5.50	87.10
MEL - 0403	MEL - 0403-PC		20-Aug-2022	4378	Dinobryon borgei Lemmermann	7184	0.30	9.00	3.00	42.40
MEL - 0403	MEL - 0403-PC		20-Aug-2022	4388	Dinobryon sertularia Ehrenberg	7184	1.63	12.00	6.00	226.20
MEL - 0403	MEL - 0403-PC		20-Aug-2022	4388	Dinobryon sertularia Ehrenberg	800	4.07	0.00	0.00	5085.00
MEL - 0403	MEL - 0403-PC		20-Aug-2022	4390	Dinobryon sociale Ehrenberg	122128	27.63	12.00	6.00	226.20
MEL - 0403	MEL - 0403-PC		20-Aug-2022	4390	Dinobryon sociale Ehrenberg	800	1.00	0.00	0.00	1250.00
MEL - 0403	MEL - 0403-PC		20-Aug-2022	4413	Chrysochromulina laurentiana Kling	43104	17.01	9.10	9.10	394.60
MEL - 0403	MEL - 0403-PC		20-Aug-2022	4418	Salpingoeca frequentissima (Zach.) Lemmermann	21552	0.69	6.00	3.20	32.20
MEL - 0403	MEL - 0403-PC		20-Aug-2022	5507	Cyclotella stelligera Cleve and Grunow	800	1.67	11.00	22.00	2090.70
MEL - 0403	MEL - 0403-PC		20-Aug-2022	5518	Synedra acus Kutzing	1600	0.15	88.00	2.00	92.20
MEL - 0403	MEL - 0403-PC		20-Aug-2022	5524	Asterionella formosa Hassall	1600	0.17	103.00	2.00	107.90
MEL - 0403	MEL - 0403-PC		20-Aug-2022	5551	Cyclotella michiganiana Skvortzow	71840	1.29	2.25	4.50	17.90
MEL - 0403	MEL - 0403-PC		20-Aug-2022	6554	Rhodomonas minuta Skuja	35920	3.01	9.60	5.00	83.80
MEL - 0403	MEL - 0403-PC		20-Aug-2022	6558	Cryptomonas erosa Ehrenberg	2000	3.56	26.00	14.00	1778.80
MEL - 0403	MEL - 0403-PC		20-Aug-2022	7632	Gymnodinium sp.	1400	10.13	24.00	24.00	7238.20
MEL - 0403	MEL - 0403-PC		20-Aug-2022	7639	Peridinium pusillum (Penard) Lemmermann	2000	8.25	19.90	19.90	4126.30
MEL - 0403	MEL - 0403-PC		20-Aug-2022	7641	Peridinium aciculiferum Lemmermann	3400	24.61	24.00	24.00	7238.20
MEL - 0404	MEL - 0404-PC		20-Aug-2022	1014	Chroococcus limneticus Lemmermann	57472	5.29	5.60	5.60	92.00
MEL - 0404	MEL - 0404-PC		20-Aug-2022	2112	Sphaerocystis schroeteri Chodat	86208	1.48	3.20	3.20	17.20
MEL - 0404	MEL - 0404-PC		20-Aug-2022	2121	Oocystis lacustris Chodat	7184	0.20	6.00	3.00	28.30
MEL - 0404	MEL - 0404-PC		20-Aug-2022	2167	Elakatothrix gelatinosa Willen	57472	1.08	12.00	2.00	18.80
MEL - 0404	MEL - 0404-PC		20-Aug-2022	2169	Planctonema lauterbornii Schmidle	21552	7.62	18.00	5.00	353.40
MEL - 0404	MEL - 0404-PC		20-Aug-2022	2178	Cosmarium sp.	200	0.28	20.00	20.00	1396.30
MEL - 0404	MEL - 0404-PC		20-Aug-2022	2182	Euastrum spp.	200	0.37	22.00	22.00	1858.40
MEL - 0404	MEL - 0404-PC		20-Aug-2022	2187	Staurodesmus extensus (Andersson) Teiling	600	0.23	13.60	12.00	387.40
MEL - 0404	MEL - 0404-PC		20-Aug-2022	2191	Staurodesmus cuspidatus (Brebisson and Ralfs) Teiling	400	0.70	23.00	19.00	1754.20
MEL - 0404	MEL - 0404-PC		20-Aug-2022	2205	Mougeotia sp.	600	0.72	31.00	7.00	1193.00
MEL - 0404	MEL - 0404-PC		20-Aug-2022	2206	Botryococcus braunii Kutzing	1400	1.27	12.00	12.00	904.80
MEL - 0404	MEL - 0404-PC		20-Aug-2022	2247	Oocystis gigas Archer	200	0.48	18.00	16.00	2412.70
MEL - 0404	MEL - 0404-PC		20-Aug-2022	4351	Small chrysophyceae	416672	2.67	2.30	2.30	6.40
MEL - 0404	MEL - 0404-PC		20-Aug-2022	4352	Large chrysophyceae	35920	6.45	7.00	7.00	179.60
MEL - 0404	MEL - 0404-PC		20-Aug-2022	4355	Chrysochromulina parva Lackey	35920	2.35	5.00	5.00	65.40
MEL - 0404	MEL - 0404-PC		20-Aug-2022	4357	Chrysococcus sp.	316096	20.67	5.00	5.00	65.40
MEL - 0404	MEL - 0404-PC		20-Aug-2022	4362	Kephyrion sp.	86208	1.22	3.00	3.00	14.10
MEL - 0404	MEL - 0404-PC		20-Aug-2022	4363	Spiniferomonas serrata	7184	0.63	5.50	5.50	87.10
MEL - 0404	MEL - 0404-PC		20-Aug-2022	4388	Dinobryon sertularia Ehrenberg	2000	10.17	0.00	0.00	5085.00
MEL - 0404	MEL - 0404-PC		20-Aug-2022	4390	Dinobryon sociale Ehrenberg	79024	17.88	12.00	6.00	226.20
MEL - 0404	MEL - 0404-PC		20-Aug-2022	4390	Dinobryon sociale Ehrenberg	600	0.75	0.00	0.00	1250.00
MEL - 0404	MEL - 0404-PC		20-Aug-2022	4413	Chrysochromulina laurentiana Kling	50288	19.84	9.10	9.10	394.60
MEL - 0404	MEL - 0404-PC		20-Aug-2022	4418	Salpingoeca frequentissima (Zach.) Lemmermann	7184	0.23	6.00	3.20	32.20
MEL - 0404	MEL - 0404-PC		20-Aug-2022	5507	Cyclotella stelligera Cleve and Grunow	1600	3.35	11.00	22.00	2090.70
MEL - 0404	MEL - 0404-PC		20-Aug-2022	5508	Cyclotella pseudostelligera	7184	3.24	6.60	13.20	451.60
MEL - 0404	MEL - 0404-PC		20-Aug-2022	5518	Synedra acus Kutzing	200	0.02	88.00	2.00	92.20
MEL - 0404	MEL - 0404-PC		20-Aug-2022	5524	Asterionella formosa Hassall	2400	0.26	103.00	2.00	107.90
MEL - 0404	MEL - 0404-PC		20-Aug-2022	5551	Cyclotella michiganiana Skvortzow	114944	2.49	2.40	4.80	21.70
MEL - 0404	MEL - 0404-PC		20-Aug-2022	6554	Rhodomonas minuta Skuja	86208	7.07	9.40	5.00	82.00
MEL - 0404	MEL - 0404-PC		20-Aug-2022	6558	Cryptomonas erosa Ehrenberg	1800	3.20	26.00	14.00	1778.80
MEL - 0404	MEL - 0404-PC		20-Aug-2022	7632	Gymnodinium sp.	1000	7.24	24.00	24.00	7238.20
MEL - 0404	MEL - 0404-PC		20-Aug-2022	7639	Peridinium pusillum (Penard) Lemmermann	1400	5.78	19.90	19.90	4126.30
MEL - 0404	MEL - 0404-PC		20-Aug-2022	7641	Peridinium aciculiferum Lemmermann	400	3.62	30.00	24.00	9047.80
MEL - 0405	MEL - 0405-PC		20-Aug-2022	1073	Snowella sp	200	0.10	0.00	0.00	500.00
MEL - 0405	MEL - 0405-PC		20-Aug-2022	2112	Sphaerocystis schroeteri Chodat	100576	1.73	3.20	3.20	17.20
MEL - 0405	MEL - 0405-PC		20-Aug-2022	2121	Oocystis lacustris Chodat	21552	0.61	6.00	3.00	28.30
MEL - 0405	MEL - 0405-PC		20-Aug-2022	2143	Monoraphidium minutum (Nag.) Komarkova-Legnerova	7184	0.41	9.00	4.00	56.50
MEL - 0405	MEL - 0405-PC		20-Aug-2022	2182	Euastrum spp.	200	0.37	22.00	22.00	1858.40
MEL - 0405	MEL - 0405-PC		20-Aug-2022	2187	Staurodesmus extensus (Andersson) Teiling	200	0.08	13.60	12.00	387.40
MEL - 0405	MEL - 0405-PC		20-Aug-2022	2193	Staurodesmus paradoxum Meyen	200	0.57	26.00	24.00	2831.60
MEL - 0405	MEL - 0405-PC		20-Aug-2022	2206	Botryococcus braunii Kutzing	800	0.72	12.00	12.00	904.80
MEL - 0405	MEL - 0405-PC		20-Aug-2022	3301	Euglena acus Ehrenberg	200	1.51	100.00	12.00	7539.80
MEL - 0405	MEL - 0405-PC		20-Aug-2022	4351	Small chrysophyceae	229888	1.47	2.30	2.30	6.40
MEL - 0405	MEL - 0405-PC		20-Aug-2022	4357	Chrysococcus sp.	158048	10.34	5.00	5.00	65.40
MEL - 0405	MEL - 0405-PC		20-Aug-2022	4362	Kephyrion sp.	86208	1.22	3.00	3.00	14.10
MEL - 0405	MEL - 0405-PC		20-Aug-2022	4368	Mallomonas crassisquama (Asmund) Fott	200	0.21	20.00	10.00	1047.20
MEL - 0405	MEL - 0405-PC		20-Aug-2022	4388	Dinobryon sertularia Ehrenberg	1000	5.09	0.00	0.00	5085.00
MEL - 0405	MEL - 0405-PC		20-Aug-2022	4390	Dinobryon sociale Ehrenberg	28736	6.50	12.00	6.00	226.20
MEL - 0405	MEL - 0405-PC		20-Aug-2022	4413	Chrysochromulina laurentiana Kling	7184	2.83	9.10	9.10	394.60
MEL - 0405	MEL - 0405-PC		20-Aug-2022	5507	Cyclotella stelligera Cleve and Grunow	1000	2.09	11.00	22.00	2090.70
MEL - 0405	MEL - 0405-PC		20-Aug-2022	5518	Synedra acus Kutzing	1000	0.09	88.00	2.00	92.20
MEL - 0405	MEL - 0405-PC		20-Aug-2022	5523	Synedra ulna (Nitzsch) Ehrenberg	200	0.45	240.00	6.00	2261.90

Station	Sample	QA Sample ID	Date	Species Code	Species Name	Density cells/L	Biomass mg/m^3	Length µm	Width µm	Cell Volume $µm^3$
MEL - 0405	MEL - 0405-PC		20-Aug-2022	5524	Asterionella formosa Hassall	1600	0.17	103.00	2.00	107.90
MEL - 0405	MEL - 0405-PC		20-Aug-2022	5551	Cyclotella michiganiana Skvortzow	35920	0.78	2.40	4.80	21.70
MEL - 0405	MEL - 0405-PC		20-Aug-2022	6558	Cryptomonas erosa Ehrenberg	800	1.42	26.00	14.00	1778.80
MEL - 0405	MEL - 0405-PC		20-Aug-2022	7632	Gymnodinium sp.	1600	11.58	24.00	24.00	7238.20
MEL - 0405	MEL - 0405-PC		20-Aug-2022	7639	Peridinium pusillum (Penard) Lemmermann	1000	4.13	19.90	19.90	4126.30
MEL - 0501	MEL - 0501-PC		14-Aug-2022	2112	Sphaerocystis schroeteri Chodat	21552	0.41	3.30	3.30	18.80
MEL - 0501	MEL - 0501-PC		14-Aug-2022	2121	Oocystis lacustris Chodat	57472	1.63	6.00	3.00	28.30
MEL - 0501	MEL - 0501-PC		14-Aug-2022	2167	Elakatothrix gelatinosa Willen	64656	1.02	10.00	2.00	15.70
MEL - 0501	MEL - 0501-PC		14-Aug-2022	2178	Cosmarium sp.	200	0.28	20.00	20.00	1396.30
MEL - 0501	MEL - 0501-PC		14-Aug-2022	2187	Staurodesmus extensus (Andersson) Teiling	600	0.23	13.60	12.00	387.40
MEL - 0501	MEL - 0501-PC		14-Aug-2022	2191	Staurodesmus cuspidatus (Brebisson and Ralfs) Teiling	200	0.29	21.00	19.00	1462.40
MEL - 0501	MEL - 0501-PC		14-Aug-2022	2247	Oocystis gigas Archer	400	0.97	18.00	16.00	2412.70
MEL - 0501	MEL - 0501-PC		14-Aug-2022	4351	Small chrysophyceae	143680	1.03	2.40	2.40	7.20
MEL - 0501	MEL - 0501-PC		14-Aug-2022	4352	Large chrysophyceae	57472	10.32	7.00	7.00	179.60
MEL - 0501	MEL - 0501-PC		14-Aug-2022	4357	Chrysococcus sp.	165232	10.81	5.00	5.00	65.40
MEL - 0501	MEL - 0501-PC		14-Aug-2022	4358	Chrysostephanosphaera globulifera Scherffel	7184	2.65	8.90	8.90	369.10
MEL - 0501	MEL - 0501-PC		14-Aug-2022	4361	Kephyrion boreale Skuja	7184	0.85	6.10	6.10	118.80
MEL - 0501	MEL - 0501-PC		14-Aug-2022	4362	Kephyrion sp.	57472	0.81	3.00	3.00	14.10
MEL - 0501	MEL - 0501-PC		14-Aug-2022	4381	Dinobryon mucronatom Nygaard	7184	0.94	10.00	5.00	130.90
MEL - 0501	MEL - 0501-PC		14-Aug-2022	4388	Dinobryon sertularia Ehrenberg	7184	1.63	12.00	6.00	226.20
MEL - 0501	MEL - 0501-PC		14-Aug-2022	4388	Dinobryon sertularia Ehrenberg	400	1.36	0.00	0.00	3390.00
MEL - 0501	MEL - 0501-PC		14-Aug-2022	4390	Dinobryon sociale Ehrenberg	201152	45.50	12.00	6.00	226.20
MEL - 0501	MEL - 0501-PC		14-Aug-2022	4390	Dinobryon sociale Ehrenberg	1200	1.50	0.00	0.00	1250.00
MEL - 0501	MEL - 0501-PC		14-Aug-2022	4396	Chrysolykos skuja (Nauwerck) Willen	7184	0.20	5.90	3.00	27.80
MEL - 0501	MEL - 0501-PC		14-Aug-2022	4414	Stichogloea spp.	43104	2.17	6.00	4.00	50.30
MEL - 0501	MEL - 0501-PC		14-Aug-2022	4418	Salpingoeca frequentissima (Zach.) Lemmermann	21552	0.60	5.90	3.00	27.80
MEL - 0501	MEL - 0501-PC		14-Aug-2022	5507	Cyclotella stelligera Cleve and Grunow	1200	2.87	11.50	23.00	2389.00
MEL - 0501	MEL - 0501-PC		14-Aug-2022	5509	Cyclotella ocellata Pant.	57472	5.78	4.00	8.00	100.50
MEL - 0501	MEL - 0501-PC		14-Aug-2022	5515	Fragilaria crotonensis Kitton	5000	1.45	69.00	4.00	289.00
MEL - 0501	MEL - 0501-PC		14-Aug-2022	5518	Synedra acus Kutzing	600	0.06	90.00	2.00	94.20
MEL - 0501	MEL - 0501-PC		14-Aug-2022	5524	Asterionella formosa Hassall	1600	0.17	100.00	2.00	104.70
MEL - 0501	MEL - 0501-PC		14-Aug-2022	5551	Cyclotella michiganiana Skvortzow	21552	0.41	2.30	4.60	19.10
MEL - 0501	MEL - 0501-PC		14-Aug-2022	6554	Rhodomonas minuta Skuja	86208	7.00	9.30	5.00	81.20
MEL - 0501	MEL - 0501-PC		14-Aug-2022	6558	Cryptomonas erosa Ehrenberg	800	1.42	26.00	14.00	1778.80
MEL - 0501	MEL - 0501-PC		14-Aug-2022	7632	Gymnodinium sp.	800	5.79	24.00	24.00	7238.20
MEL - 0501	MEL - 0501-PC		14-Aug-2022	7639	Peridinium pusillum (Penard) Lemmermann	2400	9.90	19.90	19.90	4126.30
MEL - 0501	MEL - 0501-PC		14-Aug-2022	7641	Peridinium aciculiferum Lemmermann	200	1.81	30.00	24.00	9047.80
MEL - 0502	MEL - 0502-PC		14-Aug-2022	2121	Oocystis lacustris Chodat	7184	0.20	6.00	3.00	28.30
MEL - 0502	MEL - 0502-PC		14-Aug-2022	2167	Elakatothrix gelatinosa Willen	14368	0.23	10.00	2.00	15.70
MEL - 0502	MEL - 0502-PC		14-Aug-2022	2187	Staurodesmus extensus (Andersson) Teiling	800	0.31	13.60	12.00	387.40
MEL - 0502	MEL - 0502-PC		14-Aug-2022	2206	Botryococcus braunii Kutzing	400	0.36	12.00	12.00	904.80
MEL - 0502	MEL - 0502-PC		14-Aug-2022	2247	Oocystis gigas Archer	400	0.97	18.00	16.00	2412.70
MEL - 0502	MEL - 0502-PC		14-Aug-2022	4351	Small chrysophyceae	143680	1.03	2.40	2.40	7.20
MEL - 0502	MEL - 0502-PC		14-Aug-2022	4352	Large chrysophyceae	21552	3.87	7.00	7.00	179.60
MEL - 0502	MEL - 0502-PC		14-Aug-2022	4357	Chrysococcus sp.	129312	8.46	5.00	5.00	65.40
MEL - 0502	MEL - 0502-PC		14-Aug-2022	4375	Synura sphagnicola Korschikow	7184	3.76	10.00	10.00	523.60
MEL - 0502	MEL - 0502-PC		14-Aug-2022	4381	Dinobryon mucronatom Nygaard	7184	0.94	10.00	5.00	130.90
MEL - 0502	MEL - 0502-PC		14-Aug-2022	4388	Dinobryon sertularia Ehrenberg	21552	4.88	12.00	6.00	226.20
MEL - 0502	MEL - 0502-PC		14-Aug-2022	4388	Dinobryon sertularia Ehrenberg	1200	4.07	0.00	0.00	3390.00
MEL - 0502	MEL - 0502-PC		14-Aug-2022	4390	Dinobryon sociale Ehrenberg	294544	66.63	12.00	6.00	226.20
MEL - 0502	MEL - 0502-PC		14-Aug-2022	4390	Dinobryon sociale Ehrenberg	1600	2.00	0.00	0.00	1250.00
MEL - 0502	MEL - 0502-PC		14-Aug-2022	4413	Chrysochromulina laurentiana Kling	7184	2.83	9.10	9.10	394.60
MEL - 0502	MEL - 0502-PC		14-Aug-2022	5507	Cyclotella stelligera Cleve and Grunow	600	1.43	11.50	23.00	2389.00
MEL - 0502	MEL - 0502-PC		14-Aug-2022	5509	Cyclotella ocellata Pant.	7184	0.72	4.00	8.00	100.50
MEL - 0502	MEL - 0502-PC		14-Aug-2022	5518	Synedra acus Kutzing	400	0.04	90.00	2.00	94.20
MEL - 0502	MEL - 0502-PC		14-Aug-2022	5524	Asterionella formosa Hassall	1400	0.15	100.00	2.00	104.70
MEL - 0502	MEL - 0502-PC		14-Aug-2022	5551	Cyclotella michiganiana Skvortzow	43104	0.82	2.30	4.60	19.10
MEL - 0502	MEL - 0502-PC		14-Aug-2022	6554	Rhodomonas minuta Skuja	7184	0.58	9.30	5.00	81.20
MEL - 0502	MEL - 0502-PC		14-Aug-2022	6558	Cryptomonas erosa Ehrenberg	2200	3.91	26.00	14.00	1778.80
MEL - 0502	MEL - 0502-PC		14-Aug-2022	7631	Gymnodinium helveticum Penard	200	4.71	50.00	30.00	23561.90
MEL - 0502	MEL - 0502-PC		14-Aug-2022	7632	Gymnodinium sp.	800	5.79	24.00	24.00	7238.20
MEL - 0502	MEL - 0502-PC		14-Aug-2022	7639	Peridinium pusillum (Penard) Lemmermann	3000	12.38	19.90	19.90	4126.30
MEL - 0502	MEL - 0502-PC		14-Aug-2022	7641	Peridinium aciculiferum Lemmermann	200	1.81	30.00	24.00	9047.80
MEL - 0503	MEL - 0503-PC		14-Aug-2022	2121	Oocystis lacustris Chodat	7184	0.20	6.00	3.00	28.30
MEL - 0503	MEL - 0503-PC		14-Aug-2022	2137	Dictyosphaerium simplex Sukja	57472	0.24	2.00	2.00	4.20
MEL - 0503	MEL - 0503-PC		14-Aug-2022	2145	Crucigenia quadrata Morr.	28736	0.04	2.00	2.00	1.40
MEL - 0503	MEL - 0503-PC		14-Aug-2022	2187	Staurodesmus extensus (Andersson) Teiling	400	0.15	13.60	12.00	387.40
MEL - 0503	MEL - 0503-PC		14-Aug-2022	2247	Oocystis gigas Archer	400	0.97	18.00	16.00	2412.70
MEL - 0503	MEL - 0503-PC		14-Aug-2022	4351	Small chrysophyceae	43104	0.31	2.40	2.40	7.20
MEL - 0503	MEL - 0503-PC		14-Aug-2022	4352	Large chrysophyceae	7184	1.29	7.00	7.00	179.60
MEL - 0503	MEL - 0503-PC		14-Aug-2022	4357	Chrysococcus sp.	100576	6.58	5.00	5.00	65.40
MEL - 0503	MEL - 0503-PC		14-Aug-2022	4362	Kephyrion sp.	7184	0.10	3.00	3.00	14.10
MEL - 0503	MEL - 0503-PC		14-Aug-2022	4378	Dinobryon borgei Lemmermann	7184	0.30	9.00	3.00	42.40
MEL - 0503	MEL - 0503-PC		14-Aug-2022	4383	Dinobryon bavaricum Imhof	7184	1.63	12.00	6.00	226.20
MEL - 0503	MEL - 0503-PC		14-Aug-2022	4388	Dinobryon sertularia Ehrenberg	1200	4.07	0.00	0.00	3390.00
MEL - 0503	MEL - 0503-PC		14-Aug-2022	4390	Dinobryon sociale Ehrenberg	100576	22.75	12.00	6.00	226.20
MEL - 0503	MEL - 0503-PC		14-Aug-2022	4390	Dinobryon sociale Ehrenberg	2600	3.25	0.00	0.00	1250.00
MEL - 0503	MEL - 0503-PC		14-Aug-2022	4414	Stichogloea spp.	43104	2.17	6.00	4.00	50.30
MEL - 0503	MEL - 0503-PC		14-Aug-2022	5507	Cyclotella stelligera Cleve and Grunow	600	1.43	11.50	23.00	2389.00
MEL - 0503	MEL - 0503-PC		14-Aug-2022	5518	Synedra acus Kutzing	800	0.08	90.00	2.00	94.20
MEL - 0503	MEL - 0503-PC		14-Aug-2022	5524	Asterionella formosa Hassall	800	0.08	100.00	2.00	104.70
MEL - 0503	MEL - 0503-PC		14-Aug-2022	5551	Cyclotella michiganiana Skvortzow	64656	1.23	2.30	4.60	19.10
MEL - 0503	MEL - 0503-PC		14-Aug-2022	6554	Rhodomonas minuta Skuja	21552	1.81	9.60	5.00	83.80
MEL - 0503	MEL - 0503-PC		14-Aug-2022	6558	Cryptomonas erosa Ehrenberg	1400	2.49	26.00	14.00	1778.80
MEL - 0503	MEL - 0503-PC		14-Aug-2022	7632	Gymnodinium sp.	400	2.90	24.00	24.00	7238.20
MEL - 0503	MEL - 0503-PC		14-Aug-2022	7639	Peridinium pusillum (Penard) Lemmermann	2800	11.55	19.90	19.90	4126.30
MEL - 0503	MEL - 0503-PC		14-Aug-2022	7641	Peridinium aciculiferum Lemmermann	200	1.81	30.00	24.00	9047.80
MEL - 0504	MEL - 0504-PC		14-Aug-2022	2121	Oocystis lacustris Chodat	7184	0.20	6.00	3.00	28.30
MEL - 0504	MEL - 0504-PC		14-Aug-2022	2187	Staurodesmus extensus (Andersson) Teiling	400	0.15	13.60	12.00	387.40
MEL - 0504	MEL - 0504-PC		14-Aug-2022	2206	Botryococcus braunii Kutzing	200	0.18	12.00	12.00	904.80
MEL - 0504	MEL - 0504-PC		14-Aug-2022	2247	Oocystis gigas Archer	200	0.48	18.00	16.00	2412.70
MEL - 0504	MEL - 0504-PC		14-Aug-2022	4351	Small chrysophyceae	201152	1.45	2.40	2.40	7.20
MEL - 0504	MEL - 0504-PC		14-Aug-2022	4352	Large chrysophyceae	35920	6.45	7.00	7.00	179.60
MEL - 0504	MEL - 0504-PC		14-Aug-2022	4357	Chrysococcus sp.	100576	6.58	5.00	5.00	65.40
MEL - 0504	MEL - 0504-PC		14-Aug-2022	4378	Dinobryon borgei Lemmermann	7184	0.31	9.10	3.00	42.90

Station	Sample	QA Sample ID	Date	Species Code	Species Name	Density cells/L	Biomass mg/m^3	Length µm	Width µm	Cell Volume $µm^3$
MEL - 0504	MEL - 0504-PC		14-Aug-2022	4381	Dinobryon mucronatom Nygaard	7184	0.94	10.00	5.00	130.90
MEL - 0504	MEL - 0504-PC		14-Aug-2022	4388	Dinobryon sertularia Ehrenberg	7184	1.63	12.00	6.00	226.20
MEL - 0504	MEL - 0504-PC		14-Aug-2022	4388	Dinobryon sertularia Ehrenberg	2400	8.14	0.00	0.00	3390.00
MEL - 0504	MEL - 0504-PC		14-Aug-2022	4390	Dinobryon sociale Ehrenberg	179600	40.63	12.00	6.00	226.20
MEL - 0504	MEL - 0504-PC		14-Aug-2022	4390	Dinobryon sociale Ehrenberg	1400	1.75	0.00	0.00	1250.00
MEL - 0504	MEL - 0504-PC		14-Aug-2022	4413	Chrysochromulina laurentiana Kling	43104	17.01	9.10	9.10	394.60
MEL - 0504	MEL - 0504-PC		14-Aug-2022	5507	Cyclotella stelligera Cleve and Grunow	1000	2.39	11.50	23.00	2389.00
MEL - 0504	MEL - 0504-PC		14-Aug-2022	5515	Fragilaria crotonensis Kitton	3400	0.98	69.00	4.00	289.00
MEL - 0504	MEL - 0504-PC		14-Aug-2022	5518	Synedra acus Kutzing	800	0.08	90.00	2.00	94.20
MEL - 0504	MEL - 0504-PC		14-Aug-2022	5524	Asterionella formosa Hassall	2800	0.29	100.00	2.00	104.70
MEL - 0504	MEL - 0504-PC		14-Aug-2022	5551	Cyclotella michiganiana Skvortzow	28736	0.55	2.30	4.60	19.10
MEL - 0504	MEL - 0504-PC		14-Aug-2022	5720	Cyclotella bodanica Eulenst.	400	2.57	16.00	32.00	6434.00
MEL - 0504	MEL - 0504-PC		14-Aug-2022	6554	Rhodomonas minuta Skuja	21552	1.75	9.30	5.00	81.20
MEL - 0504	MEL - 0504-PC		14-Aug-2022	6558	Cryptomonas erosa Ehrenberg	1200	2.13	26.00	14.00	1778.80
MEL - 0504	MEL - 0504-PC		14-Aug-2022	7632	Gymnodinium sp.	800	5.79	24.00	24.00	7238.20
MEL - 0504	MEL - 0504-PC		14-Aug-2022	7635	Peridinium willei Huitfeldt-Kaas	200	4.49	35.00	35.00	22449.30
MEL - 0504	MEL - 0504-PC		14-Aug-2022	7639	Peridinium pusillum (Penard) Lemmermann	3200	13.20	19.90	19.90	4126.30
MEL - 0504	MEL - 0504-PC		14-Aug-2022	7641	Peridinium aciculiferum Lemmermann	800	7.24	30.00	24.00	9047.80
MEL - 0505	MEL - 0505-PC		14-Aug-2022	2121	Oocystis lacustris Chodat	71840	2.03	6.00	3.00	28.30
MEL - 0505	MEL - 0505-PC		14-Aug-2022	2167	Elakatothrix gelatinosa Willen	21552	0.34	10.00	2.00	15.70
MEL - 0505	MEL - 0505-PC		14-Aug-2022	2178	Cosmarium sp.	200	0.28	20.00	20.00	1396.30
MEL - 0505	MEL - 0505-PC		14-Aug-2022	2215	Tetraedron caudatum (Corda) Hansgrig	7184	0.03	3.00	3.00	4.70
MEL - 0505	MEL - 0505-PC		14-Aug-2022	2247	Oocystis gigas Archer	200	0.48	18.00	16.00	2412.70
MEL - 0505	MEL - 0505-PC		14-Aug-2022	4351	Small chrysophyceae	100576	0.72	2.40	2.40	7.20
MEL - 0505	MEL - 0505-PC		14-Aug-2022	4352	Large chrysophyceae	7184	1.29	7.00	7.00	179.60
MEL - 0505	MEL - 0505-PC		14-Aug-2022	4357	Chrysococcus sp.	143680	9.40	5.00	5.00	65.40
MEL - 0505	MEL - 0505-PC		14-Aug-2022	4378	Dinobryon borgei Lemmermann	7184	0.30	9.00	3.00	42.40
MEL - 0505	MEL - 0505-PC		14-Aug-2022	4388	Dinobryon sertularia Ehrenberg	2200	7.46	0.00	0.00	3390.00
MEL - 0505	MEL - 0505-PC		14-Aug-2022	4390	Dinobryon sociale Ehrenberg	143680	32.50	12.00	6.00	226.20
MEL - 0505	MEL - 0505-PC		14-Aug-2022	4390	Dinobryon sociale Ehrenberg	2600	3.25	3.00	0.00	1250.00
MEL - 0505	MEL - 0505-PC		14-Aug-2022	4413	Chrysochromulina laurentiana Kling	21552	8.50	9.10	9.10	394.60
MEL - 0505	MEL - 0505-PC		14-Aug-2022	5507	Cyclotella stelligera Cleve and Grunow	1600	3.82	11.50	23.00	2389.00
MEL - 0505	MEL - 0505-PC		14-Aug-2022	5509	Cyclotella ocellata Pant.	7184	0.78	4.10	8.20	108.30
MEL - 0505	MEL - 0505-PC		14-Aug-2022	5518	Synedra acus Kutzing	800	0.08	90.00	2.00	94.20
MEL - 0505	MEL - 0505-PC		14-Aug-2022	5551	Cyclotella michiganiana Skvortzow	43104	0.82	2.30	4.60	19.10
MEL - 0505	MEL - 0505-PC		14-Aug-2022	6554	Rhodomonas minuta Skuja	7184	0.58	9.30	5.00	81.20
MEL - 0505	MEL - 0505-PC		14-Aug-2022	6558	Cryptomonas erosa Ehrenberg	1000	1.78	26.00	14.00	1778.80
MEL - 0505	MEL - 0505-PC		14-Aug-2022	7632	Gymnodinium sp.	400	2.90	24.00	24.00	7238.20
MEL - 0505	MEL - 0505-PC		14-Aug-2022	7639	Peridinium pusillum (Penard) Lemmermann	2400	9.90	19.90	19.90	4126.30
MEL - 0505	MEL - 0505R-PC	Lab Duplicate	14-Aug-2022	2112	Sphaerocystis schroeteri Chodat	28736	0.49	3.20	3.20	17.20
MEL - 0505	MEL - 0505R-PC	Lab Duplicate	14-Aug-2022	2121	Oocystis lacustris Chodat	28736	0.81	6.00	3.00	28.30
MEL - 0505	MEL - 0505R-PC	Lab Duplicate	14-Aug-2022	2167	Elakatothrix gelatinosa Willen	28736	0.45	10.00	2.00	15.70
MEL - 0505	MEL - 0505R-PC	Lab Duplicate	14-Aug-2022	2191	Staurodesmus cuspidatus (Brebisson and Ralfs) Teiling	200	0.29	21.00	19.00	1462.40
MEL - 0505	MEL - 0505R-PC	Lab Duplicate	14-Aug-2022	4351	Small chrysophyceae	114944	0.83	2.40	2.40	7.20
MEL - 0505	MEL - 0505R-PC	Lab Duplicate	14-Aug-2022	4352	Large chrysophyceae	7184	1.29	7.00	7.00	179.60
MEL - 0505	MEL - 0505R-PC	Lab Duplicate	14-Aug-2022	4357	Chrysococcus sp.	129312	8.46	5.00	5.00	65.40
MEL - 0505	MEL - 0505R-PC	Lab Duplicate	14-Aug-2022	4388	Dinobryon sertularia Ehrenberg	28736	6.50	12.00	6.00	226.20
MEL - 0505	MEL - 0505R-PC	Lab Duplicate	14-Aug-2022	4388	Dinobryon sertularia Ehrenberg	1600	5.42	0.00	0.00	3390.00
MEL - 0505	MEL - 0505R-PC	Lab Duplicate	14-Aug-2022	4390	Dinobryon sociale Ehrenberg	114944	26.00	12.00	6.00	226.20
MEL - 0505	MEL - 0505R-PC	Lab Duplicate	14-Aug-2022	4390	Dinobryon sociale Ehrenberg	3200	4.00	0.00	0.00	1250.00
MEL - 0505	MEL - 0505R-PC	Lab Duplicate	14-Aug-2022	4396	Chrysolykos skuja (Nauwerck) Willen	7184	0.19	5.70	3.00	26.90
MEL - 0505	MEL - 0505R-PC	Lab Duplicate	14-Aug-2022	4411	Bitrichia chodatii (Reverdin) Chodat	7184	0.36	6.00	4.00	50.30
MEL - 0505	MEL - 0505R-PC	Lab Duplicate	14-Aug-2022	4413	Chrysochromulina laurentiana Kling	14368	5.67	9.10	9.10	394.60
MEL - 0505	MEL - 0505R-PC	Lab Duplicate	14-Aug-2022	5507	Cyclotella stelligera Cleve and Grunow	1600	3.82	11.50	23.00	2389.00
MEL - 0505	MEL - 0505R-PC	Lab Duplicate	14-Aug-2022	5509	Cyclotella ocellata Pant.	21552	2.33	4.10	8.20	108.30
MEL - 0505	MEL - 0505R-PC	Lab Duplicate	14-Aug-2022	5518	Synedra acus Kutzing	1800	0.17	90.00	2.00	94.20
MEL - 0505	MEL - 0505R-PC	Lab Duplicate	14-Aug-2022	5551	Cyclotella michiganiana Skvortzow	21552	0.41	2.30	4.60	19.10
MEL - 0505	MEL - 0505R-PC	Lab Duplicate	14-Aug-2022	6554	Rhodomonas minuta Skuja	21552	1.75	9.30	5.00	81.20
MEL - 0505	MEL - 0505R-PC	Lab Duplicate	14-Aug-2022	6558	Cryptomonas erosa Ehrenberg	600	1.07	26.00	14.00	1778.80
MEL - 0505	MEL - 0505R-PC	Lab Duplicate	14-Aug-2022	7632	Gymnodinium sp.	800	5.79	24.00	24.00	7238.20
MEL - 0505	MEL - 0505R-PC	Lab Duplicate	14-Aug-2022	7639	Peridinium pusillum (Penard) Lemmermann	1800	7.43	19.90	19.90	4126.30
MEL - 0505	MEL - 0505R-PC	Lab Duplicate	14-Aug-2022	7641	Peridinium aciculiferum Lemmermann	200	1.81	30.00	24.00	9047.80
MEL - 0301	MEL - DUP1-PC	Field Duplicate	20-Aug-2022	2105	Chlamydomonas spp.	21552	1.08	6.00	4.00	50.30
MEL - 0301	MEL - DUP1-PC	Field Duplicate	20-Aug-2022	2112	Sphaerocystis schroeteri Chodat	7184	0.14	3.30	3.30	18.80
MEL - 0301	MEL - DUP1-PC	Field Duplicate	20-Aug-2022	2121	Oocystis lacustris Chodat	258624	7.32	6.00	3.00	28.30
MEL - 0301	MEL - DUP1-PC	Field Duplicate	20-Aug-2022	2167	Elakatothrix gelatinosa Willen	21552	0.41	12.00	2.00	18.80
MEL - 0301	MEL - DUP1-PC	Field Duplicate	20-Aug-2022	2169	Planctonema lauterbornii Schmidle	7184	2.54	18.00	5.00	353.40
MEL - 0301	MEL - DUP1-PC	Field Duplicate	20-Aug-2022	2178	Cosmarium sp.	200	0.28	20.00	20.00	1396.30
MEL - 0301	MEL - DUP1-PC	Field Duplicate	20-Aug-2022	2187	Staurodesmus extensus (Andersson) Teiling	200	0.08	13.60	12.00	387.40
MEL - 0301	MEL - DUP1-PC	Field Duplicate	20-Aug-2022	2193	Staurodesmus paradoxum Meyen	200	0.44	24.00	22.00	2211.70
MEL - 0301	MEL - DUP1-PC	Field Duplicate	20-Aug-2022	2235	Ankistrodesmus spiralis Lemmermann	7184	0.37	33.00	2.00	51.80
MEL - 0301	MEL - DUP1-PC	Field Duplicate	20-Aug-2022	2247	Oocystis gigas Archer	200	0.48	18.00	16.00	2412.70
MEL - 0301	MEL - DUP1-PC	Field Duplicate	20-Aug-2022	4351	Small chrysophyceae	416672	2.67	2.30	2.30	6.40
MEL - 0301	MEL - DUP1-PC	Field Duplicate	20-Aug-2022	4352	Large chrysophyceae	35920	6.45	7.00	7.00	179.60
MEL - 0301	MEL - DUP1-PC	Field Duplicate	20-Aug-2022	4357	Chrysococcus sp.	632192	41.35	5.00	5.00	65.40
MEL - 0301	MEL - DUP1-PC	Field Duplicate	20-Aug-2022	4358	Chrysostephanosphaera globulifera Scherffel	14368	5.30	8.90	8.90	369.10
MEL - 0301	MEL - DUP1-PC	Field Duplicate	20-Aug-2022	4362	Kephyrion sp.	215520	3.04	3.00	3.00	14.10
MEL - 0301	MEL - DUP1-PC	Field Duplicate	20-Aug-2022	4363	Spiniferomonas serrata	21552	1.88	5.50	5.50	87.10
MEL - 0301	MEL - DUP1-PC	Field Duplicate	20-Aug-2022	4378	Dinobryon borgei Lemmermann	14368	0.61	9.00	3.00	42.40
MEL - 0301	MEL - DUP1-PC	Field Duplicate	20-Aug-2022	4381	Dinobryon mucronatom Nygaard	21552	2.82	10.00	5.00	130.90
MEL - 0301	MEL - DUP1-PC	Field Duplicate	20-Aug-2022	4388	Dinobryon sertularia Ehrenberg	79024	17.88	12.00	6.00	226.20
MEL - 0301	MEL - DUP1-PC	Field Duplicate	20-Aug-2022	4388	Dinobryon sertularia Ehrenberg	1200	6.10	0.00	0.00	5085.00
MEL - 0301	MEL - DUP1-PC	Field Duplicate	20-Aug-2022	4390	Dinobryon sociale Ehrenberg	215520	48.75	12.00	6.00	226.20
MEL - 0301	MEL - DUP1-PC	Field Duplicate	20-Aug-2022	4390	Dinobryon sociale Ehrenberg	800	1.59	0.00	0.00	1991.00
MEL - 0301	MEL - DUP1-PC	Field Duplicate	20-Aug-2022	4396	Chrysolykos skuja (Nauwerck) Willen	7184	0.19	5.50	3.00	25.90
MEL - 0301	MEL - DUP1-PC	Field Duplicate	20-Aug-2022	4413	Chrysochromulina laurentiana Kling	71840	28.35	9.10	9.10	394.60
MEL - 0301	MEL - DUP1-PC	Field Duplicate	20-Aug-2022	4414	Stichogloea spp.	86208	4.34	6.00	4.00	50.30
MEL - 0301	MEL - DUP1-PC	Field Duplicate	20-Aug-2022	4418	Salpingoeca frequentissima (Zach.) Lemmermann	71840	2.31	6.00	3.20	32.20
MEL - 0301	MEL - DUP1-PC	Field Duplicate	20-Aug-2022	5507	Cyclotella stelligera Cleve and Grunow	1600	3.82	11.50	23.00	2389.00
MEL - 0301	MEL - DUP1-PC	Field Duplicate	20-Aug-2022	5509	Cyclotella ocellata Pant.	21552	2.17	4.00	8.00	100.50
MEL - 0301	MEL - DUP1-PC	Field Duplicate	20-Aug-2022	5511	Rhizosolenia eriense H.L. Smith	7184	0.56	11.00	3.00	77.80
MEL - 0301	MEL - DUP1-PC	Field Duplicate	20-Aug-2022	5514	Tabellaria flocculosa (Roth) Kutzing	1600	2.13	26.00	14.00	1334.10
MEL - 0301	MEL - DUP1-PC	Field Duplicate	20-Aug-2022	5518	Synedra acus Kutzing	1600	0.15	90.00	2.00	94.20
MEL - 0301	MEL - DUP1-PC	Field Duplicate	20-Aug-2022	5524	Asterionella formosa Hassall	4000	0.43	103.00	2.00	107.90
MEL - 0301	MEL - DUP1-PC	Field Duplicate	20-Aug-2022	5551	Cyclotella michiganiana Skvortzow	280176	5.35	2.30	4.60	19.10

Station	Sample	QA Sample ID	Date	Species Code	Species Name	Density cells/L	Biomass mg/m^3	Length µm	Width µm	Cell Volume $µm^3$
MEL - 0301	MEL - DUP1-PC	Field Duplicate	20-Aug-2022	6554	Rhodomonas minuta Skuja	71840	5.96	9.50	5.00	82.90
MEL - 0301	MEL - DUP1-PC	Field Duplicate	20-Aug-2022	6558	Cryptomonas erosa Ehrenberg	2000	3.56	26.00	14.00	1778.80
MEL - 0301	MEL - DUP1-PC	Field Duplicate	20-Aug-2022	7632	Gymnodinium sp.	1600	11.58	24.00	24.00	7238.20
MEL - 0301	MEL - DUP1-PC	Field Duplicate	20-Aug-2022	7639	Peridinium pusillum (Penard) Lemmermann	9000	37.14	19.90	19.90	4126.30
MEL - 0301	MEL - DUP1-PC	Field Duplicate	20-Aug-2022	7641	Peridinium aciculiferum Lemmermann	400	3.62	30.00	24.00	9047.80
MEL - 0101	MEL - DUP2-PC	Field Duplicate	18-Aug-2022	2100	Pyramidomonas tetrarhynchus Schmarda	200	0.11	14.00	12.00	527.80
MEL - 0101	MEL - DUP2-PC	Field Duplicate	18-Aug-2022	2101	Carteria spp.	200	0.25	13.30	13.30	1231.80
MEL - 0101	MEL - DUP2-PC	Field Duplicate	18-Aug-2022	2105	Chlamydomonas spp.	7184	0.19	5.60	3.00	26.40
MEL - 0101	MEL - DUP2-PC	Field Duplicate	18-Aug-2022	2112	Sphaerocystis schroeteri Chodat	35920	0.95	3.70	3.70	26.50
MEL - 0101	MEL - DUP2-PC	Field Duplicate	18-Aug-2022	2121	Oocystis lacustris Chodat	86208	2.44	6.00	3.00	28.30
MEL - 0101	MEL - DUP2-PC	Field Duplicate	18-Aug-2022	2127	Tetraedron minimum (Brunow) Hansgrig	7184	1.25	10.00	10.00	174.50
MEL - 0101	MEL - DUP2-PC	Field Duplicate	18-Aug-2022	2178	Cosmarium sp.	600	0.84	20.00	20.00	1396.30
MEL - 0101	MEL - DUP2-PC	Field Duplicate	18-Aug-2022	2187	Staurodesmus extensus (Andersson) Teiling	200	0.08	13.60	12.00	387.40
MEL - 0101	MEL - DUP2-PC	Field Duplicate	18-Aug-2022	2199	Spondylosium planum (Wolle) W. and G.S. West	43104	1.63	6.00	6.00	37.70
MEL - 0101	MEL - DUP2-PC	Field Duplicate	18-Aug-2022	3301	Euglena acus Ehrenberg	200	0.61	91.00	8.00	3049.40
MEL - 0101	MEL - DUP2-PC	Field Duplicate	18-Aug-2022	4351	Small chrysophyceae	316096	2.02	2.30	2.30	6.40
MEL - 0101	MEL - DUP2-PC	Field Duplicate	18-Aug-2022	4352	Large chrysophyceae	50288	9.03	7.00	7.00	179.60
MEL - 0101	MEL - DUP2-PC	Field Duplicate	18-Aug-2022	4357	Chrysococcus sp.	229888	15.03	5.00	5.00	65.40
MEL - 0101	MEL - DUP2-PC	Field Duplicate	18-Aug-2022	4362	Kephyrion sp.	71840	0.92	2.90	2.90	12.80
MEL - 0101	MEL - DUP2-PC	Field Duplicate	18-Aug-2022	4368	Mallomonas crassisquama (Asmund) Fott	200	0.21	20.00	10.00	1047.20
MEL - 0101	MEL - DUP2-PC	Field Duplicate	18-Aug-2022	4375	Synura sphagnicola Korschikow	200	5.25	0.00	0.00	26250.00
MEL - 0101	MEL - DUP2-PC	Field Duplicate	18-Aug-2022	4378	Dinobryon borgei Lemmermann	7184	0.30	9.00	3.00	42.40
MEL - 0101	MEL - DUP2-PC	Field Duplicate	18-Aug-2022	4383	Dinobryon bavaricum Imhof	600	1.19	0.00	0.00	1991.00
MEL - 0101	MEL - DUP2-PC	Field Duplicate	18-Aug-2022	4388	Dinobryon sertularia Ehrenberg	800	2.71	0.00	0.00	3390.00
MEL - 0101	MEL - DUP2-PC	Field Duplicate	18-Aug-2022	4390	Dinobryon sociale Ehrenberg	35920	8.13	12.00	6.00	226.20
MEL - 0101	MEL - DUP2-PC	Field Duplicate	18-Aug-2022	4390	Dinobryon sociale Ehrenberg	200	0.40	0.00	0.00	1991.00
MEL - 0101	MEL - DUP2-PC	Field Duplicate	18-Aug-2022	4396	Chrysolykos skuja (Nauwerck) Willen	7184	0.20	5.90	3.00	27.80
MEL - 0101	MEL - DUP2-PC	Field Duplicate	18-Aug-2022	4414	Stichogloea spp.	28736	1.45	6.00	4.00	50.30
MEL - 0101	MEL - DUP2-PC	Field Duplicate	18-Aug-2022	4418	Salpingoeca frequentissima (Zach.) Lemmermann	344832	11.10	6.00	3.20	32.20
MEL - 0101	MEL - DUP2-PC	Field Duplicate	18-Aug-2022	4448	Rhizochrysis scherffelii Pascher	400	0.71	15.00	15.00	1767.10
MEL - 0101	MEL - DUP2-PC	Field Duplicate	18-Aug-2022	5507	Cyclotella stelligera Cleve and Grunow	4000	9.56	11.50	23.00	2389.00
MEL - 0101	MEL - DUP2-PC	Field Duplicate	18-Aug-2022	5509	Cyclotella ocellata Pant.	21552	2.17	4.00	8.00	100.50
MEL - 0101	MEL - DUP2-PC	Field Duplicate	18-Aug-2022	5513	Tabellaria fenestrata (Lyngbye) Kutzing	3000	1.98	70.00	6.00	659.70
MEL - 0101	MEL - DUP2-PC	Field Duplicate	18-Aug-2022	5518	Synedra acus Kutzing	4000	0.46	110.00	2.00	115.20
MEL - 0101	MEL - DUP2-PC	Field Duplicate	18-Aug-2022	5523	Synedra ulna (Nitzsch) Ehrenberg	600	1.36	240.00	6.00	2261.90
MEL - 0101	MEL - DUP2-PC	Field Duplicate	18-Aug-2022	5524	Asterionella formosa Hassall	93400	10.27	105.00	2.00	110.00
MEL - 0101	MEL - DUP2-PC	Field Duplicate	18-Aug-2022	5551	Cyclotella michiganiana Skvortzow	43104	0.58	2.05	4.10	13.50
MEL - 0101	MEL - DUP2-PC	Field Duplicate	18-Aug-2022	6554	Rhodomonas minuta Skuja	21552	2.98	11.00	6.00	138.20
MEL - 0101	MEL - DUP2-PC	Field Duplicate	18-Aug-2022	6558	Cryptomonas erosa Ehrenberg	6200	11.41	26.90	14.00	1840.40
MEL - 0101	MEL - DUP2-PC	Field Duplicate	18-Aug-2022	7631	Gymnodinium helveticum Penard	200	4.71	50.00	30.00	23561.90
MEL - 0101	MEL - DUP2-PC	Field Duplicate	18-Aug-2022	7632	Gymnodinium sp.	2200	15.92	24.00	24.00	7238.20
MEL - 0101	MEL - DUP2-PC	Field Duplicate	18-Aug-2022	7639	Peridinium pusillum (Penard) Lemmermann	6800	28.06	19.90	19.90	4126.30
MEL - 0101	MEL - DUP2-PC	Field Duplicate	18-Aug-2022	7641	Peridinium aciculiferum Lemmermann	600	5.43	30.00	24.00	9047.80
MEL - 0503	MEL - DUP3-PC	Field Duplicate	14-Aug-2022	2112	Sphaerocystis schroeteri Chodat	7184	0.12	3.20	3.20	17.20
MEL - 0503	MEL - DUP3-PC	Field Duplicate	14-Aug-2022	2121	Oocystis lacustris Chodat	7184	0.20	6.00	3.00	28.30
MEL - 0503	MEL - DUP3-PC	Field Duplicate	14-Aug-2022	2143	Monoraphidium minutum (Nag.) Komarkova-Legnerova	7184	0.41	9.00	4.00	56.50
MEL - 0503	MEL - DUP3-PC	Field Duplicate	14-Aug-2022	2167	Elakatothrix gelatinosa Willen	7184	0.11	10.00	2.00	15.70
MEL - 0503	MEL - DUP3-PC	Field Duplicate	14-Aug-2022	2187	Staurodesmus extensus (Andersson) Teiling	200	0.08	13.60	12.00	387.40
MEL - 0503	MEL - DUP3-PC	Field Duplicate	14-Aug-2022	2199	Spondylosium planum (Wolle) W. and G.S. West	28736	1.08	6.00	6.00	37.70
MEL - 0503	MEL - DUP3-PC	Field Duplicate	14-Aug-2022	2205	Mougeotia sp.	200	0.24	31.00	7.00	1193.00
MEL - 0503	MEL - DUP3-PC	Field Duplicate	14-Aug-2022	2206	Botryococcus braunii Kutzing	200	0.18	12.00	12.00	904.80
MEL - 0503	MEL - DUP3-PC	Field Duplicate	14-Aug-2022	4351	Small chrysophyceae	114944	0.83	2.40	2.40	7.20
MEL - 0503	MEL - DUP3-PC	Field Duplicate	14-Aug-2022	4352	Large chrysophyceae	7184	1.29	7.00	7.00	179.60
MEL - 0503	MEL - DUP3-PC	Field Duplicate	14-Aug-2022	4357	Chrysococcus sp.	86208	5.64	5.00	5.00	65.40
MEL - 0503	MEL - DUP3-PC	Field Duplicate	14-Aug-2022	4378	Dinobryon borgei Lemmermann	7184	0.30	9.00	3.00	42.40
MEL - 0503	MEL - DUP3-PC	Field Duplicate	14-Aug-2022	4388	Dinobryon sertularia Ehrenberg	1800	6.10	0.00	0.00	3390.00
MEL - 0503	MEL - DUP3-PC	Field Duplicate	14-Aug-2022	4390	Dinobryon sociale Ehrenberg	201152	45.50	12.00	6.00	226.20
MEL - 0503	MEL - DUP3-PC	Field Duplicate	14-Aug-2022	4390	Dinobryon sociale Ehrenberg	1200	1.50	0.00	0.00	1250.00
MEL - 0503	MEL - DUP3-PC	Field Duplicate	14-Aug-2022	4413	Chrysochromulina laurentiana Kling	35920	14.17	9.10	9.10	394.60
MEL - 0503	MEL - DUP3-PC	Field Duplicate	14-Aug-2022	5507	Cyclotella stelligera Cleve and Grunow	1400	3.34	11.50	23.00	2389.00
MEL - 0503	MEL - DUP3-PC	Field Duplicate	14-Aug-2022	5509	Cyclotella ocellata Pant.	28736	3.11	4.10	8.20	108.30
MEL - 0503	MEL - DUP3-PC	Field Duplicate	14-Aug-2022	5518	Synedra acus Kutzing	400	0.04	90.00	2.00	94.20
MEL - 0503	MEL - DUP3-PC	Field Duplicate	14-Aug-2022	5524	Asterionella formosa Hassall	2200	0.23	100.00	2.00	104.70
MEL - 0503	MEL - DUP3-PC	Field Duplicate	14-Aug-2022	5551	Cyclotella michiganiana Skvortzow	7184	0.14	2.30	4.60	19.10
MEL - 0503	MEL - DUP3-PC	Field Duplicate	14-Aug-2022	6554	Rhodomonas minuta Skuja	7184	0.58	9.30	5.00	81.20
MEL - 0503	MEL - DUP3-PC	Field Duplicate	14-Aug-2022	6558	Cryptomonas erosa Ehrenberg	2400	4.27	26.00	14.00	1778.80
MEL - 0503	MEL - DUP3-PC	Field Duplicate	14-Aug-2022	7632	Gymnodinium sp.	1000	7.24	24.00	24.00	7238.20
MEL - 0503	MEL - DUP3-PC	Field Duplicate	14-Aug-2022	7639	Peridinium pusillum (Penard) Lemmermann	2200	9.08	19.90	19.90	4126.30
MEL - 0503	MEL - DUP3-PC	Field Duplicate	14-Aug-2022	7641	Peridinium aciculiferum Lemmermann	200	1.81	30.00	24.00	9047.80